

ACCESSIBILITY, EFFICIENCY AND IMPACT OF EXTENSION SERVICE DELIVERIES TO RURAL MILK PRODUCERS UNDER CONTRACT DAIRY SYSTEM*

D.V. Kolekar¹, H.R. Meena²

ABSTRACT

Consequent upon trade liberalization and globalization, contract farming was endorsed in India as a potential means to assimilate rural dairy farmers into growing markets for milk. The contracting agencies provided extension services to rural dairy farmers to promote milk production. This study was undertaken on 120 respondents belonging to Satara district of Maharashtra during 2010-11, to evaluate the accessibility, efficiency and impact of extension services provided by the contract firm to rural milk producers, classified as small (1-4), medium (5-8), and large (above 9) farmers, based on herd size with equal numbers under each category (n=40). The extension wing of the state animal husbandry department was the principal player in extension field in the study area before emergence of contractual system. There is little empirical literature on this subject. Our study revealed high access of farmers under contract system to various extension methods, which were unavailable (result demonstration, method demonstration, field visit, field tour), or scantily available (home visit, telephone service) under the prevailing system. The farmers gained better access to various extension aids under contract farming, which were inaccessible (laptop computer, farm publications) or poorly accessible (television, radio, news paper, mobile phone service) under the prevailing system. The accessibility to mobile phone service was spectacular ($P \leq 0.01$) and was available to all the farmers (100%) under contract system. The efficiency of extension services significantly ($P \leq 0.01$) improved under contract farming, which were unavailable (timely delivery, follow up action, usefulness of information) or sparsely available (accessibility to extension service) under the prevailing system. The impact of contract system was spectacular with respect to improved animal health care, feed & fodder management, and dairy husbandry practices, which pervaded all the farmers (100%), while 89% of the farmers gained access to agro-processing technologies ($P \leq 0.01$). This might have contributed to upsurge ($P \leq 0.01$) in milk production in majority of the farmers (75%). Large farmers (100%) were more benefitted ($P \leq 0.01$) in terms of improvement in milk production than medium (80%) and small (45%) farmers. The motivation for clean milk production (40%) and the decision making ability (40%) of the farmers also substantially ($P \leq 0.05$) improved under contract farming. It is concluded that accessibility of farmers to extension services, its efficiency and impact were impressive and productive under contract farming system. Small farmers were less benefited from the system than medium and large farmers.

KEY WORDS

Contract dairy farming, Extension delivery systems, Rural Milk Producers

Author attribution: ¹PhD Scholar, ²Senior Scientist, Division of Extension Education, Indian Veterinary research Institute, Izatnagar, Uttar Pradesh, India- 243122. ²Corresponding author: drhrmeena@ivri.res.in *Part of MVSc thesis (Indian Veterinary Research Institute - Deemed University) of the first author. Date of Receipt: 20/02/2012, Acceptance: 11/01/2013.

INTRODUCTION

The dairy industry in India is largely a rural interface with culmination of frivolous contributions of milk from 75 million rural households, maintaining 1 to 3 milch animals, and accounts for 98% of total milk production (Chand *et al.*, 2010). Trade liberalization and globalization accorded open access to corporate sector to tap the milk, produced by rural households that constituted 70% of the total milk production in India.

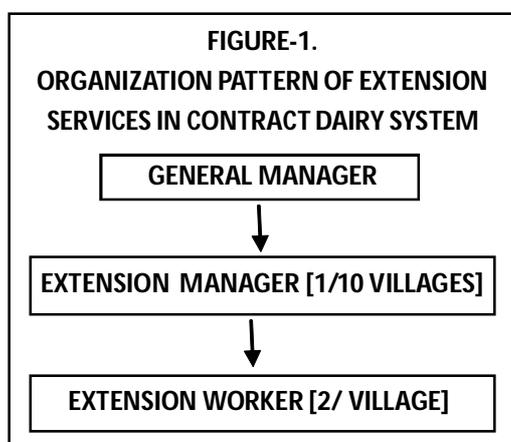
Agri-business sector introduced contract farming to assimilate small farmers in to growing markets for milk (Thapa, 2009). It was beneficial to the dairy farmers, as contract farming with vertical coordination system could ease marketing and price risks, and mitigate production risks through support services provided by them (Ramaswami *et al.*, 2006), resulting in higher profits, compared to independent producers (Birthal *et al.*, 2008).

The quality of extension services encouraged farmers' participation in contract farming (Anim, 2010). At the same time, high cost of providing extension services is a deterrent to the contracting firms, unless compensated with high-quality and low-cost farm produce (Singh, 2002). This is the basis of our study, to know the type of extension services provided by the contracting firms, and the response and outcome of these services in different category of farmers (small, medium, large), since there is little empirical literature on this aspect.

MATERIALS AND METHODS

The present study was conducted in two blocks *viz.*, Phaltan and Maan in Satara district of Maharashtra during 2010-11. From each block 6 villages and from each village 10 farmers were selected randomly, thus making total sample of 120 respondents for the investigation. The respondents were categorized into small (1-4), medium (5-8), and large (9 and above) farmers on basis of herd size with equal numbers under each category (N=40). An interview schedule was developed on the basis of objectives by incorporating all the variables required for the study. Data were collected through semi-structured interview schedule, and were analyzed by standard statistical procedures.

Govind Dudh, Phaltan was the integrating agency, providing extension services to the farmers in the study area. The extension organizational pattern of the contract agency (Figure-1) constituted two extension workers in each village, an extension manager in a cluster of ten villages to supervise the extension activities of village extension workers, and a general manager to monitor the extension activities of the extension managers. The extension personnel are contractual workers with the integrating agency. They are paravets. Their qualification is Diploma in livestock health services. Before emergence of contract system, state animal husbandry department was the principal player in extension field in the study area.



RESULTS AND DISCUSSION

Access to extension methods

The contracting firm was using various extension methods, such as, result demonstration, method demonstration, field visit, home visit, field tour, and telephone call for transfer of technology. The extent of access of the farmers to these extension methods are given in Table-1.

The farmers (0%) had no access to result demonstration, method demonstration,

field visit, and field tour, while the access was limited to home visit (17.5%) and contact through telephone (12%) under the prevailing extension system, were increased to 72.5%, 82%, 100%, 100%, 29.2%, and 100%, respectively under contract system. The differences between the three categories of farmers were significant ($P \leq 0.01$) with respect to result demonstration and method demonstration. Large farmers (95%) had better access to result demonstration than medium (77.5%) and small (45%) farmers. The difference between large farmers (95%) and small farmers (65%) was significant with respect to method demonstration.

Our study revealed high level of farmer participation in extension methodologies for skill upgradation that is ultimately reflected in high production (Ton, 2005). However, the contract agency should encourage field tours, as farmer-to-farmer contact is the best way of enhancing production (Luukkainen, 2012).

Table-1. Access of respondents to different extension methods under contractual system.

Sl. No.	Extension method	Status of Service	Category of Farmer			Pooled
			Small	Medium	Large	
1	Result Demonstration	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	18 (45.0) ^a	31 (77.5) ^b	38 (95.0) ^c	87 (72.5)
2	Method demonstration	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	26 (65.0) ^a	34 (85.0) ^{ab}	38 (95.0) ^b	98 (82.0)
3	Field visit	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
4	Home visit	Before	3 (7.5)	11 (27.5)	7 (17.5)	21 (17.5)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
5	Field tour	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	8 (10.0)	13 (32.5)	14 (35.0)	35 (29.2)
6	Telephone call	Before	2 (5.0)	4 (10.0)	8 (20.0)	14 (12.0)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
Number of Farmers			40	40	40	120

Note: (1) Figures in parentheses indicate percentage. (2) Figures with different superscripts in a row differed significantly at $P \leq 0.05$.

Access to extension aids

The contracting firm introduced various extension aids, such as, television, laptop computer, radio, newspaper, farm publications, and mobile phones for transfer of technology under contract dairy system. The extent of access of the farmers to these extension aids are given in Table-2.

The farmers had no access (0%) to laptop computer and farm publications under the existing system, were enhanced to 37% and 59% respectively under contract farming. The differences between the three categories of farmers with respect to access to television, laptop computer, radio, and farm publications were significant ($P \leq 0.05$). The large farmers had significantly ($P \leq 0.05$) higher access to these gadgets than small farmers. There was spectacular achievement ($P \leq 0.01$) in accessibility to mobile phone service by all

three category of farmers (100%), which was low (17.5%) before contract.

The farmers had minimal access to various extension aids, before the introduction of contract system. The vertical integration mode of extension under contract dairying enhanced the use of extension aids. The most used information and communication technology (ICT) tools are phone, television and internet (Ghasura *et al.*, 2011). The user rate of radio and television in our study were higher than the all India average reported by Adhiguru *et al.* (2009). However, there was spectacular achievement with respect to the use of mobile phone by farmers (100%). It is a very useful gadget, since it gives instantaneous access to the extension worker from any place at any time, and is liked due to its customized content delivery and convenience to carry the instrument (Mittal *et al.*, 2010).

Table-2. Access of respondents to extension aids under contractual system.

Sl. No.	Extension aid	Status of Service	Category of Farmer			Pooled
			Small	Medium	Large	
1	Television	Before	5 (12.5)	6 (15.0)	9 (22.5)	20 (17.0)
		After	7 (17.5) ^a	9 (22.5) ^{ab}	16 (40.0) ^b	32 (27.0)
2	Laptop Computer	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	9 (22.5) ^a	16 (40.0) ^{ab}	19 (47.5) ^b	44 (37.0)
3	Radio	Before	12 (30.0)	13 (32.5)	12 (30.0)	37 (31.0)
		After	8 (20.0) ^a	18 (45.0) ^b	12 (30.0) ^{ab}	38 (32.0)
4	Newspaper	Before	2 (5.0)	4 (10.0)	4 (10.0)	10 (8.0)
		After	2 (5.0)	5 (12.5)	6 (15.0)	13 (11.0)
5	Farm Publications	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	16 (40.0) ^a	22 (55.0) ^a	33 (82.5) ^b	71 (59.0)
6	Mobile phone	Before	2 (10.0)	11 (27.5)	8 (20.0)	21 (17.5)
		After	40 (100.0) *	40 (100.0) *	40 (100.0) *	120 (100.0)
Number of Farmers			40	40	40	120

Note: (1) Figures in parentheses indicate percentage. (2) Figures with different superscripts in a row differed significantly at $P \leq 0.05$. (3) * indicate significant ($P \leq 0.01$) difference in the perception of the farmers before and after contract with respect to the character.

Efficiency of extension services

The efficiency of extension services provided under contract dairy system was evaluated with respect to accessibility to extension service, timely delivery of extension service, follow-up action by extension worker, and usefulness of information for dairy farming (Table-3).

Accessibility of extension service, timely delivery of extension service, follow up action by the extension worker, and usefulness of the information for dairy farming were 16.7%, 0%, 0%, and 16.7%, respectively under conventional system, were enhanced to 100%, 84.2%, 100%, and 75% respectively under contract system. The usefulness of information on dairy farming delivered under contract farming system were significantly ($P \leq 0.01$) better than the existing system. The large farmers (100%) found the information more useful than medium (80%) and small (45%) farmers. The differences between the three categories were significant ($P \leq 0.01$).

Timely and proper delivery of extension service with regular follow up action enhances the knowledge and skill of the farmers culminating in increased production (Ton, 2005). The quality of extension service is also important. It positively influences farmers' choice for participation in contract farming (Anim, 2010). The farmers (75%) acknowledged that the information were highly useful to them.

Impact of extension services

The impact of extension services provided under contract dairy system was evaluated with respect to improvement in milk production, access to agro-processing technologies, motivation for clean milk production, improvement in animal health care practices, improvement in feed & fodder management practices, improvement in dairy husbandry practices, and improvement in decision making ability (Table-4).

Table-3. Perception of respondents on efficiency of extension services under contractual system.

Sl. No.	Efficiency of extension service	Status of Service	Category of Farmer			Pooled
			Small	Medium	Large	
1	Accessibility to extension service	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	40 (100.0)*	40 (100.0) *	40 (100.0) *	120 (100.0) *
2	Timely delivery of extension service	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	31 (77.5)	34 (85.0)	36 (90.0)	101 (84.2)
3	Follow up action by extension worker	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
4	Usefulness of information on dairying	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	18 (45.0) ^a *	32 (80.0) ^b *	40 (100.0) ^c *	90 (75.0)*
Number of Farmers			40	40	40	120

Note: (1) Figures in parentheses indicate percentage. (2) Figures with different superscripts in a row differed significantly at $P \leq 0.01$. (3) *indicate significant ($P \leq 0.01$) difference in the perception of the farmers before and after contract with respect to the characters.

The extension services delivered by the contracting agency, with respect to improvement in milk production, access to agro-processing technologies, motivation for clean milk production, improvement in animal health care practices, improvement in feed and fodder management practices, improvement in dairy husbandry practices, and improvement in decision making ability were 16.7%, 16.7%, 16.7%, 0%, 0%, 3.3%, and 16.7% respectively under existing system, were enhanced to 75%, 89%, 40%, 100%, 100%, 100%, and 40% respectively, under contract system.

The differences pertaining to improvement in milk production between the three categories of farmers, and before and after contract in each category were significant

($P \leq 0.01$). Large farmers (100%) got maximum improvement in milk production, followed by medium (80%) and small (45%) farmers. The differences with regard to motivation for clean milk production between the three categories of farmers and before and after contract in each category were significant ($P \leq 0.05$). The motivation was higher ($P \leq 0.05$) among large farmers (62.5%) than small farmers (15%). There were significant ($P \leq 0.05$) differences with regard to decision making ability between the three categories of farmers, and before and after contract in each category of farmers. The decision making ability was higher ($P \leq 0.05$) among large farmers (62.5%) than small farmers (15%). All the farmers (100%) got the benefit of improved animal health care services, feed & fodder

Table-4. Perception of respondents on the impact of extension services under contractual system.

S. No.	Impact of extension services	Status of Service	Category of Farmer			Pooled
			Small	Medium	Large	
1	Improvement in milk production	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	18(45.0) ^{a*}	32 (80.0) ^{b*}	40 (100.0) ^{c*}	90 (75.0) [*]
2	Access to agro-process. technologies	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	33 (82.5) [*]	36 (90.0) [*]	38 (95.0) [*]	107 (89.0) [*]
3	Motivation for clean milk production	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	6 (15.0) ^{a•}	17 (42.5) ^{b•}	25 (62.5) ^{b•}	48 (40.0) [•]
4	Improvement in animal health care	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
5	Improv. in feed & fodder management	Before	0 (0)	0 (0)	0 (0)	0 (0)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
6	Improvement in dairy husbandry practices	Before	0 (0)	1 (2.5)	3 (7.5)	4 (3.3)
		After	40 (100.0)	40 (100.0)	40 (100.0)	120 (100.0)
7	Improv. in decision making ability	Before	0 (0)	6 (15.0)	14 (35.0)	20 (16.7)
		After	6 (15.0) ^{a•}	17 (42.5) ^{b•}	25 (62.5) ^{b•}	48 (40.0) [•]
Number of Farmers			40	40	40	

Note: (1) Figures in parentheses indicate percentage. (2) Figures with different superscripts in a row differed significantly at $P \leq 0.01$. (3) * indicates significant ($P \leq 0.01$) difference in the perception of farmers before and after contract with respect to the characters. (4) • indicates significant ($P \leq 0.05$) difference in the perception of the farmers before and after contract with respect to the characters.

management practices, and dairy husbandry practices under contract system, which were unavailable to them (0%) before contract.

The improvement in animal health care, feed & fodder and dairy husbandry practices, after introduction of contract system had resulted in improvement in milk production, as knowledge in improved dairy husbandry practices is highly and positively correlated ($P \leq 0.001$) with the level of adoption of improved dairy husbandry practices (Fita *et al.*, 2012). It supports the findings of Birthal *et al.* (2008).

CONCLUSION

The extension services provided to the farmers under contract dairy system enhanced their accessibility to various extension methods and aids, which were not provided under the conventional system. These services were more efficient, and had better impact on farm outputs.

ACKNOWLEDGEMENT

The authors are thankful to the Indian Council of Agricultural Research (ICAR), and Director of Indian Veterinary Research Institute (IVRI) for providing necessary facilities and financial support for conducting this study. Authors are also thankful of livestock owners of Satara district of Maharashtra and Govind Dudh, Phaltan for endorsing the study.

REFERENCES

Adhiguru, P. 2009. Strengthening pluralistic agricultural information delivery systems in

India. *Agricultural Economics Research Review*, 22, 71-79.

Anim, F.D.K. 2010. The effect of private extension services on contract farming participation by small scale maize farmers in rural areas of the Limpopo Province of South Africa. *African Journal of Agricultural Research*, 5 (7), 514-517.

Birthal, PS *et al.* 2008. Improving farm-to-market linkages through contract farming - A case study of small holder dairying in India. Discussion paper 00814, International Food Policy Research Institute (IFPRI), Washington DC.

(www.ifpri.org/sites/default/files/publications/ifpridp00814.pdf)

Chand, S *et al.* 2010. Public Private Partnership in Indian Dairy Industry, Initiating White Revolution II. CII-Technopak.

([www.technopak.com/resources/Food/PPP %20 in % 20 Indian % 20 Dairy % 20 Industry_Technopak_ CII_Background % 20 Paper_May 2010](http://www.technopak.com/resources/Food/PPP%20in%20Indian%20Dairy%20Industry_Technopak_CII_Background%20Paper_May2010))

Fita, L *et al.* 2012. Adoption of improved dairy husbandry practices and its relationship with socio-economic characteristics of dairy farmers in Ada'a district of Oromia state, Ethiopia. *Wudpecker Journal of Agricultural Research*, 1 (6), 203-207.

Ghasura, RS *et al.* 2011. ICT penetration of rural dairy farm entrepreneurs in Banaskantha district. *Journal of Progressive Agriculture*, 2 (3), 94-98.

- Luukkainen, J. 2012. A comparison of extension methods used by different agricultural extension service providers in Nyandarua, Kenya. Bachelor's Thesis, HAMK University of Applied Sciences, Valkeakoski, Finland.
- Mittal, S et al. 2010. Socio-economic impact of mobile phones on Indian agriculture, ICRIER (Indian Council for Research on International Economic Relations) Working paper 246.
([www.colombiadigital.net/newcd/dmdocuments/89.% 20 socioimpact % 20 agriculture.pdf](http://www.colombiadigital.net/newcd/dmdocuments/89.%20socioimpact%20agriculture.pdf))
- Ramaswamy, B et al. 2006. Efficiency and distribution in contract farming: the case of Indian poultry growers. ISI Discussion Paper 05-01, Indian Statistical Institute, New Delhi.
- Singh, S. 2002. Contracting out solutions: political economy of contract farming in the Indian Punjab. *World Development*, 30(9), 1621-1638.
- Thapa, G. 2009. Small holder farming in transforming economies of Asia and the Pacific: Challenges and Opportunities. Discussion paper, prepared for the side event organized during the 33rd session of IFAD's Governing Council, 18 February 2009.
- Ton, W. 2005. Participatory research and extension in agriculture - Organisation of learning in participatory research and extension approaches. Graduate Thesis, Faculty of Behavioural Studies, University of Twente, The Netherlands.