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Demand driven livestock extension services: Farmers' participatory assessment in Eastern Haryana

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ABSTRACT

India is the house of the largest livestock population as well as highest milk producing country of the world. But, productivity of the large ruminant, i.e. cattle and buffalo is far below the world standard. Hence, the delivery of livestock extension services is emerging as an important priority area for enhancing and optimizing livestock production and productivity. At present livestock farming in India is at transition phase, i.e. transforming from subsistence to a commercial venture. Therefore, 100 livestock farmers and 60 commercial livestock farmers were randomly selected from the two highly crossbred populated districts of eastern Haryana to understand their demand for livestock extension services particularly livestock extension services other than the routine one. Incomplete Order of Merit Rating as Suggested by Garret was used to assess the degree of importance of the identified demand driven livestock extension services. A total 26 livestock extension services were demanded by the farmers of the eastern Haryana amongst which three services for specialized breeding services, 5 for animal feeding purposes, 7 for livestock production and management 6 for healthcare related and 5 services towards marketing and extension services. Both types of the farmers had a highest demand for conventional livestock extension services like timely AI services, vaccination services and non-conventional extension service like demonstration-cum-training programme on Azolla production and conservation. Livestock farmers were highly interested to grow as an entrepreneur, whereas, commercial livestock farmers were highly interested to strengthen their farm by securing credit accessibility. Hence, Livestock farmers' need on specialized demand driven extension services has been identified along with their degree of importance which may help in policy formulation in future for re-institutionalized public livestock extension services.

Keywords: Eastern Haryana, Livestock extension, Participatory assessment

Livestock production systems in India are complex even with well-defined components. It continues to demand an increasing level of intensive management, input supply, market infrastructure, support and processing to help farmers in maintaining competitive edge.

Livestock extension services for the livestock farmers have been traditionally funded, managed and delivered by the public sector in most of the developing countries (Carney 1998). Throughout the world, especially in developing countries, bovine population has increased enormously. Although India has the highest livestock population and milk production in the world, but the productivity, particularly of large ruminants, has always been a matter of concern. The crop-livestock mixed system is one of the most important characteristics of Indian agrarian economy, wherein crops and livestock symbiotically contribute to the growth and sustainability of each other (Maiti *et al.* 2014). Therefore, to improve productivity, technology dissemination and support services are the most critical factors which need to be geared up for the success of any livestock improvement programme, particularly dairy husbandry programme (Garai *et al.* 2017). But in recent years, subsistence nature livestock farming transformed into commercial venture. The changing nature of livestock farming leads to generation of new demands of the livestock farmers to make it successful one. At the same time, Indian livestock is nurtured by the small and marginal farmers who are one of the weakest sections of the society and having very poor purchasing capacity. Therefore, to meet the increasing demand of the changing nature of livestock farming, public livestock extension services has to be transformed and reinstitutionalized. Therefore, it is conceptualized to assess the demand driven specialized livestock extension services to meet the requirement of the ever changing nature of livestock farming.

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MATERIALS AND METHODS

The study was conducted in the purposively selected Haryana state of India. Haryana is a dairy progressive state

of India (Kale, 2016) and, wherein, the livestock sector contributes approximately 35% to the state's agricultural GDP which is much higher than the national average, i.e. 27.25% (Islam *et al.* 2016). Haryana is the home tract of the superior bovine germplasm of India, i.e. famous breeds of "Hariana" and "Sahiwal" cows and "Murrah" buffaloes. Murrah buffalo is the most superior milch breed of buffalo in India and also known as 'Black Gold' and used to upgrade low yielding non-descript buffaloes in India and abroad. The state possessed of 2.5% of the country's bovine population (with approximately 6.1 million buffaloes and 1.8 million cows), but, produce nearly 6 percent of total milk production of the country (the state's milk production in 2015–16 was 8.4 million tones). The per capita per day availability in 2014–15 was 805 grams as against a national average of 322 grams. The state has also promoted different exotic breeds like Jersey, Holstien Fresien and their crossbred with indigenous breed to further strengthen the livestock production scenario.

Sampling Plan: The state is divided into two regions, i.e. eastern zone and western zone. Eastern zone was selected purposively due to higher number crossbred cattle than the western zone. Out of 12 districts in Eastern zone of Haryana, two districts namely Karnal and Yamunanagar were selected purposively due to highest crossbreed populated districts in Eastern Haryana. From each selected district, two blocks were selected randomly. Thus, Karnal and Indri from Karnal district; and Jagadhari and Radaur from Yamunanagar district were selected randomly for the present study.

From the each block, 15 commercial livestock farmers were selected randomly. A commercial livestock farmer was operationalized as who was a producer of marketed surplus of least 100 litres milk per day for 200 days in a year and beneficiary of public livestock/dairy extension services. From each block one village, adjacent to the animal health centre, was selected randomly. From Karnal block, Mangalpur village and from Indri block, Taprana village was selected. From Jagadhari block, Fakarpur village and from Radaur block, Chotta bass village was selected for the present study. From each village 25 livestock farmers were selected randomly. Livestock farmers who had at least two dairy animals in milk on the day of visit his/her household and beneficiary of public livestock/dairy extension services was been considered as the respondent for the present study. Thus 60 commercial livestock farmers and 100 livestock farmers were selected as respondent and total sample size of this study was 160.

Research design and analytical tools: An exploratory research design was used to identify demand driven livestock extension services. Data were collected in two phases. In the first phase of data collection, a survey was conducted to understand the demand of different livestock extension services on an open ended interview schedule. Then, all the demand driven livestock extension services were categorized into different broad heads of scientific livestock farming, viz. breeding, feeding, healthcare, management and marketing and extension services. In the second phase, degree of importance of each identified demand driven livestock extension service of each area of livestock farming was quantified by using the *Incomplete Order of Merit Rating* as suggested by Garret (1981) which is as follows:

$$\text{Per cent position} = \frac{100(R_{ij}-0.5)}{N_i}$$

whereas, R_{ij}, Rank given for the i^{th} service by j^{th} respondent; N_j, Number of services ranked by j^{th} respondent.

RESULTS AND DISCUSSION

Table 1 shows that farmers demand three specialized demand driven livestock extension services pertaining to animal breeding services and these were AI services, quality semen and pregnancy diagnosis. Amongst the animal breeding related demand driven livestock extension services, artificial insemination service was having highest demand among the both livestock farmers and commercial livestock farmers. There is a wide coverage of livestock extension services offered by the Animal Husbandry and Veterinary department of Government of Haryana. But, timeliness of the AI services is always a matter of concern. Therefore, both the types of farmers (livestock farmers and commercial livestock farmers) had highest level of demand of AI services. Ahuja *et al.* (2000) also concluded that farmers of Gujarat, Rajasthan and Kerala had a high demand for artificial insemination services in their respective areas. Livestock farmers were having higher preference for quality semen than the commercial livestock farmers. Commercial livestock farmers were having comparatively higher level of extension contact and completeness. Commercial livestock farmers generally collected or purchased high pedigree germplasm from different sources and sometimes they directly procured from research institutes and even from outside the states. On the other hand, livestock farmers depended on the public sector managed stock centre or animal healthcare centre of their locality for the quality germplasm. Therefore, livestock farmers were having higher level of expectation for quality semen from the public funded extension system than the commercial livestock farmers. But, commercial livestock farmers were very much worried about the pregnancy diagnosis. Commercial livestock farmers understood the importance of pregnancy

Table 1. Demand driven livestock extension services related to animal breeding

Demand driven livestock extension services	Livestock farmers (n=100)		Commercial livestock farmers (n=60)	
	Garrett mean score	Rank	Garrett mean score	Rank
AI services	57.98	1st	52.22	1st
Quality semen	50.38	2nd	47.78	3rd
Pregnancy diagnosis	41.64	3rd	50.00	2nd

Table 2. Demand driven livestock extension services related to animal feeding

Demand driven livestock extension services	Livestock farmers (n=100)		Commercial livestock farmers (n=60)	
	Garrett mean score	Rank	Garrett mean score	Rank
Preparation of ration balancing	61.10	5th	48.62	4th
Consultancy services regarding preparation of complete feed formulation	62.40	3rd	49.87	2nd
Round the year fodder production and conservation	63.85	2nd	49.85	3rd
Mineral mixture supplementation	62.10	4th	48.60	5th
Demonstration-cum-training programme on *Azolla* production and conservation	65.75	1st	52.07	1st

diagnosis and they wanted early diagnosis. If any animal did not conceived after AI service, then, the farmers may face economic losses. Therefore, commercial livestock farmers had comparatively higher preference for this demand driven service.

Farmers demanded five types of animal feed related extension services (Table 2). Both types of farmers were much more interested on fodder production related extension services. They had highest demand on a non conventional extension service like demonstration-cum-training programme on azolla production and conservation. A very little portion of the cropping land used for fodder cultivation after used for major crops like rice, wheat, vegetable etc and acreage of the fodder crop is decreasing drastically. Singh (2015) reported that area under jowar, a major fodder crop of Haryana, is about 50 percent less than it was two decades earlier. Therefore, farmers were in search of a source of fodder which can be grown in other than the major crop land and can fulfill the requirement of micro and macro minerals. Pascal Letermea *et al.* (2010) and Kololgi *et al.* (2009) concluded that azolla is a good source of nutrients and have the potential to increase milk production of livestock animal. Therefore, both type farmers were having highest demand for extension services related to azolla production and conservation. In addition with the azolla production, farmers were highly interested for advisory services for the green fodder production round the year. Farmers were using a small fragment of their land for fodder production and they wanted a judicious combination of both leguminous and grasses for their animal. Therefore, they demanded regular extension services for region specific fodder production and conservation practices. Ghule *et al.* (2012) argued that cost incurred for concentrate feed is account of about 40% of the total cost of milk production and concentrate feed had a direct relation with milk production. Therefore, farmers were very much concerned about the quality of concentrate feed available in the market. They wanted to prepare concentrate feed by their own to meet the requirement for their farm. Therefore, they demanded consultancy services regarding preparation of complete feed formulation. Commercial livestock farmers were very much concern about the economic output of their farm than the livestock farmers. Hence, commercial livestock farmers were having higher level of preference for this demand driven extension service than the livestock farmers. Commercial livestock farmers were also having higher level demand for the extension service like preparation of ration balancing. FAO (2012) concluded that increases in net daily income ranged between ₹8 to 26 per animal per day through ration balancing of dairy animal. Therefore, farmers were highly interested and demanded this type of specialized extension services which may enhance the economic prosperity of their farm and family.

In case of livestock production and management, farmers were demanded seven types of specialized livestock extension services and these are presented in Table 3. Livestock farms used to produce large quantity of waste due to its large herd size and inefficient management of waste is the cause of environmental pollution in and around the livestock farm. Therefore, both the farmers were seeking special efforts from government department in the form

Table 3. Demand driven livestock extension services related to livestock production and management

Demand driven livestock extension services	Livestock farmers (n=100)		Commercial livestock farmers (n=60)	
	Garrett mean score	Rank	Garrett mean score	Rank
Animal selection and purchase	42.33	5th	42.18	7th
Advisory services about all weather animal housing	55.73	2nd	48.93	4th
Training programme regarding record keeping and animal waste management	57.96	1st	52.55	2nd
Advisory services about clean milk production	55.05	3rd	56.10	1st
Culling of management	44.96	4th	50.35	3rd
Calf and Heifer management	39.78	7th	45.28	4th
Clinical and subclinical mastitis management	41.42	6th	42.30	6th

Table 4. Demand driven livestock extension services related to healthcare services

Demand driven livestock extension services	Livestock farmers (n=100)		Commercial livestock farmers (n=60)	
	Garrett mean score	Rank	Garrett mean score	Rank
Treatment of common health ailments	54.60	2nd	52.8	2nd
Vaccination services	62.12	1st	54.73	1st
Diagnosis of the diseases	52.78	3rd	50.32	3rd
Deworming	49.95	4th	47.25	5th
Anestrus	43.21	5th	47.00	6th
Repeat breeding	37.73	6th	47.90	4th

extension services to educate them regarding management of dairy cattle waste. Proper maintenance of record on different parameters like milk production, AI, vaccination, feeding, health care treatment etc is an important characteristic of a successful dairy farm. Therefore, both type of farmers had highest preference for extension services which can address these issues. Farmers believe that clean and hygienic environment can enhance the self-life of the milk and can fetch the good price from the milk. Therefore, they had a high level of demand for the advisory services about the clean milk production. Unproductive animal is a major cause of economic setback of a dairy farm. Therefore farmers wanted specialized extension services to identify the unproductive animal and to dispose them. Hence, extension services related to culling of animal were having a high level of demand amongst the farming community. The adverse effect of excessive heat load (heat stress) on productive and reproductive performance is well documented. The studies have shown that milk yield of crossbred cows, Hariana cows, Sahiwal cows and buffalo to be negatively correlated with temperature humidity index (Kaur and Arora, 1982; Lal *et al.* 1987; Shinde *et al.* 1990; Kulkarni *et al.* 1998; Mandal *et al.* 2002; Tailor and Nagda, 2005; Maiti, 2017). Therefore, both types of farmers were highly interested for a unique type of animal housing which may give comfort their animal in all the seasons and they were seeking specialized advisory services for this. There is agreement among researchers that mastitis is the most widespread infectious disease indairy cattle, and, from an economic aspect, the most damaging (Tiwari *et al.* 2010; Sharma *et al.* 2012; Elango *et al.* 2010). Farmers also felt the importance of managing mastitis in their herd. Therefore, they demanded an exclusively extension services to manage the mastitis. Farmers also demanded specialized livestock extension services for the selection and purchase of the dairy animal, special management for calf and heifer.

As far as healthcare related extension services were concerned, farmers identified six types of specialized extension services. Farmers were having highest demand for the vaccination services. Vaccination coverage is nearly 90 percent in the study area (ICDP Karnal, 2017). But farmers were highly concerned about its timeliness. Therefore, they demanded specialized extension services for the vaccination coverage. Non-availability of the veterinary personnel during urgent hour of common health issues and its diagnosis were also a major concern for the farming community involved in livestock farming. Therefore, they demanded a specialized livestock extension services for the treatment of common health ailments including diagnosis of the diseases. Bilal *et al.* (2005) established that deworming increased the growth rate and milk yield in cows. Farmers also understood the importance of the deworming in their herd. Hence, they want a special livestock extension services for deworming of their dairy bovine. Farmers also demanded special extension services for the reproductive disorder like anestrus and repeat breeding.

Table 5 clearly depicts the five of types demand driven specialized extension services by the livestock farmers and commercial livestock farmers. Establishing and maintaining a commercial livestock farm is required a huge investment and all the time it is not possible to arrange the required fund from their own. Therefore, commercial livestock farmers had the highest demand for the specialized livestock extension service for credit accessibility for their farm. On the other hand, majority of the livestock farmers had a dream to be an entrepreneur and expand his farm. To fulfill their dream, they had to have a good amount of money in their hand in terms of entrepreneurial loan. Therefore, livestock farmers had a highest demand for the advisory services on preparation of project proposal regarding commercial livestock farming or dairy entrepreneurship. Jokhio *et al.* (2016) argued the importance of the livestock insurance to

Table 5. Demand driven livestock extension services related to marketing and extension services

Demand driven livestock extension services	Livestock farmers (n=100)		Commercial livestock farmers (n=60)	
	Garrett mean score	Rank	Garrett mean score	Rank
Source of credit	63.35	3rd	53.00	1st
Livestock insurance	63.95	2nd	52.75	2nd
Marketing of milk	61.70	4th	52.08	3rd
Training on value-added scientific dairy farming practices	61.45	5th	45.33	5th
Advisory services on preparation of project proposal regarding commercial livestock farming or dairy entrepreneurship	64.55	1st	46.83	4th

cope up with the risk involved in livestock farming. There was poor coverage of livestock insurance in the study area (ICDP Karnal, 2017). Therefore, both types of farmers were highly interested for the livestock insurance and demanded for specialized extension services for its wide coverage. Farmers used to sell their milk as liquid raw milk instead of processing. Therefore, farmers had a demand for specialized extension services for milk marketing and least preference for training on value added milk product preparation.

It is concluded from the study that livestock farmers had a special demand for AI services, quality germplasm and pregnancy diagnosis in breeding component while in case of feeding; they demanded advisory services on the green fodder production and conservation. Farmers also demanded all weather housing for their animal, advisory services for clean milk production and requested for training programme regarding record keeping and animal waste management. They also demanded timely vaccination services and treatment of common health ailments. Commercial livestock farmers were highly interested to strengthen their farm by securing credit accessibility, whereas, livestock farmers were interested to grow as an entrepreneur. But, both types of farmers were highly interested for the specialized extension service for livestock insurance to cope up with the risk associated with livestock farming. Perceived demand for specialized livestock extension services by the both livestock farmers and commercial livestock farmers were all most same in all the five dimensions of livestock farming.

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