

Effectiveness of Artificial Insemination in Dairy Cattles: Recent Evidences from India's Milking State of Gujarat

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ABSTRACT

The importance of Livestock Sector is proving in Agriculture Sector as is evident from its rising share in Agricultural GDP. However the growth of Livestock Sector is conditioned by livestock support services, wherein the performance of services is judged from the efficiency and effectiveness of livestock support services. The present study is targeted at this crucial component of development. The efficient delivery of Artificial Insemination has become a subject of rising concern to many national and international organisations such as FAO, World Bank and ILRI in India, recognising the importance of livestock for the rural poor and their limited financial access to these livestock support, the central and state governments have been extending these services at a huge subsidy. There is a vast network of veterinary institution in the public sector that offers veterinary and breeding services to the farmers at very low prices. It's a well known fact that India is having highest livestock population in world as well as highest buffalo population also but still we are lacking behind in milk productivity as most of our livestock are nondescript and local breed whose milk productivity is very low. Artificial Insemination is playing an important role for the improvement of coming progeny of Nondescript Cattle breeds of India. The present study is focusing on the economic framework and the context for effective and efficient delivery of Artificial Insemination services to the farmers in Gujarat, which is one of the leading states having good network of different agencies (cooperative network, NGOs, and public sectors) providing livestock services.

Key words: Dairy cooperatives, artificial insemination, conception rate, calving rate, livestock.

Gujarat State has a noteworthy position in the country as far as livestock wealth and dairy development is concerned. Animal Husbandry and Dairy sector contributes about 5.19% share to the Gross State Domestic Product of the State. Gujarat is lucky to have high yielding indigenous breed of cattle and buffaloes. Gir and Kankrej breed of cows and Jafarabadi, Mehsani, Surti, and Banni breed of buffaloes are well known for their high yielding capacity. Kankrej bullocks are known for their sawaichal and cows are good milk producers. Indigenous livestock breeds were developed for their utility under a certain set of agro climatic conditions and have developed some unique traits. Conservation of these breeds to be done in a way that they may yield the greatest sustainable benefits to present generation, while maintaining its potential to meet the needs and aspiration of future generation. The best way to conserve these resources is within their native environment with the help of livestock owners and non-government

organizations. Emphasis is laid on improving the performance of local breed though improves germ plasma through selective breeding, improving feeding resources and adequate health coverage. The institutional herds maintain at research stations/university/state breeding farms/artificial insemination centres/bull mother farms-GLDB etc. are constantly strengthened both in terms of superior germ plasma as well as modern tools and techniques. Considerable success has been made in the western countries in conservation of their breeds. This has been possible through breeder's societies and keeping proper animal records. In India farmers raised the livestock but no data recording system is followed in the field. Therefore, proper evaluation of indigenous breeds for further improvement is difficult. The Central Herd Registration Scheme has been launched by the Central Government for registration of outstanding animals in their respective home tract. It has become imperative to form breeder's

societies for all other important livestock breeds. Farmers participating in the state milk yield competition and central herd registration scheme and keeping outstanding pure breed animals are provided incentives in terms of cash prizes and certificates. This helps in conservation and improvement of the breeds in their home tract.

During the second half of 20th century, the population of Cattle (+ 49%), Buffalo (+ 249 %), Goat (+ 99%), Sheep (+ 27 %), Pig (+ 450%) and Poultry (+ 1076 %) shown increasing rate while Horses (-82 %) and Donkey (-40%) have declined. In Gujarat, almost 70-80 % bovine population is belongs to well define specific breed like Gir, Kankrej, Dangi, Surti, Jafarabadi, Mehsani, Banni, etc which is quite opposite to the scenario of National level (i.e. 70-80 % bovine population is non-descript type). It is also a fact that around 70% of the population now has live on 15% of the GDP (i.e. share from agriculture). Gujarat is one of the leading states contributing noticeable share in rapidly growing livestock sector. The estimated contribution of livestock sector in total GDP of Gujarat during the year 2010-11 is 5.08 % and its share in GDP of agriculture & allied sector is 24.46%. Average 15- 16 % growth rate is observed in contribution of AH in state GDP. Total 42.66 lacs families keeps livestock as primary or secondary source of income and contributed total Rs.26075 crores in the State GDP during the year 2010-11. Each livestock holding family contributed Rs. 61120 in the year 2011-11 in GDP (*Directorate of Animal Husbandry, Govt. of Gujarat*).

Large numbers of landless households mainly depends to livestock and agricultural labour. Out of total 35.42 lacs BPL families, 38.38 % BPL families keep livestock. Livestock keeping as a source of livelihood among the BPL families is well adopted in Dahod (86.60

%), Narmada (82.78 %), Panchmahals (79.63%), Banaskantha (65.06%), Dangs (54.80 %), Sabarkantha (53.88%), Valsad (51.30 %), etc. It is just to note that a unit of 10 goats + 1 buck can has potentiality to provide average net income of Rs. 100-120 per day round the year while income from agriculture wage is quite seasonal (*Directorate of Animal Husbandry, Govt. of Gujarat*)

Coverage for the other veterinary services like AI, vaccination, castration, deworming, etc have been increased over the years that contributed in control of epidemics. Pashu Arogya Mela & Krishi Mahotsav are two major drives exclusively meant for Veterinary care and doorstep extension sevices, respectively. Overall veterinary services contributed in remarkable reduction in number disease outbreaks from 135 in 2001-02 to 36 in 2012-13. For the sustainable development of livestock, a State Livestock Breeding Policy has been put in place. Conservation of livestock breeds and their genetic improvement are the thrust area of the policy. Gujarat Livestock Development Board is functioning as State Implementing Agency for the cattle and buffalo breeding programs (*Gujarat Livestock Development Board*).

Effective and efficient delivery of animal health and production services is considered vital for gainful livestock development and hence, efficient delivery of livestock services has become a subject of rising concern to many national and international organisations. In India, by recognising the importance of livestock to the rural poor and their inability to avail the fully paid livestock services, the governments in centre and the States have been extending these services at a huge subsidy. The steering group constituted by the government of India, observed that free veterinary and artificial insemination (AI) services have resulted in an

Table 1: Livestock Population in Gujarat (In Numbers)

District/State	LC	CC	Buffalo	IP	HKL	BPL	LH	LH/BPL	LBPL
Surat	247781	143628	423065	1085053	221477	82328	3.57	4.90	13.18
Junagadh	466976	14063	377487	1017231	178473	176665	2.86	5.70	5.76
Sabarkantha	468850	151846	774928	1833638	319769	127918	4.10	5.73	14.33
Kheda	148544	80426	627821	1014012	259466	82433	2.97	3.91	12.30
Gujarat	6833535	1141946	8773569	23793513	4266173	1359767	4.23	5.58	17.50

Source: Directorate of Animal Husbandry, Govt. of Gujarat, 18th Livestock Census Report.

LC=Local Cows/Indigenous;

CC=Crossbred Cows

LP=Total Livestock Population

HKL=Households keeping Livestock

BPL=BPL household keeping Livestock

LH=Livestock/Household

LH/BPL=Livestock/Household above BPL Family

LBPL=Livestock /BPL Family

infrastructure that is vast and expensive, and the governments find it extremely difficult to sustain (GOI, 1996). One side, government is subsidising these services so that farmers can easily access these services but on the other side, due to high subsidy the quality of services are deteriorating which is resulting low conception rate, more number of A.I./ Conception and low caving percentage. In the light of above context, the research objectives that the study addresses for the purpose are:

1. To find out the Livestock Infrastructure development Index.
2. To analyse the effectiveness and efficiency of Artificial Insemination services delivery system under various Dairy Cooperatives and Govt. Animal Husbandry organization.

METHODOLOGY

The Database: Both the objectives are based on secondary data. Data on number of A.I. centres, Veterinary Clinic, Livestock population, Dairy cooperative societies and Road density for developing Livestock Infrastructure Development Index, was collected from DAHD, various rounds of NSSO surveys in Gujarat, Gujarat Livestock Development Board and Directorate of animal husbandry Gujarat and Statistical Bulletin of Gujarat.

The data regarding number of animals served A.I, animal conceived, calves born per year per dairy cooperatives was collected from AMUL Dairy, SUMUL Dairy, SABAR Dairy and GOPAL(RAJKOT Dairy) Dairy working in Kheda, Surat, Sabarkantha and Junagadh respectively for the year 2008 to 2014. Same data on A.I. was collected from Govt Animal Husbandry Dept. of Kheda, Surat, Sabarkantha and Junagadh also to know and compare the efficiency of delivery of A.I. services in Gujarat.

Sampling Technique: Gujarat is having four regions i.e. Central Gujarat, Northern Gujarat, Southern Gujarat and Kachha & Sauwrashttra and 26 districts. For selecting district in Gujarat, a Livestock Infrastructure Index (LII) had been developed as depicted in Table No.1, and three districts in each region having highest livestock infrastructure index value were identified as major livestock services providing districts and one out of these three districts were selected at random. Thus, four distr

Livestock $I_{ijk} = \frac{X_{ijk} - \text{Min}X_{ijk}}{\text{Max}_j X_{ijk} - \text{Min}_j X_{ijk}} \times 100$ (LIDI)

Where, X_{ijk} represents the values of i th variable representing j th component of LIDI of k th region.

I = Number of indicators [= 5 indicators]

J = Components of LIDI (A.I. Centres, Vet. Institution, livestock population, Road density, Number of cooperative Societies

K = 1,2,3,.....26 (for district level index)

Effectiveness of A.I. services

Parameters of effectiveness

- (1) Conception Rate = Number of animal conceived / Total number of insemination done
- (2) Calving % = Number of calves born/ Number of animals inseminated
- (3) Number of A.I./ Conception = Total number of A.I. performed/ Total number of animal conceived

RESULTS AND DISCUSSION

Livestock Infrastructure Development Index: The Livestock Infrastructure Development Index (LIDI) is a prerequisite for identifying the strongly and weekly linked aspect of sustainable development of livestock for a particular area. It is also an instrument which will further assist the policy makers to draw their attention towards the development of livestock services in that particular region or area. Based on these considerations, the Livestock Infrastructure Development Index (LIDI) was developed for 4 regions and all 26 districts of Gujarat using the latest triennial average data of the relevant indicators. The highest development index 4.39 and 3.67, were found in Banaskantha and Sabarkantha districts of North Gujarat respectively. These two districts ranked first and second among all the district of Gujarat, which indicates that in this particular district livestock services are developed and sustainable as compared to other districts.

If we compare the development index of different regions with each other that we can say that on the bases of these indicators the LIDI for South Gujarat is lowest as compared to the other regions of the state, which is an indicator that in South Region of the state there is need to focus on livestock development activities and programmes.

After Banaskantha and Sabarkantha, Panchmahal is showing good sign of Livestock Development activities followed by Vadodara, which ranks fourth among all the districts of Gujarat. Kaccha and Rajkot districts among all the districts of Kaccha and Sauwrashttra are performing well in livestock development activities,

Table 2: Livestock Infrastructure Development Index of Gujarat for the year 2012-13

Index for A.I. Centres	Index of Vet. Institution	livestock population Index	Road density Index	No. of cooperative Societies Index	Overall Development Development	Districts	Ranks
<i>Kachha & Sauwraashtra Region</i>							
0.01	0.60	0.43	0.57	0.00	1.61	Jamnagar	16
0.16	0.61	0.54	0.76	0.38	2.46	Rajkot	7
0.01	0.46	0.41	0.57	0.31	1.76	Surendranagar	12
0.08	0.61	0.50	0.61	0.30	2.10	Bhavnagar	10
0.04	0.59	0.30	0.52	0.20	1.64	Amreli	15
0.12	0.63	0.44	0.58	0.14	1.90	Junagadh	11
0.01	0.06	0.05	0.00	0.00	0.12	Porbandar	26
0.00	0.70	0.77	1.00	0.18	2.66	Kachchh	5
<i>North Gujarat Region</i>							
1.00	1.00	1.00	0.70	0.69	4.39	Banaskantha	1
0.20	1.00	0.26	0.26	0.00	1.72	Patan	14
0.82	0.44	0.37	0.29	0.61	2.53	Mahesana	6
0.69	0.40	0.84	0.81	0.92	3.67	Sabarkantha	2
0.43	0.23	0.22	0.23	0.00	1.12	Gandhinagar	21
0.11	0.47	0.29	0.57	0.30	1.74	Amdavad	13
<i>Central Gujrat Region</i>							
0.52	0.36	0.43	0.35	0.58	2.24	Kheda	9
0.54	0.36	0.25	0.22	0.00	1.38	Anand	18
0.42	0.84	0.76	0.41	1.00	3.44	Panchmahals	3
0.03	0.41	0.64	0.21	0.00	1.29	Dahod	19
0.36	0.61	0.56	0.61	0.70	2.84	Vadodara	4
<i>South Gujrat Region</i>							
0.06	0.34	0.14	0.41	0.28	1.24	Bharuch	20
0.02	0.17	0.07	0.08	0.00	0.34	Narmada	24
0.26	0.39	0.47	0.67	0.52	2.30	Surat	8
0.19	0.33	0.17	-0.19	0.00	0.50	Tapi	23
0.15	0.20	0.10	0.19	0.00	0.64	Navsari	22
0.17	0.21	0.21	0.27	0.55	1.41	Valsad	17
0.003	0.00000	0.000	0.001	0.00	0.004	Dangs	25

Source: Directorate of Animal Husbandry, Gujarat 2012-13.

which are ranked 5th and 6th position in LIDI respectively. Among all the districts of Gujarat, Tapi, Narmada, Porbandar, Dang and Bharuch are falling at the bottom level, which is not a good gesture for existence of good livestock support services and sustainability issue (Table 2). Because Kaccha nad Sauwraashtra region is known for Jafrabadi Buffalo and Gir breed of Cow, the high yielding and disease resistant breed of Gujarat is already losing these breeds annually. So many programmes of breed conservation especially for Gir cow is already running in Gujarat.

Effectiveness of Artificial Insemination Services in Local/Indigenous Cows: For conception rate in

indigenous cows district cooperative societies are doing well as compared to Govt. animal husbandry dept. Though the conception rate is less than 55% during most of the year in all the dairy cooperatives units but still AMUL dairy cooperative Kheda units have achieved conception rate up to the level of 65% during 2013-14 (Table 3), which implies that out of 100 A.I. 60 indigenous cows are conceived which is really remarkable. Where as in case of Govt. agencies, the success rate was varying from 35 to 55% and most of the year in all the districts the conception rate was below than 45% (Table 3). Dairy cooperatives have attended higher calving rate as compared to Govt. agencies working in the study

Table 3 : Effectiveness and Performance of A.I. Services in Local /Indigenous Cows

Year	District Dairy Cooperatives			District Animal Husbandry Dept.		
	Conception Rate	% of calving	No. of A.I./conception	Conception Rate	% of calving	No. of A.I./conception
SUMUL DAIRY SURAT				SURAT		
2008-09	51.88	46.42	1.93	34.10	25.75	2.93
2009-10	51.31	49.03	1.95	31.27	27.37	3.20
2010-11	57.10	51.85	1.75	40.36	32.27	2.48
2011-12	52.61	53.59	1.90	35.01	34.78	2.86
2012-13	53.12	53.81	1.88	38.19	37.25	2.62
2013-14	52.00	55.60	1.92	36.66	36.06	2.73
AMUL DAIRY KHEDA				KHEDA		
2008-09	47.05	71.99	2.13	41.44	33.70	2.41
2009-10	46.21	36.72	2.16	34.59	27.57	2.89
2010-11	64.96	48.59	1.54	54.95	53.85	1.82
2011-12	56.46	47.39	1.77	40.00	39.21	2.50
2012-13	62.43	56.42	1.60	44.44	40.17	2.25
2013-14	65.77	60.63	1.52	42.69	39.79	2.34
SABAR DAIRY SABARKANTHA				SABARKANTHA		
2008-09	50.45	45.57	1.98	37.64	33.21	2.66
2009-10	45.60	42.75	2.19	26.74	25.58	3.74
2010-11	50.86	50.13	1.97	40.00	39.38	2.50
2011-12	50.21	48.03	1.99	35.66	34.34	2.80
2012-13	40.33	39.30	2.48	48.85	47.54	2.05
2013-14	39.15	35.06	2.55	42.72	41.40	2.34
GOPAL DAIRY JUNAGADH				JUNAGADH		
2008-09	50.52	37.79	1.98	38.89	26.67	2.57
2009-10	54.47	42.44	1.84	40.00	29.41	2.50
2010-11	53.75	40.93	1.86	40.43	29.36	2.47
2011-12	51.52	44.69	1.94	58.41	38.32	1.71
2012-13	51.60	47.38	1.94	54.55	43.18	1.83
2013-14	52.72	48.95	1.90	56.45	40.78	1.77

Source: AMUL Research and Development Association, Sumul Dairy Cooperative, Surat, Banas District Dairy Cooperative, Banaskantha, Gopal Dairy Cooperative Rajkot.

area. SUMUL and AMUL dairy cooperatives both are more efficient and effective in delivering A.I. services in Surat and Kheda as compared to other dairy cooperatives as their coverage in conception rate and calving percentage is far better than the other dairy cooperatives and govt. organizations (Table 3). At the end of March 2014 SUMUL and AMUL dairy cooperatives had attended 52% 55.6%, 65% and 60% of conception rate and calving rate respectively, whereas the success rate of conception and calving in SABAR and GOPAL dairy was recorded up to the level of 39%, 25%, 52% and 48% respectively.

In case of number of A.I. per conception all the dairy cooperatives was showing almost same figure i.e. more than one A.I. per conception was found in all the selected district of the research area. But there was a different figure for Govt. agencies as their per conception rate was just double of dairy cooperatives. For example in Surat for the year 2008-09, conception rate attend by the SUMUL dairy was 1.9/A.I. whereas for Govt agency it was 2.9/ A.I. and after 6 years the scenario could not changed i.e. at the end of march 2014 A.I./Conception for SUMUL dairy cooperatives was 1.92, whereas for Govt. agencies it was 2.72 almost

Table 4: Effectiveness and Performance of A.I. Services in Crossbred Cows

Year	District Dairy Cooperatives			District Animal Husbandry Dept.		
	Conception Rate	% of calving	No. of A.I./conception	Conception Rate	% of calving	No. of A.I./conception
SURAT						
2008-09	45.53	40.99	2.20	36.84	35.00	2.71
2009-10	43.54	39.81	2.30	36.14	29.77	2.77
2010-11	44.26	38.55	2.26	38.71	36.06	2.58
2011-12	43.57	39.28	2.30	37.95	35.91	2.64
2012-13	43.30	37.77	2.31	44.71	35.80	2.24
2013-14	42.84	51.03	2.33	41.28	35.86	2.42
AMUL DAIRY KHEDA						
2008-09	25.15	24.30	3.98	47.78	47.29	2.09
2009-10	26.07	23.70	3.84	38.78	37.75	2.58
2010-11	25.34	20.73	3.95	52.38	51.54	1.91
2011-12	24.40	21.36	4.10	61.92	53.27	1.62
2012-13	25.49	14.42	3.92	58.48	57.50	1.71
2013-14	27.10	16.10	3.69	60.06	55.55	1.66
SABAR DAIRY SABARKANTHA						
2008-09	47.13	41.69	2.12	45.88	43.28	2.18
2009-10	46.93	43.66	2.13	42.59	41.00	2.35
2010-11	56.24	49.08	1.78	44.37	44.30	2.25
2011-12	43.84	43.07	2.28	39.78	39.72	2.51
2012-13	41.43	39.11	2.41	43.04	41.57	2.32
2013-14	39.96	38.56	2.50	41.52	40.71	2.41
GOPAL DAIRY JUNAGADH						
2008-09	44.62	36.99	2.24	40.81	28.46	2.45
2009-10	48.58	43.84	2.06	39.02	37.89	2.56
2010-11	46.25	46.07	2.16	43.33	38.53	2.31
2011-12	48.49	42.37	2.06	39.87	32.36	2.51
2012-13	50.95	45.18	1.96	35.89	29.90	2.79
2013-14	61.52	46.37	1.63	37.77	31.07	2.65

the same figure (Table 3). Thus it clear from the analysed data that in Gujarat the services of A.I. provided by the dairy cooperatives more efficient and effective than Govt. agencies, though Govt. agencies are also doing well after the implementation of ICDP (Integrated Cattle Development Programme) in Gujarat.

Effectiveness of Artificial Insemination Services in Crossbred Cows : It was quite interesting result that the scenario for effectiveness of A.I. in crossbred cows was totally different from indigenous breed and local cows. Conception rate had been achieved up to the level of 61 % at the last of March 2014 by the GOPAL dairy, which was far below than the conception rate for indigenous cows. The conception rate was varying from 24% to 61 % and during most of the year the conception rate was found to

be 40 to 43 percent in all the dairy cooperative societies. Calving percentage was also found to be low as compared to crossbred cows. AI./Conception was found to be more than 2 A.I. during most of the year in all the dairy cooperatives as well as districts animal husbandry department. In few years like 2008-09 to 2013-14, A.I./Conception was more than 3 in kheda i.e.3.98, 3.84, 3.95, 4.10, 3.92 and 3.69, which is showing a poor performance by AMUL dairy in Kheda district (Table 4). A.I./conception was more than 2 to 3 for all the dairy cooperative units as well as Govt. animal husbandry dept. working in the study area. It can be concluded that A.I. services are not that much affective in crossbred cows as it is in Indigenous and local cows, they may be different reasons that why A.I. is not that much successful in crossbred cows as it

Table 5: Effectiveness and Performance of A.I. Services in Buffalos

Year	District Dairy Cooperatives			District Animal Husbandry Dept.		
	Conception Rate	% of calving	No. of A.I./ conception	Conception Rate	% of calving	No. of A.I./ conception
SUMUL DAIRY SURAT				SURAT		
2008-09	53.90	46.56	1.86	37.40	34.16	2.67
2009-10	47.17	43.77	2.12	33.91	28.31	2.95
2010-11	50.04	43.83	2.00	38.74	34.36	2.58
2011-12	50.34	47.97	1.99	38.14	37.47	2.62
2012-13	49.18	45.85	2.03	40.41	39.29	2.47
2013-14	48.59	47.41	2.06	39.22	38.33	2.55
AMUL DAIRY KHEDA				KHEDA		
2008-09	23.36	15.00	4.28	37.29	31.72	2.68
2009-10	39.22	21.84	2.55	69.23	54.24	1.44
2010-11	23.39	20.61	4.28	58.66	44.07	1.70
2011-12	22.52	15.13	4.44	56.23	55.50	1.78
2012-13	23.96	15.18	4.17	54.16	50.12	1.85
2013-14	23.01	16.68	4.35	55.03	52.38	1.82
SABAR DAIRY SABARKANTHA				SABARKANTHA		
2008-09	46.54	41.37	2.15	45.80	42.88	2.18
2009-10	46.08	41.33	2.17	54.99	54.88	1.82
2010-11	38.46	62.28	2.60	48.52	47.09	2.06
2011-12	45.92	45.59	2.18	44.10	42.19	2.27
2012-13	40.07	41.31	2.50	53.60	49.22	1.87
2013-14	35.30	40.89	2.83	48.92	45.76	2.04
GOPAL DAIRY JUNAGADH				JUNAGADH		
2008-09	46.49	38.29	2.15	42.73	39.37	2.34
2009-10	47.43	38.43	2.11	36.59	30.81	2.73
2010-11	46.22	41.20	2.16	37.86	34.00	2.64
2011-12	45.07	39.47	2.22	41.90	35.13	2.39
2012-13	47.16	39.84	2.12	42.96	31.12	2.33
2013-14	56.56	42.51	1.77	42.46	33.04	2.36

Source: AMUL Research and Development Association, Sumul Dairy Cooperative, Surat, Banas District Dairy Cooperative, Banaskantha, Gopal Dairy Cooperative.

was found in local breeds. Local and indigenous breeds of cattle are generally more adaptable to that particular local environment and agro-climatic conditions but, H.F., Jersey and other crossbred cattle are not having their origin from Gujarat so these breeds cannot adapt themselves in this environment, and this may be one of the reasons that A.I. in crossbred cows are not that much effective as it is in local breeds.

Effectiveness of Artificial Insemination Services in Buffalos: Gujarat is known for their local breeds of Buffalo namely Mehsani, Banni, Surti and Jafarabadi,

good producer of milk with high fat ratio. What the data said about the performance and effectiveness of A.I. in these breeds of Gujarat was quite interesting. Though dairy cooperatives are working laboriously in field and providing door to door A.I. services in Gujarat but still the conception rate is not up to the mark i.e. conception rate is varying from 22 % to 57% and in Kheda district it was very low varying from 24.5 to 35.3 % during the period of six years from 2008-09 to 2013-14 (Table 5). Likewise in calving rate also, AMUL dairy cooperative performance is not satisfactory. It shows that in every

Table 6: The Overall Effectiveness and Performance of A.I. Services in Total Dairy Animals (Cattle+ Buffalo) Effectiveness of Artificial Insemination Services in Buffalos

Year	District Dairy Cooperatives			District Animal Husbandry Dept.		
	Conception Rate	% of calving	No. of A.I./conception	Conception Rate	% of calving	No. of A.I./conception
SUMULDAIRY SURAT				SURAT		
2008-09	49.8	44.00	2.18	36.85	33.89	2.71
2009-10	45.9	42.50	2.08	34.88	28.99	2.87
2010-11	48.1	42.20	2.12	38.85	35.03	2.57
2011-12	47.1	44.09	2.16	37.81	36.50	2.64
2012-13	46.2	42.02	2.20	42.39	37.35	2.36
2013-14	45.4	43.34	4.09	40.04	36.91	2.50
AMULDAIRY KHEDA				KHEDA		
2008-09	24.5	18.80	2.01	40.92	36.99	2.44
2009-10	49.7	23.11	2.83	55.84	46.78	1.79
2010-11	35.3	21.46	3.0	56.90	46.37	1.76
2011-12	33.3	17.72	2.91	57.40	54.10	1.74
2012-13	34.4	16.13	2.90	54.94	51.77	1.82
2013-14	34.4	17.73	4.79	56.00	52.77	1.79
SABARDAIRY SABARKANTHA				SABARKANTHA		
2008-09	20.9	41.66	4.73	45.68	42.83	2.19
2009-10	21.1	42.43	1.26	50.48	49.88	1.98
2010-11	79.1	54.85	1.40	46.63	45.80	2.14
2011-12	71.5	44.41	1.78	42.05	40.96	2.38
2012-13	61.9	40.17	1.61	48.59	45.63	2.06
2013-14	56.2	39.62	1.78	45.45	43.39	2.20
GOPALDAIRY JUNAGADH				JUNAGADH		
2008-09	8.9	37.88	2.11	42.21	36.58	2.37
2009-10	9.9	40.71	2.01	37.14	32.25	2.69
2010-11	9.7	42.14	2.06	39.05	34.87	2.56
2011-12	10.8	41.66	2.09	41.67	34.54	2.40
2012-13	10.5	43.19	2.03	41.46	31.00	2.41
2013-14	13.9	45.36	1.77	41.56	32.68	2.41

100 buffalos only 25 to 36 buffalos are conceiving and it quite low not even 40 buffalos in every 100 buffalos. The calving rate is also quite low in Kheda district as compared to other district, but on the same time performance by Govt. animal husbandry dept. was better than the AMUL cooperative as the conception rate received by Govt animal husbandry dept. was 55.03% and calving percentage was 52, at the end of March 2014 (Table 5). A.I./conception was found to be very high, varying from more than 2 A.I./Conception to 4 A.I./Conception, i.e. out of 4 A.I. one buffalo is getting conceived. Results shows that conception rate and calving percentage was very low for buffalos as compared to indigenous and crossbred cows. A.I./Conception was very high varying from 2 to 4 A.I./conception, which was quite depressing result of

breeding services provided by different organizations. *The Overall Effectiveness of Artificial Insemination in Gujarat (Cattle+ Buffalo):* The overall efficiency was ranging from 45 to 50 percent of conception rate, 40 to 45 percent calving rate and more than 2 to 3 A.I./conception. This was the general scenario of A.I. services in Gujarat. Out of all the four districts Kheda and Sabarkantha is showing good result of A.I., as the overall conception rate, calving rate and A.I./Conception were better than the other districts. GOPAL dairy in Junagadh is showing the poor performance of A.I. showing the conception rate ranging from 8.9% to 13.9, which implies that in every 100 dairy animals only 9 to 14 animals getting conceived after A.I. This is showing a very low conception rate (Table 6).

CONCLUSION

The overall effectiveness of A.I. services was not as satisfactory as it should be, because in Gujarat there is a vast and strong network of Dairy Cooperatives. Though these dairy cooperatives and Govt animal husbandry dept. is doing their job laboriously but still there are some loop holes which is hindering in achieving success in high conception rate, high calving ration and minimum A.I./Conception. The one thing that the researcher wants to mention here is that as compared to Govt. organizations working in that area, Dairy Cooperatives are providing good and efficient livestock support services, reaching to the door step of the farmers, whenever need arises. Undoubtedly SUMUL, AMUL, SABAR and GOPAL dairy they have achieved quite impressive success in coverage of animals, conception rate, calving percentage and A.I./conception, but still there is more scope for doing excel for the improvement of A.I. services in these areas especially in Junagadh.

It is remarkable that in Gujarat the conception rate in Indigenous breed was found 65 %, i.e. in every 100

herds of cow 65 cows are getting conceived from A.I. This has reduced the financial burden of farmers, because for natural services farmers have to pay 500 to 600/Service in the study area, where as the per A.I. charge was Rs.30 (at farmers door step) and Rs.10 (At centre). Not only in conception rate in A.I./Conception also , Indigenous and local breeds of Gujarat was responding well, which is clear from the analysed data that A.I./conception was ranging from 1 to 2 only. In case of buffalo and crossbred the result was not that much attractive as it was for indigenous cows , as it is well known that in buffalo A.I./conception is very high but still in Gujarat it was ranging from 3 to 4 A.I./conception. And conception rate was achieved up to the level of more than 56% by the dairy cooperatives. The scope for improvement if breeding services is still there for Govt. as well as Dairy cooperative organizations, for achieving the desired objective of good progeny with highest milk productivity in the state of Gujarat.

Paper received on : October 08, 2014

Accepted on : October 18, 2014

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