

**RURAL COMMUNITY ORGANIZATION FOR
STRENGTHENING THE LIVELIHOOD SECURITY OF
BUFFALO REARERS THROUGH STRATEGIC
SUPPLEMENTATION OF MINERAL MIXTURE AND UREA
MOLASSES MINERAL BLOCKS (UMMB)**

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UNIVERSITY BIDAR-585401**

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*Thesis submitted to the
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By

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CERTIFICATE

This is to certify that the thesis entitled “*Rural community organization for strengthening the Livelihood security of buffalo rearers through strategic supplementation of mineral mixture and urea molasses mineral blocks (UMMB)*” submitted by **Mr. SHIVANAND KUMBAR, I. D. No. MVNK 804** in partial fulfillment of the requirements for the award of **MASTER OF VETERINARY SCIENCE** in **VETERINARY AND ANIMAL HUSBANDRY EXTENSION** of the KARNATAKA VETERINARY, ANIMAL AND FISHERIES SCIENCES UNIVERSITY, BIDAR, is a record of bonafide research work carried out by him during the period of his study in the university, under my guidance and supervision and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

**Bidar
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*AFFECTIONATELY
DEDICATED*

TO

*MY BROTHERS,
PARENTS AND
FRIENDS*

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BPL \Leftrightarrow Below Poverty Line

ABBREVIATIONS

DFID	⇒	Department For International Development
DRDA	⇒	Dry Area Developmental Agency
DWACRA	⇒	Development of Women and Children In Rural Areas
FAO	⇒	Food and Agriculture Organization
FCM	⇒	Fat Corrected Milk
GDP	⇒	Gross Domestic Product
GOI	⇒	Government of India
IAEA	⇒	International Atomic Energy Agency
IFAD	⇒	International Fund for Agricultural Development
ILRI	⇒	International Livestock Research Institute
ISI	⇒	Indian Standard Institute
LIG	⇒	Livestock Interest Group
MCH	⇒	Mean Corpuscular Hemoglobin
MCV	⇒	Mean Corpuscular Volume
MFI	⇒	Micro Finance Institute
NABARD	⇒	National Bank for Agriculture and Rural Development
NAIP	⇒	National Agriculture Innovation Project
OBC	⇒	Other Backward Class
PCV	⇒	Packed Cell Volume
RCA	⇒	Regional Cooperative Agreement

SC	⇒	Scheduled Caste
SHG	⇒	Self Help Group
SNF	⇒	Solid Not Fat
ST	⇒	Scheduled Tribe
UNDP	⇒	United Nations Developmental Programme
WBC	⇒	White Blood Cells

CHAPTER I

INTRODUCTION

“Progress is impossible without change and those who cannot change their minds cannot change anything”

- George Bernard Shaw

Extension work in India has passed through a series of developments in its philosophy, approach, organization and execution including the development of concept of community organization by the applied sociologists in a parallel manner. It was emphasized that the idea of thrusting technological change upon the rural communities was not sociologically sound. The alternative was to organize, integrate and develop the various natural ways of planning and implementation in the community, and help them to proceed at their own pace. It was believed that in this way, the communities could work together, solve their problems themselves and muster external help whenever they felt the need for it. So, in this historical context many government agencies developed national policies for rural development and designed a policy framework to help rural people become organized, so that the delivery of services could be channeled through various community organizations or groups. Community organizations include Self Help Groups (SHG), Livestock Interest Groups (LIG), Commodity Groups, Marketing Groups, Cooperatives etc.

The traditional approaches to community organization approach need to be revised to meet the developmental challenges in the areas of poverty, degradation of natural resources, involvement of women, health and educational facilities and socio political unrest.

Ross and Lippin (1967) have defined community organization as a process by which a community identifies its needs or objectives, gives priority to them, develops the confidence and will to work with them, finds internal and external resources - to deal with them and in doing so extends and develops cooperative and collaborative attitudes and practices within the community. This definition emphasizes that community organization is the process by which the social system of a community provides for integration and adaptation within the community. This is a process which continues regardless of the work of community organizer whose function is to initiate, nourish and develop this process.

There is a tremendous potential in the effectively mobilized manpower and ingenuity of the rural people. Everything possible should be done to help them to become effective, confident and aspiring community groups. The professional animal husbandry extension worker required for furthering such mobilization and organization is a person having expertise and practical knowledge of process of group work, community organization and also animal sciences.

Buffalo rearing scenario in country, state and Bidar district

The buffalo population of 97.9 million accounts for 58 per cent of Asia and 57 per cent of the world buffaloes (Balaraman, 2003). Milk is a leading agricultural produce contributing about 4 per cent to the total GDP of India (Banerjee, 2005). Despite being lower in numbers (97.9 millions) than cattle (185 millions) buffaloes currently produce about 55 million metric tonnes of milk, which is about 56 per cent of the total milk produced in the country. The Karnataka state has buffalo population of 39,91,000 and produces 13,46,000 tonnes (Census, 2003) of milk from buffaloes. Bidar district has

1,76,769 (Census, 2003) buffalo population and produces 84,000 tonnes of milk. Buffalo rearing is a well known secondary occupation and means of livelihood for small holder mixed crop livestock farmers in Bidar district.

Problems faced in buffalo rearing

Most of the buffalo rearers in Bidar are unorganized and have less access to the various inputs and services like feed and fodder, artificial insemination, extension services, health services etc. So, it has resulted in low production performance and reduced vitality of animals due to

- Shortage of feed and fodder
- Poor health condition and high rate of mortality due to lack of vaccination and timely treatment
- Non availability breeding services at their door step
- High cost of veterinary services leading to neglect of sick animals
- Lack of technical guidance to farmers to improve their animal husbandry practices
- Absence of suitable policies to develop small farmers
- Poor linkage between research institutions and farmers resulting in non adoption of latest technologies;

Importance of community organization in buffalo rearing

So it was realized that the mobilization and organization of buffalo rearers could help them to have easy access to inputs and pull down the services from various developmental departments and agencies. The above mentioned inputs and services are essential for the sustainable buffalo rearing. Buffalo rearing provides regular source of income, employment for youth and women, food security for the whole family, social status and asset value. But the livelihood of buffalo rearers is under threat because of problems like repeat breeding, increased intercalving period, shortage of feed & fodder etc. Keeping this in view, in collaboration with National Agriculture Innovation Project team buffalo rearers group were promoted in study villages as part of the research study.

Need for the start of strategic supplementation in buffalo rearing

Buffaloes in Bidar district reared without adopting any scientific production practices and they mainly fed on scrubs grown on community lands, grasses and crop residues which are of poor quality being deficient in energy, protein, mineral and vitamins and also have the poor digestibility due to the presence of lignin in them (Van Soest, 1994). As a result buffaloes in this area manifest stunted growth, delayed maturity, longer intercalving period with various reproductive disorders and poor milk yield. Use of urea as a non-conventional source of non-protein nitrogen for ruminal micro-organisms is well known. In India, urea has been fed to cows and buffaloes in the form of *uromol* (Chopra *et al.* 1974), ureamolasses liquid supplement (Kour, 1993) and urea-treated straw (Uddin *et al.* 2002). However, the labour and other costs involved in the preservation, transport and feeding of the end product made some of these methods unpopular and precluded their wider adoption by farmers. Urea Molasses Mineral Blocks

(UMMB) are relatively free from these constraints, have the merit of providing nitrogen over a longer period of time than any other urea source, and are generally more widely accepted.

Along with urea the blocks contain molasses which provides instant energy for ruminal microbial digestion and minerals which full fill the somatic requirement and deficiencies, thus reducing the incidences of repeat breeding and anoestrous in buffaloes. In this scenario, strategic supplementation of nutrients is essential in order to improve the utilization of poor quality roughages and fulfill the deficiency of nutrients as well supplementation of critical nutrients through dietary source. (Sampath *et.al*, 1995) Hence the adoption of improved practices like feeding of mineral mixture, UMMB, concentrate mixture, chaffed fodder by buffalo rearers is of vital importance to be in profitable dairying.

Livelihood and its security

“A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a sustainable livelihood is one which can cope up with and recover from stress and shock, maintain or enhance its capabilities and assets and prove sustainable livelihood opportunities for the next generation”(Chambers & Conway 1992).

Poor rural households generally engage in more than one activity for their livelihood [GOI.2002, (Report of Ministry of Rural Development)]. Out of the various factors that promote and sustain the livelihoods of poor people, DFID (1999) highlights the significance of a more supportive and cohesive social environment and more secure

access to financial resources. Community organization is one of the tools that help in achieving these dimensions of livelihood.

So, with this background the study was designed in order to strengthen the livelihood security of buffalo rearers by organizing themselves into a community groups (LIG) and promoting the strategy of feeding of UMMB and mineral mixture to get good milk yield, to remove the problems of repeat breeding and to reduce the intercalving period. Hence, the following objectives were set forth.

- I. To motivate buffalo keepers to organize themselves into livestock interest groups to adopt sustainable buffalo rearing practices.
- II. To study the response of buffaloes to supplementation with or without mineral mixture or UMMB or both through on farm trial.
- III. To determine the farmers perception towards the supplementation of mineral mixture and UMMB.

CHAPTER III

MATERIALS AND METHODS

This chapter brings about the general descriptions of the methods and procedures followed in conducting the research study.

The contents of this chapter are presented under the following sub- headings:

- 3.1 Research design.
- 3.2 Sampling procedure.
- 3.3 Study duration, monitoring
- 3.4 Tools and methods for data collection.
- 3.5 Analytical techniques
- 3.6 Statistical procedures used for analysis of data.
- 3.7 Collaboration with other departments

3.1 Research design

The study adopted a participatory action oriented approach for promoting livestock production technologies with smallholding farmers in selected clusters. The approach takes advantage of the capacity of farmers to experiment and solve their livestock rearing problems on their own. The approach begins with the detailed analysis of situation of the farming community. This helped the community to define, group and prioritize their main problems. After identifying the major problems like scarcity of fodder and water, poor vegetation, low productivity of buffaloes, frequent disease

outbreaks, distress sale of livestock etc. Various interventions, which were necessary and acceptable were planned and discussed with villagers. In its first step the major need was to organize the farmers in group and make it acceptable to the community as a whole. Further, it was also thought that the study could remain incomplete if the feedback of farmers was ignored. Assessing of farmers perception towards the strategic supplementation was carried out.

Establishing rapport with the villagers

The uniqueness of the present study lies in the people's participation in decision making, leadership and the nature of they perceive to be relevant and their involvement in the implementation activities. This study tends to empower local people to build a sustainable future with their own hands. Thus concentrating on the three main objectives, the NAIP project team introduced us to the study villages and people, followed by several informal meetings, discussions over tea with villagers and in consult with the key village leaders. This included self introduction to the village leaders, school teachers, old people and youth followed by explaining the aim of the study, background of the author and the expected outcomes of the study. Rapport building was not an easy procedure. It took time and had maximized frequency of visits. The author also stayed at the villages during nights and dinner was organized by the villagers. Thus over time it was possible for winning the peoples' confidence and building the rapport.

Analysis of the social system

Once the rapport with the villagers was established, the study of the insights of the villages was conducted by further discussions and self observation. This helped in knowing the following outline of the village,

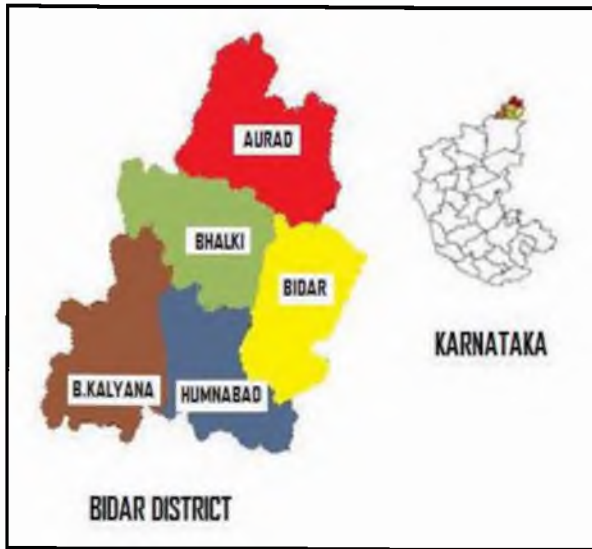
1. Socio-economic profile of the village people.
2. Distribution of the groups.
3. Existing formal and informal institutions and organizations and their activities.
4. Locating informal leaders in the community.
5. Gaining knowledge of existing farming practices, constraints and available resources.

Once the above said information was gathered, the representatives from the diverse groups with who owns buffaloes and an interest in buffalo rearing activities were persuaded, seeking to find means of working together on the problems identified during the analysis.

3.2 Sampling procedure

3.2.1 Selection of locale

Bidar district was purposively selected for the present study considering the fact that Bidar district is one of the most backward in the Karnataka and is having high level of rural poverty (above 50%). The marginal and small size holdings constitute more than 50 per cent of the total land holding and about 15 per cent of the farmers have less than



- Clusters with respective villages**
- Aurad cluster-**
1. Ganganbeed
 2. Ganeshpur
 3. Aknapur
- Humnabad cluster-**
1. Devagiri
 2. Alipur
 3. Polakapalli



(Fig.1) Map showing location of villages with respective clusters selected for study in Bidar district

one hectare land. Another important reason was most of the small and marginal farmers and agricultural laborers bank upon animal husbandry for their livelihood especially buffalo rearing being the most important livestock related activity with a 1, 76,769 buffalo population. Most of these animals are of non descript breed origin but the breeds like Pandarpuri, Nagapuri and Murrah are also found in some parts of Bidar district.

For the present study the following villages were selected from Humnabad and Aurad taluka of Bidar district as these talukas were selected as the clusters under the NAIP project.

Table 3.1: Villages selected for the study

Name of the village	Taluka	Approximate Distance form taluka place (Km)	Distance from district place (Km)
Polakpalli	Humnabad	38	40
Alipur tanda	Humnabad	35	70
Devagiri tanda	Humnabad	40	50
Ganganbeed	Aurad	35	75
Ganeshpur	Aurad	45	90
Aknapur	Aurad	40	90

a) The reasons behind the selection of study villages are as follow

- The study villages are located far away from the district place (Bidar) and respective taluka place and these villages are deprived of basic amenities like electricity, transportation facility, drinking water facility, health care facility, market etc.

- None of the study village is having veterinary dispensary or primary veterinary clinic to provide livestock health care services.
- These villages were also under NAIP, comp-3 project which will help for input support.

3.2.4 Selection of the members of buffalo rearers' group

Since the group members are also the beneficiaries of NAIP project, the following NAIP guidelines were considered while selecting the group members.

- All the members should be from below poverty line class
- The member should own at least one buffalo.
- Preference should be given to interested men buffalo farmers

3.2.5 Formation of Buffalo rearers' group

Group consisting of 10-12 members owning a total of around 20-25 breedable buffaloes were promoted in each study village with similar guidelines as that of SHGs. Regular trainings and animal health camps were conducted during the study period.

The Structure and functions of Buffalo rearers' group is as below:

Structure of group

- Number of members in each group
- Economic status of group members
- Education
- Caste

- Age
- Livestock possession
- Family size

The above mentioned variables of structure of group were recorded by through the Participatory Rural Appraisal techniques like transect (farm) walk, direct observation, informal interview, focused group discussions etc.

Functions of group

The following variables were recorded or measured while attending the monthly meeting conducted by the Buffalo rearers' group members.

- Selection of the leader in the group
- Attendance
- Meetings conducted by group
- Lending of money to members
- Repayment criteria of loan by members
- Record keeping
- Involvement in adoption of improved buffalo rearing practice

3.2.6 On-farm trial

In order to study the response of buffaloes to supplementation of mineral mixture and UMMB, to assess the farmers perception towards the supplementation of mineral mixture and UMMB and to make the buffalo rearers' aware about the strategic feeding, an on farm trial was conducted in the study villages.

Selection of animals

From six villages 48 buffaloes which were in first trimester of lactation were randomly selected, and these buffaloes were randomly distributed to the four treatment group.

3.2: Groups with respective supplementations are as follows

Group	No of buffaloes	Treatment/supplementation
I	12	Mineral mixture 50 g/day in divided doses
II	12	UMMB ad lib
III	12	Both mineral mixture and UMMB
IV	12	No supplementation

The buffaloes were managed by the farmers according to their farm practice. All the selected animals were allowed for 4-5 hours grazing daily and were fed dry and green forages (if available). Concentrate feeding was not a common practice. However pulse based byproducts and some homemade concentrate was fed to the animals by few farmers.

The farmers were advised to 25 g of feed mineral mixture to the buffaloes by mixing it with water daily morning and evening hours. For this, farmers were provided with plastic spoons dispensing 25 g of mineral mixture for accurate measurement while feeding. Similarly the farmers were advised to keep UMMB in front of the animals in a pan to allow free licking. Farmers were advised to remove the block only while cleaning the shed. The block weighed about 3 kg. All the animals got used to lick the blocks

within an adaptation period of 2-3 weeks. The selected animals were dewormed before the commencement of the trial.

3.3: The composition of mineral mixture is as below

Composition	Proportion	
Moisture, per cent by mass (max)	5	
Calcium, per cent by mass (min)	24	
Phosphorus, per cent by mass (min)	12	
Copper, per cent by mass (min)	0.10	
Acid insoluble ash, per cent by mass (max)	3	
Fluorine, per cent by mass (max)	0.07	
Sulphur, per cent by mass	1.8-3.0	
Lead (as Pb), mg/kg (max)	20	
Arsenic(as As ₂ O ₃) mg/kg (max)	7	
Total ash in moisture free sample by per cent free sample by per cent by mass	min	78
	max	85
Salt	2%	

3.4: The composition of UMMB is as below

Composition	Per cent wise
Molasses	45
Urea	3
Minerals	0.75
Rice bran	13.25
Rice polish	14
Calcite powder	6
Calcium oxide	4
Magnesium oxide	4
Diammonium phosphate	10

3.3 Study duration, Monitoring

The data were collected over period of 6 months after an acclimatization period of 2-3 weeks. Field visits were carried out once in two weeks to monitor the intake of UMMB, feeding of mineral mixture, milk production, milk composition and general health of the animals. Milk samples were collected at one month intervals and brought to the laboratory for further analysis.

3.4 Tools and methods for data collection

Data were collected personally by the author through participant observation, focused group discussion, key informant technique as per the necessity during the study and personal interview of the respondents with the help of a semi structured interview schedule (Appendix-I) developed to assess the farmers perception towards mineral mixture and UMMB supplementation. During the interview, care was taken to get accurate information from the group members.

3.5 Analytical techniques

3.5.1 Milk analysis

The milk samples were analyzed for fat, total solids, solid not fat (SNF) and ash (ISI, 1961). During every visit to the village the total milk yield was measured from each selected buffaloes of various treatments.

3.5.2 Assessment of farmers' perception

At the end of the feeding trial, a formal topical survey, focused group discussion and group interview with semi structured interview schedule (Annexure-I) was carried out regarding the following aspects.

- Milk yield and consistency
- Deprived appetite
- Health of the animal
- Intake of mineral mixture and UMMB
- Feasibility of mineral mixture and UMMB
- Feed intake
- Reproductive performance
- Problems encountered while supplementation

3.6 Statistical procedures used for analysis of data

The collected data was subjected to the statistical analysis in a completely randomized block design by two way analysis of variance technique according to Snedecor and Cochran (1968). For other parameters simple statistical tools like Mean, Mode, Per centage, Standard deviation etc were used as per the necessity and the results were interpreted accordingly.

3.7 Collaboration with other departments/teams

The study was carried out in collaboration with the following departments.

- ❖ NAIP project team
- ❖ Department of Animal Nutrition
- ❖ Department of Animal Husbandry and Veterinary Services



Fig. 2: Showing researcher explaining purpose of the study to the villagers during his first visit to Ganaganbeed



Fig. 3: Showing researcher performing transect walk along with NAIP team in Ganeshpur village



Fig. 4: Showing research scholar interacting with the villagers during group meeting in Ganeshpur



Fig. 5: Showing researcher conducting animal health camp in Aknapur village



Fig. 6: Showing researcher treating a buffalo during health camp



Fig. 7: Showing the feeding of mineral mixture to buffalo



Fig.8: Showing buffalo licking the UMMB



Fig.9: Researcher administering interview schedule to respondents of Polakapalli village

CHAPTER IV

RESULTS

This chapter deals with the results based on the objectives set for the study. In this chapter the results analyzed from the present study are presented under the following subheads.

- 4.1 Promotion of buffalo rearers' groups
- 4.2 Characteristics of buffalo rearers' groups
- 4.3 Structure and functions of the promoted buffalo rearers' groups.
- 4.4 The effect of supplementation of UMMB and mineral mixture in lactating buffaloes
- 4.5 Farmers' perception regarding the supplementation

4.1 Promotion of buffalo rearers' group

4.1.1 Establishing rapport with the villagers

Introduction to village and self introduction

The work in the study villages commenced as on 8th September 2009. In the first visit the research scholar along with the NAIP team visited the villages of Aurad taluk followed by the villages of Humnabad taluk on the next day. On the first visit to these villages the key persons of the villages were met and introduced to the villagers by the NAIP team. After the introduction the research scholar explained the purpose of study

and the idea behind the selection of the particular villages for study. During discussion, the cultural background of the villages was known.

In the next visit, the research scholar accompanied by the NAIP team and other villagers walked on different streets (transect walk) of the villages and was introduced to different people on the way. The study purpose was discussed with most people over walk in Kannada and Hindi as many people in Aurad were Marathi speaking and by this time the village gained idea behind the study and over time everyone had something to murmur over it.

Analysis of the situation

In the third visit, again an informal discussion was made with the key village persons and the brief history on the villages, data on available resources, population, number of households were collected (table 4.1). The buffalo population and rearing pattern, availability of fodder were discussed. A planning was done for the next and by that time the villagers interested in improved buffalo rearing practices were asked to assemble.

Fourth visit was done as scheduled and most of the villagers interested in improved buffalo rearing practices had gathered at the meeting place of the village. The research scholar, NAIP team and key persons of the village approached the meeting place. Once again a formal welcome was given to the research scholar and the village leader explained the background of the research and the purpose of visit. This was followed by the explanation of the purpose of study, prevailing situation, possible

interventions and expected outcomes of the study by the research scholar. All the villagers showed interest and clarified the doubts over discussions. At the same time the

Table 4.1: Village resources

Sl. No	Place	Human population	Number of house holds	Buffalo population	Feeding pattern
1	Aknapur	239	47	86	Grazing, feeding of straw, stower and other crop residues; Greens if available; no concentrate feeding
2	Ganganbeed	1566	160	241	Grazing, feeding of straw, stower, husk and other crop residues; Greens if available, no concentrate feeding;
3	Ganeshpur	787	120	196	Grazing, feeding of straw, stower, husk and other crop residues; Greens if available; concentrate feeding rarely practiced;
4	Devagiri tanda	666	125	145	Grazing, feeding of straw, stower and other crop residues; no concentrate feeding;
5	Alipur	368	70	194	Grazing, feeding of straw, stower and other crop residues; no concentrate feeding;
6	Polakapalli	726	150	267	Grazing, feeding of straw, stower, husk and other crop residues; Greens if available; concentrate feeding rarely practiced;

personal profile of the interested farmers was collected. Once this information was gathered from all the villages, planning was done for next visit.

Existing situation

- All the villages had very good buffalo population.
- Agriculture was the main occupation.
- Most of the villagers were small farmers and landless who cultivated land belonging to large farmers on sharing cropping basis.
- The main crops grown were sunflower, maize, safflower, black gram, green gram, Bengal gram, ground nut, red gram etc.
- The scientific animal husbandry practices were not followed especially vaccination, deworming, AI etc.
- Villages were lacking the basic facilities and infrastructure like bank, veterinary dispensary, post office etc.

Utilization of the services of known village leaders

The fifth visit to the villages was very crucial. Based on the gathered information and with the help of the village leaders, selection of the members for the buffalo rearers' group was done. This was done by the information on their family income, occupation, family size and possession of buffalo. The farmers who were under Below Poverty Line (BPL) and who possessed minimum of one buffalo were selected. Importance was given to divorced women, families affected with drunkards and widows. Many disputes were encountered during selection of the group members and were efficiently solved with help of key village leaders and mutual understanding. Once the selection process was over the prepared list was brought to the notice of the village leader followed by the villagers at a

meeting. Table 4.2 reveals the important village key persons who played vital role in integration of farmers and communication.

Before suggesting for organization

- Public meeting was called to discuss about the formation of groups, need for such groups and purpose they have to serve.
- Researcher helped the villagers to decide how the organization should be established and managed once it has been formed; and what will be its programme of activities
- Kinds of help oneself or other agency can provide was indicated.

Table. 4.2: Important village leaders who played vital role in integration of farmers and communication

Sl. No	Name of the leaders	Position	Village
1	Mr. Srimanthrao Ramchandra Patil	Village Elder	Ganganbeed
2	Mr. Basavanthrao Yashavanth Patil	Village Elder	Ganganbeed
3	Mr. Harikishan Shesharao Patil	Village Elder	Aknapur
4	Mr. Digamberrao Namdev Kumte	Village Elder	Aknapur
5	Mr. Prakash Dattaji Chikhale	Village Elder	Ganeshpur
6	Mr. Shankar Ramu Pawar	Village Elder	Alipur
7	Mr. Bhimshetti Amrutarao Malipatil	Village Elder	Polakapalli
8	Mr. Hanmantarao Shankarao Policepatil	Village Elder	Polakapalli
9	Mr. Shankar Ramnayak	Village Elder	Devagiri
10	Mr. Rupala Harju Dalpathi	Gram panchayat member	Devagiri

4.1.3 Initiation of the group activities

After the formation of the group, a name was given to the group of each village on the choice of its members. Efficient leader was elected for each group (Table 4.3). Monthly saving of fifty Rupees per member which contributes to group saving of rupees five hundred was planned. Group account was opened for each promoted group members at the nearest bank / cooperatives (table 4.3). During the process the manager of the bank, school teachers and other needful persons became familiar.

Table 4.3: Initiation of the group activities

Sl. No	place	Name of the group	Leader of the group	Name of the bank	Meeting place
1	Aknapur	Doodh Ganga buffalo rearers' group	Shivaji Mahadev Biradar	DCC bank, Dapka	temple
2	Ganganbeed	Shree Ganesh buffalo rearers' group	Laxmibai Kempwade	DCC bank, Dapka	temple
3	Ganeshpur	Panduranga buffalo rearers' group	Baburao Bajirao Biradar	DCC bank, Dapka	Community stage
4	Devagiri tanda	Laxmi buffalo rearers' group	Smt. Dropadi Janu Rathod	Krishna Grameena Bank, changler	School premise
5	Alipur	Kamadhenu buffalo rearers' group	Shivaram Khubu Pawar	DCC bank, Muttangi	School premise
6	Polakapalli	Nandini buffalo rearers' group	Basavaraj Nagashetty Patil	Krishna Grameena Bank, changler	temple

4.1.4 Organisation of training programmes

The training programmes both on-farm and on campus on scientific buffalo rearing practices were organised for group members in order to get enhanced productive performance from buffaloes. The main emphasis was given to issues like feeding of concentrates, mineral mixture, UMMB, chopped fodder, growing of high yielding grass varieties, regular deworming, timely vaccination, need for the adoption of the AI, marketing channels, value addition to milk and its products and other managerial practices. As these practices were not followed in these villages and also very much required to perform profitable buffalo rearing.

4.1.5 Integration of animal health camps

Almost all the farmers in the villages did not follow the deworming and vaccination schedule. Hence, regular animal health camps were organized at the villages with the help of NAIP team and in conjunction with the local Animal Husbandry Department. Animals were dewormed with broad spectrum anthelmintic and vaccinated against various infectious diseases like foot and mouth disease, hemorrhagic septicemia, black quarter etc. A large gathering of farmers from all livestock owning wealth groups was evidenced during the animal health camps. Camps created awareness among farmers regarding the adoption of better livestock practices.

4.2 Characteristics of buffalo rearers' group

Personal and socio-economic profiles of members of the buffalo rearers' groups are presented under following subheads.

4.2.1 Age

The distribution of members according to age is presented in table 4.4. Mean age of the members of the group was found to be 41.28 years. An overview of the table 4.4 revealed that majority of the members belonged to upper middle age group followed by the middle, old and young age group.

Table 4.4: Distribution of members according to age

Variable	Category	Frequency (N=60)	Percentage (%)
Age (in years) Range: 26-51 $\bar{X} = 41.28$	Young (below 30 years)	4	6.66
	Middle (between 30-40 years)	17	28.34
	Upper middle (between 40-50 years)	34	56.66
	Old (above 50 years)	05	8.34

4.2.2 Caste

All the members in the groups belonged to Hindu religion and one belonged to Islam religion. The members of the Kamadhenu buffalo rearers' group and Laxmi buffalo rearers' group belong to the scheduled caste and members of Doodh Ganga buffalo rearers' group, Panduranga buffalo rearers' group, Shree Ganesh buffalo rearers' group and Nandini buffalo rearers' group belong to other backward classes. These groups depicts the homogeneity of the groups with respect to caste.

4.2.3 Education

Table 4.5 indicates that 22 members in the group had no education. 18 members had primary school education, 13 members had middle school education and 7 members had high school education.

Table 4.5: Distribution of members according to education

Variable	Category	Frequency(N=60)	Percentage
Education Range: Illiterate - College	No schooling/ Illiterate	22	36.67
	Primary school	18	30.00
	Middle school	13	21.66
	High school	07	11.67
	College	-	-

4.2.4 Buffalo possession

All the members of the group reared one or the other species of livestock which include cattle, goat, and poultry. Table 4.6 reveals that most of the members have two to four buffaloes.

Table 4.6: Distribution of members according to possession of buffaloes

Variable	Category	Frequency (N=60)	Percentage
Possession of buffaloes	One	7	11.66
	Two to four	45	75.00
	Four or above	8	13.34

4.2.5 Family size

Most of members of the buffalo rearers' group had family size of 4-6 members, followed by 6 or more members and 2-4 members as detailed in table 4.7

Table 4.7: Distribution of members according to family size

Variable	Category	Frequency (N=60)	Percentage
Family size	2-4 members	7	11.67
	4-6 members	41	68.33
	6 or more	12	20

4.2.6 Occupation

Table 4.8 reveals that majority of members belonged to agriculture and animal husbandry followed by agriculture labour as main occupations. However, all the group members involved in animal husbandry (buffalo rearing).

Table 4.8: Distribution of members according to occupation

Variable	Category	Frequency	Percentage
Occupation	Agriculture and animal husbandry	30	50.00
	Agricultural labour	16	26.67
	Animal husbandry alone	4	6.67
	Others	10	16.66

4.3 Structure and functions of buffalo rearers' group

4.3.1 Structure of buffalo rearers' group

The structure and composition of buffalo rearers' group members were presented in table 4.9. Six groups namely Panduranga buffalo rearer's group (Men), Doodh Ganga buffalo rearer's group (mixed), Shree Ganesh buffalo rearer's group (mixed), Laxmi

buffalo rearers' group (mixed), Kamadhenu buffalo rearers' group (men) and Nandini buffalo rearers' group (men) consisting 60 members were constituted in respective villages, out of which 3 were men groups, 3 were mixed groups and each group had 10 members as group strength.

Out of six groups, 20 members belong to schedule caste (SC) and others belong to other backward classes. All the members in the group fell under below poverty line, even though some of them owned land. Each group had two office bearers; the president and secretary elected by its members. They were holding the position since the formation of the group. Eighty per cent of members of Panduranga buffalo rearer's group and Doodh Ganga buffalo rearer's group are literate followed by 70 per cent in Nandini buffalo rearers' group, 60 per cent in Shree Ganesh buffalo rearer's group a, 50 per cent Laxmi buffalo rearers' group and 40 per cent in Kamadhenu buffalo rearers' group. All the members of the each buffalo rearers' group were residing at very close proximity in the village.

4.3.2 Functions of the buffalo rearers' groups

Table 4.10 shows that all the six groups were conducting meetings regularly on a fixed day of every month. Attendance in the four groups was about 80-100% and 90-100% in two groups. All the six groups conducted meetings either in community halls or temples. Barring one or two members, others attended the monthly meetings. Usually they are unable to attend the meetings on the days when they have to go to market, when they are ill or not in the village.

Table 4.9 Structure and composition of buffalo rearers' group

Sl. No	Name of village	Name of Buffalo rearers' group	Group members	IGA	Group strength
1	Aknapur	Panduranga	Men	Buffalo farming	10
2	Ganganbeed	Doodh Ganga	Mixed	Buffalo farming	10
3	Ganeshpur	Shree Ganesh	Mixed	Buffalo farming	10
4	Devagiri tanda	Laxmi	Mixed	Buffalo farming	10
5	Aleepur	Kamadhenu	Men	Buffalo farming	10
6	Polakapalli	Nandini	Men	Buffalo farming	10

Table 4.10 Organization and conducting of meetings

Sl.	Name of the buffalo rearers' group	Organization and conducting of meetings						
		Name of the village	Meeting/ Month	Meeting time	Attendance of members	Saving amount/meeting (Rs)	Participation	Record keeping
1	Doodh Ganga	Ganganbeed	1	7 PM	8-10 (80-100)	50	Active	Updated
2	Panduranga	Aknapur	1	8 PM	9-10 (50-60)	50	Active	Updated
3	Shree Ganesh	Ganeshpur	1	6 PM	8-10 (80-100)	50	Active	Updated
4	Laxmi	Devagiri tanda	1	7 PM	8-10 (80-100)	50	Active	Updated
5	Kamadhenu	Aleepur	1	7 PM	8-10 (80-100)	50	Active	Updated
6	Nandini	Polakapalli	1	5 PM	9-10 (70-75)	50	Active	Updated

4.4 The effect of supplementation of UMMB and mineral mixture in lactating buffaloes

4.4.1 Supplementation of UMMB and mineral mixture

Table 4.11 reveals that the daily intake of UMMB by buffaloes was ranging from 240 to 360 g and averaged 294 g when fed alone (T₂). Similarly the daily intake of UMMB ranged from 190 to 320 g and averaged 256 g when fed in combination with mineral mixture (T₃). However fixed quantity of mineral mixture of 50g was supplemented and no wastage was reported.

Table 4.11: Amount of consumption of UMMB and mineral mixture

Supplementation group	Amount of mineral mixture fed to the buffalo	Average daily intake of UMMB by buffalo and range
T₁	50 g/ day in divided doses	-
T₂	-	294.16 g (240g-360g)
T₃	50 g/ day in divided doses	256.66 g (190g-320g)

The effect on strategic supplementation on milk fat, total solids, solid not fat and organic matter of buffalo milk is presented in table 4.12

Table 4.12: Mean values of milk parameters under study

Particulars	Supplementation				P
	T ₀	T ₁	T ₂	T ₃	
Milk yield (lit/day)	3.50±0.14 ^c	4.39±0.24 ^b	4.35±0.20 ^b	4.52±0.16 ^a	0.01
Total solids (%)	15.15±0.26	15.24±0.27	15.57±0.24	15.63±0.23	NS
Solid not fat (%)	8.98±0.11 ^c	8.98±0.098 ^c	9.34±0.091 ^b	9.43±0.097 ^a	0.01
Milk fat (%)	6.16±0.17	6.25±0.19	6.23±0.18	6.27±0.17	NS
Organic matter (%)	99.29±0.0068	99.33±0.011	99.34±0.0095	99.34±0.0061	NS

Notes: T₀= Control; T₁= with mineral mixture; T₂ = with UMMB; T₃= both mineral mixture and UMMB
 NS- Non significant.

^{abc} means within rows without common superscripts are significantly different at ($P \leq 0.01$)

4.4.2 Milk yield

The mean milk yield (lit/day) observed for treatment groups were 3.5, 4.39, 4.35 and 4.52 for T₀, T₁, T₂ and T₃ groups, respectively. The combination of mineral mixture and UMMB significantly ($P \leq 0.01$) improves the milk yield. However, UMMB or mineral mixture alone showed non significant increase in milk yield among themselves but significantly higher than the control and significantly lower than the combination of mineral mixture and UMMB. The increase in milk yield was 29.14 per cent in T₃ 25.29 per cent in T₁ and 24.29 per cent in T₂ when compared to control group.

4.4.3 Total solids

The mean total solids (per cent) observed for treatment groups were 15.15, 15.24, 15.57 and 15.63 for T₀, T₁, T₂ and T₃ groups, respectively. There was no significant

difference in the total solids of milk among the treatment groups. Interaction between the treatments and periods was also not significant.

4.4.4 Solid not fat (SNF)

The mean SNF (per cent) observed for treatment groups were 8.98, 8.98, 9.34 and 9.43 for T₀, T₁, T₂ and T₃ groups, respectively. The combination of mineral mixture and UMMB significantly ($P \leq 0.01$) improves the SNF content of milk followed by supplementation of UMMB. However, mineral mixture alone showed non significant increase in SNF.

4.4.5 Milk fat

The mean milk fat (per cent) observed for treatment groups were 6.16, 6.25, 6.23 and 6.27 for T₀, T₁, T₂ and T₃ groups, respectively. There was no statistical significant difference in the milk fat among the treatment groups. Interaction between the treatments and periods was also not significant.

4.4.6 Organic matter

The mean organic matter (per cent) observed for treatment groups were 99.29, 99.33, 99.34 and 99.34 for T₀, T₁, T₂ and T₃ groups, respectively. There was no statistical significant difference in the organic matter of milk among the treatment groups. Interaction between the treatments and periods was also not significant.

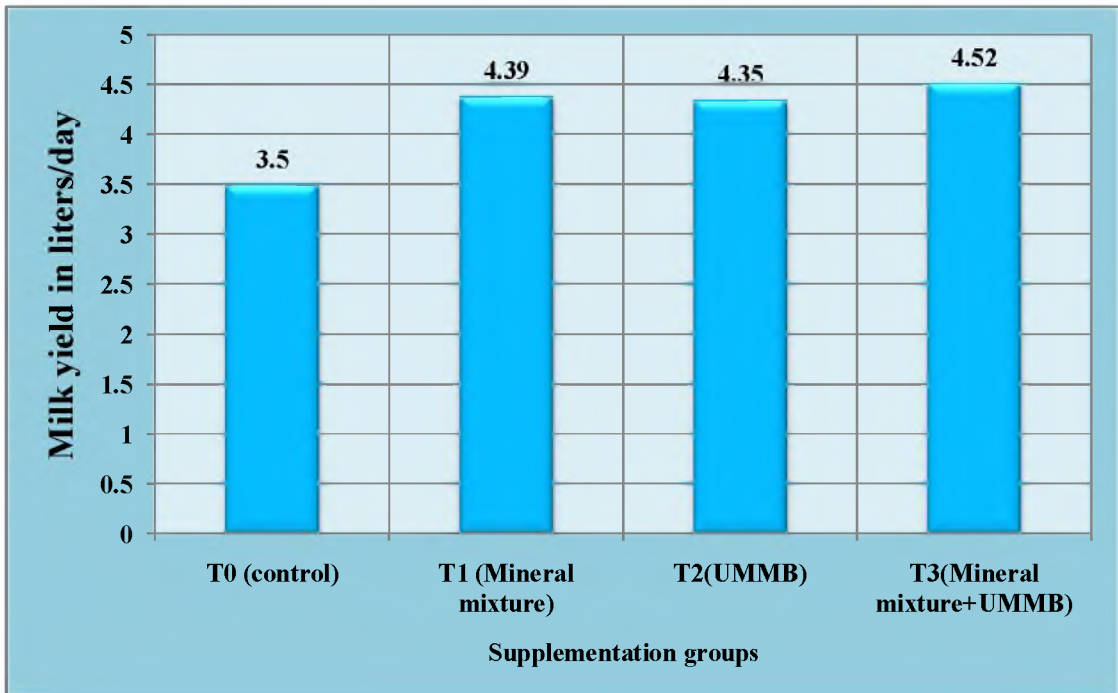


Fig.10: Bar chart showing the effect of supplementation on milk yield

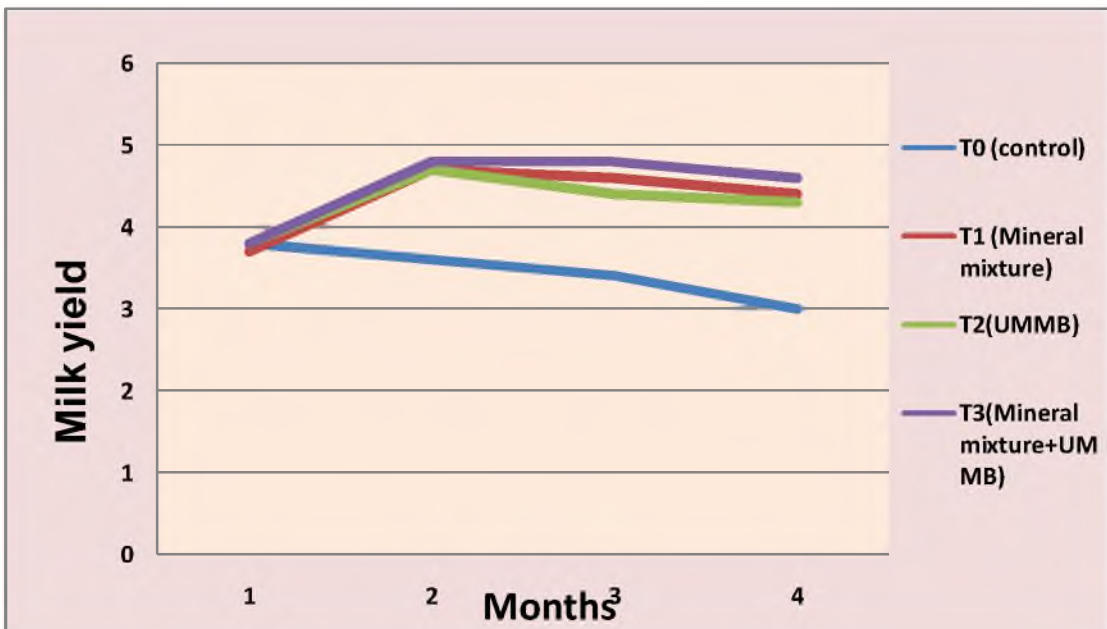


Fig 11. Line chart showing the effect of supplementation on milk yield pattern in study period

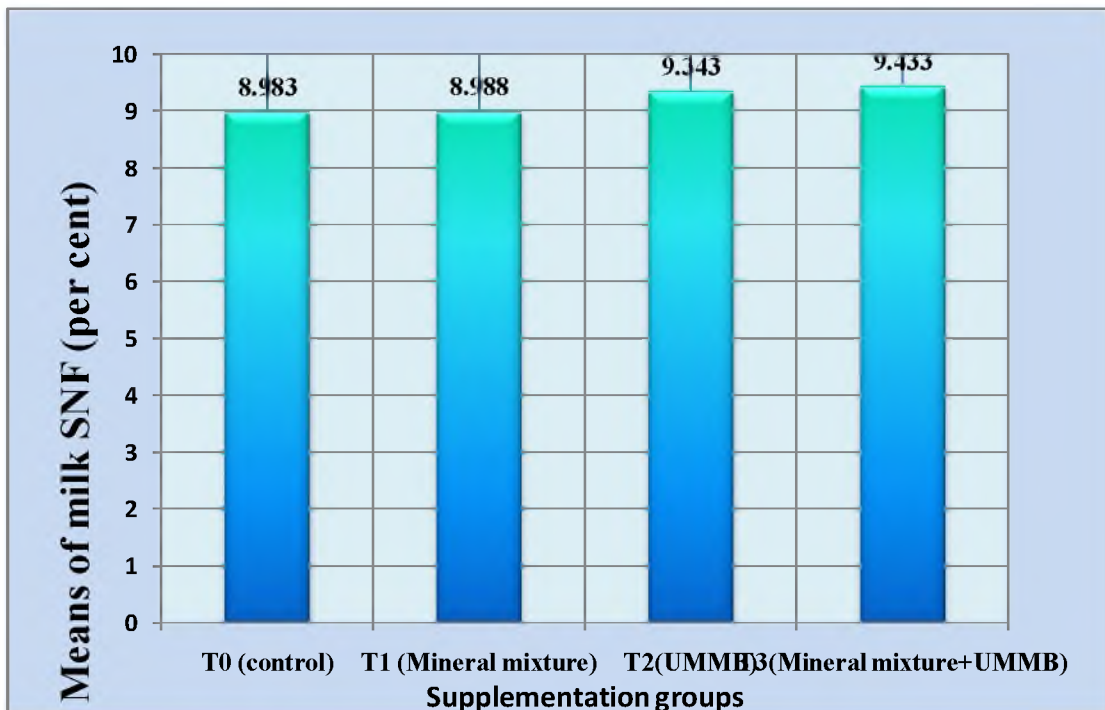


Fig. 12: Bar chart showing the effect of supplementation milk SNF

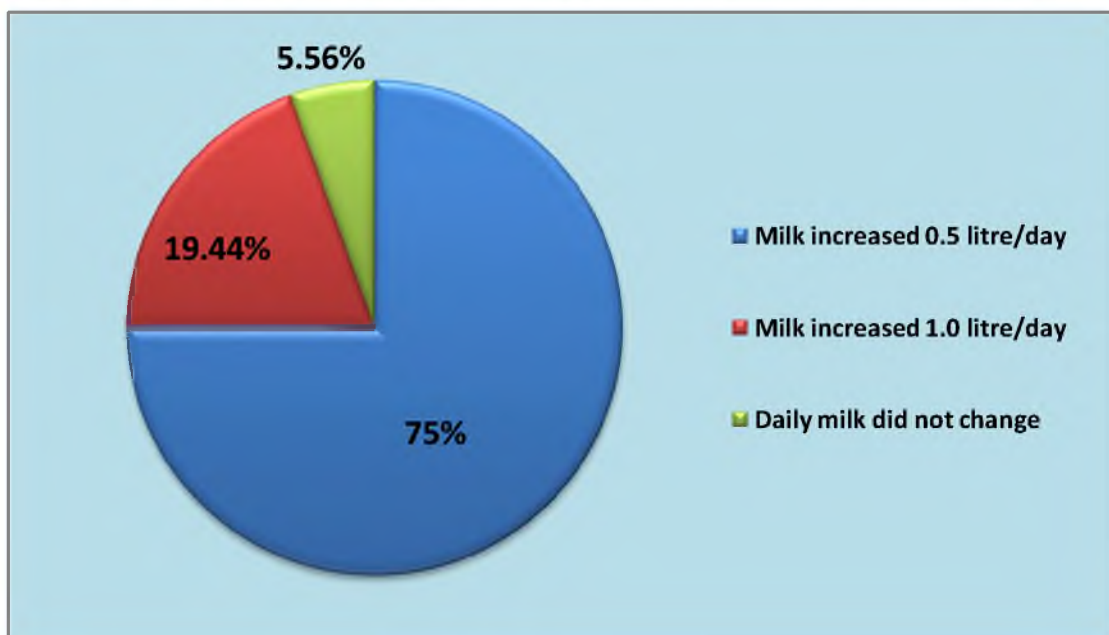


Fig. 13: Pie chart showing the effect of supplementation on milk yield (according to farmers' response)

4.4.7 Effect on reproductive performance

Eleven per cent of the buffaloes conceived just two months after start of the supplementation similarly 19.44 per cent of the buffaloes conceived between three to four months and 61.11 per cent of the buffaloes conceived between four to six months after the start of supplementation. However, 8.33 per cent of buffaloes did not conceive in six months of the study period and only 50 per cent of the buffaloes conceived in control group (T₀) during the last two months of the study period.

Table 4.13 shows the number and percentage of buffaloes conceived in different supplementation groups.

Table 4.13: Conception pattern in buffaloes

Variable	Supplementation groups (12 buffaloes/ group)				Months in which animal conceived		
	T ₀	T ₁	T ₂	T ₃	0-2	3-4	4-6
No of buffaloes conceived	6	11	10	12	4	7	22
Percentage	50	91.66	83.33	100	11.11	19.44	61.11

Notes: T₀= Control; T₁= with mineral mixture; T₂ = with UMMB; T₃= both mineral mixture and UMMB

4.5 Farmers' perception regarding the supplementation of UMMB and mineral mixture

The response of buffalo owners on various parameters is listed in table 4.14.

4.5.1 Feeding of mineral mixture and UMMB to buffaloes

Nearly 67 per cent of farmers reported that their animals started licking the blocks; where as 17 per cent of farmers reported that animals bit the blocks instead of

licking. In some cases (16.66 per cent) animals did not start licking. In such cases farmers broke the blocks in to pieces and fed the animals by mixing in animal feed. Some famers even sprayed salt or sugar or wheat flour on the block to induce licking.

Twenty four per cent of buffaloes started licking the blocks on day one and 42.67 per cent of buffaloes started licking the blocks between day 2 to day 7. However 33.33 per cent buffaloes started licking/feeding the blocks after a week. The maximum period for adoption was observed to be 10 days. Thus first two weeks of study period was considered as adoption period. Majority of the farmers (81%) reported that the animals started licking on its own but 41.67 per cent of farmers informed that they induced the feeding. All the farmers fed mineral mixture by mixing in drinking water

4.5.2 Effect on feed consumption and water intake

During the investigation all the farmers (cent per cent) reported that there was a significant improvement in intake of feed and water by buffaloes. Eighty one per cent of famers reported the reduction in feed wastage and less selective feeding when fed with stover similarly 66.66 per cent of farmers reported that their buffaloes grazed actively in fields.

4.5.3 Effect on milk yield

Three forth of buffalo farmers (75%) informed that there was an increase in the milk yield of 0.5 lit/day. Similarly 19.44 per cent farmers informed an increase of 1 lit/day. However, 80.33 per cent of farmers informed that unlike previous year there was no reduction in milk yield especially during summer months (February-May). Only 5.56

per cent of farmers informed that there was no effect of feeding of UMMB and mineral mixture on the milk yield.

4.5.4 Effect on consistency of milk

Nearly 70 per cent of farmers informed that the consistency of the milk got thickened. However, 27.77 per cent farmers reported that there was no change in milk consistency.

4.5.5 Impact on animal health

One fourth per cent of the farmers (25%) felt that UMMB blocks and mineral mixture had no effect on buffalo health. About 75 per cent of farmers reported that the supplementation feed technology and water intake of their buffaloes increased and further they also observed that improvement in overall health condition of buffaloes.

4.5.6 Impact on eating of abnormal things by buffaloes

Half of the farmers (50%) informed that eating of abnormal things was stopped after the supplementation and 19.44 per cent of respondents reported that eating of abnormal things was reduced. However, 30.56 per cent of farmers did not notice any change.

Table: 4.14 Perception of the farmers towards strategic supplementation

Parameter	Response	Percent
UMMB consumption		
	Licking	66.68%
	Biting	16.66%
	Fed in pieces	16.66%
	Started licking on day 1	24%
	Started licking from day 2 to day 6	42.67%
	Started licking after One week	33.33%
	Self licking	58.33%
	Induced licking	41.67%
Mineral mixture feeding		
	Fed through water	100%
Feed consumption		
	More feed consumed	100%
	Less selective when fed stover	80.55%
	Active grazing	66.66%
	Consumed more water	100%
Milk production		
	Daily milk increased	94.44%
	Milk increased 0.5 litre/day	75%
	Milk increased 1.0 litre/day	19.44%
	No changes in daily milk production	5.56%
	Sustained milk production during summer	80.33%
Changes in consistency of milk		
	No change in milk	27.78%
	Increased thickness	69.44%
	Abnormality in milk	2.78%
Deprived appetite		
	Stopped eating abnormal things	50%
	Reduced eating abnormal things	19.44%
	No change observed	30.56%
Changes in health/body condition		
	Improved	75%
	No changes	25%
Economic feasibility		
	Not economical	17.44%
	Economical	80.56%

Constraints		
	No constraints	52.77%
	Non availability of UMMB and mineral mixture in nearby places	38.88%
	Laborious work	5.55%
	Supplementation costly	11.11%
Adoption of the technology in future		
	Yes	61.11%
	No	11.11%
	Yes, only if supplemented free of cost or some financial help from outside	27.78%

4.5.7 Constraints in supplementation technology

Around 53 per cent of the farmers expressed there was no constraints regarding the supplementation technology. However, 38.88 per cent of farmers expressed that the UMMB and mineral mixture were not available in nearby market. Around 6 per cent and 11 per cent of the farmers expressed that the supplementation technology is laborious and costly respectively.

4.5.8 Economic feasibility and readiness for the adoption of strategic supplementation by farmers

About 81 per cent of the farmers felt that the strategic is economically feasible but 19.44 per cent felt that the supplementation technology would be non economical if supplemented on their own cost. Eighty eight per cent farmers were ready to adopt the supplementation in future in spite some of them felt that the supplementation would be uneconomical. Twenty eight per cent of farmers reported that they would continue the supplementation in future if UMMB and mineral mixture supplemented free of cost or on financial help from outside.

CHAPTER V

DISCUSSION

The results emerged from the present research study are discussed suitably in this chapter under the following sub heads for the sake of brevity and clarity. The findings were examined in the light of the earlier studies.

The discussion was carried out according to the objectives of the study.

- 5.1 Promotion of buffalo rearers groups
- 5.2 Characteristics of buffalo rearers groups
- 5.3 Structure and functions of the promoted buffalo rearers' groups.
- 5.4 The effect of supplementation of UMMB and mineral mixture in lactating buffaloes
- 5.5 Farmers' perception regarding the supplementation

5.1 Promotion of buffalo rearers' groups

5.1.1 Establishment of rapport with the villagers

In the present study the research scholar experienced quite different multifaceted approach than normal one to build up his rapport. This was very much necessary to overcome the suspicious nature of the villagers which was said to be quite natural among the villagers towards strangers. Quite similar effort done was reported by Gangrade (1971), where he started his work by self introduction to the villagers. He further pointed out that it made him to take a long time to develop rapport in the village. Verahagan (1982) also reported that Research Officers introduced themselves to the village leaders and started their research work without experiencing any particular problem in the two

Srilankan villages. Further the research scholar spent time with the people of all categories in his visits and collected the information of the problems and resources of the villages. Kanjilal (1984) in his rural development study mentioned that project workers used to visit the village, sit with people of all categories to discuss about their problems and solutions for solving the same. The availability of the resources in the villages was satisfactory. Most of the time, the researcher used make halt at the study villages whenever he visited. This helped in gaining the confidence of the villagers.

5.1.2 Formation of the group

During each step of the formation of group the village leaders were involved. It was the leaders who created a congenial atmosphere for the study in the villages (Table 4.2). The study would have been difficult or incomplete without the assistance and involvement of the village leaders. Batten and Batten (1967) studied the case of bee expert keeping to help the villagers without consulting the leader and peoples' interest. As a result, the project failed even though it was thought to be a good one. Further the interest shown by the villagers was in accordance to their needs and problems.

The idea of introducing the technology into the group was to assure its sustainability and its reach to other fellow villagers. A similar effort made by Tandon and Brown in 1983, in which two poor farmers from each village were trained in new agricultural technological skills and they were requested to share the their knowledge with fellow villagers. And to organize other farmers into "peer groups" which would assist in spreading the knowledge. Two years later, careful comparison of demographic characteristics showed the experimental and control groups to be strikingly similar to

each other, suggesting they were sufficiently comparable for the study. With the use of sufficient time, resources and measures, the groups were formed in all the six villages.

5.1.3 Initiation of the group activities

Though lot of problems and strains were encountered in the formation of group, an equally difficult time was experienced in the beginning of its activities. At this step, it is right to recall the words of Ross and Lappin (1967) who stated that community organization is not a minority movement and cannot be initiated solely by reason of needs or discontent which appeal to only a very small group in the community.

5.1.4 Organization of training programme

The various training programmes organized make the farmers to aware about the profitable buffalo rearing practices like feeding of chopped fodder, concentrate, mineral mixture, UMMB and growing high yielding fodder grasses; regular deworming and vaccination of animals; adoption of AI; value addition to milk and its by products and various marketing channels. The practice of feeding chopped fodder was adopted by the farmers and they appreciated the results. The farmers adopted regular deworming and vaccination which was very much evident in animal health camps where farmers brought their animals for vaccination and deworming in large number. These findings are in confirmation with the findings of Kumaran (2002) where he reported that technical training given to the entrepreneurs, the micro enterprises setup by the members of the SHGs, promoted by NGO and banks were more viable and sustainable as compared to those formed by the DRDA promoted groups.

5.1.5 Integration of animal health camps

Animal health camps and on-farm trials created awareness among farmers regarding the adoption of better livestock practices like supplementation of mineral mixture and UMMB. Through farmer-farmer interaction, many farmers realized the economic benefits of improved husbandry practices and came forward to adopt them. Through this, it was evident that veterinarian has lot of opportunity to work in the rural environment as he can fulfill the needs of the people and their animals by providing good suggestions, latest information and treating the animals. So, veterinarian can be a very good grass root level worker. These findings are in line with Misra et al. (2006) where he reported that animal camps were the major focus for rapport build up in the villages as everyone gathered at a common place.

5.2 Characterizations of the members of buffalo rearers group

5.2.1 Age

Majority of the members belong to upper middle age group followed by the middle age and few in the old and young age group (Table 4.4). The mean age of the members of the groups was found to be 41.28 years. This was mainly because of the vast experience and interest shown by the upper middle age group in buffalo rearing.

The results are in line with the findings of Singh and Kunzroo (1985), Savitha (1997), Dash and Das (1998), Rangi et al. (2002), Gaikwad et al. (2003) and Gangil and Dabas (2005) who stated that socio-economic characteristics are significantly related with

the training/education of the respondents interested in improved goat management practices which will improve the living status of the goat keepers.

5.2.2 Caste

All the members in the groups belonged to Hindu religion except one who belonged to Islam religion. The homogeneity of the respondents with respect to caste is seen as all the members of each group belonged to either SC or OBC category since most of the village population belonged to these particular categories. Each group has members either from SC category or OBC category. This is a case in which the homogenous composition has helped for the effective functioning of the group. The results are in line with the findings of Savitha (1997), Dash and Das (1998) and Gaikwad *et al.* (2003).

5.2.3 Education

Twenty two members in the groups had no education, 18 members had primary school education, 13 members had middle school education, 7 members had high school education and none had college education (Table 4.5). The results are in confirmation of the findings of Savita (1997), Aruna (1999) and Rangi *et al.* (2002),

5.2.4 Buffalo possession

There is a positive relationship between employment and income earned in any activity. Though majority of farmers were engaged in agriculture or other occupations, the possession of buffaloes was equally good (Table 4.6). Almost 75 per cent of the

members possessed 2-4 buffaloes and had better income derived from the sale of milk and milk products and also through the sale of buffalo calves in critical times.

The results are in line with the findings of Hegde (1997) who stated that buffaloes are maintained by all sections of the community but they are well distribute among small holders.

5.2.5 Family size

Most of the members in the groups had a family size with 4-6 (Table 4.7). To take care of the family, consistent source of income is required and people diversifying their income sources like agriculture, buffalo rearing, goat rearing in addition to agriculture labour could be a result of this need. The results are in confirmation of the findings of Savita (1997) and Gangil and Dabas (2005).

5.2.6 Occupation

Even though all the farmers were involved in animal husbandry along with this they were doing other occupations also (Table 4.8). Fifty per cent of the members were engaged in agriculture and animal husbandry. As some of the members of the group were own lands, but the size of the land holdings were small. The people who were agriculture labourers, in addition to agricultural labour they engaged in other works for their additional income to meet out the family expenses.

The results are in line with the findings of Reijntes *et al.* (1992) who stated that normally small households also attach high value to an even distribution of production over time in order to secure year round needs and make effective use of the available

labour resources. Aryal (1995) reported that poverty in rural Nepal is due to small size of land holding. The results are also similar to the findings of Kumar *et al.* (1999) and Rangi *et al.* (2002).

5.3 Structure and function of the promoted buffalo rearers group

5.3.1 Structure of buffalo rearers group

The results of the study (Table 4.9) showed that all the groups consisted of 10 members as group strength. This is in confirmation of SHG and its norms, but it is contrary to the findings of Kumaran (2002), Samuel *et al.* (2007), where in, the average number of members in SHG ranges from 13 – 15. All the beneficiaries were poor and fall under BPL category. Out of six groups in the study, there were three men groups and three mixed groups.

The results of the study are in line with the findings of Kumaran (2002), Suryakanthi and Subramani (2006), reported that men SHGs can certainly reap the same advantage as those reaped by women SHGs and it will be a good idea to have mixed group of men and women to compliment the disadvantages of unisex.

5.3.2 Functioning of the buffalo rearers' group

The results of the study (Table 4.10) showed that all the six groups used to conduct meetings regularly on a fixed day of every month in the evening at different timings. The timings and the day was in accordance with the convenience of the group members. The findings with respect to frequency of meetings are in contrary with the findings of Kumaran (2002), Samuel *et al.* (2007), who observed that 95-96 per cent of

the meetings were conducted weekly which is indispensable to maintain frequent contact with members to discuss about activities, carry out transactions and contributions of their savings. Attendance in the four groups ranged from 80-100 per cent and in two groups it was 90 to 100 per cent. The reason behind the good figure of attendance might be due to the feeling of belongingness, interest to take up IGA and also due to the governing rules agreed upon.

The results are in similar line with that of Kumaran (2002), Mkpado and Arene (2006) and Samuel *et al.* (2007) who stated that membership size of the microcredit groups should be reduced to aid group cohesion and loan repayment, because they are inversely related. All the groups used to save Rs.50/- per month. But the lending of money was not recorded as on the date of completion of the study. The groups maintain a meeting register in which the proceedings of the meeting are recorded, including the matters discussed in the meeting, the money collected from members and names of the members attended the meeting. The records are filled up and maintained by the Secretaries. The records which are maintained by the groups are pass book (both group and individual), savings register, and meeting book (with attendance and proceedings). The entire six buffalo rearers group updated savings pass book this may be due to concern of the members about their total savings, lending and repayment. This finding is similar that of Singh and Usharani (2007).

5.4 The effect of supplementation of UMMB and mineral mixture in lactating buffaloes

5.4.1 Milk yield

The mean milk yield (lit/day) observed for treatment groups were 3.5, 4.39, 4.35 and 4.52 for T₀, T₁, T₂ and T₃ groups, respectively. The milk yield was high in the group T₃ in which both mineral mixture and UMMB were fed to the buffaloes and it differed significantly with T₁ and T₂ where either mineral mixture or UMMB alone was fed. However, UMMB and mineral mixture showed non significant increase among themselves but significantly higher than the control group (T₀). In confirmation with Misra *et al.* (2006) who reported that feeding of UMMB to the cross bred cows which were in mid lactation produced 30 per cent more milk (p<0.05) than the control group. Similarly Khanum *et al.* (2007) and Sahoo *et al.* (2009) reported the significant increase in milk yield due to the supplementation with UMMB in buffaloes. Mathialagan *et al.* (2009) reported that on an average 0.8 lit per day per animal of milk yield was increased in buffaloes supplemented with mineral mixture.

Similar reports about supplemented with UMMB were also given by Abeygunawardane *et al.* (1996), Bheekhee (1999), Habib and Ishrat (2000), Perera and Perera (2000), Kang (2002), Singh and Singh (2003), Misra *et al.* (2006).

5.4.2 Total solids

The mean total solids (per cent) observed for treatment groups were 15.15, 15.24, 15.57 and 15.63 for T₀, T₁, T₂ and T₃ groups, respectively. There was no statistical significant difference in the total solids of milk among the treatment groups and between the treatments and periods. Even though the significant increase in milk SNF the milk fat

was not increased significantly. Hence, the increase in total solids was non significant in milk. The results are in line with the findings reported by Sahoo *et al.* (2009) where he reported that the milk total solids increased by 3.22 per cent.

5.4.3 SNF

The mean SNF (per cent) observed for treatment groups were 8.98, 8.98, 9.34 and 9.43 for T₀, T₁, T₂ and T₃ groups, respectively. The combination of mineral mixture and UMMB significantly ($P \leq 0.01$) improves the SNF content of milk followed by UMMB alone. However, mineral mixture alone showed non significant increase in SNF. The UMMB blocks contain urea which acts as non protein nitrogen source and rumen microbes use it in synthesis of rumen microbial protein which animal will utilize it to meet the body protein demand. Molasses enhances the rumen microbial digestion by providing instant energy to the rumen microbes. The mineral salts provide required minerals for all the metabolic activities. Similarly Sahoo *et al.* (2009) reported that 2.18 per cent of SNF was increased in buffalo milk due to UMMB supplementation. Mathialagan *et al.* (2009) reported that an average of 0.35 per cent of SNF was increased in buffalo milk due to mineral supplementation.

5.4.3 Milk fat

The mean milk fat (per cent) observed for treatment groups were 6.16, 6.25, 6.23 and 6.27 for T₀, T₁, T₂ and T₃ groups, respectively. There was no statistical significant difference in the milk fat among the treatment groups and between the treatment groups and periods. Since there is an inverse relationship between milk yield and milk fat, this is evident from the results where milk yield increase significantly whereas milk fat showed

non significant increase. Similar findings were reported by IAEA/RCA (2004) where it has reported that an increase of 0.1 to 0.3 per cent was observed in milk SNF.

However, Sahoo *et al.*(2009) reported an increase of 6.21 per cent in milk fat of buffaloes supplemented with UMMB similarly Misra *et al.* (2006) reported an increase of 8 per cent of milk fat that of control group.

5.4.4 Organic matter

The mean organic matter (per cent) observed for treatment groups were 99.29, 99.33, 99.34 and 99.34 for T₀, T₁, T₂ and T₃ groups, respectively. There was no statistical significant difference in the organic matter of milk among the treatment groups. Interaction between the treatments and periods was also not significant. This finding can be attributed to the fact that only milk SNF increased significantly but the milk fat did not show significant increase.

However, further study needs to be done on effect of UMMB or mineral mixture on organic matter of the milk.

5.4.5 Effect on reproductive performance

Majority (61.11 per cent) of the animals conceived between four to six months of the study period and 19.44 per cent of the animals conceived during three to four months of the study period. However, 11 per cent of the animals conceived just two months after the start of the supplementation. Similarly Brar and Nanda (2002) reported that out of 44 anestrus buffaloes 90 per cent came in to heat and conceived within one month, compared with only 28 per cent in the control group after supplemented with UMMB.

Kang (2002) reported that 30 days of UMMB supplementation induced behavioral estrous in 40 buffaloes, compared with only 10 per cent in control group. Extended UMMB supplementation for another 30 days induced behavioral estrous in 85 per cent of buffaloes with 100 per cent first service conception rate. Koley and Biswas (2004) reported that the supplementation of mineral mixture at the rate of 25 g/animal/day for 60 days to 20 anestrus heifers resulted in 70 per cent of animals showed behavioral estrous.

The results are also in confirmation with findings reported by Shah *et al.* (2003), Misra *et al.* (2006) and IAEA/RCA (2004).

5.5 Farmers' perception regarding the supplementation

5.5.1 Consumption pattern of UMMB by buffaloes

Licking was evident in most of the buffaloes (66.68 per cent, Table 4.13). The intake gradually increased over two weeks with large diurnal variations. Thereafter intake became more or less constant. Some animals did not consume blocks for the first few days and then slowly started licking. Some farmers (16.66 per cent) induced block licking by spreading small quantity of salt or wheat flour or sugar on top of block for the first few days. In some cases (16.66 per cent) animals refused to consume blocks on their own, farmers cut the block into small pieces and fed some pieces daily mixed in homemade concentrate or directly put into the mouth of the animal.

Similar findings were reported on consumption pattern and induced feeding by Misra *et al.* (2006) and Sharma and Singh (year not published).

5.5.2 Effect on feed consumption and water intake

During the investigation all the farmers (100%) expressed that feed and water intake by buffaloes were increased. About 86 per cent of farmers reported that the feed wastage was reduced and animals were less selective when fed with stover or straw. Similarly, 66.66 per cent of farmers reported that their animals grazed actively in fields. It was quite evident from the farmer's response that the supplementation of UMMB and mineral mixture stimulated intake of the basal diet irrespective of the type of forage. Since the UMMB contains the molasses, urea and minerals and mineral mixture contains essential mineral salts which subsequently increased the palatability and appetite. Thus increasing the overall dry matter intake and followed by water intake by the buffaloes.

These results are in confirmation with the findings reported by Madhumohini and Gupta (1993), Kakkar and Makka (1995), Abeyguanawardane *et al.* (1996), Bheekie (1999), Habib and Ishrat (2002), Sharma *et al.* (2004), Misra *et al.* (2006) and Sharma and Singh (year not published).

5.5.3 Effect of milk yield

The results from the table 4.14 shows that 75 per cent of farmers reported that milk yield was increased by 0.5 lit/day and 19.44 per cent of the farmers reported that milk yield was increased by 1 lit/day when fed with mineral mixture or UMMB or both to the buffaloes. The urea which acts as source of non protein nitrogen and molasses which provides the instant energy for rumen microbes along with essential minerals especially calcium and phosphorus helped in increasing the milk yield. The amount of increase in milk yield, according to the farmers response and actual measurement which the researcher got during regular intervals may vary but the perception of the farmers about the mineral mixture and UMMB was quite satisfying as per as milk yield was concerned.

These results are in confirmation with the findings of Sharma *et al.* (2004), Misra *et al.* (2006) and Sharma and Singh (year not published).

5.5.4 Effect on milk consistency

Even though there is an inverse relationship between milk yield and milk fat, 94.44 per cent (Table 4.14) of the farmers reported that the yield was increased against 69.44 per cent of farmers who reported that the thickness of the milk was increased. This was mainly due to the significant increase in milk SNF and non significant increase in milk fat (Table 4.11). However, 27.78 per cent of the famers did not notice any change in the milk consistency because most of these buffaloes were belonged T₁ group where in the milk SNF hardly increased as compared to the T₂ and T₃ groups.

Brar and Nanda (2002), Kang (2002), Reddy and Krishna (2002) and Sahoo *et al.* (2009) reported that the milk fat and SNF content has increased due to the supplementation of UMMB, similarly Mathialagan *et al.* (2009) reported that 0.35 per cent of SNF increased per day per animal in buffaloes due to the supplementation of mineral mixture. However, Sharma and Singh (year not published) reported from on-farm trial that only 11 per cent of farmers accepted that the fat content was increased.

5.5.5 Impact on animal health/body condition

The results from the table 4.14 revealed that 75 per cent of the farmers noticed the improvement in their animal health/body condition. They had the perception that due to the supplementation technology the feed and water intake increased and subsequently health was improved rapidly. According to the farmers, the animals had glossy skin, bright eyes and no signs of any malnourishment. Some of the buffaloes had stiff joint,

ataxia due to prolonged mineral deficiencies but interestingly when the animals were fed with UMMB and mineral mixture the symptoms subsided. However, 25 per cent of the farmers reported that no change has occurred in their animals' health/body condition. This could be attributed to the fact that their animals were healthy prior to the start of the supplementation or some farmers could not appreciate the changes in the health/body condition.

These observations are in line with the findings of Kakkar and Makka (1995), Sharma *et al.* (2004), Misra *et al.* (2006). However Sharma and Singh (year not published) reported from their on-farm trial that only 12 per cent of the farmers opined that their animals health was improved. No case of urea poisoning was reported except in one instance a farmer reported that the milk was getting spoiled after the feeding of the UMMB block. But after milk analysis it was concluded that milk was of good quality. The farmer might have said that to get extra benefits or inputs from the researcher.

5.5.6 Impact on eating of abnormal things by buffaloes

Pica was a common problem in the buffaloes in the study areas but it was effectively reduced by supplementing mineral mixture or UMMB. Hence, 50 per cent of the farmers reported that eating abnormal things was stopped by the buffaloes. and 19.44 per cent of the farmers reported that eating abnormal things was reduced. But around 30 per cent reported that there was no change. This was mainly because these animals were not having any mineral deficiencies earlier.

Similar findings were reported by Misra *et al.* (2006) and Kumar and Singh (year not published).

5.5.7 Constraints in supplementation technology

Around 53 per cent (Table 4.14) of the farmers reported that the technology doesn't have any constraints. But around 39 per cent of farmers reported that non availability of mineral mixture and UMMB was major constraint. This is due to all the study villages are situated far away from the major markets and transportation. Further, road facility is also not good to these villages. Hence, people rarely visit the markets. Similar observations were reported by Misra *et al.* (2006). Around 5 per cent of the farmers expressed that supplementation technology was laborious.

5.5.8 Economic feasibility and readiness for the adoption of strategic supplementation by farmers

The UMMB blocks cost around Rs. 30/block (3 kg) and mineral mixture cost around Rs. 32/kg. Considering all the favorable characteristics of these supplements, 81 per cent of the farmers reported that this technology is economically feasible and really affordable from the resource poor farmers. Around 88 per cent of the farmers were ready to adopt this supplementation technology in future, because this technology has desirable characteristics which an innovation must have. The feeding of UMMB and mineral mixture found to be convenient to feed, these blocks were easy to store, handle and results were observable. The effect of UMMB or mineral mixture or both on milk yield, dry matter intake, reproductive performance etc was evident. Thus farmers found this supplementation technology is convenient, effective and inexpensive method of providing required nutrients for the buffaloes which may be deficient in the current diet.

Similar studies conducted by Misra *et al.* (2006) and Sharma and Singh (year not published) were reported adoption rate of 100 per cent and 93.32 per cent respectively.

CHAPTER VI

SUMMARY

The present study on *“Rural community organization for strengthening the livelihood security of buffalo rearers through strategic supplementation of mineral mixture and urea molasses mineral blocks (UMMB)”* was conducted with the objectives of motivating buffalo rearers to organize themselves into community group to adopt sustainable buffalo rearing practices and to study the response of buffaloes to supplementation with or without mineral mixture or UMMB or both through On-farm trial was conducted to determine the farmers perception towards strategic supplementation of mineral mixture and UMMB. A participatory action oriented approach for promoting livestock production technologies was adopted in this study. The sample drawn included 60 farmers from six villages who involved in buffalo rearing and they were also the beneficiaries of NAIP comp-3. The data were collected through participant observation, focused group discussion and individual interview through a semi structured interview schedule developed for the study.

In this study the researcher adopted multi facet approach of six steps to build up rapport viz, initial introduction through NAIP team, utilization of services of known village leaders, self introduction in informal gatherings, utilization of professional knowledge and skill to treat the sick animals, staying in the village and sitting and working with them and all categories of people in the study area to discuss about the problems.

The analysis of social system revealed that the villages had very good buffalo population, agriculture was the main occupation. Most of the villagers were small farmers and the landless who cultivate land belonging to large farmers on sharing cropping basis. The main crops grown were sunflower, maize, safflower, black gram, green gram, bengal gram, ground nut, red gram etc. The animal husbandry practices followed were non scientific and villages were lacking the basic facilities and infrastructure.

The dissatisfaction of the villagers about the existing conditions and problems of the village was given expression. The villagers felt that an organization is essential to access the services and inputs of various departments. Later the public meeting was called and organizations were established in different villages. Members decided to keep regular monthly meeting and general meetings to discuss about its activities.

The villagers passed through six definite steps in building of organizations viz, consciousness of the need, spreading of consciousness of the need, sharing of the discontent about existing village problems, impulse to meet the need quickly pretest and open discussion of the issue. The researcher played a catalytic role by stimulating sense of need for the organization.

The personal profile of members of buffalo rearers' groups revealed that majority of the respondents (56.66 per cent) were in upper middle age group, about 63.33 per cent of the members were literate. Members of the two groups belonged to SC and members of the four groups belonged to OBC. Majority of the farmers had the family size of 4-6 members and 75 per cent of the farmers had 2-4 buffaloes. The structure and composition of the buffalo rearers' group revealed that four were men groups and two were mixed

groups, all the farmers were poor (BPL). All the group members were residing in close proximity.

The functions of the groups were carried out, in that all the six groups were conducting monthly meetings. Four groups had an attendance of 80-100 per cent and two groups had 90-100 of attendance. All the groups saved Rs 50 per month. All the groups were maintaining records viz, saving pass books, meeting register.

The on-farm trial revealed that the average daily intake of UMMB was 294 g ranged from 240 to 360 g when fed alone (T₂). Similarly the daily average intake of UMMB was 256 g and ranged from 190 to 320 g when fed in combination with mineral mixture. The strategic supplementation of UMMB and mineral mixture in buffaloes showed that the combination of mineral mixture and UMMB significantly ($p \leq 0.01$) improved the milk yield and mineral mixture or UMMB alone showed non significant effect on milk yield among themselves. Total solids, milk fat and organic matter of milk showed non significant effect. However, SNF of milk increased significantly in T₃ and T₂ groups. The conception rate among buffaloes of various groups were 92 per cent in T₁, 83.33 per cent in T₂ and cent per cent in T₃ and only 50 per cent in control group.

The farmers perception towards strategic supplementation of mineral mixture and UMMB revealed that 58 per cent of buffaloes started licking the blocks on its own but 41.67 per cent of did not start lick initially hence farmers induced the licking by spreading salt or flour on blocks. All the farmers reported that there was a significant increase in feed and water intake and 81 per cent of farmers reported that the reduction in feed wastage and less selective feeding when fed with stover and 66.66 reported that

active grazing was noticed among buffaloes. Only 5.55 per cent informed that there was no effect of supplementation in milk yield but rest of the farmers reported increase in milk yield due to supplementation. Importantly 80.33 farmers informed that unlike previous year there was no reduction in milk yield especially during summer months (February-May). Nearly 70 per cent of the farmers felt that the milk consistency got thickened. Seventy five per cent of farmers reported that health and body condition improved due to supplementation. Fifty per cent farmers reported that eating abnormal things was stopped by the buffaloes and 19.44 per cent of them reported that after supplementation the eating of abnormal things was reduced.

Around 53 per cent of the farmers expressed there was no constraints regarding the supplementation technology. However, 38.88 per cent of farmers expressed that the UMMB and mineral mixture were not available in nearby markets. Finally about 81 per cent of the farmers felt that the strategic supplementation was economically feasible and 80 per cent of the farmers were ready to adopt the supplementation technology in future.

Limitations of the study

1. Since it is a Post Graduate (M.V.Sc) research, it has the limitation of time and resources.
2. The study was carried out only in six villages of Bidar district and hence the results and findings of the study on community organization strategic supplementation and farmer's perception towards strategic supplementation of UMMB and mineral mixture have limited applicability or cannot be generalized.

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**RURAL COMMUNITY ORGANIZATION FOR STRENGTHENING THE
LIVELIHOOD SECURITY OF BUFFALO REARERS' THROUGH STRATEGIC
SUPPLEMENTATION OF MINERAL MIXTURE AND UREA MOLASSES
MINERAL BLOCKS (UMMB)**

SHIVANAND KUMBAR

2010

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ABSTRACT

A participatory action research was designed to promote the buffalo rearers' groups in study villages and to strengthen the livelihood security through strategic supplementation of mineral mixture and UMMB. The analysis of the social situation revealed that all the villages were lacking basic facilities, infrastructure and services. The dissatisfaction of the villagers about existing conditions and problems was given expression with the formation of buffalo rearers groups in each study villages. The importance was given to collective work and necessity of the groups was stressed. The members have gained social benefits like managerial skills, increased interpersonal contacts, improved relation and better understanding among themselves, problem solving through group discussion and group consensus, opportunity to develop leadership etc in addition to this villagers got the benefits of regular health camps and training programmes. The results of On-farm trial revealed that the milk yield and milk SNF increased significantly after the supplementation with mineral mixture and UMMB however, total solids, fat and organic matter of milk showed non significant increase. Similarly the reproductive efficiency of the buffaloes was enhanced after the supplementation. out of 36 buffaloes 33 buffaloes conceived during the study period. The assessment of farmers perception revealed that due to strategic supplementation the milk yield was increased, milk consistency got thickened, and animals stopped eating abnormal things and health/body condition of the buffaloes improved. The major constraint of this supplementation was non availability of the mineral mixture and UMMB in nearby places. Farmers reported that supplementation technology was economically feasible and farmers were ready to it in future.

Appendix-I

Interview Schedule for farmer's socio-economic profile

Village:

Taluka:

Dist:

Name of the farmer:

Age:

Gender:

Education:

Illiterate
Primary school
Middle school
High school
College

Occupation:

Caste:

Vimukta Jati/ Nomadic Tribe
Scheduled Tribe / Scheduled Caste
Other Backward Class
Open

Family size:

2-4 members
4-6 members
6 or more members

Buffalo Possession:

No of Buffalo calves:
No of Buffalo heifers:
No of Lactating buffalo:
No of Pregnant buffalo:
No of Dry buffalo:

If calved recently, the approximate date of calving:

Production status:

No of lactating buffaloes:

Milk yield per day per animal:

Land Holding

Land Holding	Type of land holding			
	Irrigated	Rain fed	Pasture/waste land	forest

Feeding practices:

Knowledge level regarding livestock rearing

- Do you feed concentrate feed to your buffaloes? Yes or No
- Do you follow Artificial insemination during heat period? Yes or No
- Do you follow vaccination schedule for your animals? Yes or No
- Do you follow the deworming of animals to control endo-parasites? Yes or No
- Do you feed the mineral mixture or UMMB to your buffaloes? Yes or No

Appendix-II

Interview Schedule for assessment of farmer's perception

Village-----

- 1) Name of the SHG-----
- 2) Name of the farmer-----
- 3) Buffalo supplemented with-----
- 4) Amount of UMMB consumed-----
- 5) Consumption/ Feeding pattern of UMMB and Mineral mixture
 - A) Consumption pattern of UMMB-----
 - a. Licking
 - b. Biting
 - c. Fed in pieces
 - B) Feeding pattern of Mineral mixture
 - a. Through water
 - b. Through feed
- 6) Animal started licking the block-----
 - a. On day one
 - b. Between day 2 to day 6
 - c. After one week
- 7) Consumption behavior-----

- a. Self licking
- b. Induced licking

8) Feed consumption-----

- a. More feed consumed
- b. Less selective when fed Stover / reduced wastage of fodder
- c. Active grazing
- d. Consumed more water

9) Changes Milk production-----

- a. Daily milk yield increased by 0.5 liter
- b. Daily milk yield increased by 1 liter
- c. Daily milk yield increased by 1.5 liter
- d. Daily milk yield did not change

10) Changes in the consistency of milk-----

- a. Increased thickness of the milk
- b. If any abnormality in milk-----

10) Depraved appetite-----

- a. Stopped eating abnormal things
- b. Reduced eating abnormal things
- c. No change observed

11) Changes in Health or Body condition-----

- a. Improved
- b. No change
- c. Did not notice

12) Did animal show Sustained milk Production during fodder scarcity? ----- Yes/No

13) Estrous resumption-----

a. Started showing heat signs

b. Did not notice

14) Conception

Buffalo conceived-----

a. After One month of the beginning of the trail

b. After Two month of the beginning of the trail

c. After Three month of the beginning of the trail

d. After Four month of the beginning of the trail

15) Is this supplementation economically viable? Yes/ No

16) Constraints in supplementation

a. -----

b. -----

c. -----

17. Would you like to continue the supplementation? Yes/ No