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Dr. Rajkumari Bhandari

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Access of Dairy Agricultural Technology by Small- Scale Farmers and Youth in India

[1*]Dr. Rajkumari Bhandari
Maharana Pratap University of Agriculture & Technology
*Corresponding Author's Email: Raj34@yahoo.com

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Abstract

Purpose: The purpose of this study is to investigate access and use of dairy agricultural technology by small-scale farmers in India.

Methodology: The study used a computerized literature review methodology (desk study). This required a thorough analysis of research on the access of dairy agriculture technologies by small-scale farmers. In order to assess the subject under study's suitability as a research topic, three phases of sorting were used.

Findings: The research came to the conclusion that dairy agricultural technology are not widely available. It also came to the conclusion that the biggest challenges for young dairy farmers today are a lack of money, inadequate extension services, a lack of information services, illiteracy, a lack of government support, and bad infrastructure.

Unique Contribution to Theory Policy and Practice: To evaluate, choose, and buy relevant agricultural resources and upgrade infrastructure, the government should establish agricultural resource centers with certified information providers. The informational requirements of dairy producers should be assessed, after which suitable agricultural resources should be selected and purchased. The centers can provide mobile information services, two examples of which are Current Awareness Services and Selective Dissemination of Information. The farmers will have better access to current information as a result.

Keywords: *Agricultural Technologies, Small Scale Farmers, Dairy Farmers, Agricultural Information.*

INTRODUCTION

The value of information in any kind of progress is undeniable. Information is crucial to people's daily lives and is thus necessary, say Rezvanfar, Moradnezhai, and Vahedi (2017). As we move deeper into the information age, the dissemination and adoption of information-by-information providers to farmers will play a crucial role in the development of more effective farming strategies. For food production to improve in rural areas, farmers need easy access to agricultural information (Yusuf, Masika, and Ighodaro, 2022). To better rural farmers, "agricultural information provision is the central element of advanced agriculture system, as well as the fundamental and essential promoter for agriculture development," as stated by Li and Baoguo (2021). There is a significant information gap between urban and rural areas, and this is a major barrier to high agricultural output and farmer income. Filling the knowledge gap and helping farmers raise yields and incomes through better information dissemination at the village level is a win-win (Yaseen, Xu, Yu & Hassan, 2016). Therefore, information providers through the government need to devise effective means of meeting the information needs of farmers, as the rural community as a whole requires data on a wide range of topics relevant to rural life in order to maximize advantages and minimize disadvantages.

In rural areas, dairy farming has long played a significant role in the agricultural economy. Demand for milk products is on the rise with the global population, making the dairy industry a major global employer. Dairy farming requires a dependable supply of inputs and a well-developed network of service providers at the national or regional level. Successful farming requires education, experience, and leadership (Maas, Bonnier & Rijks 2018).

India may be the world's largest milk producer, but the country's rural farmers still struggle with issues like illiteracy, ineffective marketing, and a lack of access to modern information and communication technologies. "New approaches towards the dissemination of agricultural technology such as the Agriculture Technology Management Agency (ATMA) model has contributed to diversification of agricultural production in parts of rural areas," however, World Bank News (2022) reported. Agricultural information in India, which consists primarily of scientific research information, is primarily obtained from research institutions and universities, but this information is not disseminated to the rural farmers, as shown by the studies conducted by Chandrasekan, Dipesh, Jitendra, Kamlesh, and Dinesh (2020) and Rao (2017).

Statement of the Problem

A large proportion of young Indians (those under the age of 35) have found it difficult to find white-collar work due to a lack of available positions. Many young adults return to their rural roots to pursue farming careers. With ready markets for agricultural goods, this is a fantastic chance for young people in India. Dairy farming is one of the main agricultural pursuits. When the older generation retires, the younger generation steps up to take over the dairy farm. Jobs and business ventures are something they're interested in, and they've found potential in dairy farming projects. The national government has already implemented these projects, and more are on the horizon, all with the goal of bolstering dairy farming and, by extension, raising incomes and bettering the quality of life for rural youth and women.

Objectives of the Study

The general objective of this study was to investigate access of dairy agricultural information and technology by small scale farmers and young farmers in India.

Significance of the Study

Young farmers and small-scale dairy farmers in India could benefit from the findings because they highlight the importance of having ready access to up-to-date agricultural information for the sake of success in dairy farming and increased milk output. Most seasoned Indian dairy farmers are now in their retirement years and have amassed a wealth of knowledge about the industry, but the young farmers who stand to gain the most from the dairy farming project require intensive, individualized agricultural education. Feeding, breeding, healthcare, reproduction, and recording are among the most important aspects of dairy farming, so knowledge in these areas is crucial.

LITERATURE REVIEW

Dairy Farmers Information Needs

The term "information need" refers to the collection of facts that consumers require to make decisions or address problems. All demographics rely on information to carry out their daily tasks, and as a result, information's qualities are shaped by the requirements of its end users. Farmers are among the information users who would benefit from a reliable source of agricultural data. "those needs that arise from the dairy farming activities of farmers on which they feel themselves incompetent and need the assistance from some other sources before taking a decision for action," as defined by Subash, Gupta & Babu (2015) in his study.

To promote national growth in countries where agriculture is the primary economic sector, it is crucial to meet the informational needs of the agricultural community (Meitei & Devi, 2019). "Information enables farmers to make informed decisions regarding production and marketing and managing their lives successfully in order to cope with everyday problems and realize opportunities, Matovelo (2018) and Idiegbeyan-ose & Theresa (2019). Understanding the information gaps that exist among farmers can help in developing useful norms and managerial innovations (Babu, Glendenning, Asenso &Govindarajan, 2022).

Information Seeking Behaviors by Small-Scale Dairy Farmers

Information-seeking is "a set of attitudes in the process of resolving problems in a goal-directed way," as defined by Singh and Satija (2017). To put it simply, a person's propensity to seek out and make use of information services and resources is a response to his awareness of, and desire to meet, a set of specific information needs (Emmanuel, 2022).

Farmers can be broken down into a variety of subgroups. It is crucial to understand the specific factors that control their access, selection, and utilization of information because this is what defines the type of farming activities, they are engaging in. Better programs for sharing data will be established as a result of this. Several factors influence and shape the farmer's persona as he or she looks for relevant data. Individual factors like age, education, and farming

experience; business factors like farm size, market orientation, enterprise type, debt level, and ownership status; and geographical factors like proximity to markets and technological resources all play a role. Farmers' hope in life is influenced by psychological and socioeconomic factors, both of which exert pressure on their information-seeking behavior. Individual characteristics to information search behavior relate to the formation of aspirations," write Bernard, Dercon, and Taffesse (2021). An individual's search behavior may be affected by their "capacity to aspire and gaps in aspiration," as Ray (2016) notes.

Empirical Review

Kumar, Sharma, Leahy, Shome, Bandyopadhyay, Deka and Lindahl (2021) conducted a study on the understanding antibiotic usage on small scale dairy farms in the Indian states of Assam and Haryana. The use and misuse of antibiotics in both humans and animals contributes to the global emergence of antimicrobial resistant (AMR) bacteria, a threat to public health and infection control. Currently, India is the world's leading milk producer but antibiotic usage within the dairy sector is poorly regulated. Little data exists reflecting how antibiotics are used on dairy farms, especially on small-scale dairy farms in India. To address this lack of data, a study was carried out on 491 small-scale dairy farms in two Indian states, Assam and Haryana, using a mixed method approach where farmers were interviewed, farms inspected for the presence of antibiotics and milk samples taken to determine antibiotic usage. Usage of antibiotics on farms appeared low only 10% (95% CI 8–13%) of farmers surveyed confirmed using antibiotics in their dairy herds during the last 12 months. Of the farms surveyed, only 8% (6–11%) had milk samples positive for antibiotic residues, namely from the novobiocin, macrolides, and sulphonamide classes of antibiotics. Of the farmers surveyed, only 2% (0.8–3%) had heard of the term "withdrawal period" and 53% (40–65%) failed to describe the term "antibiotic". While this study clearly highlights a lack of understanding of antibiotics among small-scale dairy farmers, a potential factor in the emergence of AMR bacteria, it also shows that antibiotic usage on these farms is low and that the possible role these farmers play in AMR emergence may be overestimated.

De Dios García-Villegas, Juan, et al., (2020) conducted a study on the use of information and communication technologies in small-scale dairy production systems in central Mexico. The objective of the study was to characterize small-scale dairy production systems to identify the technological preferences according to the farmer and farm characteristics and to analyze the importance and role of the information communication technologies (ICTs) in the dissemination of information related to management and livestock activities. To collect the data, a survey was applied to 170 small-scale dairy farmers from central Mexico. To characterize the farms, a factor analysis (FA) and cluster analysis (CA) were performed. To compare and identify differences between groups, a Kruskal–Wallis test was conducted. Four factors that explain 70.93% of the accumulated variance were identified; these factors explain the use of technology, production characteristics, social connections, and use of ICTs. The cluster analysis identified four groups. Group 1 was integrated by farmers with more experience and the largest farms. Group 2 had higher studies and use of ICTs. Group 3 was formed by young farmers but had a low use of technology. Group 4 contained older farmers with a low use of technology. The young farmers with higher studies have begun to incorporate

ICTs into their daily activities on the farm, as observed in Group 2. Smartphones were the most used and were considered important by the farmers of the four groups, since they enable interaction with other farmers and the dissemination of topics of interest related with the farm. In conclusion, four group of farmers were differentiated; therefore, different extension approaches should be implemented to take into account the preferences and the technologies considered most important for each group. The ICTs are emerging technologies among small-scale dairy farmers to communicate information related to livestock management, mainly by young farmers with studies of secondary, as observed in Group 2.

Prospero-Bernal, Martínez-García, Olea-Pérez, López-González & Arriaga-Jordán (2017) conducted a study on intensive grazing and maize silage to enhance the sustainability of small-scale dairy systems in the highlands of Mexico. The aim of the study was deepening the knowledge of livestock innovations knowledge on small-scale farms in developing countries. First, they developed a methodology focused on identifying potential appropriate livestock innovations for smallholders and grouped them in innovation areas, defined as a set of well-organized practices with a business purpose. Finally, a process management program (PMP) was evaluated according to the livestock innovation level and viability of the small-scale farms. Logistic regression was used to evaluate the impact of PMP on the economic viability of the farm. Information from 1650 small-scale livestock farms in Mexico was collected and the innovations were grouped in five innovation areas: A1. Management, A2. Feeding, A3. Genetic, A4. Reproduction and A5. Animal Health. The resulting innovation level in the system was low at 45.7% and heterogeneous among areas. This study shows the usefulness of the methodology described and confirms that implementing a PMP allows improving the viability an additional 21%, due to a better integration of processes, resulting in more efficient management.

Martínez-García, Ugoretz, Arriaga-Jordán, & Wattiaux, (2015) carried out a study on farm, household and farmer characteristics associated with changes in management practices and technology adoption among dairy smallholders. This study explored whether technology adoption and changes in management practices were associated with farm structure, household, and farmer characteristics and to identify processes that may foster productivity and sustainability of small-scale dairy farming in the central highlands of Mexico. Factor analysis of survey data from 44 smallholders identified three factors related to farm size, farmer's engagement, and household structure that explained 70 % of cumulative variance. The subsequent hierarchical cluster analysis yielded three clusters. Cluster 1 included the most senior farmers with fewest years of education but greatest years of experience. Cluster 2 included farmers who reported access to extension, cooperative services, and more management changes. Cluster 2 obtained 25 and 35 % more milk than farmers in clusters 1 and 3, respectively. Cluster 3 included the youngest farmers, with most years of education and greatest availability of family labor. Access to a network and membership in a community of peers appeared as important contributors to success. Smallholders gravitated towards easy to implement technologies that have immediate benefits. Nonusers of high investment technologies found them unaffordable because of cost, insufficient farm size, and lack of knowledge or reliable electricity.

METHODOLOGY

The study adopted a desktop methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low-cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

FINDINGS

The results were grouped into various research gap categories namely as conceptual, contextual, and methodological gaps.

Research Gaps

There is no distinguishing feature on specific determinants of dairy farming technologies adoption among small scale dairy farmers, despite the fact that there are numerous generalized methods for doing so. The literature review revealed blank spots that needed to be filled by this investigation. In addition, a methodology gap can be identified, for instance, Kumar, Sharma, Leahy, Shome, Bandyopadhyay, Deka & Lindahl, (2021) who conducted a study on the understanding antibiotic usage on small scale dairy farms in the Indian states of Assam and Haryana. The study used a mixed method approach where farmers were interviewed, farms inspected for the presence of antibiotics and milk samples taken to determine antibiotic usage. de Dios García-Villegas, Juan, et al., (2020) who conducted a study on the use of information and communication technologies in small-scale dairy production systems in central Mexico. A survey method was applied to collect data from 170 small-scale dairy farmers from central Mexico. Contrary to our current study which will use a desk study review methodology where relevant empirical literature was reviewed to identify main themes and to extract contextual gaps.

Kumar, Sharma, Leahy, Shome, Bandyopadhyay, Deka & Lindahl (2021) who conducted a study on the understanding antibiotic usage on small scale dairy farms in the Indian states of Assam and Haryana. Diverted their attention from the main purpose of which was to be to investigate access and use of dairy agricultural technology by small-scale farmers in India. And hence they did not meet the objective of the study, leaving out numerous gaps on the topic.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Young dairy farmers have a generally positive outlook on seeking agricultural information, but face unique barriers to doing so. They include insufficient familiarity with the topic, inadequate knowledge, a lack of resources, and a lack of technical know-how to access the information. The study also found that radio, other dairy farmers, and television are the most common ways local dairy farmers learn about the industry. In particular, farmers liked radio because they could listen to regional stations that broadcast news and other content in their native tongues. Some other dairy farmers were contacted because they were in close proximity

and easy to get in touch with. Farmers were able to understand the information shown on television because it is audiovisual in nature. Researchers concluded that a lack of capital, inadequate extension services, a lack of information services, illiteracy, a lack of government support, and poor infrastructure are the greatest obstacles facing young dairy farmers today. Individual factors that influence the motivation for seeking information also contribute to these difficulties.

Recommendations

To guarantee better extension services, the government should hire more extension officers in the Ghaziabad area. To better serve dairy farmers, extension agents must determine what kinds of dairy knowledge they need. Extension officers should regularly attend workshops and training to ensure they are meeting the most up-to-date informational needs of farmers. To ensure that extension officers can visit farmers across the country, sufficient funding must be allotted to this sector.

The government of India should fund the establishment of agricultural resource centers in rural areas, staffed by trained experts who can disseminate useful information. Dairy farmers' informational needs should be evaluated, and then appropriate agricultural resources should be chosen and acquired. Current Awareness Services and Selective Dissemination of Information are just two examples of the mobile information services that the centers can offer. This improves the availability of up-to-date information for the farmers.

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