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Identifying and prioritizing the stakeholder linkages of dairy-based farmer producer companies in India: An analytical hierarchy process

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ABSTRACT

The present study was proposed to identify stakeholders involved in the formation of FPCs, as related to the dairy-based farmer producer companies. The proposed study was conducted in Uttar Pradesh, Rajasthan, and Madhya Pradesh, as these three states are the major milk-producing states of India as well as have the highest number of dairy-based farmer producers. Four farmer producer companies from each state were selected randomly, based on three criterias. The sample size was 90 (60 officials of FPCs and 30 experts) for the study. The data were collected from primary and secondary sources. A semi-structured interview schedule based on the Sattys nine continuum scale was developed to collect data related to stakeholder analysis. The study reported that 12 stakeholders were actively involved in the formation of FPCs. The farmers were the most important stakeholder and got the first rank in the AHP priority ranking.The linkage among the stakeholders were found medium to strong. Interest influence matrix categorized stakeholders into Key players, Context setters, Subjects and Crowd. The study suggests that there is a huge need to enhance and coordinate the backward and forward linkage among stakeholders for developing a sustainable ecosystem for the long-term viability of FPCs.

Keywords: Analytical hierarchy process, Farmer Producer Company, Stakeholders

In India, more than 85 per cent of farmers were small and marginal having less than one hectares of cultivable land. Even after the second phase of agrarian and economic structural reforms in India, opponents contended that the agricultural sector in the country did not develop rapidly enough to benefit small and marginal farmers (Panda and Singh 2016). The idea of the Farmer Producer Company emerged as an alternative to the cooperative model with the hybridization feature of a cooperative and private company. The producer company model is an effective pathway to enhance the farmer's income and helps to provide 30-40% more price of produce to farmers (Trebbin and Hassler 2012, Kumar S *et al.* 2021). The farmer producer company is a complex organization that involves a multi-layer network of stakeholders encompassing from the internal and external environment (Alagh 2019). A favourable ecosystem among various stakeholders is obligatory to develop an effective and sustainable farmer producer company and it is based on the trust, commitment, and mutual benefit relationship among them (Devitt C *et al*. 2013). The stakeholders of FPCs need to put their effort proficiently for the development and progress of farmer producer companies but the reality is different at the ground level (Meinzen-Dick R *et al*. 2004). In the initial phase, the lack of trust, commitment, and weak linkage among the stakeholders is a major challengable task for the success of the Farmer Producer Company (Balasubramanian and Vijayalakshmi 2016). The conflicting nature of stakeholders' interests in the FPC is a major issue of failure of organization which in turn affects the sustainability (String *et al.* 1997, Narrod *et al*. 2009). So the sustainability of FPCs largely depends on the cooperation among all stakeholders (Meinzen-Dick R *et al*. 2004). The transparency, coordination, and strong networking among various stakeholders are the secrets of success of the FPCs and this needs to develop organizational and institutional relationships between them (Narayan G. Hegde 2019). The participation and support of all stakeholders would help in strengthening linkages to help make organizations long-term sustainable and viable (Sreeram and Gupta 2017). In this context, an attempt was made in the present study to identify and prioritize the stakeholders, their linkage, and interest influence matrix of the dairy-based farmer producer companies in India. The outcome of the study would help to identify and prioritize the key stakeholders, type of linkages among stakeholders and help us to strengthen the weak linkage for better development of a sustainable ecosystem for farmer producer companies.

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MATERIALS AND METHODS

Locale of the study: The present study was conducted in three purposively selected states of India. Two criteria were made for the selection of the states, i.e. the states having the highest share of milk production in total milk production of the country and having the highest number of registered dairy-based farmer producer company. Three states, i.e. Uttar Pradesh, Rajasthan, and Madhya Pradesh fulfilling the criterias were selected purposively for the present study (Livestock census 2020). Four dairy-based farmer producer companies were selected from each state based on three criteria of selection of FPCs, i.e. FPCs should be dairy-based, three years old during the time of investigation, and having at least 100 active members. So, 12 FPCs were selected from the three states for the investigation.

Selection of the respondents: A list of stakeholders was developed through secondary information such as Policy and Process Guidelines for FPO's (MOA,GoI 2013), Focus Groups Discussions, Semi-structured Interviews, and Snowball Sampling methods with the various experts and agencies (NGOs, Successful large FPCs resource persons, and experts from private and government organizations) who are directly involved in establishment and development of FPCs in the country. After that, this list was sent to 30 personnels having high expertise in areas of farmer producer company for validation of these stakeholders. After receiving the final list of stakeholders from expert validation, a semi-structured interview schedule was developed based on Satty's (1980) 1-9 continuum scale for the analytical hierarchy process. Linkage matrix, classification or categorization, Venn diagram, and important and influence matrix components are also incorporated in the schedule for getting detailed information about stakeholder analysis. Ninety respondents (five from each FPC and thirty experts from government and private organizations having expertise in the field of FPCs) were selected through a stratified random sampling method. The developed semi-structured interview schedule was administrated to selected respondents for collecting data of stakeholder analysis of dairy-based FPCs. The stakeholder analysis methodology (Fig. 1) and AHP were used for analysis and interpretation of the results of the dairy-based farmer producer company's stakeholder analysis.

Identification, categorization, Venn diagram, and linkage matrix of the stakeholders involved in the formation of FPCs: Stakeholders are any individual, group, or party that has an interest in an organization and the outcomes of its actions. Stakeholders for this study are operationalized as 'all those actors, agency, organization and institutions involved from pre-production to marketing of milk and milk products'. The Stakeholder Analysis Method was used for stakeholder analysis and the flow chart for it is given in Fig. 1.

Prioritizing the stakeholders through AHP: AHP is a multi-criteria decision-making approach that disintegrates a

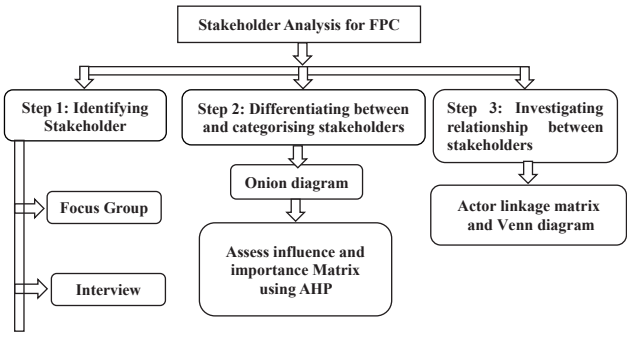

Fig. 1. Stakeholders analysis process.

complex problem into a multilayer hierarchical structure of goal, criteria, and alternatives to better describe the overall choice operations. It is employed in multilevel hierarchic systems to identify relative priority on absolute scales from both discrete and continuous paired comparisons. The AHP method is based on three principles: first, the structure of the model; second, the comparative judgment of the criteria and/or alternatives; third, the synthesis of the priorities. A semi-structured interview schedule was developed using the nine continuum Saaty scale based on identified stakeholders of FPCs. A brief introduction was given to respondents about AHP and how to rank stakeholders in the interview schedule. Respondents were asked to prioritizing the stakeholders based on their importance in development and running a successful FPC on each other among the list of stakeholders on nine continuums. For each comparison, respondents were asked to prioritize the importance of each stakeholder of the FPCs on a 1–9 continuum scale, where 1 indicates that two compared stakeholders were given equal importance by respondents. The continuum from 2 to 9 indicated increasing order of importance of one criterion over another one, i.e. from moderate to extreme. The geometric means of various respondents' response was calculated for making pairwise comparison and normalization matrix. The normalized pairwise comparison matrix was used to calculate the global priorities/criteria weight of each stakeholder in the matrix. The priority/ criteria weight shows the relative weight among the criteria that we calculated for each stakeholder. For this, twelve stakeholders were compared as per their weight and found the most important stakeholder of FPCs. To establish validity to it, Saaty (1980) has proposed a consistency index (CI) related to the eigen value method (max). This eigen value λ (max) was obtained by summing the product of each element of the eigen vector multiplied by the total column of the reciprocal matrix. The highest eigen value was equal to several comparisons (λ max=n). The formula used to calculate the consistency index is given below:

$$CR = 100(CI/ACI)$$
$$CI = (\lambda_{max} - n)/(n - 1)$$

The priority of each stakeholder was calculated to finding their importance in the overall stakeholders of FPCs. Thus the final response of respondents provides the initial

information about the priority weight of all stakeholders and indicates which stakeholders are most important for the formation of FPCs and so on. After ranking or prioritizing the stakeholders, stakeholders mapping, onion diagram, importance influences matrix, and actor linkage matrix were formulated.

RESULTS AND DISCUSSION

Identification and prioritizing the stakeholders using AHP: The output of the first step is the documentation of all possible stakeholders of FPCs. The identified stakeholders of dairy-based farmer producer companies were farmers, funding agencies (NABARD, bank, trust, etc.), professional staff (CEO, CA, CS, and technical/ non-technical staff), NGOs/ resource institutions, processing industry, market, customers, bank, research/ training institutions, input suppliers, facilitating organizations (local governemnet authority, veterinary officer, agricultural university, policymakers, Ministry of the corporative affairs, legal departments, transporters, international agency, donor, etc.) and state agricultural and horticultural departments. To understand the roles and responsibilities of each stakeholder, it is very necessary to get detailed information related to each stakeholder. The information contained the following criteria: (i) the level of stakeholder interest in the FPCs, (ii) alliances i.e. FPCs that collaborate to support farmers and other stakeholders in organizations, (iii) stakeholder's resource base: the number of resources like human, financial, technological, and other like availability to mobilize them, (iv) stakeholders' power: the ability of the stakeholder to affect the FPCs, (v) leadership: the willingness to initiate or lead in FPCs for its right direction, and (vi) management strategy relating to stakeholders were obtained from stakeholders. The above information is needed to make an informed decision about the identified stakeholders of FPCs and these stakeholders to be involved in the ranking process based on qualitative and quantitative measures. The stakeholders were ranked as their importance and interest in FPCs through AHP. AHP is the most viable and feasible method as compared to other methods for prioritizing the different stakeholders according to their importance. The local priorities of different stakeholders assess through pairwise comparison matrix and normalization matrix computations. The Saaty scale (1980) was used for the development of pairwise comparison matrix computations. After that, normalization of the pairwise comparison matrix was done. The normalized pairwise comparison matrix was used to calculate the global priorities/criteria weight of each stakeholder in the matrix. The priority/criteria weight shows the relative weight among the criteria that we calculated for each stakeholder. For this, twelve stakeholders were compared as per their weight and found the most important stakeholder of FPCs. The ranking of stakeholders provides the initial information about all stakeholders and indicates which stakeholders are most important for the formation of FPCs and so on. Table 1 indicates the preference list of each stakeholder in FPCs based on their importance and interest in the formation and development of farmer producer organizations. The farmers ranked higher because of their importance in the formation of FPCs. The second-ranked actor was the funding agency because of their importance to provide financial support and grant to the development of FPCs. In the third position was the customer because FPCs focus on direct marketing of products. Especially in perishable product-based FPCs like milk and vegetable, customers play a very important role in the consumption of FPCs products so customers are very important from FPCs' point of view. The fourth-ranked actor was POPI/NGOs because they help in the formation of FPCs as resource institutions. The actor in the fifth position was market actors like wholesalers and retailers who are the part and parcel of FPCs products value chain. The sixth position was occupied by the the input suppliers who deal with different inputs supplying to FPCs and their members. The seventh-ranked actors were the professional staffs who are responsible for professionally managing and governing FPCs. The eighth-ranked actor was the bank that helps in financial transactions and provides needed loans to FPCs. The ninth-ranked actor was the research and training institution as they were responsible for capacity building of FPCs staff and farmers, provide innovative technology to FPCs, and exposure visits and demonstrations to shareholders for motivating them. The tenth-ranked stakeholder of FPCs was the processing industry as it helps FPCs to sell their raw material after collection from member farmers due to the unavailability of infrastructure facilities with FPCs. The eleventh rank stakeholders were the different facilitator organizations who are not directly related to the formation of FPCs but they largely affect the efficiency of FPCs. Lastly, the twelfth number stakeholder of FPCs were the state agricultural departments as it helps to strengthen FPCs at the ground level but not found directly responsible for the formation of FPCs.

Onion diagram: Visualizing stakeholder categories: The stakeholder onion diagram is a way of visualizing the relationship of stakeholders in the Farmer Producer Company. An onion diagram indicating how involved the stakeholder is with the FPCs. Fig. 2 indicates an onion diagram for classifying stakeholders who participate in dairy-based farmer producer companies in India. The diagram usually consists of four components such as (i) system, (ii) primary stakeholders, (iii) secondary stakeholders, and (iv) tertiary or external stakeholders. Each component is indicated through a circle and the center circle of the diagram indicates the issue or problem in which these actors are interested/associated with the Farmer Producer Company. The first circle is for the key (primary) stakeholders and the second circle indicates the secondary stakeholders. The outer circle indicates the external stakeholders of farmer producer companies (Fig. 2). Fig. 3 depicts the relationship between different identified stakeholders of dairy-based farmer producer companies. Lines are used to indicate relationships between stakeholders where a single line is used to

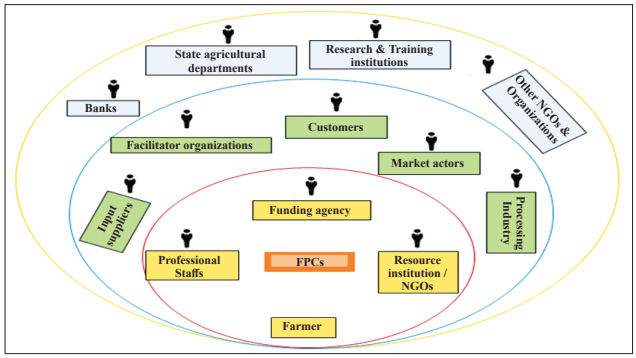

Fig. 2. Stakeholder's onion diagram for dairy-based farmer producer companies.

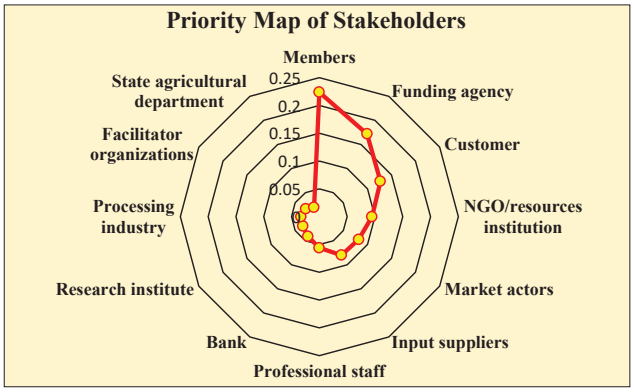

Fig. 4. Priority Map of dairy-based FPCs stakeholders.

illustrate relationships with a high degree of interaction (information, resources, materials, etc.) and two lines are used for relationships between stakeholders who have a contract or maintain the relationship. A dotted line is used where partnerships are weak, and a question mark is inserted if the relationships are unknown.

The stakeholders namely NGOs/ producer organizations promoting institutions, professional staffs, processing industries, and facilitator's organizations depict through two-line and its show that they have a contract, cooperation, and mutually beneficial relationship with farmer producer companies. The signal line between funding agencies, members, customers, input suppliers, and market actors indicates that they have a high level of exchange (of information, capital, supplies, etc.) with farmer producer companies and its beneficiaries Banks, State Agricultural Departments, research and training institutions is showing through the dotted line, as it indicates that they have a weak relationship with farmer producer companies and its beneficiaries. Even,we can say that they have a formal relationship, interacts only when they need something from each other and are not directly related to farmer producer companies.

Influence and interest matrix of farmer producer company stakeholders: A stakeholder matrix can be created to differentiate stakeholders by the power and interests relevant to the specific issue or problem addressed. The tool can also be used for assessing two other issues, e.g. resources and interest, or who is an 'enabler' or an 'influencer' upon farmer producer company. Fig. 5 shows exemplarily how stakeholders were differentiated by their

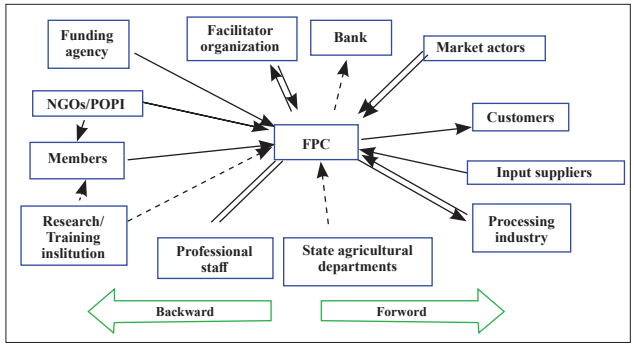

Fig. 3. Mapping relationship of dairy-based FPCs stakeholders.

importance and interest relating to the farmer producer company. Stakeholders are placed on a matrix according to their relative interests and influence. Under this method, all the stakeholders were categorized into ''Key players, ''Context setters'', ''Subjects'' and ''Crowd''. 'Key players' were those stakeholders who have actively groomed, due to their high interest in and influence over farmer producer companies. 'Context setters' are highly influential, but have little interest in the farmer producer company. 'Subjects' have high interest but low influence and although by definition they were supportive. They are lacking the capacity for impact, although they may become influential by forming alliances with other stakeholders. The 'Crowd'were those stakeholders who have little interest or influence over desired outcomes from farmer producer companies. A glance at Fig. 5 indicates that banks, contractual FPO staff, veterinary officers, government organizations, state dairy, and animal husbandry departments, legal departments, Ministry of the cooperative affairS, and facilitator organizations have high influence but have low interest in farmer producer company from its incubation stage to maturity stage. Due to their different roles in the FPOs, they were categorized as the

Table 1. Ranking of stakeholders

Stakeholders	Priority weights	Priority rank	Priority (%)
Members	0.224	1	23.6%
Funding agency	0.172	2	18.5%
Customer	0.127	3	13.1%
NGO/resources institution	0.095	4	9.7%
Market actors	0.082	5	8.0%
Input suppliers	0.080	6	7.5%
Professional staff	0.056	7	5.2%
Bank	0.041	8	3.7%
Research institute	0.034	9	3.2%
Processing industry	0.033	10	3.1%
Facilitator organizations	0.028	11	2.7%
State agricultural department	0.019	12	1.9%
CR= 0.095		CI = 0.146446	Λ = 13.61091

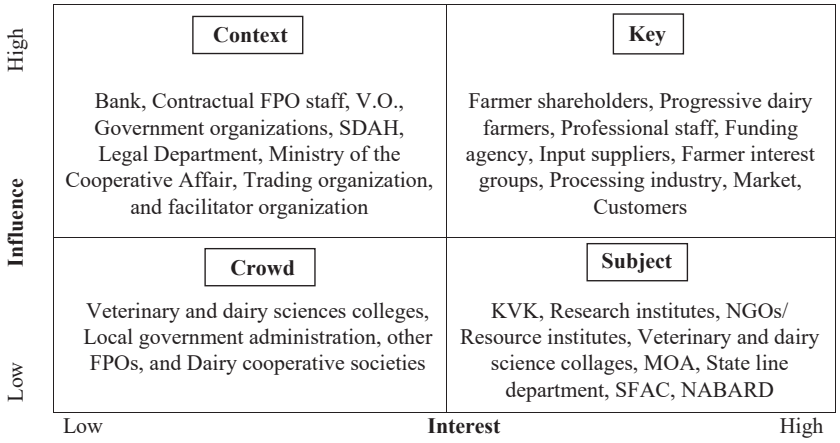

Fig. 5. Influence and interest matrix of FPOs stakeholders.

"Context Setters" for FPOs in the study area. Concerning the "Key players"; farmer shareholders, progressive farmers, funding agency, professional staff, farmer interest group, and input dealers were the key players of FPOs. Subjects have high interest but low influence in FPOs, likewise Krishi Vigyan Kendras, Research institutes, NGOs/ Resource institutes, Veterinary and dairy science colleges, State line departments, SFAC and NABARD constitute this category only at the formation stage of FPOs. As, these institutions do not have any direct contact with individual farmers so they have low influence, but as they have to deal with the problems of the farmers at formation as well as in long term for the development of FPOs.. The crowd was categorised by the stakeholders who have low interest and low influence in FPOs. Veterinary and dairy science colleges, local government administration, other FPOs, dairy cooperative societies were in this category due to their poor role in the improvement of FPOs.

Social Network Analysis of stakeholders linkage: The actor linkage matrix provides an overview, that how the different stakeholders in the relation of dairy-based farmer producer companies are connected and the strength of their relationship. Social Network Analysis of stakeholders linkage is given in Fig. 6. From the figure, it can be concluded that some of the stakeholders in farmer producer companies played a very crucial role whereas, some others were having a very little contribution to the different activities of FPCs. The board of directors, CEO of the companies, and progressive dairy farmers of the organization played a very important role in the transfer of different kinds of important information related to dairy farming, government schemes, agriculture, and information are about different activities of farmers producer companies to their members. The other different important sources of information related to dairy and agriculture for member farmers were NGOs, State Agricultural Departments, Input dealers, training, and research institutions as they are providing different kinds of capacity-building services to the member farmers. From the above discussion, it can be understood that progressive farmers, BOD, CEO, NGO, etc. were having very strong linkage with the member farmers and provide different kinds of services to members.

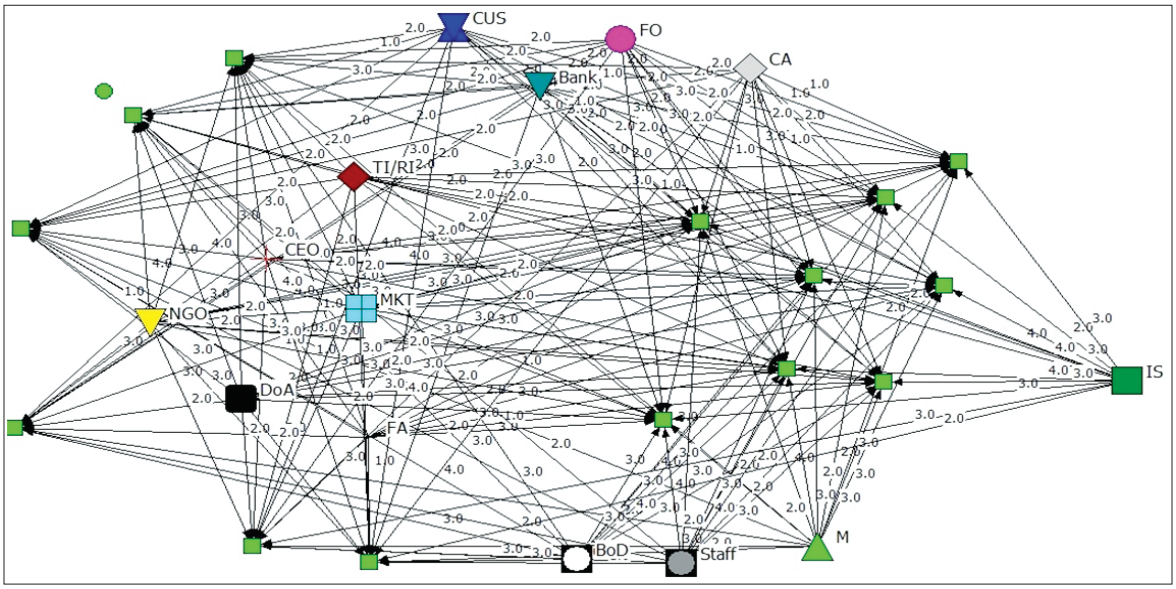

Fig. 6. Social Network Analysis of stakeholders linkage.

The Board of Directors has a very strong linkage with NGOs, funding agencies, input suppliers, and CEOs of the company. All decisions related to company activities taken by BOD and decisions are implemented by CEO so they have a very strong linkage with each other. Funding agencies play a very important role in the development of FPOs. Input suppliers are key stakeholders in the organization for providing input supply services. From the company management and business point of view, the CEO is the major stakeholder and has a very strong linkage with the processing industry, market actors, and the input suppliers. Professional staffs are strongly linked with the CEO as they were working under his supervision. Market personal and input suppliers were strongly linked with each other for their mutual dependency. FPOs generally depends on the services of market personal and input suppliers for production, processing, and marketing of their products. CEO of FPOs have strong linkage with the customers as they have to depend on them for the establishment of integrated value chain of their products in the market.

Training and research institutions have a good linkage with the state extension department and it is supporting farmers directly or indirectly through the state line departments. The linkages between different research institutions like veterinary and dairy science colleges with the member farmers were not very encouraging. The reasons might be the large distances between university and FPOs working areas, lack of awareness among farmers, poor extension mechanism, and inefficient manpower with these institutions for handling large areas. Banks are having poor linkages with the member farmers, followed by a facilitator organization and funding agency as they do not have direct strong linkage with the member farmers. The weak linkage of CA/CS and customers with the farmers were mainly due to that they are not dependent on signal members of the company as they have to work with the professional staff of the company like CEO and upper management staffs. Among, all the NGOs play a very important role in establishing FPOs and provide capacity building services to FPOs as major resource institutions at the field level. Some NGOs work as a parent organization of FPOs and help in sustaining FPOs at the ground level. The stakeholder theory is an appropriate lens through which FPO governance can ber viewed for a number of reasons. First, according to stakeholder theory, surviving is more important than maximizing any one goal (Freeman and McVea 2001).

Stakeholder theory as a lens for examining such organizations has also received support from academics working in the cooperatives field (Iliopoulos and Valentinov 2018). Alonso (2015) also proposed a framework to examine the industry from the viewpoint of the stakeholders. The framework goes beyond describing and identifying the stakeholders to characterize the many kinds of connections that exist between them. They emphasize that these connections are reciprocal, meaning that the stakeholders have an impact on the sector and vice-versa.

The FPCs are a network of multiple stakeholders, and maintaining long-term sustainability requires strong links between all of these stakeholders. Stakeholder theory aids in viewing the organization as a system of players inside a wider system rather than as an isolated unit with a boundary. Combining this viewpoint with the case study approach makes it possible to both record the FPO's history and analyze how it has changed through time in light of shifting circumstances. Twelve stakeholders identified thorugh AHP method in the dairy-based farmer producer company resembles medium-strong linkages with each other. The study's findings may serve as a standard for strategic decision-making, planning, and stakeholder analysis in other farmer-producer companies. Future areas of thrust research should concentrate on examining the linkages, links, and correlations between various players and criteria at various levels of hierarchy.

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