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### ASSESSING BEHAVIOUR OF FARMERS IN LINKING TO VILLAGE INSTITUTION: DAIRY SOCIETY'S PERSPECTIVE FROM SEMIARID REGIONS, GUJARAT, INDIA

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#### KEYWORDS

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Dairy  
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#### ABSTRACT

Dairy Co-operative Societies (DCS) in India are an important entity in linking smallholder livestock producers with external market. This helps smallholder producer(s) in occupational diversification and gainful income. These economically important institutions also serve social purposes. Co-operative member farmers get an opportunity to interact among themselves as well members outside their society. In semiarid regions, the nature of dependence on these institutions among communities for their livelihood becomes particularly more important. The present study appreciates behaviour of farmers to supply milk to dairy society in Panchmahal district, a semiarid region of Gujarat state, India. The relationship pattern of socioeconomic variables viz., age, education, land size and total milk production were assessed towards linkage of farmers with this particular village institution. The nature of such linkage by society with local institutions often determines technological refinement, intervention and adoption. The study did not find any significant relationship for variables like age, education and total milk production in respect to farmers approaching milk cooperative societies. However, land holding size among respondents appeared to be a significant factor towards supply of milk to societies/society. This clearly demonstrates importance of identifying and understanding variables that can influence livestock interventions through dairy societies. The developmental intermediations must take this into account for welfare of farmers in semiarid region.

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## 1 Introduction

Rainfed agriculture play an important role in Indian economy as nearly 100 million ha of land is under rainfed cultivation (Mynavathi & Jayanthi, 2015). The nature of agricultural cultivation in these regions was less intensive, serving subsistence requirements of farmers (Ravikumar et al., 2015a). Under such circumstances, dairy farming with support of crop farming does provide steady flow of income and visualized as a viable enterprise (Chaurasiya et al., 2016). The importance of animal husbandry in rainfed regions were reinforced as these areas did not avail greater benefit through technologies responsible for green revolution in India (Kumar & Singh, 2008). Livestock in these regions plays pivotal role in smallholder production system as it meets unexpected household expense (Ibrahim et al., 2014). The economic efficiency in small holder production units were determined by institutional factors, socioeconomic and farm characteristics (Masuku et al., 2014). Further in recent times, agriculture farming experiences change in institutional arrangements as private stakeholders had emerged (Herzfeld & Jongeneel, 2012). There is a need to relook at institutions in the sphere of farmers interface as demand for milk and milk products has been on rise (Gautam et al., 2010). This is very much evinced in dryland livestock production system as there is pressure on natural resources due to increase in human population (Nyberg et al., 2015).

### 1.1 Technology Advancement for livelihood

Initiatives were taken to minimize technological gap in subsistence farming, a characteristic of most developing countries wherein communities rely on farming for food security and income generation (Larsen & Lilleor, 2014). Studies had found that extent of adoption of farm practices were influenced by variables such as education, operational landholding, extension contact, innovation proneness and decision making ability (Singha & Baruah, 2012). However, the disconnect between policy development and implementation has been known (Warren et al., 2016). This is pertinent as farmers in rainfed regions were not involved comprehensively while setting up priorities for research (Ravikumar et al., 2015a). Intervention programs were initiated with assumption that farmers can afford and make use of it (Nkya et al., 2007). It was illustrated at field of action that role of societies refining technology is crucial for wider diffusion of innovation. Farmer based assessment methods enable exchange of information and for effective implementation for livestock health system (Ravikumar et al., 2016). Silvestre & Neto (2014) expressed concern over social exclusion and wealth congregation due to limited use of technologies by economically poor section. The context is challenging with scenario that 60 percent of farming community in Asia have entitlement for only 28 percent of arable land in the world (Uotila & Dhanapala, 1994). The viability of technology or techno-economic utility has to be seen holistically during implementation and not in fragmented manner (Hiremath et al.,

2006). Linear model of development of technology from research stations were examined and implementation of technologies through non-linear, open source innovation systems were discussed (Ravikumar et al., 2016a).

### 1.2 Social setting and characteristics of rainfed agriculture

The relevance of psychological variables which may influence farmers decision have to be understood (Borges et al., 2014). Studies by Gebrezgabher et al. (2015) refer that age, education and farm size had affected farmers' behaviour in adoption of technology. According to Borges et al. (2016) adoption of an innovation is influenced by attitude, norm and perceived behaviour. Khode et al. (2009) found that attributes like education, land size, daily milk production, daily milk sale had played significant role in implementation of dairy management practices. In their social learning system, farmers were influenced by web of influencers and work within their boundary of practice (Oreszczyzn et al. 2010). The decision making ability of end users need to be examined for developing suitable communication strategies (Alarcon et al., 2014). The adoption of technologies for rural community has to be through partnership of all stakeholders (Dubeuf, 2014; Hani & Mustapit, 2016). It was felt to improvise such low input-low output smallholder livestock system with frontline demonstration and sustaining farmers skill through training (Pourouchottamane et al., 2012).

Farmers' adaptive measures need to be comprehensively understood from household, village and community, which are unit of beneficiary (Singh et al., 2014). This only can enhance the scope to plan suitable strategies for improvising their existing social context by strengthening their resilience. Members of community used to reinterpret messages as per their social need and context (Machila et al., 2007). Rufino et al. (2013) found that policies need to provide suitable safety system, market, and infrastructure support to minimize vulnerability in drier regions. Paucity of credit is one of the major characteristic of rainfed agriculture affecting economic activities (Baig et al., 2013). These smallholder system also appear to move towards intensification due to transformation from free range dairy system to intensive (stall-fed) production system (Hellin et al., 2013). This had created stress on natural resources, changing lifestyle and prevalence of diseases affecting livestock. However, poor availability of quality livestock service has been a constraint (Ravikumar & Chander, 2011). Adopting low cost locally available technological alternatives may be sustainable in such smallholder system (Ravikumar et al., 2015). Thus accessing financial service and technology through such service improvise household income (Hansen et al., 2015).

### 1.3 Social Support Service

The livelihood factors affecting farmers in rain-fed regions were not well appreciated among stakeholders. Peoples' resilience, their learning strategies and process with which

local people sustain themselves have to be analysed (Bacud et al., 2014). The interrelationship of stakeholders has been stressed for minimizing impact of drought (Habiba et al., 2012). Such vulnerable regions often affected with drought or drought like situation need to be supported with social service apart from intervention (Keshavarz & Karami, 2014). Dairy cooperatives in India had provided opportunity in reducing rural poverty through marketing of milk mostly from smallholders (Rajendran & Mohanty, 2004).

Dairy cooperatives as producer organization had empowered farmer members (Chander & Sulaiman, 2014). These institutions enable market access and reduce cost of transaction (Latynskiy & Berger, 2016). It had helped towards participation of women in economic upliftment as reflected in their increased membership percentage to 20 percent (Sheela & Ramegowda, 2013). Chand et al. (2015) refer that gender equity and increasing herd size up to six can maximize economic sustainability. Though such social institutional system is for poor, wealthier people also join and seek benefit through group action (Fischer & Qaim, 2012). Thus local institutions can enhance social and economic rewards among participants (Taylor & Grieken, 2015). In spite of advantages, these institutions could cater only to 17 percent of marketable commodity of surplus milk (Rathod et al., 2012).

Recognition livestock assets of resource poor, rural women have to be first step as it provides financial security and helps to exercise positive control over their livelihood (Ramkumar et al., 2004). It was opinioned institutional and technological advancement have to be effective for development of dairy sector (Kebebe et al., 2015). These institutions enable farmers to seek information and such interactions indirectly make them to initiative driven individuals (Hansen, 2015). Ravikumar et al. (2015) indicated that for improvising livelihood strategies in semiarid regions role of dairy cooperative societies need to be focussed.

Drought prone areas require initiatives in terms of utilizing niche specific technologies, institutional changes to help stakeholder operating at this interface (Shiferaw et al., 2014). It is in this context a research study was undertaken in semiarid regions of Gujarat to improve the understanding of farmer's behaviour in linking with dairy co-operative society (DCS). This will help scientific communities and extension agencies in

executing location specific technologies for enhancing livelihood security in rain-fed regions.

## 2 Materials and Method

The study was conducted to assess role of socioeconomic variables affecting nature of participation by farmers in supply of milk to dairy cooperative society (DCS), a village institution. Two villages viz., Vankoda of Kothambataluk, Lunawada block and Dhakaliya of Sheherataluk, Shehera block of Panchmahal district in Gujarat state were selected randomly. Twenty seven farmers were randomly selected from each of these two villages during 2012. A total of 54 farmers were selected and constituted sample size for the study. The information from respondents was enumerated with help of structured interview schedule through personnel interview. Their socio-economic status was ascertained with specific reference to age, education, land size and milk yield. The collected data were processed and analysed with help of chi-square test as sample size was more than 50 (N=54). Results obtained were calculated by applying Yates correction where frequency in ordinary table was found less than 10 to avoid inflated chi-square values as per Gupta (2000).

## 3 Results and Discussion

The focus on food security through small holder production system had gained attention and reinforces the need to appreciate factors apart from beliefs and social norms for technological advancement (Martínez-García et al., 2013). Social participation enables society to seek opportunities and avail social security as advocated by social theories which seeks engagement, empowerment and building of capacity (Rainer, 2014). Community action is an important entity for development and it has to be linked with innovation for effective utilization at farmers' field (Seyfang & Smith, 2007). Involvement of resource poor farmers and evaluating their resources, constraints are essential for implementation of livestock development program (Devesh et al., 2012). Assessing determinants in terms of farmers' behaviour towards marketing channels will provide fillip to knowledge towards improvising better livelihood initiatives (Lubungu et al., 2012). Hence, nature of association between variables like age, education, size of land, total milk production in relation to supply of milk to DCS were studied and summarized.

Table 1 2 X 2 chi square table reflecting relationship of age towards linkage with DCS.

SN	Treatment group	Response to supply of milk in DCS		
		Yes	No	Total
1	Less than Mean Value [47.18 ±1.91 years]	15	17	32
2	More than Mean Value [47.18±1.91 years]	13	9	22
	Total	28	26	54

Chi square  $\chi^2=1.35$  NS  $v=1$  ( $n-1$ )

Table 2 2 X 2 chi square table reflecting relationship of education towards linkage with DCS.

SN	Treatment group	Response to supply of milk in DCS		
		Yes	No	Total
1	Upto secondary school	14	18	32
2	Higher secondary & above	14	8	22
	Total	28	26	54

Chi square  $\chi^2=2.93$  NS  $\nu=1$  ( $n-1$ )

Table 3 2 X 2 chi square table reflecting relationship of land size towards linkage with DCS.

SN	Treatment group	Response to supply of milk in DCS		
		Yes	No	Total
1	Less than Mean value [4.35±0.29 acre of land]	11	24	35
2	More than Mean value [4.35±0.29 acre of land]	17	02	19
	Total	28	26	54

Chi square  $\chi^2=17.66$  \* $\nu=1$  ( $n-1$ )

### 3.1 Age

Nishi et al. (2011) found that majority of respondents in dairy societies were in middle age group (31-50 years). The study also vindicated with similar observations. About 40 percent of respondents were found to be above average years of age (47.18 ± 1.91). The results were interpreted to understand impact of age in supplying milk to dairy cooperative societies. The calculated value of  $\chi^2$  is less than table value  $\chi^2=3.85$  at 5% level of significance (Table 1) and results of study did not provide evidence against null hypothesis. The attribute age of respondents did not associate with supply of milk to dairy society. This was in agreement with Khode et al. (2009).

### 3.2 Education

It was found that about 40 percent of farmers in the study region had education of higher secondary & more. The calculated value of  $\chi^2$  is less than table value  $\chi^2=3.85$  at 5% level of significance (Table 2). This indicates that education did not have any significant association with supply of milk to dairy society among respondents of the study. The livelihood security among farmers in semi-arid regions is focussed on food security (Baumgartner & Hogger, 2006). Studies indicated that level of education did not influence milk production among dairy animals (Gangasagare & Karanjkar, 2009). This may be the reason for less influence of education towards linking farmers with village institutions.

### 3.3 Size of land

Ownership rights of land so as to enable integration into desired social process has been stressed (Ellis, 1999). About 44 percent of farmers did not supply milk to cooperative societies who had less than 4.35±0.29 acre (Mean ± Standard error) of land. The calculated value of  $\chi^2$  was greater than table value at 5% level of significance (Table 3). The size of land had significant association with respondent's behaviour towards supply of milk to dairy society. The study found that farmers with large size of land were more inclined towards supply of milk to dairy society. Market participation is strongly associated with land and this is in concurrence with Olwande et al. (2015).

These inferences were in agreement with findings that dairy societies in semi-arid region had significant association with farmers' with more of land ownership. The study aimed to monitor existing program of dairy cooperatives as a village institution to understand its role in fulfilment of desired objectives. Sheela & Ramegowda (2013) indicated overall societies were composed primarily of small, marginal (66%), landless (21%) farmer members. Thus providing technological alternatives to these village units have to be examined as they cater to community with more land and not necessarily landless or marginal farmers.

Table 4 2 X 2 chi square table reflecting relationship of total milk production towards linkage with DCS.

SN	Treatment group	Response to supply of milk in DCS		
		Yes	No	Total
1	Less than Mean value [10.11±0.48 litre]	19	14	33
2	More than Mean value [10.11±0.48 litre]	09	12	21
	Total	28	26	54

Chi square  $\chi^2=0.60$  NS  $\nu=1$  ( $n-1$ )

### 3.4 Total milk production

Majority of farmers (61.11 percent) were found with their livestock asset to produce less than  $10.11 \pm 0.48$  litres (Mean  $\pm$  Standard error) of milk per day. The study evaluated association between total milk production and behaviour of farmers towards supply of milk to society. The calculated value of  $\chi^2$  is less than table value  $\chi^2 = 3.85$  at 5% level of significance (Table 4). Hence, it was concluded that there was no significant association between total milk production and supply of milk to society by farmers. This is in agreement with Pica-Ciamarra et al. (2011) as livestock offers better nourishment to family. The overall experience in dairy farming (Singh et al., 2012) is an important factor, wherein livestock assets are considered for food security at households. Communities in dryland region try to minimize food intake so as to extend supply over time as a pattern of risk adjustment (Tewari & Gupta 1997). These understanding helps to mobilise farmers with suitable strategies and enable village institutions for delivery or utilization of suitable technologies (Roling 1988).

### Conclusion

Dairy cooperatives play an important role in rural society to link with market forces and for steady flow of income. Association of farmer behaviour with this village institutions need to be examined before conducting intervention program. Farmers with more land size tend to supply milk to dairy society in comparison to other. In semiarid region, farming community depends on livestock as provider of food security and not necessarily on economic return. The research revealed that factors like age, education and total milk production did not influence linkage with dairy cooperative society. In spite of presence of marketing channels, carrying capacity of local environment, household as well as ability to undertake risk due to unfavourable seasonal conditions might act as limiting factor towards supply of milk societies. These features have to be distinguished while addressing location specific intervention through dairy cooperative societies in semi-arid regions. The study also infers necessity to relook institutional support for dairy enterprise in-order to improvise social, economic status of landless or less land owning farmers.

### Conflict of interest

Authors would hereby like to declare that there is no conflict of interests that could possibly arise.

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