

DEVELOPMENT OF GROUP DYNAMICS INDEX FOR DAIRY BASED FARMER PRODUCER ORGANISATIONS

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ABSTRACT

Collectivizing small and marginal farmers through Dairy based Farmer Producer Organisations is essential for overcoming value-chain challenges. To ensure FPOs long-term sustainability, it is crucial to assess the group dynamics within these organizations. Accordingly, an index to measure group dynamics was developed using the Normalized Rank Order Method proposed by Guilford (1954). A total of twelve dimensions with 116 indicators were sent to 150 experts for relevancy assessment. Based on responses from 60 experts, Relevancy Weightage (RW) and Mean Relevancy Scores (MRS) were computed. Seventy-one indicators with RW > 0.85 and an overall MRS > 2.25 were retained for item analysis. Following content validation, these 71 indicators were administered to 40 members from non-sampling FPOs to assess reliability. The resulting Cronbach's Alpha of 0.772 confirmed good internal consistency. Overall, the reliability and validity demonstrated the precision and robustness of the developed index.

Keywords: farmer producer organization, collective approach, guilford, rank order

INTRODUCTION

Livestock production in India is largely driven by marginal, small and landless farmers, contributing about 90.00% of total output. Smallholders alone produce 73.00% of the country's total milk (Kumar et al., 2018). Despite this significance, farmers face constraints such as poor access to quality feed, high input costs, weak extension support, inadequate veterinary care and low prices (Saikia et al., 2024). Institutions supporting them also struggle due to dispersed farmers, small-scale operations and limited marketable surplus (Singh, 2019). Weak cooperatives further aggravate the situation, making Dairy based Farmer Producer Organizations vital for strengthening dairy value chains and ensuring quality, fair prices and sustainable livelihoods (Satyasai and Mehrotra, 2016).

FPOs are formed by primary producers such as farmers, milk producers and fishermen to protect member interests (Falguni et al., 2022; Navya et al., 2025). As hybrid organizations, FPOs combine cooperative welfare with corporate efficiency and engage in input sourcing, financing, aggregation, primary processing, technology dissemination, branding, and quality control (Lade et al., 2024; Venkattakumar and Narayanaswamy, 2022). However,

only few dairy based FPOs effectively sustain the business operations, necessitating an examination of factors behind weak performance. Additionally, farmers in rural areas are often divided by caste, class, and political differences, which can create conflicts within FPOs and hinder decision-making (Venkattakumar and Narayanaswamy, 2022). Since farmers rely on group-based activities, strong group organization and functioning are essential. Thus, effective group dynamics is necessary to overcoming constraints and ultimately determining the success of FPOs.

Group dynamics play a vital role in both formal and informal groups, influencing functioning and effectiveness of group (Lewin, 1936). Group Dynamics (GDE) is operationally defined as the internal nature of a group- its formation, structure, processes, functioning, and influence on individual members, other groups and the organization as a whole (Van Vugt and Schaller, 2008). As group work is integral to FPO, understanding and managing group dynamics enhances performance, member satisfaction, and overall outcomes (Patil et al., 2024; Kavadi et al., 2024).

OBJECTIVE

To construct the index to measure group dynamics of dairy-based farmer producer organisations

METHODOLOGY

The group dynamics index was developed using the Normalized Rank Order Method recommended by Guilford (1954).

Selection of dimensions

Dimensions were identified through literature review and expert consultations. Given the wide range of activities and services FPOs provide to their members, the construct "Group Dynamics of the FPO" was evaluated across twelve distinct dimensions: Participation; Team spirit; Group atmosphere; Interest and motivation; Decision-making procedures; Group cohesiveness; Leadership; Empathy; Task functions; Interpersonal trust; Group membership; and Group norms. Operational definitions follow.

- (1) Participation was defined as the degree to which FPO members are actively involved in group activities, including meetings, discussions, and group processes.
- (2) Operationalized as the extent to which members maintain unity, work collectively toward group goals, and attribute success to the team as a whole.
- (3) Defined as the degree to which members experience a warm, open, and friendly environment where they feel free to express opinions without discomfort.
- (4) It is the extent of member involvement in collective decision-making, maintaining focus, supporting consensus, encouraging participation, and feeling recognized for contributions.
- (5) Defined as the level of unity within the group, reflected in interpersonal relationships, social interactions, loyalty, pride, cooperation, and identification with the group.
- (6) Operationalized as the nature and effectiveness of the leader's influence on members to support smooth group functioning.
- (7) Defined as the extent of mutual trust among members, including trust placed in others and trust perceived from other members.
- (8) Defined as the degree to which a member feels accepted within the FPO, perceives sub-group dynamics, and identifies whether they or others are included or excluded.
- (9) Operationalized as the level of interest and drive a member maintains during all phases of group activities.
- (10) Defined as the extent to which members perceive that rules and regulations guiding group behaviour are

effectively implemented.

- (11) Defined as the degree to which a member understands, is aware of, and is sensitive to the experiences and emotions of others.
- (12) Operationalized as the extent of member involvement in roles essential for achieving group objectives, such as initiating activities, seeking and giving information or opinions, elaborating, coordinating, summarizing, and assessing feasibility.

Initial selection and editing of suitable indicators within different dimensions of the construct

Indicators for each dimension were identified from published reports, research papers, manuals, web resources, and refined through consultations with domain experts and FPO stakeholders to ensure comprehensive coverage. In total, 116 indicators were identified across the twelve dimensions, which were subsequently refined using the fourteen criteria proposed by Edwards (1969).

Selection of indicators for FPO's Group Dynamics Index under different dimensions after Relevancy test (Content validation)

Given the equal importance of all indicators in measuring the Group Dynamics Index, content validity was established through expert evaluation involving scientists, researchers, and professionals from agricultural universities, research institutes, government departments and NGOs. All 116 indicators were sent to 150 judges along with detailed instructions. Judges rated each indicator on a three-point relevance scale: Most Relevant (3), Relevant (2), and Irrelevant (1). Of the 150 judges contacted, 66 responded within the stipulated period; six responses were incomplete or ambiguous and were excluded. Thus, evaluations from 60 judges were used to compute the Relevancy Weightage (RW), Mean Relevancy Score (MRS), and Overall Mean Relevancy Score (OMRS) for all indicators using the following formulae:

$$\text{Relevancy Weightage (RW)} = \frac{(\text{MRR} \times 3) + (\text{RR} \times 2) + (\text{LRR} \times 1)}{\text{MPS}}$$

$$\text{Mean Relevancy Score (MRS)} = \frac{(\text{MRR} \times 3) + (\text{RR} \times 2) + (\text{LRR} \times 1)}{\text{Number of judges}}$$

$$\text{OMRS} = \frac{\text{Sum of total weightage of all indicators}}{\text{Total Number of Judges} \times \text{Total Number of Indicators}}$$

Where, MRR= Most Relevant Response

RR= Relevant Response

LRR = Least Relevant Response.

OMRS = Overall Mean Relevancy Score

Indicators with a Relevancy Weightage (RW) greater than 0.85 and a Mean Relevancy Score (MRS) equal to or above the Overall Mean Relevancy Score (OMRS) of 2.25 were selected for final inclusion (Roy et al., 2022). Based

on these criteria, 71 indicators were retained from the initial 116 and were subsequently rewritten and refined using expert feedback.

Sr. No	Statements	RW	MRS
1. Participation			
1	I participate actively in the meetings of FPO *	0.90	2.70
2	All the group members participate actively in the FPO *	0.87	2.62
3	The discussions in the groups drift away from main subject *	0.87	2.60
4	Group members provide valuable suggestions during discussion *	0.88	2.65
5	Members are forced to participate in group activities *	0.86	2.58
6	The group members are verbally and physically active in the group activities	0.74	2.22
7	All members are allowed to express their views equally in group meetings and other activities *	0.93	2.80
8	I remain silent and detached during group discussion	0.58	1.75
9	The attendance of group members is satisfactory whenever required *	0.86	2.57
10	I actively involve in production activities and marketing of the produce	0.68	2.03
2. Team spirit			
1	Members try to impose group unity for achieving their objectives *	0.87	2.62
2	FPO is working with team spirit in all activities *	0.88	2.65
3	Some members use the FPO for their personal benefits	0.74	2.23
4	Some members claim to take the credit for the FPO achievements *	0.87	2.60
5	I prefer to work alone without the help of other FPO members *	0.89	2.68
6	All the members are responsible to achieve the FPO targets *	0.87	2.60
7	All the members give major credit to team effort for achieving success in FPO activities *	0.87	2.60
8	The returns of FPO are distributed to members based on share holding	0.72	2.17
9	The leader guides the members and lead them as a team	0.82	2.45
10	Members voluntarily organise themselves when required for an activity *	0.88	2.65
3. Group atmosphere			
1	FPO has friendly and congenial atmosphere *	0.88	2.65
2	Everyone is given equal chance to express the ideas, to agree and disagree	0.71	2.12
3	Some members of FPO disrupt group activities	0.75	2.25
4	Conflicts or unpleasant feelings in the group are resolved amicably *	0.87	2.62
5	The group members understand individual's point of view that is different from the group *	0.87	2.60
6	Most of the members are indifferent and hostile towards me	0.71	2.12
7	The group environment is not comfortable for the slow /shy people to come out and participate in group tasks *	0.89	2.67
8	The group is open in accepting divergent views and encourage novel ideas *	0.86	2.58
9	Some members intentionally create an atmosphere of conflict and disagreement *	0.93	2.80
10	The group atmosphere is favourable to work and no unnecessary arguments observed	0.68	2.03
4. Decision making			
1	Decision concerning the group is taken with the consent of all the members of the FPO *	0.94	2.83
2	The group makes the decision without the focus being diverted *	0.87	2.60
3	Major decisions are taken unilaterally by board members or the committee without informing the group members of FPO	0.73	2.20
4	The leader gets consensus of all the members of FPO before finalizing decision	0.77	2.30

Sr. No	Statements	RW	MRS
5	Decisions of majority is regarded valid in the FPO *	0.87	2.60
6	I prefer to take my decision, whether personal or concerning the groups, all by myself *	0.86	2.57
7	Many a times the office bearers make decisions and execute, without the opinion of other FPO members	0.68	2.05
8	I feel my decisions for FPO activities should be always with the consent of other members of the FPO	0.77	2.32
9	Every member is free to contribute to the group decisions	0.66	1.97
10	The group decisions have positive outcome for success of the FPO	0.92	2.75
5. Group cohesiveness			
1	The FPO members enjoy working with each other and manage any disagreement effectively *	0.89	2.67
2	Members have sense of belongingness for one another in the group *	0.87	2.60
3	I feel dissatisfied with FPO and would like to quit the FPO at the earliest *	0.86	2.58
4	Members do not rely on one another in the group for carrying the group tasks *	0.86	2.58
5	There is unhealthy criticism and competition among the group members *	0.87	2.60
6	Members extend support to one another whenever any member needs help or in crisis	0.79	2.38
7	My contribution for the success of FPO is not being recognized by the group members	0.76	2.27
8	The members do not amicably work and frequent disagreement are observed in group	0.76	2.28
9	I do not feel comfortable to work with some of the group members	0.77	2.32
10	FPO could function well due to better understanding among group members	0.79	2.38
6. Group leadership			
1	The group leader is efficient in execution of FPO activities *	0.87	2.62
2	The group leader is sympathetic and helpful to other members in solving the problems	0.72	2.15
3	The group leader makes sincere efforts for achieving FPO goals	0.76	2.27
4	Group leader is less approachable and dependable *	0.87	2.60
5	Group leader has no influence on the members and their actions *	0.86	2.58
6	Group leader maintains good relations with members as well other organizations that benefit the group *	0.88	2.65
7	The group leader tries to force members to support his/her own decisions	0.74	2.22
8	Leader gives equal chance to all members for group tasks	0.78	2.35
9	Leader is open to feedback and criticism from others *	0.88	2.63
10	When tension arises, our leader attempts to deal with the conflicts in a problem-solving way *	0.86	2.58
7. Interpersonal trust			
1	It is difficult to accept and support the ideas of the majority *	0.86	2.57
2	Mysuggestions for FPO activities are accepted by my fellow members *	0.86	2.58
3	Exchange of ideas and feelings with the FPO members is a difficult task	0.77	2.30
4	Group members have good opinion about my capability to do good work for executing the FPO activities successfully	0.78	2.35
5	The members should work towards achieving the common goals first and not for their personal interest	0.76	2.27
6	There are too many misunderstandings among FPO members	0.69	2.07
7	I depend on the group members for taking certain major decisions in FPO activities *	0.86	2.58
8	Member should possess the requisite experience and expertise in the field, to execute the work for FPO activities	0.77	2.32
9	When any member interacts and gives suggestions / recommendations, I have feeling that he/she may mislead me *	0.89	2.67
10	Members have the ability to accomplish the set targets of FPO *	0.87	2.62
8. Membership			
1	I feel that there are many sub-groups in our FPO *	0.86	2.57
2	Members in the FPO consistently agree and support each other	0.75	2.25
3	Farmers willingly join as members in the FPO	0.77	2.32

Sr. No	Statements	RW	MRS
4	Members remain in the group if their interests and needs are met out	0.74	2.23
5	Some group members move out of the group and join later according to their convenience *	0.87	2.62
6	The members in the FPO consistently disagree and oppose within the group	0.77	2.32
7	Membership of FPO is open to all interested farmers *	0.86	2.58
8	Some members are removed from group for their misbehaviour *	0.86	2.57
9	Membership is voluntary and members are not forced to remain in the group *	0.88	2.65
10	Members of the FPO belong to similar socio economic status	0.73	2.20
9. Interest and motivation			
1	Members are interested in all issues concerning the group	0.79	2.38
2	Some activities are interrupted, due to disagreement and resumes after a break *	0.91	2.72
3	Members have intrinsic motivation for success of FPO *	0.87	2.60
4	Some members are highly motivated and make extra contribution to the FPO *	0.86	2.58
5	The interest to achieve the group objectives remains low most of the time *	0.90	2.70
6	Members try to motivate one another during group action *	0.86	2.58
7	Members feel that the FPO's objectives are important than their personal motives	0.72	2.15
8	It is not only monetary profit, but the sense of group feeling is the reason to remain in FPO	0.78	2.35
9	The sole purpose of the members is to gain economic benefits from FPO *	0.87	2.60
10	The members are fully satisfied with functioning of FPO	0.78	2.33
10. Group norms			
1	The FPO members attend meetings regularly	0.78	2.35
2	Repayment of loan is done promptly by FPO members	0.78	2.35
3	Rules and regulations of FPO in production and marketing are in operation to maintain harmony *	0.88	2.63
4	The price of the products is accepted by all the members *	0.87	2.60
5	Members are penalized for any default in payment	0.78	2.33
6	Many members do not complete tasks that they have to do/attend *	0.87	2.62
7	The registers and records are promptly maintained *	0.86	2.58
8	The group exerts pressure on those members who do not cooperate to correct themselves	0.77	2.30
9	I agree that group norms are essential in controlling the behaviour of members *	0.88	2.63
11. Empathy			
1	The members of FPO interact closely to understand one another feelings	0.77	2.30
2	When a member, mentions his/her problem in enterprise activity, other members readily extend help *	0.89	2.68
3	There are too many conflicts in the FPO because of lack of understanding among members *	0.86	2.57
4	The FPO is quick to sense and solve any issue that is worrisome to group members *	0.87	2.62
5	I understand the problems faced by the group members *	0.88	2.63
6	Most of the members are not able to understand or sense the problems of other members	0.79	2.38
12. Task functions			
1	Initiating activity: (proposing solutions, suggesting new ideas, new definitions of the problem, new attack on problem, or new organization of material) *	0.86	2.58
2	Seeking opinion: (looking for an expression or feeling about something from the members, seeking clarification of values, suggestions or ideas) *	0.91	2.72
3	Giving opinion: (stating an opinion or belief concerning a suggestion or one of several suggestions) *	0.88	2.65
4	Elaborating: (clarifying, giving examples or developing meanings, trying to analyse how a proposal might work out if adopted) *	0.87	2.62

Sr. No	Statements	RW	MRS
5	Coordinating: (showing relationships among various ideas or suggestions, trying to pull ideas and suggestions together, trying to draw together activities of all members) *	0.87	2.60
6	Standard setting: (Expressing standards for group to use in choosing its content or procedures in evaluating its decisions, reminding group to avoid decisions which conflict with group standards) *	0.86	2.57
7	Relieving tension: (Drawing off negative feeling by pulling a tense situation in a wider context) *	0.86	2.57
8	Mediating: (harmonizing, conciliating differences in view points, making compromise solutions) *	0.86	2.58
9	Gate keeping: (trying to make it possible for all the member to participate and regulating the participation) *	0.86	2.57
10	Testing for consensus: (Aspiring for group opinion in order to find out if the group is reaching consensus on a decision) *	0.92	2.75

(*Denotes indicators/statements selected for further analysis having RW>0.85 and MRS ≥ 2.25; RW=Relevancy weightage; MRS=Mean Relevancy Score)

Determination of index values

To assign specific weights (Index Values) to each dimension of the Group Dynamics Index for FPOs, Guilford’s Normalized Rank Order Method was employed. This method is advantageous because it accommodates any number of variables and does not require a large panel of judges. The following steps were used to determine the index values.

Judges’ rating to the dimensions of the construct

Judges ranked the twelve dimensions of the Group Dynamics Index according to their perceived importance, using the same experts that contributed to content validity assessment. Each judge assigned ranks from 1 (most important) to 12 (least important). Of the 100 judges approached, 60 provided complete and usable rankings. These rankings were then analyzed to derive the final index values.

Calculation of proportions

The proportion values (P values) for each dimension were computed from the judges’ rankings using the following formula:

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

Where,

R_i stands for the rank value of the dimension ‘i’ in reverse order i.e 12 to 1.

‘n’ denotes the number of dimensions ranked by the judges (here, n=12).

In this method, the central area corresponding to each ranked dimension was identified, with ‘p’ denoting the centile value

of that area under the normal distribution. These ‘p’ values were computed for every rank to represent the relative weight or importance of each dimension within the Group Dynamics Index. The resulting ‘p’ values ranged from the lowest to the highest rank, reflecting the gradation in perceived significance across the twelve dimensions.

Calculation of the C values

Correct ranks (r_i, 1 to 12) and reverse ranks (R_i, 12 to 1) were recorded; corresponding C values were obtained from Guilford’s Table M (1954) and used to refine the weighting of each dimension in the Group Dynamics Index.

Calculation of Index values for every dimension

In the next step, the $\sum(f_{ji} \cdot C)$ values were computed for each dimension (Table 2), where C denotes the rank values obtained from Guilford’s Table M. This was done by multiplying the frequency of each rank (1to 12) by its corresponding C value (r_i = correct rank order) and then summing these products for each dimension. To derive the index value, the $\sum(f_{ji} \cdot C)$ for each dimension was divided by the total number of judges (60), yielding the mean value (M_c), which was accepted as the index value (R_j or R_c). The average R_c value was 5, with a standard deviation of 0.33. The final index values (R_c) are presented in the row labeled M_c or R_j, or R_c (Index Value).

Computation of the composite index

Since each dimension of the Group Dynamics Index contains a different number of items, their total score ranges vary. Therefore, the scores must be standardized into a unit score for each dimension. This was done using the following formula, which adjusts for differences in both score range and variance:

$$U_{ij} = \frac{(Y_{ij} - \text{Min}Y_{ij})}{(\text{Max}Y_j - \text{Min}Y_j)}$$

Where,

U_{ij} = Unit score of the i^{th} respondents on j^{th} dimension

Y_{ij} = Value of i^{th} respondent on the j^{th} dimension

$\text{Max}Y_j$ = Maximum score on the j^{th} dimension

$\text{Min}Y_j$ = Minimum score on the j^{th} dimension

Each dimension's standardized score ranges from 0 to 1, where the minimum Y_{ij} score corresponds to 0 and the maximum to 1. The Group Dynamics Index (GDI) for each respondent was then calculated by multiplying the

respondent's unit score for each dimension by the respective index value of that dimension. The weighted scores across all dimensions were summed and divided by the total of all index values, yielding the final GDI score for each respondent.

$$\text{GDI } i = \frac{\sum U_{ij} * I_j}{\text{Sum of Index Values}}$$

Where,

GDI $_i$ = Group Dynamics Index for i^{th} respondent

U_{ij} = Unit score of the i^{th} respondent on j^{th} dimension

I_j = Index value of the j^{th} dimension

\sum = Sum

Table 2: Weightage to dimensions of Group Dynamics based on Guilford's (1954) Normalized Rank Order Method

r_i	R_i	P	TS	GA	DM	GC	GL	IT	MM	IM	GN	EM	TF	Total	P	C
1	12	7	4	5	6	2	11	4	1	1	8	4	7	60	95.83	8
2	11	5	7	9	2	4	5	1	6	8	5	5	3	60	87.5	7
3	10	2	8	6	6	5	4	6	2	5	2	5	9	60	79.17	7
4	9	8	5	4	5	7	4	5	6	4	5	4	3	60	70.83	6
5	8	7	6	8	4	6	5	1	6	5	6	2	4	60	62.5	6
6	7	10	6	4	2	6	4	8	5	3	8	0	4	60	54.17	5
7	6	4	6	2	3	8	3	7	5	10	4	1	7	60	45.83	5
8	5	7	3	5	5	3	3	9	2	11	4	5	3	60	37.5	4
9	4	5	4	4	9	6	5	4	6	5	3	6	3	60	29.17	4
10	3	3	4	3	4	8	5	5	6	4	4	7	7	60	20.83	3
11	2	2	5	6	5	2	6	8	7	3	3	9	4	60	12.5	3
12	1	0	2	4	9	3	5	2	8	1	8	12	6	60	4.17	2
$\sum f_{ji}$	60	60	60	60	60	60	60	60	60	60	60	60				
$\Sigma(f_{ji} C)$	328	322	318	284	299	315	287	273	305	304	259	306			Mean- 5	
Mc or Rj or Rc ($\Sigma f_{ji} C / \Sigma f_{ji}$)	5.47	5.37	5.3	4.73	4.98	5.25	4.78	4.55	5.08	5.07	4.32	5.1			SD- 0.33	

(P- Participation, TS-Team Spirit, GA- Group Atmosphere, DM-Decision Making, GC- Group Cohesiveness, GL- Group Leadership, IT- Interpersonal Trust, M- Membership, IM- Interest and Motivation, GN- Group Norms, E- Empathy, TF- Task Functions, r_i = Correct Rank order, R_i = Reverse rank order, \sum = Sum, P = Proportion, C = C values of respective ranks from Guilford's Table M, Mc = Mean Value, Rj = Response value, Rc = Index Value, SD= Standard Deviation)

Reliability test and construction of final index

Reliability testing is essential for developing a robust index. To assess reliability, the 71 validated indicators were administered to 40 members from non-sampling FPOs.

Responses were recorded on a three-point scale- 'Always' (3), 'Sometimes' (2), and 'Never' (1). Analysis in SPSS 23 produced a Cronbach's Alpha of 0.772 (Table 3), indicating good reliability of the constructed index.

Table 3: Reliability statistics of group dynamics index

Cronbach's Alpha	Part 1	Value	0.772 ^a
		N of Items	36
	Part 2	Value	0.763
		N of Items	35
Total N of Items			71
Correlation Between Forms			0.794
Spearman-Brown Coefficient	Equal Length		0.885
	Unequal Length		0.885
Guttman Split-Half Coefficient			0.883
a. The items are: I1, I3, I5, I7,....., I71 (Odd items)			
b. The items are: I2, I4, I6, I8,..... I70. (Even items)			

Validity of the index

Validity ensures that a tool measures its intended construct. In this study, content validity was established through expert judgment and literature review. Items with at least 80% agreement were retained. Strong discriminating values and variation across statements confirmed that the index is a valid and appropriately representative measure of the construct.

CONCLUSION

The primary objective of establishing FPOs is to collectively organize small and marginal farmers to access greater benefits. FPOs performance is dependent on group dynamics of members. Hence, the study developed an index to measure group dynamics among dairy-based FPO members, identifying key dimensions and their relative importance. The precision and consistency of the Index were ensured through standard procedures, with both reliability and validity well established, indicating a high level of accuracy and stability in the results. The developed index can be applied to assess group dynamics other member based organizations, with appropriate modifications to items and indicators.

ACKNOWLEDGEMENT

The authors express their sincere gratitude to the SRS of ICAR–NDRI, Bengaluru, for the institutional support and to all respondents of the study.

CONFLCT OF INTEREST

No conflict of interest among researchers.

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Received : October 2025 : Accepted : December 2025