ANIMAL HUSBANDRY EXTENSION SERVICE DELIVERY: FARMERS' PERCEPTION IN FOUR MAJOR INDIAN STATES

M. A. Kareem[1], S. S. Phand[2], P. L. Manohari[3] and M. Borade[4]

Abstract

The present study was conducted to analyze farmers' perception regarding the effectiveness of Animal Husbandry extension services delivery in four major Indian states viz., Karnataka, Maharashtra, Odisha and Uttar Pradesh. Purposive sampling technique was used for the sample selection and questionnaire was used to elicit information from 80 respondents. Data were analyzed using descriptive statistics such as mean, frequency counts, percentages, standard deviation and Kruskal-Wallis test. Results showed that majority of farmers (48.75%) belonged to middle age group with more than 20 years of experience (41.25%) and majority (91.25%) interviewed were full time farmers in small farmers(35%) category with 1.1 to 2.0 ha land. With regards to extension contact the cumulative frequency indicates that Animal Husbandry officer is the most contacted person as he is in touch with the farmers in the service area. Thirty-nine practices scaled by 20 farmers from each state on a 3-point continuum scale reveal that majority of the farmers were moderately satisfied with the services of Animal husbandry officers with Maharashtra state being more satisfied followed by Karnataka, Uttar Pradesh and Odisha being lagging behind. In conclusion it was found that for animal husbandry extension to be efficient, effective and visible there needs to be more integration among agriculture and allied sector extension personnel. The study recommended a review on extension methods perceived to be non-effective or slightly effective and collaboration between stakeholders for a strong extension services. It will be imperative to ensure that methods regarded to be effective are mainly used to deliver extension messages.

Keywords: Extension Service Delivery, Animal Husbandry, Farmers' Perception,

Introduction

Agriculture plays a vital role in India's economy. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. Agriculture, along with animal husbandry, fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP). The share of agriculture and allied sectors

[1]Deputy Director & Centre Head, CAEM, MANAGE, Hyderabad

[2]Assistant Director, CAEM, MANAGE, Hyderabad

[3]Assistant Director, MANAGE, Hyderabad

[4]Senior Research Fellow, CAEM, MANAGE, Hyderabad

(including agriculture, livestock, forestry and fishery) is expected to be 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. (Central Statistics Office). The extension approaches and services followed by service providers mainly, institutions of State Department of Agriculture, have resulted into wider spread of modern technologies and increase in agricultural production worldwide.

The delivery of agricultural allied sector extension services, particularly animal husbandry services is an important emerging area due to increasing demand for livestock and its products for enhancing and optimizing livestock production and management. In year 2005, National Sample Survey Organization (NSSO) revealed that, only 5% of farm households access any information on animal husbandry against 40.1% farm households accessing information on crops. Moreover, the plethora of studies (*Shweta, 2014; CALPI, 2008; Ravikumar et. al., 2007*) has indicated State Department of Animal Husbandry, is major service provider for livestock farmers, apart from other private agencies, Dairy Cooperatives and NGOs which function at the regional level. However, it has been repeatedly observed by the researchers that, the extension components in animal husbandry is generally found weak.

In this context it is necessary to explore the reasons of weakness of the extension component in allied sector. Therefore, Centre for Allied Extension Management (CAEM), MANAGE, Hyderabad has planned an in-depth study for the "Analysis of Extension Approaches in the Allied Sector Departments". The study has been conducted in four major Indian states viz., Uttar Pradesh, Odisha, Maharashtra and Karnataka. The above states as well as the districts were selected purposively wherein; all the allied sectors viz., Animal Husbandry, Horticulture, Sericulture and Fisheries were present and operational. A total 480 respondents (240 Government Officers and 240 Farmers) were selected from the two districts of each state. The details of sampling is as follows;

Table 1. Selection of respondents:

State		Uttar Pradesh				Odisha				Maharashtra				Karnataka			
District		Basti		Faizabad		Sonepur		Bargarh		Ahmednagar		Aurangabad		kolar		Chikkaballapu	
Respondents		O	F	O	F	O	F	O	F	O	F	O	F	O	F	O	F
Depart-ment	Animal Husbandry	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Horticulture	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	Sericulture	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
	Fisheries	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
Total		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Gross Total		480															

O= Officers, F: Farmers, Total sample Size: 480; 240 Officers + 240 Farmers

In view of the immenseness of the research, it is difficult to discuss all the research finding comprehensively, in single research paper. One of the specific objectives of the research was to determine farmers' perception of delivery of extension services by the allied sector departments i.e. Animal Husbandry, Sericulture, Horticulture and Fisheries in selected four states. In the present research paper, *"Perception of farmers of all four state with respect to effectiveness of the animal husbandry extension service delivery"* is discussed. The total sample size for present paper is 80 farmers who practicing animal husbandry.

Perception of the farmers towards animal husbandry extension services:

Perception is the feeling of the individuals towards the services offered by service provider. In this investigation perception towards extension services offered by State Department of Animal Husbandry staff is expressed through agreement-disagreement on item statements of the perception schedule. Understanding of their perceptions helps in strengthening the department of animal husbandry staff through proper training. The farmers perception is measured in terms of Rank Based Quotient (RBQ) value, which denotes satisfaction level of the farmers towards extension services.

(RBQ) Value computation for satisfaction level of farmers

$$RBQ = \sum_{i=1}^{n} \frac{fi(n+1-i) \times 100}{N \times n}$$

i = Concerned rank (1 to 3 ranks of the problem) and rank value is the reverse of the ranks

N = Total no of farmers (20 farmer respondents)

n = No of practices in each enterprise ranks (n =3),

fi = Number of farmers reporting the satisfaction level on that particular item of the enterprise like animal husbandry, sericulture, fisheries & horticulture as for Highly satisfied, moderate, and somewhat satisfied.

The problem having the highest RBQ value indicates the perception of summated satisfaction level by respondent farmers.

Objective

1. To study farmers' perception of usefulness of services offered by the Animal husbandry officers

2. To study farmers' perception of satisfaction with respect to services offered by the Animal husbandry officers

3. To study suggestions for improvement of services offered by the Animal husbandry officers

Methodology

The study was conducted in four states, namely Karnataka, Maharashtra, Odisha and Uttar Pradesh, from each state two neighbouring districts were selected purposively with the simple criterion that all the 4 allied sector departments viz., Animal Husbandry, Sericulture, Horticulture and Fisheries were existed in the district. Further the 10 respondents were selected from each district using purposive and simple random sampling methods. The sample size of each state form two districts was 20. Hence, the total sample size form all the four states constitutes 80.

Data collection tool

Taking into consideration of the scope and objectives of the study, a draft interview schedule was prepared after perusal of available literature and through consultation with experts in the field of extension education and other related fields. After incorporating their suggestions, a well-structured interview schedule was finalized in English and translated into Hindi, Marathi, Kannada and Oriya language for collecting data from the farmers.

Statistical analysis

The data collected from the farmers were scored, tabulated and analyzed using suitable statistical methods. The statistical analysis was done using SPSS (Statistical Package for Social Sciences). Keeping in view the objectives of the study and amenability, the data were subjected to different statistical tools. These tools included frequency, percentage, mean, standard deviation, and Kruskal-Wallis test. The other statistical tools like correlation coefficient also used in analyzing the data.

Results and Discussion

**Table 2: Socio-personal variables of Animal Husbandry farmers**

(n=80)

Sr. No	Socio-personal variables	Maharashtra	Odisha	Karnataka	Uttar Pradesh
		f / %	f / %	f / %	f / %
A	**Age**				
1	Young (up to 35 years)	6 (30)	7 (35)	2 (10)	4 (20)
2	Middle (36-45 years)	7 (35)	4 (20)	5 (25)	6 (30)
3	Old (> 45 years)	7 (35)	9 (45)	13 (65)	10 (50)
B	**Education**				
1	Illiterate	0 (0)	4 (20)	3 (15)	3 (15)
2	Primary school	3 (15)	1 (5)	6 (30)	1 (5)
3	Middle school	3 (15)	0 (0)	8 (40)	2 (10)
4	High school	9 (45)	5 (25)	3 (15)	9 (45)
5	12th	1 (5)	7 (35)	0 (0)	1 (5)
6	College	4 (20)	3 (15)	0 (0)	4 (20)
C	**Experience**				
1	0-10 years	7 (35)	8 (40)	3 (15)	5 (25)
2	11-20 years	7 (35)	4 (20)	6 (30)	7 (35)
3	> 20 years	6 (30)	8 (40)	11 (55)	8 (40)

D	Occupation				
1	Full time farmer	18 (90)	17 (85)	20 (100)	18 (90)
2	Farming +other	2 (10)	3 (15)	0 (0)	2 (10)
E	Size of land holding				
1	Landless	0 (0)	1 (5)	0 (0)	0 (0)
2	Marginal (0.1-1.0 ha)	0 (0)	2 (10)	13 (65)	9 (45)
3	Small (1.1-2.0 ha)	6 (30)	7 (35)	6 (30)	9 (45)
4	Semi-medium (2.1-4.0 ha)	8 (40)	6 (30)	1 (5)	1 (5)
5	Medium (4.1-10.0 ha)	2 (10)	4 (20)	0 (0)	1 (5)
6	Large (>10 ha)	4 (20)	0 (0)	0 (0)	0 (0)

Table 2. shows that, Orrisa state have more number of young farmers (35%) while Karnataka state have more number of old farmers (65%). Nearly half of the farmers (45%) of Maharashtra & Uttar Pradesh had completed high school education. The findings are in line with Nishi *et. al.,* (2011). Karnataka state was found with more experienced farmer among the four states. On an average 91% respondents of all four states said that, agriculture was their primary occupation. Similar findings were reported by Rathod *et. al.* (2014). As far as land holding is concern, the number of marginal farmers were more in Karnataka State while Maharashtra having highest number of large farmers.

Figure 1: Information source utilization by Animal Husbandry farmers
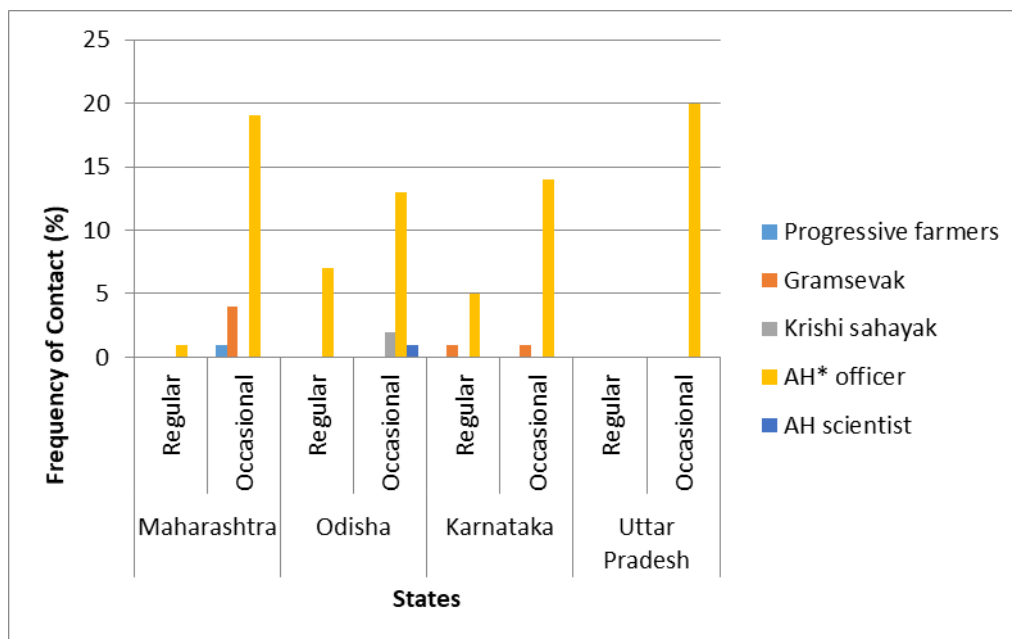
It is observed from figure 1 in all state, with regards to information sources utilization, the cumulative frequency indicates that farmers contact Animal Husbandry Officer occasionally. National Sample Survey Organization (NSSO) in 2005, revealed that progressive farmers is the most used information source by the farmers.

Table No. 3: Satisfaction level of the farmers with respect to services offered by the Animal husbandry officers:

Sr. No	Particulars	Maharashtra			Odisha			Karnataka			Uttar Pradesh		
		HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)
I	**Breeding**												
1	Heat detection	0 (0)	15 (75)	3 (15)	0 (0)	2 (10)	10 (50)	0 (0)	13 (65)	2 (10)	0 (0)	8 (40)	4 (20)
2	Artificial Insemination (AI)	0 (0)	15 (75)	5 (25)	2 (10)	2 (10)	12 (60)	0 (0)	17 (85)	3 (15)	0 (0)	14 (70)	6 (30)
3	Pregnancy diagnosis	2 (10)	5 (25)	13 (65)	1 (5)	3 (15)	16 (80)	0 (0)	6 (30)	11 (55)	1 (5)	5 (25)	14 (70)
4	Diagnosis and Treatment of reproductive disorders	1 (5)	8 (40)	11 (55)	0 (0)	2 (10)	14 (70)	2 (10)	5 (25)	10 (50)	6 (30)	3 (15)	3 (15)

Note: Not all the respondents have expressed their opinion on the services offered by the animal husbandry officers in four states. Therefore the 'n' value is not consistent in different parameters like, breeding, feeding, health, management and extension activities. This might be due to irrelevance of the particular service to the farmer or he might be unaware about the services.

Almost 95 per cent received service in heat detection, of which 75 per cent of the farmers perceived the service to be moderately satisfied and 15 per cent were somewhat satisfied. Similarly 39 practices of Animal husbandry was scaled on a 3 point continuum. In case of perception of farmers towards livestock breeding service delivery by animal husbandry officers the data revels that majority of farmers (75% in Maharashtra in case of heat detection, 65% in Karnataka and 40% in Uttar Pradesh) are moderately satisfied. But, some experiences revealed that majority of livestock farmers were not satisfied with the livestock services delivery by the State Department of Animal Husbandry (Rajashree, 2000 and Rajput, 2006).

SI No	Particulars	Maharashtra			Odisha			Karnataka			Uttar Pradesh		
II	**Feeding**												
		HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)	HS *f* (%)	MS *f* (%)	SS *f* (%)

SI No	Particulars												
5	Pasture Rotation	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
6	Conservation of grazing lands	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
7	Recommended fodder material	0 (0)	1 (5)	1 (5)	1 (5)	1 (5)	5 (25)	0 (0)	1 (5)	2 (10)	0 (0)	2 (10)	1 (5)
8	Recommended growing of legume crops along with fodder crops	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
9	Balanced feed /concentrates	0 (0)	1 (5)	4 (20)	4 (20)	12 (60)	4 (20)	0 (0)	3 (15)	15 (75)	0 (0)	1 (5)	5 (25)
10	Storage of fodder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (10)	2 (10)
11	Feed and fodder management to ruminants	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)	7 (35)	0 (0)	0 (0)	2 (10)

III	Health												
SI No	Particulars	Maharashtra			Odisha			Karnataka			Uttar Pradesh		
		HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)
12	Control measures for diseases	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
13	Vaccination	2 (10)	5 (25)	13 (65)	0 (0)	15 (75)	5 (25)	5 (25)	5 (25)	10 (50)	5 (25)	5 (25)	10 (50)
14	Recommend skills in case of outbreak of diseases	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
15	Maintenance of hygiene conditions	0 (0)	9 (45)	1 (5)	0 (0)	2 (10)	5 (25)	0 (0)	4 (20)	9 (45)	0 (0)	4 (20)	4 (20)
16	Information on disinfectants	0 (0)	4 (20)	0 (0)	0 (0)	0 (0)	4 (20)	0 (0)	3 (15)	6 (30)	0 (0)	4 (20)	1 (5)
17	First aid	0 (0)	13 (65)	3 (15)	0 (0)	2 (10)	3 (15)	0 (0)	9 (45)	8 (40)	0 (0)	7 (35)	9 (45)
18	Information on deworming	1 (5)	18 (90)	1 (5)	2 (10)	8 (40)	10 (50)	0 (0)	15 (75)	5 (25)	0 (0)	8 (40)	12 (60)
19	Organize health camps	1 (5)	15 (75)	4 (20)	0 (0)	3 (15)	6 (30)	5 (25)	7 (35)	8 (40)	1 (5)	3 (15)	16 (80)

IV	Management												
SI No	Particulars	Maharashtra			Odisha			Karnataka			Uttar Pradesh		
		HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)
20	Construction of shelter house	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
21	Clean milking techniques	0 (0)	0 (0)	13 (65)	0 (0)	2 (10)	14 (70)	0 (0)	0 (0)	16 (80)	0 (0)	0 (0)	8 (40)
22	Provide information on Sale of animals	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
23	Provide information on purchase of an animal	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
24	Information related to marketing	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
25	Value addition	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
26	Safe disposal of dead animals	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	2 (10)	0 (0)	0 (0)	4 (20)	0 (0)	0 (0)	0 (0)

V	Extension activities												
SI No	Particulars	Maharashtra			Odisha			Karnataka			Uttar Pradesh		
		HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)	HS f (%)	MS f (%)	SS f (%)
27	Training programs	0 (0)	1 (5)	0 (0)	2 (10)	2 (10)	16 (80)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (10)
28	Exposure visits	0 (0)	0 (0)	1 (5)	0 (0)	4 (20)	10 (50)	0 (0)	0 (0)	4 (20)	0 (0)	0 (0)	2 (10)
29	Conduct exhibitions	0 (0)	0 (0)	12 (60)	0 (0)	2 (10)	5 (25)	0 (0)	0 (0)	8 (40)	0 (0)	0 (0)	4 (20)
30	Demonstrations	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	3 (15)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
31	Campaigns	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
32	Organize farmer-scientific interaction	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)

| #	Particulars												
33	Formation of groups	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
34	Helps in getting programme benefits	0 (0)	1 (5)	1 (5)	0 (0)	3 (15)	4 (20)	0 (0)	1 (5)	6 (30)	2 (10)	0 (0)	14 (70)
35	Disseminate information through literature	0 (0)	0 (0)	3 (15)	0 (0)	3 (15)	8 (40)	0 (0)	0 (0)	9 (45)	0 (0)	0 (0)	3 (15)
36	Getting loans from banks	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)	2 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
37	Insurance coverage	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (15)	0 (0)	0 (0)	1 (5)	0 (0)	0 (0)	0 (0)
38	Take feedback	0 (0)	2 (10)	14 (70)	1 (5)	3 (15)	9 (45)	0 (0)	2 (10)	16 (80)	0 (0)	0 (0)	6 (30)
39	Maintain continuous communication contact	0 (0)	1 (5)	9 (45)	4 (20)	3 (15)	11 (55)	1 (5)	3 (15)	4 (20)	0 (0)	0 (0)	8 (40)
	Overall satisfaction level (frequency) for all 39 services/ activities	7	114	103	17	72	196	13	95	164	10	66	136
	RBQ value	**45.1**			**50.1**			**50.4**			**38.2**		
	% satisfaction level over 39 services/ activities and over 20 farmers	15	13	2	9	25	2	12	21	1	8	17	15

Thirty nine practices scaled by 20 farmers on a 3 point continuum reveal that majority of the farmers were moderately satisfied with the services/ activities of Animal husbandry officers with Maharashtra state being more satisfied followed by Karnataka, Uttar Pradesh and Odisha being lagging behind. The reason being, Maharashtra farmers are progressive and respond better to Extension interventions. While the RBQ values indicate Odisha and Karnataka, followed by Maharashtra and Uttar Pradesh. There is a lot of scope for Uttar Pradesh to improve its animal husbandry services.

VI	**Others**								
	Particulars	**Maharashtra**		**Odisha**		**Karnataka**		**Uttar Pradesh**	
		Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
1.	Standard of living is improved with the services of	2	18	5	15	4	16	3	17

	department officials							
2.	Production is affected if the extension services are withdrawn	14	6	13	7	19	0	15	0
	Total	**16**	**24**	**18**	**22**	**23**	**16**	**18**	**17**

Majority of the farmers believe that the production is affected by the lack of Animal husbandry services of the department and the standard of living animal husbandry farmers has not improved significantly for across the four states even after intervention by the Animal husbandry department.

Figure 2: Perception the farmers regarding overall quality of extension services offered by the Department of Animal husbandry
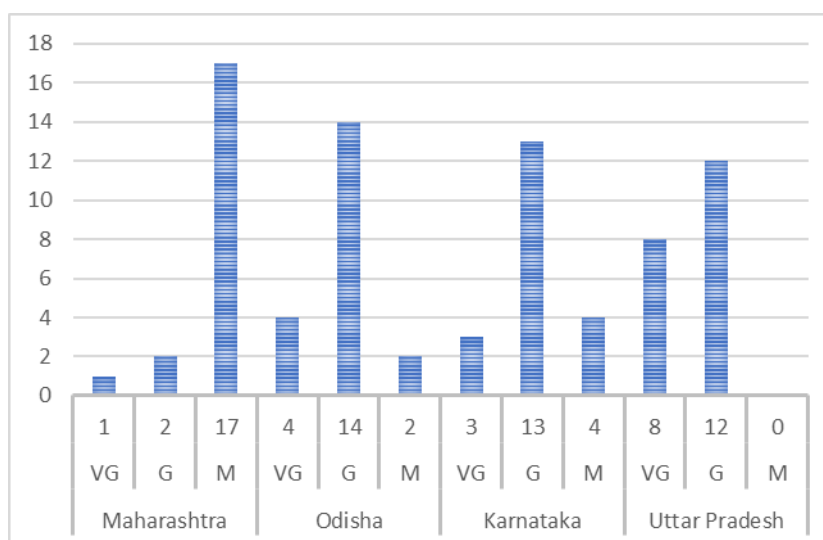
(VG: Very Good, G: Good, M: Moderate)

Majority of the farmers of Maharashtra expressed opinion about moderate usefulness of the Animal Husbandry department, while other states have given good to very good response, this indicates that there is a scope for Maharashtra for its animal husbandry sector to cater to the higher expectations of the progressive farmers who expect higher returns and services and also have higher aspirations and it is a challenge to satisfy the farmers of Maharashtra in the animal husbandry sector and effective strategies and approaches are needed for effective implementation. The same challenge is true for other states as well and it does not call for complacency of services rather positioning the services at a higher level of an aspiration is the need for the departments through convergence and other approaches in extension.

Figure 3: Suggestions for Improvement
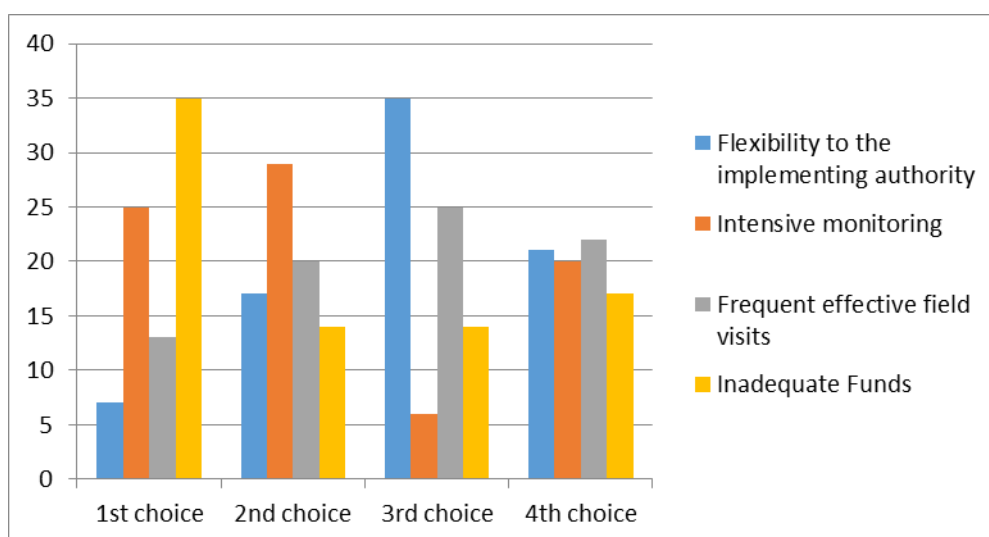
Farmers form all the four states expressed their suggestions for improvement of the services provided by animal husbandry officers. Inadequate funds for the infrastructure, programmes and schemes of Animal Husbandry Department was given the 1st ranking followed by intensive monitoring (2nd), flexibility to the implementing authority (3rd) and frequent effective field visits (4th) as the suggestions for improvement. Similar findings were reported by Mahesh Chander and Prakashkumar Rathod (2013) and Patil A.P *et al.* (2009).

Policy Implication and Conclusion

The authors concluded that the SDAH should pay adequate attention and streamline their Animal Husbandry extension service delivery by ensuring programmes, sufficient funds, infrastructure, and human resources development initiatives to train the manpower and deliver extension services to the farmers effectively. Providing adequate funds and intensive monitoring of the animal husbandry programmes and schemes will assure the improvement in the animal husbandry sector across states. Intensive monitoring & frequent effective field visits assure the suggestions for improvement in the animal husbandry sector across states.

References

CALPI. (2008). The economic rationale of public and private sector roles in the provision of animal health services. Rev. Sci. Tech. Off. Int. Epiz., 23:33-45.

Central Statistics Office (CSO), Ministry of Statistics and Programme Implementation, Advance Estimates of National Income, 2015-16, http://pib.nic.in/newsite/PrintRelease.aspx?relid=136214

Chander, M. and Rathod, P., (2013) Investment in livestock extension activities by State Departments of Animal Husbandry (SDAH) in India: An appraisal. *Indian Journal of Animal Sciences* 83 (2): 185–189.

Government of India. (2006). Planning commission working papers of Eleventh Five year plan 2007-2011, New Delhi.

Government of India. (2012). Annual Report 2011-12 of Department of Animal Husbandry, Dairying and Fisheries, New Delhi.

Nishi, Sah, A.K. and Ram Kumar (2011). Dairy farmers' satisfaction with diary cooperative societies: A case study. Indian Res. J. Ext. Edu., 11 (1): 74-78.

Patil, A.P., Gawande S.H., Nande M.P., Gobade M.R. (2009) Constraints Faced by the Dairy Farmers in Nagpur District while Adopting Animal Management Practices. Veterinary World, Vol. 2(3):111-112.

Rajashree, (2000). Farmer's perception on privatizing animal husbandry extension services. M.V.Sc thesis, Tamil Nadu Veterinary and Animal Sciences University, Chennai.

Rajput, D.S. (2006). Animal health delivery system among pastoralists in arid zone of Rajasthan. Ph.D. thesis, Indian Veterinary Research Institute, Izatnagar.

Rangnekar, D. V. (1997). BAIF's Experience in Developing Delivery System to Provide Services at the Door Steps of Smallholders.

Rathod, P., Nikam, T.R., Landge, S., Hatey, A., Singh, B.P., 2014. Perception towards Livestock Breeding Service Delivery by Dairy Cooperatives. Indian Res. J. Ext. Edu 14(2).

Ravikumar S., Reddy K.V.R. and Sudhakar Rao B. (2007). Farmers' choice for cost recovery of veterinary services in different livestock holding systems- A case study of India. Livestock Res. For Rural Dev., 19 (66) (*http://www.lrrd.org)*

Shweta, K., (2014). AI for dairy development in Ranchi district of Jharkhand. Indian Res. J. Ext. Edu., 14(1):90-92.