RATE OF ADOPTION OF SOME IMPROVED ANIMAL HUSBANDRY PRACTICES BY THE FARMERS AROUND ANAND, GUJARAT STATE

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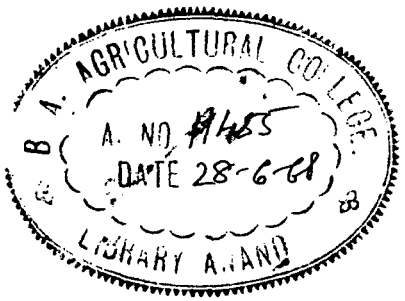

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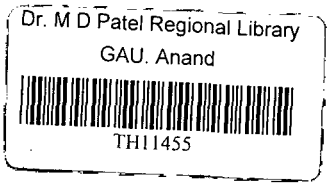

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(K.G.Halyal)

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CHAPTER I

THE PROBLEM IN ITS SETTINGS

Introduction

In India 71 per cent of the population live on income from land. A total of 371 million acres are under cultivation, most of which is in small and fragmented holdings of less than five acres. The cultivator has to depend entirely on bullock labour for tillage, irrigation and carting. Therefore, the provision of food for the country's large human population, depends on the production of the required number of bullocks among other things. The scope of mechanization of agriculture is very limited, because large holdings are few, or cooperative farming is practically non-existent in this country, "cattle are therefore, the foundation of agriculture in India."[1]

A large proportion of the population is vegetarian, to whom milk and milk products constitute the only source of animal proteins in their diets. Even in countries, where meat and eggs constitute articles of diet, minimum physiological requirements of man worked out at sixteen ounces per head per day. As compared with western countries the consumption of milk and milk products is lowest that

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[1] K.P.R. Karta, "Cattle and Buffalo Breeding," Hand Book of Animal Husbandry (New Delhi: Indian Council of Agricultural Research, 1962), p.1.

too with richest resources of livestock. It has been said, "Though India possesses 175 million cattle, nearly one third of the cattle population of the world and 51 million buffaloes i.e. half the buffalo population of the world, the present production is hardly five ounces per head."[2]

The question of the provision of more efficient bullocks for cultivation and of more milk for her growing population, therefore, assumes a paramount importance in India.

Cow dung is universely recognised as being better than synthetic products for the retention of humus in soil and for maintaining its fertility. The present production of cattle manure in India is of the order of about 1095 million tons annually or three tons per acre of cultivated land.

The remains of dead animals constitute an important source of national wealth. India has been one of the largest supplier of hides and skins to the international market and is an exchange earner, while horns, hoofs, and bones are utilised in inudstries and in preparation of bone-meal used as mineral supplements to cattle feeds and as soil fertilizers.

The evaluation of the cattle industry in India with any degree of precision is hardly possible, in as much as it is spread over the whole country in innumerable small units.

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[2] Ibid.

The following statement is reproduced from a report made in 1937 by Wright, after a country wide survey of cattle and dairy industries undertaken by him, wherein he pointed out that potential productive value of cattle industry is very great though economic and climatic conditions adversely affect its value. He said that, "India possesses the largest number of cattle of any country in the world. Out of the world's cattle population of about 690 millions animals, 215 millions (or just under one-third) are located in India. Owing to adverse climatic and economic conditions the productive value of the cattle industry is not commensurate with its size. Nevertheless the actual and potential value of cattle products is very great."[3]

The gross annual contribution which this industry makes to Indian economy is very high. In an estimate made in 1932, this contribution was roughly assessed at Rs.3000 crores. Recently, the national income group of the department of economic affairs estimated the net income, after deducting feeding and other expenses to be about Rs.650 crores and most of this income is derived from cattle.

There is a close relationship between the development of agriculture and livestock as such, improvement of

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[3] N.C. Wright, Report on Development of cattle and Dairy Industry in India (Delhi: Manager of publications, 1941), p.57.

one cannot be thought in isolation of the other as has been pointed out by Randhwa:

> "It is impossible to think of improving agriculture in India without having good cattle... At present more than 50 per cent of our total agricultural income is derived from cattle, and it is obvious that they should receive adequate attention in the planning programme for rural sector."[4]

In Gujarat the industry of animal husbandry plays an important part as a subsidiary industry to agriculture. In this context Trivedi remarked that:

> The livestock statistics bear testimony only to the development of agriculture in the State (Gujarat) by the adoption of improved farming practices and increasing resort to mechanization but also reveal the mixed nature of the State economy where in Animal Husbandry plays an important part as an occupation ancilliary to cultivation.[5]

Raising of milch animals, buffalo being the animal of choice of the cultivators, forms supplementary occupation to the farmer and his family. Buffalo-keeping provides not only ready cash returns but also supply milk and milk products to the farmers' family. Buffaloes can very well thrive on inferior fodder like bajri straw, by-product of cereal crops, and in return maintain the

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[4]M.S.Randhwa, Agriculture and Animal Husbandry in India (New Delhi: Indian Council of Agricultural Research, 1962), pp.259-60.

[5]R.K.Trivedi, Census of India 1961, Gujarat Vol.V (Delhi: Manager, Publications, 1965), p.87.

fertility of soil through valuable manure. So dairying forms a subsidiary occupation to farming.

The pattern of agricultural practices in Charotar area has been very well described by Desai in a study on Charotar farm that:

> Dairying is the important subsidiary enterprise in the region, the chief milch animal being buffalo. Thus the pattern of farming in the region is mixed farming which implies dove-tailing of crop production and animal husbandry to the best advantages of the farmer. This pattern of farming enables full utilization of by-products of crops and their conversion into animal products, and gives additional work to the farmer and his family, particularly females, who generally need some light indoor work which they can do along with household work. Again, the livestock yields manure required for crops and provides milk and milk products to the family members and brings in ready cash so essential in farming.[6]

Such a type of farming owes itself to the best available milch breeds in this tract. In a survey conducted by National Council of Applied Economics Research, regarding the potentiality of natural resources of Gujarat State, it has been remarked about the cattle and buffaloes that:

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[6] N.K.Desai, "Problems of Mixed Farming - Study of a Charotar Farm," Indian Journal of Agricultural Economics, XVI : (July - Sept, 1961), p.46.

> Gujarat is among the few states in the country which has relatively well developed livestock industry. The per capita output of livestock products is two and a half times higher than the national average...The State has some best milch breeds both cattle and buffaloes, consequently the milk yields are among the highest in the country... The average annual yield per animal is at 1086 lbs.as against the national average of 553 lbs. On the average a cow yields about 577 lbs. and a buffalo about 1580 lbs. a year.[7]

With this potentiality of dairying and farmers comparatively more progressive minded, there is very good future for this industry in this area.

The late Sardar Vallabhbhai Patel, with his fore sighted view of development of this industry in this area, Kaira District Co-operative Milk Producers' Union, came into existence. It was just to cater the need of Bombay City milk supply by collecting milk from producers through Milk Producers' Co-operatives in the neighbourhood villages round about Anand, and to supply whole milk to Bombay City, a modest beginning was made with only eight co-operatives in the year 1946.

Dairy development is flooded with immense problems right from the production of milk, collection, transport, preservation and supply to consumers at the required time. Perishability and bulk of whole milk add more problems.

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[7]National Council of Applied Economic Research, Techno-Economical Survey of Gujarat (New Delhi: National Council of Applied Economic Research, 1963), p.84.

Transport from rural area, where again production is scanty, scattered, and in small units, with no proper approachable roads round the year, is one of the key problems in dairy development. In this connection Wright has rightly remarked that:

> One of the great advantages of retaining industries within the villages is that the by-products of manufacture are still available for the use of the cultivator at the same time this degree of centralisation of manufacture is sufficient to call for some form of co-operative marketing from which cultivator should benefit materially.[8]

He indicated that co-operative attempts would be very much useful in development of this industry in rural areas. The problems can be tackled by collective attempts. This involves organisation of Producers' Co-operatives and to mobilise production collection in the rural areas that is, at the villages. Transport, preservation, manufacture of milk products, and marketing has to be taken care at a central place by a representative federal body of the primary co-operatives. This task involves among many other things investment of large capital and trained technicians. This aspect has been taken care by the Kaira District Co-operative Milk Producers' Union at Anand.

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[8] Wright, op. cit., p.15.

In 1946, Saraya Committee recommended that:

> 25-30 Societies to a union... and formation of Milk Producers Co-operative Societies in the villages within a radius of 30 miles of towns having population of 30,000 or more. Their scheme called for about 300 milk unions to be started within 5 years with generous state support...[9]

Accordingly, the Kaira District Cooperative Milk Producers' Union got generous help from the Government and could work for the development of dairying in this area.

This organised body was in a position to break the vicious cycle of low production and high cost, by providing a remunerative and regular return all the year round to the produce of the farmer members. On the other hand, supply of production requisites at cheaper rate to farmer members, to improve production from individual animals, was also undertaken. Both measures adopted by the Union have induced, not only to takeebetter care of buffaloes, but also to produce more milk.

The progress report of Kaira District Co-operative Milk Producers' Union revealed that there were 567 Primary Co-operative Milk Producers' Societies in the villages of Kaira District by the end of the year 1966-67. It is expanding rapidly and very soon almost all the villages may join the Union; thereby, farmers can improve the standard of dairy industry on one hand and also improve

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[9]Eleanar. M.Hough, The Co-operative Movement in India (Fourth edition, Oxford:University Press, 1959), p.186.

their way of living by utilising the return from the produce in making their living more satisfying.

The present production from buffaloes is low. Farmers can realise better returns only if each animal can produce more per head. This is only possible if the buffaloes are bred by improved methods, fed adequately, and managed on scientific lines by adopting improved methods of breeding, feeding, and management.

One of the specific objectives as provided in the by laws of the Union as well as primary co-operative Milk Producers' Societies at the villages is to help the farmers to keeptheir buffaloes in best possible health conducive to higher milk production. A provision in the by laws of the Primary Societies is evident which states that:

> To take such measures in the village that can improve production, health, and breed of milch buffaloes by adoption of improved methods of animal husbandry practices."[10]

Correspondingly there is also provision in the by laws of the Kaira District Co-operatives Milk Producers' Union, Anand, which states that:

> Generally to do all such things as are indicated or conducive to the attainment of the above mentioned objects."[11]

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[10]Cooperative Milk Society Limited, Bylaws, 1965, p.1.

[11]The Kaira District Co-operative Milk Producers' Union Ltd., Bylaws, 1962, p.3.

In order to achieve this objective of improvement in production, health and breed of the buffaloes, a massive integrated programme has been launched by the Union with the partnership of Primary Co-operative Milk Producers' Societies at the villages affiliated to Union.

It is envisaged to double the production of milk within a period of seven years by adopting scientific ways of breeding, feeding, and management of buffaloes by the farmer members.

This involved a continuous, well balanced programme of extension education, propoganda and requisite services needed for adoption of improved animal husbandry practices.

Though the Union has well organised societies, and adequate professional staff to implement schemes aimed at higher level of production, that too more or less in an uniform way at all the villages, the response varies for the adoption of improved animal husbandry practices. Some societies are far ahead andsome are too behind.

As has been said by Bowles that:

> Rural societies are usually dominated by traditional way of thinking and doing which are not changed; because of this, rural improvement is not susceptible to crash programmes which yield immediate tangible results.[12]

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[12]Chester Bowles, Making a Just Society (Delhi: University of Delhi, 1963), p.39.

Apart from apathy of cultivators towards improved methods, unlike in agriculture production, to get increased production from animals is a long range programme, as such, results are not evident soon. Patience and perseverence must prevail while attempting to increase return from animal production. Proper planning, execution and persistent follow-up is very essential to achieve some tangible results in the field of animal production.

Why some villages progress well and some lack behind, in spite of equal and uniform endeavour? To answer correctly this baffling question one has to evaluate the attempts made in each of the villages. The assessment can be made by studying the relative rate of adoption of improved animal husbandry practices by the farmers in each villages.

The fact that everybody does not adopt new ideas or practices at the same time is well known. Ordinarily, adoptions are slow at first and they increase at an increasing rate later on. Unless one is fully convinced about what is new in the practice and its advantages, one may not try to adopt it. Actually one will pass through a mental process before full conviction. This has been defined by Rogers as under:

> The adoption process is a mental process throggh which an individual passes from first hearing about a new idea to final adoption.[13]

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[13] E.M.Rogers, Social Change in Rural Societies (New York: Appleton Crops Inc, 1960), p.10.

There is a lapse of time between hearing about a new idea or practice and final adoption. This lapse of time may vary from few days to few years depending on the practice and receptivity of farmers. How one at last comes to a decision has been pointed out by Lionberger that:

> A decision to change ordinarily is the product of a sequence of events and influences operating through time than abrupt metamorphosis.[14]

A situation may be created wherein farmer is allowed to have his own decision. All will not respond equally to the situation and a slow change prevails, as such, there is difference in the rate of change from individual to individual and village to village. Rate of adoption has been defined by Rogers:

> Rate of adoption is the relative speed with which an innovation is adopted by the members in a social system. It is usually measured by length of time required for certain percentages of the members of a social system to adopt an innovation.[15]

It is a useful measure to evaluate also the attempts made by the extension workers in order to convince the cultivators to adopt improved methods. Adoption is likely to vary from village to village. It was in this context that the study of rate of adoption of some

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[14] H.E.Lionberger, Adoption of New Ideas and Practices (Iowa: Iowa State University Press, 1964), p.21.

[15] E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

improved animal husbandry practices was taken up. Operational area of the Kaira District Co-operative Milk Producers' Union is an ideal situation for such a study. The results of the study i.e. factors responsible for high rate of adoption or low rate of adoption will be a useful information for the success of extension activities undertaken by the union in partnership with Primary Co-operative Milk Producers' Societies at the villages. The highlights of success will add a feather in the cap for the organisation and pit-falls will be useful in improving slow rate of adoption. The study will be of immense use for future line of extension work in the new area of extension activities.

Statement of the Problem

The Kaira District Co-operative Milk Producers& Union, Anand is striving hard in partnership with the Primary Co-operative Milk Producers' Societies in the villagesin its operational area, for adoption of improved animal husbandry practices by the farmers, for the last 10-15 years. It is observed that the adoption of improved animal husbandry practices is slow in some villages and comparatively faster in others. The adoption of one of the practices that is 'Artificial Insemination' to be adopted as a method of breeding; another practice

of 'Rendering buffaloes for pregnancy diagnosis'./ which were the practices had been taken up for the study of rate of adoption. Study was restricted to such villages where artificial insemination centres were working for a period of three years or more at the end of the year 1965-66.

It was envisaged to study also factors responsible for high or low rate of adoption of the practices at the villages under study.

Objectives of the Study

The study was conducted with the following objectives:

(a) To study the rate of adoption of artificial insemination as a method of breeding buffaloes for the years from 1960-61 to 1965-66, at such villages where artificial insemination centres were existing and working for a period of 3 years or more.

(b) To study similarly in such villages the rate of adoption of rendering she buffaloes for pregnancy diagnosis.

(c) It was envisaged to study further the factors affecting the rate of adoption so far as the organisational factors and efforts of the

Primary Co-operative Milk Producers' Societies of the respective villages and that of Kaira District Co-operative Milk Producers' Union, Anand, for the two practices under study were concerned.

Hypotheses

Many factors concerning characteristics of artificial insemination workers, of the co-operatives were taken up. Pattern of the organisational aspects, working of co-operatives and village conditions in general were included for the study. On broad basis following null hypotheses were formulated:

(a) There was no difference betwen the characteristics of artificial insemination workers and rate of adoption of improved animal husbandry practices.

(b) There was no difference betwen the pattern of organisation and working of societies and the rate of adoption of improved animal husbandry practices.

(c) There was also no difference between the general conditions prevailing at the villages and the rate of adoption of improved animal husbandry practices.

CHAPTER II

REVIEW OF LITERATURE

The literature reviewed so far has clearly revealed that very few researches on the rate of adoption of animal husbandry practices have been taken up in India. However, the experts engaged in the field of rural sociology from the United States of America have developed some literature which can be taken as a guide for conducting researches in India with some modifications to suit local conditions. A brief account of such selected studies conducted abroad as well as in India, which were closely related to the problem under study, is presented in the following pages.

Literature on the Rate of Adoption

Roger[1] defined, rate of adoption is the relative speed with which an innovation is adopted by members of a social system. People do not adopt new ideas or practices at one and the same time. There is a time lag between first hearing and final adoption; that means some preparation of mind is necessary as stated by Cannon:

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[1] E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

> The seeds of great discoveries are constantly/ floating around us, but they only take rest in minds well prepared to receive them.[2]

The preparation of mind has been ascribed as the adoption process, which is the mental process through which an individual passes from first hearing about an innovation to final adoption.[3] The adoption process is traced from the learning theories of psychology. Learning is defined as relatively enduring change in response to stimulus.[4]

The views held by Lionberger[5] on adoption process were that the time from initial knowledge to final acceptance may range from few days to many years and also a decision to change is ordinarily the product of a sequence of events and influences operating through time rather than an abrupt metamorphosis. March and Simon[6] held that the adoption process is one of decision making. The adoption of an innovation requires a decision by an individual. Decision making is the process by which an evaluation of the meaning and consequences of alternate lines of conduct is made.

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[2]Walter B.Cannon, The Way of an Investigator (N.Y.Norton, 1945), p.76. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.76.

[3]Rogers, op.cit., pp.76-77.

[4]Ibid.

[5]Herbert.F.Lionberger, Adoption of New Ideas and Practices (Iowa: The Iowa State University Press, Ames, 1964), p.21.

[6]James.G.March, and Herbert.A.Simon, Organisations (N.Y.Willey, 1958), p.177. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966) p.77.

The way in which an individual adopts an innovation is viewed by most researches as a process. Adoption of a new idea is a bundle of related events flowing through time, in short it is a process.[7] It may be fruitful to trace briefly the conceptual development. Ryan and Gross[8] were probably the first to recognise that adoption of new ideas consisted of stages. They distinguished between awarness of hybrid seed corn, conviction of its usefulness, trial, acceptance and complete adoption. Pedersen[9] also suggested that a sequence of events leads to adoption. However, it was Wilkening[10] who first pointed out that an individual's

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[7]Rogers, op. cit., p.78

[8]Brace Ryan, and Neal. C.Gross, "The Diffusion of Hybrid seed corn in Two Iowa Communities," Rural Sociology 8: 15.24. (1943), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.79.

[9]Harold. A.Pedersen, "Cultural Differences in Acceptance of Recommended Practices," Rural Sociology 16: 37-49 (1951) Cited by E.M.Rogers. Diffusion of Innovations (New York: The Free Press, 1966), p.80.

[10]Eugene.A.Wilkening, "Acceptance of Improved Farm Practices," (Raleigh: North Carolina Agricultural Experiment Station Technical bulletin, 98, 1952), p.16. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.80.

decision to adopt an innovation was a process composed of stages. He described the adoption of innovation as:

> ... a process composed of learning, deciding, and acting over a period of time. The adoption of a specific practice is not the result of a single decision to act but of a series of actions and thought decisions.[11]

In summary, it can be said that individuals do not adopt an innovation all at one time. So the rate of adoption varies with individuals. There is time factor involved in adoption as such, different practices have different rates of adoption in one and the same area.

Measures of the Rate of Adoption

Roger[12] stated that rate of adoption is usually measured by the length of time required for certain percentage of the members of a social system to adopt an innovation. A variety of specific measures of rate of adoption have been used by researchers, although all these measures are based on length of time required to reach certain level of adoption. Kivlin[13] used the annual per cent

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[11]"Adoption of Improved Farm Practices as related to Family Factors," (Madison, Wisconsin Experiment Station Research Bulletin 183, 1953), p.9. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.88.

[12]Rogers, op.cit., p.134.

[13]Josef.E.Kivlin, "Characteristics of Farm Practices Associated with rate of adoption," (Ph.D.Thesis, University Park, Pennsylvania State University, 1960), p.28. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

of adoption during the eight years of most rapid growth in adoption. Tucker's[14] measure was the number of years from 5 per cent adoption to 20 per cent adoption. Mansfield,[15] Heavens and Rogers,[16] measured the rate of adoption by dividing the number of individuals adopting in a given year by the number yet to adopt that year. Griliches[17] measured the rate of adoption by the slope of the adopter distribution. Adler[18] utilised a 'Vitality index' to operationalize this

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[14]Carlos.F.Tucker, "Prediction of Rate of Adoption from Characteristics of Farm Innovations," (M.S.Thesis, Columbus, Ohio State University, 1961). Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

[15]Edwin Mansfield, "Technical Change and the Rate of Imitation," Econometrica, 129. 741-766 (1961) Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

[16]A Eugene Havens, and Everette M.Rogers, "Adoption of Hybrid Corn Profitability and Interaction Effect," Rural Sociology, 26 (1961), pp. 409-414. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

[17]Zvi.Griliches, "Hybrid Corn An Exploration in the Economics of Technical Change," Econometrica, 25, (1957), p.501-522. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

[18]David Adler, "An Analysis of Quality in the Associated Public Systems through a Study of the Patterns of Diffusion of Selected Educational Practices," (D.Ed.Thesis Columbia N.Y.Teachers' College, 1953), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.134.

dimension which also took discontinuances into account.

The measure used in the present thesis was based on the number of buffaloes inseminated during the year in relation to total number of breedable buffaloes in the village.

Literature on the Role of Co-operatives on the Adoption of Improved Practices

"Co-operative is a voluntary association of individuals who join together to secure goods and service at cost. Several farmers become associated so that a part of their individual business operations may be conducted jointly thus making these functions more efficient and less costly than if each farmer acted individually."[19] Hough[20] defined, "A Co-operative Society - whether it would be for credit, marketing, or processing or any other purpose - is a voluntary business association of persons especially those belonging to weaker sections of the community drawn together by common economic interests organised on the basis of co-operative principles." It is interesting to note that co-operatives are recommended by practically every commission on development of underdeveloped areas, Beckette said:

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[19] E.M.Rogers, Social Change in Rural Sociology (New York: Appletion Century - Crofts. Inc, 1960), p.352.

[20] Elinar.M.Hough, The Cooperative Movement in India (Fourth Edition, Oxford: University Press, 1959), p.423.

> Perhaps the most useful single tool in rural development is the co-operative. It can at the same time function as an economic system and as a cradle for the growth of social attributes essential to development of a community, such as self help and democratic organisation and management of affairs. On the economic side in the sphere of agriculture it can organise thrift, credit, marketing and consumer supply at village level, and through federations and central organisations provide the whole frame work of banking, insurance, whole-sale trading, import and export services in an efficient manner, making possible the maximum rate of agricultural development and ensuring to the farmer the optimum fair return for his productive effort.[21]

On the same lines a village milk co-operative can very well take care of development of dairy industry in the area, assuring fair return to the produce, as well as it can also provide production requisites and necessary services conducive to higher production. Shah[22] rightly said that : through a dairy co-operative as an agency of improvement, and with dynamic partnership with federation, a tremendous progress in animal husbandry, and co-operative extension activities, can be achieved. In emphasizing the relation of extension workers with co-operative organisations,

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[21] W.H.Beckett, "The Development of Peasent Agriculture," Approach to Community Development (Bandung: W.Van Hoeve Ltd., The Hague, 1953), p.148.

[22] M.K.Shah, "Production Enhencement and Cooperative Extension Activities by a Dairy Cooperative, Amul," (Paper read at regional seminar/How to establish a Cooperative Processing Plant, Organised by International Cooperative Alliance in Colloboration with National Cooperative Union of India. Bangalore, December,1966), pp.2-3.

Kelsey & Hearne[23] stated that such organisations if well organised and managed may perform following functions:

(1) Provide a way to meet difficulties and situations which are hindering profitable farming, but which cannot be handled by publicly supported educational institutions or by the individual working alone.

(2) Establish local organisations which may be federated into regional organisations to solve marketing and distribution problems beyond the capacity of the individual to handle.

(3) Help to increase profits from farming and thus to put farming on a better business basis.

(4) Have the effect of improving rural economic, home and social conditions.

In community development programmes, co-operatives play a vital role. Murti[24] stated that co-operation and community development were integral parts of the same process of rural development, for which every attempt is made to achieve through Five Yeal Plan. The community development gets consolidated by the formation of co-operatives, both together go a long way in satisfying socio-economic needs of the society.

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[23]L.D.Kelsey, and C.C.Hearne, Cooperative Extension Work (New York: Comstock Publishing Associates, Ithaca, 1963), p.95.

[24]B.S.Murti, "Community Development and Cooperation," All India Cooperative Review, XXVIII (October,1962),pp.363-64.

Kamat[25] said that, "This process in a way is a final answer to the usually discussed problem, which should come first, economic development, or social development,"

Though co-operatives are meant for the benefit of their members, certain factors hinder the smooth working of the co-operatives. Some of the studies taken up to probe into these aspects have been reviewed.

A study was conducted by Munjal[26] in a Punjabi village to find out factors impending functional effieiency of co-operative societies. He observed that members having surplus income had more representation in the various offices as compared to the actual proportion in the village. Absence of landed property was one of the reasons for not becoming members. More members from subsistence class left the society than surplus class, either due to differences with the president, or prevalence of politics and quarrels. Dominant group got the most of the advantages. Dominant caste held majority among the office bearers. The widely prevalent illiteracy, dominance of caste, and class hierarchical groups in the working of the society, lack of proper communication between the officials and members,

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[25]G.S.Kamat, "Cooperative and Community Development Movement," Indian Cooperative Review, II. (July, 1965),

[26]H.R.Munjal, "A Research Study of a Punjabi village," Indian Cooperative Review, III (January,1966), p.72.

were some of the factors hindering the efficiency and smooth working of the society. A resume of the observations made of this limited study indicated that the co-operative was not equipped with the capacity to help the weaker section of the community which in economic terms were called non-credit worthy. If it was to succeed and improve its functional efficiency and encompass the whole village, as an agency of economic development, ways be devised to cover the weakest section who were non-members at present.

Similar study was conducted by Misra and Baldeo Ram[27] to appreciate role of service co-operatives. They observed that only 15.6 per cent families joined the service co-operatives, out of which 6.6 per cent could obtain loans and only 7 per cent could avail of the marketing facilities. Although, investigation was carried on a small scale, it may still safely be concluded that performance of service co-operatives had been much below the expectations.

Meti[28] stated that cooperation in India was not merited with able leadership. There was prevalence of vested interests, factions, overdues, and liquidation in the co-operative sector. Many co-operatives remained defunct due to wide difference of opinion between the members of

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[27]M.D.Misra, and Baldeo Ram, "Role of Service Co-operative," Indian Journal of Extension Education, II (March-June, 1966), pp.73-80.

[28]T.K.Meti, "Cooperative in Development Prospective," Indian Cooperative Review,II (July, 1965), pp.501-3.

societies and managing committees. If proper leaders were selected and a code of conduct and discipline observed, Rochdale principles of cooperation were properly applied, the cooperatives would prove to be an important institutions in a democratic country like India.

Endivy, while discussing the problem of service personnel of service cooperative societies stated that:

> The success of a co-operative society depends not only on the prudence, diligence, sagacity and wisdom of its committee management and board of directors, which lays down the internal policy within the frame-work of policy directives; it is the quality of the personnel that has a direct bearing on the quality of the management of the cooperative. Service personnel occupy a strategic role in the management of conduct of business.[29]

Same views were expressed in a research study by Folkman[30] at Arkansas. The study indicated that cooperative managers (secretary af cooperative) often have a good deal of influences over their board of directors. Good manager had his board in his pocket. Manager usually had the power to hire and fire all other employees of the co-operative, because of his training, experience and close contact with business, and he was also in a position to render advice on policy decisions.

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[29]Endivy, "Problem of Service Personnel of Cooperative Societies," The Maharashtra Cooperation Quarterly, XLVII (April, 1964), pp. 298-305.

[30]William.S.Folkman, "Board Members as Decision Makers in Farmers' Cooperatives," Rural Sociology, 23 (1958) pp.239-252. Cited by E.M.Rogers, Social Change in Rural Society,(New York: Appleton Century Crafts Inc. 1960), p.358.

Choubey[31] stated that employees of the cooperative need a good treatment as human beings. Security, good wages, opportunity for higher jobs, pride of product, job accomplishment, sense of 'we' feeling, sense of belonging to the enterprise, involvement in decision making, and job satisfaction, etc., that can be guaranteed to the employees. He has further stated that an employee in a primary cooperative, having worked for a number of years should be able to go to a higher cadre either in government service or at the federal organisations. This could motivate employees for discharging their duties more efficiently and usefully.

Some factors like culture, social norms, innovativeness, educational level, traditions, castes etc., of farmers affect the rate of adoption of improved practices in an area. Some of the studies conducted on these aspects have been reviewed.

Caste and the Rate of Adoption

A study was conducted by Rajendra[32] in Community Development Block, Lakhaoti (in western U.P.) to investigate relationship between caste and adoption of improved farm practices. He concluded that there was a significant difference between the adoption indices of the three castes,

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[31]B.N.Choubey, "Motivation in Cooperatives," Indian Cooperative Review, II (July, 1965), p.515.

[32]Rajendra, "Adoption of Improved Farm practices and Caste-System," Indian Journal of Extension Education, II (March-June, 1966), p.99-101.

viz., agricultural caste, lower caste, and scheduled caste. The adoption level was the highest for agricultural caste in that locality and it differed significantly from the adoption levels of lower caste and scheduled caste. There was statistically no significant difference between the adoption levels of lower caste and scheduled caste.

A similar study was conducted by Mulay and Ray[33] in the Kanjawala Community Development Block. They concluded that support from one's own group was an important factor for adoption of improved seeds, fertilizers, and plant protection measures. Support or lack of support from own caste group influenced adoption or non-adoption of farm practices.

Culture and social norms play also vital role in acceptance of innovations and adoption. In this respect Linton said:

> If we know what a society's culture is we can predict its members will welcome or resist a particular innovation.[34]

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[33]Sumati Mulay, and G.L.Ray, "Caste and Adoption of Improved Farm Practices," Indian Journal of Extension Education,I (July, 1965) pp. 106-111.

[34]Ralph Linton, "Cultural and Personality Factors Affecting Economic Growth," in Ber F.Hoselitz (ed) The Progress of Under Developed Areas (Chicago: University of Chigago Press, 1953), p.74. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.57.

Not only are the more modern members of a social system more innovative than their more traditional peers, but there may be few social relationship between the moderns and the traditionals. This was illustrated by the study of Vande Ven[35] in the investigation of diffusion of artificial insemination in a Netherland village. A few modern farmers pioneered in adopting a new idea and their followers adopted soon after; but then the rate of adoption seemed to plateau as the majority of traditional farmers did not adopt. Vande Ven found that there was no visiting relationship between the modern and the traditional farmers. It was as if each lived in a separate system rather than in the same community.

It was thought that lack of knowledge delays adoption and affects rate of adoption, but the studies of Wilkening and Santapole[36] and Coleman[37] revealed that there was little evidence that lack of knowledge about innovations actually delays their adoption. Non adoptors were often aware of an

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[35] W.J.Vande Ven, "Problemen Yond de verbreiding vond de kunstmatige, inseminatie," (M.S.Thesis Wageningen, Netherlands, University of Wageningen, 1957), Cited by E.M. Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.67.

[36] Eugene A Wilkening, and Frank A.Santopolo, "The Diffusion of Improved Farm Practices from Unit Test-Demonstration Farms in the Tennessee Valley Countries of North Caroline," (Raleigh: North Caroline Agricultural Experiment Station, Mimeo Bulletin, 1952), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.108.

[37] A Lee Coleman, "Some Aspects of Human Relations in soil Conservation,"(Washington D.C: U.S.D.A.B.A.E. unpublished report, 1946). Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.108.

innovation but were not motivated to adopt it. Ryan and Gross[38] reported that almost all of the Iowa farmers in their study heard about hybrid seed corn before more than a handful were planting. It was pointed out further that:

> It is evident that... isolation from knowledge was not a determing factor in late adoption for many operators.[39]

Chandra Prabhat[40] in a study of communication of some new ideas in a Madhya Pradesh village concluded that geographical and social isolation, influence of brahmins who insisted on strict observance of customary ways, prevented acceptance of new ways.

Cultural values may serve as a block to new ideas in any culture. Many American farmers had generally been reluctant to adopt artificial insemination for their dairy cows. Although artificial insemination had been widely available for over twenty years, by 1958, less than 25 per cent of American dairy farmers used the practice. Why farm

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[38]Bryce Ryan, and Neal.C.Gross, "Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology 8:(1943) 15-24). Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.108.

[39]_____ "Acceptance and Diffusion of Hybrid Corn in Two Iowa Community," (Ames, Iowa Agricultural Experiment Stations Research Bulletin, 372, 1950), p.679, Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.108.

[40]Chandra Prabhat, "Communication of Some New Ideas in a Mahdya Pradesh Village, a Sociological Study Conducted in a Mixed Village," Eastern Anthropology 17.3 (Sept-Dece,1964), p.183-214. Cited by Sociological Abstracts 14-4(June, 1966), p.427.

people have been so resistant to adopt artificial breeding? One important reason pointed out was that many farmers perceived the practice as unnatural or artificial. Some thought the calves would be weak and sickly. As one farmer tried and then rejected the practice stated in a research interview:

> I used that artificial breeding once several years back and it was't so good. The cows did not all get with calf, and I had lot of trouble. The calves was small and not very thrifty. So I got me one bull again. If God wanted us to use artificial breeding he wouldn't have made bulls.[41]

It was interesting to speculate as to the rate of adoption if the practice had been called scientific breeding.

Social resistance hinders adoption of improved practices. Khare[42] studied about social resistance to sanitation programme in rural India at a village Gopalpura during 1958-60. He concluded that caste interference was present but such stimuli as political power, inter-caste group co-operation, heterogenous occupational pattern and individualistic approach no matter delimiting the effect of caste groups. Decisions at individual levels were rare in Gopalpura.

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[41] E.M.Rogers, Social Change in Rural Society (New York: Appleton Century Crofts Inc, 1960), pp. 40-41.

[42] R.S.Khare, "A Study of Social Resistance to Sanitation Programmes in Rural India," Eastern Anthropology, 17.2 (May-August, 1964), p.86-94.Cited by Sociological Abstracts 14.4 (June, 1966), p.430.

Many times it is not the resistance to innovations but lack of sufficient economic motive to adopt cause failure in adoption of some improved practices. This was illustrated in a case study of agricultural extension in a District of Uttar Pradesh, India. It was shown that innovations initiated by State Sponsored Community Development Programme especially with increasing agricultural production, may be blocked or fail to crystalize for reasons other than peasant opposition to innovation. Sonwal[43] attributed the failure to provide sufficient economic incentive to compensate for the abandonment of traditional pattern.

Characteristics of Innovations and the Rate of Adoption

Characteristics of innovations influence rate of adoption. Kelkar and Sohoni[44] conducted a study on role of farm practice - attributes in adoption of improved agricultural practices in the extension block of Agricultural College, Nagpur. They concluded that low cost of practice did not necessarily provide a strong incentive for adoption of a

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[43] R.D.Sonwal, "Agricultural Extension in a Kumonese Village," Journal of Development of Studies, 1.4 (July,1965), p. 384-398. Cited in Sociological Abstracts 15.1 (February, 1967), p.83.

[44] M.G.Kelkar, and A.W.Sohoni, "Role of Farm Practice Attributes in Adoption of Improved Agricultural Practices," Indian Journal of Extension Education, I (October, 1965), pp. 223-230.

practice while high cost of a practice whether initial or recurring proved quite a serious impedement in adoption. Efficiency was the single attribute which affected adoption of all practices to a very great extent. A practice would be adopted if it gave a distinct advantage over the old one. A practice which did not involve major change, less risk, least technical guidance and also fulfilled need of farmers, would be adopted easily.

Change Agents and the Rate of Adoption

Change agents play a vital role in the adoption of innovations. Much depends on how change agents motivate adoptors, to adopt innovations.

A study was conducted by Horst Von Oppenfeld[45] and Florentine Librero, in the pilot barriors in the Philippines on results of a study of adoption of better farm practices. It was based on the rate of adoption of the practices among the farmers of the selected pilot barrios. They concluded that many farmers could participate in the agricultural development by changing farming practices. It devolved upon the technician to employ suitable methods to motivate and teach the cultivators.

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[45]Horst Von Oppenfeld, [illegible] Florentine Librero and Jesu.C.Sta.Iglesia, "Results of a Study of Adoption of Better Farm Practices in the Philippines," Indian Journal of Agricultural Economics, XVII (Oct, Dec, 1962), pp. 23-32.

Change agent is a professional person who attempts to influence adoption decisions in a direction he feels is desirable. The change agent functions as a link between two social systems.

Nye[46] analysed factors contributing to the success of county extension agents in Missouri. The amount of the variation explained by each of the five variables was in percentage of variation in rated success: personality 28 per cent, training 15 per cent, vocational interests 11 per cent, attitudes 9 per cent; learning ability zero per cent. Nye was able to explain statistically 63 per cent of the variation in the rated success of the change agents.

Perceptions of the change agent by his client system may affect his success in securing change. These perceptions vary on the basis of the social characteristics his client will have with him. Research results showed that change agents reach the upper social status portion of their clientele disproportionately more than lower strata.[47] Several research studies indicated that "The extent of promotional efforts by change agents is directly related to the rate of adoption of an innovation.[48]

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[46]Ivan Nye, "The Relationship of Certain Factors to County Agents' Success," (Columbia: Missouri Agricultural Experiment Station Research Bulletin, 498, 1952), Cited by E.M.Rogers, Diffusion of Innovations(New York:The Free Press, 1966), p.257.

[47]E.M.Rogers, op.cit., p.257.

[48]Ibid.

Stone[49] analysed the amount of effort spent by eighteen Michigan County Extension agents from 1943 to 1950, in promoting the new farm idea of the artificial breeding of dairy cattle. The result of this study suggested that there was not necessarily direct relationship between the extent of change agents' efforts and the rate of adoption. In any event for some innovations that were studied the two variables, rate of adoption and change agents' efforts seemed to occur concurrently. Hoffer,[50] Ross[51] and Armstrong[52] attributed the rate of adoption of innovations to the promotional efforts of the change agents.

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[49]John.T.Stone, "How County Agricultural Agents Teach," (East Lansing: Michigan Agricultural Service Mimeo Bulletin, 1952), p. 16. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.259.

[50]Charles.R.Hoffer, "Selected Social Factors Affecting Participation of Farmers in Agricultural Extension Work," (East Lansing: Michigan Agricultural Experiment Station Special Bulletin 331, 1944), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.259.

[51]Donald.H.Ross, "Rate of Diffusion for Driver Education," Safety Education 32. 16:32, (1952). Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.258.

[52]Joseph.B.Armstrong, "County Agent Activities and the Adoption of Soil Building Practices," (M.S.Thesis, Lexington University of Kentucky, 1959), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.258.

Leaders and the Rate of Adoption

Change agents approach to their entire clientele individually is not possible. The best approach would be to introduce new ideas through the leaders in whom his clientele has belief. So leaders of community play an important role in acceptance of new ideas and adoption to the fullest extent in the clientele.

DasGupta[53] conducted a study on patterns of agricultural leadership and innovation in six indian villages. He observed that agricultural leadership in high adoption villages was distinctive and well defined. Low adoption villages lacked distinctive agricultural leadership. Agricultural leadership in medium adoption villages diffused when compared with high adoption villages. Findings of the study would help the extension workers to select those individuals in villages at different levels of adoption to whom he should impart his information.

Muley, Moulik, and Lokhande[54] conducted a study in Karla village of Kanjhawala block in Delhi State, regarding a

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[53]Stadal DasGupta, "Patterns of Agricultural Leadership and Innovation in Six Indian Villages," Indian Journal of Extension Education, I (January,1966),

[54]Sumati Mulay, T.K.Maulik, and M.R.Lokhande, "A Comparative Study of Traditional and Emerging Patterns of Leadership in North Indian Village," Indian Journal of Extension Education, I (January, 1966), pp.303-311.

comparative study of traditional and emerging patterns of leadership in a North Indian villages. They concluded that the villages under study was no longer strictly ascriptive in its orientation towards leadership in respect of caste, and age, but avenues for achievement of leadership were being increasingly opened up. The new emerging avenues in the areas of activities in panchayat, co-operatives and agriculture. Caste and age still played dominant role in the leadership pattern of the village. It was clearly indicated that the traditional leaders were having more stability in relation to the popularity status and thus in terms of number of followings and consistency in positions and preferences.

Perhaps in less developed countries and in other social systems where the norms are traditional, opinion leaders are more likely to be polymorphic than monomorphic. There is probably a greater separation role in more developed countries than in traditional societies. In an investigation of a Pakistani village Rahim[55] found that many of the farm opinion leaders were also the formal leaders of the village, although there was not complete overlap. Rahudkar[56] found in a study of 339 farmers in central India, that village head man was seldom influential in farmers' decisions to adopt new farm ideas.

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[55] S.A.Rahim, "The Diffusion and Adoption of Agricultural Practices: A Study in a Village in East Pakistan." (Comilla: Pakistan Academy for Village Development, 1961), p.60. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p. 237.

[56] W.B.Rahudkar, "Testing a Culturally. Bound Model for Acceptance of Agricultural Practices," (M.A.Thesis. Manhattan Kansas State University, 1961), Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), p.237.

Interaction Effect and the Rate of Adoption.

The interaction effect is one of the variables for the rate of adoption. This is the process through which individuals in a social system who have adopted an innovation influence those who have not yet adopted. Adoption of new idea is a product of human interaction. "Crude measure of the interaction effect is total per cent of adoption in a social system."[57] It was apparent from the study of Havens and Rogers[58] that the rate of adoption was not related to profitability, but was related to interaction effect as measured by cumulative per cent of adoption. What really determines the rate of adoption of an innovation was the adoptors' perception of profitability. Thus it was through interaction with others that individuals in a system internalize the relative advantage of an idea as well as other characteristics.

In summarising the findings, it can be said that the rate of adoption is a complex process which is influenced by innumerable variables right from the khowledge about a new idea and to its final adoption and realising complete satisfaction from the change.

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[57] E.M.Rogers, op.cit., p.140.

[58] A Eugene Havens, and E.M.Rogers," Adoption of Hybrid Corn" Profitability and the Interaction Effect," Rural Sociology 26 (1961), pp.409-414. Cited by E.M.Rogers, Diffusion of Innovations (New York: The Free Press, 1966), pp.140-141.

CHAPTER III

PLAN OF STUDY

Rate of adoption is the relative speed with which an innovation is adopted by the members of a social system. Rate of adoption is measured by the length of time required for a certain percentage of the members of a social system to adopt an innovation.

An ideal situation for such a study is an area wherein practice under adoption must have an ongoing extension programme, and rate of adoption if it can be measured in quantitative terms at regular intervals, and the progress of adoption must be readily recorded for the period under study. Main difficulty encountered in such studies is to get reliable and measurable data.

The practices selected for this study had an ongoing extension programme, and the progress was being recorded periodically and available records were also most relaiable. Such a place was the operational area of Kaira District Co-operative Milk Producers' Union, Anand, where all conditions necessary for the study were readily prevailing.

It was designed to study two of the practices under progress in the area. It was envisaged to determine the rate of adoption of the practices in such villages, wherein artificial insemination centres were working for a period not less than three years, with the available records at the Central Insemination Centre, Anand. Then to categorise the

villages into villages of high rate of adoption and that of low rate of adoption, based on the average rate of adoption of each practice. Average rate of adoption was determined by the average of rates of yearly adoption depending on number of years for which data were available under each of the practices.

It was contemplated further to study the factors affecting rate of adoption at the villages from the sample drawn. Factors, such as role of organisation of societies, general condition of villages, day to day working, contribution of workers like, artificial insemination workers, secretaries and chairman of the societies, etc. which altogether affect the rate of adoption, were studied. Attempts made by the Union through the extension workers was also incorporated to a certain extent in the study.

For sake of convenience study was divided into two parts.

Part I. This dealt with determination of rate of adoption of both practices under study and also categorisation of villages taken up for study into villages of high rate of adoption and that of low rate of adoption under each practice.

Part II. This dealt with the study of factors responsible for high and low rate of adoption at the villages under study.

Part I

Determination of Rate of Adoption and Categorisation of Villages

Selection of Area under Study

One hundred artificial insemination centres were selected for study. These centres were maintained by the union and manned by the services of the artificial insemination workers of the co-operatives at the villages, covered by the operational area of the Union.

Criteria for Selection of the Villages

Following criteria were considered while selecting villages for study.

1. Villages where artificial insemination centres were working for a period not less than three years at the end of the year 1965-66.

2. Villages in which records, at least for a period of three successive years or more for both the practices were available.

Selection of the Improved Animal Husbandry Practices

Two of the improved animal husbandry practices were selected for study.

1. Adoption of artificial insemination as a method of breeding.

2. Adoption of rendering buffaloes for pregnancy diagnosis.

Criteria for Selection of these Practices. For determination of the rate of adoption, certain criteria were considered in selecting such practices, wherein it was possible to study both the practices in one and the same village. Certain other aspects were also considered while selecting the practices.

Other aspects. 1. There was regular extension programme concurrently running at all the insemination centres for educating the member farmers of the co-operatives and other non-member farmers. Amul News letter, mobile exhibitions on improved animal husbandry practices, field trips for farmmer members and farm women to Central Insemination Centre at Anand and campaigns, were some of the measures to educate farmers regarding adoption of artificial insemination and other practices. Farmer members were also contacted personally by the staff of the co-operatives and extension officers from the Union.

2. Regular supply of requisite services necessary for adoption, like semen supply which was made regularly to all the insemination centres, duly preserved and packed in thermos flasks through milk trucks. There were local workers of the co-operatives who were trained in artificial insemination, to render necessary services at the villages. Their services were available at any times of the day at the villages to the farmers.

3. The veterinary officers from the union were visiting these centres regularly once a week and rendered their services

for pregnancy diagnosis as well as supplied necessary equipments needed for insemination work. Stockmen, who were also trained in artificial insemination and pregnancy diagnosis, supplemented the services needed for supervision and pregnancy diagnosis.

4. The progress of inseminations and number of buffaloes examined for pregnancy diagnosis were recorded at the centres daily and monthly returns of the progress were sent regularly to the Central Insemination Centre at Anand. Records from villages were compiled at the Central Insemination Centre and maintained carefully as permanent records.

The two practices selected fulfilled required conditions for the study of rate of adoption. Moreover, the available records were amenable for study at the Central Insemination Centre at Anand.

Sampling Technique

One hundred centres were fulfilling the required conditions, out of 213 centres working at the end of the year 1965-66. Their data were available at one place. It was also convinient to collect data for all the one hundred centres under each practices

Collection of Data

For collection of data it was only just to search the available records at the Central Insemination Centre, and to record necessary information.

1. Artificial Insemination as a Method of Breeding. For determination of the rate of adoption of this practice, data regarding first inseminations done during each year from 1960-61 to 1965-66 at all the one hundred centres were collected from the records available at the Central Insemination Centres, Anand. Depending on the year of inception of artificial insemination centres, data were available in some cases for three years, in some for four years, and in some for five years.

2. Rendering Buffaloes for Pregnancy Diagnosis. In this case total number of buffaloes examined for pregnancy diagnosis during the year, were collected for the same period, 1960-61 to 1965-66. The number of buffaloes were inclusive of both types of animals, served by artificial insemination as well as natural services. Data for three to five years, depending on year of inception of artificial insemination centres, were available from the records, Data were collected for all the one hundred centres under study.

Analysis Plan

With the data collected from the available records at the Central Insemination Centre, Anand, the rate of adoption for each year under both the practices were determined.

1. Determination of rate of adoption of artificial insemination as a method of breeding. It was determined by applying the following formula:

$$\text{Rate of adoption for the year} = \frac{\text{Number of first inseminations done during the year.}}{\text{Number of breedable buffalo population of the village.}}$$

Rate of adoptions for all the years under study were determined against the breedable buffalo population kept constant through out.

Average rate of adoption was determined by applying a simple formula:

$$\text{Average rate adoption} = \frac{\sum \text{rates of yearly adoption}}{\text{Number of years under study}}$$

Categorisation of Villages

The average rates of adoptionsof all the villages were arranged in an ascending order, from the lowest to highest, amongst villages which started working simultaneously. Villages where artificial insemination centres werestarted in the year 1960-61 were grouped together, compared and categorised amongst them. Then by applying following formulae quartiles were determined.[1]

$$Q\ 1 = \frac{(n+1)^{th}}{4} \text{ or } \frac{(n)^{th}}{4} \quad \text{(if even number)}$$

$$Q\ 2 = \frac{(n+1)^{th}}{2} \text{ or } \frac{(n)^{th}}{2} \quad \text{(if even number)}$$

$$Q\ 3 = \frac{3(n+1)^{th}}{4} \text{ or } \frac{(3n)^{th}}{4} \quad \text{(if even number)}$$

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[1] George.W.Snedecor, Statistical Methods (Bombay: Allied Pacific Private Ltd., 1961), pp.110-111.

The values of quartiles determined range of observations lying in each quartile. After the range for each category was determined villages in each group were classified into four categories, depending on individual average rate of adoption under each practice.

Villages in the first quartile denoted villages of low rate of adoption. Villages under second and third quartiles indicated villages of medium rate of adoption. Villages in last quartile determined villages of high rate of addption.

All the hundred villages were categorised, but those in the first and last quartiles were of interest, as villages of low rate of adoption and high rate of adoption respectively. They were considered for drawing samples for further study.

2. Determination of rate of adoption of rendering buffaloes for Pregnancy Diagnosis. Following formula was used for the determination of rate of adoption.

$$\text{Rate of adoption for the year} = \frac{\text{Number of buffaloes examined for pregnancy diagnosis during the year.}}{\text{Number of breedable buffalo population of the village.}}$$

Number of buffaloes included both types of animals served by artificial insemination and natural services. The buffalo population of the village was kept constant throughout the period under study 1960-61 to 1965-66.

Breedable buffalo population was taken as per records maintained at the Central Insemination Centre, Anand for determination of rate under both the practices.

Average rate of adoption was determined by the same formula as for average rate of adoption of artificial insemination as a method of breeding.

Categorisation of villages into villages of high rate of adoption and that of low rate of adoption was determined similarly as in the case of artificial insemination as a method of breeding.

Part II

Study of Factors Responsible for Rate of Adoption

Selection of Area

1 The operational area of Kaira District Co-operative Milk Producers' Union remained to be the same as under part I. Samples were drawn from the villages of high rate of adoption and that of low rate of adoption under both the practices.

Selection of the improved animal husbandry practices remained to be the same as in part I. They were adoption of artificial insemination as a method of breeding and rendering buffaloes for pregnancy diagnosis.

Sampling Technique

The villages were grouped as per year of inception of artificial insemination centres and categorised into villages of high and low rates of adoption under both the practices. As it was not possible to take up all the villages which were categorised, a sample had to be drawn from the lott of one

hundred villages studied. Fifteen villages from high rate of adoption and fifteen villages from low rate of adoption were selected for further study.

Selection of Villages

In all there were seventeen villages under high rate of adoption for artificial insemination as a method of breeding and twenty villages under rendering buffaloes for pregnancy diagnosis. Out of these, ten villages were common for both the practices, as such, all the ten villages were included in the sample. Out of remaining seventeen villages, five villages were selected randomly making total sample of fifteen villages from the villages of high rate of adoption under both the practices taken up for study.

Similarly, selection of villages from the villages of low rate of adoption, in which sixteen villages were common for both the practices, ten villages were selected randomly from the sixteen villages and five villages were selected randomly from the remaining twenty six villages, making a total sample of fifteen villages from the villages of low rate of adoption under each practice.

Villages Taken up for Further Study

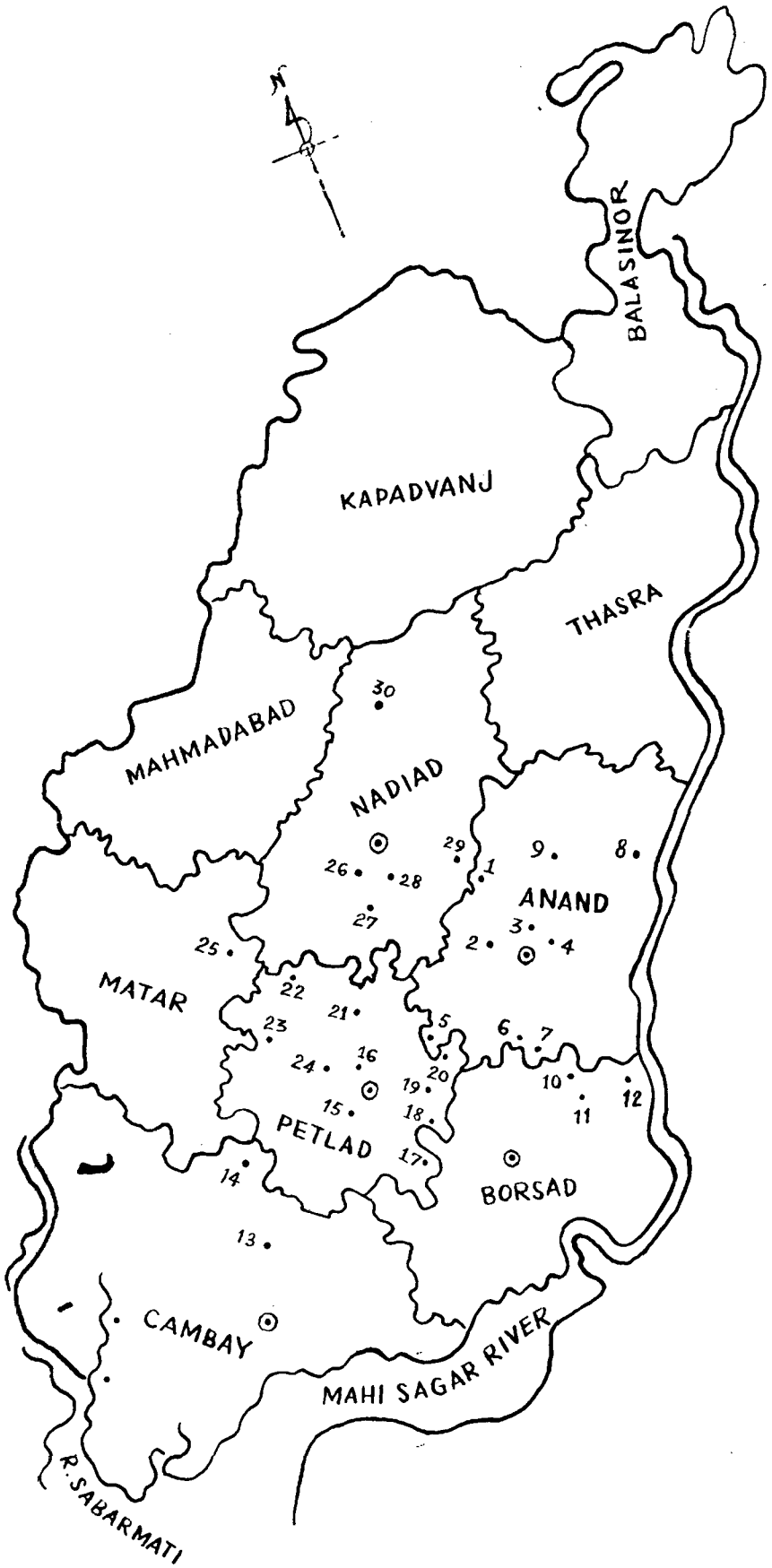
S. No.	High Rate of Adoption		Sr. No.	Low Rate of Adoption	
	Name of villages	Taluka		Name of villages	Taluka
1	Ajarpura	Anand	1	Chikhodra	Anand
2	Gamdi	"	2	Lambhvel	"
3	Khandhali	"	3	Napad	"
4	Sandesar	"	4	Shili	"
5	Sayama	Cambay	5	Tranol	"
6	Alindra(Vasso)	Matar	6	Asodar	Borsad
7	Rampur (Vasso)	Nadiad	7	Bhetasi	"
8	Tundel	"	8	Khadol (Haladri)	"
9	Ashi	Petlad	9	Tamapur	Cambay
10	Bhalel	"	10	Mahudha	Nadiad
11	Dabhou	"	11	Piplata	"
12	Rangaipura	"	12	Raghupura	"
13	Runa	"	13	Boria	Petlad
14	Shekhadi	"	14	Mahelav	"
15	Virol (Simarda)	"	15	Palaj	"

The above villages which were selected for further study are shown in Figure 1.

Selection of Respondents

Artificial insemination workers at the villages were the main respondents for the study. The rate of adoption mainly

MAP OF THE AREA AROUND ANAND SHOWING THE VILLAGES UNDER STUDY



No	VILLAGE	TALUKA
1	AJARPURA	ANAND
2	LAMBHVEL	,,
3	GAMDI	,,
4	CHIKHODRA	,,
5	SANDESAR	,,
6	KHANDHLI	,,
7	NAPAD	,,
8	SHILI	,,
9	TRANOL	,,
10	KHADOL (H.)	BORSAD
11	ASODAR	,,
12	BHETASI	,,
13	SAYAMA	CAMBAY
14	TARAPUR	,,
15	SHEKHADI	PETLAD
16	RANGAIPURA	,,
17	BHALEL	,,
18	VIROL (SIM.)	,,
19	ASHI	,,
20	BORIA	,,
21	MAHELAV	,,
22	RUNA	,,
23	DABHOU	,,
24	PALAJ	,,
25	ALINDRA (V.)	MATAR
26	TUNDEL	NADIAD
27	RAMPUR (V.)	,,
28	PIPLATA	,,
29	RAGHUPURA	,,
30	MAHUDHA	,,

⊙ TALUKA PLACE
• VILLAGE UNDER STUDY

Fig-1

dependedupon the zeal, enthusiasm, and integrity of these workers. Secretaries of the primary co-operative milk producers' societies at the villages were the second category of respondents. They were concerned with co-ordination and management of day to day work. They were the persons who could give authentic information about the organisation of the societies, and also about the villages in general.

Chairman of the societies were the third category of respondents, who as the leaders of the villages, and also interested in the welfare of the villages, could guide the staff of the society. Their opinions and convictions played a great role in adoption of improved animal husbandry practices.

The fourth category of respondents in series were the veterinary officers from the Kaira District Co-operative Milk Producers' Union, Anand. They were concerned with supervision, and professional guidance, for artificial insemination workers at the villages. They were also concerned with the examination of buffaloes for pregnancy diagnosis. Veterinary Officers were regularly visiting the centres every week, as such, their opinion about the artificial insemination workers, progress of work, etc., were of much importance for the study.

Artificial insemination workers, secretaries, chairman of the co-operatives of the villages and the supervising veterinary officers from Union were the respondents for the study.

Tools of Study

As per the objectives of the study, three schedules were

prepared. While developing the schedules, they were pretested and were revised accordingly.

Schedule 'A'. This was a common schedule operated on artificial insemination workers, secretaries and chairman of the co-operatives at the villages under study. Personal details of individuals such as age, education, training, experience, social participation, income, etc., and also opinions, convictions, suggestions about the practices under study were included in the schedule.

Schedule 'B'. This was regarding the general conditions of the villages such as distance from taluka, district, railway station, roads, etc., also included about the pattern of organisation of the Primary Co-operative Milk Producers' Societies. Attempts made by the Kaira District Co-operative Milk Producers' Union for adoption of the practices under study were also incorporated to a certain extent.

Schedule 'C'. This was for the veterinary officers from the Union who supervised and guided the artificial insemination workers at the villages. Their opinions about the workers and progress of artificial insemination, pregnancy diagnosis work, were specially included in the schedule.

Schedule 'A' and 'B' were translated into Gujarati, the local language, to elicit better response from the respondents.

Collection of Data

Personal interview method was followed. Each of the thirty villages were visited. The respondents, insemination

workers, secretaries, and chairmen of the villages were contacted personally. The objectives of the study were explained to them. Complicated items of response were also made clear to all of them and their responses to various items of the schedules were recorded. During the visit to the villages, records of artificial insemination work, insemination crate, pattern of working of society, were observed. Schedule 'A' and 'B' both were operated on the respondents in respective villages.

Schedule 'C'.which was operated on the veterinary officers from the Union, who visited the villages under sample, were contacted personally at Anand, and their responses were recorded.

For some of the items included under schedule 'B' information was collected for such villages from the concerned Taluka Panchayat Offices at Anand, Nadiad, Cambay, Borsad and Petlad.

Attempts were made to collect information from the reliable sources as far as possible under existing conditions.

Analysis Plan

The data collected through personal interview method were classified, tabulated and analysed in the light of objectives.

Chi-square test was applied at appropriate places to test the dependence or independence of the factors on the rate of adoption.

In case of quantitative factors wherever possible "t" test was applied to know significant variation in the means of the two groups.

Limitations of the Study

The rate of adoption was based on 1961 cattle census as recorded at the Central Insemination Centre, Anand. The population was held constant for sake of study but in reality the population is likely to be subjected to fluctuations due to deaths and births, sales and purchases.

CHAPTER IV

DESCRIPTION OF 'AMUL'

The problem is concerned with the endeavours of the pioneer institution in the dairy development in India, in close partnership with the village co-operatives. It is desirable to know about this organisation. In the following few pages salient features about the organisation are presented briefly.

'AMUL' is the popular trade name of the products manufactured by the dairy and sold throughout India. In Sanskrit AMUL means one whose value cannot be estimated and is so precious. That means the contributions done by this organisation in the field of dairy development and thereby rural upliftment in this area cannot be estimated easily. Amul means, the short farm of the organisation popularly known in the area Anand Milk Union Limited.[1]

Sputnik, of Economic Times, in giving his impressions of his visit to Amul said, "When one comes across a rare project that has not only fulfilled all the anticipations but greatly exceeded them, one is inclined to shout for joy and welcome the spectacle, as if it were Manna from heavens."[2]

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[1]Kaira District Co-operative Milk Producers' Union. Annual Report for the year 1964-65 (Anand: Kaira District Milk Producers' Union), p.6.

[2]Sputnik, "Off the record", Newsitem in the Economic Times (Bombay), February 17, 1964.

Background of Anand Dairy

The background may be stated better in the words of the President of the Union. He has stated that:

> In the year 1945, the Government of Bombay, started a milk scheme for the city of Bombay by taking the surplus milk available in the Anand area to Bombay, after pasteurising it at Anand, started distributing it to the consumers in Bombay. During the initial stages of the scheme the collection and pasteurisation of milk were left to milk contractors and private dairies. The increase in prices offered by the Government of Bombay, therefore, did not filter down to the producers in the area. This resulted in considerable dis-satisfaction amongst the producers of Anand, and so a meeting of the farmers of this area was held under the chairmanship of Shri Morarji Desai, the then General Secretary of the Gujarat Provincial Congress Committee. Scheme for setting up village milk producers' co-operative societies and a central dairy to be run by union of these societies was decided upon. This marked the beginning of the Kaira District Co-operative Milk Producers' Union Limited, Anand.[3]

On the occasion of the inauguration of the dairy plant in 1955, the President of the Union, while reviewing the progress within a short span of seven years in an enchanting mood expressed that:

> Then a very modest beginning awas made in June, 1948 by processing about 500 lbs. of milk a day. None of us thought on that day this Union will one day cover an area of 600 square miles and will embrace within its folds more than 20,000 farmer members. None of us imagined that we would one day build one of the largest and most modern dairy factories in India, and will be called upon to pinneer in the development of new dairy products. None of us dreamt that international organisations like the United Nations Children's Fund and the Food and Agriculture Organisation of the United Nations and Foreign Governments like the Newzealand Government would enter into partnership with us. We never anticipated that we would one day become one of the largest cooperative organisations in India. Yet, within a short space of seven years all these have come to pass. My mind

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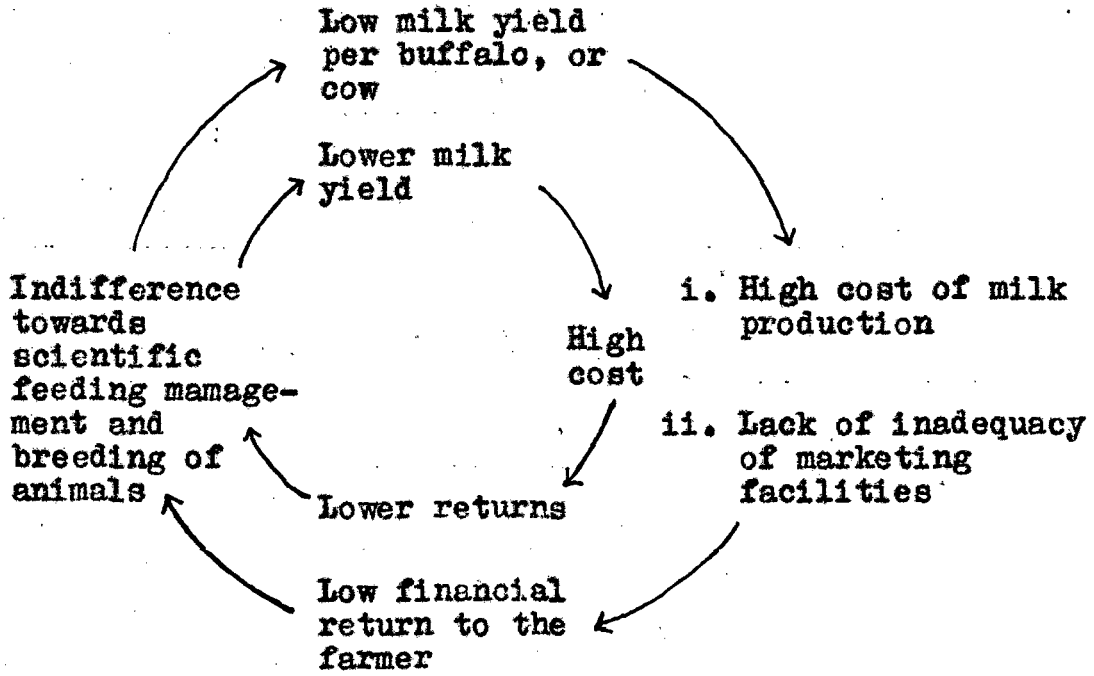
[3] V.A. Philipos, Report on Approach to Rehabilitation of People Living on Dairy Industry in Delhi Comparing Aarey, Anand in Bombay. (New Delhi: Town Planning Organisation, Health Ministry, 1957), p.7.

> at once goes back to 30th June 1942, when one man foresaw the pattern of things yet to come, when in a letter written to the present Vice-President of this Union, this man said, "The dairy industry in Kaira District must be organised along cooperative lines if it is to thrive and develop to its fullest extent." That man was Sardar Vallabhbhai Patel. He provided the inspiration that brought this Union into existence. He gave the strength to overcome obstacles. He instilled into us the enthusiasm which gives this Union the courage to undertake big projects and try out new ideas.[4]

To day this is the largest milk products plant in India and for the first time any where in the world milk from water buffaloes has been successfully spray dried to a powder capable of storage and transport to distant places.

Incentive for increasing production. The Union has set vicious cycle of low milk production and high cost in a reverse way. The vicious cycle of low milk yield operating in India is depicted below.[5]



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[4] Ibid.

[5] M.K.Shah, "Planning of Milk Supply for a Dairy Cooperative," (Paper read at Seminar on How to Establish A Cooperative Processing Plant Organised by International Cooperative Alliance, Banglore, December, 1966), p.4.

The vicious cycle is broken by providing regular all the year round remunerative market for the produce and also supplying production requisites to producers at cheaper rate.

The reaction of farmers to such a situation is described by Shah that: "Once a dairy cooperative assures its members a steady and remunerative ma rket for their milk, a chain of reaction starts. Farmers start receiving higher returns from the sale of milk than they ever did before; this induces them to improve their dairy animals so as to have more milk for higher income; it leads them to use of scientific animal husbandry practices; this increases the average milk yield per dairy animal and reduce the cost of milk production, which means additional return for farmers."[6]

In this way the vicious cycle of low production is set in reverse way aimed at higher production and better returns, and also inducement to adopt improved animal husbandry practices. This is the greatest contribution of the Union for the desirable change in the out look of farmers.

Dairy Co-operative as an Agency of Improvement.[7]

A rural co-operative is an excellent agency for undertaking the development programmes, because it is in a

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[6]M.K.Shah, "Production Enhancement and Cooperative Extension Activities by a Dairy Cooperative, Amul, "(Paper read at Seminar on How to Establish a Cooperative Processing Plant Organised by International Cooperative Alliance Banglore, December, 1966), p.2.

[7]Ibid., p.3.

position to contribute man power and resources. Moreover, in the same way, as the farmer members are in daily contact with their village milk co-operatives, so are the village milk co-operatives in constant touch with their federation. Milk trucks visit all villages twice daily to deliver empty cans and to pick up their milk and transport it to the central dairy. This provides a very useful communication system for animal husbandry work. For the simultaneous dispatches of preserved bull semen for artificial insemination work in the villages, this mode of communication is very useful.

Federation - Village Co-operative Partnership

While undertaking animal husbandry and co-operative extension programme one has to sort out items which have to be looked after by the central organisation or federation of milk co-operatives and those that can be usefully undertaken at the village level by the village milk co-operatives. The federation should operate the services requiring large investment which are useful for all participating villages. For example, the semen collection station for artificial insemination work, mobile veterinary dispensaries, and the federation should also employ the staff with specialised technical skills. The village milk co-operatives can run veterinary first-aid and artificial insemination centres and provide the local component of staff required for other activities and can also undertake small village level projects from their own funds. With the development of dairy industry, and the co-operatives, the extension and

animal husbandry activities undertaken by the Union society partnership will also have to be re-adjusted as may be demanded by the change in the environment.

This sort of partnership has been tried out in Kaira District between Kaira District Co-operative and the affiliated village milk co-operatives with encouraging results. A tremendous progress can be achieved by a dynamic partnership between a federation and a co-operative.

This can be illustrated by studying how artificial insemination work is organised in this area.

Artificial Insemination

In normal conditions dry period in dairy cattle is about two months. In the villages of Kaira district it has been found that dry period is larger by about five months.[8] It was found that the chief cause of long interval between two calvings was due to the fact, that, the number of breeding bulls maintained in villages was much less than the requirement. As farmers keep one or two buffaloes, the breeding bulls are maintained by only one or two families in the village, in the proportion of about 220 buffaloes to one bull.[9] There should not be more than sixty buffaloes to a bull under normal conditions. As a result, a large number of animals remain dry and farmers are put to a loss of rupees 200 - 300 per buffalo per year. This is found to be a very good selling point for artificial insemination work in villages.

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[8] Ibid., p.7.

[9] Ibid., .

The major objective of artificial insemination however is genetic improvement of cattle to increase milk production through an intensive use of small number of excellent breeding bulls.

The semen collection station and artificial insemination laboratory are established in Anand. Depending on number of artificial insemination centres, equal number of test tubes with preserved bull semen are sent daily to the Amul Dairy Platform, where they are packed individually in ice-boxes and dispatched to village co-operative through the milk trucks in the evening along with empty cans. The trucks reach all the societies before nine o'clock morning on the following day. This mode of transport is very economical and effieient, as the bull semen is issued for artificially inseminating the buffaloes within twenty-four hours of collection, also it helps in maintaining a high conception rate, which usually decreases as the period of preservation increases.

The actual insemination work in all the artificial insemination centres is done by the staff of village milk co-operatives. The insemination workers are trained by veterinarians of Amul. The glass inseminating tubes used at village artificial insemination centres are cleaned and sterilised only at the laboratory at Anand. This sort of centralised system is necessary to ensure proper aseptic precautions. When veterinary officers from Amul make their weekly calls on the village co-operatives, they collect used glass tubes and replace them by sterilised ones. They supervise

the village artificial insemination work, and also carry out pregnancy diagnosis and sterility treatment work.

Supervisors, stockmen, and officers of Kaira Milk Union are in close touch with leaders and staff of the co-operative societies, by attending their managing-committee and general body meetings, apart from contacts with milk producers directly at artificial insemination centres or treatment of animals in the villages.

In September, 1966, a house to house campaign was undertaken to talk about the artificial insemination work for reducing dry period of buffaloes. Streetwise meetings of small groups of men and women were also undertaken. The result was that, in the year 1965-66, after sixteen years of work, the annual figures had hardly reached 42,000 but it was anticipated that figures for 1966-67 would reach 80,000 and actual insemination in the year 1966-67[10] were 87,445 which were more than the anticipated figures. This was the out come of house to house campaign. Started with few insemination centres, now number of insemination centres have reached 295 at the end of the year 1966-67. This expansion was possible because of entrusting the insemination work to lay inseminators, who were duly trained in insemination work at all the centres.

The figures of progress speak themselves of the tremendous expansion and the work of insemination at the villages. This shows what can be achieved by mutual cooperation of the Union and the village cooperatives.

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[10] Kaira District Cooperative Milk Producers' Union Limited, Trading Profit and loss Account for the year 1966-67 (Anand: Anand Milk Union Limited, 1967), p.9.

TABLE I

PROGRESS OF ARTIFICIAL INSEMINATION WORK 1950-1966.[11]

Year	Number of artificial insemination centres.	Number of Insemination.	Number of Pregnancy diagnosis	Cases treated for Sterility
1950-51	5	578	50	45
1951-52	11	786	62	91
1952-53	7	1314	250	169
1953-54	6	1673	479	146
1954-55	6	2574	577	50
1955-56	7	3854	816	130
1956-57	14	5533	2220	293
1957-58	14	6434	2726	104
1958-59	14	6287	2656	97
1959-60	14	7700	2989	173
1960-61	26	9027	4774	211
1961-62	44	12839	6997	101
1962-63	75	19232	13972	392
1963-64	102	26148	23338	683
1964-65	138	31582	24160	245
1965-66	261	41841	28718	85

[11]Shah, op.cit., p.12.

Schemes like first aid veterinary boxes, fodder development schemes, sale of Amuldan and many other schemes which are aimed at higher milk production, have been implemented through co-operatives.

Shah in his concluding remarks stated that "Kaira District Co-operative Milk Producers' Union Limited, Anand, is based on rural economy. The benefits go back to the farmers, thereby gradually raising the general level of dairy industry, and also the standard of living of the farmers. The pattern of Animal Husbandry based on rural economy is a valuable asset to India and other developing countries."[12]

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[12]M.K.Shah, "Dairy Husnadry through Milk Marketing Cooperatives", The Indian Dairy Man, XVII (March,1965), p.5.

CHAPTER V

PRESENTATION AND ANALYSIS OF DATA

The data collected from the records available at the Central Insemination Centre, Anand, and by personal interview with the help of schedules, have been classified, tabulated and analysed in the light of the objectives of the study. Such data along with relevant analysis, are presented in the following pages.

Part I

Classification of villages

Rate of adoption of artificial insemination as a method of breeding, and that of rendering buffaloes for pregnancy diagnosis was determined for one hundred artificial insemination centres, from the data available at the Central Insemination Centre, at Anand.

The data available were in some cases for five years, in some for four years and in some for three years, depending on the year of inception of the centres. Rate of adoption of artificial insemination as a method of breeding was determined and then subsequently centerwise average rate of adoption of all the 100 centres was also determined. Based on the average rate of adoption all the 100 centres were categorised in four quartiles. First quartile represented artificial insemination centres having low rate of adoption and last quartile, that of

high rate of adoption. Second and third quartiles represented centres having medium rate of adoption.

Similarly all the 100 centres were categorised in four quartiles based on average rate of adoption of rendering buffaloes for progmancy diagnosis. Categorisation of artificial insemination centres in 100 villages as per average rate of adoption of artificial insemination and year of inception of artificial insemination centres are presented in Table II.

TABLE II

CLASSIFICATION OF ONE HUNDRED VILLAGES INTO QUARTILES, BY THE AVERAGE RATE OF ADOPTION OF ARTIFICIAL INSEMINATION AS A METHOD OF BREEDING AND YEAR OF INCEPTION OF ARTIFICIAL INSEMINATION CENTRES

Group by year of inception	I Quartile Range	II Quartile Range	III Quartile Range	IV Quartile Range	Total No.of villages
	0.30 - 0.36	0.37 - 0.49	0.50-0.68	0.69-0.78	
I Group 1950-51	1.Samarkha	Sihol	Ajarpura	Sandesar	5
	2. -	Lambhvel	-	-	
	0.32 - 0.37	0.38 - 0.43	0.44-0.66	0.67-0.73	
II Group 1956-57	1.Mahelav	Kasor	Davol	Ashi	8
	2.Napa	Bhalej	Bodal	-	
	3. -	-	Bandhani	-	

TABLE II (Continued)

Group by year of inception	I Quartile Range	II Quartile Range	III Quartile Range	IV Quartile Range	Total No.of villages
	0.11-0.23	0.24-0.30	0.31-0.37	0.38-0.51	
III Group 1960-61	1.Asoñar	Ravalpura	Raghupura	Surkuva	
	2.Boria	Agas	Demol	Manej	
	3.Porda	Khankuva	Narsanda	Gunteli	25
	4.Tranol	Valasan	Sarsa	Rampura(Vasso)	
	5.Nar	Akhdol	Bamroli		
	6.Sandhana	Thamna			
	7.Vasana	Lingda			
	8.Ode				
	9.Napad				
	0.07-0.20	0.21-0.30	0.31-0.46	0.47-086	
IV Group 1962-63	1.Virsad	Amod	Changa	Virol (Simadrda)	
	2.Siswa	Bochasan	Mogari	Dantali	
	3.Piplata	Kasor(P)	Kanjoda	Dabhou	
	4.Bedwa	Gada	Palana	Bhalel	
	5.Pandoli	Vadtal	Gamdi	Shekhadi	
	6.Bhetasi	Malataj	Torna	Tundel	
	7.Ramol	Karamsad	Khambolaj	Rangaipura	62
	8.Malataj	Bhaner	Ratanpura	Bhuvel	
	9.Shili	Kanjari	Alindra	Sayama	
	10.Sunav	Sanjaya	Piplag	Runa	
	11.Undhela	Vina	Undel	Khandhali	

TABLE II (Continued)

Group by year of inception	I Quartile Range	II Quartile Range	III Quartile Range	IV Quartile Range	Total No. of villages
12.Vatara	Devataj	Limbali	-		
13.Traj	Piplav	Mogar	-		
14.Tarapur	Pij	Navli	-		
15.Sinjiwada	-	-	-		
16.Kantharipa	-	-	-		
17.Chikhodra	-	-	-		
18.Khadol (Haldri)	-	-	-		
19.Vansol	-	-	-		
20.Antroli	-	-	-		
21.Surasamal	-	-	-		
22.Palaj	-	-	-		
23.Mahudha	-	-	-		
Total	35	25	23	17	100

The Centres were grouped in four groups depending on the year of inception of artificial insemination centres.

Group I Centres started working in 1950-51

Group II Centres started working in 1956-57

Group III Centres started working in 1960-61

Group IV Centres started working in 1962-63

In the group I there were five centres out of which two centres were in second quartile and one each in first, second

and third quartiles.

In the group II there were eight centres out of which there were two centres each in first and second quartiles, three in the third quartile and one was in the last quartile.

In the group III in all there were twenty five centres out of which there were nine centres in first quartile, seven in the second, five in the third, and four in the last quartile.

In the group IV there were in all sixty two centres out of which twenty three were in the first quartile, fourteen each in second and third, and eleven were in the last quartile.

Out of 100 centres, there were seventeen centres of high rate of adoption, (total of four groups from first quartile), and thirty five centres having low rate of adoption, (total of four groups ffom last quartile), and remaining forty eight centres were of medium rate of adoption, (total of four groups from second and third quartiles).

Data on categorisation of 100 centres as per average rate of adoption of rendering buffaloes for pregnancy diagnosis are presented in Table III.

The Centres were grouped in four groups depending on the year of inception of artificial insemination centres as in Table II.

In the group I there were five centres, out of which one centre each in first, second and last quartiles and two were in the third quartile.

TABLE III

CLASSIFICATION OF ONE HUNDRED VILLAGES INTO QUARTILES, BY THE AVERAGE RATE OF ADOPTION OF RENDERING BUFFALOES FOR PREGNANCY DIAGNOSIS AND YEAR OF INCEPTION OF ARTIFICIAL INSEMINATION CENTRES

Group by year of inception	I Quartile Range	II Quartile Range	III Quartile Range	IV Quartile Range	Total No.of villages
	0.24-0.25	0.26-0.28	0.29-0.45	0.46-0.58	
I Group 1950-51	1.Lambhvel	Samarkha	Sandesar Sihol	Ajarpura	5
	0.20-0.25	0.26-0.39	0.40-0.43	0.44-0.78	
II Group 1956-57	1.Davol 2.Mahelav	Napa Bodal	Bandhani Kasor Bhalej	Ashi	8
	0.08-0.13	0.14-0.23	0.24-0.28	0.29-0.43	
IIIGroup 1960-61	1.Asodar 2.Raghupura 3.Vasna 4.Napad	Ravalpura Tranol Narsanda Nar Sarsa Khankuva Gunteli	Surkuva Sandhana Manej Valasan Akhadol Thamna Lingda	Boria Porda Demol Agas Rampur(Vasso)	25

TABLE III (continued)

Group by year of inception	I Quartile Range	II Quartile Range	III Quartile Range	IV Quartile Range	Total No.of villages
		Ode	Bamroli		
	0.03-0.12	0.13-0.21	0.22-0.30	0.31-0.73	
IV Group 1962-63	1.Pandoli	Siswa	Viread	Virol(Simarda)	
	2.Bhetasi	Piplata	Boohasan	Amod	
	3.Vadtal	Malataj	Changa	Dabhou	
	4.Shili	Torna	Mogari	Gamdi	
	5.Bhaner	Ramol	Dantali	Bhalel	
	6.Vatra	Khambholaj	Kanjoda	Shekhadi	
	7.Bhuvel	Undhela	Palana	Tundel	
	8.Tarapur	Kanjari	Bedwa	Rangaipura	62
	9.Sanjaya	Traj	Kasor(P)	Alindra	
	10.Kantharia	Sinjiwada	Gada	Piplag	
	11.Chikhodra	Vina	Maliataj	Limbali	
	12.Khadol (Haladri)	Pij	Ratanpura	Runa	
	13.Vansol	Mogar	Sunav	Khandhali	
	14.Antroli	Navli	Karamsad		
	15.Palaj	Surasamal	Sayama		
	16.Mahudha		Devataj		
			Piplav		
			Undel		
Total	23	26	31	20	100

In the group II there were eight centres, out of which two each in first and second quartiles, three in the third and only one was in the last quartile.

In the group III there were twenty five centres, out of which four were in first quartile, eight each in second and third quartiles and five in the last.

In the group IV there were in all sixty two centres out of which sixteen were in the first quartile, fifteen in the second, eighteen in the third, and thirteen were in the last quartile.

Out of 100 centres analysed under this practice, twenty three were in the low rate of adoption, (total of four groups from first quartile), twenty were in the high rate of adoption, (total of four groups from last quartile), and remaining fifty seven centres were under medium rate of adoption, (total of all, thenfour groups from second and third quartiles).

Part II

Factors responsible for Rate of Adoption

Samples were drawn from the villages of high and low rates of adoption as determined under Part I under both the practices, i.e. artificial insemination as a method of breeding and rendering buffaloes for pregnancy diagnosis. Fifteen villages from the villages of high rate of adoption and fifteen from the villages of low rate of adoption, were selected randomly for further study to determine factors responsible for high and low rates of adoption. Such data are presented in four sections.

Section 1. Data on the characteristic of artificial insemination workers.

Section 2. General village conditions were considered for study.

Section 3. Organisations of the Primary Co-operative Milk Producers' Societies were studied.

Section 4. Data on opinions expressed by artificial insemination workers, secretaries, and chairmen of the co-operatives from villages of high and low rates of adoption and veterinary officers from Amul were collected on the supplies and services rendered by Amul.

Data collected under these four sections are presented in the following pages.

Characteristics of Artificial Insemination Workers

Length of service of artificial insemination workers.

Data regarding length of service of artificial insemination workers and the relationship of the same with the rate of adoption are presented in Table IV.

From the villages of high rate, of adoption, 13.33 per cent of the artificial insemination workers and 33.33 per cent artificial insemination workers from the villages of low rate of adoption, had length of service 1 - 12 months; whereas 13.33 per cent of artificial insemination workers and 20 per cent of artificial insemination workers from the villages of low rate of adoption had a length of service in the range of 12 - 36 months; whereas 66.66 per cent of artificial

TABLE IV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR LENGTH OF SERVICE AS ARTIFICIAL INSEMINATION WORKERS

Number of Months of service	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
1 - 12 months	2	13.33	5	33.33
12 - 36 months	2	13.33	3	20.00
37 - 60 months	10	66.66	4	26.66
Above 60 months	1	6.66	3	20.00
Total	15	100	15	100
Mean length of service in months		40.36		36.13

x^2 Value = 5.05, non significant at 0.05 level; 3 D.F.

"t"Value = 0.04, non significant at 0.05 level; 15 D.F.

insemination workers from the villages of high rate of adoption and 26.66 per cent of artificial insemination workers from villages of low rate of adoption had a length of service between 37 - 60 months; but from the villages of high rate of adoption 6.66 per cent of the artificial insemination workers had a length of service more than a period of 60 months

including 20 per cent artificial insemination workers from the villages of low rate of adoption.

Chi-square value (5.05) was non significant for three degrees of freedom. "t" value was 0.04, non significant for fifteen degrees of freedom. Mean lengths of service in months were 40.36, and 36.13 respectively of the artificial insemination workers from villages of high and low rates of adoption. This indicated that length of service of artificial insemination workers had no significant relationship with rate of adoption.

Combination of Jobs with Artificial Insemination Workers

Data regarding the combination of jobs of artificial insemination workers in relation to rate of adoption are presented in Table V.

From the villages of high rate of adoption 66.66 per cent artificial insemination workers had a combination of veterinary first aid worker; whereas 53.33 per cent of the insemination workers from villages of low rate of adoption had the same combination. Twenty per cent of the artificial insemination workers and 26.66 per cent of artificial insemination workers respectively from the villages of high and low rates of adoption had the combination of secretary of the society.

Out of the artificial insemination workers from villages of low rates of adoption, 20 per cent had combination of other jobs like, milk-recorder, tester, amuldan seller, but none of

TABLE V

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR COMBINATION OF JOBS WITH ARTIFICIAL INSEMINATION

Combination of jobs	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Artificial Insemination and First aid	10	66.66	8	53.33
Artificial Insemination and Secretary	3	20.00	4	26.66
Artificial Insemination and anybother job	-	-	3	20.00
Artificial Insemination only	2	13.33	-	-
Total	15	100	15	100

x^2 Value = 5.36, non significant at 0.05 level; 3 D.F.

the artificial insemination workers from the villages of high rate of adoption had this combination. Of the artificial insemination workers in villages of high rate of adoption 13.33 per cent had only to look after artificial insemination work, but in case of artificial insemination workers from villages of low rate of adoption none, had a single job only of artificial insemination work.

The chi-square value (5.36) was not significant for three degrees of freedom. The different combination of jobs of artificial insemination workers had no significant relationship with rate of adoption.

Age of Artificial Insemination Workers

Data on the age of artificial insemination workers and the relationship with rate of adoption are presented in Table VI.

TABLE VI

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR AGE

Age group of workers in years	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
18 - 23	3	20	4	26.66
24 - 28	6	40	3	20.00
29 - 33	3	20	4	26.66
34 - 45	3	20	4	26.66
Total	15	100	15	100
Mean age		29.80		29.26

x^2 Value = 1.25, non significant at 0.05 level; 3 D.F.

"t"Value = 0.022, non significant at 0.05 level; 15 D.F.

In the age group of 18 - 23, 20 per cent of the artificial insemination workers from the villages of high rate of adoption as well as 26.66 per cent of artificial insemination workers from low rates of adoption were included.

Forty per cent of the artificial insemination workers from the villages of high rate of adoption, 20 per cent of the artificial insemination workers from the villages of low rates of adoption were in the age group of 24 to 28.

There were 20 per cent of artificial insemination workers from the villages of high rate of adoption, in the range of 29-33 years, but 26.66 per cent of artificial insemination workers from the villages of low rate of adoption were also in the same age group.

In the age group of 34 - 45, there were 20 per cent of the artificial insemination workers from the villages of high rate of adoption as well as 26.66 per cent of the artificial insemination workers from the villages of low rate of adoption.

The chi-square value was (1.25) non significant at three degrees of freedom. "t" value (0.022) was non significant for fifteen degrees of freedom.

Mean age of artificial insemination workers of villages of high rate and low rate of adoption were 29.80 and 29.26 respectively. This indicated that age of artificial insemination workers had no significant relationship with the rate of adoption.

Educational Level of Artificial Insemination Workers

Data regarding relationship of education obtained by artificial insemination workers, and rate of adoption are presented in Table VII.

TABLE VII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR EDUCATIONAL LEVEL

Educational level	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto 5th Standard	3	20	4	26.66
Upto 7th Standard	6	40	3	20.00
V.F. and 3rd English, upto S.S.C.	3	20	4	26.66
S.S.C. pass & above	3	20	4	26.66
Total	15	100	15	100
Mean years of education		8.73		9.93

x^2 Value = 1.42, non significant at 0.05 level; 3 D.F.

"t" Value = 0.184, non significant at 0.05 level; 15 D.F.

Twenty per cent of the artificial insemination workers, from the villages of high rate of adoption, 26.66 per cent

artificial insemination workers from villages of low rate of adoption had education upto fifth standard.

Forty per cent of artificial insemination workers, from villages of high rate of adoption,as well as 20 per cent of artificial insemination workers from the villages of low rate of adoption had their education upto seventh standards. 20 per cent of the artificial insemination workers from villages of high rate of adoption and also 26.66 per cent of artificial insemination workers from the villages of low rate of adoption, had their education either upto Secondary School Certificate Examination or had passed vernacular final and completed third English. Twenty per cent of artificial insemination workers from villages of high rate of adoption had education beyond secondary school examination passing. So also 26.66 per cent of artificial insemination workers from villages of low rate of adoption had education of similar level.

Chi-square value (1.42) was non significant for three degrees of freedom, "t" value was (0.184) also non significant for fifteen degree of freedom. This indicated that educational level of artificial insemination workers had no significant relation with the rate of adoption. However, mean years of education obtained by artificial insemination workers from villages of high and low rates of adoption were 8.73 and 9.93 respectively.

Types of Training Received by Artificial Insemination Workers

Data regarding relationship between type of training received by artificial insemination workers, and the rate of

adoption are presented in Table VIII.

TABLE VIII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR TYPE OF ARTIFICIAL INSEMINATION TRAINING

Type of training	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Trained in artificial insemination for one month	12	80	11	73.33
Secretaries' training with animal husbandry	3	20	4	26.66
Total	15	100	15	100

X^2 Value = 0.18, non significant at 0.05 level; 1 D.F.

From the villages of high rate of adoption, 80 per cent artificial insemination workers had training for a month at artificial insemination centre, Anand. So also 73.33 per cent artificial insemination workers from villages of low rate of adoption had similar training. 20 per cent artificial insemination workers from villages of high rate of adoption and 26.66 per cent artificial insemination workers from villages of low rate of adoption, who were working both as artificial insemination workers and secretaries had training of secretaries

with animal husbandry.

Chi-square value (0.18) was non significant for one degree of freedom, which indicated that the type of training of artificial insemination workers had no significant relationship with the rate of adoption.

Experience of Artificial Insemination Workers

Data regarding relationship of experience of artificial insemination workers with rate of adoption are presented in Table IX.

TABLE IX

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR EXPERIENCE PRIOR TO ARTIFICIAL INSEMINATION WORK

Experience of job prior to insemination work	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Nil	4	26.66	5	33.33
Experience in any jobs at the society	11	73.33	10	66.66
Total	15	100	15	100

x^2 Value = 0.15, non significant at 0.05 level; 1 D.F.

Of the artificial insemination workers, 26.66 per cent from villages of high rate of adoption and 33.33 per cent of

the artificial insemination workers, from villages of low rate of adoption had no experience before they started working as artificial insemination workers; whereas 73.33 per cent artificial insemination workers, from villages of high rate of adoption and 66.66 per cent from the villages of low rate of adoption had experience in one of the jobs at the co-operatives as veterinary first aid workers or any other job before they started working as artificial insemination workers. Chi-square value (0.15) was non significant for one degree of freedom, which indicated that prior experience of artificial insemination workers had no significant relationship with the rate of adoption.

Marital Status of Artificial Insemination Workers

Data regarding relationship between marital status of artificial insemination workers and rate of adoption are presented in Table X.

Out of the artificial insemination workers 73.33 per cent from villages of high rate of adoption, 86.66 per cent artificial insemination workers from the villages of low rate of adoption were married; whereas 26.66 per cent of artificial insemination workers from villages of high rate of adoption and 13.33 per cent of artificial insemination workers from villages of low rate of adoption were bachelors.

Chi-square value (0.82) was non significant at one degree of freedom. It revealed that marital status of artificial insemination workers had no significant relation with the rate of adoption.

TABLE X

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR MARTTAL STATUS

Marital Status	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Married	11	73.33	13	86.66
Bachelor	4	26.66	2	13.33
Total	15	100	15	100

x^2 Value = 0.82, non significant at 0.05 level; 1 D.F.

Main Occupation of Artificial Insemination Workers

Data regarding main occupation of artificial insemination workers and the relationship with rate of adoption are presented in Table XI.

Out of artificial insemination workers from the villages of high rate of adoption, 73.33 per cent and 73.33 per cent artificial insemination workers from the villages of low rate of adoption were engaged in agriculture as their main occupation; whereas 26.66 per cent of artificial insemination workers from either villages of high and low rates of adoption were entirely engaged in service as their main occupation.

TABLE XI

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR MAIN OCCUPATION

Main Occupation	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Agriculture	11	73.33	11	73.33
Service	4	26.66	4	26.66
Total	15	100	15	100

x^2 Value = 0.0, non significant at 0.05 level; 1 D.F.

Chi-square value determined was non significant for one degree of freedom. This clearly indicated that main occupation of artificial insemination workers had no significant relation with the rate of adoption.

Caste of Artificial Insemination Workers

Data regarding relationship of caste of the artificial insemination workers with rate of adoption are presented in Table XII.

TABLE XII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR CASTE

Caste	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Uppercaste	-	-	-	-
Middlecaste	15	100	12	80
Lowercaste	-	-	3	20
Total	15	100	15	100

x^2 Value = 3.33, non.significant at 0.05 level; 2 D.F.

Out of the artificial insemination workers from the villages of high rate of adoption and, 80 per cent artificial insemination workers from villages of low rate of adoption too were belonging to intermediate castes, whereas 20 per cent of artificial insemination workers from the villages of low rate of adoption only were belonging to lower castes, but none of the artificial insemination workers were from upper castes. Chi-square value (3.33) which was non significant for two degrees of freedom, indicated that caste of artificial insemination workers had no significant relation with the rate of adoption.

Stay of Artificial Insemination Workers in Different Types of Families

Data regarding stay of artificial insemination workers in different types of families and the relation with rate of adoption are presented in Table XIII.

TABLE XIII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR STAY IN DIFFERENT TYPES OF FAMILIES

Stay with families	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Joint family	12	80	13	86.66
Individual family	3	20	2	13.33
Total	15	100	15	100

x^2 Value = 0.24, non significant at 0.05 level; 1 D.F.

From the villages of high rate of adoption, 80 per cent of artificial insemination workers and 86.66 per cent of artificial insemination workers from the villages of low rate of adoption were staying in joint families. Twenty per cent of artificial insemination workers from the villages of high rate of adoption and 13.33 per cent of artificial

insemination workers from the villages of low rate of adoption were staying in individual families. Chi-square value (0.24), was non significant for one degree of freedom, which indicated that stay of artificial insemination workers in different types of families had no significant relation with the rate of adoption.

Membership in Village Organisations

Data regarding relationship of membership of artificial insemination workers in the village organisations with rate of adoption are presented in Table XIV.

TABLE XIV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR MEMBERSHIP IN THE VILLAGE ORGANISATIONS

Membership in village organisation	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Nil	4	26.66	9	60.00
Member in One Institution	3	20.00	5	33.33
Member in more than one institutions	8	53.33	1	6.66
Total	15	100	15	100

x^2 Value = 7.58, significant at 0.05 level; 2 D.F.

Out of the artificial insemination workers, 26.66 per cent from the villages of high rate of adoption and 60 per cent from the villages of low rate of adoption had no membership in any of the village organisations; whereas 20 per cent of artificial insemination workers from the villages of high rate of adoption and 33.33 per cent of artificial insemination workers from the villages of low rate of adoption had membership in one of the organisations of the villages, but 53.33 per cent of artificial insemination workers from the villages of high rate of adoption and 6.66 per cent from the villages of low rate of adoption had membership in more than one organisations of the villages. Chi-square value (7.58) was found to be significant at 0.05 level for two degrees of freedom. This indicated that membership in the village organisation had significant relation with the rate of adoption.

Land Cultivation by Artificial Insemination Workers

Data regarding relationship between acres of land cultivated by artificial insemination workers with rate of adoption are presented in Table XV.

From the villages of high rate of adoption, 6.66 per cent of artificial insemination workers and 26.66 per cent artificial insemination workers from the villages of low rate of adoption had no land of their own. Out of artificial insemination workers, 46.66 per cent from the village of high rate of adoption and 40 per cent of artificial insemination workers from the villages of low rate of adoption, had their land for cultivation

TABLE XV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE NUMBER OF ACRES OF LAND CULTIVATED BY THEM

No.of Acres	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Nil	1	6.66	4	26.66
1 - 4 Acres	7	46.66	6	40.00
5 - 10 Acres	6	40.00	3	20.00
Above 10 Acres	1	6.66	2	13.33
Total	15	100	15	100
Mean acres of land cultivated		4.13		4.46

x^2 Value = 3.65, non significant at 0.05 level; 3 D.F.

"t" Value = 0.02, non significant at 0.05 level; 15 D.F.

in the range of 1 - 4 acres. Forty per cent of artificial insemination workers from the villages of high rate of adoption and 20 per cent from the villages of low rate of adoption had land for cultivation in the range of 5 - 10 acres, whereas 6.66 per cent of artificial insemination workers

from the villages of high rate of adoption, and 13.33 per cent from the villages of low rate of adoption had more than ten acres. Chi-square value (3.65) was non significant at three degrees of freedom, "t" value (0.02) was non significant for fifteen degrees of freedom. This indicated that acres of land cultivated by artificial insemination workers had no significant relation with the rate of adoption. However, mean acres of land cultivated by artificial insemination workers from the villages of high and low rates of adoption respectively were 4.13 and 4.46.

Number of Animals Maintained by Artificial Insemination Workers

Data regarding relationship of number of animals maintained by artificial insemination workers with rate of adoption are presented in Tabbe XVI.

Twenty per cent of artificial insemination workers, from the villages of high rate of adoption and 26.66 per cent of artificial insemination workers, from the villages of low rate of adoption had not kept any animals; whereas 13.33 per cent of artificial insemination workers from the villages of high rate of adoption including 33.33 per cent artificial insemination workers from the villages of low rate of adoption had maintained 1 - 2 animals. Of the artificial insemination workers from the villages of high rate of adoption, 66.66 per cent and 40 per cent of artificial insemination workers from the villages of low rate of adoption had maintained 3 - 5 animals.

TABLE XVI

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE NUMBER OF ANIMALS MAINTAINED BY THEM

Number of Animals Maintained	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Nil	3	20.00	4	26.66
1 - 2	2	13.33	5	33.33
3 - 5	10	66.66	6	40.00
Total	15	100	15	100
Mean number of Animals kept		2.80		2.53

x^2 Value = 2.42, non signfficant at 0.05 level; 2 D.F.

"t" Value = 0.03, non significant at 0.05 level; 15 D.F.

Chi-square value (2.42) was non significant for three degrees of freedom, "t" value was 0.03, non significant for fifteen degrees of freedom. This indicated that number of animals maintained by artificial insemination workers had no significant relation with the rate of adoption. However, mean number of animals mainatained by artificial insemination workers from the high and low rates of adoption were respectively 2.8 and 2.53.

Method of Breeding Buffaloes Adopted by Artificial Insemination Workers

Data regarding the relationshkp between the method of breeding adopted by artificial insemination workers with rate of adoption are presented in Table XVII.

TABLE XVII

NUMBERSAND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE METHOD OF BREEDING BUFFALOES ADOPTED BY THEM

Method of Breeding Buffaloes	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
By Artificial Insemination	12	80	11	73.33
Natural Service	-	-	-	-
Total	12*	80	11*	73.33

*Rest of the workers had no animals.

Eighty per cent of artificial insemination workers from the villages of high rate of adoption, 73.33 per cent of artificial insemination workers from the villages of low rate of adoption had adopted artificial insemination as a method of breeding buffaloes. However, method of breeding had no significant relation with the rate of adoption.

Monthly Income of Artificial Insemination Workers

Data regarding monthly income of artificial insemination workers and the relation with rate of adoption are presented in Table XVIII.

TABLE XVIII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR INCOME RECEIVED THROUGH THEIR MONTHLY SALARY

Monthly Salary	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto rupees 100	13	86.66	10	66.66
Rs.101 and above	2	13.33	5	33.33
Total	15	100	15	100
Mean Monthly Salary		78.6		87.8

x^2 Value = 0.57, non significant at 0.05 level; 1 D.F.

"t" Value = .076, non significant at 0.05 level; 15 D.F.

From the villages of high rate of adoption 86.66 per cent of artificial insemination workers, and 66.66 per cent of artificial insemination workers from the villages of low rate of adoption were receiving pay in the range upto rupees 100 per month.

Of the artificial insemination workers, 13.33 per cent from the villages of high rate of adoption, and 33.33 per cent of artificial insemination workers, from the villages of low rate of adoption were receiving income through salary more than rupees 100 per month. Chi-square value (0.57) was non significant for one degree of freedom, "t" value (0.076) was found to be non significant for fifteen degrees of freedom. This indicated that income received through monthly salary had no significant relationship with the rate of adoption. However, mean income received by the artificial insemination workers from the villages of high and low rates of adoption were rupees 78.6 and rupees 87.8 respectively.

Income Received through Sources other than Pay

Data regarding relationship of income received by artificial insemination workers through sources other than pay, with rate of adoption are presented in Table XIX.

Forty per cent of artificial insemination workers from the villages of high rate of adoption and 53.33 per cent of artificial insemination workers, from the villages of low rate of adoption were receiving income through sources other than pay upto rupees 2000 per year. From the villages of high rate of adoption 53.33 per cent artificial insemination workers and 13.33 per cent of artificial insemination workers, from the villages of low rate of adoption were receiving annual income through sources other than pay in the rrange of rupees 2001 - 5000; whereas 6.6 per cent of artificial insemination

TABLE XIX

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR INCOME RECEIVED THROUGH OTHER SOURCES

Income from other sources	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto Rs.2000 per year	6	40.00	8	53.33
2001 - 5000	8	53.33	2	13.33
Above 5000	-	-	1	6.66
Nil	1	6.66	4	26.66
Total	15	100	15	100
Mean income from other sources in rupees	2186.66		1433.33	

x^2 Value = 5.67, non significant at 0.05 level; 3 D.F.

"t" Value = 0.15, non significant at 0.05 level; 15 D.F.

workers, from the villages of low rate of adoption were only receiving yearly income in the range of above rupees 5000 per year. Out of the artificial insemination workers, 6.66 per cent from the villages of high rate of adoption and 26.66 per cent artificial insemination workers from the villages of low rate of adoption, had no income through sources other than pay.

Chi-square value (5.67) was non significant for three degrees of freedom. "t" value (0.15) was also non significant for fifteen degrees of freedom. This indicated that yearly income received by artificial insemination workers through sources other than pay had no significant relationship with the rate of adoption. However, mean income received through sources other than salary by the artificial insemination workers from the villages of high and low rates of adoption were rupees 2186.66 and 1433.33, respectively.

Advice given by Artificial Insemination Workers

Data regarding relationship of giving advices to farmers to adopt artificial insemination, by the artificial insemination workers, with rate of adoption are given in Table XX.

TABLE XX

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE ADVICE GIVEN BY THEM TO FARMERS

Advice to other	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Yes	15	100	15	100
No	-	-	-	-
Total	15	100	15	100

Cent per cent of the artificial insemination workers in both categories of villages were giving advice to farmers to adopt artificial insemination as a method of breeding, but there was no significant relationship of advice given to farmers with the rate of adoption.

Intensity of Participation of Artificial Insemination Workers in School Activities during School Career

Data regarding relationship of intensity of participation in the school activities by the artificial insemination workers during their school career, with rate of adoption are presented in Table XXI.

TABLE XXI

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR INTENSITY OF PARTICIPATION IN SCHOOL ACTIVITIES

Participation in number of activities	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
One activity	3	30	3	37.5
More than one activity*	7	70	5	62.5
Total	10	100	8	100

x^2 Value = 0.12, non significant at 0.05 level; 1 D.F.
*Rest had not participated in school activities.

Thirty per cent of artificial insemination workers from the villages of high rate of adoption and 37.5 per cent artificial insemination workers from the villages of low rate of adoption had participated in only one activity during their school career; whereas 70 per cent of artificial insemination workers from the villages of high rate of adoption and 62.5 per cent artificial insemination workers, from the villages of low rate of adoption had participated in more than one school activities during their school career. Out of all the artificial insemination workers only 66.66 per cent from villages of high rate of adoption and 63.33 per cent from villages of low rate of adoption only participated in school activities and rest had not taken any part. Chi-square value (0.12) was non significant at one degree of freedom. This indicated that intensity of participation in school activities by the artificial insemination workers during their school career had no significant relationship with the rate of adoption.

Role played by Artificial Insemination Worker in the Present Village Activities

Data regarding relationship of role played by artificial insemination workers in the present village activities with rate of adoption are presented in Table XXII.

TABLE XXII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE ROLE PLAYED BY THEM IN PRESENT VILLAGE ACTIVITIES

Role played in present village activities	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Organiser or Adviser or both	8	57.15	4	33.33
Volunteer	6	42.85	6	50.00
Participant*	-	-	2	16.66
Total	14	100	12	100

x^2 Value = 3.3, non significant at 0.05 level; 2 D.F.

*Rest had not participated in present village activities.

From villages of high rate of adoption, 57.15 per cent of artificial insemination workers, 33.33 per cent of artificial insemination workers from the villages of low rate of adoption, participated in the village functions as organisers, or advisers or both. Out of artificial insemination workers, 42.85 per cent from the villages of high rate of adoption; 50.00 per cent of artificial insemination workers from the villages of low rate of adoption had participated in the present village activities as volunteers; but 16.66 per cent

of artificial insemination workers from the villages of low rate of adoption had participated only in the present village activities. Chi-square value (3.3) was non significant for two degrees of freedom. This indicated that intensity of participation in the present village activities by artificial insemination workers had no significant relationship with the rate of adoption.

Specific Measures Used to Persuade Farmers by Artificial Insemination Workers

Data regarding relationship between the specific measures used to persuade farmers to adopt artificial insemination workers with rate of adoption are presented in Table XXIII.

TABLE XXIII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE MEASURES USED BY THEM TO PERSUADE FARMERS

Specific measures to Persuade	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Yes	15	100	14	93.33
No	-	-	1	6.66
Total	15	100	15	100

x^2 Value = 1.06, non significant at 0.05 level; 1 D.F.

Cent per cent of artificial insemination workers from the villages of high rate of adoption and 93.33 per cent artificial insemination workers from the villages of low rate of adoption, took specific measures to persuade farmers to adopt artificial insemination as a method of breeding; whereas 6.66 per cent of artificial insemination workers from the villages of low rate of adoption did not make any special attempts to persuade farmers to adopt artificial insemination.

Chi-square value (1.06) was non significant for one degree of freedom, indicated that specific attempts to persuade farmers to adopt artificial insemination as a method of breeding by artificial insemination workers had no significant relationship with the rate of adoption.

Interest taken by Artificial Insemination Workers

Interest in artificial insemination work was determined by the firmness shown in sticking to the job of artificial insemination worker. Such data regarding interest are presented in Table XXIV.

Out of artificial insemination workers from the villages of high rate of adoption, 26.66 per cent and equal per cent of artificial insemination workers from the villages of low rate of adoption showed no much interest in the job and they were willing to leave the job if opportunity arose for better jobs; whereas 73.33 per cent of artificial insemination workers from the villages of high rate of adoption, and equal per cent of

TABLE XXIV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR INTEREST SHOWN IN THEIR JOB

Willingness to leave the job	Artificial Insemination Worker			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
A. Yes	4	26.66	4	26.66
B. No	11	73.33	11	73.33
Total	15	100	15	100

x^2 Value = 0.0, non significant at 0.05 level; 1 D.F.

artificial insemination workers from the villages of low rate of adoption were more interested in the job and they were not willing to leave the job even though an opportunity for better job was offered to them.

Chi-square value (0.0) which was non significant for one degree of freedom indicated that interest taken in the job by artificial insemination workers had no significant relationship with the rate of adoption.

Specific Reasons Given by Artificial Insemination Workers for the Interest Taken or No Interest in the Job

Data regarding the specific reasons given by

artificial insemination workers are presented in Table XXV.

TABLE XXV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE REASONS GIVEN, BY THEM TO LEAVE OR TO STICK TO JOB

Speicifc Reasons	Artificial Insemination Workers			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
No interest				
More Pay	2	50.00	4	100
No liking for the job	2	50.00	-	-
Any other reasons	-	-	-	-
Total	4	100	4	100
Interested				
Like the job	-	-	3	27.27
Service to my village	11	100	6	54.54
Cannot leave the job	-	-	2	18.18
Total	11	100	11	100

Village Conditions in General

Distance of the Villages from Taluka Places

Data regarding relationship of distance of villages from taluka places and the relation with rate of adoption are presented in Table XXVI.

TABLE XXVI

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DISTANCE FROM THE TALUKA PLACES

Distance from Taluka place	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Within 5 miles	6	40.00	4	26.26
5 - 10 miles	5	33.33	8	53.33
Beyond 10 miles	4	26.66	3	20.00
Total	15	100	15	100
Mean distance in miles		5.66		7.33

x^2 Value = 1.25, non significant at 0.05 level; 2 D.F.

"t" Value = .133, non significant at 0.05 level; 15 D.F.

Forty per cent of villages of high rate of adoption, including 26.66 per cent villages of low rate of adoption

were within a distance of five miles from the taluka places; whereas 33.33 per cent villages of high rate of adoption and 53.33 per cent villages of low rate of adoption were within a distance of 5 - 10 miles from the taluka places; but 26.66 per cent villages of high rate of adoption including 20 per cent villages of low rate of adoption were at a distance beyond ten miles from the taluka places.

Chi-square value (1.25) was non significant at two degrees of freedom. "t" value (0.133) was non significant for fifteen degrees of freedom. Both indicated that distance of villages from taluka places had no significant relationship with the rate of adoption, however mean distance of the villages of high and low rates of adoption from the taluka places were 5.66 and 7.33 respectively.

Distance from State High Ways

Data regarding relationship of distance of villages from state high ways with rate of adoption are presented in the Table XXVII.

Out of villages of high rate of adoption, 26.66 per cent and 80 per cent villages of low rate of adoption were within one mile distance from the nearest state high ways; whereas 73.33 per cent villages of high rate of adoption, and 20 per cent villages of low rate of adoption were within 1 - 5 miles distance from the state high ways. Chi-square value (8.57) was highly significant at 0.01 level for one degree of freedom,

TABLE XXVII

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DISTANCE FROM STATE HIGH WAYS

Distance from State high ways	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Within a mile	4	26.66	12	80.00
1 - 5 miles	11	73.33	3	20.00
Total	15	100	15	100
Mean distance in miles		1.81		0.65

x^2 Value = 8.57, highly significant at 0.01 level; 1 D.F.

"t" Value = 0.269, non significant at 0.05 level; 15 D.F.

This indicated that distance from State high way had highly significant relationship with rate of adoption. "t" value (0.269) was also significant at 0.05 level for fifteen degrees of freedom; however mean distance from the state high ways were 1.81 and 0.65 miles respectively in case of villages of high and low rates of adoption, indicated that means of distance differed significantly.

Distance from National High Ways

Data regarding relationship of distance from national

high ways, of the villages with rate of adoption are presented in Table XXVIII.

TABLE XXVIII

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DISTANCE FROM NATIONAL HIGH WAYS

Distance from National high ways	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Within a mile	-	-	2	13.33
1 - 5 miles	3	20.00	5	33.33
5 -10 miles	5	33.33	3	20.00
Beyond 10 miles	7	46.66	5	33.33
Total	15	100	15	100
Mean distance in miles		10.45		8.36

x^2 Value = 3.33, non significant at 0.05 level; 3 D.F.

"t" Value = .086, non significant at 0.05 level; 15 D.F.

Out of villages of low rate of adoption 13.33 per cent were within a mile from the national high ways. Twenty per cent villages of high rate of adoption, 33.33 per cent villages of low rate of adoption were within 1 - 5 miles from the national high ways; but 33.33 per cent villages of high rate of

adoption and 20 per cent villages of low rate of adoption were at a distance of 5 - 10 miles from the national high ways; whereas 46.66 per cent villages of high rate of adoption, 33.33 per cent villages of low rate of adoption were at a distance beyond 10 miles from the national high ways.

Chi-square value (3.33) which was non significant at three degrees of freedom, indicated that distance from national high ways had no significant relationship with rate of adoption. "t" value (0.086) was non significant for fifteen degrees of freedom, indicated that there was no significant difference in the mean distance of villages of high and low rates of adoption. However, mean distances were 10.45 and 8.36 respectively of villages of high and low rates of adoption.

Distance from Anand (Amul)

Data regarding the relationship of distance from Anand (Amul) of the villages with rate of adoption are presented in Table XXIX.

Of the villages from high rate of adoption, 6.66 per cent and 13.33 per cent villages of low rate of adoption were within a distance of five miles from Anand; whereas 13.33 per cent villages of high rate of adoption, 13.33 per cent villages of low rate of adoption were within a distance of 5 - 10 miles from Anand; but 26.66 per cent villages of high rate of adoption and 40 per cent villages of low rate of

TABLE XXIX

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DISTANCE FROM ANAND (AMUL)

Distance from Anand	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Within 5 miles	1	6.66	2	13.33
5 - 10 miles	2	13.33	2	13.33
10 - 15 miles	4	26.66	6	40.00
Beyond 15 miles	8	53.33	5	33.33
Total	15	100	15	100
Mean distance in miles		15.33		12.23

x^2 Value = 1.44, non significant at 0.05 level; 3 D.F.

"t" Value = 0.137, non significant at 0.05 level; 15 D.F.

adoption were within a distance of 10 - 15 miles from Anand; whereas 53.33 per cent of villages from high rate of adoption and 33.33 per cent villages of low rate of adoption were at a distance beyond 15 miles from Anand.

Chi-square value (1.44) was non significant for three degrees of freedom, indicated that distance from Anand had no significant relationship with the rate of adoption. "t" value (0.137) was also non significant at fifteen degrees of freedom;

however mean distance of the villages of high and low rates of adoption from Anand were 15.33 and 12.23 miles, respectively.

Area of the Villages

Data regarding relationship of area of the villages with rate of adoption are presented in Table XXX.

TABLE XXX

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY AREA OCCUPIED

Area in Acres	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto 1000 acres	5	33.33	-	-
1001 to 2500	9	60.00	6	33.33
Beyond 2500	1	6.66	9	66.66
Total	15	100	15	100
Mean area in acres and gunthas	1415.22		3369.39	

x^2 Value = 12.00, highly significant at 0.01 level; 2 D.F.

"t" Value = 0.485, highly significant at 0.01 level; 15 D.F.

Out of the villages of high rate of adoption 33.33 per cent villages occupied the area upto 1000 acres. Sixty

per cent villages of high rate of adoption, 33.33 per cent villages of low rate of adoption occupied an area in the range of 1001 - 2500 acres; whereas 6.66 per cent villages of high rate of adoption, 66.66 per cent villages of low rate of adoption had an area beyond 2500 acres.

Chi-square value (12.00) was highly significant at 0.01 level, indicated that area of the villages had a highly significant relationship with the rate of adoption. "t" value (0.485) was highly significant at 0.01 level for fifteen degrees of freedom, which indicated that mean area of villages of high and low rates of adoption significantly differed. Mean area occupied by villages of high and low rates of adoption were 1415 acres and 22 gunthas, and 3369 acres and 39 gunthas, respectively.

Human Population of the Villages

Data regarding relationship between human population of the villages and rate of adoption are presented in Table XXXI.

Twenty per cent villages of high rate of adoption and 6.66 per cent villages of low rate of adoption had the human population in the range upto one thousand. Secondly, 53.33 per cent villages of high rate of adoption and 20 per cent villages of low rate of adoption had the human population in the range of 1001 - 3000; whereas 26.66 per cent villages of high rate of adoption had population in the range of 3001 - 5000, including 26.66 per cent villages of low rate of

TABLE XXXI

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR HUMAN POPULATION

Human Population	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto 1000	3	20.00	1	6.66
1001 - 3000	8	53.33	3	20.00
3001 - 5000	4	26.66	4	26.66
Above 5000	-	-	7	46.66
Total	15	100	15	100
Mean human population	2072.4		5210.4	

x^2 Value = 10.27, significant at 0.05 level; 3 D.F.

"t" Value = 0.49, highly significant at 0.01 level; 15 D.F.

adoption; but 6.6 per cent villages of low rate of adoption had human population above 5000.

Chi-square value (10.27) was significant at 0.05 level for three degrees of freedom. This indicated that human population of villages and rate of adoption had a significant relationship. "t" test was applied to know whether there was any significant difference in the mean population of villages of high and low rates of adoption . "t" value (0.49) was found

highly significant at 0.01 level for fifteen degrees of freedom. Mean human population were 2072.4 and 5210.4 respectively of villages of high and low rates of adoption, which differed significantly.

Buffalo Population of Villages

Data regarding relationship between buffalo population of the villages and rate of adoption are presented in Table XXXII.

TABLE XXXII

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE BUFFALO POPULATION

Buffalo population of villages	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Below 500	9	60.00	2	13.33
501 - 1000	6	40.00	5	33.33
1001 - 1500	-	-	5	33.33
Above 1500	-	-	3	20.00
Total	15	100	15	100
Mean buffalo population	471.8		1093.3	

x^2 Value = 12.54, highly significant at 0.01 level; 3 D.F.

't' Value = 0.59, highly significant at 0.01 level; 15 D.F.

Sixty per cent villages of high rate of adoption, 13.33 per cent villages of low rate of adoption had buffalo population upto 500. Forty per cent villages of high rate of adoption, and 33.33 per cent villages of low rate of adoption had buffalo population in the range of 501 - 1000; whereas 33.33 per cent villages of high rate of adoption had population in the range of 1001 - 1500; but 20 per cent villages of low rate of adoption had buffalo population above 1500.

Chi-square value (12.54) which was highly significant at 0.01 level for three degrees of freedom, indicated that buffalo population of villages had a significant relationship with the rate of adoption. "t" test was applied to know whether there was any significant difference between mean buffalo population of villages of high rate of adoption and low rate of adoption. "t" value was 0.59 which was highly significant at 0.01 level for fifteen degrees of freedom. Mean buffalo population were 471.8 and 1093.3 respectively of the villages of high and low rates of adoption, which differed significantly

Percentage of Literacy of Villages

Percentage of literacy do affect rate of adoption. Percentage of literacy of the villages under study were studied and categorised in three levels. Such data are presented in Table XXXIII.

TABLE XXXIII

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY PERCENTAGE OF LITERATE PEOPLE AT THE VILLAGES

Percentage of Literate people in the village	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
40 - 50 per cent	12	80	5	33.33
30 - 40 per cent	-	-	5	33.33
Below 30 per cent	3	20	5	33.33
Total	15	100	15	100
Mean percentage of literate people		42.22 per cent		34.06 per cent

x^2 Value = 8.38, significant at 0.05 level; 2 D.F.

Eighty per cent villages of high rate of adoption and 33.33 per cent villages from low rate of adoption had percentage of literate people in the village in the range 40 - 50 per cent; whereas 33.33 per cent villages of low rate of adoption had percentage of literacy in the range of 30 - 40 per cent, but 20 per cent villages of high rate of adoption and 33.33 per cent of low rate of adoption had the percentage of literacy less than 30 per cent. Chi-square value (8.38) was significant at 0.05 level for two degrees of freedom.

Mean percentage of literacy in the villages of high and low rates of adoption were 42.22 and 34.06 per cent respectively.

Significant value of chi-square indicated a significant relationship of percentage of literacy of the villages with the rate of adoption.

Majority Caste in the Villages

Data on the majority caste prevalent in the villages and the relationship with rate of adoption are presented in Table XXXIV.

TABLE XXXIV

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE MAJORITY CASTE IN THE VILLAGES

Majority Caste	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Patels in majority	13	86.66	3	20.00
Non Patels in majority	2	13.33	12	80.00
Total	15	100	15	100

x^2 Value = 13.39, highly significant at 0,01 level; 1 D.F.

Out of villages of high rate of adoption, 86.66 per cent and 20 per cent of villages of low rate of adoption in which patel community was in majority; whereas 13.33 per cent of villages of high rate of adoption and 80.0 per cent of low rate of adoption had majority of non-patel community.

Chi-square value (13.39) was highly significant at 0.01 level for one degree of freedom which indicated that majority community had highly significant relationship with the rate of adoption.

Irrigation Facilities Available

Based on the irrigation facilities available in the villages, it was roughly estimated what potential area could be irrigated under existing conditions at the villages depending on area available for cultivation. Data regarding relationship of area irrigated and rate of adoption are presented in Table XXXV.

Out of villages of high rate of adoption in 33.33 per cent villages, almost whole area under cultivation had the facility for irrigation, but 33.33 per cent villages of high rate of adoption and 26.66 per cent villages of low rate of adoption had facilities for irrigation for more than half of the area cultivated in the villages; whereas 33.33 per cent villages of high rate of adoption and 73.33 per cent villages of low rate of adoption had facilities for irrigation for less than half the area cultivated.

TABLE XXXV

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE AREA HAVING IRRIGATION FACILITIES

Area Irrigated	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Whole village area	5	33.33	-	-
More than half of the area	5	33.33	4	26.26
Less than half of the area	5	33.33	11	73.33

x^2 Value = 7.36, significant at 0.05 level; 2 D.F.

Chi-square value (7.36) which was significant at 0.05 level for two degrees of freedom indicated that irrigation facilities available, and the rate of adoption had significant relationship.

Distribution of Land Holdings

Based on the records of land owned by the farmers, ratio of farmers having area below five acres and those having more than five acres of land was aseertained and the relationship with rate of adoption was studied. Such data are presented in Table XXXVI.

TABLE XXXVI

NUMBERS AND PERCENTAGES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE PROPORTION OF LAND HOLDINGS AMONGST LAND OWNERS

Villages with ratio of below average land holding: above average	Villages			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Above average village 2:1	3	23.07	1	9.09
Average villages 3:1	6	46.15	3	27.27
Below average 4:1	4	30.76	7	63.63
Total	13*	100	11*	100

*Data for only 24 villages were available.

x^2 Value = 2.80, non significant at 0.05 level; 2 D.F.

Out of villages of high rate of adoption, 23.07 per cent and 9.09 per cent villages of low rate of adoption had the distribution in the ratio of 2:1 (between holders below 5 acres and above 5 acres); whereas 46.15 per cent villages of high rate of adoption and 27.27 per cent villages of low rate of adoption had the distribution in the ratio of 3:1; but 30.76 per cent villages of high rate of adoption and 63.63 per cent villages of low rate of adoption had the distribution in the ratio 4:1. The ratio 2:1, indicated

better economic conditions, 3:1 average conditions and 4:1 ratio indicated lower economic conditions. Chi-square value (2.80) was non significant at two degrees of freedom, indicating that there was no significant relationship between distribution of land holding and the rate of adoption.

Organisational Aspects of Primary Cooperative Milk Producers' Societies

Number of members in the cooperatives. Data regarding the relationship between number of members of the cooperative society and rate of adoption are presented in Table XXXVII.

TABLE XXXVII

NUMBERS AND PERCENTAGES OF THE PRIMARY COOPERATIVE MILK PRODUCERS SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY NUMBER OF MEMBERS OF THE COOPERATIVES

Number of members	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
100 - 500	14	93.33	3	20.00
501 - 1000	1	6.66	11	73.33
Above 1000	-	-	1	6.66
Total	15	100	15	100
Mean number of members	270.26		791.33	

x^2 Value = 13.53, highly significant at 0.01 level; 2 D.F.
"t" Value = 0.810, highly significant at 0.01 level; 15 D.F.

Out of cooperatives from the villages of high rate of adoption 93.33 per cent and 20 per cent, villages of low rate of adoption had members in the range of 100 - 500; but 6.66 per cent of cooperatives from the villages of high rate of adoption and 73.33 per cent cooperatives from the villages of low rate of adoption had members in the range of 501 - 1000 members; whereas 6.66 per cent cooperatives from the villages of low rate of adoption had members above 1000.

Chi-square value (13.53) was highly significant at 0.01 level for two degrees of freedom, indicated that number of members in the co-operatives and the rate of adoption were significantly related. "t" value (0.810) was also highly significant at 0.01 level for fifteen degrees of freedom, indicated that means of number of members in villages of high and low rates of adoption significantly differed. However, mean number of members of cooperatives from the villages of high and low rates of adoption were 270.36 and 791.33 respectively.

Audit Classification of Cooperatives

Data regarding audit classification of cooperatives and relationship of the same with rate of adoption are presented in Table XXXVIII.

Of the co-operatives from the villages of high rate of adoption, 26.66 per cent and 60.00 per cent cooperatives from the villages of low rate of adoption were classified as A class

TABLE XXXVIII

NUMBERS AND PERCENTAGES OF THE PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE AUDIT CLASSIFICATION

Audit Classification	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
A Class	4	26.66	9	60.00
B Class	11	73.33	5	33.33
C Class	-	-	1	6.66
Total	15	100	15	100

x^2 Value = 5.27, non significant at 0.05 level; 2 D.F.

societies; but 73.33 per cent cooperatives from the villages of high rate of adoption and 33.33 per cent cooperatives from the villages of low rate of adoption were classified as B class societies; whereas 6.66 per cent cooperatives from villages of low rate of adoption were classified as C class.

Chi-square value (5.27) which was non significant at two degrees of freedom indicated that audit classification had no significant relationship with the rate of adoption. However, the chi-square value was found to be significant at 0.10 level for two degrees of freedom.

Quantity of Milk Handled

Data regarding relationship between the milk handled daily by the cooperatives and rate of adoption are presented in Table XXXIX.

TABLE XXXIX

NUMBERS AND PERCENTAGES OF THE PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE QUANTITY OF MILK HANDLED DAILY

Quantity of milk handled daily	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Upto 500 litres	12	80-00	4	26.66
501 to 1000 litres	3	20.00	10	66.66
Above 1000 litres	-	-	1	6.66
Total	15	100	15	100
Mean quantity of milk handled daily in litres		380.33		630.00

x^2 Value = 8.77, significant at 0.05 level; 2 D.F.

"t" Value= 0.306, highly significant at 0.01 level; 15 D.F.

Eighty per cent cooperatives from the villages of high rate of adoption and 26.66 per cent cooperatives from the villages of low rate of adoption were handling milk daily less than 500 litres, but 20 per cent cooperatives fro the

villages of high rate of adoption and 66.66 per cent cooperatives from the villages of low rate of adoption were handling milk in the range of 501 to 1000 litres per day; whereas 6.66 per cent villages from low rate of adoption were handling milk more than 1000 litres per day.

Chi-square value (8.77) was significant at 0.05 level for two degrees of freedom, indicated that quantity of milk handled by the cooperatives had a significant relationship with the rate of adoption. "t" value (0.346) was highly significant at 0.01 level which indicated that mean quantity of milk handled by cooperatives from villages of high and low rates of adoption differed significantly. The mean quantities of milk handled daily at the cooperatives from the villages of high and low rates of adoption were 380.33 and 630 litres respectively.

Accommodation of Cooperatives

Data regarding relationship between the accommodation available for the society and rate of adoption are presented in Table XL.

Out of cooperatives from the villages of high rate of adoption 46.66 per cent, and 60.00 per cent cooperatives from the villages of low rate of adoption were having their own building; whereas 53.33 per cent cooperatives from the villages of high rate of adoption, and 40.00 per cent cooperatives from the villages of low rate of adoption were working in rented buildings.

TABLE XL

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE TYPE OF ACCOMMODATION AVAILABLE

Accommodation	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Own Building	7	46.66	9	60.00
Rented House	8	53.33	6	40.00
Total	15	100	15	100

x^2 Value = 0.53, non significant at 0.05 level; 1 D.F.

Chi-square value (0.53) was non significant at one degree of freedom, indicated that accommodation had no significant relationship with the rate of adoption.

Number of years completed for the Primary Cooperative Milk Producers' Societies

Data regarding the relationship of number of years completed by the cooperatives and rate of adoption are presented in Table XLI.

Out of the cooperatives from the villages of low rate of adoption 6.66 per cent of them had completed less than five years; whereas 53.33 per cent cooperatives from the villages of high rate of adoption and 26.66 per cent cooperatives from the

TABLE XLI

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF VILLAGESOF HIGH AND LOW RATES OF ADOPTION, BY THEIR NUMBER OF YEARS COMPLETED

Number of years of completed for societies	Cooperaa t i v e s			
	High Ratee		Low Rate	
	Number	Per cent	Number	Per cent
Below 5 years	-	-	1	6.66
5 - 10 years	8	53.33	4	26.66
Above 10 years	7	46.66	10	66.66
Total	15	100	15	100
Mean number of years completed		10.2		12.6

x^2 Value = 2.86, non significant at 0.05 level; 2 D.F.

"t" Value = 0.16, non significant at 0.05 level; 15 D.F.

villages of low rate of adoption had completed of their existence for a period in the range of 5 - 10 years; but 46.66 per cent cooperatives from the villages of high rate of adoption and 66.66 per cent cooperatives from the villages of low rate of adoption had completed a period of existence more than ten years.

Chi-square value (2.86) was non significant for two degrees of freedom, indicated that number of years completed by the cooperative had no significant relationship with the

rate of adoption. "t" value (0.09) was also non significant for fifteen degrees of freedom, however mean number of years completed for the cooperatives from the villages of high and low rates of adoption respectively were 10.2 and 12.2.

Number of Years Completed for Artificial Insemination Centres

Data regarding the number of years of existence of artificial insemination centres and the relationship with rate of adoption are presented in Table XLII.

TABLE XLII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION CENTRES OF VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THEIR NUMBER OF YEARS COMPLETED

Number of years completed for the artificial insemination centres	Insemination Centres			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Below 5 years	9	60.00	8	53.33
5 - 10 years	4	26.66	5	33.33
Above 10 years	2	13.33	2	13.33
Total	15	1000	15	100
Mean years completed		6.2		6.33

x^2 Value = 0.16, non significant at 0.05 level; 2 D.F.

"t" Value = 0.09, non significant at 0.05 level; 15 D.F.

Sixty per cent of artificial insemination centres from the villages of high rate of adoption and 53.33 per cent artificial insemination centres from the villages of low rate of adoption, were existing for a period less than five years; but 26.66 per cent artificial insemination centres from the villages of high rate of adoption and 33.33 per cent artificial insemination centres from the villages of low rate of adoption were existing for a period in the range of five to ten years; whereas 13.33 per cent artificial insemination centres from the villages of high rate of adoption and 13.33 per cent artificial insemination centres from the villages of low rate of adoption were existing for a period of more than ten years.

Chi-square value (0.16) which was non significant at two degrees of freedom, indicated that number of years completed for the insemination centre had no significant relation with the rate of adoption. "t" value (0.09) was also non significant for 15 degrees of freedom. Mean completed years were 6.2, and 6.33 respectively for the villages of high and low rates of adoption.

Frequency of Change of Artificial Insemination Workers

Data on the frequency of change of artificial insemination workers at the cooperatives in the villages of high and low rates of adoption and the relation with rate of adoption are presented in Table XLIII.

TABLE XLIII

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE FREQUENCY OF CHANGE OF ARTIFICIAL INSEMINATION WORKERS

Change of workers	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
One man working from begining	10	66.66	5	33.33
Change of workers more than one	5	33.33	10	66.66
Total	15	100	15	100

x^2 Value = 3.33, non significant at 0.05 level; 1 D.F.

Of the cooperatives from the villages of high rate of adoption 66.66 per cent, and 33.33 per cent cooperatives from the villages of low rate of adoption had one man working as artificial insemination worker from the beginning; whereas 33.33 per cent cooperatives from the villages of high rate of adoption and 66.66 per cent cooperatives from the villages of low rate of adoption had more frequency of changes of persons as artificial insemination workers.

Chi-square value (3.33) was non significant for one degree of freedom, indicated that frequency of changes of artificial insemination workers had no significant relationship with the rate of adoption. However, chi-square value was found to be significant at 0.10 level for one degree of freedom.

Number of Persons Trained in Artificial Insemination at the Cooperatives

Data regarding number of persons trained in artificial insemination at the cooperatives, and the relation with rate of adoption are presented in Table XLIV.

TABLE XLIV

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE NUMBER OF PERSONS FROM THE SOCIETIES TRAINED IN ARTIFICIAL INSEMINATION

Number of persons trained more than one	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Yes	6	40.00	9	60.00
No	9	60.00	6	40.00
Total	15	100	15	100

x^2 Value = 1.31, non significant at 0.05 level; 1 D.F.

Forty per cent cooperatives from the villages of high rate of adoption and 60 per cent cooperatives from the villages of low rate of adoption had more than one persons trained in artificial insemination, but 60 per cent of cooperatives from the villages of high rate of adoption and 40 per cent from low rate of adoption had no other man trained except the present artificial insemination worker.

Chi-square value (1.31) was non significant for one degree of freedom, indicated that having an additional man trained in artificial insemination had no significant relationship with the rate of adoption.

Placement of Insemination Crate

Data regarding placement of insemination crate at the villages and the relationship with rate of adoption are presented in Table XLV.

Out of the cooperatives from the villages of high rate of adoption 46.66 per cent and 73.33 per cent cooperatives from the villages of low rate of adoption had "A" class insemination crate; whereas 53.33 per cent cooperatives from the villages of high rate of adoption and 26.66 per cent cooperatives from the villages of low rate of adoption had insemination crate of "B" class.

Chi-square value (2.22) was non significant for one degree of freedom, indicated that placementof insemination crate had no significant relationship with the rate of adoption.

TABLE XLV

NUMBERS AND PERCENTAGESOF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY PLACEMENT OF INSEMINATION CRATE

Types of placement	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
A Class	7	46.66	11	73.33
B Class	8	53.33	4	26.66
Total	15	100	15	100

x^2 Value = 2.22, non significant at 0.05 level; 1 D.F.

"A" Class = Crate fixed in concrete, having verandah, privacy maintained, with or without roof fixing.

"B" Class = Crate not fixed in concrete, no privacy and no roof.

Specific Measures to Persuade Farmers through the Organisational Means

Data regarding whether any specific measures undertaken to persuade farmers by the organisation or not, and the relation of the attempts with rate of adoption are presented in Table XLVI.

TABLE XLVI

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE SPECIFIC MEASURES ADOPTED TO PERSUADE FARMERS

Whether specific measures used	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Yes	5	33.33	7	46.66
No	10	66.66	8	53.33
Total	15	100	15	100

x^2 Value = 0.55, non significant at 0.05 level; 1 D.F.

Out of the cooperatives from the villages of high rate of adoption 33.33 per cent, and 46.66 per cooperatives from the villages of low rate of adoption had adopted some measures by giving facilities to bring animals by the workers of the cooperatives; whereas 66.66 per cent cooperatives from the villages of high rate of adoption and 53.33 per cent cooperatives from the villages of low rate of adoption had not got any such arrangements from the cooperatives to persuade farmers to adopt artificial insemination as a method of breeding.

Chi-square value (0.55) was non significant for one degree of freedom, indicating that taking up specific measures had no significant relationship with the rate of adoption.

Types of Animals Brought to the Cooperatives for Pregnancy Diagnosis

Both types of animals either bred by natural service or artificial insemination were brought for pregnancy diagnosis. Such data and the relation of the same with the rate of adoption are presented in Table XLVII.

TABLE XLVII

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVES MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE TYPE OF ANIMALS BROUGHT FOR PREGNANCY DIAGNOSIS

Types of animals brought for pregnancy diagnosis	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Animals bred by artificial insemination or natural service	15	100	15	100
Animals only bred by artificial insemination	-	-	-	-
Total	15	100	15	100

Cent per cooperatives from the villages of high and low rates of adoption reported that both types of animals were brought to the centre, whether bred by natural service or artificial insemination, as such there was no significant relationship between types of animals brought for pregnancy diagnosis and the rate of adoption.

Use of Different Types of Funds

In cooperative societies, three types of funds, cattle benefit fund, charity fund and cooperative funds are drawn and funds were utilised for welfare activities of the villages. Data on the utilisation of funds and the relation with rate of adoption are presented in Table XLVIII.

TABLE XLVIII

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE USE OF DIFFERENT TYPES OF FUNDS

Use of funds	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
All the three funds are used	8	53.33	11	73.33
Only two funds	4	26.66	4	26.66
None is used	3	20.00	-	-
Total	15	100	15	100

x^2 Value = 3.47, non significant as 0.05 level; 2. D.F.

Out of the cooperatives from the villages of high rate of adoption 53.33 per cent, and 73.33 per cent cooperatives from the villages of low rate of adoption had utilised all the three type of funds, charity, cattle benefit, and cooperative funds for different welfare activities of the concerned villages; whereas 26.66 per cent cooperatives from the villages of high rate of adoption and 26.66 per cent cooperatives from the village of low rate of adoption had utilised only cooperative and charity funds, but 20 per cent of cooperatives from the villages of high rate of adoption had utilised none of the funds.

Chi-square value (3.47) was non significant for two degrees of freedom, indicated that utilisation of funds had no significant relationship with the rate of adoption.

Outstanding Activities Achieved by Cooperatives

Data regarding outstanding and meritorious activities done by the cooperatives and the relationship with rate of adoption are presented in Table XLIX.

Of the cooperatives from the villages of high rate of adoption 33.33 per cent and 13.33 per cent cooperatives fro the villages of low rate of adoption had achieved some of the outstanding and meritorious activities either in cooperative sector or in animal husbandry activities; whereas 66.66 per cent of cooperatives from the villages of high rate of adoption and 86.66 per cent from the villages of low rate of adoption had not achieved any outstanding activities.

TABLE XLIX

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE OUTSTANDING ACHIEVEMENT IN ANIMAL HUSBANDRY ACTIVITIES

Outstanding achievements	Cooperatives			
	High Rate		Low Rate	
	Number	Per cent	Number	Per cent
Yes	5	33.33	2	13.33
No	10	66.66	13	86.66
Total	15	100	15	100

x^2 Value = 1.61, non sighificant at 0.05 level; 1 D.F.

Chi-square value (1.61) was non significant for one degree of freedom, which indicated that achievement of outstanding activities in animal husbandry or cooperation, had no significant relationship with rate of adoption.

Participation of Cooperatives in Different Activities

Amul sponsored many developmental activities through the Primary Cooperative Milk Producers' Societies. To what extent such activities had been undertaken at the villages through the cooperatives was ascertained by the response of the secretaries or chairman. Data on the participation of

cooperatives in different activities, and relation of taking up such activities with rate of adoption are presented in Table L.

Chi-square values 1.15, 0.55, 1.03, 1.42, 0.08, 0.135, 1.03, 0.38, 0.55, 2.14, 0, 1.03, 1.42, 1.03 respectively in the cases of activities exhibition on animal husbandry, visit of farmers to dairy, milk yield competition, progeny testing scheme, insurance of buffaloes, free milk to school children, supply of chaff-cutters, lucern cultivation, Gajraj cultivation, calf rearing, cattle standings, head quarter of Intensive Cattle Development Scheme, members in Arda, sale of Amuldan, prevention of ecto-parasites, prevention of endo-parasites, were all nonsignificant at one degree of freedom.

Chi-square value (5.4) was significant at 0.05 level for one degree of freedom, in case of distribution of free milk to school children and had a significant relation with the rate of adoption.

Opinions on Supplies and Services and the Work of Artificial Insemination Worker and Suggetions for Improving the Present Rate of Adoption or to Maintain the Progress Achieved

Opinion of the Artificial Insemination Workers, Secretaries and Chairman on the Services and Supplies from Amul

Data on the opinions are presented in Table LI.

TABLE L

NUMBERS AND PERCENTAGES OF PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DETAILS OF DIFFERENT ACTIVITIES TAKEN UP BY THE COOPERATIVES

Activities sponsored by Amul	Cooperatives								x^2 Value
	High Rate				Low Rate				
	Already taken up		Not taken		Already taken up		Not taken		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Amul Newsletter	15	100.00	-	-	15	100.00	-	-	-
Exhibition on animal husbandry	12	80.00	3	20.00	14	93.33	1	6.66	1.15 N.S.
Visit of farmers to dairy	10	60.66	5	33.33	8	53.33	7	46.66	0.55 N.S.
Milk yield competition	15	100.00	-	-	14	93.33	1	6.66	1.03 N.S.
Progeny testing scheme	6	40.00	9	60.00	3	20.00	12	80.00	1.42 N.S.
Insurance of buffaloes	3	20.00	12	80.00	7	46.66	8	53.33	0.80 N.S.
Milk to school children	7	46.66	8	53.33	13	86.66	2	13.33	5.4*
Chaff cutters	7	146.66	8	53.33	6	20.00	9	60.00	0.135 N.S.

TABLE L (continued)

Activities sponsored by Amul	Cooperatives									
	High Rate				Low Rate				x^2	
	Already taken up		Not taken		Already taken up		Not taken			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Value	
Lucern cultivation	15	100.00	-	-	14	93.33	1	6.66	1.03	N.S.
Gajraj cultivation	8	53.33	7	46.66	9	60.00	6	40.00	0.38	N.S.
Ear tagging	15	100.00	-	-	15	100.00	-	-	-	
Calf rearing	10	66.66	5	33.33	8	53.33	7	46.66	0.55	N.S.
Cattle standing	2	13.33	13	86.66	-	-	15	100.00	2.14	N.S.
H.Q.of I.C.D.P.Stockman	3	20.00	12	80.00	3	20.00	12	80.00	0	N.S.
Member in ARDA	15	100.00	-	-	15	100.00	-	-	-	
Sale of Amuldan	14	93.33	1	6.66	15	100.00	-	-	1.03	N.S.
Prevention of ecto-parasites	6	40.00	9	60.00	3	20.00	12	80.00	1.42	N.S.
First Aid Veterinary box	15	100.00	-	-	15	100.00	-	-	-	
Regular visits of Vety. Officers	15	100.00	-	-	15	100.00	-	-	-	
Prevention of Endo-parasites	15	100.00	-	-	14	93.33	1	6.66	1.03	N.S.

N.S. = Non Significant at 0.05 level;

* = Significant at 0.05 level; 1 D.F.

TABLE LI

. NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS,

ADOPTION, BY THEIR OPINION IN DETAIL ABOUT THE SUPPLIES AN

Sr. No.	Items	Artificial Insemination Workers													
		High Rate						Low Rate							
		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cen
1	Supply of semen	15	100.00	-	-	-	-	14	93.33	1	6.66	-	-	13	100.00
2	Replacement of equipments	15	100.00	-	-	-	-	14	93.33	1	6.66	-	-	13	100.00
3	Supervision by Veterinary Officers	15	100.00	-	-	-	-	13	86.66	2	13.33	-	-	13	100.00
4	Placement of insemination crate	8	53.33	5	33.33	2	13.33	10	66.66	4	26.66	1	6.66	7	53.84
5	Cooperation from managing committee members	12	80.00	2	13.33	1	6.66	14	93.33	-	-	1	6.66	10	76.92
6	Cooperation from chairman	15	100.00	-	-	-	-	14	93.33	-	-	1	6.66	12	92.30
7	Cooperation from secretary	15	100.00	-	-	-	-	14	93.33	-	-	1	6.66	13	100.00
8	Cooperation from other workers	15	100.00	-	-	-	-	14	93.33	1	6.66	-	-	13	100.00
9	Cooperation from farmer members	15	100.00	-	-	-	-	12	80.00	2	13.33	1	6.66	13	100.00
10	Cooperation from non-members	14	93.33	1	6.66	-	-	12	80.00	2	13.33	1	6.66	12	92.30
11	Artificial insemination and pregnancy diagnosis progress at present	12	80.00	3	20.00	-	-	-	-	15	100.00	-	-	11	84.61

SECRETARIES AND CHAIRMEN OF THE VILLAGES OF HIGH AND LOW RATES OF

SERVICES RENDERED BY AMUL FOR ARTIFICIAL INSEMINATION AND PREGNANCY DIAGNOSIS

Secretaries										Chairman									
High Rate				Low Rate						High Rate						Low Rate			
Satisfactory		Not Satisfactory		Most Satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
-	-	-	-	9	81.81	1	9.09	1	9.09	14	93.33	1	6.66	-	-	12	80.00	2	13.33	1	6.66
-	-	-	-	10	90.9	1	9.09	-	-	14	93.33	1	6.66	-	-	12	80.00	3	20.00	-	-
-	-	-	-	11	100.00	-	-	-	-	14	93.33	1	6.66	-	-	13	86.66	2	13.33	-	-
6	46.15	-	-	4	36.36	6	54.54	1	9.09	7	46.66	8	53.33	-	-	6	40.00	9	60.00	-	-
3	23.07	-	-	10	90.90	-	-	1	9.09	11	73.33	4	26.66	-	-	13	86.66	2	13.33	-	-
1	7.69	-	-	10	90.90	1	9.09	-	-	13	86.66	2	13.33	-	-	13	86.66	2	13.33	-	-
-	-	-	-	11	100.00	-	-	-	-	13	86.66	2	13.33	-	-	13	86.66	2	13.33	-	-
-	-	-	-	10	90.90	1	9.09	-	-	12	80.00	3	20.00	-	-	13	86.66	2	13.33	-	-
-	-	-	-	11	100.00	-	-	-	-	12	80.00	3	20.00	-	-	10	66.66	4	26.66	1	6.66
1	7.69	-	-	9	81.81	2	18.18	-	-	12	80.00	3	20.00	-	-	9	60.00	5	33.33	1	6.66
2	15.38	-	-	1	9.09	9	81.81	1	9.09	12	80.00	3	20.00	-	-	1	6.66	13	86.66	1	6.66

Opinion of artificial insemination workers. Majority of artificial insemination workers, that is cent per cent, from the villages of high and low rates of adoption expressed that the supply of semen, equipment, and supervision by veterinary officers, were either most satisfactory or satisfactory. So also the cooperation from the managing committee members, chairmen, secretaries, and other workers of the cooperatives, and also from the member and non-member farmers, was either most satisfactory or satisfactory including the present progress of artificial insemination and pregnancy diagnosis work at their villages.

Very few that is 6.6 per cent of artificial insemination workers expressed that placement of insemination crate was not satisfactory in their villages. Equal per cent of them also expressed that cooperation from managing committee members, secretaries, chairmen and members and non-member farmers, was also not satisfactory.

Opinion of secretaries. Cent per cent secretaries from the villages of high and low rates of adoption expressed that supplies, services, supervison and cooperation from chairmen, managing committee members, other workers, and also from member and non-member farmers were either most satisfactory or satisfactory.

Very few that is 9.09 per cent of secretaries from villages of low rate of adoption expressed that supply of semen, placement of insemination crate, and present progress

of artificial insemination and pregnancy diagnosis were not satisfactory in their villages.

Opinion of chairmen. Majority of chairmen that is cent per cent expressed same views as that of secretaries and artificial insemination workers so far as supply of semen, equipments, supervision by veterinary officers, and cooperation from secretary, members of the managing committee, member and non-member farmers.

Supply of semen, cooperation from member and non-member farmers, and the present progress of artificial insemination and pregnancy diagnosis work in their villages, were either most satisfactory or satisfactory. Very few that is 6.6 per cent of them from the villages of low rate of adoption expressed that supply of semen, cooperation from member and non-member farmers, and present progress of artificial insemination and pregnancy diagnosis work in their villages were not satisfactory.

There seems to be more or less concurrence in the opinions expressed by the artificial insemination workers, secretaries and chairmen of the cooperatives both at the villages of high and low rates of adoption so far as supplies and service from Amul are concerned. The services rendered by Amul were well appreciated by almost all the respondents from the villages of high and low rates of adoption except few, who were not satisfied with supply of semen and supervision of veterinary officers, that too at the villages of low rate of adoption.

Opinion of Veterinary Officers from Amul Regarding the Present Progress of Artificial Insemination and Pregnancy Diagnosis Work

Data on the opinion of veterinary officers from Amul who supervised and guided artificial insemination and pregnancy diagnosis work at the villages in detail are presented in Table LII.

Veterinay Officers supervising the villages of high rate of adoption, 26.66 per cent of them, and same per cent of veterinary officers supervising the villages of low rate of adoption opined that role of secretary in organising propaganda was most satisfactory. Out of veterinary officers supervising villages of high rate of adoption 73.33 per cent of them and 66.66 per cent of veterinary officers supervising the villages of low rate of adoption opined that the role of secretary was satisfactory, but 20 per cent of veterinary officers supervising the villages of low rate of adoption, opined that the role was not at all satisfactory.

So far as the role of chairmen for the progress of artificial insemination and pregnancy diagnosis in the villages was concerned, 46.66 per cent of veterinary officers supervising the villages of high rate of adoption and 13.33 per cent of veterinary officers supervising villages of low rate of adoption, had opined that it was most satisfactory. Whereas, 46.66 per cent of veterinary officers supervising the villages of high rate of adoption, 73.33 per cent of veterinary officers supervising villages of low rate of

TABLE LII

NUMBERS AND PERCENTAGES OF VETERINARY OFFICERS OF AMUL BY THEIR OPINION ON THE ARTIFICIAL INSEMINATION AND PREGNANCY DIAGNOSIS WORK AT THE VILLAGES

Sr. No.	Items	Veterinary Officers											
		High Rate						Low Rate					
		Most satisfactory		Satisfactory		Not satisfactory		Most Satisfactory		Satisfactory		Not satisfactory	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Secretaries' role in organisation & propaganda etc.	4	26.66	11	73.33	-	-	4	26.66	8	53.33	3	20.00
2	Chairmen's role	2	13.33	11	73.33	2	13.33	2	13.33	10	66.66	3	20.00
3	Farmers' role in progress for artificial insemination&pregnancy diagnosis	7	46.66	7	46.66	1	6.66	2	13.33	11	73.33	2	13.33
4	Communication and Transport	2	13.33	12	80.00	1	6.66	10	66.66	5	33.33	-	-
5	Village in general	1	6.66	14	93.33	-	-	2	13.33	12	80.00	1	6.66
6	Progress of artificial insemination	10	66.66	5	33.33	-	-	1	6.66	12	80.00	2	13.33
7	Progress of pregnancy diagnosis	7	46.66	8	53.33	-	-	2	13.33	7	46.66	6	40.00
8	Any specificity noticed*	1	6.66	-	-	-	-	1	6.66	-	-	-	-

*Detailsof (8), a. Good working, b. Artificial insemination worker very much interested.

adoption opined that it was satisfactory; but 13.33 per cent of veterinary officers supervising the villages of high rate of adoption and 20 per cent of veterinary officers supervising the villages of low rate of adoption had opined that the role was not satisfactory.

As far as the farmers' role in the progress of artificial insemination and pregnancy diagnosis was concerned, 46.66 per cent of veterinary officers supervising villages of high rate of adoption and 13.33 per cent of veterinary officers supervising the villages of low rate of adoption opined that their role was most satisfactory; at the same time, 46.66 per cent of veterinary officers supervising the villages of high rate of adoption, 73.73 per cent of veterinary officers supervising the villages of low rate of adoption opined that the role was satisfactory; but 6.66 per cent of veterinary officers supervising the villages of high rate of adoption and 13.33 per cent of veterinary officers supervising the villages of low rate of adoption opined that the role was not satisfactory.

As far as transport and communication for the villages were concerned, 13.33 per cent of veterinary officers supervising the villages of high rate of adoption and 66.66 per cent of veterinary officers supervising the villages of low rate of adoption, opined that it was most satisfactory; whereas 80 per cent of veterinary officers supervising the villages of high rate of adoption and 33.33 per cent of veterinary officers supervising the villages of low rate of

adoption had opined that it was satisfactory; but 6.66 per cent of veterinary officers supervising the villages of high rate of adoption opined that the facility was not satisfactory.

As far as village in general was concerned, 6.66 per cent of veterinary officers supervising the villages of high rate of adoption and 13.33 per cent of veterinary officers supervising the villages of low rate of adoption opined that it was most satisfactory. Out of veterinary officers supervising the villages of high rate of adoption, 93.33 per cent and 80 per cent of veterinary officers from the villages of low rate of adoption opined that village conditionsin general were satisfactory; but 6.66 per cent of veterinary officers supervising the villages of low rate of adoption opined that it was not satisfactory.

Regarding the progress of artificial insemination in the villages was concerned, 66.66 per cent of veterinary officers, supervising the villages of high rate of adoption and 6.66 per cent of veterinary officers supervising the villages of low rate of adoption opined that the progress was most satisfactory; whereas 33.33 per cent of veterinary officers supervising the villages of high rate of adoption and 80 per cent of veterinary officers supervising the villages of low rate of adoption opined that progress was satisfactory; but 13.33 per cent of veterinary officers supervising villages of low rate of adoption opined that the progress was not satisfactory.

Out of veterinary officers supervising the villages of high rate of adoption, 46.66 per cent and 13.33 per cent of veterinary officers supervising villages of low rate of adoption opined that progress of pregnancy diagnosis was most satisfactory; whereas, 53.33 per cent of veterinary officers supervising the villages of high rate of adoption and 46.66 per cent of veterinary officers supervising villages of low rate of adoption opined that progress was satisfactory; but 40 per cent of veterinary officers supervising villages of low rate of adoption opined that progress of pregnancy diagnosis was not satisfactory.

Some of the reasons as expressed by veterinary officers for progress of artificial insemination and pregnancy diagnosis were: good working of artificial insemination workers, and interest taken by artificial insemination workers.

Specific Reasons for the Present Progress of Artificial Insemination and Pregnancy Diagnosis Work at the Villages

Data regarding specific reasons given by artificial insemination workers, secretaries and chairmen of the villages of high and low rates of adoption, and veterinary officers from Amul, for the present progress of artificial insemination and pregnancy diagnosis work at the villages are presented in Table LIII.

TABLE LIII

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS, SECRETARIES AND CHAIRMEN OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION AND VETERINARY OFFICERS FROM AMUL, BY THE DETAILS OF THE REASONS GIVEN BY THEM FOR THE PRESENT PROGRESS OF ARTIFICIAL INSEMINATION AND PREGNANCY DIAGNOSIS WORK AT THE VILLAGES

Sr. No.	Reasons for present progress	Artificial Insemination Workers						Secretaries						Chairmen						Veterinary Officers					
		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Good results of artificial insemination	14	93.33	6	40.00	20	66.66	13	100.00	5	45.45	18	75.00	15	100.00	5	33.33	20	66.66	14	93.33	9	60.00	23	76.66
2	Sincere workers	11	73.33	3	20.00	14	46.66	9	69.23	6	54.54	15	62.50	11	73.33	4	26.66	15	50.00	13	86.66	9	60.00	22	73.33
3	Economic advantange	12	80.00	6	40.00	18	60.00	12	92.30	5	45.45	17	70.83	14	93.33	5	33.33	19	63.33	11	73.33	8	53.33	19	63.33
4	Paucity of good bulls	7	46.66	4	26.66	11	36.66	9	69.23	4	36.36	13	54.16	13	86.66	4	26.66	17	56.66	6	40.00	2	13.33	8	26.66
5	Recent campaign	9	60.00	13	86.66	22	73.33	11	84.61	10	90.90	21	87.50	13	86.66	15	100.00	28	93.33	14	93.33	13	86.66	27	90.00
6	Effective leadership	9	60.00	-	-	9	30.00	8	61.53	1	9.09	9	37.50	12	80.00	2	13.33	14	46.66	5	33.33	4	26.66	9	30.00
7	Any other*	6	40.00	-	-	6	20.00	3	23.07	-	-	3	12.50	2	13.33	1	6.66	3	10.00	1	6.66	1	6.66	2	6.66

*Details of items No.7.

1. Two times artificial insemination done, once in morning once in evening
2. No buffalo bulls in the village
3. People have belief in artificial insemination.

1. Artificial insemination workers do the insemination at any time of day or night
2. Artificial insemination workers do a good work and take interest.

1. People have belief in the society and its work.
2. Artificial insemination workers take much pain and do a good work.

1. Confidence of villagers in artificial insemination.
2. Site of artificial insemination crate.

Reasons given by artificial insemination workers. Recent campaign by Amul was stated by 73.33 per cent artificial insemination workers as main reason for the present progress. Results of insemination (66.66 per cent), economic advantage (60.00 per cent), sincere workers (46.66 per cent), paucity of good bulls (36.66 per cent), and effective leadership (30.00 per cent), were reasons for progress in the order of the preference by the majority. Twenty per cent of them gave other reasons. They were: two inseminations in the day, no bulls for natural service, and belief in artificial insemination.

Reasons given by secretaries. The reasons given by them in order of their preference were: recent campaign (87.50 per cent) good results of insemination (75.00 per cent), economic advantage (70.83 per cent), sincere workers (62.50 per cent), paucity of good bulls (54.16 per cent), and effective leadership (37.50 per cent).

Some of the secretaries (12.50 per cent) gave some other reasons as turn out of good work by artificial insemination workers, and also timely service rendered by artificial insemination workers as per convenience of the farmers, were also responsible for progress of work in their villages.

Reasons given by chairmen. They also held the same views as that of artificial insemination workers. The reasons given by the majority in order of the preference were: recent campaign (93.33 per cent), good results of artificial

insemination (66.66 per cent), economic advantage (63.33 per cent), paucity of good bulls (56.66 per cent) and effective leadership (44.66).

Some of the chairmen (10.00 per cent) gave other reasons that farmers had belief first in the society and its work, and also attributed to the work of artificial insemination workers who took much pain to do good work.

Reasons given by veterinary officers from Amul. Veterinary officers in general had the same views as that of secretaries, chairmen and artificial insemination workers. The reasons given by them in order of the preference by the majority were: recent campaign (90.00 per cent), good results of artificial insemination (76.66 per cent), sincere workers (73.33 per cent), economic advantage (63.33 per cent), effective leadership (30.00 per cent), and paucity of good bulls (26.66 per cent).

Some of the veterinary officers (6.66 per cent) attributed confidence of villagers in artificial insemination and favourable site of insemination crate as other reasons contributing to progress of artificial insemination work.

Specific Reasons for the Slow Progress of Artificial Insemination and Pregnancy Diagnosis Work at the Villages.

Specific reasons in details as given by artificial insemination workers, secretaries and chairmen of the villages of high and low rates of adoption and veterinary

officers from Amul for the slow progress of artificial insemination and pregnancy diagnosis work at the villages under study are presented in Table LIV.

Reasons given by Artificial Insemination Workers

Reasons given by artificial insemination workers in order of the preference given by the majority were: misbeliefs (43.33 per cent), traditional mindedness of farmers (43.33 per cent), lack of proper guidance (36.66 per cent), lack of good propaganda (30.00 per cent), artificial insemination culturally not acceptable (16.66 per cent), lack of good leadership (16.66 per cent), recent start, political or caste split, lack of all weather transport, frequent changes of artificial insemination workers (6.66 per cent under each).

Some of the artificial insemination workers (16.66 per cent) attributed lack of convenient insemination crate, Mohammedan population do not agree for insemination, wide distribution of farmers on farms, animals are not brought at proper heat period, and some farmers take their buffaloes to other near by centre, as other causes for slow progress of artificial insemination and pregnancy diagnosis work.

Reasons given by secretaries. The reasons given by secretaries in order of preference by the majority were: misbeliefs (41.66 per cent), traditional mindedness of farmers (37.50 per cent), lack of proper guidance (25.00 per

TABLE LIV

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS, SECRETARIES AND CHAIRMEN OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION AND VETERINARY OFFICERS FROM AMUL, BY THE DETAILS OF REASONS GIVEN BY THEM FOR THE SLOW PROGRESS OF ARTIFICIAL INSEMINATION AND PREGNANCY DIAGNOSIS WORK AT THE VILLAGES

Sr. No.	Reasons	Artificial Insemination Workers						Secretaries						Chairmen						Veterinary Officers					
		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Recent start	-	-	2	13.33	2	6.66	-	-	3	27.27	3	12.50	1	6.66	5	33.33	5	16.66	1	6.66	-	-	1	3.33
2	Misbeliefs	1	6.66	12	80.00	13	43.33	1	7.69	10	81.81	10	41.66	1	6.66	14	93.33	15	50.00	-	-	8	53.33	8	26.66
3	Culturally not accepted	-	-	5	33.33	5	16.66	-	-	2	18.18	2	8.33	-	-	4	26.66	4	13.33	-	-	-	-	-	-
4	Split, political or caste	-	-	2	13.33	2	6.66	-	-	3	27.27	3	12.50	-	-	3	20.00	3	10.00	-	-	3	20.00	3	10.00
5	Lack of good leadership	-	-	5	33.33	5	16.66	-	-	4	36.36	4	16.66	-	-	6	40.00	6	20.00	3	20.00	6	40.00	9	30.00
6	Lack of proper guidance	1	6.66	10	66.66	11	36.66	1	7.69	5	45.45	6	25.00	-	-	7	46.66	7	23.33	2	13.33	2	13.33	4	13.33
7	Lack of good propaganda	1	6.66	8	53.33	9	30.00	-	-	4	36.36	4	16.66	1	6.66	5	33.33	6	20.00	1	6.66	1	6.66	2	6.66
8	Traditional minded	1	6.66	12	80.00	13	43.33	1	7.69	8	72.72	9	37.50	1	6.66	10	66.66	11	36.66	2	13.33	8	53.33	10	33.33
9	Lack of all weather transport	-	-	2	13.33	2	6.66	-	-	2	18.18	2	8.33	-	-	2	13.33	2	6.66	1	6.66	2	13.33	3	10.00
10	Frequent changes of artificial insemination workers	-	-	2	13.33	2	6.66	-	-	1	9.09	1	4.16	-	-	2	13.33	2	6.66	1	6.66	-	-	1	3.33
11	Any other*	-	-	5	33.33	5	16.66	-	-	1	9.09	1	4.16	-	-	2	13.33	2	6.66	-	-	2	13.33	2	6.66

*Lack of convenient insemination crate, Mohammedan population do not agree, farmers are distributed on farms and do not bring at proper heat and al take buffaloes to r centres.

*Artificial insemination workers' progress was not satisfactory.

*Worker takes holiday on Sundays&does not take interest.

*Poor results of pregnancy diagnosis, artificial insemination worker had no interest.

cent), lack of good leadership (16.66 per cent), lack of propaganda (16.66 per cent), recent start (12.50 per cent), political or caste split (8.33 per cent), artificial insemination culturally not acceptable (8.33 per cent), frequent changes of artificial insemination workers (4.16 per cent) and lack of all weather transport (4.16 per cent).

Some of the secretaries (4.16 per cent) gave other reason that the progress of artificial insemination worker in their villages was not good, as one of the causes for the slow progress.

Reasons given by chairmen. Reasons given by chairmen for the slow progress in order of the preference of the majority were: misbeliefs (50.00 per cent), traditional mindedness (36.66 per cent), lack of proper guidance (23.33 per cent), lack of good leadership (20.00 per cent), lack of good propaganda (20.00 per cent), recent start (16.66 per cent), culturally not accepted (13.33 per cent), splite, political or caste (10.00 per cent), lack of all weather transport (6.66 per cent), and frequent changes of artificial insemination workers (6.66 per cent).

Some of the chairmen (6.66 per cent) attributed that lack of interest, and taking holidays on Sundays, by artificial insemination workers had also affected the progress.

Reasons given by veterinary officers. The reasons given by veterinary officers supervising the artificial insemination work in order of the preference of the majority were: traditional mindedness (33.33 per cent), lack of good

leadership (30.00 per cent), misbeliefs (26.66 per cent), lack of proper guidance (13.33 per cent), political or caste split (10.00 per cent), lack of all weather transport (10.00 per cent), lack of proper propaganda (6.66 per cent), recent start (3.33 per cent), and frequent changes of artificial insemination workers (3.33 per cent).

Some of the veterinary officers (6.66 per cent), attributed poor results of pregnancy diagnosis and lack of interest on the part of the insemination workers as other reasons affecting the progress.

Opinions Expressed on the Working of Artificial Insemination Workers

Details of opinions expressed under each item by the secretaries, chairmen of the cooperatives and supervising veterinary officers from Amul on the working of artificial insemination workers are presented in Table LV.

Opinion expressed by secretaries. Majority of the secretaries both from the villages of high and low rates of adoption, that is cent per cent of them expressed either most satisfactory or satisfactory opinion on the training received by artificial insemination workers, confidence in artificial insemination work, regularity and sincerity and interest taken. Similar opinion was also expressed (cent per cent of them) on the behaviour of artificial insemination workers with the farmers and veterinary staff, and keeping of

TABLE LV

NUMBERS AND PERCENTAGES OF SECRETARIES, CHAIRMEN OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION, BY THE DETAILS OF OPINIONS EXPRESSED BY THEM ON THE WORKING OF THE ARTIFICIAL INSEMINATION WORKERS

Sr. No.	Items	Secretaries												Chairmen											
		High Rate						Low Rate						High Rate						Low Rate					
		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Training received	13	100.00	-	-	-	-	8	72.72	3	27.27	-	-	14	93.33	1	6.66	-	-	11	73.33	4	26.66	-	-
2	Confidence in artificial insemination work	13	100.00	-	-	-	-	7	63.63	4	36.36	-	-	14	93.33	1	6.66	-	-	11	73.33	4	26.66	-	-
3	Regularity in artificial insemination work	12	92.30	1	7.69	-	-	7	63.63	4	36.36	-	-	15	100.00	-	-	-	-	11	73.33	4	26.66	-	-
4	Sincerity in artificial insemination work	12	92.30	1	7.69	-	-	7	63.63	4	36.36	-	-	15	100.00	-	-	-	-	11	73.33	4	26.66	-	-
5	Interest in artificial insemination work	12	92.30	1	7.69	-	-	7	63.63	4	36.36	-	-	15	100.00	-	-	-	-	11	73.33	3	20.00	1	6.66
6	Behaviour with farmers	12	92.30	1	7.69	-	-	7	63.63	3	27.27	1	9.09	15	100.00	-	-	-	-	11	73.33	3	20.00	1	6.66
7	Behaviour with veterinary staff	12	92.30	1	7.69	-	-	7	63.63	4	36.36	-	-	15	100.00	-	-	-	-	11	73.33	3	20.00	1	6.66
8	Artificial insemination records keeping	10	76.92	3	23.07	-	-	7	63.63	4	36.36	-	-	15	100.00	-	-	-	-	11	73.33	4	20.66	-	-
9	Cleanliness in artificial insemination work	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Physical fitness	12	92.30	1	7.69	-	-	8	72.72	3	27.27	-	-	15	100.00	-	-	-	-	11	73.33	4	26.66	-	-
11	Special quality if any	2	15.38	-	-	-	-	1	9.09	-	-	-	-	1	6.66	-	-	-	-	2	13.33	-	-	-	-

Sr. No.	Items	Veterinary Officers											
		High Rate						Low Rate					
		Most satisfactory		Satisfactory		Not satisfactory		Most satisfactory		Satisfactory		Not satisfactory	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Training received	10	66.66	5	33.33	-	-	8	53.33	7	46.66	-	-
2	Confidence in artificial insemination work	9	60.00	5	33.33	1	6.66	5	33.33	9	60.00	1	6.66
3	Regularity in artificial insemination work	10	66.66	4	26.66	1	6.66	5	33.33	8	53.33	2	13.33
4	Sincerity in artificial insemination work	10	66.66	4	26.66	1	6.66	6	40.00	7	46.66	2	13.33
5	Interest in artificial insemination work	10	66.66	4	26.66	1	6.66	8	53.33	4	26.66	3	20.00
6	Behaviour with farmers	10	66.66	5	33.33	-	-	7	46.66	7	46.66	1	6.66
7	Behaviour with veterinary staff	11	73.33	4	26.66	-	-	11	73.33	3	20.00	1	6.66
8	Artificial insemination records keeping	5	33.33	9	60.00	1	6.66	4	26.66	9	60.00	2	13.33
9	Cleanliness in artificial insemination work	7	46.66	7	46.66	1	6.66	3	20.00	10	66.66	2	13.33
10	Physical fitness	5	33.33	10	66.66	-	-	4	26.66	11	73.33	-	-
11	Special quality if any	-	-	-	-	-	-	-	-	-	-	-	-

Details of item No.11.

a) Percentage of P.D. rose from 45 p.c. to 85 p.c. by the present worker.

b) Cooperative attitude.

a) Works honestly.

Details of item No.11.

a) Keeps time and truthful.

Details of item No.11.

a) Truthful to his job.

b) Does a good work.

artificial insemination records, and physical fitness of artificial insemination workers.

Some of the special qualities of artificial insemination worker as mentioned by them were cooperative attitude of artificial insemination workers, and attempts of artificial insemination workers to improve the results of artificial insemination.

Only few (9.09 per cent), secretaries from villages of low rate of adoption expressed that behaviour of artificial insemination workers with farmers was not satisfactory.

Opinion of chairmen. Majority of chairmen from the villages of high and low rates of adoption that is cent per cent of them expressed either most satisfactory or satisfactory opinion so far as training received, confidence, regularity sincerity and interest in artificial insemination work was concerned. Similar opinion also is given so far as behaviour of artificial insemination workers with farmers and veterinary staff and also keeping of records of artificial insemination work and physical fitness.

Very few chairmen (6.66 per cent) from the villages of low rate of adoption expressed that interest taken by artificial insemination workers and behaviour with farmers and veterinary staff were not satisfactory at their villages.

Some of the chairmen (6.66 per cent from villages of high rate of adoption and 13.33 per cent from the villages of low rate of adoption) mentioned about special qualities noticed in artificial insemination workers which were:

keeping up time, truthfulness, and desire to do a good work.

Opinion of veterinary officers from Amul. Majority of the supervising veterinary officers of the villages of high and low rates of adoption (nearly cent per cent) expressed either most satisfactory or satisfactory opinion on training received, confidence, regularity, sincerity and interest taken in artificial insemination work. Similar opinion was also expressed so far as behaviour with farmers and veterinary staff, keeping of records, cleanliness in artificial insemination work and physical fitness of artificial insemination workers were concerned.

Some of the veterinary officers (6.66 per cent to 20.00 per cent) supervising villages of high and low rates of adoption expressed that some of the artificial insemination workers were lacking in confidence, regularity, sincerity and interest in artificial insemination work and also their behaviour with farmers and veterinary staff and keeping of records of artificial insemination work, were not satisfactory in some of the villages.

Suggestions for Improving or Maintaining the Progress already Achieved

Details of suggestions offered for improvement of slow rate or to maintain present progress were collected from artificial insemination workers, secretaries and chairmen and veterinary officers. Such data are presented in Table LVI. (Overall percentage of high and low rates of adoption was taken).

TABLE LVI

NUMBERS AND PERCENTAGES OF ARTIFICIAL INSEMINATION WORKERS, SECRETARIES AND CHAIRMEN OF THE VILLAGES OF HIGH AND LOW RATES OF ADOPTION AND VETERINARY OFFICERS FROM AMUL, BY THE DETAILS OF SUGGESTIONS OFFERED BY THEM FOR IMPROVING OR MAINTAINING THE PROGRESS ACHIEVED

Sr. No.	Suggestions	Artificial Insemination Workers						Secretaries						Chairmen						Veterinary Officers					
		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all		High Rate		Low Rate		Over all	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
	PERSONAL																								
1	In-service training	14	93.33	10	66.66	24	80.00	12	92.30	9	81.81	21	87.50	15	100.00	12	80.00	27	90.00	14	93.33	5	33.33	19	63.33
2	Better emoluments	13	86.66	9	60.00	22	73.33	11	84.61	10	90.90	21	87.50	14	93.33	9	60.00	23	76.66	14	93.33	13	86.66	27	90.00
3	Separate insemination worker	13	86.66	8	53.33	21	70.00	12	92.30	8	72.72	20	83.33	15	100.00	10	66.66	25	83.33	3	20.00	5	33.33	8	26.66
4	Chance for promotion at Amul.	8	53.33	10	66.66	18	60.00	11	84.61	8	72.72	19	79.16	11	73.33	9	60.00	20	66.66	11	73.33	3	20.00	14	46.66
	ORGANISATIONAL																								
1	More propaganda on sexual health control(animals)	15	100.00	12	80.00	27	90.00	10	76.92	8	72.72	18	75.00	15	100.00	11	73.33	26	86.66	15	100.00	12	80.00	27	90.00
2	Individual contact by society staff	9	60.00	9	60.00	18	60.00	11	84.61	10	90.90	21	87.50	12	80.00	12	80.00	24	80.00	14	93.33	11	73.33	25	83.33
3	Better guidance and follow up	11	73.33	6	40.00	17	56.66	10	76.92	7	63.63	17	70.83	13	86.66	11	73.33	24	80.00	15	100.00	8	53.33	23	76.66
4	Increase in frequency of visits of Vety.Officers	14	93.33	13	86.66	27	90.00	11	84.61	11	100.00	22	91.66	15	100.00	14	93.33	29	96.66	2	13.33	5	33.33	7	23.33
5	Persuation of ladies regarding artificial insemination	15	100.00	13	86.66	28	93.33	11	84.61	11	100.00	22	91.66	15	100.00	15	100.00	30	100.00	-	-	-	-	-	-
6	Any other	2	13.33	-	-	2	6.66	2	15.38	4	36.36	6	25.00	5	33.33	5	33.33	10	33.33	-	-	-	-	-	-

Details of 6.
1. To reward A.I.Workers for good work.
2. Vety.Officers to visit in morning hours.

Details of 6.
1. More grants for pay of A.I. workers from Amul
2. Two persons trained in A.I.
3. Prise for best A.I.born animals.
4. Lady extension workers.
5. Two crates in big villages.

Details of 6.
1. Payment to A.I.Workers in propagtion to work.
2. Telephone connections to all societies.
3. Veterinary doctors to understand farmers & their wives regarding artificial insemination.
4. Training camps to farmers
5. Misbelief regarding Amuldam & heat be removed.

Suggestions from Artificial Insemination Workers

Suggestions from artificial insemination workers from the villages of high and low rates of adoption in order of the preference so far as personal incentives to artificial insemination workers were: in-service training (80.00 per cent), better emoluments (73.33 per cent), separate insemination workers (70.00 per cent), and chances for promotion at Amul (60.00 per cent). So far as organisational suggestions were concerned they were: persuation of ladies regarding artificial insemination (93.33 per cent), increase in frequency of visits of veterinary officers (90.00 per cent), more propaganda on sexual health control of animals (90.00 per cent), individual contact of farmers by staff of the society (60.00 per cent), and better guidance and follow-up (66.66 per cent).

Some of the artificial insemination workers (6.66 per cent), suggested rewards for artificial insemination workers for good work and visits of veterinary officers to villages be arranged in morning hours only.

Suggestions from secretaries. Suggestions from secretaries from the villages of high and low rates of adoption in order of preference of the majority so far as personal incentives to artificial insemination workers were: in-service training to artificial insemination workers (87.50 per cent), better emoluments (87.50 per cent), separate insemination workers (87.33 per cent), and chances for promotion at Amul (79.16 per cent). So far as organisational suggestions they were: persuation of ladies regarding artificial insemination (91.66 per cent), increase in frequency of visits of

veterinary officers (91.66 per cent), individual contact of farmers by society staff (87.50 per cent), more propaganda on sexual health control of animals (75.00 per cent). Some of the secretaries (25.00per cent) suggested that more grants from Amul be given to pay better emoluments to artificial insemination workers,twb persons be trained in artificial insemmnation at each centre, provision of lady extension workers, and more than one insemination crate in bigger villages.

Suggestions from chairmen. Suggestions from chairmen from the villages of high and low rates of adoption in order of the preference by the majority so far as incentives to artificial insemination workers were: in-service training to artificial insemination workers (90.00 per cent), separate insemination workers (83.33 per cent), better emoluments (76.66 per cent), and chances for promotion at Amul (66.66 per cent). So far as organisational suggestions were concerned they were: persuation of ladies regarding artificial insemination (100.00 per cent), increase in frequency of visits of veterinary officers (96.66 per cent), more propaganda on sexual health control of animals (86.66 per cent), individual contact of farmers by society staff (80.00 per cent), and better guidance and follow-up (80.00 per cent).

Some of the chairmen (33.33 per cent) gave other suggestions. They were: payment of artificial insemination workers be in proportion to their work, telephone connections to societies, training camps to farmers and their wives on

artificial insemination, veterinary officers to win the confidence of farmers by understanding them, and removal of prevalent misbeliefs regarding artificial insemination.

Suggestions from veterinary officers. Suggestions so far as personal incentives to artificial insemination workers in order of the preference by the majority of them were: better emoluments (90.00 per cent), in-service training (63.33 per cent), chances for promotion at Amul (46.66 per cent), and separate insemination workers (26.66 per cent). Organisational suggestions were: more propaganda on sexual health control of animals (90.00 per cent), individual contact of farmers by society staff (83.33 per cent) and better guidance and follow-up (23.33 per cent) and increase in frequency of visits of veterinary officer (23.33 per cent).

These suggestions are of worth consideration while taking measures to improve the rate of adoption or to maintain the progress achieved.

CHAPTER VI

INTERPRETATION OF FINDINGS

From the analysis of the data in Chapter V it is evident that some factors were related to high rate of adoption of the practices under study, whereas others had no influence on adoption.

Some of the personal characteristics of the artificial insemination workers like, membership of the artificial insemination workers in the village organisations was found to be significantly related with high rate of adoption. Among the other characteristics studied, length of service, combination of jobs, age, educational level, number of animals maintained, income from sources other than pay and participation in village activities had some noticeable relation with high rate of adoption. These factors, however, were found to be non significant, Such factors were included in the interpretation.

On the other hand, interest taken in the job, participation in school activities, monthly income, specific methods used for persuation, breeding method adopted, advice given to farmers, marital status, stay in different types of families, caste, main occupation, land cultivated, experience of other jobs and type of training received were such factors for which no appreciable difference was noticed between the artificial insemination workers of the villages

of high and low rates of adoption. Such factors were not included in the interpretation of the findings.

Factors studied under village conditions in general, area occupied by the villages, distance of the village from state high ways, human and buffalo population, percentage of literacy, irrigational facilities available and majority caste were found to be related significantly with high or low rate of adoption.

Distances from taluka places, Anand, and national high ways and land distribution, etc. were found to have no appreciable difference between the villages of high and low rates of adoption. These factors were not included in the interpretation of the findings.

Among the factors studied under the organisational aspects of the Primary Co-operative Milk Producers' Societies, number of members in the cooperatives and quantity of milk handled daily, were related with high or low rate of adoption.

Factors like, audit classification, frequency of change of worker, placement of insemination crate, though statistically non significant at 0.05 level, but there was noticeable difference between the societies from the villages of high and low rates of adoption. Such factors were included under interpretation of the findings. However, factors like, types of animals brought for pregnancy diagnosis, accommodation, number of years completed for artificial insemination centres and cooperative societies, number of persons trained in artificial insemination, specific measures used for persuation,

etc., for which there was no appreciable difference in the organisation of cooperatives from the villages of high and low rates of adoption. Such factors were not included under interpretation of findings.

Characteristics of Artificial Insemination Workers

Length of service. It revealed from Table IV that 66.66 per cent of the artificial insemination workers from the villages of high rate of adoption had a length of service between 37 to 60 months as against only 26.66 per cent of workers of villages of low rate of adoption. Length of service naturally creates confidence in the worker himself and farmers too in their turn would have more faith in such workers, which ultimately pushes the rate of adoption higher. However, this factor was non-significant statistically. The mean length of service of artificial insemination workers from the villages of high rate of adoption was 40.36 months, and for artificial insemination workers from the villages of low rate of adoption was 36.13 months. Artificial insemination workers from the villages of high rate of adoption had in general longer length of service than the artificial insemination workers from the villages of low rate of adoption.

Combinations of Jobs with Artificial Insemination Work

Out of (Table V) artificial insemination workers from the villages of high rate of adoption 66.66 per cent, and

58.33 per cent from villages of low rate of adoption had the combination of veterinary first aid worker. As both the jobs involved handling of animals, this combination perhaps must have worked well. In many cases persons working as veterinary first aid workers were selected for training in artificial insemination. So in majority of the cases combination of veterinary first aid work and artificial insemination was noticed, though this factor was found to be statistically non-significant at 0.05 level.

Age of Artificial Insemination Workers

This factor was statistically non-significant at 0.05 level, but it was found to give certain trends. Majority of artificial insemination workers, that is 40 per cent (Table VI) were in the age group of 24 to 28 years in the villages of high rate of adoption as against 20 per cent in the same age group at the villages of low rate of adoption. Mean age of artificial insemination workers of the village of high rate of adoption was 29.80 and that of low rate of adoption 29.26, practically same. Artificial insemination workers in the age group of 24 to 28 years may persist in the job as against youngesters who may not stick to the job because of higher aspirations, and persons of higher age groups, because of physical ability needed in the work might not like to take up the job, unless one is forced by circumstances. As such, artificial insemination workers from the age group 24 to 28 years could work more

successfully as artificial insemination workers.

Educationallevel. Table VII revealed that this factor was found statistically non-significant at 0.05 level, still conveyed some facts. Sixty per cent of artificial insemination workers (40 per cent upto Gujarati seventh and 20 per cent upto fifth Gujarati) from the villages of high rate of adoption had their education upto seventh Gujarati as against 46.66 per cent artificial insemination workers at the villages of low rate of adoption. So also mean number of years of education obtained by the artificial insemination workers from the villages of high rate of adoption was less than that of workers(8.73 years, high rate and 9.93 years low rate)from the villages of low rate of adoption. It revealed that, those who had less education were rather satisfied with the job at their own village and took more interest, which resulted in high rate of adoption; whereas artificial insemination workers from the villages of low rate of adoption, because of higher education, they were in this job till they could get a better job, as such artificial insemination workers could not take interest in the work, which resulted in low rate rate of adoption.

Membership in the Village organisations. This is the only factor found to be statistically significant at 0.05 level with high rate of adoption. (Table XIV). Out of the artificial insemination workers, 53.33 per cent were members in more than one organisation of the villages as against 6.6

per cent at the villages of low rate of adoption. Sixty per cent of the artificial insemination workers from the villages of low rate of adoption had no membership in the organisations of the villages as against 26.66 per cent at the villages of high rate of adoption.

Membership of the artificial insemination workers in one or more than one institution adds more value and weightage to their words. They also develop more contacts and experience as to how to deal and influence others and to convince them. Such persons because of their social participation, were in a position to convince farmers in a better way than those who were not members in any other village organisations. The relation can be stated that higher the participation of the artificial insemination workers in the village organisations higher the rate of adoption and vice versa.

Number of animals maintained. Out of (Table XVI) the artificial insemination workers from the villages of high rate of adoption, 66.66 per cent of them maintained 3-5 animals against 40 per cent by the artificial insemination workers from the villages of low rate of adoption. Mean number of animals maintained by the artificial insemination workers from the villages of high rate of adoption was 2.80; whereas it was 2.53 in case of artificial insemination workers from the villages of low rate of adoption.

More number of animals maintained by artificial insemination workers from the villages of high rate of

adoption helped them to convince farmers by quoting their own example and experience with artificial insemination. This sort of explanation of the trials, and experience of artificial insemination workers add more weightage to their words while convincing farmers. They could also demonstrate at their own house the good results of artificial insemination, which might help in convincing other farmers, who could accept artificial insemination as a method of breeding. This factor was found to be non-significant at 0.05 level.

Income from sources other than pay. Table XVIV revealed that 53.33 per cent of artificial insemination workers from the villages of high rate of adoption received annual income in the range of 2001/- to 5000/- rupees as against 13.33 per cent from the villages of low rate of adoption, but 53.33 per cent artificial insemination workers from the villages of low rate of adoption received income less than rupees 2000 a year. Mean income of artificial insemination workers from the villages of high rate of adoption was rupees 2180.60 as against 1433.33, which indicated that higher income of artificial insemination through the sources other than pay, from the villages of high rate of adoption kept them more satisfied than those from the villages of low rate of adoption. Being more satisfied they could work more sincerely and took interest and that is how the rate of adoption could be pushed up, as compared to artificial insemination workers from the villages of low rate of adoption, who seemed less

satisfied and took less interest in the work. This factor was found to be statistically non-significant at 0.05 level.

Role played in village activities. Out of the (Table XXII) artificial insemination workers from the villages of high rate of adoption 57.5 per cent participated as organisers or advisors or both in the village functions as against 26.66 per cent from the villages of low rate of adoption. Artificial insemination workers participating in village functions and taking responsibility of successfully carrying out the activities increased the faith and confidence of farmers in them. Words from such workers were easily acceptable to farmers than those who could not take any part in the village functions. This factor was found to be non-significant statistically at 0.05 level.

Village Conditions in General

Distance from state high ways. Table XXVI revealed that 80 per cent of the villages of low rate of adoption were within a mile distance from state high ways and mean distance being 0.65 miles; whereas 73.33 per cent villages of high rate of adoption were within a distance of 1 - 5 miles from the state high ways, and mean distance being 1.81 miles. The highly significant relation (significant at 0.01 level) indicated that nearer the village to state high ways lower the rate of adoption and farther the villages from state high ways the

higher the rate of adoption.

This sort of relation could be explained in a way that many of the villages of low rate of adoption were bigger villages and they were nearer to roads, but smaller villages where rate of adoption was high were away from the state high ways. Because of this situation nearness to state high ways was related to low rate of adoption.

Area of the villages. From the highly significant relation of this factor at 0.01 level with rate of adopthon, it was evident that larger the area of the villages lower was the rate of adoption and smaller the area of the villages higher was the rate. Mean area 1415 acres and 22 gunthas, in case of villages of high rate of adoption and 3369 acres and 39 gunthas in case of villages of low rate of adoption revealed negative relation with high rate of adoption ("t" value significant at 0.05 level). 66.66 per villages of high rate of adoption had occupied an area more than 2500 acres as (Table XXVIII) against 6.66 per cent villages of high rate of adoption. The possible reasons may be: (1) In bigger villages the present facilities provided for artificial insemination and pregnancy diagnosis were not sufficient to attract larger number of farmers and also in the absence of proper facilities the farmers were not motivated to adopt. (2) The larger area was not amenable to closer contacts and present facilities for propaganda and extension education might not be adequate. (3) In bigger villages area being large, farmers live isolated on farms and lack of closer contacts from one group to another. The total effect resulted in the trend of low rate of adoption in the villages having larger areas.

Human population. Statistically significant relation of this factor at 0.05 level revealed that human population of villages is negatively related to high rate of adoption. Larger the population lower the rate of adoption and smaller the population higher was the rate of adoption. (Table XXX). Out of the villages of high rate of adoption 53.33 per cent had human population in the range of 1001 to 3000 as against 20 per cent of the villages of low rate of adoption. 46 per cent villages of low rate of adoption had human population above 5000 as against nil of the villages of high rate of adoption. Mean ("t" value highly significant at 0.01 level) population in case of villages of low rate of adoption was 5210.4 and that of high rate of adoption 2072.4.

This trend can be explained on the same lines as in Table XXIX. (a) The present arrangements for service, supplies and propaganda in proportion to population might be inadequate. (b) In larger population the number of non-members may be more than members of the cooperative, as such that part of human population remained untouched as compared to the population from which members enrolled. (c) In larger populations because of other opportunities existed, part of the population might be engaged in trade and in other activities and remained refractory to measures used for spread of new ideas. Large villages more or less reach to a status of urban civilisation rather than rural one. So contacts between farmers being comparatively less, spread of ideas take longer time. This condition resulted into low rate of adoption in bigger villages.

Buffalo population. This factor was also statistically highly significant at 0.01 level, which indicated a highly significant relation with rate of adoption. Here again the relation is negative with high rate of adoption. Almost all the villages from high rate of adoption had buffalo population less than 1000 (Table XXXI) as against 46.66 per cent villages of low rate of adoption. Mean buffalo population also varied significantly (at 0.01 level). Mean buffalo population in case of villages of high rate of adoption was 471.8; whereas in case of villages of low rate of adoption it was 1093.3. This negative trend with high rate of adoption could be explained on the same lines as in Table XXX.

(a) The present facilities available at the village cooperatives might be inadequate to cover a larger population of buffaloes.

(b) Large population of buffaloes tend to be distributed on a wider area. In larger villages vagri people move door to door with the bulls for natural service, as such farmers could take the advantage of vagri coming to their farm for service than to take the buffaloes a longer distance to artificial insemination centres for insemination. In smaller villages there was a reverse trend, i.e. facilities were adequate, smaller area to be covered and compactness of living together. The total effect was that larger buffalo population had a negative relation with high rate of adoption.

Percentage of literacy. A significant relation of this factor at 0.05 level had a positive relation with rate of adoption. Eighty per cent villages of high rate of adoption had percentage of literate people in the village in the range of 40-50 per cent as against 33.33 per cent at the villages of low rate of adoption. Mean percentage of literacy per village of high rate of adoption was 42.22 as against 34.06 for the villages of low rate of adoption. ("t" value significant at 0.05 level).

Higher percentage of literacy means farmers were comparatively educated, and less traditional minded and acceptable to new ideas. Being literate they could read, also the improvements done out side the villages in the State or out side the State and they were more elated as compared to less literate. The spread and acceptance of new practice was earlier in such villages, hence the positive relation of rate of adoption in villages where percentage of literacy was higher.

Majority caste. The highly significant relation at 0.01 level of this factor indicated that in villages where the majority community was Patels the rate of adoption was high, but in villages where non-Patel community was in majority rate of adoption was low.

In 86.66 per cent (Table XXXIII) villages of high rate of adoption Patel community was in majority as against 20 per cent of the villages of low rate of adoption.

This trend of relation of high rate of adoption with Patel community could be explained in the following way:

(a) The socio-economic conditions of Patel community was higher. They were more interested to increase production and they would not leave any such measures which would help in increasing production as it would add more income.

(b) Being more educated they could understand implications and also benefits of improved methods.

(c) They were more interested in intensive agriculture and owned larger holdings, as such their economic, social and cultural aspects were more favourable for introduction of new ideas and practices. It was evident that high rate of adoption at the villages where Patel community was in majority. This community also being more cosmopolite than others and less traditional minded, and more homogenous than non-Patel community, the rate of adoption was high.

Irrigation facilities. Significant relation of this factor with the rate of adoption revealed that, more the irrigation facilities for irrigation higher was the rate of adoption. Having more facilities for irrigation had a positive relation with high rate of adoption. In 66.66 per cent villages where (33.33 per cent whole village + 33.33 per cent more than half of the village) irrigation facilities were available to

irrigate more than half of the area under cultivation as against 26.66 per cent at the villages of low rate of adoption.

The positive relation of irrigation facilities with high rate of adoption could be explained by the fact that irrigation facilities lead to more intensive cultivation and more area under cultivation (2 to 3 crops in year) and production of more fodder, green as well as dry in more quantity. This again lead to the farmer to keep more animals and utilise the by-products, and this was combined with buffalo keeping. Being economically and socially more progressive than other, they would not hesitate to adopt such measures to improve production. So one facility lead to a chain of reactions and ultimately resulted in high rate of adoption of artificial insemination in such villages where potentiality existed for more area under irrigation.

Organisational Factors of Primary Cooperative Milk Producers' Societies

Number of members of the cooperatives. This factor was highly significant at 0.01 level. The number of members at the cooperatives had a negative relation with high rate of adoption. Larger the number of members lower was the rate of adoption and smaller the number higher was the rate of adoption. Table XXXVI revealed that 93.33 per cent cooperatives

had membership in the range of 100-500 as against 20 per cent of cooperatives from the villages of low rate of adoption. ("t" value was also highly significant at 0.01 level) Mean number of membership respectively were 270.26 and 791.33, which differed significantly at the villages of high and low rates of adoption.

The negative relation with rate of adoption could be explained, in a way, that, number of members were more in bigger villages, and bigger villages having more population (Table XXX) had low rate of adoption, hence more number of members was negatively related with high rate of adoption.

Though the number of members might be more, but in proportion to the population in villages of low rate of adoption it might be less as compared to smaller villages; as such number of more members may represent a smaller section of the community hence lower rate of adoption.

One more reason as given under Table XXX that the facilities provided at the cooperatives might be quite inadequate to cater the needs of large number of members, hence less response from large number of members. Large membership was related to bigger villages where facilities for breeding by natural service might be more convenient to members than to bring animals for insemination, hence the lower rate of adoption.

Audit classification. Though this factor was found to be non-significant at 0.05 level, it was found to be significant 0.10 level, which indicated an appreciable difference between

villages of high and low rate of adoption. Audit classifications were given to societies by the way in which accounts were kept, good administration, proper records, no misappropriations, and serious audit objections and sound transaction of milk business. Sixty per cent (Table XXXVII) of the cooperatives at the villages of low rate of adoption were classfied as 'A' class as against 26.66 per cent of cooperatives at the villages of high rate of adoption. The negative relation of 'A' class societies with high rate of adoption was rather conspicuous. In larger villages more competent and better qualified secretaries might be working and bigger societies could pay better salaries also and got a higher audit classification "A", as compared to cooperatives at the villages of high rate of adoption. Hence the negative relation of higher audit classification with low rate of adoption.

Quantity of milk handled daily. This factor was found to be significant at 0.05 level. Majority of the cooperatives, i.e. 66.66 per cent (Table XXXVIII) were handling milk in the range of 501 to 1000 litres daily as against 20 per cent of the cooperatives from the villages of high rate of adoption. "t" value was also found highly significant at 0.01 level which indicated that means differed significantly and they were respectively 380.33 litres and 630 litres at the villages of high and low rates of adoption.

This negative trend again with high rate of adoption might be due to more milk collected where number of members

were more and more number of members in bigger villages as well as more buffaloes and rate of adoption was low at bigger villages, hence larger the quantity of milk handled lower was the rate of adoption.

Change of artificial insemination workers. This factor though found to be non-significant at 0.05 level, it was found to be significant at 0.10 level. (Table XLIII) Of the cooperatives from the villages of high rate of adoption 66.66 per cent had one man only working as artificial insemination worker from the beginning of the artificial insemination centres, as against 33.33 per cent of the cooperatives at the villages of low rate of adoption. A positive trend of one worker since beginning with high rate of adoption was evident.

This could be explained by the fact that one man if worked continuously, gathered experience and confidence in himself and farmerswould have faith in his work, So such workers could influence farmers, and push the rate of adoption higher and higher.

Number of Persons Trained in Artificial Insemination

This factor was found to be non-significant at 0.05 level. Here again the trend was negative relation with high rate of adoption (Table XLIII). Forty per cent cooperatives from the villages of low rate of adoption had more than one man trained, as against 60 per cent at the cooperative from the villages of high rate of adoption. The negative trend,

perhaps might be due to the fact that both who were trained might not have the responsibility, and also one may shirk the responsibility when more than one person was available for the same work. In bigger villages even two persons trained could not cope up with the work effectively, as such the negative trend with high rate of adoption.

Placement of insemination crate. This factor found to be non-significant statistically. In majority of the villages, (Table XLIV) 73.33 per cent had "A" class insemination crate as against 46.66 per cent at the villages of high rate of adoption. The negative trend of having more facilities but low rate could be explained by the fact that, availability of more funds by which better facilities for placement of insemination crate were made available in bigger villages, but the out-come was low rate of adoption. It revealed that good work never awaits better facilities as seen at the villages of high rate of adoption where the facilities were lacking still the rate of adoption was high. (A class crate: fixed in concrete having verandah, and arrangement for privacy, with or without roof; 'B' class crate: not fixed in concrete, no verandah, no roof, etc).

Another reason for negative relation of placement of crate with high rate of adoption might be that better facilities at the villages of low rate of adoption might be inadequate as revealed at the time of the study, that there was only one insemination crate at each village irrespective of the buffalo population. One insemination crate at bigger

villages would be quite inadequate to cater the needs of larger buffalo population, hence low rate of adoption at the bigger villages.

Participation in the activities sponsored by Amul. Table XLIX revealed that all the activities sponsored by Amul were taken up by the Primary Cooperative Milk Producers' Societies. Participation of the cooperatives in the activities had no significant relationship with rate of adoption. Chi-square values in case of all the activities were non-significant at 0.05 level except in case of one activity the distribution of milk to school children. There was negative relation of this factor with high rate of adoption. This could be explained by the fact that bigger villages could afford to distribute milk free of cost to school children as the financial conditionsof bigger cooperatives were sound. Rate of adoption in bigger villages is low hence the negative relation with rate of adoption. Participation of the cooperatives in other activities had no appreciable difference between the villages of high and low rates of adoption.

Opinions and Suggestions

Opinion of artificial insemination workers, secretaries, and chairmen of the cooperatives of the villages of high and low rates of adoption. Opinions were called for an the following points: Supply of semen, replacement of equipment, supervision by veterinary officers of Amul, placement of

insemination crate, cooperation from secretaries, chairmen and other workers, managing committee members, farmer members and non member farmers, and also about the progress of artificial insemination and pregnancy diagnosis work. Majority of the respondents expressed either most satisfactory, or satisfactory opinion on almost all the points, but in case of placement of insemination crate, some had expressed that both in villages of low and high rates of adoption, it was not satisfactory (6.6 per cent chairmen, 9.09 per cent secretaries, 6.66 per cent artificial insemination workers from the villages of low rate of adoption, and also 13.33 per cent of artificial insemination workers from the villages of high rate of adoption). This indicated that placement of insemination crate which should be rectified wherever it was lacking. No other appreciable difference in the opinions of the respondents could be noticed.

Opinion of Veterinary Officers from Amul on the Working of Artificial Insemination Centres.

Opinions were called for from the veterinary officers from Amul supervising the artificial insemination centres. Majority of them (Table LI) expressed either most satisfactory opinion almost on all points which were: role of secretary, and chairmen, farmers' role, communication and transport, village conditions in general, progress of artificial insemination and pregnancy diagnosis, and also on any specific

points noticed by them. In case of some of the villages of low rate of adoption, role of chairmen, secretaries, and farmers were not satisfactory. So also the village conditions in general, progress of pregnancy diagnosis and artificial insemination work in some cases, were also not satisfactory. The short comings have to be rectified to push up the rate of adoption in such villages. No other appreciable difference between the opinions expressed on villages of high and low rates of adoption were evident.

Reasons given for present progress of artificial insemination and pregnancy diagnosis work. Reasons given by artificial insemination workers, secretaries, and chairmen of the cooperatives at the villages of high rate of adoption, and veterinary officers from Amul for the progress of artificial insemination and pregnancy diagnosis in table LII, revealed that majority of them agreed that, for the present progress achieved, following factors were responsible. In order of their preference, they were: recent compaign by Amul, good results of artificial insemination, sincere workers, economic advantages, paucity of good bulls, and effective leadership. Some of the other factors contributed to success according to them were: belief of farmers in artificial insemination, no bull available for natural service at some villages, sincerity and interest taken by artificial insemination workers, confidence of farmers in artificial insemination, favourable site of insemination crate etc., had also contributed to progress of artificial insemination and pregnancy diagnosis work at the villages.

Reasons given for slow progress. Reasons given (Table LIII) by artificial insemination workers, secretaries, chairmen from the villages of high and low rates of adoption and veterinary officers from Amul, in order of their preferences were; misbelieves regarding artificial insemination, traditional mindedness, lack of proper guidance, lack of proper propaganda, culturally artificial insemination not accepted, lack of good leadership, lack of all weather transport, political or caste splite, and frequent change of artificial insemination workers.

Some additional factors like, lack of proper knowledge about oestrus cycle, or lack of convenient insemination crate, no interest on the part of insemination workers, poor results of pregnancy diagnosis also affected the rate of adoption. To devise ways and means, these impediments in tne way of progress must have to be tackled to improve the rate of adoption.

Opinion on the Working of Artificial Insemination Workers

Table LIV revealed that opinion of secretaries and chairmen of the cooperatives both from villages of high and low rate of adoption and from the veterinary officers from Amul were called for on the following points: training received, confidence, regularity, sincerity in artificial insemination work, behaviour with farmers, and veterinary staff, keeping of records of artificial insemination,

cleanliness in artificial insemination work, and physical fitness. Majority of them had expressed as either satisfactory or most satisfactory opinion on these points, but in case of workers at the villages of low rate of adoption, (i.e. 6.6 per cent) interest taken in artificial insemination work, behaviour with farmers, and behaviour with veterinary staff was not satisfactory. Veterinary officer endorsed same views regarding (6.6 and 13.3 per cent) artificial insemination workers from the villages of low rate of adoption who were lacking in interest, proper behaviour, sincerity, regularity, cleanliness and physical fitness of artificial insemination worker. On other points veterinary officers expressed satisfactory opinion. These drawbacks have to be checked up in selecting proper persons for artificial insemination work.

Suggestions. Table LV revealed that majority of the respondents agreed with the following suggestions in the order of the preference of the majority. The suggestions were, under personal incentives to workers were: inservice training, better emoluments, separate insemination workers without any combination of other jobs, and chances for promotion at the Amul.

Among the organisational suggestions following were agreed by majority of the respondents and in the order of the preference they were: persuation of ladies regarding artificial insemination, more propaganda on sexual health control of animals, increase in the frequency of visits of veterinary officers to the villages, individual contact by

staff of the society, and the last was better guidance and follow up. Some of the other suggestions were: visit of veterinary officers be arranged only in morning hours, lady extension workers be appointed to persuade ladies, two persons be trained in artificial insemination istead of one at each village, for better emoluments to artificial insemination workers more grants be made available to societies from Amul, more than one or more crates be made available in bigger villages.

The suggestions made were of worth consideration while recommending measures to improve the rate of adoption of artificial insemination as a method of breeding and rendering buffaloes for pregnancy diagnosis.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

A study of relationship of certain factors with rate of adoption of artificial insemination, and pregnancy diagnosis, in the villages around Anand was conducted. In addition to certain factors which were found statistically significant at 0.01 and 0.05 levels, some other factors for which chi-square values were found significant even at 0.10 level, were considered as having high relationship with the rate of adoption. The salient conclusions based on this study are as follows:

Mean (average) rate of adoption in case of artificial insemination as a method of breeding at the villages of high rate of adoption was 0.614 as against 0.180 at the villages of low rate of adoption. Ranges of rate of adoptions at the villages of high and low rates of adoption were 0.32 to 0.86 and .07 to 0.49 respectively.

Mean (average) rate of adoption in case of rendering buffaloes for pregnancy diagnosis was 0.478 at the villages of high rate of adoption as against 0.126 at the villages of low rate of adoption. Range of rates of adoption at the villages of high and low rates of adoption were from 0.26 to 0.78 and from .05 to 0.24 respectively.

Characteristics of Artificial Insemination Workers From the Villages of High Rate of Adoption

1. Artificial insemination workers from the villages of high rate of adoption were participating more actively and with greater responsibility in the present village organisations.

The remaining factors like, length of service, education, training, income, stay in different types of families, interest taken in artificial insemination work, number of animals maintained, land cultivated and main occupation, had no significant relation with the characteristics of artificial insemination workers from the villages of high rate of adoption.

2. The artificial insemination workers from the villages of low rate of adoption had the following main features:

(a) They had not participated actively in village functions like celebration of Melas, Independence day etc.

(b) The length of their service was less than artificial insemination workers from the villages of high rate of adoption.

(c) They were either of the younger age groups (20-24) or of higher age groups (30-35), but not of the age group (24-30).

(d) They had more number of years of education than artificial insemination workers from the villages of high rate of adoption.

(e) They maintained less number of animals.

(f) They received less income from the sources other than pay.

No significant difference was found between the artificial insemination workers from the villages of high rate of adoption and that of the low rate of adoption when they were compared in respect of interest taken in the job, participation in school activities, monthly income, specific methods used for persuation, breeding methods adopted by artificial insemination worker, advice given to farmers, marital status, stay in different types of families, caste, main occupation, number of acres of land cultivated, experience, and types of training received.

General Village Conditions

1. The area occupied by villages of high rate of adoption was smaller than the area occupied by the villages of low rate of adoption.

2. Distance from the state high ways was more in case of villages of high rate of adoption than the distance of the villages of low rate of adoption from the state high ways.

3. Villages of high rate of adoption had less human population than the villages of low rate of adoption.

4. Buffalo population of the villages of high rate of adoption was less than that of the villages of low rate of adoption.

5. The percentage of literacy in the villages of high rate of adoption was higher than that of the villages of low rate of adoption.

6. Irrigational facilities were more in the villages of high rate of adoption as compared to the villages of low rate of adoption.

7. In the villages of high rate of adoption Patel community was in majority; whereas in the villages of low rate of adoption non-Patel (mostly Bareiya) community was in majority.

No significant relation was found between the villages of high and low rates of adoption when they were compared with the distance from taluka place, national high ways and from Anand (Amul) and land distribution among the land owners in the villages.

Organisational Aspects of the Primary Co-operative Milk Producers' Societies

1. The number of members of the Primary Cooperative Milk Producers' Societies at the villages of high rate of adoption were less than the number of members of the cooperatives at the villages of low rate of adoption.

2. Cooperatives at the villages of high rate of adoption handled less milk (this is because the buffalo population is less) than the cooperatives at the villages of low rate of adoption.

3. According to audit classification, more cooperatives at the villages of low rate of adoption were classified as "A" class societies than the cooperatives at the villages of high rate of adoption which were classified as "B", a lower class.

4. The placement of artificial insemination crate in the villages of low rate of adoption was superior in respect of fixation in cement concrete, provision for privacy and verandah with or without roof as compared to no such provision for insemination crate in villages of high rate of adoption.

5. Only one artificial insemination worker was working at the villages of high rate of adoption from the beginning of the centres as compared to more than one artificial insemination worker from the beginning of the centres at the villages of low rate of adoption.

There was no significant difference between cooperatives of the villages of high and low rates of adoption when they were compared with accommodation, types of animals brought for pregnancy diagnosis, number of years completed for the societies as well as artificial insemination centres, number of persons trained in artificial insemination and specific measures used for persuation.

Opinions and Suggestions

1. Almost all respondents expressed that supplies and services rendered by the Amul for the adoption of artificial insemination as a method of breeding and rendering buffaloes for pregnancy diagnosis, were quite adequate.

2. The working of artificial insemination workers was up to the mark in most of the villages.

3. Following factors were responsible for the present progress of artificial insemination and pregnancy diagnosis work at the villages of high and low rate of adoption. They in order of the preference by the majority of them were as follows:

Recent compaign by Amul, good results of artificial insemination work, sincere workers, economic advantage, paucity of good bulls, and effective leadership. Other factors which contributed for the success were: belief of farmers in artificial insemination, non-availability of bulls for service, sincerity and interest taken by artificial insemination workers, better site for insemination crates.

4. Following factors were responsible for the slow progress of artificial insemination and pregnancy diagnosis work at the villages of low rate of adoption. They in order of preference by the majority of them were: misbeliefs regarding artificial insemination, traditional mindedness of farmers, lack of proper guidance and propaganda, culturally artificial insemination not accepted, lack of good leadership,

lack of all weather transport, political or caste split, and frequent changes of artificial insemination workers and recent start of artificial insemination centres. Factors like, lack of knowledge about oestrous cycle, lack of proper facility for insemination crate, less interest of artificial insemination workers and poor results of pregnancy diagnosis, affected the rate of adoption.

5. All the primary cooperatives of the villages of high and low rates of adoption participated in the activities sponsored by Amul.

Recommendations

One broad conclusion of the study is that the rate of adoption was found to be low in the villages where area, human and buffalo population were larger. So in order to improve the rate of adoption in such village and also to maintain the progress already achieved, following recommendations based on the study, may prove beneficial in future.

Following points may be considered while selecting artificial insemination workers:

1. They should be preferably in the age group of 24-30.

2. They should be educated at least upto seventh standard or studied upto Secondary School Leaving Certificate Examination but not highly qualified with college education.

3. They may be chosen from those who have worked as veterinary first-aid workers.

4. Those who are members in the local organisations like youth clubs, gram rakshakdal or other village organisations, may be preferred for selection.

5. Such workers, who show some interest in the work as first-aid veterinary workers be preferred for selection.

6. Physical fitness of artificial insemination worker must be taken into consideration while selecting artificial insemination workers for training.

Incentives are necessary for the workers to induce them for better work and also to continue in the job. The following incentives may be given to artificial insemination workers:

1. Those, who have served sincerely as artificial insemination workers may be given higher training in technical aspects of sexual health control of animals, pregnancy diagnosis, which will improve the knowledge and skill of the workers and they will be in a better position to satisfy the farmers so far as artificial insemination and pregnancy diagnosis are concerned.

2. The artificial insemination workers be paid better emoluments in proportion to the turn out of work.

3. The artificial insemination workers should be relieved of other jobs at the cooperatives such as milk collector, tester, Amuldan seller, etc., and they may be made more responsible for all such developmental activities in connection with improvement of production from buffaloes.

4. Good workers after a certain period of experience as artificial insemination workers should have chance for promotion to jobs carrying higher emoluments at the village cooperative and Amul. Jobs like stockmen, supervisors, can also be done equally well by them after gaining sufficient experience as artificial insemination workers in the villages.

General Village Conditions

Amul should concentrate on bigger villages by expanding the present facilities to cater the need of the larger buffalo population. The following measures would prove more beneficial:

1. There should be more persons trained in artificial insemination. At least two persons in every big village where artificial insemination centres are working, should be trained in artificial insemination work. Each one of them will work in a particular area, so that larger area can be covered easily.

2. In bigger villages there should be 2-3 insemination crates in different directions depending on the area of the villages and concentration of buffalo population.

3. The efforts to educate farmers should be intensified in such villages where non-Patel community is in majority and percentage of literacy is less than thirty per cent.

4. Arrangements for supply of more equipments, and adequate quantity of semen should be made to cope up with the additional work.

Organisational aspects of primary cooperative milk producers' societies. The following suggestions would be beneficial in improving the slow rate of adoption:

1. To persuade ladies to adopt artificial insemination as a method of breeding buffaloes, and to render buffaloes for pregnancy diagnosis, lady extension workers may be tried so that they will be in a better position to explain the ladies on the adoption of artificial insemination as a method of breeding.

2. There should be more propaganda on sexual health control of buffaloes and adequate extension methods like compaigns, field trips, exhibitions etc., may be undertaken.

3. There should be increase in the frequency of visits of veterinary officers from Amul especially to cover bigger villages. They may also be asked to spare more time and also guide the artificial insemination worker. If possible, visits of veterinary officers to villages be arranged in the morning hours so that more number of farmers take the advantage of the visits.

4. Staff of the society i.e. chairmen and secretaries or even other workers along with the artificial insemination workers should make special efforts to tackle obstinate, and unwilling persons to persuade them to adopt artificial insemination as a method of breeding and to take the advantage

of pregnancy diagnosis. Personal contacts of farmers by the staff of the cooperative would prove more beneficial.

5. Artificial insemination workers be guided in professional matters and they also should follow up the work done.

6. For paying better emoluments to artificial insemination workers, additional expenditure incurred should be compensated by extra grants from Amul especially to such societies where financial resources do not permit to incur higher expenditure towards payment of higher wages to artificial insemination workers.

Suggestions for Further Research

Further studies on the subject may be conducted on the following lines:

1. Similar studies may be taken up in the same area for different improved animal husbandry practices on a larger sample of villages.

2. The present study may be repeated every five years to evaluate the achievements and also to improve the measurers used for propoganda and extension education, till cent per cent farmers adopt the improved animal husbandry practices under study in the area.

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A P P E N D I X E S

APPENDIX A

INTERVIEW SCHEDULE USED IN THE STUDY FOR COLLECTION OF DATA FROM THE ARTIFICIAL INSEMINATION WORKERS, SECRETARIES, AND CHAIRMEN OF THE PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES AT THE VILLAGES

Interview Schedule*

1. Name.
2. Designation. Inseminator/Secretary/Chairman
3. Village. Taluka. Tract. Charotar/non-Charotar
4. Human population. Buffalo population
5. Date of inception of the A.I.Centre.
6. Date of inception of the cooperative society.
7. Date from which he is in the present job.
8. What other jobs is he entrusted with?
   (a)
   (b)
   (c)
   (d)
9. Age.
10. Education.
11. Training. Name Period
12. Previous experience. Job Period
13. Residance. a) same village b) other village
14. Marital status.

*Schedule was translated into Gujarati, the local language.

15. Main occupation.

16. Caste.

17. Stay with a) joint family b) parents
c) own family

18. Positions held in village organisations.
(a)
(b)
(c)
(d)

19. Positions held outside village organisations.
(a)
(b)
(c)
(d)

20. Land owned.

21. No.of animals maintained. Buffaloes Cattle
owned adult
young ones

22. Breeding by. A.I. Natural service

23. Income (monthly) Salary other sources

24. Do you advise other farmers to ger their buffaloes bred by A.I?
If yes whom do you advise?
(a) Member farmers
(b) Non-members also
(c) Friends and neighbours
(d) Relatives
(e) Even to outside villagers

25. During your schooling career, did you use to participate in any of the activities like, sports, cultural activities etc?

Yes._____

No. _____

If yes which are they?

(a) Sports

(b) Shramdan

(c) Drama

(d) Social work

(e) Any other

26. At present do you take active part in the village common functions like independance day, melas, cultural functions?

Yes._____

No. _____

If yes what is the role played?

(a) Leader

(b) Organiser

(c) Advisor

(d) Volunteer

(e) Just a participant

27. Do you take any specific measures to persuade farmers to breed by A.I.

Yes._____

No. _____

If yes,-

(a) Personal attempts

(b) Organisational

If no can there be reasons,-

(a) Long standing centre

(b) It is not felt necessary

(c) Any other reason

28. Do the farmers bring their buffaloes for pregnancy diagnosis?

Yes._____

No. _____

If yes,- do they bring?

(a) Inseminated animals

(b) Naturally served

(c) Both

(d) Only troublesome animals are brought.

If no, can there be reasons?

(a) Short stay of Veterinary Officers

(b) Importance of P.D. not realised yet

(c) No need for P.D.

(d) Any other.

29. If you get a better job in the village or elsewhere will you leave the job of Artificial Insemination Worker.

Yes._____

No. _____

If yes, can these be probable reasons?

(a) More emoluments

(b) Dislike the job

(c) Any other.

If no, can there be probable reasons?

(a) Like the job

(b) Service to my village

(c) Cannot leave the village

(d) Not much in need of money

(e) Any other reasons.

30. What have you to say about the following supplies and services?

Inseminator/Secretary/Chairman

Items	Most Satis-factory	Satis-factory	Not satis-factory
(a) Semen suply			
(b) Replacement of equipment etc.			
(c) Supervision and guidance from Vety. staff.			
(d) Placement of insemination crate.			
(e) Cooperation from the members of the managing committee.			
(f) Cooperation from chairman			
(g) Cooperation from secretary			
(h) Cooperation from other workers			
(i) Cooperation from member farmers.			
(j) Cooperation from non-members.			
(k) Present progress. Artificial Insemination and Pregnancy diagnosis.			

31. Can there be any specific reasons why the present Artificial Insemination Worker was selected for training at Amul?

    Can these be probable reasons?

    (a) Willingness

    (b) Working as First Aid Worker

    (c) Pressure

    (d) Any other.

32. If you are convinced that A.I. & P.D.Work in this village is satisfactory, do you attribute the success to any specific reasons?

Factors	For A.I.	For P.D.
(a) Good results of A.I.		
(b) Sincere workers		
(c) Economic advantage		
(d) Paucity of good buffalo bull		
(e) Recent campaign by Amul		
(f) Effective leadership		
(g) Any other reasons		

33. If you think otherwise, do you attribute any specific reasons for the slow progress?

Factors	For A.I.	For P.D.
(a) Recent start		
(b) Misbeliefs		
(c) Culturally not accepted		

Factors	For A.I.	For P.D.
(d) Split in village, political caste groups.		
(e) Lack of good leadership		
(f) Lack of proper guidance		
(g) Lack of good propaganda		
(h) Traditional mindedness		
(i) Lack of good all weather communications and transport		
(j) Change of artificial insemination worker frequently.		
(k) Any other reasons.		

34. If A.I. & P.D. are to progress at a rapid rate in the village or to maintain the present level of progress, have you any concrete suggestions to offer?

Suggestions	For A.I.	For P.D.
<u>Personal:</u>		
(a) Inservice training to A.I. worker		
(b) Better emoluments		
(c) Seperate inseminator		
(d) Chance for promotion at Amul		
<u>Organisational:</u>		
(a) More propaganda on sexual health of animals		

Suggestions	For A.I.	For P.D.
(b) Individual cantacts frequently by staff of the society.		
(c) Better guidance and followup.		
(d) Increase in frequency of visit of Veterinary Officers and more time allotted pervillage.		
(e) Persuation of ladies regarding artificial insemination.		
(f) Any other		

35. What is your opinion about the present A.I.Worker?

Secretary/Chairman

Item	Most satisfactory	Satisfactory	Not satisfactory
(a) Training received			
(b) Confidence			
(c) Regularity			
(d) Sincerity			
(e) Interest			
(f) Behaviour with Vety.staff.			
(g) Behaviour with Collegues.			
(h) Behaviour with farmers.			
(i) Records keeping			
(j) Cleanliness in A.I. work.			
(k) Physical fitness			
(l) Special qualities if any.			

APPENDIX B

INTERVIEW SCHEDULE USED IN THE STUDY FOR COLIECTION OF DATA REGARDING THE ORGANISATION OF THE PRIMARY COOPERATIVE MILK PRODUCERS' SOCIETIES AT THE VILLAGES AND VILIAGES IN GENERAL

Interview Schedule

I. Village in general:

1. Name of the village
2. Taluka (H.Q.) Distance
3. District (H.Q.) Distance
4. Police Station Distance
5. Post/Telegraph Office Distance
6. Railway Station Distance
7. High Way (State) Distance
8. High Way (National) Distance
9. Bus Stand (Road) Distance
10. Approach to village
11. Distance from Anand (Amul) Distance
12. Total human population
13. Area of the village
14. Market facilities

II. Population	Male	Female
(a) Literate		
(b) Illeterate		
Total:		

III. Caste & Religion:

Sr. No.	Caste/Religion	No.of families	No.of members
1.	Hindu-brahmin.		
2.	Kshatria.		
3.	Vaisyas-Patels.		
4.	Harijans.		
5.	Mohammedans.		
6.	Christians.		
7.	Tribals.		
8.	Any other.		

IV. Irrigation facilities:

Sr. No.	Sources of irrigation	No.	Acres.
1.	Wells with pumping plant		
2.	Tube wells		
3.	Other wells		
4.	Tanks - major - minor		
5.	Nallahas		
6.	Canals		
7.	Other sources		

V. Land Tenure:

Sr.No.	Land tenure	No.of holdings
(a)	Upto one acre	

S.No.	Land tenure	No.of holdings
	(b) Above one and below 3	
	(c) Above 3 and below 5	
	(d) Above 5 and below 10	
	(e) Above 10 acres.	

VI. Cropping pattern:

S.No.	Crops	Acres
	(a) Food crops	
	(b) Cash crops	
	(c) Fodder crops	
	(d) Other crops	
	Total:	

VII. Livestock:		Male	Female
Buffaloes	- Above three years.		
	- Below three years		
Cattle	- Above three years		
	- Below three years		
Poultry	-		

VIII. Organisation of the Society:

(a) Date of inception of the society

(b) Date of inception of the A.I.Centre

(c) Number of members

(d) Number of managing committee members

(e) Catagory of the society (Audit)

(f) Average quantity of milk handled daily

(g) Functioning in its own building

(h) What other activities are under taken

(i) At what intervals managing committee meets?

(j) Whether monthly progress of A.I. & P.D. work is taken on agenda.

Yes._____

No. _____

If no, why it is not discussed?

(k) Whether the following activities sponsored by Amul have been taken up so far?

Sr. No.	Activity	Already existing	Not taken up
1.	News letter from Amul		
2.	Exhibitions on Animal husbandry held		
3.	Visits of farm women to A.I.Centre, Dairy etc.		
4.	Milk yield competition		
5.	Progeny testing programme		
6.	Insurance of buffaloes		
7.	Free milk distribution to school children		
8.	Lucern cultivation		
9.	Chaff cutters		

Sr. No.	Activity	Already existing	Not taken up
10.	Gajraj cultivation		
11.	Ear tagging		
12.	Calf rearing programme		
13.	Cattle standing		
14.	Stockman headquarter (under I.C.D.P.)		
15.	Inclusion in ARDA		
16.	Amuldan sale		
17.	Programme of spraying of buffaloes against Ectoparasites,ticks etc.		
18.	First Aid Box		
19.	Regular visits of veterinary staff		
20.	Deworming programme		

(l) Will there be unanimous decisions by the members in the managing committee meetings?

Yes._____

No. _____

If no, is there any reason for the split?

(m) How are the following funds are utilised?

Fund	Activities
(a) Cattle benefit fund	
(b) Philanthrofic fund	
(c) Cooperative fund	

(n) Are there any special efforts made by the organisation to speed up the progress of A.I. & P.D.

Yes._____

No. _____

If yes..... Specify steps .....

If no ..... Specify reasons....

(o) What have you to say about the placement of insemination crate on the following points?

Points	Details
(i) Where it is situated?	
(ii) Is it near to the village?	
(iii) What is the distance from the society?	
(iv) What is the distance from the main road?	
(v) Is there a shade over it?	
(vi) Is it covered with verandah	
(vii) Is it properly fixed in concrete?	
(viii) Is there any arrangement to tie?	
(ix) Is there any space to wait for the owners?	
(x) Measures for secrecy.	

(p) Is the staff changed frequently?

If yes,-

(a) How many have changed so far?

(b) What are the reasons?

If no,- Any specific reasons?

(q) Is there any one else among the staff of society trained for A.I. other than the one,-

Yes._____

No. _____

working at present?

If yes, in what capacity are they working at the society?

(r) Who was working as A.I.Worker prior to the present A.I.Worker? When did he leave the job? Give the information in the Table.

Name of the Artificial Insemination Worker	: No.years : served	: Reasons for : leaving the job.

(s) Whether the cooperation week was celebrated, this year?

Yes._____

No. _____

If yes what were the high lights of the function.

If no why it was not celebrated.

(t) Is there any outstanding achievement of the society in the field of Animal Husbandry activities taken up so far?

If yes specify the same.

Yes._____

No. _____

APPENDIX C

INTERVIEW SCHEDULE USED IN THE STUDY FOR COLLECTION OF DATA FROM THE VETERINARY OFFICERS FROM 'AMUL' SUPERVISING THE ARTIFICIAL INSEMINATION CENTRES AT THE VILLAGES.

Interview Schedule

1. Name
2. Qualification & year of graduation
3. No, of years of service at Amul
4. On what route are you working at present?
5. What is your opinion about the A.I.Worker Mr._____ in the village_____ on your route?

Items	Name of the village			Remarks
	Most satis-factory	Satis-factory	Not satis-factory	
(a) Training received in A.I.				
(b) Confidence in A.I.work				
(c) Regularity in A.I.work				
(d) Sincerity in A.I.work				
(e) Interest in A.I. work				
(f) Behaviour with farmers				
(g) Behaviour with Vety. staff				
(h) A.I.Records keeping				
(i) Cleanliness in A.I. work				

Items	Name of the village			Remarks
	Most satis-factory	Satis-facto-ry	Not satis-factory	
(j) Physical fitness				
(k) Special qualities if any				

6. What is your opinion about the organization of the society of the above mentioned village?

Items	Name of the village			Remarks
	Most satis-factory	Satis-facto-ry	Not satis-factory	
(a) Secretaries role regarding organization and propaganda etc. of A.I. and P.D.work.				
(b) Chairman's role in progress of A.I. and P.D.work.				
(c) Farmers role in progress for A.I & P.D.work.				
(d) Communication and transport facilities at the village.				
(e) Village in general.				
(f) Progress of A.I.				
(g) Progress of P.D.				
(h) Any speciality noticed about the society.				

7. If you are satisfied that the A.I. and P.D. work is satisfactory which of the factors have contributed for the success.

Factors	For A.I.		For P.D.	
	Yes	No	Yes	No
(a) Good results				
(b) Sincere workers				
(c) Economic advantage				
(d) Paucity of good buffalo bulls				
(e) Recent campaign by Amul				
(f) Effective leadership				
(g) Any other				

8. If you think it otherwise which of the specific causes do you attribute for the slow progress?

Causes	For A.I.		For P.D.	
	Yes	No	Yes	No
(a) Recent start				
(b) Misbeliefs				
(c) A.I. and P.D. not culturally acceptable				
(d) Political or Caste split.				
(e) Lack of good leadership.				
(f) Lack of proper guidance				

Causes	For A.I.		For P.D.	
	Yes	No	Yes	No
(g) Lack of good propaganda				
(h) Traditional mindedness of farmers.				
(i) Lack of all weather communication and transport.				
(j) Frequent changes of A.I. workers.				
(k) Any other reasons.				

9. If A.I. & P.D. are to progress in this village at a rapid rate or to maintain the present level of progress, have you concrete suggestions to offer?

Suggestions	For A.I.		For P.D.	
	Yes	No	Yes	No
Personal				
(a) Inservice training to A.I. worker.				
(b) Better emoluments.				
(c) Chance for promotion at Amul in recognition of good work.				
(d) Separate inseminator.				
Organisational.				
(a) More propaganda on sexual health control of animals.				
(b) Individual contacts frequently by society staff				
(c) Better guidance and follow up.				
(d) Increase in frequency of visits of Vety. Officers.				