

**RESEARCH ARTICLE**

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## Dairy Entrepreneurial Ecosystem of Kerala, India

**S.R.Shyam Suraj****ABSTRACT**

*During the recent times, studies on entrepreneurship are found to shift their focus from entrepreneur-centered to environment-centered; outlining the role of entrepreneurial ecosystem in creating productive entrepreneurship. An attempt was made to map the dairy entrepreneurial ecosystem of Kerala state in India, to understand the actors and factors, functional stages of the actors and the linkages among them. The methodology followed was desk research, key informant interviews and focus group discussions. Mapping exposed the major actors under the financial, support, technology, human capital, culture and legal domains; and factors were direct, partially direct and indirect. The actors were grouped under the different functional stages of ideation, establishment, survival, early and late growth and maturity; as well as their linkages were portrayed. The findings shall enable appropriate planning and interventions to refurbish the ecosystem for a more dynamic dairy entrepreneurial development.*

**Keywords:** Entrepreneurial ecosystem; dairy; factors; actors; linkages; roles; Kerala

**INTRODUCTION**

Entrepreneurial Ecosystem usually abbreviated as 'EE' is the recently emerged systemic view of entrepreneurship. This new concept has its roots from the studies relating to clustering of innovation and regional innovation systems (RIS). 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'.

It is advocated that the research system should map and understand the evolving entrepreneurial ecosystem (EE) in agriculture and allied sectors; and increase the understanding on entrepreneurship (Prasad, 2018). Hence a primary

effort was made to map the entrepreneurial ecosystem of the dairy sector of Kerala (India) to determine the actors and factors contributing to dairy entrepreneurship in the state and study their relationship with the dairy entrepreneur. Kerala was chosen for the study owing to several valid reasons, the prominent among them being the award which it received as the best state in raising milk productivity instituted by India Today Agro-Summit and Awards 2018; the performance getting linked with affirmative dairy entrepreneurship and the contributing dairy entrepreneurial ecosystem (DEE). Also, the state was ranked high in dairy progressiveness (Kale et al, 2016) and milk marketing infrastructure (Mohapatra and Sendhil, 2020), which are key to the dairy entrepreneurial ecosystem. Looking

into the depressing aspect, Kerala was also hit by floods during 2018 and dairy sector was worst affected (Arun and Senthilkumar. 2021).

According to GIZ (2018), mapping is the process of observing, analysing and visualizing the entrepreneurial ecosystem. Auerswald (2015) suggests that we map an entrepreneurial ecosystem as a relational inventory of participants and how they are connected. The relationships can be differentiated by type, direction and magnitude of interaction. In short, mapping helps to identify central players, key relational structures and linked domains of capabilities. If validated by entrepreneurs and sectoral experts, ecosystem maps are valuable tools in developing strategies. Accordingly, this study was taken up.

## METHODOLOGY

The present mapping was done to record the dairy entrepreneurship scene in the given context and plot the relations and interactions between its elements. The data collection included desk research, key informant interviews and focus group discussions. Desk research included the collection of secondary information from government departments and state universities. Thirty Key Informant Interviews were conducted with two members each from the various stakeholders in the dairy sector including government and cooperative officials, banks, universities, dairy entrepreneurs/farmers and consumers. Five Focus Group Discussions were performed with groups of animal husbandry department officials, dairy department officials, dairy cooperative secretaries, dairy farmer groups and milk consumer groups. The data was analysed and along with other collected information, the ecosystem was pictured using appropriate visualization tools (tables and figures). Two key informants each from 15 different dairy stakeholder categories were interviewed and 10 focus groups discussions were conducted to

collect data. The stakeholders included dairy entrepreneurs, government department officials, dairy co-operative secretaries, banks and grama panchayat members etc. The initial data collected from key informants was analysed, discussed and finalized in the focus group discussions.

The factors affecting the dairy entrepreneurial ecosystem were portrayed in line with the PESTEL analysis; acronym for political, economic, social, technological, ecological and legal factors (Walsh, 2005). Additionally, market factors were also included in the dairy entrepreneurial ecosystem along with other factors. Also depending on their influence on entrepreneurship; these factors were direct, partially direct and indirect (ANDE, 2013). Direct factors had immediate and straight influence on dairy entrepreneurial ecosystem; while partially direct though had straight effect, was not on regular basis. Indirect factors were those whose effect was unfamiliar to the entrepreneur; and were imperceptible and made an isolated appearance. The actors of the dairy entrepreneurial ecosystem were grouped into seven categories: financial, support, technology, market, human capital, culture and legal according to the ecosystem domain classification given by Isenberg (2011) with minor modifications. The functional stages of dairy entrepreneurship were expressed as per the six stages given by Kahan (2013) which included ideation (pre-establishment), establishment, survival, early growth, rapid growth and maturity or decline.

The relationship and flow of information (strong or weak) among the actors were mapped to enable reflection and action on refining the information flow leading to better system performance; as the frequency of contact of dairy entrepreneurs with information sources were found to be medium in Kerala (Shyam and Kadian, 2022). Actor-Linkage Matrix developed by Biggs

and Matsuert (2004) was used to explore linkages between the actors. Here the various actors of the ecosystem were listed along the vertical and horizontal axes and the key informants were asked to express the linkage scores as per their information and experience. The cells in the matrix represented the linkage expressed as the mean scores given by the key informants in a continuum of 3, 2, 1 for linkage strength and 0 for no linkage. The mean scores i.e., the total scores divided by the number of respondents, represented strong linkage (2.1-3.0), medium linkage (1.1-2.0), weak linkage (0.1 to 1.0), no linkage (0) and also blank (do not know) between the actors in the rows to actors in the columns as applied by Prasad and Sulaiman (2004) in their study on fodder innovation systems. The overlapping roles of actors, a weakness of the ecosystem was displayed qualitatively using Venn diagrams (Paradi, 2012) as they make the distinction visually clear for the audience. The overlapping shapes were given in circles and role title was inserted to show what was common to both shapes. Narrations followed to clarify the details of overlapping.

## FINDINGS AND DISCUSSION

### Factors of the Dairy Entrepreneurial Ecosystem

Table 1 represents the key factors affecting dairy entrepreneurship in Kerala. The most

important directly influencing factors were milk price and bank loans (economic), market identification and marketing methods (market), attitude of officials and subsidies (political), experience and family labour (socio-cultural), knowledge and inputs (technological) and license of farm and purchase of animals from outside state (legal). Co-operative and food safety laws were only partially influencing legal factors. Training and mechanization were partially influencing; while R & D and waste disposal were indirectly affecting technological factors.

Media support and women participation in dairying were partially direct socio-cultural factors of entrepreneurship; while rural-urban differences and social status were indirect. Fund flow to the sector and milk inflow from other states was partially direct political factors; while welfare funds and govt. policies were indirect. Insurance and loan interest were partially direct; and record keeping was an indirect economic factor. Consumer demand was a partially direct market factor while milk pricing and agent's commission were indirect factors. It was also seen that there were only slight differences in the effect of certain direct and partially direct factors; particularly economic, market and technological factors.

**Table 1: Key factors affecting Dairy Entrepreneurial Ecosystem**

Factors	Degree of Influence		
	Direct	Partially Direct	Indirect
Political	Loan Norms Government Subsidies Attitude of officials	Plastic ban Milk inflow from other states Fund flow to the sector	Welfare Funds Command over co-ops Government policies

Factors	Degree of Influence		
	Direct	Partially Direct	Indirect
Economic	Bank loan Milk price Production cost By-products	Insurance Loan interest	Record keeping
Socio-cultural	Family labor Rearing practices Experience and awareness	Media support Women participation	Rural-urban difference Social status
Technological	Inputs Knowledge Advisory services Hygiene Diseases	Training Mechanization Management	Research and development
Ecological	--	--	Climate change Natural disasters Waste disposal
Legal	License Animal purchase Pollution	Cooperative Laws Food Safety Laws	Taxes
Market	Market identification Marketing methods	Consumer demand	Milk pricing Agents commission

### Actors of the Dairy Entrepreneurial Ecosystem

Table 2 displays the various actors forming part of the dairy entrepreneurial ecosystem of Kerala state. The actors included individuals, groups, formal and informal institutions and organizations. Financial actors consisted of banks, money lending private agencies and friends/relatives who were sources of finance to the dairy entrepreneur. Support system actors were the Government departments (Dairy Development, Animal Husbandry, Rural

Development etc.), public sector undertakings (Kerala Livestock Development Board, Kerala Feeds Ltd, Kerala Dairy Farmers Welfare Fund Board etc.), input agencies and utility service providers giving input in the form of product, services or infrastructure facilities to support the dairy entrepreneur. Actors providing technology were the Government departments, *Krishi Vigyan Kendras* (KVK) and Universities (Kerala Veterinary and Animal Sciences University - KVASU and Kerala Agricultural University - KAU) in the form of consultancy and training.

**Table 2: Important Actors of the Dairy Entrepreneurial Ecosystem**

Actor Category						
Financial	Support	Technology	Market	Human Capital	Culture	Legal
Nationalized banks	Government departments	Government Departments	Kerala Cooperative Milk Marketing Federation	Family Labor	Neighbors	Food Safety and Standards Authority of India
Cooperative banks	Public Sector Undertakings	<i>Krishi Vigyan Kendras</i>	Private Agencies	Skilled Labor	Media	Pollution Control Board
Money lending agencies	Input agencies	Universities	Milk vendors	Unskilled Labor	Dairy farmer	Local Self Governments
Friends and relatives	Utility services	Private Agencies	Consumers FPOs	--	Family members	--

The market actors were Kerala Cooperative Milk Marketing Federation-KCMMF (referred as MILMA), dairy cooperatives and private dairies providing marketing channels; and consumers. Family labour and skilled/unskilled labour were the human capital actor category. Family, neighbours, media and fellow dairy farmers were the cultural actors. Local Self Governments (comprising grama/village, block and district panchayats), Food Safety and Standards Authority of India (FSSAI) and State Pollution Control Board were the legal actors.

### Functional stages of actors

Fig. 1 depicts the functional stage of the actors in dairy entrepreneurship in the state. The role of input agencies was from the establishment to the rapid growth stage. Establishment of the

dairy enterprise required the support of input agencies for purchase of equipment; animals etc. followed by the role of feed, fodder and medicine suppliers during the next three stages (survival, early growth and rapid growth). The role of Kerala Veterinary and Animal Sciences University (KVASU) was during the ideation and establishment stage where the entrepreneurs consult the university experts for training and guidance for prior knowledge and opening the enterprise. The role of MILMA and dairy cooperatives were mainly in marketing and hence their role was from survival to maturity stage. The role of Kerala Livestock Development Board (KLDB) was during ideation, establishment and survival. The agency provided training to the dairy entrepreneurs and rendered inputs like semen and fodder seeds.

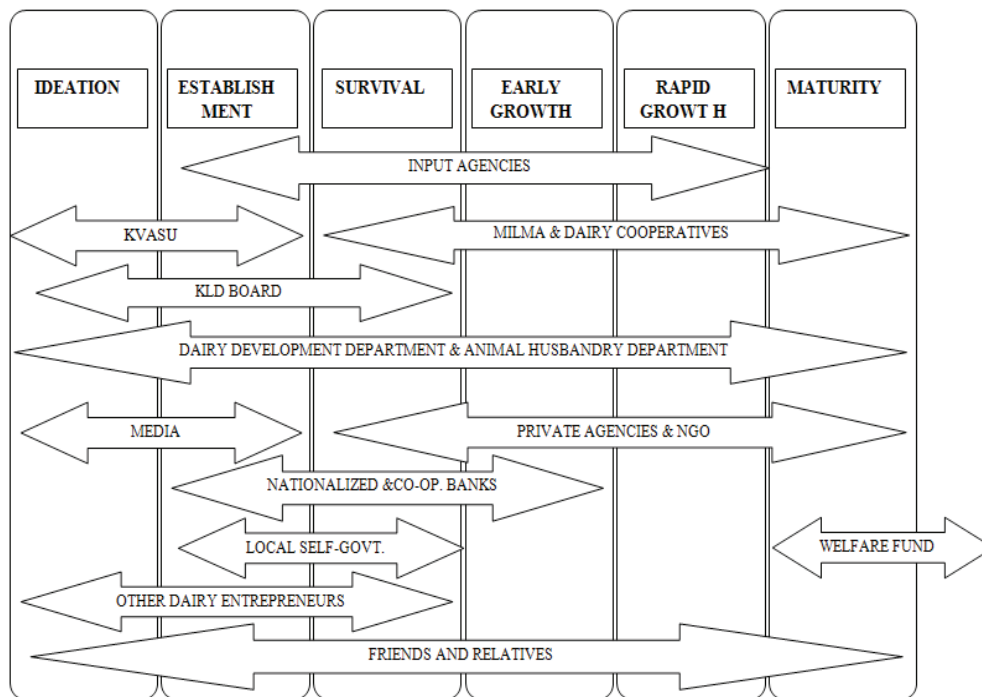


Figure 1: Actors and their functional stages in Dairy Entrepreneurship

The role of two major government departments – Dairy Development (DDD) and Animal Husbandry (AHD) were important in all the six stages of dairy entrepreneurship. These two departments had a day-to-day involvement in dairy entrepreneurship through schemes, services, training and extension. Under DDD functions, the Kerala Dairy Farmers Welfare Fund Board (KDFWFB), which provided pension to dairy farming community; a function performed even after the decline/maturity stage of entrepreneurship. The role of media was significant during the ideation and establishment stages for information and education. The role of private agencies marketing milk extended from the survival to maturity stage. Non-Governmental Organizations (NGOs) taking up dairy related activities functioned similar to private agencies; except that they contributed to ideation too. Banks had a role mainly from

establishment to early growth. Local self-government institutions supported dairying mostly during establishment and survival. Fellow dairy entrepreneurs were important for ideation, establishment and survival. Friends and relatives supported the dairy entrepreneurship during all the six stages, which was inevitable. The roles played by the actors were expressed in terms of their significance at each stage; however, it may also extend to other stages at times as per necessities.

### Actor-Linkage Matrix

Fig. 2 portrays the Actor-Linkage Matrix in the dairy entrepreneurial ecosystem. The matrix shows that there was a strong linkage of the dairy entrepreneur with the dairy cooperatives, Govt. departments, Local Self Government Department and bank; because there was regular contact of the entrepreneur with them.

There was no linkage with MILMA (regional milk unions and federation) because the marketing of milk by the dairy entrepreneur was through primary dairy cooperatives, which in turn was strongly linked with the unions of MILMA. The dairy cooperatives also had strong linkages with

the government departments and regional milk unions; but weak linkage with KVASU and have no opinion on relation with KVK. Private agencies marketing milk have strong linkages with dairy entrepreneurs, AHD and banks; but have medium or weak linkages with other stakeholders.

ACTORS	DE	DCS	PVT	DDD	AHD	INPUT	LSGD	BANK	KVK	KVASU	MILMA
DE		2.5	1	3	3	1.5	2.5	3	0.5	1.5	0
DCS	3		0	3	2.5	2.5	2.5	3		2	2.5
PVT	3			1	2.5	3		3		1.5	0
DDD	3	3	0.5		2.5	2.5	3	1.5	0	1.5	3
AHD	3	3	2.5	3		3	2.5	2	1.5	2	1.5
INPUT	3	3	1.5	3	1.5		0.5	0	1.5	2.5	1.5
LSGD	1	2.5	1	3	3			1.5	1		
BANK	2	2.5	1.5	3	3	2.5	3		1	0.5	3
KVK	1.5		0	0	1.5		2	2		1.5	
KVASU	1	1	2	2.5	2.5	1		0.5	1		2
MILMA	2	2.5	0	3	0			2		0.5	

**DE:** Dairy Entrepreneur

**PVT:** Private Agencies

**AHD:** Animal Husbandry Dept

**LSGD:** Local Self Government Dept.

**KVK:** Krishi Vigyan Kendra

**LINKAGES:** 2.1 - 3.0 = **STRONG**, 1.1-2.0 = **MEDIUM**, 0.1 - 1.0 = **WEAK**, 0 = NO LINKAGE AND BLANK FOR 'DON'T KNOW'

**DCS:** Dairy Cooperative Society

**DDD:** Dairy Development Dept

**INPUT:** Input Agencies

**BANK:** Nationalized and Others

**MILMA:** Apex Dairy Federation

*Figure 2: Actor Linkage Matrix in Dairy Entrepreneurial Ecosystem*

Dairy Development Department (DDD) and Animal Husbandry Departments (AHD) had strong linkages with the majority of stakeholders. While DDD had strong linkage with MILMA, it was only medium for AHD. There was no linkage between KVK and DDD. Input suppliers had strong linkage with the DDD, entrepreneur and dairy cooperatives. MILMA had strong linkages

with dairy cooperatives and DDD. Local self-government departments (LSGDs) had strong linkages with dairy cooperatives and the vital Government departments. The linkages of KVASU, KVK and banks with the stakeholders were medium to weak in comparison to others. The actor-linkage matrix revealed that there were stronger linkages mainly among the dairy

entrepreneurs, dairy cooperatives, Government departments, input agencies and MILMA; which was required for the facilitation and growth of dairy entrepreneurship. There was requirement for the universities and KVK to develop strong linkages with other stakeholders particularly in entrepreneur education and effective technology transfer.

There was absence of formal/informal mechanism for stakeholder coordination among government departments/agencies, who were key sponsors to the dairy entrepreneurial ecosystem; due to lack of combined efforts, ego problems of officials, overlapping of functions and compartmentalization. However, it can be overcome by proper initiatives for joint efforts, open discussions and non-overlapping of roles and functions.

### Overlapping Roles of Ecosystem Actors

Fig. 3 depicts the overlapping roles of the dairy entrepreneurial ecosystem actors of Kerala.

There were overlapping roles mainly among four actors – Dairy Development, Animal Husbandry, MILMA and Kerala Livestock Development Board. Extension/advisory services and dairy schemes were common activities among the two government departments (DDD and AHD). Nevertheless, there was a difference in subsidy norms between the departments. There was similarity in schemes and services between AHD and KLDB. Also, there were overlapping roles in schemes and extension activities between DDD and MILMA. With regard to KLDB and MILMA, there was overlap of training and extension. College of Veterinary and Animal Sciences (under KVASU) overlapped with AHD in training, while College of Dairy Science and Technology (under KVASU) overlapped with DDD and MILMA in the same. Recently MILMA had stopped its activities at its Training Centre due to lack of funds and non-availability of trainees. Local Self Governments had similarity of dairy related schemes with AHD and DDD.

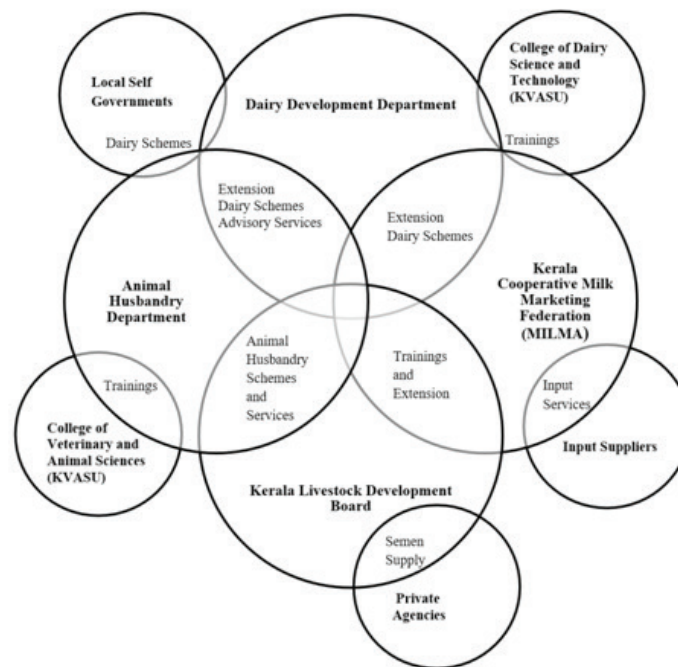


Figure 3: Overlapping Roles of Dairy Entrepreneurial Ecosystem Actors



## CONCLUSION

The dairy entrepreneurial ecosystem of Kerala reveals a list of factors and actors contributing to dairy entrepreneurship; and the functional stages of actors throw light on their importance for its development. The actor-linkage matrix outlines the strength and types of linkages; revealing the mislaid networks in the system. Exposing overlapping roles shall aid in eliminating redundant functions and deciding on the proper nodal agencies. Altogether mapping shall assist the authorities to comprehend the dairy entrepreneurial ecosystem of the state with its contributions and limitations; and take steps for either detailed inquiry or initiate actions to amend the ecosystem for a dynamic dairy entrepreneurship.

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