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Constraints perceived by the smallholder dairy farmers in adoption of bio-security measures

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Abstract

Infectious illnesses pose a significant economic danger to the dairy business. It significantly affects dairy herd health, production and farm revenues, both directly and indirectly. Hence, bio-security measures need to be adopted by the dairy farmers in order to maintain good health status. The present study was conducted among smallholder dairy farmers to identify the various constraints perceived by them in adoption of bio-security measures. Descriptive research design was adopted for this study. 100 smallholder dairy farmers were selected as sample for this study. The constraints were studied on a five-point continuum scale. Considering all of the components of constraints in adoption of bio-security measures, managerial constraints (3.7) was perceived as the most relevant constraints, followed by socio-psychological constraints (3.6), institutional constraints (3.5) and socio-economic constraints (3.4). The overall constraint faced by the farmers in the adoption of bio-security measures was serious to least serious. There is a need for targeted training, accessible resources and supportive policies to strengthen bio-security practices to not only safeguard the dairy industry but also contribute to national food security and public health.

Keywords: Adoption, bio-security measures, constraints, disease, smallholder dairy farmers

Introduction

Livestock plays significant role in the economy of the India. Livestock provides employment to about 8.8% of the total population of India ^[1]. It provides livelihood for landless individuals as well as small and marginal farmers, who make up 90% of the farming population ^[2]. Dairying is considered as one of the predominant subsidiary occupations of the rural people that plays an important role in the national economy by way of generating income and employment. Indian dairy enterprise is dominated by smallholder dairy farms, which maintain 85% of the country's total cattle population. Nearly 97% of these farms (73 million) have only 2 cows and contribute 72% of the milk produced in India ^[3]. Dairy sector provides food security and nutrition, livelihoods and economic growth, promotes One Health, it contributes to the conservation of biodiversity and genetic resources ^[4].

The total cattle population in the country was 193.46 million in 2019 which is an increase of 1.3% over the previous census ^[1]. India serves as a largest milk producing country in the world with a production of 239.3 million tonnes milk and Per Capita Availability of milk in India was 471 grams per day ^[1].

The increasing urban population, changing food habits and social transformation has created more demand for livestock products leading to intensive livestock production and high livestock density and this poses a threat of zoonotic diseases for the human population ^[5]. Infectious illnesses also pose a significant economic danger to the dairy business. It significantly affects dairy herd health, production and farm revenues, both directly and indirectly. The implementation of measures that reduce the risk of introduction and spread of disease agents is needed to control the occurrence and spread of disease. They are called as bio-security measures. The adoption of a set of attitudes and behaviour towards bio-security measures by the people is vital to reduce risk in all activities involving livestock management and in preparation of their products ^[6]. Bio-security can be subdivided into external bio-security (bioexclusion), prevention of the introduction of pathogens into the herd and internal bio-security (biocontainment), limiting transmission of diseases within and between the farm ^[7]. Although, bio-security measures reduce the risk of livestock diseases, the diseases continue to exist in the livestock farms. Adoption of bio-security measures is not much practiced by the farmers. Poor on-farm adoption of

recommendations to enhance strategies to decrease transmission of specific diseases is common [8]. Furthermore, participation rates in voluntary disease prevention and control programs are often below 30% [9, 10]. Multiple factors hinder the adoption of the bio-security measures and the underlying causes need to be studied. Hence the study was designed with the following objective.

Objectives

To identify the constraints perceived by the smallholder dairy farmers in the adoption of bio-security measures.

Materials and Methods

The present study was conducted at Tiruchirapalli district of Tamil Nadu since it had the highest organized milk procurement in Tamil Nadu [11]. Among fourteen blocks of Tiruchirapalli district, Thuraiyur and Uppiliyapuram blocks were selected randomly. Focused Group Discussion was held with the Veterinary Assistant Surgeons of the selected blocks to identify most commonly occurring diseases and to select the study area. Thus mastitis and parasitic infection were identified as the most commonly occurring diseases and Sikkathambur and Venkatachalapuram villages of Thuraiyur and Uppiliyapuram blocks respectively to undertake the study. Also two focused Group Discussions were held with smallholder dairy farmers in the study area to identify most commonly occurring diseases. Laboratory testing of milk (TANUCHEK SCC kit) and dung samples (flotation and sedimentation techniques) to determine the prevalence of infection in the study area. Finally, mastitis and parasitic infection were identified as most commonly occurring disease to undertake this study. Smallholder dairy farmers who possessed 1 to 5 cattle utilizing family labour with limited land resources, producing milk for income, connected to milk processors for selling milk at the time of study were selected as respondents for the study [12, 13, 14]. Thus a total of 100 respondents were selected for the two villages identified.

The constraints were listed by perusal of literatures, consultation with extension experts and subject matter specialists. The listed constraints were classified as socio-psychological, socio-economical, managerial and institutional constraints. Thus, seven socio-psychological constraints, five socio-economical, ten managerial and seven institutional constraints were identified. The respondents were requested to indicate the degree of perception of the constraints in a five-point continuum from most relevant to least relevant. The scoring procedure followed was as below

Response	Most relevant	More relevant	Relevant	Less relevant	Least relevant
Constraints score	5	4	3	2	1

The constraints were studied based on total mean score value and the total mean scores for all the statements were arranged in descending order to prioritize the constraints and ranked based on the total score obtained.

Results and Discussion

Constraints referred to the problems faced by the dairy

farmers in the adoption of bio-security measures. The constraints perceived by the smallholder dairy farmers were listed below as the socio-psychological constraints, socio-economic constraints, managerial constraints and institutional constraints.

Socio-psychological constraints as perceived by the farmers to adopt the bio-security measures

Table 1: Socio-psychological constraints perceived by the smallholder dairy farmers in adopting the bio-security measures (n = 100)

S. No.	Socio- psychological constraints	Mean score	Rank
1	Lack of know-how among farmers	4.0	I
2	Lack of co-operation from others	3.8	II
3	There is no appreciation for taking risk	3.7	III
4	Questionable efficacy of bio-security	3.6	IV
5	Resistance to change from traditional practices	3.6	IV
6	Previous experiences	3.5	VI
7	Negligence of farmers	3.2	VII
	Mean score	3.6	

It could be observed from Table.1 that among the socio-psychological constraints lack of know-how among farmers was perceived as the most relevant constraint faced by the dairy farmers (4.0), followed by lack of co-operation from others (3.8), there is no appreciation for taking risk (3.7), questionable efficacy of bio-security (3.6), resistance to change from traditional practices (3.6), previous experiences (3.5) and negligence of farmers (3.2). This study showed that farmers had less awareness and knowledge on bio-security measures, less sharing of knowledge among the farmers and not much importance given on bio-security measures.

Socio-economic constraints as perceived by the farmers to adopt the bio-security measures

Table 2: Socio- economic constraints perceived by the smallholder dairy farmers to adopt the bio-security measures (n = 100)

S. No.	Socio- economic constraints	Mean score	Rank
1	Lack of social interaction	3.8	I
2	Limited financial resources to invest infrastructure	3.4	II
3	Increased cost for purchasing preventive equipment	3.3	III
4	Lack of access to credit	3.2	IV
5	Inadequacy of public policy on bio-security	3.2	IV
	Mean score	3.4	

It could be observed from Table.2 that among the socio-economic constraints lack of social interaction (3.8) was considered as the most relevant constraints followed by limited financial resources to invest infrastructure (3.4), increased cost for purchasing preventive equipment (3.3), inadequacy of public policy on bio-security (3.2) and lack of access to credit (3.2). The main socio-economic constraint felt by the farmers was lack of social interaction among the respondents which shows that farmers do not interact among themselves related farming practices. Farmers felt lesser economic constraints as they did not have any felt needs on spending for bio-security measures.

Managerial constraints as perceived by the farmers to adopt the bio-security measures

Table 3: Managerial constraints perceived by the smallholder dairy farmers to adopt the bio-security measures (n = 100)

S. No.	Managerial constraints	Mean score	Rank
1	Difficulty in following correct deworming schedule	3.9	I
2	Lack of awareness on bio-security measures	3.9	I
3	Lack of knowledge on bio-security measures	3.8	III
4	Lack of time to follow bio-security measures	3.7	IV
5	Lack of appropriate housing facilities on farm	3.7	IV
6	Insufficient labour to carry out bio-security measures	3.7	IV
7	Difficulty in following all bio-security measures in management of dairy animals	3.7	IV
8	High cost of feeds and fodders to provide balanced feeding	3.6	VIII
9	Inconsistency due to multiple works	3.5	IX
10	Most measures are impractical	3.4	X
	Mean score	3.7	

It could be observed from Table.3 that among the managerial constraints difficulty in following correct deworming schedule (3.9) and lack of awareness of bio-security measures (3.9) were perceived as the most relevant constraints. The other constraints faced were lack of knowledge on bio-security measures (3.8), lack of time to follow bio-security measures (3.7), lack of appropriate housing facilities on farm (3.7), insufficient labour to carry out bio-security measures (3.7), difficulty in following all bio-security measures in management of dairy animal (3.7), high cost of feeds and fodders to provide balanced feeding (3.6), inconsistency due to multiple works (3.5) and most measures are impractical (3.4). The farmers had difficulty in following the deworming schedule and lacked awareness and knowledge on bio-security measures which could lead to less adoption of bio-security measures. Similar results were reported that lack of knowledge about clean milk

production was one of the major constraints perceived by members of Manipur (India) milk producer's cooperative union^[15] and non-availability of timely treatment facilities, lack of knowledge of common contagious diseases, their prevention and control measures, lack of knowledge about hygienic milk production, lack of scientific housing and milking facilities and lack of knowledge about waste disposal practices were considered as most relevant constraints faced by dairy farmers of Uttar Pradesh^[16]. Minimizing the incidence of mastitis has been established as a strategy to improve farmers' economic status, the well-being of animals and the quality of milk in the supply chain, as well as minimizing public health hazards linked with the use of antibiotics in animal production^[17].

Institutional constraints as perceived by the farmers to adopt the bio-security measures

Table 4: Institutional constraints perceived by the smallholder dairy farmers to adopt the bio-security measures (n = 100)

S. No.	Institutional constraints	Mean score	Rank
1	Lack of veterinary influence or interest in promotion of bio-security	4.1	I
2	Limited access to get resources to adopt bio-security measures	3.6	II
3	Lack of adequate media publicity on disease control measures	3.6	II
4	Weak extension system	3.5	IV
5	Lack of herd specific information	3.4	V
6	Lack of motivating agencies	3.4	V
7	Lack of education to change attitudes	3.2	VII
	Mean score	3.5	

It could be observed from Table.4 that among the institutional constraints lack of veterinary influence or interest in promotion of bio-security (4.1) was perceived as the most relevant constraints followed by lack of adequate media publicity on disease control measures (3.6), limited access to get resources to adopt bio-security measures (3.6), weak extension system (3.5), lack of motivating agencies (3.4), lack of herd specific information (3.4) and lack of education to change attitudes (3.2). The farmers contact veterinarians only when treatment or artificial insemination is required for their animals and veterinarians also do not find time to elaborate on various information due to their busy work schedule in the dispensary.

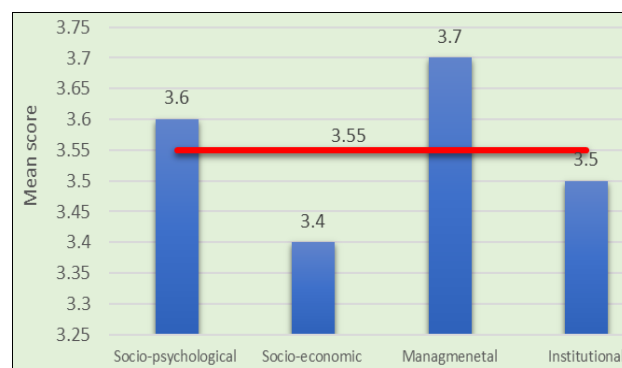


Fig 1: Distribution of respondents according to their perceived constraints

Considering all of the components of constraints in adoption of bio-security measures as depicted in Fig.1, managerial constraints (3.7) was perceived as the most relevant constraints, followed by socio- psychological constraints (3.6), institutional constraints (3.5) and socio- economic constraints (3.4). This could be that management operations were carried out by the farmers on day-to-day basis was felt as a major constraint and they did not feel a need for adoption of bio-security measures and did not spend money or did not have any localite / cosmopolite contact as a reason for low socio- economic constraints. Overall constraint felt by the farmers (3.55) were from relevant to more relevant. This is in agreement with the results that lack of information, insufficient time and high cost perceived as most relevant constraints by the smallholder farmers^[18] and the inadequate public policies on bio-security, high cost of bio-security measures and expensive laboratory charges, questionable efficacy of bio-security and lack of veterinary influence in promotion of bio-security were considered as the most serious constraints to adopt bio-security measures^[19].

Conclusion

The smallholder dairy farmers felt lack of veterinary influence or interest in promotion of bio-security measures which requires policy interventions in formulating strategies to implement extension activities on management and disease control awareness among farmers in addition to providing veterinary treatment services by the veterinary institutions. The dairy farmers felt the difficulty of following correct deworming schedule and lacked media publicity. Efforts need to be taken by the extension agencies to conduct training programmes, demonstrations, utilize mass contact methods, etc. regularly which will lead to imparting awareness and knowledge to the farmers on the bio-security measures, need for deworming, drug resistance and the economic and health benefits in cattle by adopting proper deworming schedule for increased adoption of bio-security measures. The constraints of limited access to get resources to adopt bio-security should be taken into consideration by the policy makers and other stakeholders while developing appropriate strategies to minimize constraints to adopt bio-security measures.

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