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RESEARCH ARTICLE

Future scenario of Dairy Entrepreneurial Ecosystem (DEE) of Kerala

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Abstract: The present study was undertaken to forecast the future of dairy entrepreneurial ecosystem for a short term, medium term and long term in the state of Kerala (India) during 2020-21; owing to the high ranks of the state in dairy progressiveness, production systems and marketing infrastructure. Delphi survey was used to project the future into conceivable scenarios. Four likely scenarios were estimated for each period based on the important driving factors and their probability of occurrence of change. The constant factor taken to decide the scenario axis for the three periods was 'dairy entrepreneurial growth'; while for the short term, the second contributing factor was 'support services'; for medium term it was 'cooperative sector'; and for the long term, it was 'advanced technology'. The study presented the narration of the scenarios which can be utilized by policy makers and planners to design in advance the appropriate modifications and interventions to develop dairy entrepreneurship; and thereby create a desirable dairy entrepreneurial ecosystem for the state in the future.

Keywords: Advanced technology, Cooperative sector, Dairy, Entrepreneurial ecosystem, Future scenario, Support services,

Introduction

The existing literature in entrepreneurship is mostly concerned with the characteristics and behaviours of individuals or firms; but of late, a strong emphasis is placed on the importance of relationships between entrepreneurs and their local economic and social contexts/environment. Several scholars have highlighted the need to pay more attention to the contexts in which entrepreneurial activities take place (Koch et al. 2017). The recently emerged systemic view of entrepreneurship is known as the 'Entrepreneurial Ecosystem' truncated as EE. Stam (2015) defined Entrepreneurial Ecosystem as 'a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory'. Daniel Isenberg (2011) emphasized that every EE is unique as it develops under idiosyncratic circumstances. They are geographically bounded referring to a nation, state or be limited to smaller geographical areas like towns/cities. Moreover, there are also specific industry based entrepreneurial ecosystems; and those spanning over different industries (OECD, 2014).

Entrepreneurial ecosystems are dynamic and evolve over time; and focus on the cultures, institutions and networks that develop within a region (Stam and Spigel, 2016). Roundy (2017) suggested that we need to have future oriented narrative accounts of entrepreneurial ecosystems to chart the ecosystem's future. Studying EE pertaining to primary production sectors (e.g. dairying) of different states shall benefit in deepening our understanding about how entrepreneurship happens in different contexts. Hence a study was conducted to analyze the future of the dairy entrepreneurial ecosystem of Kerala state owing to its high ranks in socio-economic development index (Ohlan, 2012), dairy progressiveness index (Kale *et al*, 2016), dairy production systems index (Patel *et al*, 2019) and milk marketing infrastructure index (Mohapatra and Sendhil, 2020); to forecast the probable future scenarios and recommend points of action for the actors and factors to the development of dairy entrepreneurship in the state for a short term, medium term and long term period.

Methodology

Future scenario of dairy entrepreneurial ecosystem is the most likely alternative future of the dairy entrepreneurial ecosystem based on the predictions derived through the opinion and consensus of the expert/experienced judges of the sector. In the present study, scenario was not intended to forecast or predict a desired future; but to produce an illustration of the possible futures for learning opportunity and be prepared for any unanticipated changes. Delphi technique was used to collect and analyze data to project the future scenario of DEE. The steps

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followed in the process of comprehending the status of Dairy Entrepreneurial Ecosystem were as detailed by Kale et al. (2017); with slight modifications and sketched in the Fig 1:

The time frame for the study was for short term (up to 2025), medium term (2035) and long term (2050) period and the state of Kerala was the study area. Key factors were identified based on desk research and consultation with the experts (using key informant interviews and focus group discussion). Delphi survey questionnaire was prepared based on the same. A group of 10 experts involved in the field of dairy entrepreneurship in Kerala having experience above 15 years was selected by snowball sampling technique. They belonged to the different stakeholder categories, having prominent roles in developing dairy entrepreneurship in the state. The experts were from Kerala Veterinary and Animal Sciences University (KVASU), State Dairy Development Department, State Animal Husbandry Department, Kerala Livestock Development Board, Kerala Cooperative Milk Marketing Federation and a progressive dairy entrepreneur. In Delphi survey, a questionnaire with 34 statements was prepared to select the key factors and measure their significance along with probable changes that may occur over the selected period.

The importance and uncertainty of the key factors influencing the future of dairy entrepreneurial ecosystem of Kerala was analyzed. The key factors were judged on a 5-point scale by the Delphi panel in Round I. The importance of the factors was measured with a scale ranging from least important (1) to extremely important (5) and the probability of occurrence of change in the factors was measured from highly certain (1) to highly uncertain (5). The first round responses were analyzed for measures of central tendency (Mean, Median and Mode) and dispersion (Standard Deviation) (Grisham, 2009) and those results were sent back to the panel in order to see whether agreement/disagreement increases or decreases (Round II).

On completion of the second round, an index value of the statements was calculated to identify the key factors and probability of occurrence of change in the key factors using the formula given below:

$$\text{Index} = \frac{\textit{Obtained Score}}{\textit{Maximum Obtainable Score}} \times 100$$

Based on the index values, the key factors and their change or trends were prioritized. The key factors were then ordered on the basis of priority and clustered into groups with the help of a scenario team. Two key factors with critical uncertainty in terms of occurrence of change and highest impact in the dairy entrepreneurial ecosystem were identified and a matrix was created with four conceivable scenarios. The other factors were interpreted and logically fitted into the scenarios. Scenarios were generated for the short term, medium term and long term period. The scenarios were carefully examined by a scenario team in line with their experiences and literature review, for proper understanding and explanation which forms the basis for future plan of action. The narration of the scenario was written as per the interpretation by the scenario team and also the commentary provided by the panel members during the course of Delphi survey.

Results and Discussion

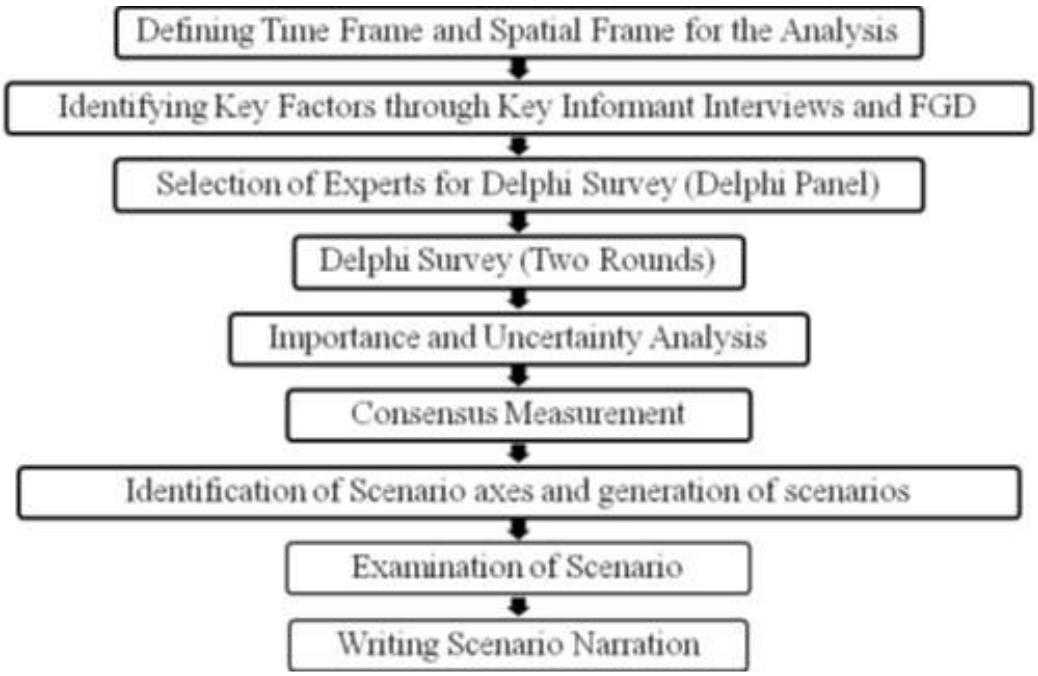

Fig 1: Steps used to project the future scenario of Dairy Entrepreneurial Ecosystem

Table 1: Salient outcomes of scenarios for the Short term period (up to 2025)

Scenarios			
Futile Uncertainty dimensions: Strong support services; but low dairy entrepreneurial growth	Changing (✓) – desirable Uncertainty dimensions: Strong support services; with high dairy entrepreneurial growth	Constant Uncertainty dimensions: Weak support services and low dairy entrepreneurial growth	Neglected Uncertainty dimensions: Weak support services; however high dairy entrepreneurial growth
Outcomes			
Favourable government support in the background of COVID-19 with new schemes and services.	Encourages entry of nascent entrepreneurs; imposed choice for income generation for youth, displaced workers and expatriates. Migration to dairying due to loss in other sectors.	Lesser subsidies and schemes for dairy development due to financial constraints caused by COVID-19 pandemic. Primary production sectors are prone to be neglected at times of financial crisis.	Overlooking support, new entrepreneurs may take up dairying as a voluntary or forced choice of income generation by investing their own resources without waiting for support from government.
Hike in milk productivity due to breeding support through high quality semen and insemination facilities.	Consumer trend moves to unpacked farm fresh milk; hence expansion of local milk market with better price.	Though cattle induction from neighbouring states has contributed to increase in milk production, it has created an allusion of spread of animal diseases which apprehends the number of takers for government schemes during the recent times.	There shall be media hype and celebration of dairy entrepreneurial success with more appealing stories appearing in media. This naturally fascinates youth towards the sector and shall pave ways for new entrants to dairying.
Bank loan facilities are available at lower interest; but mortgaging shall be a must for bigger dairy units.	Liquidity of the sector shall attract investment and number of animals in farms shall increase for higher profitability. (Minimum profitability with 8-10 animals by 2025)	Demand for liquid milk shall remain steady or shall increase marginally until 2025. It is the lowest among the South Indian states and this shall negatively impact the growth of dairy sector.	The demand for fresh milk, out of quality and health concern is increasing among the urban families especially for feeding infants and children. This indirectly creates a market for new dairy entrepreneurs who take up direct marketing.
Government subsidies shall continue at the present pace; but the number of beneficiaries shall be limited due to fund constraints.	Society shall give due respect to dairy entrepreneurs and there shall be recognition and awards for dairy entrepreneurship.	Number of smallholder dairy farmers shall remain stagnant or lessen during the short-term period. Cost of milk production shall increase and profits for small holders may be less, which is negative for dairy entrepreneurial growth.	Special ghee, spiced paneer, dairy health supplements etc. are gaining popularity creating opportunities for product diversification. This market demand shall develop the sector in spite of deprived support services.
There shall be more agencies and more schemes in the animal and owner insurance sector. But entrepreneurs may evade insurance owing to high premium.	Effective support services extended by Government departments, public sector undertakings, banks and cooperatives shall boost the growth of dairy entrepreneurship.	The breeding policy of the state refrain the use of pure exotic semen which impedes the creation of high productive animals. The entrepreneur's interests may thus be curtailed which negatively affect dairy entrepreneurial development.	Diversification can lead to dairy entrepreneurs themselves starting consultancy services, sales of inputs especially feed and fodder; and starting training activities.
Skilled and unskilled labour availability increases due to unemployment, movement of displaced workers from other fields and migration of labour from other states		Competition with cooperatives in selling price is a disadvantage for the entrepreneur; for he is constrained to sell his product at a lower price.	

Table 2: Salient outcomes of scenarios for the medium term period (2035)

Scenarios			
Protective	Competitive (✓) - desirable	Status quo	Transitional
Uncertainty dimensions:Strong cooperative sector; but low dairy entrepreneurial growth	Uncertainty dimensions: Strong cooperative sector and high dairy entrepreneurial growth	Uncertainty dimensions: Weak cooperative sector and low dairy entrepreneurial growth	Uncertainty dimensions: Weak cooperative sector; nevertheless high dairy entrepreneurial growth
Outcomes			
Government support is usually given through dairy cooperatives in the form of subsidies, incentives and pension; available to its members. This shall benefit smallholders; and not farm owners, whose dependency is less on cooperatives and also avoid meagre pensions.	The number of dairy entrepreneurs shall increase due to consistent entry of youth, use of technology and product diversification (also including dung and urine products) in dairying during the medium term. Also there shall be growth of secondary trading entrepreneurs.	A decreasing trend in milk production continued through the short term to medium term period shall weaken the cooperative sector, resulting in increased inflow of cheaper milk from neighbouring states, through cross-border milk traders. This will increase competition and is detrimental to dairy entrepreneurship.	Despite the weakening of cooperative sector, the number of dairy entrepreneurs shall marginally increase and dairy farms may transform to larger ones with capital-intensive operations, advanced breeding and feeding technology, increased scale of production, variety products and direct marketing alternatives.
The small holder dairy farmers who are at present in their fifties shall remain in the field for a maximum of another 15 years. In addition, they have disinterest/risk in local sales (apathetic to household sales due to delay in getting milk price); hence their milk shall always flow to cooperatives.	There shall be availability of funds from private agencies for dairying in the medium term, especially funding in the form of venture capital for processing start-ups or private investment as part of contract farming by retail chains, supermarkets, processing industries etc.	The number of milch animals may decrease in the medium term because of drop out of small holders (the pillar of cooperatives) due to high cost of production, lack of land availability and strict environment protection laws and compulsory licensing etc. It is also forecasted that commercial dairy farms shall compensate the decrease in animals and hence static milk production.	Availability of training and incubation facilities for dairy entrepreneurship shall increase over the period in line with those already established by public institutes in livestock sector. Online forums shall emerge as the main platforms for training to cater expected change in technologies.
There shall be increase in the number of dairy cooperatives and processing plants continuing the current trend due to political interests and government support. Also there shall be revamping and merger of cooperatives for economies of scale and export. The government in power has a tendency to capture the administration of regional milk unions; by increasing the number of cooperatives having political affiliation to the ruling party.	There are chances of low cost feed substitutes/formulations using locally available resources entering market in the medium-term period. New customized equipment/devices at low cost shall enter market as part of mechanisation. Labour cost shall decrease and condition shall shift from labour scarcity to surplus.	There shall be merger/amalgamation of cooperatives or conversion to producer companies in order to gain better scale of production and avoid liquidation during the medium term. Also a good number of dairy cooperatives and dairy plants shall become defunct due to non-viability and tough competition.	ICT sources; especially use of mobile and social media shall increase for selling of milk and milk products directly to consumers (through apps and portals); already initiated by private agencies. Milk shall be available in different types, quantities and packaging options.
The incremental increase in procurement and selling price of milk shall continue from the short term to the medium term period; prompting small holders to bind to cooperatives. It shall indirectly affect the sales of dairy entrepreneurs, pressured to sell their product at the price of cooperatives.	Animal identification and insurance shall change from optional to mandatory to rear cattle; and insurance schemes shall be tailored as per the requirement of the entrepreneur; benefitting him. Also paid consultancy and single window services shall be popular.	The increasing trend in cost of animals, input and utility services shall continue. It shall reduce the profit margin, with falling interest in dairy entrepreneurial activity. Also Government support with incentives shall come down.	Private veterinary hospitals shall increase by 2035. Number of professional private consultants in dairy field shall escalate during the medium term, utilized by large farm owners. Ayurvedic and homoeopathic treatment of animals shall get popularized.

Table 3: Salient outcomes of scenarios for the long term period (2050)

Scenarios			1
Lethargic Uncertainty dimensions:Strong technology; but low dairy entrepreneurial growth	Dynamic(✓) – desirable Uncertainty dimensions: Strong technology with high dairy entrepreneurial growth	Conventional Uncertainty dimensions: Weak technology leading to low dairy entrepreneurial growth	Conservative Uncertainty dimensions:Weak technology; however high dairy entrepreneurial growth
Outcomes			
The technological advancement in production (better animal productivity) and processing sector (continuous methods) shall be high during the long term period. But the use of the technologies by entrepreneurs may be limited owing to cost factors, indifference to adopt and lack of information and training.	Adopting the changes in technology, dairy farms shall prosper in the long term due to increased profitability. Rather than high-tech farms, growth will be for skill-tech farms (using technology skilfully than plentifully). Dairy production and processing shall transform as an entirely business enterprise for youth.	Number of dairy entrepreneurs shall marginally decrease due to cost of milk production, reduced profits and competition from external milk brands. Dairying will vanish from peri-urban areas unless innovative methods for waste disposal evolve. Number of cattle shall also shrink and the per-animal productivity may no longer be able to hold on the level of milk production.	Number of small holders in dairy shall diminish to the level of 50% from the short term period. But there shall be growth of dairy entrepreneurs having land and financial resources particularly in rural areas following an integrated approach with agriculture and dairying.
Competition from milk brands outside the state shall increase steadily. Efficient local brands shall survive competing in the market. Contract farming, online purchase/sales, mobile apps, door delivery etc. shall be highly prevalent. Food Safety and Standards Authority of India (FSSAI) shall make chilling/processing milk mandatory for sales similar to registration/license at present, citing health reasons.	Organic milk, A2 milk and their products may gain importance among an elite group of population. There shall be change in consumer preferences and it depends on quality, price, advertisement, health and accessibility; which can be used by dairy entrepreneurs. There shall be Public-Private-Community-Partnership (PPCP) in milk marketing; and farm branding dominates product branding in the long term.	It is very unlikely for cooperatives and entrepreneurs to beat the effect of cross border price difference due to high cost of production. The local milk will find it hard to compete with incoming milk, due to price difference. The assumption is that there may be influx of additional 60 LLPD to Kerala by 2050 from outside states.	Number of cattle owned by an individual entrepreneur may increase during the long-term period. Dairy farms may transform to larger ones with direct marketing. Availability of cheap labour due to unemployment shall inhibit chances of mechanization.
Profitability may decrease in the long-term period and number of animals in a dairy farm should increase for better profitability. Licensing will be mandatory and Animal Husbandry/Dairy Development Departments shall have a say in issuing license to dairy farms.	Number of dairy smallholders shall reduce to a higher extent by 2050. Many young smallholders may grow to an entrepreneurial level by upgrading their farms through intensive methods and innovative marketing for survival.	Leaving apart the cooperative sector, sale price of milk in unorganized sector shall be different in rural and urban market. Out of competition, it is forecasted that the selling price may reduce in the long term, depressingly affecting dairy entrepreneurs of the state.	The increased productivity of animals in the long term may result in additional infertility and disease problems instigating the entrepreneur to adopt lesser productive and adaptive breeds without affecting the herd size.
Mechanization shall grow as a must in dairy industry and new equipment/devices shall enter market. There shall be customized equipment manufacturers and sellers in market. However, in the long term, the cost of mechanization shall increase; prompting the entrepreneur to select cheaper labour against automated systems.	There shall be sharp drop in the number of dairy cooperatives and many dairy cooperatives may transform to producer companies. In addition, private dairy plants shall take up alternate models of marketing to compete with national/international brands.	There are chances of overhauling or merger of various departments for improved efficiency during the long term. Government intervention shall be restricted to extension, insurance, social security and regulatory laws. Smallholders may be brought under minimum wages norms with financial support.	There are chances of proliferating desi and indigenous milch breeds with better production and climate adaptability as part of state and central government schemes. Climate crisis and natural calamities may also contribute in selection of animals.

The results obtained after the Delphi analysis is expressed for the three periods as given below:

Future scenario of the dairy entrepreneurial ecosystem by 2025 (short term)

The four scenarios produced were named as 'futile', 'changing', 'constant' and 'neglected' based on the strength or weakness of 'support services' leading to high or low 'dairy entrepreneurial growth'; which were the uncertainty dimensions. It was seen that stronger support services shall form the base of a productive entrepreneurial ecosystem and this shall induct a higher number of new entrants into the dairy sector. The salient outcomes during the short term are given in Table 1. 'Changing' dairy entrepreneurial ecosystem is the desirable scenario during the short term.

Future scenario of the dairy entrepreneurial ecosystem by 2035 (medium term)

The scenario matrix was framed depicting the key uncertainty dimensions of 'Cooperative sector' and 'Dairy Entrepreneurial Growth'. Stronger expansion of organized cooperative sector and more intense participation of entrepreneurs in dairying form the base for a further competitive entrepreneurial ecosystem. The four scenarios were named as 'protective', 'competitive', 'status quo' and 'transitional'. The salient outcomes of the scenarios forecasted by 2035 are given in table 2 and 'Competitive' dairy entrepreneurial ecosystem is the desirable one.

Future scenario of the dairy entrepreneurial ecosystem by 2050 (long term)

The scenario matrix was illustrated depicting the key uncertainty dimensions of 'Advanced Technology' and 'Dairy Entrepreneurial Growth'. The four scenarios by 2050 were named as 'lethargic', 'dynamic', 'conventional' and 'conservative' based on the strength or weakness of advanced technology leading to high or low dairy entrepreneurial growth and forecasted in table 3; and 'Dynamic' system being the desirable scenario.

Conclusion

The projection of the dairy entrepreneurial ecosystem of the state of Kerala provides both desirable and undesirable scenarios in the future for the three terms studied. During the short term, support services shall be the main driving factor for high dairy entrepreneurial growth which can be designated as 'changing dairy entrepreneurial ecosystem'. During the medium term cooperative sector shall be the leading major factor; and its strength shall decide an appropriate dairy entrepreneurial growth labelled as 'competitive dairy entrepreneurial ecosystem'. Strength of advanced technology in milk production, processing and marketing shall be the driving factor for desired dairy entrepreneurial growth during the long term, termed as 'dynamic dairy entrepreneurial ecosystem'. Other scenarios too were predicted pertaining to weaker driving factors which lead to diminished dairy entrepreneurial growth. Furthermore, scenarios were described when there was possibility of dairy entrepreneurial growth in spite of weak driving factors; and those when even strong driving factors shall not create desired dairy entrepreneurial growth. Moreover, it is to be noted that the expected outcomes shall be overlapping the periods; as one cannot ignore the possibility of an outcome getting extended from one term to another. The results shall enable the actors of the dairy entrepreneurial ecosystem and also the policy makers to appreciate the plausible future outcomes and plan in advance, to reconsider their actions towards a desirable dairy entrepreneurial development.

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