Development and Validation of Group Decision Making Index: A Measure of Collective Decision Making among Self Help Groups

Pragya Goswamy[1*], S. K. Kashyap[1], Neelam Bhardwaj[1], V. L. V. Kameswari[1] and G. S. Kushwaha[2]

[1]*Department of Agricultural Communication, College of Agriculture, GBPUAT Pantnagar, Uttarakhand, 263145, India.*
[2]*Department of Humanities and Social Sciences, College of Basic Sciences and Humanities, GBPUAT Pantnagar, Uttarakhand, 263145, India.*

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

Group decision-making is a participatory process in which multiple individuals collectively perform situation analysis, think of alternative courses of action, and select the best alternative to solve the problem. Similarly, in the context of Self-help groups, group decision-making is a necessary process. However, decisions made collectively tend to be more effective than decisions made by a single individual. Still, group members face various constraints while group decision making like social pressure toward conformity, individual domination, conflicting secondary goals, undesirable compromises, ambiguous responsibility, and time. Most studies suggest that SHG members perceived problems faced during group decision-making as a significant constraint. Considering a shortage of empirical research indicating the exact reason for group failures, what makes a group successful, and the factors that lead to ineffective group decision-making, the study aimed at systematically and scientifically developing a group decision-making index to study the group

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*Corresponding author: E-mail: pragya24goswamy@gmail.com;

decision-making of the Self-help groups, various factors affecting the group decision-making process, and quantitatively measuring how different groups vary in their group decision-making ability, Thus, an instrument was developed using a two-step method, i.e., instrument designing and judgmental evidence. After that, the validity of the instrument was computed through Item-Content Validity Index (I-CVI) method. Finally, it was narrowed down to 48 statements distributed among ten indicators. The reliability coefficient of the tool was found to be 0.80. Thus, it was found that the group decision-making indexes had appropriate content validity and internal consistency to measure and quantify the group decision-making process of selected Self-help Groups. The study recommends the use of the developed index for studying the root cause of ineffectiveness in group decision-making in various Self-help groups, which will help in the formulation of strategy for overcoming the constraints related to group decision-making as reported by various SHGs.

1. INTRODUCTION

The agricultural development of a nation is closely associated with the strengthening of the agricultural extension system. Over the years, looking into the challenges faced by Agricultural Extension in India, a paradigm shift has emerged in the extension approach from the earlier top-down approach towards the participatory extension approach. Among the various Participatory Extension Approaches (PEAs), a group-led extension (GLE) has emerged as one prominent approach. Sharing agricultural technology to farmers in organized groups is the primary emphasis of the group-led extension approach. A group-led extension focuses on the formation of Self Help Groups (SHGs), Farmer Interest Groups (FIGs), Commodity Interest Groups (CIGs), Farmer Producer Organisations (FPOs), etc.

One of the prominent group approaches in agricultural extension is Self Help Groups (SHGs). These are small informal Groups of 10-20 individuals who are homogenous concerning the social and economic background and come together voluntarily for promoting saving habits among members and for a common cause to raise and manage resources for the benefit of group members [1]. SHGs are voluntary association of people who are common in respect to social background, heritage, caste or traditional occupation come together to attain a collective goal [2]. These groups can play a significant role in many core aspects of farming, such as increasing production at a reduced cost; providing expert technical guidance; purchasing inputs; marketing products; training; credit or equipment; representing members' interests; building influence, fundraising, and carrying different projects (Pertev and King, 2000). With time, Self-Help groups have assumed greater importance as the most necessary tool to adopt the participatory approach for social, economic, marketing, and financial improvement at the grassroots level [3]. SHGs make collective decisions in groups which fetch them various advantages like the greater total of knowledge, the more significant number of approaches, multiple alternatives, recognition of a decision, and a better understanding of a problem. Active involvement of members in group decision-making has been indicated as one of the critical factors for farmers' groups' sustainability [4]. Purnima [5] in a study on group dynamics of SHGs in the North Coastal Zone of Andhra Pradesh concluded that group decision making significantly influence group effectiveness.

However, SHGs play an essential role in empowering its members and acting as a support for the entire agricultural extension system of the country but being a group-driven approach besides various advantages, and it also faces few constraints. Among the various problems and constraints, most studies suggest that SHG members perceived problems during group decision-making as a significant constraint. Kalra et al. [6] reported that among the hindering factors of group effectiveness, the emerging conflicts during decision-making were prominent. Studies on social problems faced by members of SHGs revealed that members of SHGs had conflicts among the group members in decision-making [7,8]. Moreover, one common point observed in the groups facing decision-making constraints was the centralized control of the leader on the decisions. In other words, we can say the dependence of the members on the leader for the decisions. Among all these factors, ineffective group decision-making has been identified as one of the main problems. Still, there is a shortage of empirical research indicating the exact reason for group failure, what

makes a group successful, and the factors that lead to ineffective group decision-making and group leadership. Due to the lack of this analysis, upcoming SHGs and FPOs are continuously suffering from group formation followed by group cessation. Therefore, to study the group decision-making of the Self-help groups, various factors affecting the group decision-making process, and quantitatively measuring how different groups vary in their group decision-making ability, present paper elaborates the process of development and validation of an instrument to measure group decision-making among self-help groups in quantitative terms.

Development of a research instrument is a scientific and systematic process, which includes determining a construct which ought to be measured by the instrument, followed by the collection of exhaustive content relating to that construct and then selection of the most relevant content for measuring the construct. However, selection of the most relevant and appropriate content relating to the construct, requires a yet another scientific method, like content validity index. Content validity is vital to ensure the relevance of a measurement tool. Therefore, the paper provides a systematic approach for development and content validation of an instrument with group decision-making as the main construct.

2. METHODOLOGY

For the study, Group decision-making was operationally defined as the total of forces among Group members, based on specific sub-dimensions/ indicators. The indicators of group decision making as identified from an intensive review of literature are; Extent of participation in group decision making, Group communication, Group cohesiveness, Influence of leader, Nature of group decision making, Accuracy of group decision making, Speed of group decision making, Group conflicts in decision making, Extent of satisfaction and Conviction of decision. A group decision-making index was developed and validated to measure the group decision-making of SHGs following a two-step method, i.e., instrument designing and obtaining judgmental evidence.

2.1 Step One: Instrument Designing

Instrument designing involves three sub-steps: determining content domain, item generation, and instrument construction [9]. The first step is determining the content domain of a construct that the instrument ought to measure. The content domain is the content area related to the variables that are being measured. A clear image of its boundaries, dimensions, and components is obtained through a precise definition of the attributes and characteristics of the desired construct. Thus, all the identified indicators of group decision making were operationally defined as follows;

a. **Extent of participation in group decision-making:** It is operationalised as the degree to which group members participate in group decision-making, i.e., either continuously, sometimes, or never.

b. **Group Communication:** It is a measure of the nature and extent of information flow access to all group members

c. **Group Cohesiveness:** It is defined as the unity in the group in terms of acknowledging the opinion of all members, giving priority to decisions that will benefit the group at large, feeling of loyalty, cooperation, and identification with the group.

d. **Influence of leader:** It is operationalized as the degree to which the leader facilitates and influences the direction of the decision-making process.

e. **Nature of group decision making:** It refers to the nature of group decision making in terms of autocratic decisions, majority based decisions or consensus based decisions.

f. **Accuracy of group decision making:** It measures the correctness of group decisions due to the involvement of all members, presence of well-informed members, initial disagreements, availability of complete and accurate information, and examination of facts.

g. **Speed of group decision-making:** It measures the time taken by members in making group decisions.

h. **Group conflicts in decision making:** It measures the degree to which group faces and manages the conflicts during decision making.

i. **The extent of Satisfaction:** It is defined as the degree to which group members relate themselves positively to the decision-making process and outcome.

j. **Conviction of decisions:** It is operationally defined as the degree of confidence of the group members in the group decisions.

The second step is item generation. Items for each indicator were generated through a systematic review of literature from various sources like research articles or journals from a web of science, Scopus, Science Direct, Google Scholar, Research Gate, etc., and thesis repositories like Krishikosh and Shodhganga. Apart from the literature sources, suggestions were taken from subject specialists who have experience working with self-help groups and understanding decision-making as a psychological domain. Item generation is followed by instrument construction. In this step, the items are revised and organized in a suitable format to be comprehensively presented. A total of 60 items distributed under ten indicators were finalized to be sent for content validation by the expert panel.

2.2 Step 2: Judgmental Evidence (Content Validity)

In this step, a panel of experts is selected to evaluate the content validity of the instrument's items and the entire instrument. The selection of the number of experts is often arbitrary. However, it is recommended to keep at least five people to avoid chance agreement. Also, it is indicated that with the increase in the number of experts, the probability of chance agreement decreases [10]. The instrument was sent to 60 domain experts via email for validation in the present study, out of which 33 experts responded positively. The expert panel of 33 experts was then asked to give their quantitative and qualitative response on the relevancy of the items according to the indicators and operationally defined constructs on a relevancy scale of 1 to 4, i.e., not relevant (1), somewhat relevant (2), quite relevant (3) and very relevant (4).

2.3 Quantification of Content Validity

Lindquist [11] defined the validity of an instrument as the accuracy with which it measures what it is intended to. Content validity measures how well items correspond or reflect a specific domain and are measured using quantitative techniques. Various methods can quantify the responses of the expert panel. This study used one method that involved empirical techniques to calculate the index of content validity (CVI). Content Validity Index is the most widely reported approach for content validity in instrument development and can be computed using the Item level-CVI (I-CVI). I-CVI is

computed as the number of experts giving a rating of 3 or 4 for each item divided by the total number of experts. Before calculating CVI, the relevance rating must be recorded as 1 (for relevance scale of 3 and 4) or 0 (for relevance scale of 1 and 2). After that, experts in the agreement are calculated for each item by summing up the relevance rating (Rating of 1) provided by all experts for a particular item.

Thus, I-CVI=Experts in agreement/No. Of experts.

Values of I-CVI can range between 0 to 1 wherein if I-CVI> 0.79, the item is relevant, between 0.70 and 0.79, the item needs revisions, and if the value is below 0.70, the item is eliminated [9, 12].

2.4 Quantification of Reliability

Reliability is the degree to which a measurement tool gives consistent results. Internal consistency reliability was used in this study to evaluate the homogeneity of the test. The split-half method was employed to compute internal consistency reliability. The test was divided into two halves, one half contained the odd number items, and the other half contained the actual number items. A positive or significant correlation between the two sets of scores indicates that the test is reliable [13].

Primarily the score of each respondent for even and odd items was calculated. A list was made with scores for actual items and odd items of each respondent. Then correlation was computed between these two lists of scores. The Spearman-Brown split-half formula was used to estimate the test's reliability from the correlation between its two halves. This formula is given by:

$$\mathbf{R=} \frac{2r}{1+r}$$

where R is the reliability of the test and r is the correlation between the two parts.

3. RESULTS AND DISCUSSION

3.1 Content Validity Results

The preliminary version of the group decision-making index comprised 60 items related to the ten indicators of group decision-making. The group decision-making index was sent to 60 domain experts, including scientists and

researchers who have worked at different levels with self-help groups and possessed a conceptual understanding of group dynamics and decision-making. Also, an expert panel constituted of a few NGO personnel and executive members of some selected SHGs. A letter of request was corresponded to the expert panel through email, which included study objectives and an account of the instrument, scoring method, and required instructions on responding. Theoretical definitions of the underlying construct study, its dimensions, and items of each dimension were also mentioned in that letter. Minimum duration of 15 days and a maximum duration of one month was requested for the experts to share their responses. Two reminder emails were sent, one in the second week and the other in the fourth week.

Positive responses from 33 experts were received, who responded quantitatively in terms of a rating between 1 to 4 for each item and qualitatively by proposing specific suggestions for revisions of certain items. For the calculation of I-CVI, the rating of 3 and 4 were recorded as one, and the ratings of 2 and 1 were recorded as 0. After that, all the scores of 1 for each item were summed up, leading to a summated score of 'Experts in Agreement' for each item. Thus, after dividing the Experts in Agreement score by the total no. of experts, the I-CVI score was computed for each item. The instrument comprised of total 60 items distributed among ten indicators.

Adhering to the set criteria for accepting, revising, and eliminating the items based on the I-CVI score, Table 1 depicts that 44 items were found appropriate for the instrument and were accepted as such. In contrast, 12 statements were found irrelevant and were eliminated. However, four statements showed a need for revision and were further revised as per the expert panel's suggestions. After the incorporation of necessary revisions, the final instrument was circulated to an advisory committee for feedback. It is also depicted in **Table 1** that for all the items with an I-CVI score > 0.79, more than 26 experts out of 33 were in

agreement and gave the score of 1(rating of 3 or 4) to that item.

As validated through the index developed in the study, the indicators and items finalized according to the construct conform to the findings of the prior researches on group-decision making. Quality of group communication has been identified as a differentiating factor between effective decision-making groups and ineffective ones. Therefore, in effective decision-making task requirement of members in the groups are effectively satisfied by interactions, whereas these characteristic interaction are absent in ineffective groups interactions [14, 15]. Group participation in decision-making is another important factor, which tend to enhance the commitment to the decision made [16, 17]. Group conflict has also been identified as a critical factor affecting collective decision-making. It is indicated that as long as conflict remains within the disagreement continuum, quality of decisions will improve with increase in disagreements, as it ought to result in in-depth analysis of problem, increase in the number of solutions proposed by the members of the group. However, as conflict or disagreements consumes more time, therefore overall satisfaction often decreases with increase in the amount of conflict [18, 19]. Researches also indicate five more indicators intrinsic to group decision-making which include; Agreement with the group decision, Conviction to that decision, Satisfaction with the decision, participation in decision making and with the process of group decision making [20]. Krause et al. [21] suggested that decision making almost always involves some form of leadership. In line with the above research findings, thus, in general, from the I-CVI method and positive feedback of both the expert panel and advisory committee, the study revealed that the group decision-making index attained an appropriate level of content validity, wherein 48 relevant and appropriate items were distributed under 10 Indicators were finalized for the group decision-making index. Table 2 depicts the 48 items of the group decision-making index, of which some constitute negative statements while others were positive statements. The items are

Table 1. Distribution of initial 60 items based on I-CVI score

No. of items (Total 60)	Experts in agreement	I-CVI Score	Interpretation
44	>26	>0.79	Appropriate
04	24-26	0.70 – 0.79	Need for Revision
12	<24	< 0.70	Eliminate

Table 2. Indicators and items constituting the group decision-making index with their I-CVI score

S. No.	Indicators/Items	I-CVI
I1	**The extent of participation in group decision making**	
1	All the members participate in all the decisions taken by the group.	0.79
2	The extent of participation in group decisions differs from one issue to another issue. **(-ve)**	1.00
3	The extent of participation in group decisions is significant for group performance.	0.73
4	All members are physically and verbally active during the group decision-making process.	0.94
5	I remain silent and aloof during group decision-making. **(-ve)**	0.82
I2	**Influence of leader in group decision making**	
6	Group decisions taken by the leader alone are more effective. **(-ve)**	0.88
7	The group leader is open to feedback and criticism from others.	0.94
8	Leaders often dominate the group decision-making process. **(-ve)**	1.00
9	The leader encourages the involvement of all members in the decision-making process.	0.94
I3	**Nature of decisions**	
10	A leader takes all the decisions on behalf of the group**. (-ve)**	0.91
11	Decisions on which the majority agrees are considered as group decisions	0.94
12	Group decisions are taken only when the entire group reaches a consensus	0.85
13	Group members analyze various options before making a decision.	0.94
14	My opinions matter while making group decisions	0.82
I4	**Group Communication**	
15	A discussion is organized for all group members before making a decision.	0.91
16	All the members of the group communicate with each other informally.	0.82
17	Group members share all relevant information before making a decision.	0.88
18	Group members freely exchange decision confidence among themselves through both verbal and non-verbal communication.	0.94
I5	**Group Cohesiveness**	
19	The group makes effective decisions because all members seek the more significant benefit of the entire group.	0.82
20	Group decisions are not taken if anyone member disagrees with the decision.	0.91
21	While decision making all members independently keep their opinions on different grounds and the basis of their opinions and suggestions, the group takes decisions.	0.85
22	More people understand a decision when a group takes it.	0.85
23	There is unhealthy criticism and competition among group members. **(-ve)**	0.82
24	While making group decisions, I readily change my choice and support the other member whose choice seems more relevant to me	0.88
25	The group members enjoy working with each other and manage any disagreements effectively.	0.97
I6	**Accuracy of decision making**	
26	Accurate decision-making takes more time. **(-ve)**	0.82
27	The participation of well-informed members in decision-making leads to accurate decisions.	0.97
28	Group carefully examines all the facts and information before making a decision.	0.82
29	If a member consistently suggests correct choices for decisions, their confidence towards a decision is given higher weight.	0.97

S. No.	Indicators/Items	I-CVI
I7	**Speed of decision-making**	
30	In the case of quick decisions, autocratic decisions are more effective. **(-ve)**	0.91
31	I do not participate in group decision-making as it is a time-taking process. **(-ve)**	0.85
32	Fast decisions are always flawed. **(-ve)**	0.82
33	Most-members believe in fast decision-making.	0.97
I8	**The extent of satisfaction with group decision making**	
34	I am satisfied with my group's group decision-making process, as most of the previous group decisions yielded positive results.	0.79
35	I feel motivated to give my suggestion during the decision-making process in the group.	0.94
36	It hardly matters if I am satisfied or not satisfied with the decision of the group. **(-ve)**	0.88
37	I feel dissatisfied and would like to quit the group at the earliest. **(-ve)**	0.85
I9	**Group conflicts in decision making**	
38	I feel uncomfortable in making decisions, so I avoid participating in the decision-making process. **(-ve)**	0.82
39	I am often not heard during group decision-making. **(-ve)**	0.91
40	Sometimes I am not convinced with a decision, but I am forced to agree to the majority's decision. **(-ve)**	1.00
41	I oppose when a leader dominates the group decisions.	0.88
42	Until I am convinced of a decision, I oppose the group decisions.	0.82
43	Many members consider their choices as the best, overlooking others' opinions which leads to conflicts. **(-ve)**	0.76
44	Open discussions and conflicts during decision-making promote critical evaluation of problems and decision options.	0.97
45	Often personal issues between members lead to conflicts in group decision-making. **(-ve)**	0.85
I10	**Conviction of decisions**	
46	Group decisions are more convincing than individual decisions.	0.91
47	When I am fully aware of the benefits of a decision, I support it with full conviction.	1.00
48	If a member is very confident in their decision, other members give high weightage to their confidence.	0.94

Table 3. Distribution of the scores of respondents among even and odd items

Respondent	Score of Even items (24)	Score of Odd items (24)
1	93	95
2	98	97
3	95	90
4	110	99
5	94	92
6	93	96
7	94	92
8	96	93
9	100	98
10	96	94
correlation coefficient (r)		0.67

required to be rated on a continuum of 1 to 5 by the respondents, i.e., Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly Disagree (1) for positive items and vice versa for the negative items with Strongly Agree (1) and Strongly Disagree (5).

3.2 Reliability Results

Reliability of the instrument was measured by administering it amongst ten respondents of a Self- help group with similar characteristics as of the targeted SHGs for the study, such as functional for more than three years and engaged in some group enterprise. Total 48 items of the group decision-making index were divided into two groups following the split-half method, wherein 24 odd-numbered items formed one group and 24 even-numbered items formed another group. The two halves of the instrument were then administered by the same respondents one after the other. The scores of each respondent for both halves of the instrument were calculated as listed in Table 3. Then correlation was computed between these two lists of scores. The correlation between the even items and odd items was a positive correlation of 0.67, i.e., r = 0.67. The Spearman-Brown split-half formula was used to estimate the instrument's reliability from the correlation between its two halves. Hence, the reliability of the group decision-making index was found to be 0.80.

Thus, it was found that the group decision-making index had appropriate content validity and internal consistency to measure and quantify the group decision-making process of selected Self-help Groups.

3.3 Group Decision-making Index Score Calculation

The group-decision-making index developed in the present study constitutes 48 items distributed across ten indicators, rated on a scale of 1 to 5 by the respondents. As for the present index, the weightage for each indicator is considered equal. Therefore, a respondent's maximum possible group decision-making index score will be 200, whereas the minimum possible index score for a respondent will be 40. However, for calculating the group decision-making index score of an entire group, the index scores of all the respondents of that group will be summated, but to maintain the value of score between the max.-

min. Ranges of the index, it is suggested to compute the Mean Index Score (Total score of all respondents/ no. of respondents) of group decision-making for each group.

Dewangan et al. [22], Ghosh et al. [23], and Purnima [5] developed a Group dynamic effectiveness index on a similar line and reported the Group dynamics effectiveness index score of various groups like a self-help group, water user group, etc. and found the index highly effective in identifying the essential indicators contributing to it. The index was also efficient enough in indicating the reason behind one group having a better index score than other, direct and indirect effect of different indicators on index score. Moreover, the information availed through the index can be effectively used in formulating strategies for strengthening the effectiveness of the groups. Therefore, the present instrument for measuring group decision-making can be effectively utilized for future research in similar contexts and broader purviews.

4. CONCLUSION

The group decision-making index developed and validated in the present study is the first of its kind. This paper has provided a systematic and standardized approach to develop a statistically sound measure and conduct proper content validation of the research instrument for measuring group decision-making of self-help groups. Ghosh et al. [23] generalized that decision-making among groups is a critical indicator that needs special attention to improve the overall group dynamics effectiveness of the groups. Moreover, the empirical data, which will be collected from this group decision-making index, will form a foundation for studying the root cause of ineffectiveness in group decision-making in various Self-help groups and will help in the formulation of strategy for overcoming the constraints related to group decision-making as reported by various SHGs. Moreover, the study of conventional decision-making in Self-help groups done using this index can also form a basis for bringing some significant changes in the decision-making pattern and processes of the groups. This group decision-making index can be a convenient and standardized tool for the researchers, scientists, students, project implementers, and anybody else who tend to study decision-making of Self-help groups and various other groups involved in group decisions for collective activities.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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