Impact Assessment and Evaluation of Ration Balancing Program in Gujarat State

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Report submitted to the

Division of Dairy Economics, Statistics & Management
National Dairy Research Institute (NDRI), Karnal (Haryana), India

by

Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture & Farmers Welfare, Govt. of India)
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Foreword

India stands at first position in terms of cattle and buffalo population in the world. The population of cattle and buffalo in India was 218 million and 115 million in 2012 which accounts for 14.7 per cent and 58 per cent share respectively of world cattle and buffalo population. However, the productivity of dairy animals in India is very low as compared to other countries. The reason cited for this is inappropriate feeding as well as inadequate supplies of quality feeds and fodder in addition to the low genetic profile of the Indigenous breeds. It will not be possible to achieve higher productivity in a milch animal by merely increasing its genetic potential, due attention needs to be given on proper feeding of milch animal. There is evidence to show that when a milch animal is fed a balanced diet, it receives the required nutrients to produce milk commensurate with its genetic potential. Research and field trials indicates that this approach to feeding has the potential to increase milk yield, reduce cost of milk production, and contribute to reducing methane emissions. Milch animals are usually fed one or two locally available concentrate feed ingredients, grasses and crop residues. This often leads to an imbalanced ration–resulting in proteins, energy, minerals and vitamins being either in excess or deficient. Imbalanced feeding adversely impacts not only the health and productivity of animals but also affects income from milk production since an estimated 70 percent of the total cost of milk production is contributed by feed. Therefore, there is a need to educate milk producers on feeding balanced ration to their animals so that the nutrients required by their individual milch animals is fulfilled in an optimum manner, thereby improving milk production efficiency and the economic return.

With an aim to increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk as well as to provide rural milk producers with greater access to the organised milk-processing sector, Government of India had approved the scientifically planned multi-state initiative, i.e. National Dairy Plan Phase I (NDP I) as a Central Sector Scheme for a period of for a period of six years from 2011-12 to 2016-17, which is extended up to 2018-19. This plan is implemented wholly by National Dairy Development Board, Anand (Gujarat) through milk co-operatives and state agencies. The project includes a number of programs, of which Ration Balancing Program (RBP) is design with an aim to improve milk yield of milch animals, reduce the feeding costs/kg of milk produced and reduction in methane release per kg of milk produced by animals. It is expected that

through RBP program, 40000 trained LRPs would provide ration balancing advisory services for about 2.7 million milch animals in 40000 villages.

It is now four years since RBP is being implemented, thus NDDB, Anand felt a need to access the performance of the scheme at ground level. National Dairy Research Institute, Karnal was assigned the task of evaluating the programme in the state of Punjab and Gujarat. On the request of NDRI, Karnal, we have provided the necessary support in collecting the field level data in the state of Gujarat. On the basis of collected and complied data set, this report is prepared.

I would like to congratulate the entire project team for collecting quality data and preparing this excellent research report. I hope findings of the study would be useful for academicians, policy makers and researchers.

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We have benefited immensely from various scholars and officials from different government departments while carrying out this study. At the outset, we would like to thank **Dr. Harish Padh,** former Vice Chancellor of our University and Chairman, AERC Governing Body for his encouragement for undertaking such research activity at the Centre.

We are thankful to **Dr. Shirish R. Kulkarni,** our present Vice Chancellor and Chairman, AERC Governing Body and **Dr. Mahesh Pathak**, Honorary Advisor of our Centre for their constant support and providing necessary guidance in completing the study.

We are grateful to the **Dr. Smita Sirohi, Project Coordinator and Principal Scientist, NDRI, Karnal** for approaching us for field work in Gujarat, providing study framework and necessary inputs in completing the data collection work for this study. We also thank **Dr. Sirohi** for giving us an opportunity to work for this project.

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The study would not have reached to this stage without the active co-operation of the Local Resource Persons and sample households (beneficiaries, non beneficiaries), who provided all the required data for the study without any hesitation and expectation. We thank each one of them for their invaluable support.

We have also received support and encouragements from our colleagues in the Centre while carrying out the study. We would specifically thank to Dr. M. Swain and Dr. S. R. Bhaiya for their support. We are also thankful to Shri M. C. Makwana, Shri T. B. Parihar, Ms. K. M. Kapadia, Ms. Priyanka Patel and Shri Sandeep Panchal for collecting the field data and feeding the data. Thanks to Shri D. N. Thakkar, Shri Deep Patel, Shri Vinod Parmar, and all staff of Accounts section for providing necessary support.

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Team Leader

December 2016

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List of Abbreviations

ASMM	-	Area Specific Mineral Mixture
A.I.	-	Artificial Insemination
A.I.C.	-	Artificial Insemination Centre
Av.	-	Average
BANAS DAIRY	-	Banaskantha District Cooperative Milk Producers' Union Limited
BDO	-	Block Development Officer
BEN	-	Beneficiary
BRGF	-	Backward Regions Grant Fund Programme
CB	-	Cross Breed
DADF	-	Department of Animal Husbandry, Dairying and Fisheries, New Delhi
DCS	-	Dairy Cooperative Society
DES	-	Directorate of Economics and Statistics
DM	-	Dry Matter
DPAP	-	Drought Prone Area Programme
EIA	-	End Implementing Agency
FDG	-	Focus Group Discussion
GCA	-	Gross Cropped Area
GCMMF	-	Gujarat Co-operative Milk Marketing Federation Limited
GIA	-	Gross Irrigated Area
GOG	-	Government of Gujarat
GOI	-	Government of India
GRO	-	Grievance Redressal Officer
ha	-	Hectare
HH/hh	-	Household
I.I.	-	Irrigation Intensity

IDA	-	International Development Association
INAPH	-	Information Network for Animal Productivity and Health
ISP	-	International Organization for Standardization
kg	-	kilograms
KVK	-	Krishi Vigyan Kendra
KM	-	Krishi Mohotsav
LTPD	-	Litres per day
LRP	-	Local Resource person
mha	-	Million hectares
MOA	-	Ministry of Agriculture
mt	-	Metric Tonnes
NA	-	Not Available
NBEN	-	Non-Beneficiary
NDDB	-	National Dairy Development Board
NDP	-	National Dairy Plan
Nos	-	Numbers
OF	-	Operation Flood
PCs	-	Producers Company
PDO	-	Project Development Objective
PMC	-	Project Management Cell
PMU	-	Project Management Unit
Prodvty.	-	Productivity
PSC	-	Project Steering Committee
RBP	-	Ration Balancing Programme
SC	-	Scheduled Caste
SNF	-	Solid Not Fat
ST	-	Scheduled Tribe
SUMUL	-	Surat Milk Union Limited
SWOT	-	Strength, Weakness, Opportunity and Threat
VAP	-	Village Awareness Programme
Y	-	Yield

Chapter I

Introduction

1.1 Introduction

Dairy development in India has been acclaimed as one of the most successful development programmes under the world's largest integrated dairy development programme 'Operation Flood' (Shiyani, 1996; NAAS, 2003). India ranks first in the world in milk production, which has increased to 146.31 million tonnes in 2014-15 from 17 million tonnes in 1950-51. Nearly 51 per cent of milk production is contributed by buffalo followed by cow (45%) and goats (4%). The per capita availability of the milk in the country has also increased significantly from 130 grams/day in 1950-51 to as increased to 322 gram per day in 2014-15 as against the world average of 294 grams per day during 2013. This represents sustained growth in the availability of milk and milk products for our growing population. However, there are large interregional and interstate variations in milk production as well as in per capita availability in India. The largest producer of milk is Uttar Pradesh which produces 17.2 per cent of the total milk production in the country followed by Rajasthan (11.6%) and Gujarat (7.99%). About 70 percent of national milk production comes from the major eight milk producing states, viz. Uttar Pradesh, Rajasthan, Andhra Pradesh, Gujarat, Punjab, Madhya Pradesh, Maharashtra and Haryana (Fig. 1.1). However, only 9 States were having per-capita availability more than the national average of 307 gm/day in the year 2013-14 (see, Fig. 1.2). The major milk-producing states in the country have good resource endowment and infrastructure, while eastern states are lagging behind in terms of dairy development. The country's estimated demand for milk is likely to be about 155 million tonnes by 2016-17 and around 200 million tonnes in 2021-22 (NDDB, 2014). To meet the growing demand, there is a need to increase the

annual incremental milk production from 4 million tonnes per year in past 10 years to 7.8 million tonnes in the next 8 years (210 million by 2021-22). To meet the growing demand, it is necessary to maintain the annual growth of over 4 per cent in the next 15 years. It is therefore, imperative to increase productivity of milch animals.

Dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities particularly for marginal and women farmers. Most of the milk is produced by animals reared by small, marginal farmers and landless labourers. It has been witnessed over the years that the stability in dairy income is far stronger than the income realised from agricultural activities (Kumar and Shah, 2016). While more than 75 million households in India are engaged in dairy farming, about 15.4 million farmers have been brought under the ambit of 1, 60,000 village level dairy corporative societies up to March 2014 (http://dahd.nic.in).

Fig. 1.1: Statewise share in total Milk Production 2014-15 (%)

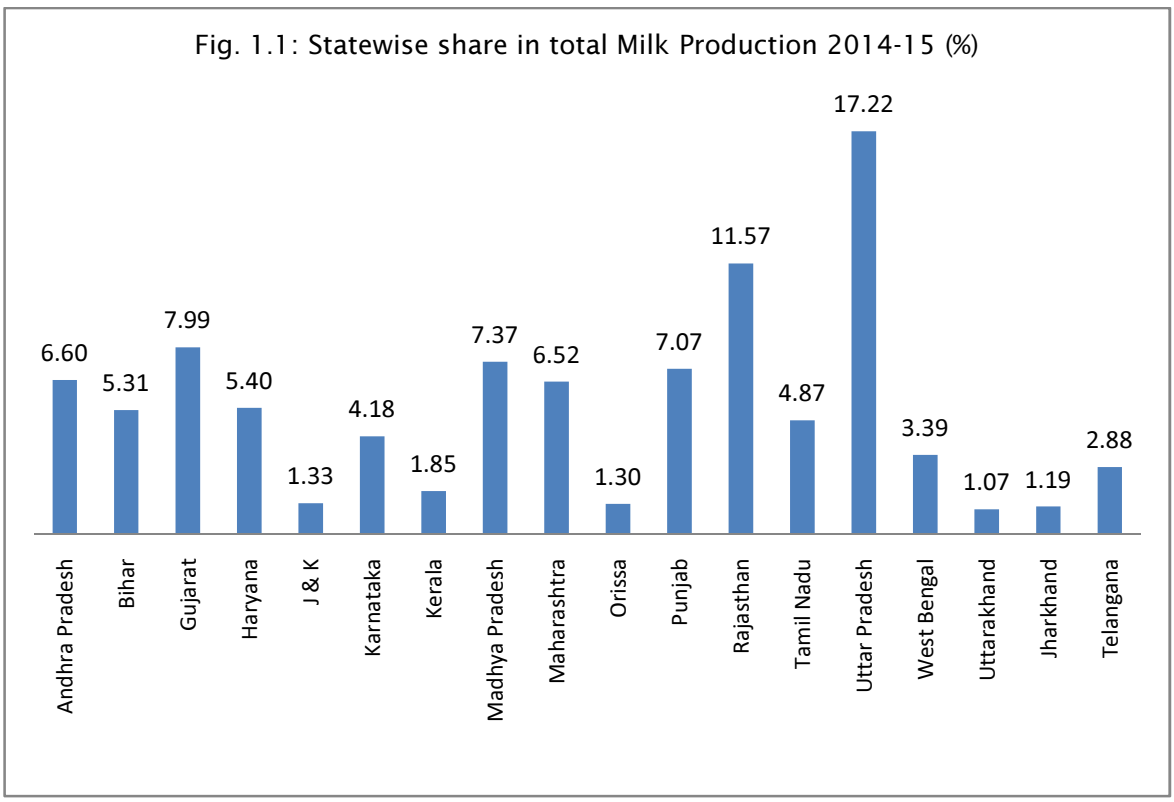
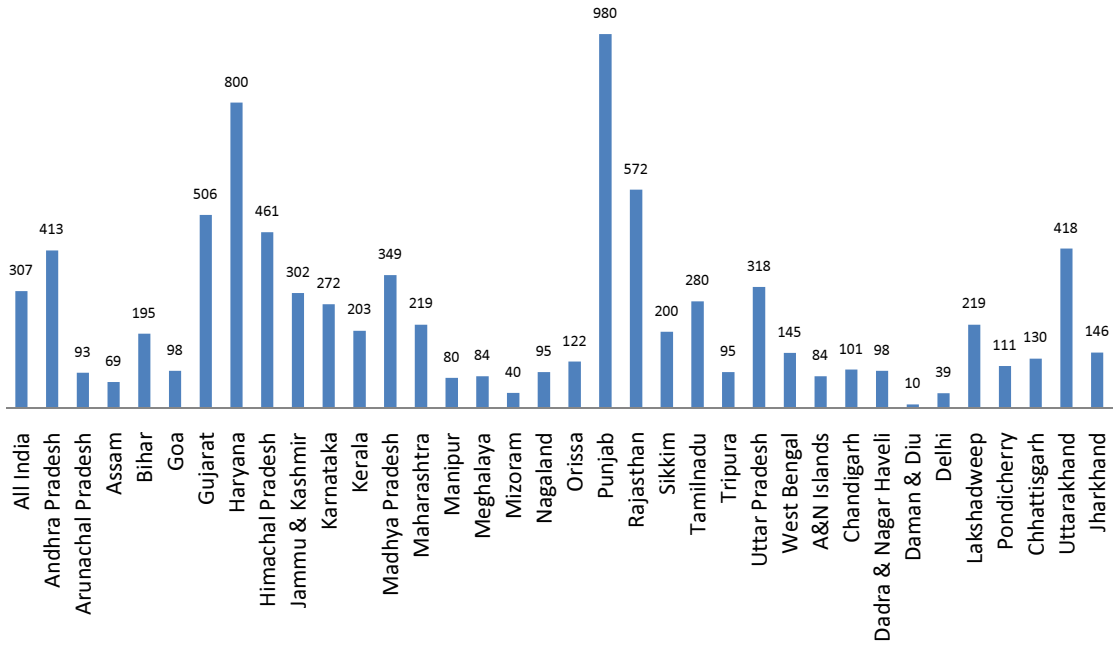


Fig. 1.2: State-wise Per Capita Milk Availability in India (2013-14)



India stands at first position in terms of cattle and buffalo population in the world. The population of cattle and buffalo in India was 218 million and 115 million in 2012 which accounts for 14.7 per cent and 58 per cent share respectively of world cattle and buffalo population. However, the productivity of dairy animals in India is very low as compared to other countries (Table 1.1). The reason cited for this is inappropriate feeding as well as inadequate supplies of quality feeds and fodder in addition to the low genetic profile of the Indigenous breeds. It is not be possible to achieve higher productivity in a milch animal by merely increasing its genetic potential, due attention needs to be given on proper feeding of milch animal. There is evidence to show that when a milch animal is fed a balanced diet, it receives the required nutrients to produce milk commensurate with its genetic potential. Research and field trials indicates that this approach to feeding has the potential to increase milk yield, reduce cost of milk production, and contribute to reducing methane emissions. Milch

animals are usually fed one or two locally available concentrate feed ingredients, grasses and crop residues. This often leads to an imbalanced ration–resulting in proteins, energy, minerals and vitamins being either in excess or deficient. Imbalanced feeding adversely impacts not only the health and productivity of animals but also affects income from milk production since an estimated 70 percent of the total cost of milk production is contributed by feed. Therefore, there is a need to educate milk producers on feeding balanced ration to their animals so that the nutrients required by their individual milch animals is fulfilled in an optimum manner, thereby improving milk production efficiency and the economic return.

Table 1.1: Milk yield in India and other selected countries (2012)

Country	Yield (kg/animal)	
	Cow	Buffalo
India	1196.0	1709.8
Israel	11579.7	NA
Canada	8816.8	NA
Denmark	8529.3	NA
USA	9841.3	NA
Saudi Arabia	10802.5	NA
South Korea	9895.8	NA
Pakistan	1263.5	1971.0
Sri Lanka	842.9	654.5
World average	2318.7	1612.4

Note: N.A. Not Available
Source: FAOSTAT.

With an aim to increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk as well as to provide rural milk producers with greater access to the organised milk-processing sector, Government of India had approved the scientifically planned multi-state initiative, i.e. National Dairy Plan Phase I (NDP I) as a Central Sector Scheme for a period of for a period

of six years from 2011-12 to 2016-17[1]. This plan was launched to cover 14 major milk producing States viz. Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal which account for over 90 per cent of the country's milk production, having 87 per cent of breedable cattle and buffalo population and 98 per cent of the fodder resources. In June/August 2015, the Union Government has included three more states viz. Uttarakhand, Jharkhand and Chhattisgarh and it has been extended up to 2018-19[2]. This plan is implemented wholly by National Dairy Development Board, Anand (Gujarat) through milk co-operatives and state agencies. The project includes a number of programs, of which Ration Balancing Program (RBP) is one among them which is designed with an aim to provide advisory on balance ration in order to improve milk yield of milch animals, reduce the feeding costs/kg of milk produced and reduction in methane release per kg of milk produced by animals. It is expected that through RBP programme, 40000 trained LRPs would provide ration balancing advisory services for about 2.7 million milch animals in 40000 villages.

NDP-I[3] is being implemented in 18 major milk producing states including state of Gujarat. Gujarat is a leading state in terms of its quality milch animals and milk production. Gujarat harbours some of the elite breeds of livestock like Girand, Kankrej, Mehsani, Surti, Jafarabadi and Banni buffalows, which have high milk yields. The Eighteenth Livestock Census (2007) of India has placed total livestock population at 529.7 million, out of which, 235.15 lakhs livestock (4.44%) was in the state of Gujarat. Gujarat ranks third position in

[1] Department of Animal Husbandry, Dairying and Fisheries, Government of India issued administrative approval of central sector scheme NDP I vide office memorandum F.No. 22-23/2011-DP dated 16 March 2012.

[2] Department of Animal Husbandry, Dairying and Fisheries, Government of India's addendum dated August 3, 2015 (F.No. 22-23/2011-DP).

[3] NDP-I and RBP is discussed in detail in Chapter II.

terms of milk production in the country with milk production of 116.91 lakh tonnes which is 7.99 per cent of entire country in 2014-15. The milk production in the state has increased by 99.4 per cent (from 5862 thousand tonnes in 2001-02 to 11691 thousand tonnes in 2014-15). Animal Husbandry is not only a subsidiary source of livelihood in rural Gujarat, it is a major economic activity, especially in the arid and semi-arid regions of the state. This sector plays a vital role in the rural economy of the state and has significant impact on employment generation for marginal, sub-marginal and landless farmers. Major share of motive power of agriculture comes from livestock. Livestock keeping- an integral part of farming system as land, labours and water can be efficiently utilized. In view of importance of this sub-sector in livelihood of majority of population in the state, State Government has taken several innovative steps in the recent past. An intensive animal vaccination program was launched in all the villages at the Krushi Mahotsav[4] held since four years, so as to focus on disease management and the rearing of healthy livestock In addition to vaccinating the livestock, animal health camps were also held. Farmers feeding balanced ration in different regions of the country/state have experienced an increase in their net daily income in the range of Rs 15 to 25 per animal. It is now four years since RBP is being implemented in the State of Gujarat and there is a need to access the performance of the scheme at ground level. Therefore present study was undertaken in Gujarat with following specific objectives.

[4] Krushi Mahotsav (KM) is an intensive convergence and mass contact strategy adopted by the Government of Gujarat, held every year for one full month during May-June. Its critical components include Krushi Mela, Exhibition and Seminars/Talks. Experts from agricultural universities directly interact with farmers at the village level and area specific and crop specific issues. Krushi Mahotsav has led to heightened awareness amongst farmers about the advantages of scientific farming and animal husbandry, benefits of drip irrigation and built a bridge between agri-scientists and the farming community (http://gujaratinformation.net/showpage.aspx?contentid=107).

1.2 Objectives of the study:

a) To evaluate the efficacy of RBP in increasing milk yield and/or reducing feed cost.
b) To examine the quality of service delivery by End Implementing Agencies (EIAs) and implementation of record keeping through use of the information technology (INAPH/MIS).
c) To assess the reporting & monitoring systems and institutional capacity building at various levels in the context of the RBP for ascertaining the provisioning of these services on a sustainable basis to the milk producers.
d) To document the innovative practices followed by EIAs to implement and make the RBP sustainable.
e) To identify the bottlenecks, if any, in the implementation of this on-going program and take the remedial measures accordingly, for a successful completion by the end of project period.

1.3 Data and Methodology:

The study is based on both, the secondary and primary level data. The secondary data pertain to the details of statewise milk production, NDP program, selected EIA and animal covered, selected villages, etc. were compiled from the published sources, NDDB and other websites.

1.3.1 Sampling Framework

The primary data were collected from the sample farmers selected on the basis of the sampling design described below and as presented in Fig. 1.3.

Selection of End Implementing Agency (EIAs):

The programme has been implemented in 4 EIAs of Gujarat, namely, Surat, Mehsana, Sabarkantha and Banaskantha. EIAs / Milk Unions are district level organizations, for implementation of RBP 200

(one module) / 400 (two module) villages are selected as EIA. For the present study, out of four EIAs, two EIA were selected, namely Surat and Banaskantha (see, Map 1.1). The selection of EIA was made keeping in view the diversity of livestock animal and agro-climatic conditions in these two selected regions of Gujarat so that diverse picture can be captured.

Selection of Villages (random):

Total 10 villages under each EIA were selected randomly out of the villages where RBP is being implemented. The selection of sample villages has been done in consultation with the EIAs by adopting the two criteria, viz. (i) RBP programme should implemented at least for a period of 6 months at the time of village selection, and (ii) the villages should geographically well represent the study area, that is should not be concentrated in one tehsil of area of the district/milk shed area (see Table 1.2).

Map 1.1: Location Map of Study Area-District Milk Unions in Gujarat, India

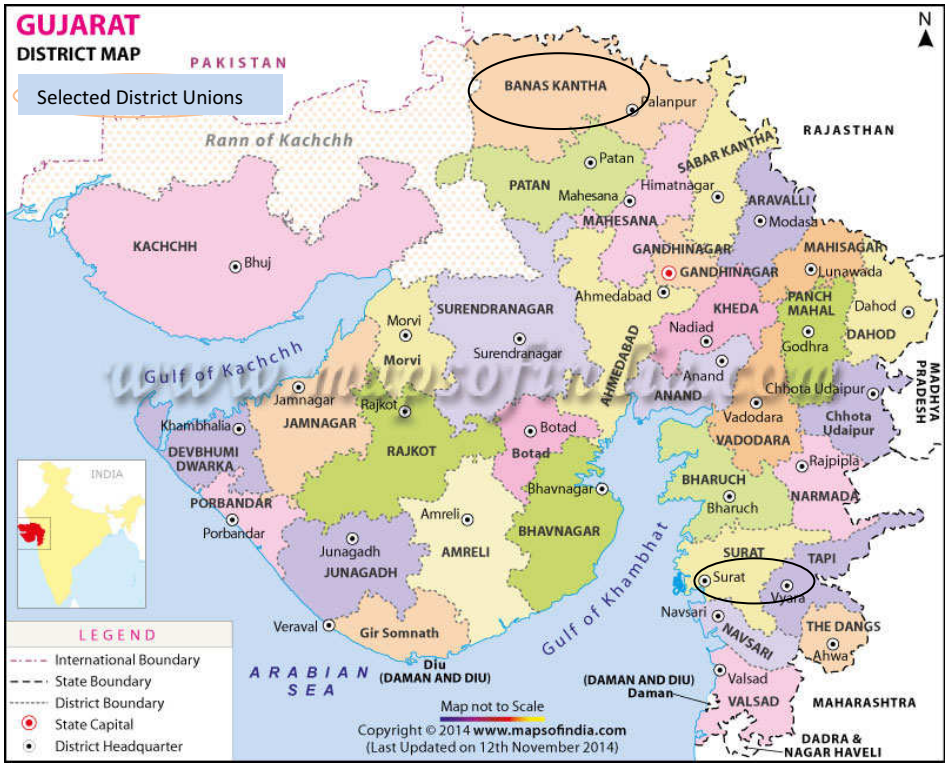


Fig. 1.3: Sampling Framework- Gujarat

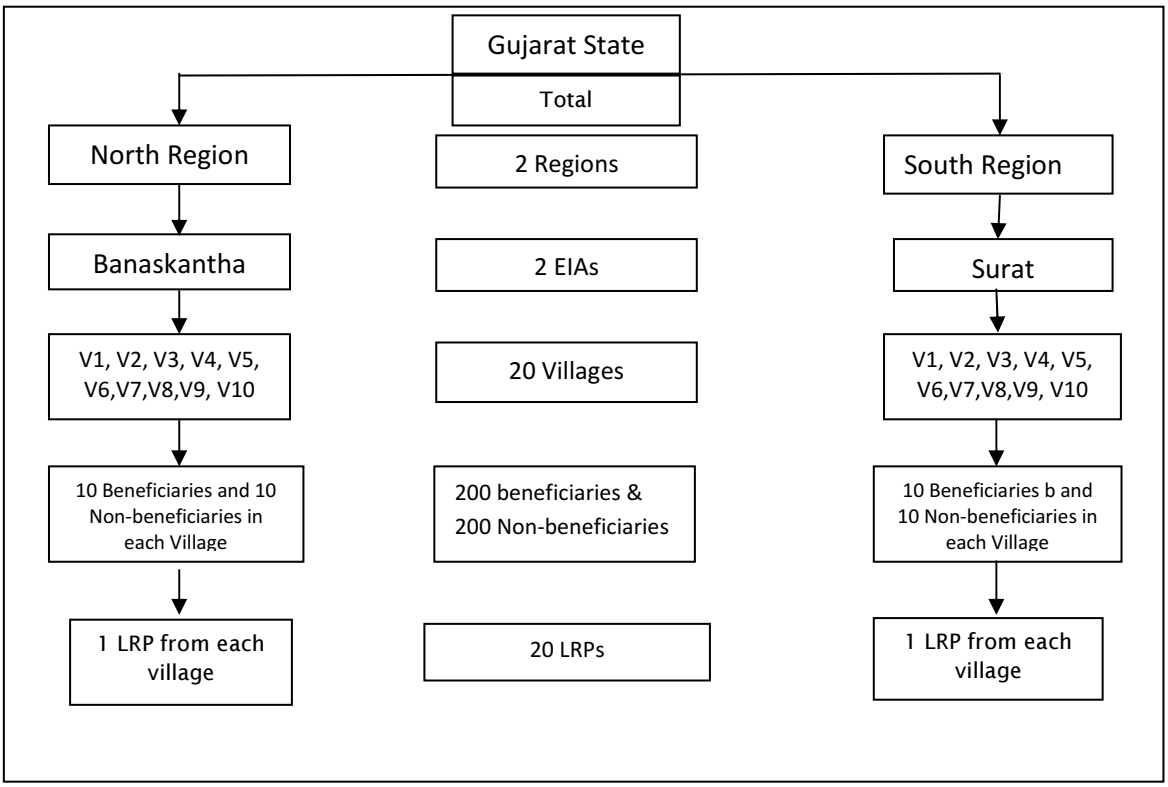


Table 1.2: List of Selected Villages in Selected District Unions

Sr. No.	Banaskantha district		Surat district	
	Village Name	Tehsil	Village	Tehsil
1	Ruppura	Palanpur	Allu	Bardoli
2	Genaji Rabari Goliya	Deesa	Tajpore Bujrang	Bardoli
3	Malosana	Vadgam	Machhisadada	Mahuva
4	Nanameda	Dhanera	Vaheval	Mahuva
5	Vaghor	Dantiwada	Naren	Mandvi
6	Haripura	Deodar	Dhajamba	Songadh
7	Bhordu	Tharad	Kaher	Valod
8	Jasara	Deesa	Umarkui	Vyara
9	Gela	Deesa	Shekhpur	Kamrej
10	Khengarpura	Tharad	Kadrama	Olpad

Selection of beneficiary households (random):

A sample of 10 beneficiary dairy farmers from each village was selected randomly. In case the number of beneficiaries in the selected village is less than 10, a cluster of proximate villages was constituted the sample frame for selection of beneficiary respondents.

Selection of non-beneficiary households (random):

A sample of 10 non-beneficiary dairy farmers from each village were selected randomly as the control group for analysis. In case, the number of non-beneficiaries in the selected village were less than 10, a cluster of proximate villages was constituted the sample frame for selection of beneficiary respondents.

Selection of milch animals:

All the milch animals on the sample households (both beneficiary and non-beneficiary) were covered for impact assessment.

Selection of Local Resource Person (LRP):

The LRP operating in each of the selected villages were interviewed for fulfilling the objectives of the study.

Thus, data were collected from the total sample of 200 beneficiaries, 200 non-beneficiaries and 20 LRPs from 20 selected villages from two districts unions (Banaskantha and Surat) of Gujarat.

1.3.2 Survey Schedules:

The different survey schedules for the collection of data have been developed. Four types of survey schedules were canvassed in the study area.

- ***Village Schedule 1.0:*** General information about the village regarding demographic particulars, dairy related infrastructure, basic information about the dairy cooperative society covering the village, etc.
- ***Household Schedule 2.0:*** Detail information about the feeding pattern constraints, perception, awareness about RBP, etc. from the sample beneficiary & non beneficiary farmers
- ***LRP Schedule 3.0:*** Information on the functioning of LRP, constraints faced by him/her, etc.
- ***EIA Schedule 4.0:*** Semi-structured schedule to get overall information of the RBP program with the officials of EIA.

Nature of Data collected:

Information was collected from the beneficiary and non-beneficiary households on structured interview schedules as mentioned above. The major aspects on which data were collected were as follows: quantity of different types of feed and fodder fed to animals, milk yield, milk fat, household and village characteristics, prices of feed inputs and milk output. General information on animal health, milk consumption, employment opportunities, awareness on ration balancing, capacity of households to scaled up dairy activities, coverage and quality of services under RBP, their timeliness, mode of implementation, etc. In addition to the information collected from the farm households, the interaction and interviews with the various functionaries such as EIA, LRPs and other stakeholders in the project boundary has been carried out to examine these aspects. Based on the Focus Group Discussions (FGDs) involving the farmers, LRPs and EIA, and in-depth observations of the mechanism that has been put in place under the RBP, the sustainability of the RBP is evaluated.

1.3.3 Analytical Framework: The analytical framework used for the study has been discussed under different sub-heads covering various aspects of RBP programme:

Effects and Outcomes:

Quantitative assessment: In accordance with the first objective of the study, a quantitative assessment of impact of RBP was carried out using two outcome variables: i) milk productivity (ii) gross returns from milk.

Qualitative assessment: In addition to the quantitative assessment of the two outcome variables, the effect on following parameters was evaluated on the basis of the primary data collected from the beneficiary households: i) milk fat, (ii) animal health, (iii) conception rate, (iv) milk consumption, (v) employment opportunities, (vi) awareness on ration balancing, (vii) livelihood of the women and vulnerable group beneficiaries, and (viii) capacity of households to scaled up dairy activities.

Effectiveness

Commensurate with the second objective of the study, the effectiveness of the programme was evaluated in terms of the program status with respect to its coverage, quality of services, their timeliness, mode of implementation, etc. In addition to the information collected from the farm households, the interaction and interviews with the various functionaries of EIA, LRPs and other stakeholders in the project boundary will be carried out to examine these aspects.

Sustainability

Based on the Focus Group Discussions (FGDs) involving the farmers, LRPs and EIA, and in-depth observations of the mechanism

that has been put in place under the RBP, the following questions were addressed:

- What mechanisms have been put in place to ensure sustainability of program results, for instance, has the capacity of DCS and other EIAs improved for delivering better goods and services to dairy farmers; what is the extent of institutional capacity building a various levels in the context of the RBP for ascertaining the provisioning of these services on a sustainable basis to the milk producers ?
- Have any innovative practices been adopted by the EIA in implementing the programme?
- What kind of reporting and monitoring system has been put into place?
- Do the stakeholders have a sense of ownership of the program? Are beneficiary households likely to continue receiving RBP advisory services after the program ends as a paid service?
- Are LRPs likely to continue operating and remain financially viable after the program ends?

Lessons learned

The delineation of constraints faced in each stage of the RBP has formed the basis of highlighting the lessons learned for its further improvement.

1.4 Limitations of the Study

The study is based on both primary and secondary level of data and hence the accuracy of results depends on the accuracy with which the data were generated. The secondary data on few aspects were not provided by the EIA, thus could not estimate the impact accurately. As in some cases, different types and colours of tag were found in untagged condition with some of the dairy farmers as well as in few

cases, the number of animals covered mismatch with the actual number of animals covered in record. Some LRPs were not satisfied with remuneration they get, thus did not show much interest in providing data and support. These posed the major constraints to assess the impact of RBP.

1.5 Organization of Report

The present study report is divided into five chapters including this introductory chapter. The details on NDP I and RBP have been presented in Chapter II. The Chapter III presents socio-economic status of selected area and unions, sample households and LRP. The Chapter IV discusses the findings from field survey and data analysed. The outreach, perceptions and constraints in implementation of programme are presented and discussed in Chapter V and the last chapter presents the summary of findings of the study and some policy implications.

The next chapter presents the information on NDP I programme having details focus on program under study.

Chapter II

NDP I - Ration Balancing Program

2.1 Introduction:

Before we discuss about the adoption and effect of advisory given to dairy farmer by LRP under RBP, it is important to discuss in brief about the National Dairy Plan Phase I (NDP I) and its one of the subcomponents, i.e. Ration Balancing Programme (RBP) which is major focus of this study.

2.2 National Dairy Plan Phase I (NDP I):

As mentioned in earlier chapter, National Dairy Plan Phase I (NDP I) is a Central Sector Scheme for a period of 2012-13 to 2018-19 envisaging a scientifically planned multi-state initiative with the following Project Development Objectives (PDO:

(a) To help increase productivity of milch animals and there by milk production to meet the rapidly growing demand for milk;
(b) To help provide rural milk producers with greater access to the organized milk-processing sector.

The above mentioned objectives are being pursued through adoption of focused scientific and systematic processes in provision of technical inputs supported by appropriate policy and regulatory measures. NDP I is implemented in 18 major milk producing states namely Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, Telangana, Uttarakhand, Jharkhand and Chhattisgarh which together account for over 90 per cent of the country's milk production. Coverage of NDP I is however be across the country in terms of benefits accruing from the scheme.

NDP-I is implemented with a total investment of about Rs. 2242 crore comprising Rs. 1584 crore as International Development Association (IDA) credit, Rs. 176 crore as Government of India share, Rs. 282 crore as share of End Implementing Agencies (EIAs) that carry out the projects in participating states and Rs 200 crore by National Dairy Development Board and its subsidiaries for providing technical and implementation support to the project. NDP I is being implemented by National Dairy Development Board (NDDB), Anand through End Implementing Agencies. A Project Management Unit (PMU) located in NDDB, headed by a Mission Director, manages implementation of the project and monitor day-to-day project activities. The PMU appraise the sub project plans received from the EIAs and recommend plans for approval to the Project Steering Committee (PSC). The PMU include a multi-disciplinary team and responsible for preparation of annual plans; coordination with End Implementing Agencies (EIAs); project financial management; quality assurance and control; monitoring of the project inputs/outputs/ outcomes/processes /impacts; and providing support to EIAs as needed. In case of RBP, listed EIA includes Milk Unions/ Federations/ Producer Companies.

As mentioned earlier, NDP-I plan to cover about 2.7 million milch animals in 40,000 villages using about 40,000 local resource persons (LRPs) which need to be identified, trained and supervised by existing dairy cooperatives and producer companies. The project finances the training costs, necessary equipments, and a modest monthly stipend for the LRPs on a tapering basis for about two years. Thereafter, it is targeted that the LRPs would earn a self-sustaining income from the commission through sale of area specific mineral mixture (ASMM[1]) and other neutraceutical products.

[1] NDDB has completed mineral mapping for various states/ region and accordingly area specific mineral mixture formulations have been developed. ASMM has to be fed @ 100-200 g daily, depending upon level of milk production in lactating animals, 50 g daily for growing and non-producing animals and 25 g daily for calves (http://www.nddb.org).

2.2.1 Components and Sub-components

The project includes a number of programs which could have favorable impact on milk production, breed improvement and improvement in yield of milch animals in the project areas (Table 2.1).

Table 2.1: NDP I- Components and Sub-components with Project Outlay

Sr. No.		Outlay (Rs. in Crore)				% to Total Outlay
		IDA Credit	GoI's Share	EIA's share	Total Outlay	
A	Productivity Enhancement	1026	114	22	1162	56.90
(a)	Production of high genetic merit (HGM) cattle and buffalo bulls and import of bulls/ semen/ embryos of HF and Jersey breeds for semen production.	267	30	0	297	14.54
(b)	Strengthening existing Semen Stations/ Starting new stations for producing high quality disease free semen doses	213	24	22	259	12.68
(c)	Setting up a pilot model for viable doorstep AI delivery services (based on Standard Operating Procedures [SOPs]) through a professional service provider including animal tagging and performance record	163	18	0	181	8.86
(d)	Scientific nutrition programme for milch animals to produce milk commensurate with their genetic potential and to reduce methane emission	383	42	0	425	20.81
	i) Ration Balancing Programme	**324**	**36**	**0**	**360**	**17.63**
	ii) Fodder Development	59	6	0	65	3.18
B	Village based milk procurement systems for weighing, testing quality of milk received and making payment to milk producers	439	49	259	747	36.58
C	Project Management & Learning	119	13	0	132	6.46
(a)	a) ICT for MIS	53	6	0	59	2.89
(b)	b) Learning and Evaluation	66	7	0	73	3.57
D	Grand Total	1584	176	282	2042	100.00

Source: http://www.nddb.org/services/animalnutrition/rationbalance

[A] Productivity Enhancement

This component aims at increasing bovine productivity through a scientific approach to animal breeding and nutrition. The main expected results from the interventions proposed under Component A are increased milk production through increased productivity per milk animal, increase in in-milk animals, improved AI (artificial insemination) conception rates, improved animal nutrition, reduction in feeding costs/kg of milk produced and reduction in methane release per kg of milk produced by animals covered under Ration Balancing Program (RBP). For this component, the highest share in total project cost is earmarked, i.e. 56.90 per cent. Out of the total budget allotted for this component, RBP is covered under one of four sub-components (Scientific nutrition programme for milch animals to produce milk commensurate with their genetic potential and to reduce methane emission), which accounts for about 31 percent share in budget allocated for Component 'A' and around 18 per cent of total budget of this program..

[B] **Village based milk procurement systems:**

Efforts to increase milk production through increase in productivity would need to be supported by expanding the setting up of village based milk procurement systems to collect milk in a fair and transparent manner and ensure timely payments. Investments in village level infrastructure for milk collection and bulking such as milk cans, bulk milk coolers for a cluster of villages, associated weighing and testing equipment and related IT equipment would be made. The main expected results from the interventions proposed under this initiative are an increase in the number of additional villages covered and more milk producers organized into Dairy Cooperative Societies and Milk Producer Institutions. About 37 per cent of project cost is allotted to this component.

[C] Project Management and Learning

The main expected results under Component C are effective coordination of project activities among various EIAs, timely preparation and implementation of annual plans, regular review and reporting of project progress and results, a comprehensive and functional project management information system (MIS) and learning that will support improvement and innovation. Importantly, it will also facilitate the development of the skills and knowledge of personnel involved in the implementation of the project and develops capabilities for enhanced capacity building which would extend beyond the life of the project. About 6.5 per cent of total project cost is earmarked for this component.

2.2.2 Need of Ration Balancing:

Farmers feed their animals based on their traditional knowledge and information passed through generations with crop residues, locally available one or two feed ingredients like brans, oil-cakes, chunnies, grains etc. and seasonally available green fodders. They rarely offer mineral mixture to their animals or in a very less quantity of 25g to 50g per day. In most of the cases, the quantity of feed/fodder offered to animals is either more or less than the requirements. This leads to an imbalance of protein, energy and minerals in their ration. Animals on such imbalanced ration produce milk sub-optimally, cost of milk production is higher and it affects the health and fertility of animals. Besides, it also reduces the net daily income to milk producers from dairying because the potential of milk production of animals is not fully exploited. The disadvantages of imbalanced feedings are as below:

- Low milk production, poor growth and reproduction
- Milk production of animals lower than their genetic potential
- Shorter lactation length and increased inter-calving period

- Animals more prone to metabolic disease such as milk fever & ketosis
- Slow growth of young animals delaying the age of first calving
- Low productivity and shorter duration of productive life.
- More methane production per kg of milk yield.

Therefore, milk producers need to understand the implications of imbalanced feeding and recognise the importance of giving their animals balanced ration. Thus, it is necessary to educate farmers on feeding of balanced ration. Ration Balancing Program is one of such programmes adopted under NDP-I to provide advices to farmers at their door step.

What is Ration balancing?

All species required balanced ration for optimal growth. Ration balancing is the process to balance the level of various nutrients of animals, from the available feed resources, to meet its nutrient requirements for maintenance and production. It is the ration that provides all the essential nutrients to the animal in such a proportion and amount that is required for the proper nourishment of animal in 24 hours. A balanced ration[2] would provide protein, energy, minerals and vitamins from dry fodders, green fodders, concentrates, mineral supplements etc, in appropriate quantities to keep the animal in its form to perform best in respect of production and health. The different types of dietary feed ingredients are as below:

- ***Compound cattle feed:*** This is considered to be a balanced source of nutrients for growth and milk production. However, only 10 to 12 per cent of the total feed ingredients are used to produce compound cattle feed. Compound cattle feed does not always complement the feed ingredients used by milk producers.

[2] http://www.nddb.org/sites/default/files/pdfs/guidelines/PIP-Vol-V-Guidelines-on-RBP-FD.pdf

- ***Other feeds:*** Feed ingredients like rapeseed cake/meal, groundnut cake/meal, sunflower meal, cotton seed cake/meal, soya bean meal, guar meal, maize gluten, sesame cake, coconut cake, linseed cake, safflower meal, de-oiled rice bran, rice polish, wheat bran, maize bran, sorghum grain, wheat, broken rice, millets and channels are fed as such, depending on availability and cost.
- ***Crops residues and grasses:*** Wheat straw, paddy straw, sorghum straw, maize stovers, straw of pearl millet and locally available grasses are fed as basal feed.
- ***Green Fodder:*** Maize, sorghum, oats, hybrid napier bajra, Lucerne, cowpea and berseem are available seasonally and fed in a limited quantity.
- ***Mineral mixture:*** This is a source of macro and micro minerals, usually lacking in the animals' ration.

2.2.3 NDDB's Ration Balancing Program (RBP):

The estimation of nutrient requirement of an animal depends on factors like animal type, class, age, pregnancy status, body weight, milk yield, milk fat, months of calving etc. Information on nutrients availability from the feeds and fodder being fed is required to assess the nutrients supply. Based on nutrient requirement and availability of feed resources, a least cost animal ration is formulated. This formulation is a complex exercise and is very difficult to work out manually. Therefore, National Dairy Development Board (NDDB) has developed the software, Information Network for Animal Productivity and Health (INAPH), which will formulate least cost balanced ration.

The objective of NDDB's RBP is to produce an optimum quantity of milk at the least cost from milch animals by readjusting, wherever required, the proportion of locally available dietary feed ingredients, so as to provide them adequate amounts of proteins, minerals, vitamins as well as energy. NDDB developed user-friendly software for ration

balancing which is used by dedicated local resource persons (LRPs). The LRP is trained by the implementing agency to effectively use the software in the local language and involves the following steps:

1. *Assessing nutrient status of animals:* This is assessed on the basis of prevalent feeding practises as well as factors such as level of milk production, milk fat per cent, body weight, lactation stage and pregnancy status.
2. *Assessing chemical composition of locally available feed resources*: The software contains a data base of the analyses of the chemical composition of feeds and fodders available in various parts of the country. The chemical composition of different grains, oil cakes/meals, brans, chunnies, agro0industrial byproducts, cultivated green fodders, grasses, crop residues, tree leaves and mineral supplements can be known through this software.
3. *Assessing nutrient requirement of animals*: The software has a database of the nutrient requirements of the various types of animals based on the feeding standards commonly followed in India. The total nutrient of an animal is assessed for dry matter, crude protein, total digestible nutrients (TDN), calcium and phosphorus
4. *Formulating least cost balanced ration using locally available resources*: Based on chemical composition of available feed resources and in accordance with the nutrient requirement of the animal/s, the software compute the least cost ration within the given nutritional and available resource constraints. Accordingly, LRP provide advisory note to the milk producer to prepare the least cost ration using feed ingredients in the proportion as indicated by the software. In case there is a change in feed resources, the LRP reformulates the least cost ration through the software.

The LRP revisits the milk producer according to his/her requirement and keeps a record of the various observations related to the quality and quantity of milk, including the cost of milk production before and after implementation of the RBP and increase in the net daily income per animal. For this purpose, implementing agencies provide the necessary facilities such as a personal digital assistant/ netbook loaded with NDDB's RBP software, a weighing balance, measuring tape and ear tags with applicators, to the LRP. The LRP functions in a dedicated manner to implement the RBP in a village and provides services to the farmers. Various agencies such as dairy cooperatives, service providing organisations and NGOs can implement the RBP.

The benefits of RBP are as follows:

- Proper use of locally available feed resources to balance the ration of animals at least cost
- Increases milk production with more fat and solids-not-fat (SNF)
- Helps increasing the net daily income
- Improves reproduction efficiency
- Helps reducing inter-calving period, thereby increasing the productive life of animals
- Improves the general health of animals
- Improves the growth rate in growing calves, leading to early maturity

Thus, RBP (NDP-I) aims to create awareness amongst the milk producers on optimization of animal feeding by efficient utilization of locally available feed resources at the possible least cost. RBP has been designed to deliver the following benefits, (a) increased milk productivity, (b) reduced cost of milk production, and (c) reduced methane emission. It is primarily an extension program wherein advisory support is provided to dairy farmers at their doorstep, through

trained Local Resource Persons (LRPs). LRP ear tag the animals, record animal profile as well as present feeding practices and then give a least cost balanced ration advice to the farmer with the help of ration balancing application of INAPH software. NDDB developed software can be used on desktops, laptops, net-books, tablets as well as phones.

The project aims to demonstrate a new approach to extension by underlining the importance of unique identification of animals, their performance measurement and advisory support at farmers doorstep. It is envisaged under the project that each animal covered under RBP would be uniquely identified with an ear tag so as to enable monitoring of its productivity as well as efficiency of RBP through data to be fed into a performance recording system. Proper and effective training is the key for successful countrywide implementation of ration balancing programme (RBP) envisaged under NDP I. The technical officers, animal nutritionists and trainers of end implementing agencies (EIAs) are trained at NDDB who in turn impart training to local resource persons (LRPs) at EIA level.

Besides, providing advisory services to dairy farmers on feeding balanced ration to their animals, trained LRPs also educate the milk producers on the latest technologies such as feeding milch animals with bypass protein, bypass fat, ASMM, treated or enriched crop residues etc. Besides, milk producers would also be educated on importance of drinking water, proper mangers for feeding the animals, significance of colostrum feeding to newly born calves, chaffing of fodder, de-worming, vaccination, timely insemination etc.

The next chapter presents the socio-economic background of selected district milk unions, villages and households.

Chapter III

Socio-Economic Characteristics of Selected District Milk Unions, Villages, Sample Households & LRPs

3.1 About Selected District/District Milk Union

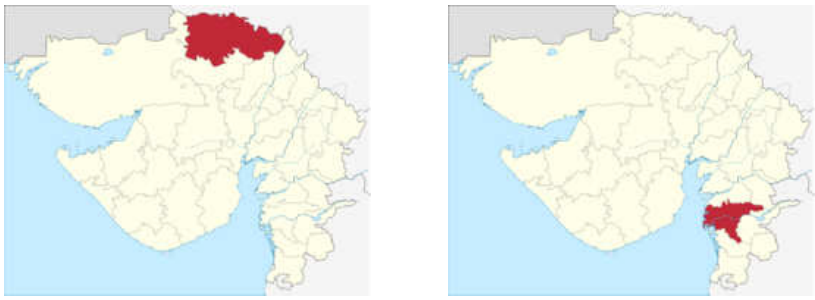
As mentioned earlier, this programme has been implemented in four district cooperative milk unions of Gujarat (Surat, Mehsana, Sabarkantha and Banaskantha). These unions are named as End Implementation Agency (EIA). Out of these four EIAs, two EIA were selected for the study, viz. Surat and Banaskantha (Map 3.1). The basic information of selected EIA is presented in Table 3.1. Surat EIA cover 1500 villages and 1128 primary cooperative milk societies spread over two districts (Surat & Tapi). Banaskantha EIA covers relatively less number of villages (1409) but more number of milk societies (1250) as compared to Surat. The annual collection of Banaskantha dairy was around 11724 lakh liters while same was around 3903 lakh litres in Surat. The dominance of milch cows was found in Surat while large number of milch buffaloes were recorded in Banaskantha.

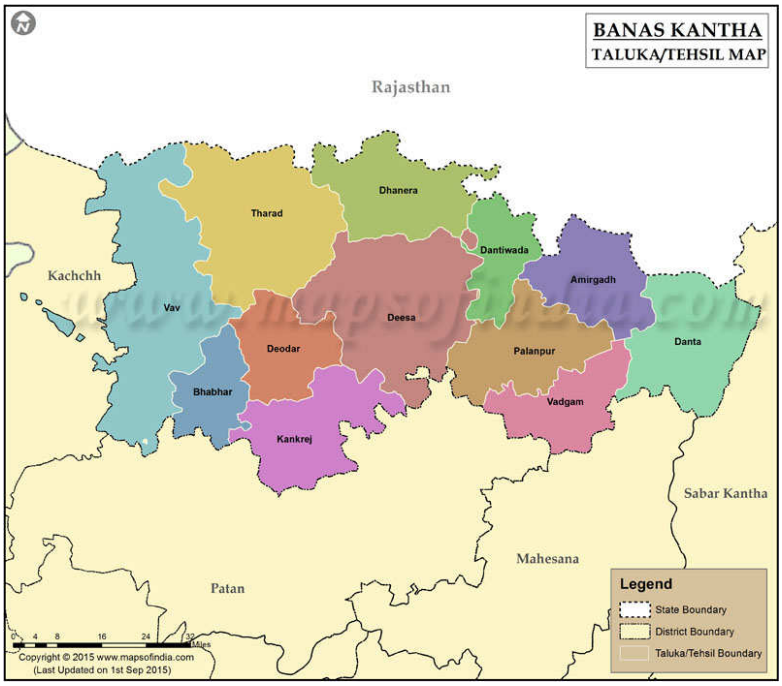
Table 3.1: Basic information about EIA

Sr. No.	Particulars	Surat	Banaskantha
1	Milk Union (name)	Surat Milk Union	Banaskantha Milk Union
2	Districts Covered (no.)	02 (Surat & Tapi)	01 (Banaskantha)
3	Total number of Villages Covered	1500	1409
4	Total Number of village level Dairy Cooperative Societies	1128	1250
5	Milch Animals (no.)	LC:245789 CB:412578 BU:215364	LC:144656 CB:241964 BU:1068227
6.	Annual Milk Procurement (lakh litres)	3903.2	11723.8

Source: Data provided by respective milk union.

Map 3.1: District Map of Banaskantha and Surat





3.1.1 Surat:

Surat[1] district in the state of Gujarat with Surat city as the administrative headquarters of this district, is surrounded by Bharuch, Narmada (North), Navsari (South) districts and east Tapi district, and to the west is the Gulf of Cambay. It is the second-most advanced district in Gujarat. It had a population of 6,079,231 of which 79.68 per cent were urban (as of 2011). On 2 October 2007, Surat district was split into two by the creation of a new Tapi district, under the Surat District Re-organisation Act 2007. As of 2011, it is the second most populous district of Gujarat (out of 33) after Ahmadabad. Surat district's total area is 4,418 sq. km, and the density was 1,376 per sq.km (2011 Census). Surat has a sex ratio of 788 females for every 1000 males, and a literacy rate of 86.5 per cent.

SUMUL/Sumul[2] or Surat Milk Union Limited, which is now renamed as The Surat District Co-operative Milk Producers' Union Ltd, is one among the 17 district unions which acts as manufacturing units of dairy products for Gujarat Co-operative Milk Marketing Federation Limited (GCMMF), the marketers of Amul brand of dairy products. Surat district has been a pioneer in India in channeling trade in Cotton and Milk through co-operatives. Before SUMUL stepped in, traditional private milk traders were dominant in the area. The private trade was monopolizing the milk market and exploiting both the milk producers and consumers alike. The milk procurement price which used to be fixed by the traders (traditional *Bhatias*) was very low and was fluctuating from time to time at their sole discretion. This has capitalized on the absence of any infrastructure and processing facilities and has managed to keep producers from deriving equitable benefits from the marketable surplus generated. As such their income from milk was very low and they had no incentive for modern dairy

[1] https://en.wikipedia.org/wiki/Surat_district
[2] http://sumul.com/sumul-history.html

farming. The farmers resented/disliked the system, but were helpless in the face of these traditional constraints and to their own lack of resourcelessness.

Map 3.2: Work Area Map of SUMUL

Dairying on the other hand, was never popular with tribal's (a major rural population in the district) as practically no infrastructure existed for milk marketing in their talukas, inaccessibility to their villages as well as taboos regarding keeping of buffaloes prevented the entire population of tribal's from considering dairying as a source of income. The tribal's kept their cows to produce bullocks rather than milk, which was insufficient even to nurse the calves. Most of the tribal's were unaware of the usual milch breeds. Hygienic and pure milk was almost unknown in the market. In fact unbridled adulteration of milk was practiced by these traders to meet the growing demand of milk in the city. To salvage the poor producers from the clutches of these private traders, organisation and integration of procurement, processing and marketing of milk and milk products by the producers themselves on a sound co-operative line was essential for elimination of middlemen, equitable distribution of benefits to rural milk producers and indirectly to urban milk consumers as well. Hence, the Surat

District Co. operative Milk Producers' Union Ltd., SUMUL is trade name and literally meaning sound price, came into existence on August 22, 1951. The work area map of SUMUL is presented in Map 3.2 and details on plants are presented in Table 3.2.

Table 3.2: Details of SUMUL Plants

Unit	Place	Capacity	Employees	Distance from Surat
SUMUL DAIRY	Surat	5 Lakh LTPD	591	0 km
Navi Pardi Chilling Centre	Navi Pardi	2 Lakh LTPD	66	25 km
Uchchhal Chilling Centre	Uchchhal	1 Lakh LTPD	49	105 km
Bajipura Chilling Centre	Bajipura	3 Lakh LTPD	113	50 km
Sumuldan Factory	Chalthan	300 MT PD	96	18 km
Nasik Plant	Nasik	---	---	330 km
Nizer Chilling Centre	Nizer	63.000 LTPD	16	175 km

Source: http://sumul.com

In order to comply with the national and international standards, union had got certificate of ISO 9001:2015 a Quality Management System. In order to comply with the new Government of India regulations on Food Safety and Standards, SUMUL has introduced ISO 22000:2005 a Food Safety Management System by DNV GL[3]. Thus, dairy took responsibility starts right from animal care, milk society, bulk chilling unit, chilling centre, transportation, care and caution during processes at central dairy plant, and ensure supply of clean, safe and quality milk to consumers in view of slogan 'Grass to Glass'. Total 262 societies are being certified with ISO 9001:2008. SUMUL has achieved recordable targets regarding environment in every field. The progress made by the SUMUL in milk procurement and sale are presented in Figures 3.1 to 3.4.

[3] Driven by purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business (https://www.dnvgl.com/careers/).

Fig. 3.1: SUMUL-Milk Procurement (1996-1997 to 2015-2016)

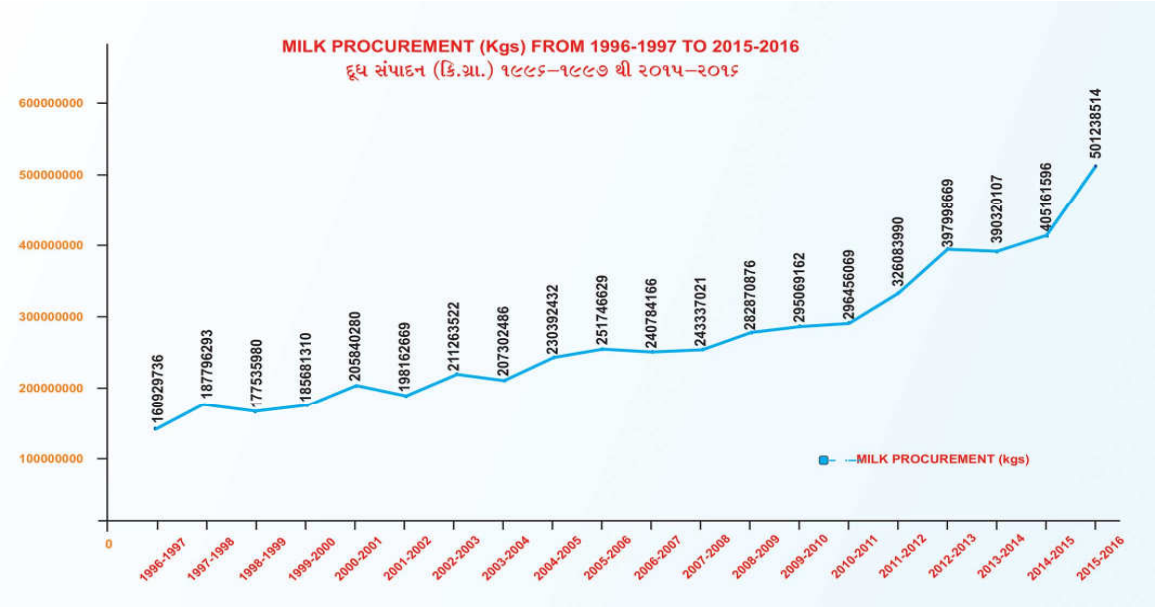


Fig. 3.2: SUMUL- Milk Sale (1996-1997 fo 2015-2016)

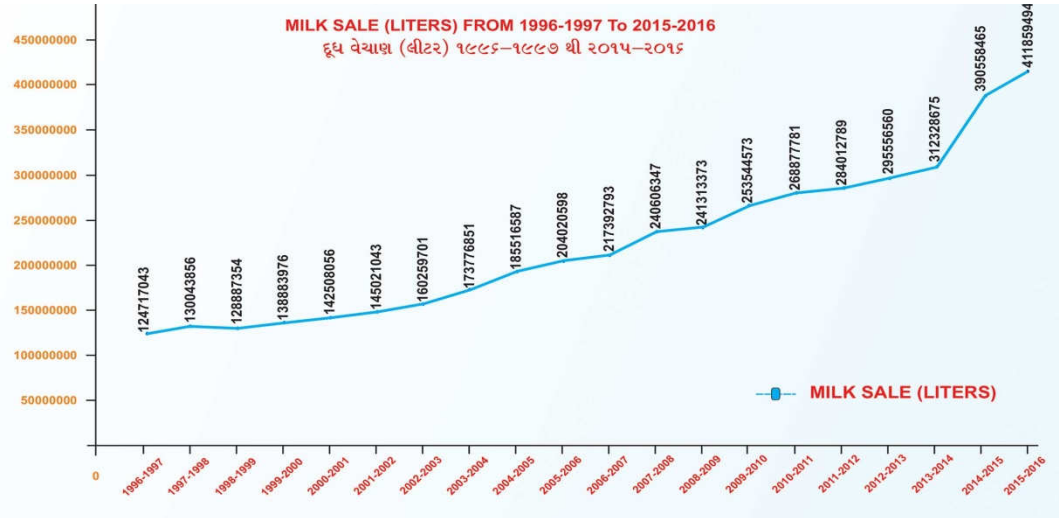


Fig. 3.3: SUMUL-Milk Procurement v/s Milk Sale (2015-2016)

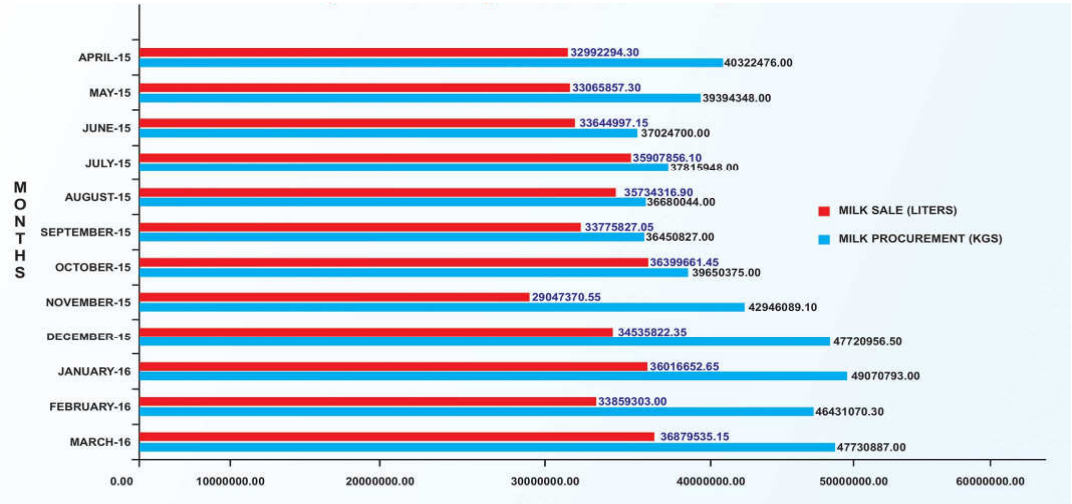
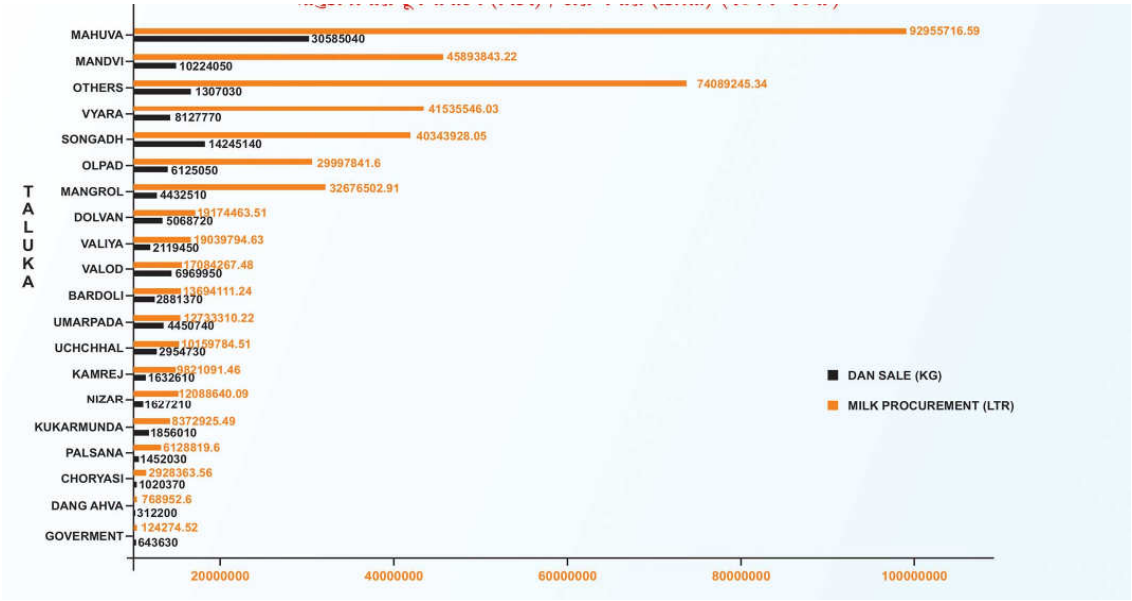


Fig. 3.4: SUMUL- Taluka wise Milk Procurement v/s Cattle Feed Sale (2015-2016)



3.1.2 Banaskantha

Banaskantha [4] is one among the thirty-three districts of the Gujarat having administrative headquarters at Palanpur which is also its largest city. The district is located in the Northeast of Gujarat and is presumably named after the West Banas River which runs through the valley between Mount Abu and Aravalli Range, flowing to the plains of Gujarat in this region and towards the Rann of Kutch. Banaskantha has a population of 3116045 of which 13.27 per cent were urban (2011). It covers an area of 10,400 km^2 and is the second largest district in the state. Banaskantha shares its borders with Rajasthan state in the North, Sabarkantha district in East, Kutch district in West and Patan district and Mehsana district in the South. In the year 2006, the Union Ministry of Panchayati Raj, GOI named Banaskantha one of the country's 250 most backward districts (out of a total of 640). It is one of the six districts in Gujarat currently receiving funds from the Backward Regions Grant Fund Programme (BRGF). Banaskantha has a sex ratio of 936 females for every 1000 males, and a literacy rate of 66.39 per cent.

[4] https://en.wikipedia.org/wiki/Banaskantha_district

Banaskantha District Cooperative Milk Producers' Union Limited[5], Palanpur known as BANAS Dairy is a cooperative organization established in the year 1969 under the Gujarat Co-operative societies Act 1961 with the support of NDDB as a part of their Operation Flood Program launched to bring about white revolution in the country. This dairy manufacture a large number of dairy products under AMUL, SAGAR and BANAS brands, and product range includes Amul Pasteurised Milk, Amul longer Shelf Life Milk, Amul Butter, Amul Ghee, Sagar Ghee, Amulya Powder, Sagar Tea and Coffe Whitner, Sagar SMP, Amul SMP, Amul Shakti Powder, a wide range of Amul Ice Creams, Banas Peda, Banas Tea, etc. The products of dairy are marketed through GCMMF, Anand. Dairy Union also provide a large number of technical inputs to over 1.8 lakh farmer households, which are organised through 1200 odd Village level Cooperative Milk Societies.

3.2 Coverage of RBP

It can be seen from the Table 3.3 that official inception of RBP in Banaskantha was in July 2012 while it was in February 2013 in Surat. Both the unions are yet to achieve the target fixed.

Table 3.3: Coverage of RBP in Selected Study Area (as on 31st May, 2015)

Sr. No.	Particulars	Surat		Banaskantha	
A	Date of official inception of RBP	February 2013		July 2012	
B	Target and Achievements	Target	Achievement	Target	Achievement
1	Staff Position- at Union level	6	6	13	9
2	Net-books purchased (no.)	420	420	420	420
3	LRPs trained (no.)	400	382	400	367
5	LRPs functioning (no.)	400	313	400	349
5	VAP Conducted (no.)	1000	104	1000	1001
6	Villages covered (no.)	400	318	400	311
7	Animals Covered (no.)	40000	28841	40000	31694

Source: Data provided by respective milk union.

[5] http://banasdairy.coop/aboutus.html

3.3 About Selected Villages

The information on selected villages such as basic details, workers population and amenities available are presented in Tables 3.4 to 3.6. It can be seen from these tables that selected villages in Banaskantha are relatively bigger than villages selected in Surat, because the households in villages of Banaskantha district are scattered in nature as compared to compact households in villages of Surat. The farmers in Banaskantha district have constructed their houses on farm and thus village area is relatively higher. Also the villages in Banaskantha are populous than villages in Surat district. The average size of selected households in Banaskantha was larger (6.14 persons) than selected villages of Surat (i.e. 4.72 persons). The seven out of ten villages in Surat district has dominance of tribal population, while remaining villages also has significant share of tribal population in village total. However, rate of literacy was very high (around 70 percent) in the villages of Surat as compared to around 53 percent in the villages of Banaskanatha district.

As far as the distribution of population as workers is concerned, the total workers to total population was found to be higher in selected villages of Surat (around 49 percent) than Banaskantha district (around 37 percent). Same trend was observed in case of share of main workers to total population, for which average figures were estimated to be 93 percent and 82 per cent respectively. The data indicate that the large numbers workers in the villages of Banaskantha work less than six month period in a year. The share of cultivators in main workers was estimated to be 50 percent in Banaskantha followed by 26 percent workers as agricultural labours, while the same share was found opposite as 30 percent and 48 percent respectively in Surat district. Thus, the dominance of agricultural labour in main workers group in Surat indicate that due smaller holding size of land, the workers opt to work as agricultural labours on other farmers field.

Table 3.4: Basic details of Selected Villages (2011 Census)

Sr. No.	Name of village	Total area of village (hectares)	Number of households	Total population	SC population (%)	ST population (%)	Literates (%)
A	**Banaskantha**						
1	Ruppura	146.9	151	847	34.24	0.00	65.88
2	Genaji Golia	437.1	421	2635	0.00	0.00	61.02
3	Malosana	514.8	536	2604	23.39	0.00	69.47
4	Nana Meda	457.9	203	1237	27.00	13.99	51.90
5	Vagor	677.9	365	2080	6.83	2.02	43.32
6	Haripura	151.2	74	485	21.03	0.00	60.82
7	Bhordu	2042.5	662	4036	6.52	1.19	39.17
8	Jasara	1062.8	459	3183	11.31	7.67	46.72
9	Gela	1718.1	541	3786	13.42	0.00	52.67
10	Khengarpura	1155.9	343	2158	11.63	0.00	42.49
B	**Surat**						
1	Allu	310.7	359	1682	6.96	39.83	78.60
2	Tajpore Bujrang	450.2	210	958	4.91	81.11	67.64
3	Machhisadada	286.6	223	1037	0.00	97.88	78.01
4	Vaheval	1274.9	1440	6622	0.35	98.91	74.78
5	Naren	933.2	461	2208	0.00	99.28	60.96
6	Shekhpur	568.2	304	1432	2.23	47.28	64.04
7	Kadrama	754.6	335	1695	3.24	25.66	77.46
8	Dhajamba	748	634	3146	0.00	99.36	57.15
9	Kaher	625.6	476	2137	1.97	87.55	64.25
10	Umarkui	324.5	287	1347	0.00	99.33	70.60

Source: Census 2011.

It is important to know about the dairy related or supportive amenities available in and around the selected villages. It can be seen from the Table 3.6 that all the selected villages of both district are well connected through pucca road, having self help groups established and availability of electricity of domestic as well as agriculture purpose. However, except one village in Banaskantha district, no other village has veterinary hospital, which is located nearby takula places. The availability of agricultural credit societies and public distribution centre

was found better in selected villages of Banaskantha than Surat. Excpet two villages in Surat, all other villages are located more than 10 kms away from the nearest town, mostly the taluka place.

Table 3.5: Details of Workers Population in Villages (2011 Census)

Sr. No.	Name village	Total workers (% to total pop)	Main workers (% to total workers)	% to main workers			
				Cultivators	Agricultural labourers	Household industry workers	Other workers
A	**Banaskantha**						
1	Ruppura	37.78	98.75	34.81	27.53	2.22	35.44
2	Genaji Golia	42.16	54.19	86.88	1.99	0.17	10.96
3	Malosana	32.07	71.26	17.65	15.63	1.34	65.38
4	Nana Meda	18.76	95.26	37.56	33.03	21.27	8.14
5	Vagor	24.57	95.11	56.17	23.05	2.67	18.11
6	Haripura	47.63	99.13	19.65	44.10	10.48	25.76
7	Bhordu	42.15	71.25	47.03	36.96	1.49	14.52
8	Jasara	28.24	89.54	59.63	26.46	1.37	12.55
9	Gela	44.40	98.69	76.31	12.30	0.90	10.49
10	Khengarpura	54.54	44.35	58.81	37.74	0.00	3.45
B	**Surat**						
1	Allu	43.52	96.86	15.66	48.94	0.00	35.40
2	Tajpore Bujrang	56.05	97.58	5.34	63.17	0.19	31.30
3	Machhisadada	44.46	99.35	59.83	22.49	1.09	16.59
4	Vaheval	44.74	92.20	31.84	41.51	0.48	26.17
5	Naren	55.66	94.96	45.33	45.16	0.17	9.34
6	Shekhpur	45.46	99.23	13.16	64.55	0.00	22.29
7	Kadrama	39.53	98.81	33.84	39.12	0.00	27.04
8	Dhajamba	62.08	69.02	38.06	41.99	13.58	6.38
9	Kaher	56.20	78.02	26.25	65.42	2.13	6.19
10	Umarkui	35.04	98.31	30.17	40.30	0.22	29.31

Source: Census 2011.

Except two villages in Banaskantha, all other selected villages of both districts have significant land under irrigation. The groundwater is the only source of irrigation in nine selected villages of Banaskantha while one is dependent on canal water for irrigation purpose. In case of

villages in Surat, nine villages are dependent on canal water while one village has groundwater availability for irrigation purpose. Thus, the selected villages have well support of irrigation.

Table 3.6: Amenities available in and around Selected Villages

Sr. No.	Name village	Amenities available. If not available within the village , the distance range code viz; a for < 5 Kms, b for 5-10 Kms and c for 10+ kms of nearest place where facility is available												
			Connected to						Societies/PDC			Electricity		Nearest Town	
		No. of Veterinary hospital (VH)	national highway	state highway(SH)	major district road	others district road	Pucca roads	Kutchcha roads	Agricultural Credit Societies	Self-Help Group	Public distribution system (PDS) shop	for Domestic Use (ED)	for Agricultural Use	Name	Distance range
A	**Banaskantha**														
1	Ruppura	c	b	c	Yes	b	Yes	Yes	a	Yes	a	Yes	Yes	Palanpur	c
2	Genaji Golia	a	b	b	Yes	Yes	Yes	Yes	Yes	Yes	c	Yes	Yes	Deesa	c
3	Malosana	b	c	a	Yes	Yes	Yes	Yes	c	Yes	Yes	Yes	Yes	Palanpur	c
4	Nana Meda	1	c	c	Yes	c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dhanera	c
5	Vagor	a	a	a	c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dhanera	c
6	Haripura	c	c	Y	Yes	Yes	Yes	Yes	c	Yes	b	Yes	Yes	Tharad	c
7	Bhordu	c	c	c	c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tharad	c
8	Jasara	b	b	b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tharad	c
9	Gela	c	b	b	b	Yes	Yes	a	Yes	Yes	Yes	Yes	Yes	Tharad	c
10	Khengarpura	a	c	c	c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tharad	c
B	**Surat**														
1	Allu	c	c	Y	c	c	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Bardoli	c
2	Tajpore Bujrang	b	c	Y	b	Yes	Yes	Yes	b	Yes	a	Yes	Yes	Bardoli	b
3	Machhisadada	c	c	c	c	Yes	Yes	Yes	c	Yes	c	Yes	Yes	Bardoli	c
4	Vaheval	b	c	c	Yes	Yes	Yes	Yes	b	Yes	Yes	Yes	Yes	Bardoli	c
5	Naren	c	c	Y	Yes	Yes	Yes	Yes	a	Yes	Yes	Yes	Yes	Mandvi	c
6	Shekhpur	c	c	c	Yes	Yes	Yes	Yes	a	Yes	Yes	Yes	Yes	Surat	c
7	Kadrama	c	c	Y	c	c	Yes	Yes	c	Yes	c	Yes	Yes	Surat	c
8	Dhajamba	c	c	c	c	Yes	Yes	Yes	c	Yes	Yes	Yes	Yes	Songadh	c
9	Kaher	b	c	b	b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Vyara	b
10	Umarkui	c	c	b	Yes	Yes	Yes	Yes	c	Yes	a	Yes	Yes	Vyara	c

Source: Census of India (http://www.censusindia.gov.in).

Table 3.7: Net Area Sown and Total Irrigated Area in Selected Villages

Sr. No	Name village	Area Sown and Irrigated					
		Net Area Sown (ha)	Total Irrigated Land Area (% to NSA)	Sources of irrigation - % to total irrigated area			
				Canals	Wells/Tube-wells	Tanks/ Lakes	Others
A	**Banaskantha**						
1	Ruppura	121.2	66.17	0.0	100.0	0.0	0.0
2	Genaji Golia	229.1	53.56	0.0	100.0	0.0	0.0
3	Malosana	419.6	29.39	0.0	100.0	0.0	0.0
4	Nana Meda	404.8	50.89	0.0	100.0	0.0	0.0
5	Vagor	578.7	59.51	0.0	100.0	0.0	0.0
6	Haripura	125.6	0.00	-	-	-	-
7	Bhordu	1788.5	89.49	0.0	100.0	0.0	0.0
8	Jasara	926.2	97.18	0.0	100.0	0.0	0.0
9	Gela	1590	62.89	0.0	100.0	0.0	0.0
10	Khengarpura	1044.8	78.80	100.0	0.0	0.0	0.0
B	**Surat**						
1	Allu	222	85.72	100.0	0.0	0.0	0.0
2	Tajpore Bujrang	396.7	83.59	100.0	0.0	0.0	0.0
3	Machhisadada	210	85.71	100.0	0.0	0.0	0.0
4	Vaheval	726.9	100.00	86.2	13.8	0.0	0.0
5	Naren	706	59.46	92.9	7.1	0.0	0.0
6	Shekhpur	441.7	100.00	96.5	3.5	0.0	0.0
7	Kadrama	637.2	91.76	95.2	3.4	1.4	0.0
8	Dhajamba	690	65.22	89.6	4.4	0.0	6.0
9	Kaher	537.5	41.56	55.1	44.9	0.0	0.0
10	Umarkui	210.8	93.83	0.0	50.5	0.0	49.5

Source: Census of India (http://www.censusindia.gov.in).

3.4 About Sample Households

3.4.1 Socio-Economic Characteristics

The socio-economic characteristics of selected sample households are presented in Table 3.8. It can be seen from this table that the selected household average size was 5.5 members which was found similar in both categories (BEN-beneficiary & NBEN-non beneficiary households). Across selected districts, same trend was found in both categories, while household size was relatively large in Banaskantha (5.8 members) as compared to Surat (around 5.2 members). The family composition indicates that around 38 percent were male, followed by 37 percent female and remaining were children.

The ratio of female was better in Surat than Banaskantha, while opposite the case of children. The average age of respondents of both categories was around 43 years, which was relatively higher in Surat than respondents having age between 37-39 years in Banaskantha district. Also, in case of average family age, it was around 33 years in Surat and 27-28 years in Banaskantha. The figures on average level of education of family indicate that higher rate of literacy was found in beneficiary households (77%) than non beneficiary households (70.8%). As Surat is a well developed district, the level of education was found relatively higher in the selected households than selected households in Banaskantha. All the selected households belongs to Hindu religion, of which dominance of scheduled tribe population was observed in Surat district while majority of selected households belongs to other backward class category in Banaskantha district. The main occupation of the selected households was agriculture comprised of cultivation of land as a farmer along with supportive allied activity of animal husbandry and dairying.

The data on operational land holding indicates that selected households in Surat has very small piece of land of 4-5 bigha while same figures for Banaskantha was 12-13 bigha[6], having more than 85 percent land under irrigation. In fact irrigated area share in total area was found higher in Surat (around 95 percent) than Banaskantha (87.2 %). Higher size of land holding with irrigation support may have resulted in high level of income in Banaskantha as around 80 percent of households are categorized above poverty line as compared to around 57 per cent in Surat. The tribal population dominance is some pockets of Surat are reflected in relatively large number of households under below poverty line. Same trend was observed in case of dwelling structure where almost two third households are pucca structure in Banaskantha while same was with one third number in Surat district.

[6] 1 ha= 4.17 bigha in Suarat while 1 ha= 6 bigha in Banaskantha district area.

Table 3.8: Socio-Economic Characteristics of Selected Households

Sr. No.	Particulars	Surat		Banaskantha		Gujarat	
		BEN	NBEN	BEN	NBEN	BEN	NBEN
		n=100	n=100	n=100	n=100	n=200	n=200
1	Av. Household Size (Nos.)	**5.1**	5.2	5.8	5.8	5.5	5.5
	Male (%)	39.7	39.5	35.4	37.1	37.4	38.3
	Female (%)	39.1	40.8	34.0	32.8	36.4	36.6
	Children (below 15 years)%	21.1	19.7	30.6	30.1	26.2	25.1
2	Av. Age of Respondent (years)	42.8	42.6	39.6	37.7	41.2	40.1
3	Av. Age of Family (years)	32.2	33.3	27.1	27.7	29.7	30.5
4	Experience in dairy (years)	22.5	22.2	26.3	27.9	24.4	25.1
5	Level of Education of Family (%)						
	Illiterate	19.8	24.7	25.6	30.6	22.9	27.8
	Literate Without Formal Schooling	0.2	1.2	0.0	1.3	0.1	1.3
	Primary	17.5	7.8	17.3	16.4	17.4	12.3
	Middle	17.5	17.6	24.0	21.8	21.0	19.8
	Secondary	21.3	21.4	14.4	17.0	17.6	19.1
	Higher Secondary	11.5	13.3	10.5	8.6	11.0	10.8
	Diploma/Certificate Course	1.7	1.2	0.7	0.4	1.2	0.8
	Graduate	7.9	10.6	6.5	3.9	7.1	7.1
	Post Graduate And Above	2.5	2.2	0.9	0.0	1.7	1.1
6	Religion (% to total)						
	Hinduism	100.0	100.0	100.0	100.0	100.0	100.0
	Islam/ Christianity/ Sikhism	0.0	0.0	0.0	0.0	0.0	0.0
7	Social Group (% to total)						
	Scheduled Tribe	83.0	77.0	15.0	13.0	49.0	45.0
	Scheduled Caste	7.0	6.0	5.0	1.0	6.0	3.5
	Other Backward Class	7.0	15.0	68.0	76.0	37.5	45.5
	General	3.0	2.0	12.0	10.0	7.5	6.0
8	Occupation –Main (% to total)						
	Cultivator	55.0	54.0	50.0	54.0	52.5	54.0
	AH & Dairying	41.0	39.0	47.0	45.0	44.0	42.0
	Agri. Labour	1.0	1.0	0.0	1.0	0.5	1.0
	Trade	0.0	0.0	2.0	0.0	1.0	0.0
	Employee In Service	3.0	5.0	1.0	0.0	2.0	2.5
	Other (Specify)	0.0	1.0	0.0	0.0	0.0	0.5
9	Operational Land Holding (*Bigha*)						
	Irrigated	4.20	4.78	11.94	11.71	8.07	8.25
	% to total	*96.4*	*93.8*	*85.2*	*89.2*	*87.9*	*90.5*
	Unirrigated	0.16	0.32	2.07	1.42	1.11	0.87
	% to total	*3.6*	*6.2*	*14.8*	*10.8*	*12.1*	*9.5*
	Total	4.36	5.10	14.01	13.13	9.18	9.11
10	Income Group (% to total)						
	BPL	43.0	44.0	17.0	23.0	30.0	33.5
	APL	57.0	56.0	83.0	77.0	70.0	66.5
	If APL, Annual Income (% of hh)						
	Below 1 lakh	18.0	16.0	10.0	9.0	14.0	12.5
	1 to 3 lakh	25.0	17.0	23.0	22.0	24.0	19.5
	3 to 5 lakh	11.0	16.0	32.0	22.0	21.5	19.0
	above 5 lakh	3.0	7.0	18.0	24.0	10.5	15.5
11	Dwelling Structure (% to total)						
	Pucca	29.0	32.0	67.0	55.0	48.0	43.5
	Semi-pucca	27.0	23.0	26.0	30.0	26.5	26.5
	Kuccha	44.0	45.0	7.0	15.0	25.5	30.0

Source: Field survey data.

Thus, it is very much clear that at overall level, the socio economic factors of beneficiary and non beneficiary households are almost similar, though there are huge differences between two selected districts as both are located in different regions of the state.

3.4.2 Communication Characterises

The details on frequency of extension contact, mass media exposure and exposure of any training to the selected household are presented in Tables 3.8 to 3.10. It can be seen from these tables that in case of beneficiary households, the local resource person (LRP) had regularly visited 68 percent households in Surat and 78 percent households in Banaskantha while 32 and 46 percent households respectively received regular support of Veterinary assistant surgeons. The non beneficiary households also received same extent of support of veterinary assistant surgeon and from LRP as well. Though few farmers has received support from other extension agency/personal, but majority of both the categories of households had mentioned that they had never received any support of Dairy Extension Officers, B.D.O., Scientist from KVK, progressive farmers, neighbours/friends, input dealer and output buyer.

The frequency of mass media exposures through television and educational film was relatively low and majority of the selected households had not received magazine, newspaper and pamphlets. It was also observed that sometime selected households had attended the common functions such as dairy training, group meeting, while majority of them has never got chance to attend dairy mela/cattle show, dairy exhibition, educational tour, farmer's day, and any demonstration.

Thus, at overall level, the beneficiary farmers had little bit more exposure and received support as compared to non-beneficiary farmers, due to implementation of programme having support of local resource person.

Table 3.9: Details on Communication Characteristics- Surat

Sr. No.	Particulars	Details on Communication Characteristics (in past one year)- Surat					
		BEN- Beneficiary			NBEN- Non Beneficiary		
		Never-0	Sometine-1	Regularly-2	Never-0	Sometine-1	Regularly-2
A	**Frequency of extension contact**						
1	Stockman/LRP	0.0	32.0	68.0	39.0	35.0	26.0
2	Vety. Asstt. Surgeons	3.0	65.0	32.0	16.0	55.0	29.0
3	Dairy Extension Officers	64.0	35.0	1.0	80.0	20.0	0.0
4	B.D.O.	67.0	32.0	1.0	89.0	11.0	0.0
5	Scientist From K.V.K.	87.0	12.0	1.0	97.0	3.0	0.0
6	Progressive Farmers	57.0	41.0	2.0	72.0	28.0	0.0
7	Neighbors/Friends	45.0	53.0	2.0	63.0	37.0	0.0
8	Input Dealer	63.0	34.0	3.0	44.0	54.0	2.0
9	Output Buyer	80.0	19.0	1.0	61.0	39.0	0.0
B	**Mass Media Exposure**						
1	Radio	77.0	18.0	5.0	86.0	14.0	0.0
2	T.V.	41.0	44.0	15.0	33.0	45.0	22.0
3	Film (Educational)	31.0	67.0	2.0	64.0	36.0	0.0
4	Magazine	72.0	26.0	2.0	74.0	26.0	0.0
5	Newspaper	68.0	27.0	5.0	59.0	39.0	2.0
6	Pamphlets	51.0	44.0	5.0	74.0	26.0	0.0
C	***Attended any function during last year***						
1	Dairy Mela/Cattle Show	39.0	56.0	5.0	56.0	43.0	1.0
2	Dairy Exhibition	58.0	39.0	3.0	77.0	22.0	1.0
3	Educational Tour	70.0	27.0	3.0	84.0	15.0	1.0
4	Farmer's Day	75.0	24.0	1.0	84.0	16.0	0.0
5	Demonstration	55.0	42.0	3.0	68.0	30.0	2.0
6	Dairy Training	42.0	53.0	5.0	44.0	53.0	3.0
7	Group Meeting	18.0	61.0	21.0	35.0	58.0	7.0

Source: Field survey data.

Table 3.10: Details on Communication Characteristics- Banaskantha

Sr. No.	Particulars	Details on Communication Characteristics (in past one year)- Banaskantha					
		BEN			NBEN		
		Never-0	Sometine-1	Regularly-2	Never-0	Sometine-1	Regularly-2
A	**Frequency of extension contact**						
1	Stockman/LRP	0.0	22.0	78.0	23.0	59.0	18.0
2	Vety. Asstt. Surgeons	7.0	47.0	46.0	5.0	46.0	49.0
3	Dairy Extension Officers	70.0	24.0	6.0	70.0	24.0	6.0
4	C.D.O/ B.D.O.	81.0	19.0	0.0	90.0	10.0	0.0
5	Scientist From K.V.K.	97.0	2.0	1.0	98.0	2.0	0.0
6	Progressive Farmers	59.0	39.0	2.0	58.0	35.0	7.0
7	Neighbors/Friends	42.0	53.0	5.0	40.0	55.0	5.0
8	Input Dealer	31.0	62.0	7.0	36.0	56.0	8.0
9	Output Buyer	54.0	44.0	2.0	63.0	35.0	2.0
B	**Mass Media Exposure**						
1	Radio	78.0	15.0	7.0	71.0	26.0	3.0
2	T.V.	38.0	45.0	17.0	26.0	59.0	15.0
3	Film (Educational)	37.0	56.0	7.0	49.0	47.0	4.0
4	Magazine	67.0	30.0	3.0	73.0	25.0	2.0
5	Newspaper	65.0	30.0	5.0	64.0	26.0	10.0
6	Pamphlets	60.0	34.0	6.0	76.0	23.0	1.0
C	***Attended any function during last year***						
1	Dairy Mela/Cattle Show	34.0	62.0	4.0	41.0	55.0	4.0
2	Dairy Exhibition	68.0	30.0	2.0	68.0	30.0	2.0
3	Educational Tour	84.0	13.0	3.0	83.0	16.0	1.0
4	Farmer's Day	93.0	5.0	2.0	88.0	12.0	0.0
5	Demonstration	73.0	20.0	7.0	76.0	23.0	1.0
6	Dairy Training	46.0	38.0	16.0	37.0	60.0	3.0
7	Group Meeting	11.0	58.0	31.0	33.0	58.0	9.0

Source: Field survey data.

Table 3.11: Details on Communication Characteristics - Gujarat

Sr. No.	Particulars	Details on Communication Characteristics (in past one year)- Gujarat					
		BEN			NBEN		
		Never-0	Sometine-1	Regularly-2	Never-0	Sometine-1	Regularly-2
A	**Frequency of extension contact**						
1	Stockman/LRP	0.0	27.0	73.0	31.0	47.0	22.0
2	Vety. Asstt. Surgeons	5.0	56.0	39.0	10.5	50.5	39.0
3	Dairy Extension Officers	67.0	29.5	3.5	75.0	22.0	3.0
4	C.D.O/ B.D.O.	74.0	25.5	0.5	89.5	10.5	0.0
5	Scientist From K.V.K.	92.0	7.0	1.0	97.5	2.5	0.0
6	Progressive Farmers	58.0	40.0	2.0	65.0	31.5	3.5
7	Neighbors/Friends	43.5	53.0	3.5	51.5	46.0	2.5
8	Input Dealer	47.0	48.0	5.0	40.0	55.0	5.0
9	Output Buyer	67.0	31.5	1.5	62.0	37.0	1.0
B	**Mass Media Exposure**						
1	Radio	77.5	16.5	6.0	78.5	20.0	1.5
2	T.V.	39.5	44.5	16.0	29.5	52.0	18.5
3	Film (Educational)	34.0	61.5	4.5	56.5	41.5	2.0
4	Magazine	69.5	28.0	2.5	73.5	25.5	1.0
5	Newspaper	66.5	28.5	5.0	61.5	32.5	6.0
6	Pamphlets	55.5	39.0	5.5	75.0	24.5	0.5
C	***Attended any function during last year***						
1	Dairy Mela/Cattle Show	36.5	59.0	4.5	48.5	49.0	2.5
2	Dairy Exhibition	63.0	34.5	2.5	72.5	26.0	1.5
3	Educational Tour	77.0	20.0	3.0	83.5	15.5	1.0
4	Farmer's Day	84.0	14.5	1.5	86.0	14.0	0.0
5	Demonstration	64.0	31.0	5.0	72.0	26.5	1.5
6	Dairy Training	44.0	45.5	10.5	40.5	56.5	3.0
7	Group Meeting	14.5	59.5	26.0	34.0	58.0	8.0

Source: Field survey data.

3.4.3 Cropping Pattern:

The details on cropping pattern of selected households are presented in Table 3.12.

Table 3.12: Cropping Pattern of Selected Households

Sr. No.	Particulars	Cropping Pattern of Selected Households- % to GCA					
		Surat		Banaskantha		Gujarat	
		BEN	NBEN	BEN	NBEN	BEN	NBEN
		n=100	n=100	n=100	n=100	n=200	n=200
(I)	**Seasons**						
(a)	**Kharif**	64.57	77.09	46.00	48.27	49.63	53.68
	Cereals	19.79	28.59	6.41	7.37	9.03	11.35
	Pulses	1.01	0.59	5.85	7.75	4.90	6.40
	Oilseeds	0.00	0.42	17.59	17.11	14.14	13.98
	Cotton	0.00	0.00	2.05	2.49	1.65	2.02
	Sugarcane	34.82	44.13	0.00	0.00	6.82	8.29
	Fruits & Veg.	0.50	1.19	1.79	1.63	1.53	1.54
	Fodder crops	8.45	2.16	12.32	11.79	11.56	9.98
	Other Crops	0.00	0.00	0.00	0.14	0.00	0.11
(b)	**Rabi**	18.50	12.96	29.20	28.26	27.10	25.38
	Cereals	6.21	6.10	3.32	3.65	3.88	4.11
	Pulses	0.00	0.00	0.00	0.08	0.00	0.06
	Oilseeds	1.43	0.59	10.93	11.79	9.07	9.69
	Sugarcane	0.80	2.46	0.00	0.00	0.16	0.46
	Fruits & Veg.	1.26	1.36	11.56	10.05	9.54	8.42
	Fodder crops	8.81	2.46	2.78	2.00	3.96	2.08
	Other Crops	0.00	0.00	0.61	0.69	0.49	0.56
(c)	**Summer**	16.93	9.95	24.81	23.48	23.26	20.94
	Cereals	4.65	3.18	16.33	15.82	14.04	13.45
	Pulses	0.34	0.00	0.00	0.00	0.07	0.00
	Oilseeds	1.87	1.44	0.78	0.62	0.99	0.78
	Sugarcane	0.00	2.88	0.00	0.00	0.00	0.54
	Fruits & Veg.	0.55	1.44	0.16	0.02	0.24	0.29
	Fodder crops	9.53	1.02	7.47	7.01	7.87	5.89
	Other Crops	0.00	0.00	0.07	0.00	0.06	0.00
(II)	**GCA (bigha)**	5.96	5.90	24.50	25.53	15.23	15.71
(III)	**Cropping Intensity (%)**	137	116	175	194	166	172

Source: Field survey data.

It can be seen from the table that sample households from Surat had highest area under sugarcane crop followed by cereals and fodder crop. While farmers of Banaskantha district had grown more oilseed crops in kharif, followed by fodder crops, cereal and pulses. The area under rabi oilseeds and vegetables was also significant in Banaskantha district. The beneficiary households had put relatively more area under fodder crops than non-beneficiary households. The cropping intensity was found higher in case of beneficiary farmers of Surat district, while opposite picture was noticed in Banaskantha district.

3.5 About Local Resource Persons (LRP)

The details about the selected LRPs are presented in Table 3.13. The male LRP dominance can be seen in selected villages of Banaskantha than Surat district. The average age of LRP ranges between 22-29 years and half of them were married. As most of the area selected for the study in Surat district union fall in hilly area and categorized as tribal area, all the LRP belongs to scheduled tribe caste, while dominance of LRP belonging to Other Backward Classes caste category was found in Banaskantha milk union area. The education level of selected LRPs was relatively higher in Banaskantha than Surat, and same trend was observed in case of own land holding and holding of milch animals. Though the selected LRP receive fixed salary, most of them have earned incentives on sale of other product as well as through other assignments. Most of the LRPs have puccka house with electric facility.

Table 3.13: Socio-Economic Characteristics of selected LRPs

Sr. No.	Particulars	Surat	Banaskantha	Gujarat
1	Gender (% to total)			
	Male	60	90	75
	Female	40	10	25
2	Ave Age (years)			
	Male	28.7	30.3	29.3
	Female	31	20	22.2
3	Marital Status (% to total)			
	Married	50	50	50
	Unmarried	50	50	50
4	Social Group (%to total)			
	ST	100	10	55
	SC	0	10	5
	OBC	0	70	35
	General	0	10	5
5	Education (% to total)			
	Primary	0	10	5
	Secondary	10	0	5
	Higher Secondary	40	20	30
	Diploma	30	0	15
	Graduate	10	70	40
	Post Graduate	10	0	5
6	Average Land holding (Bigha)	5.25	16.56	10.91
7	Own Milch Animal (No.)	2.7	6.3	4.5
8	Income (Rs.)			
	Fixed salary	2870	2167	2518
	Incentive	938	775	856
	Commission	850	300	575
	Feed sale	40	0	20
	MM sale	720	855	788
9	House Structure (%)			
	Pakka	20	80	50
	Semi Pakka	30	20	25
	kachcha	50	0	25
10	Household electrification (% to total)			
	Yes	90	80	85
	No	10	20	15

After having discussed about the selected area and households, the findings from field survey data are discussed in the next chapter.

Chapter IV
Findings from Field Survey

4.1 Introduction:

After having discussed about the selected study area and characteristics of the sample households, this chapter discusses the data on various parameters collected from the beneficiary and the non-beneficiary households in order to work out the size of the herd, number of animals covered under programme, details on feed and fodder, labour use and expenditure on animal health, milk production and pattern of sale of milk.

4.2 Livestock holdings/Herd Strength

As mentioned earlier, Gujarat harbours some of the elite breeds, such as Gir and Kankrej of cows and Mehsani, Surti, Jafarabadi and Banni breeds of buffalos, which are well known for high milk yields. It is important to have information on distribution of local and crossbreed cows and buffaloes with selected households. The details on herd strength are presented in Tables 4.1 and 4.2. It can be seen from the Table 4.1 that all together, number of cattle covered under RBP were higher than buffalos in selected areas of both districts. However, among the cattle, crossbreed cattle dominated the numbers. Among district, selected households in Banaskantha district milk union area had relatively higher herd strength than selected households in Surat district. At overall level, except number of buffalos in Surat, beneficiary households had larger herd strength than non-beneficiary households in both districts. The number of animals reared were very high in Banaskantha than Surat district, having dominance of cattle population in Surat whereas both cattle and buffaloes in Banaskantha. Total 114 cattle and 33 buffaloes of selected households of Surat were covered

under RBP while corresponding figure for selected households in Banaskantha were 214 and 180 respectively. As per the RBP guidelines, in-milk cow and buffalos are preferred first to select under programme followed by adult female cattle and buffaloes and heifers, the data confirmed the coverage of animals as per guidelines stipulated.

Table 4.1: Herd Strength with Selected Beneficiary households

Sr. No.	Particulars	Surat- BEN hh (n=100)			Banaskantha- BEN hh (n=100)		
		Number of Cattle		No.of Buffaloes	Number of Cattle		Number Buffaloes
		Local	Crossbred		Local	Crossbred	
A	**Covered under RBP**						
1	In Milk Not Pregnant	6	51	20	15	57	37
2	In Milk And Pregnant	6	46	9	18	74	69
3	Dry And Pregnant	1	3	4	6	31	46
4	Dry And Not Pregnant	0	0	0	2	1	1
5	Not Calved Even Once	0	0	0	0	0	0
6	Pregnant Heifer	1	0	0	2	8	27
7	Calves-Male	0	0	0	0	0	0
8	Calves-Female	0	0	0	0	0	0
9	Adult Male	0	0	0	0	0	0
	Total	14	100	33	43	171	180
B	**Not Covered Under RBP**						
1	In Milk Not Pregnant	7	22	12	4	12	12
2	In Milk And Pregnant	5	26	7	8	23	13
3	Dry And Pregnant	2	24	14	8	3	30
4	Dry And Not Pregnant	3	6	2	0	0	0
5	Not Calved Even Once	0	3	0	0	0	4
6	Pregnant Heifer	2	6	11	3	10	12
7	Calves-Male	0	26	5	0	14	17
8	Calves-Female	10	140	35	7	175	151
9	Adult Male	3	6	7	3	5	5
	Total	32	259	93	33	242	244
C	**All**						
1	In Milk Not Pregnant	13	73	32	19	69	49
2	In Milk And Pregnant	11	72	16	26	97	82
3	Dry And Pregnant	3	27	18	14	34	76
4	Dry And Not Pregnant	3	6	2	2	1	1
5	Not Calved Even Once	0	3	0	0	0	4
6	Pregnant Heifer	3	6	11	5	18	39
7	Calves-Male	0	26	5	0	14	17
8	Calves-Female	10	140	35	7	175	151
9	Adult Male	3	6	7	3	5	5
	Total	46	359	126	76	413	424

Source: Field survey data.

Table 4.2: Herd Strength with Selected Non-beneficiary households

Sr. No.	Particulars	Surat- NBEN hh (n=100)			Banaskantha-NBEN hh (n=100)		
		Number of Cattle		Number of hh having Buffaloes	Number of Cattle		Number of Buffaloes
		Local	Crossbred		Local	Crossbred	
1	In Milk Not Pregnant	4	66	48	12	49	43
2	In Milk And Pregnant	6	40	14	18	54	78
3	Dry And Pregnant	1	23	30	9	27	73
4	Dry And Not Pregnant	2	2	5	2	0	0
5	Not Calved Even Once	0	2	1	0	1	0
6	Pregnant Heifer	1	18	8	3	4	31
7	Calves-Male	2	18	14	3	8	28
8	Calves-Female	6	90	69	11	108	155
9	Adult Male	0	5	2	2	0	3
	Total	22	264	191	60	251	411

Source: Field survey data.

4.3 Breedable Animals

On the date of survey, the information was collected on numbers of breedable animals with the selected households and presented in Tables 4.3 and 4.4. It can be seen from these tables that on an average, in both beneficiary and non-beneficiary group, the age at first calving of local cattle was found higher than crossbred cows that to it was recorded longer in Surat than Banaskantha. The average age of first calving ranges from 32-39 months in case of cows and 40-47 months in case of buffalos. The average level of peak yield recorded during the present lactation was found higher than earlier lactation in all cases and both groups. In case of beneficiary households, except yield of local cow in Banaskantha, the peak yield level of milk of all other animal type and breed have found higher in case of animals covered under RBP than animals not covered under RBP as well as the level yield level recorded of animals with non-beneficiary households. The average milk recorded was higher in crossbred cows than local cows as well as buffaloes. In fact, the crossbred cows from

selected households in Banaskantha had yielded as high as 18.63 kg which was covered under RBP, while a corresponding figure for Buffalo was recorded as 12.63 kg. Thus, the positive effect of programme on ration balancing could be broadly seen from the high level of peak yield figures.

Table 4.3: Details of Breedable Animals with Beneficiary Households on Survey Date

Sr. No.	Particulars	Surat- BEN			Banaskantha- BEN		
		Number of Cattle		Number of Buffaloes	Number of Cattle		Number of Buffaloes
		Local	Crossbred		Local	Crossbred	
(I)	**Covered under RBP**						
A	Animal Type and Breed (Nos.)	14	100	33	43	171	180
B	Calving Age at First Calving (month)	38.92	36.76	46.75	33.32	30.69	40.33
C	Peak Yield (Kg)						
	Previous Lactation	8.00	10.0	9.86	10.24	15.88	9.27
	Present Lactation	10.71	13.07	10.91	12.35	18.63	12.44
D	Calf at Heal						
	Yes (%)	14.3	33.0	18.2	16.3	16.4	6.1
	Milk Fed to Calf (kg/calf)	1.4	1.13	1.08	1.28	2.84	1.58
E	Milk Drawn In Pail (Kg)						
	Morn.	3.83	4.73	3.84	4.98	7.2	4.38
	Even.	3.83	4.56	3.75	5.09	6.77	4.13
	Total	7.64	9.29	7.59	10.07	13.97	8.51
(II)	**Not covered under RBP**						
A	Animal Type and Breed (Nos.)	19	84	46	22	48	67
B	Calving Age at First Calving (Month)	37.5	37.26	44.72	32	30.91	41.88
C	Peak Yield (Kg)						
	Previous Lactation	8.92	10.91	7.31	11.10	11.39	10.27
	Present Lactation	10.46	12.63	8.65	13.73	15.31	12.63
D	Calf At Heal						
	Yes (%)	15.8	17.9	13.0	4.5	47.9	9.0
	Milk Fed to Calf (kg/calf)	1.67	1.24	1.25	3.80	1.01	1.03
E	Milk Drawn in Pail (Kg)						
	Morn.	3.54	4.31	3.46	5.41	6.01	4.07
	Even.	3.27	4.23	3.31	5.18	5.99	3.79
	Total	6.81	8.54	6.77	10.59	12.00	7.86

Source: Field survey data.

In order to have more clarity on level of milk yield, the data on milk drawn in pail on earlier day of survey was collected. It was found that except in few cases of cows (cross breed in Surat and local in Banaskantha), the milk yield of animals covered under RBP was found higher than animals not covered under RBP of beneficiary households as well as milch animals of non beneficiary households. The highest milk yield of about 14 kg/day was recorded in case of crossbreed cows in Banaskantha and lowest was of local cows in Surat (6.8 kg), both from RBP group. While highest buffalo milk yield on earlier day was recorded in Banaskantha (8.51 kg/day). The same trend was found in case of milk yield of animals with non-beneficiary households. The data on milk fed to calves shows mixed results which indicate that with few exceptions, milk fed to calf was marginally lower RBP group than its counterpart, both beneficiary and non beneficiary groups.

Table 4.4: Details of Breedable Animals on Survey Date of Non-Beneficiary households

Sr. No.	Particulars	Surat- NBEN			Banaskantha-NBEN		
		Number of Cattle		Number of Buffaloes	Number of Cattle		Number of Buffaloes
		Local	Crossbred		Local	Crossbred	
A	Animal Type and Breed (Nos.)	14	149	105	44	134	225
B	Calving						
	Age at First Calving (month)	39.92	34.83	45.64	35.36	33.2	42.18
C	Peak Yield (Kg)						
	Previous Lactation	6.10	9.18	8.40	8.26	12.59	8.80
	Present Lactation	7.85	12.20	8.62	10.63	14.81	11.42
D	Calf At Heal						
	Yes (%)	21.4	14.8	10.5	9.1	22.4	8.4
	Milk Fed to Calf (kg)	5.50	26.70	9.50	5.40	1.37	1.04
E	Milk Drawn in Pail (Kg)						
	Morn.	3.02	4.46	2.93	4.36	5.23	3.47
	Even.	2.96	4.84	2.64	4.35	5.04	3.42
	Total	5.98	9.30	5.57	8.71	10.27	6.89

Source: Field survey data.

4.4 Details on Feed and Fodder

There is a direct relation between the nutritional status of the animals and the type of feed fed. For getting the best results, feeding of animal need planned scientific, practical as well as economical approach. Livestock feeds are generally classified as roughages and concentrates. Roughages are further classified into green fodder and dry fodder. Green fodder are cultivated and harvested for feeding the animals in the form of forage (cut green and fed fresh), silage (preserved under anaerobic condition) and hay (dehydrated green fodder). Fodder production and its utilization depend on various factors like cropping pattern followed, climatic condition of the area as well as the socio-economic conditions of the household and type of livestock reared. The cattle and buffaloes are normally fed on the fodder available from cultivated areas, supplemented to a small extent by harvested grasses. The major sources of fodder supply are crop residues, cultivated fodder and fodder from common property resources like forests, permanent pastures and grazing lands.

At present, there is huge gap between demand and supply of animal feed and fodder. The increased growth of livestock particularly that of genetically upgraded animals, has further aggravated the situation. Additionally, the quality of the available fodder is also poor, being deficient in energy, protein and minerals. Therefore, it is important to have information on feed and fodder fed to animals. The details on feed and fodder fed by the selected households at the time of survey are presented in Tables 4.5 and 4.6. It can be seen from the tables that all the animals selected under RBP were feeded at stall, which is mandatory requirement to balance the diet of particular animal. As it was expected Banaskantha being rainfed and fodder deficient area, the selected households were dependent on purchased fodder to feed their animals, while selected households from Surat used fodder from both sources (self cultivated & purchased fodder).

Table 4.5: Details of Feed and Fodder (at the Time of Survey) Beneficiary Households

Sr. No.	Particulars	Surat- BEN			Banaskantha- BEN		
		Cattle		buffaloes	Cattle		buffaloes
		local	Crossbred		local	Crossbred	
(I)	**Covered under RBP**						
A	Feeding Mode	14	100	33	43	171	180
	Only Stall Fed	14	100	33	43	171	180
	Only Grazing	0	0	0	0	0	0
B	Stall-feeding quantity fed (kg/animal)						
i)	Dry Fodder	11.79	13.01	12.12	11.09	10.61	12.19
ii)	Green Fodder	21.79	25.24	24.64	23.72	26.78	26.64
iii)	Concentrates	6.29	6.72	5.62	3.00	3.00	3.00
iv)	Supplements (Gm)	69.29	94.65	83.52	102.21	121.08	91.47
C	Grazing Hours						
	Av. Time (hours/day)	0	0	0	0	0	0
	No. of days (last 30 days)	0	0	0	0	0	0
(II)	**Not Covered under RBP**						
A	Feeding Mode	19	84	46	23	48	67
	Only Stall Fed	18	81	38	23	48	67
	Only Grazing	1	3	8	0	0	0
	Both	0	0	0	0	0	0
B	Stall-feeding quantity fed (kg/animal)						
i)	Dry Fodder	13.79	12.51	14.35	7.36	9.77	11.51
ii)	Green Fodder	18.84	23.17	21.70	16.91	25.96	26.94
iii)	Concentrates	2.99	5.87	4.13	5.95	7.32	6.01
iv)	Supplements (Gm)	35.79	48.93	45.22	59.09	93.33	64.48
C	Grazing Hours						
	Av. Time (hours/day)	4	4.6	5.81	0	0	0

Source: Field Survey Data.

Table 4.6: Details of Feed and Fodder (at the Time of Survey) Non Beneficiary Households

Sr. No.	Particulars	Surat- NON BEN			Banaskantha- NON BEN		
		Cattle		buffaloes	Cattle		buffaloes
		local	Crossbred		local	Crossbred	
A	Feeding Mode	14	149	105	44	134	225
	Only Stall Fed	14	147	68	44	134	255
	Only Grazing	0	2	37	0	0	0
	Both	0	0	0	0	0	0
B	Stall-feeding quantity fed (kg)						
i)	Dry Fodder	10.57	14.03	12.94	16.11	17.55	15.74
ii)	Green Fodder	32.00	26.77	25.08	23.30	19.93	22.91
iii)	Concentrates	3.50	3.77	3.76	6.94	6.45	5.98
iv)	Supplements (Gm)	36.43	32.15	16.76	39.77	49.57	25.36
C	Grazing Hours						
	Av. Time (hours/day)	0	4	4.9	0	0	0
	No. of days (last 30 days)	0	30	30	0	0	0

Source: Field Survey Data.

The animals were also feeded with concentrates which were mostly purchased from the market. It is very interesting to note here is that animals covered under RBP in Banaskantha were fed with very lesser amount of concentrates as compared to not only the animals covered under RBP in Surat but also animals not covered under RBP of both groups. Besides feeding the animals at stall in shed, the selected households in Surat could graze their animals every day for about 4-5 hours on their own agriculture land or common grazing land of the village.

4.5 Details on Prices of Feed and Fodder, Wages and Value of Animals

The details of prices of feed and fodder, wages and value of animals and use of dung by selected households are presented in Table

4.7. It can be seen from the table that there was not much difference between the rate paid for fodder and concentrates paid by the beneficiary and non beneficiary households in both districts. The dry and green fodder was found very costly in Banaskantha district, which was almost the double the rate paid by Surat households. Same trend was noticed in case of wages of labour and rental value of land. Thus, rearing the animal in selected areas of Banaskantha district was costlier than rearing in the areas of Surat district. In general, salvage value of cross breed cow was recorded the highest followed by salvage value for adult buffalo and the local cows.

Table 4.7: Details of Prices of Feed and Fodder, Wages and Value of Animals and Use of Dung by Selected Households

Sr. No.	Particulars	Unit	Surat		Banaskantha	
			BEN	NBEN	BEN	NBEN
A	Feed and Fodder	(Rs./kg)				
	1. Dry Fodder		2.79	2.76	5.63	5.47
	2.Green Fodder		1.82	1.82	2.43	3.14
	3.Concentrate					
	Home Prepared		20.17	20.01	17.24	17.86
	Prepared Cattle Feed		14.65	15.05	14.30	14.56
	4.Supplements Rs./kg					
	Mineral Mixture		66.67	67.72	78.38	74.02
	Salt		0.00	0.00	0.00	0.00
	Molasses		0.00	0.00	0.00	0.00
	Mustard Oil		0.00	0.00	70.00	0.00
B	Labour Wages (agriculture)	(Rs./day)				
	Men		111.4	109.4	246.5	257.00
	Women		109.9	109.0	246.5	257.00
C	Salvage Value of Adult Animals	*Rs./Animal*				
	Crossbred Cow		2240	1868	1638	1480
	Local Cow		937	865	881	977
	Buffalo		1177	1217	1316	1510
D	Rental Value of Land	*Rs./Bigha*	4058	4365	8671	8475
E	Present Value Of Adult Animals (unproductive)	*Rs./Animal*				
	Crossbred Cow		34715	26310	32981	26237
	Local Cow		3145	2335	3305	7740
	Buffalo		15050	23190	44950	40690
F	% of Dung used as	*% to total*				
	Manure		84.28	84.1	98.58	98.98
	Dung Cakes		17.72	16.2	1.12	1.02

Source: Field Survey Data.

The present value of unproductive adult cross breed cows in Surat was found higher than buffalo, while opposite picture was notices in Banaskantha. About 85 percent dung was used for manure an remaining was used to make dung cakes by selected households in Surat, while corresponding figures for Banaskantha were 99 and 1 per cent respectively.

4.6 Details on Veterinary and Breeding Services and Expenditures

The details of veterinary and breeding expenditure incurred during last one year by beneficiary and non-beneficiary households are presented in Tables 4.8 and 4.9. It can be seen from the table that almost all the animals were given vaccinations (such as FMD, HS, BQ, Deworner, Thailera, Swell in Feet, etc), which was mostly received free of cost. Besides, some of the selected households had incurred expenditure on medicine and doctor as and when some of animals fell sick. The data presented in Tables 4.8 and 4.9 indicate that on an average beneficiary household had incurred medicine plus doctor fee cost ranging between Rs. 400-800/- per animal during the year, while corresponding figure for Banaskantha was at higher side which ranges between Rs. 400-900/animal. The amount spent towards cost of medicine and doctor on animals not covered RBP by beneficiary households was relatively higher than animals covered under RBP. While expenditure incurred by non beneficiary households on medicine and doctor was at lower range, which was very strange to note.

During the visit to the field and discussion with the selected household, it was observed that despite of various efforts made by the government; availability of veterinary doctor is one of the bottlenecks in dairy development. It can be seen from the table that on an average, every year total number of visit of veterinary doctor ranges between 3 to 4 only. Thus, most of the households had either depend on the alternative source of advisory and medical support for their animals.

Table 4.8: Details of Veterinary and Breeding Expenditure during last one year Beneficiary Households

Sr. No.	Particulars	Covered under RBP				Not covered under RBP			
		Number of cattle		Buffaloes	Total	Number of cattle		Buffaloes	Total
		local	Crossbred			local	Crossbred		
A	**Surat**								
1	Vaccination (No. of Animals)	14	100	34	148	19	84	46	149
2	No. of Animals treated with Medicine+ Doctor	4	16	2	22	2	13	2	7
3	Av. Cost of Medicine+ Doctor (Rs./animal)	425	353	438	374	175	846	450	1750
4	Average of av. no. Visit by Doctor per year	2.79	3.73	3.42	3.31	2.22	2.98	2.98	2.89
5	No. of Service								
	AI Service	12	97	29	138	18	84	36	138
	Natural Service	2	3	4	9	1	0	10	11
	Total	14	100	33	147	19	84	46	149
6	Cost incurred on								
	AI Service	940	6830	2230	10000	1470	5870	2760	10100
	Natural Service	300	460	900	1660	100		2400	2500
	Grand Total	1240	7290	3130	11660	1570	5870	5160	12600
7	Average of no. of AI per conception	1.36	1.56	1.39	1.50	2.28	1.86	1.89	1.92
B	**Banaskantha**								
1	Vaccination (No. of Animals)	43	171	180	394	22	48	67	137
2	No. of Animals treated with Medicine+ Doctor	1	11	9	21	0	3	3	6
3	Av. Cost of Medicine+ Doctor (Rs./animal)	700	846	478	681	0	2007	907	1457
4	Average of av. no. Visit by Doctor per year	2.63	4.19	2.51	3.25	3.05	2.17	2.85	2.64
5	No. of Service								
	AI Service	41	171	154	366	19	45	49	113
	Natural Service	2		26	28	3	3	18	24
	Total	43	171	180	394	22	48	67	137
6	Cost incurred on								
	AI Service	4510	17390	17260	39160	1900	4600	5190	11690
	Natural Service	300	0	4300	4600	400	600	3600	4600
	Grand Total	4810	17390	21560	43760	2300	5200	8790	16290
7	Average of no. of AI per conception	1.47	1.33	1.36	1.36	1.77	1.98	1.36	1.64

Source: Field Survey Data.

Though under cooperative dairy sector, member of dairy can register a complaint at diary society and doctor visit the animals, it sometimes takes long time to get doctor visited and thus delayed visit and prescription of doctor sometime result in extra expenditure on

medicine and doctor as well as loss in income due to low milk yield (in case of milch animal). Beside natural service, artificial insemination facility was availed by the selected households for their animals and on an average, rate of conception of AI was less than 2.

Table 4.9: Details of Veterinary and Breeding Expenditure during last one year Non-Beneficiary Households

Sr. No.	Particulars	Surat-Non Beneficiary				Banaskantha-Non Ben			
		Number of cattle		Buffaloes	Total	Number of cattle		Buffaloes	Total
		Local	Crossbred			Local	Crossbred		
1	Vaccination (No. of Animals)	14	149	105	268	44	134	225	403
2	No. of Animals treated with Medicine+ Doctor	0	17	16	33	6	11	10	27
3	Av. Cost of Medicine+ Doctor (Rs./animal)	0	436	688	558	1317	893	660	901
4	Average of av. no. Visit by Doctor per year	2.0	2.8	2.7	2.8	2.7	2.9	2.6	2.7
5	No. of Service								
	AI Service	12	147	90	249	40	130	153	323
	Natural Service	2	2	15	19	4	4	72	80
	Total	14	149	105	268	44	134	225	403
6	Cost incurred on								
	AI Service	1280	11310	6390	18980	4520	12450	16840	33810
	Natural Service	0	250	2300	2550	350	500	12504	13354
	Grand Total	1280	11560	8690	21530	4870	12950	29344	47164
7	Average of no. of AI per conception	1.43	1.93	1.64	1.76	1.36	1.59	1.44	1.48

Source: Field Survey Data.

4.7 Labour Use Pattern

As dairy activities are carried out as complimentary activity to agriculture activities, the labour use pattern by the selected sample households indicate the dominance of use family labour who were engaged in both the activities and out of total time worked in a day, about half of the time was spent on dairy and household activities while remaining time was spent on field. Though some of the household had hired casual labour, which were mainly used for agriculture activities, while tendency of having permanent labour was very rare and found

with few households only. Thus, activities of dairy were carried out mostly by the household members.

Table 4.10: Labour Use Pattern

Sr. No.	Particulars	Labour Use Pattern						
		No. of Workers		Average No. of days Labour Hired	Total Hours Worked Per Person Per Day	Distribution of Total Hours Work		
		Male	Female			Dairy Activities	Agri. Operations	Other (Household Etc.)
(I)	**SURAT-BEN**							
A	**Type of Labour**							
(a)	Family	139	158	0	8.44	3.52	4.63	0.28
(b)	Hired Casual	139	134	5.44	1.61	0.10	1.51	0
(c)	Hired Permanent Labour	2	0	5.6	0.12	0.06	0.04	0
(II)	**SURAT-NON BEN**							
B	**Type of Labour**							
(a)	Family	167	157	0.00	8.28	3.52	4.52	0.23
(b)	Hired Casual	110	106	2.16	1.40	0	1.40	0
(c)	Hired Permanent Labour	0	0	0.0	0	0	0	0
(III)	**Banaskantha BEN**							
A	**Type of Labour**							
(a)	Family	157	162	0	9.31	4.2	4.97	0.14
(b)	Hired Casual	176	154	3.08	2.08	0.00	2.08	0
(c)	Hired Permanent Labour	17	1	35.8	0.90	0.75	0.15	0
(IV)	**Banaskantha NON BEN**							
B	**Type of Labour**							
(a)	Family	172	173	0.0	9.65	3.90	5.05	0.70
(b)	Hired Casual	207	143	3.64	2.71	00	2.72	0
(c)	Hired Permanent Labour	04	01	6.48	0.31	0.15	0.16	0

Source: Field Survey Data.

4.8 Handling of Feeding and Income from Dairying

As dairy activities are carried out mostly at household level and it has been observed that most of labour engaged in dairy activities were family labour, it is expected the dominance of female member in

feeding the animals as well as handling the income of dairy. It can be seen from the Table 4.11 that in majority of the cases, feeding as well as income from dairy was handled by the female members in Surat district, whereas in Banaskantha district, feeding animals work responsibility was with female member while income was handled by male member. It may due to the fact that distance between the households and dairy cooperative in Surat is close, thus female pour milk every day in dairy cooperative and also collect the money toward same. The households in selected areas of Banaskantha district are scattered and located far from dairy, thus, male member generally pour milk in society and thus collect the payment.

Table 4.11: Handling of Feeding and Income from Dairying

Sr. No.	Particulars	SURAT (n=100)			Banaskantha (n=100)		
		Adult Male	Female	Children	Adult Male	Female	Children
I	**Beneficiary HH**						
A	Who handles animal feeding						
	Family member (No.)	51	96	20	73	86	4
	Hired worker (No.)	2	2	0	9	0	0
b	Who handles income from dairying	Male	Female	Both	Male	Female	Both
	Family member (No.)	59	19	22	66	9	25
II	**Non beneficiary hh**						
A	Who handles animal feeding						
	Family member (No.)	61	95	9	59	70	1
	Hired worker (No.)	0	0	0	13	12	0
b	Who handles income from dairying	Male	Female	Both	Male	Female	Both
	Family member (No.)	50	35	15	74	7	19

Note: Multiple responses.
Source: Field Survey Data.

4.9 Production and Disposal of Milk

The data collected on production of milk on the earlier day of visit and during last 15 days is presented in Tables 4.12 and 4.13. It can be seen from the tables that the fat and SNF level was found higher in milk drawn from animal covered under RBP than other uncovered animals with beneficiary households in both district.

Table 4.12: Production of Milk by selected Beneficiary Households (on the day of visit)

Sr. No.	Particulars	Surat				Banaskantha			
		RBP		NRBP		RBP		NRBP	
		Buffaloes	Cow	Buffaloes	Cow	Buffaloes	Cow	Buffaloes	Cow
1	No. of Milch Animals	23	86	13	35	67	67	23	29
2	Quantity of Milk Drawn (Litres/hh)	10.1	11.2	9.25	12.91	13.87	**32.17**	9.75	17.26
(i)	On the day of visit (total quantity in litres)	232.3	963.75	120.3	451.9	929.5	2155.5	224.3	500.5
	FAT (%)	7.4	4.23	7.39	3.88	7.44	4.05	7.13	4.07
	SNF (%)	9.15	8.43	9.03	8.5	9.26	8.5	9.16	8.51
(ii)	During the Last 15 Days (total quantity in litres)	3517.65	14485.25	1851.5	6413	13930	30896	3405	6849
	Av. per animal (liters)	152.89	168.43	142.42	183.2	207.91	461.13	148.04	236.2
	FAT (%)	7.3	4.15	7.05	3.81	7.42	4.03	7.08	3.87
	SNF (%)	9.15	8.5	9.04	8.5	9.23	8.5	9.20	8.51

Source: Field Survey Data.

Table 4.14 and 4.15 presented the details on disposal of milk by selected households. It was observed that on an average, about 90 percent of milk produced had been disposed by the selected households. Thus, hardly around 10 per cent of total milk produced must have either used for the home purpose and used for preparation of further value added products, such as ghee, curd, etc. If we look at the disposal pattern of milk, it can be observed that in case of

beneficiary households, more than 97 per cent of milk was deposited with cooperative society and remaining milk was sold to consumer and sweet shop owner. While in case of non beneficiary households, around 85 per cent of milk was sold to Cooperative society followed by consumers, up to 15 percent milk was sold to them. Surat non beneficiary households had opted to sold their milk to consumers directly whereas the same trend was not observed in case of Banaskantha non beneficiary households who opted to sell almost all milk to dairy cooperative only.

Table 4.13: Production of Milk by selected Non-Beneficiary Households

Sr. No.	Particulars	Surat		Banaskantha	
		Buffaloes	Cow	Buffaloes	Cow
I	No. of Milch Animals	43	67	76	69
A	Quantity of Milk Drawn (Litres/**hh**)	8.17	13.22	11.11	18.47
i)	On the day of visit (total quantity in litres)	351.4	886.3	845	1274.6
	FAT (%)	6.94	4.02	7.11	6.62
	SNF (%)	9.09	8.5	9.36	8.49
ii)	During the Last 15 Days (total quantity in litres)	5215	13090.3	12686.5	19070.5
	Av. per animal (liters)	121.27	195.37	166.92	276.38
	FAT (%)	6.86	3.97	6.99	4.05
	SNF (%)	9.09	8.51	9.36	8.49

Source: Field Survey Data.

Table 4.14: Disposal of Milk by Selected Beneficiary Households (All)

Sr. No.	Particulars	Surat			Banaskantha		
		Buffaloes	Cow	Total	Buffaloes	Cow	Total
1	**Production**						
i)	On the day of visit (lit)	353	1416	1768	1154	2656	3810
ii)	During the Last 15 Days (lit)	5368	20898	26266	17335	37745	55080
2	**Disposal**						
i)	On the day of visit (lit)	313	1276	1589	929	2577	3505
ii)	During the Last 15 Days (lit)	4710	18816	23526	14008	36182	50190
3	**Disposal %**						
i)	On the day of visit	88.7	90.1	89.8	80.5	97.0	92.0
ii)	During the Last 15 Days (lit)	87.7	90.0	89.6	80.8	95.9	91.1
4	**Consumption/ Processing (%)**						
i)	On the day of visit	11.3	9.9	10.2	19.5	3.0	8.0
ii)	During the Last 15 Days (lit)	12.3	10.0	10.4	19.2	4.1	8.9
5	**Disposal Agency %**						
(a)	On the day of visit (% to total)						
i)	Consumer	0.32	0.98	0.85	0.32	0.06	0.13
ii)	Vendor/ Middlemen	0.00	0.00	0.00	0.00	0.00	0.00
iii)	Sweet Shop/ Creameries	2.56	0.00	0.50	0.00	0.00	0.00
iv)	Cooperative Society	97.12	99.02	98.65	99.68	99.94	99.87
v)	Private Milk Plant	0.00	0.00	0.00	0.00	0.00	0.00
vi)	Other (Specify)	0.00	0.00	0.00	0.00	0.00	0.00
(b)	During the Last 15 Days (% to total)						
i)	Consumer	0.32	1.00	0.86	0.32	0.06	0.13
ii)	Vendor/ Middlemen	0.00	0.00	0.00	0.00	0.00	0.00
iii)	Sweet Shop/ Creameries	2.55	0.00	0.51	0.00	0.00	0.00
iv)	Cooperative Society	97.13	99.00	98.63	99.68	99.94	99.87
v)	Private Milk Plant	0.00	0.00	0.00	0.00	0.00	0.00
vi)	Other (Specify)	0.00	0.00	0.00	0.00	0.00	0.00

Source: Field Survey Data.

Table 4.15: Disposal of Milk by Selected Non-Beneficiary Households

Sr. No.	Particulars	Surat			Banaskantha		
		Buffaloes	Cow	Total	Buffaloes	Cow	Total
1	**Production**						
i)	On the day of visit (lit)	351	886	1238	845	1275	2120
ii)	During the Last 15 Days (lit)	5215	13090	18305	12687	19071	31757
2	**Disposal**						
i)	On the day of visit	290	813	1103	695	1132	1827
ii)	During The Last 15 Days	4347	11721	16068	10217	17179	27395
3	**Disposal %**						
i)	On the day of visit	82.5	91.8	89.1	82.2	88.8	86.2
ii)	During The Last 15 Days (lit)	83.4	89.5	87.8	80.5	90.1	86.3
4	**Consumption/ Processing (%)**						
i)	On the day of visit	17.5	8.2	10.9	17.8	11.2	13.8
ii)	During the Last 15 Days (lit)	16.6	10.5	12.2	19.5	9.9	13.7
5	**Disposal Agency %**						
(a)	On the day of visit						
i)	Consumer	14.84	0.61	4.35	0.00	0.22	0.14
ii)	Vendor/ Middlemen	0.00	0.00	0.00	0.00	0.00	0.00
iii)	Sweet Shop/ Creameries	0.00	0.00	0.00	0.00	0.00	0.00
iv)	Cooperative Society	85.16	99.39	95.65	100.00	99.78	99.86
v)	Private Milk Plant	0.00	0.00	0.00	0.00	0.00	0.00
vi)	Other (Specify)	0.00	0.00	0.00	0.00	0.00	0.00
(b)	During The Last 15 Days (lit)						
i)	Consumer	14.84	0.64	4.48	0.00	0.31	0.19
ii)	Vendor/ Middlemen	0.00	0.00	0.00	0.00	0.00	0.00
iii)	Sweet Shop/ Creameries	0.00	0.00	0.00	0.00	0.00	0.00
iv)	Cooperative Society	85.16	99.36	95.52	100.00	99.69	99.81
v)	Private Milk Plant	0.00	0.00	0.00	0.00	0.00	0.00
vi)	Other (Specify)	0.00	0.00	0.00	0.00	0.00	0.00

Source: Field Survey Data.

The next chapter presents the outreach, perception, constraints & suggestions made by the beneficiary and non beneficiary households regarding RBP.

Chapter V
Outreach, Perception & Constraints

5.1 Introduction

After having discussed about the animals, breed, feed and fodder, milk production and its disposal, this chapter presents the details on awareness about the programme, perceptions of the selected households about benefit of program, constraints in implementation/adoption of programme and also suggestions received from famers to improve the impact of programme.

5.2 Awareness about RBP among Adopters:

The details about the awareness about RBP among selected beneficiary and non beneficiary households are presented in Table 5.1. It can be seen from the table that more than 92 percent of beneficiaries were aware about the programme, while corresponding figure for the non beneficiary household was about 51 percent. The major source of information about the programme for more than 75 percent of beneficiary household was LRP itself, followed by the dairy cooperative society and other sources such as friends, progressive farmer in village and relatives. About same number of beneficiary households had seen documentary on RBP. Around two third of the beneficiary households mentioned that they had seen poster/banner on RBP, while one third of non beneficiary households got exposure to programme through the same source. Though the pamphlets were also distributed about the programme, about two third of beneficiary households and one fifth non beneficiary households had received the same. The village awareness programme was

attended by 67 percent of beneficiary and 42 per cent of non-beneficiary households. The pattern was found same in both the selected districts.

Table 5.1: Awareness about the Programme among Adopters

Sr. No	Particulars	Awareness about the programme (% to responses)					
		Banaskantha		Surat		Total	
		RBP	NRBP	RBP	NRBP	RBP	NRBP
1	Have you heard of RBP (%)						
	No	2.0	44.0	8.0	55.0	5.0	49.5
	Yes	98.0	56.0	92.0	45.0	95.0	50.5
	If yes, source of information on RBP						
	Milk Union-1	4.1	3.6	2.2	12.7	3.2	8.1
	DCS-2	14.3	44.6	13.0	23.6	13.7	34.2
	LRPs-3	76.5	51.8	84.8	63.6	80.5	57.7
	Others (LRP + Coop Soc)4	5.1	0.0	0.0	0.0	2.6	0.0
2	Have you seen any documentary on RBP						
	No	25.0	66.0	24.0	72.0	24.5	69.0
	Yes	75.0	34.0	76.0	28.0	75.5	31.0
	If Yes, specify (Coop Soc)	71.0	34.0	73.0	28.0	72.0	31.0
3	Have you seen any poster/banner on RBP						
	No	34.0	70.0	34.0	72.0	34.0	71.0
	Yes	66.0	30.0	66.0	28.0	66.0	29.0
	If Yes, specify (Dairy Soc)	61.0	26.0	64.0	24.0	62.5	25.0
4	Have you received any pamphlet on RBP						
	No	41.0	81.0	30.0	74.0	35.5	77.5
	Yes	59.0	19.0	70.0	26.0	64.5	22.5
5	Have you attended village awareness program (VAP)						
	No	37.0	58.0	28.0	58.0	32.5	58.0
	Once	36.0	22.0	52.0	37.0	44.0	29.5
	Twice	12.0	13.0	13.0	4.0	12.5	8.5
	Thrice	5.0	4.0	3.0	1.0	4.0	2.5
	More	10.0	3.0	4.0	0.0	7.0	1.5

Source: Field survey data.

5.3 Outreach of RBP among Adopters and its Benefits:

In order to know about reachness of RBP and its benefits realised by the adopters, the data were collected on specific parameters which are presented in Table 5.2. It can be seen from this table that about one third of the selected beneficiary households were not aware about ration balancing before adopting it. On an average, total nine advisory

recommendations were received till date by the beneficiary households in Surat whereas number of advisory/recommendations was found higher in Banaskantha district having about 14 recommendations. More than 77 percent of beneficiary households from both districts opined that benefits of RBP has increased their interest in dairy and would like increase the herd strength in coming days.

Table 5.2: Outreach of Programme among RBP Adopters

Sr. No.	Particulars		Surat	Banaskantha	Total
1	Awareness about ration balancing before adopting RBP	No	34.0	38.0	36.0
		Somewhat	40.0	54.0	47.0
		Well aware	26.0	8.0	17.0
2	Av. number of RB recommendation received till date	No./hh	9.1	13.6	11.4
3	Benefits of RBP increased interest in dairy	No	9.0	12.0	10.5
		Yes	81.0	77.0	79.0
		Can't say	10.0	11.0	10.5
4	Would like to increase herd strength	No	20.0	13.0	16.5
		Yes	62.0	71.0	66.5
		May be	18.0	16.0	17.0
5	Feel about involvement in the program	No	6.0	7.0	6.5
		Yes	80.0	85.0	82.5
		Somewhat	14.0	8.0	11.0
6	Following the recommended ration correctly	No	5.0	12.0	8.5
		Yes	95.0	88.0	91.5
7	Constraints in regular feeding of recommended ration	Mineral mixture shortage	18.0	9.0	13.5
		Frequent change in feed items	9.0	13.0	11.0
		Lrp not visit timely	2.0	4.0	3.0
		Not convinced about the recommendations	2.0	6.0	4.0
		Any others	3.0	5.0	4.0
8	Recommend other farmers also to join RBP	No	8.0	12.0	10.0
		Yes	92.0	88.0	90.0
9	Points given to RBP	On a 10 point scale	8.4	8.6	8.5

Source: Field survey data.

The success of RBP can be seen from the fact that more than 88 percent of farmers were following the recommended ration advisory given by LRP, while more than 80 percent household felt that they are in programme. Though most of beneficiary households followed the advice given by the LRP, some of them had faced the constraints in regular feeding to animals as shortage of recommended ration (such as mineral mixture), frequent change in feed items, LRP do not visit timely and not convinced about the recommendations. More than 88 per cent of respondents had mentioned that they would recommend the other dairy farmers also to join the RBP and gave 8.5 points (out of 10) to this programme.

The changes realized by the RBP adopted in various parameters are presented in table 5.3. It can be seen from the table that more than 78 per cent of beneficiary households opined that milk production has increased by around 15 percent after adoption of RBP, i.e. about 1.5 litre/day. Not only milk production was increased, the composition of milk was also improved. More than 79 per cent households has realized that on an average milk fat and SNF level has increased before adopting the programme. Most of the households have also reported that health of animals is also improved after adoption of RBP. Decrease in digestive disorders of animals after adoption of RBP was experienced by selected sample households. By following the recommended ration given by the LRP under programme, more than half of the selected households have realized reduction in feed cost while feed cost was increased in case of one fourth households and same was unchanged in case of remaining households. Though one fourth of households mentioned that additional expenditure (money/labour) is involved in adopting RBP while three fourth of selected households mentioned that no change in employment opportunity was experienced after RBP.

Table 5.3: Changes realized by the RBP Adopters

Sr. No.	Particulars		Changes realized (% to total responses)		
			Surat	Banaskantha	Total
1	Increase in milk production after RBP	No	22.0	19.0	20.5
		Yes	78.0	81.0	79.5
	Avg. Milk Yield (Lit/Day)	Before RBP	10.1	12.6	11.3
		After RBP	11.8	14.2	13.0
2	Improved Composition of Milk	No	17.0	21.0	19.0
		Yes	83.0	79.0	81.0
	Avg. Milk Fat(%)	Before RBP	4.3	5.3	4.8
		After RBP	4.7	5.9	5.3
	Avg. Milk SNF(%)	Before RBP	8.6	5.3	6.9
		After RBP	8.7	5.9	7.3
3	Change in general health of animal after RBP	No	3.0	2.0	2.5
		Yes	84.0	82.0	83.0
		Can't say	13.0	16.0	14.5
4	Experienced decrease in digestive disorders of animals	No	3.0	5.0	4.0
		Yes	80.0	81.0	80.5
		Can't say	17.0	14.0	15.5
5	Change in feed cost of milch animal after RBP	decreased	55.0	53.0	54.0
		increased	21.0	25.0	23.0
		unchanged	24.0	22.0	23.0
6	Additional expenditure (money/labour) is involved in adopting RBP	No	35.0	23.0	29.0
		Yes	25.0	29.0	27.0
		Can't say	40.0	48.0	44.0
7	Any Change in employment opportunity after RBP	decreased	1.0	3.0	2.0
		increased	22.0	21.0	21.5
		unchanged	77.0	76.0	76.5
8	Changes in Monthly income from dairy	decreased	1.0	0.0	0.5
		increased	73.0	75.0	74.0
		unchanged	26.0	25.0	25.5
9	Savings from dairy have increased after adopting RBP	No	4.0	1.0	2.5
		Yes	78.0	83.0	80.5
		Can't say	18.0	16.0	17.0
	if *yes*, additional saving from dairying utilized for	Education	15.0	3.0	9.0
		Nutrition & health	41.0	44.0	42.5
		Expanding dairying	30.0	26.0	28.0
		Others (Edu+Nuti)	14.0	27.0	20.5
10	After adopting the RBP, milk consumption has increased	No	77.0	91.0	84.0
		Yes	23.0	9.0	16.0

Source: Field survey data.

It can be seen from the table that more than 73 per cent of households realized that monthly income from dairy has increased after adoption of RBP while about 78 percent households mentioned that their savings from dairy have increased which was utilized for education, nutrition and health as well as for expanding the dairy business. Despite of all benefits discussed above, actual consumption of milk in household did not increase significantly as expected.

Table 5.4: Benefits of RBP realized by Adopters/Beneficiary hh

Sr. No.	Particulars		Benefits realized (% to responses)		
			Surat	Banaskantha	Total
1	Increase in conception rate	No	31.0	24.0	27.5
		Yes	69.0	76.0	72.5
	If yes then specifiy avg. of inseminations	Before RBP	2.63	2.51	2.57
		After RBP	1.2	1.19	1.20
2	Reduction in service period	No	36.0	37.0	36.5
		Yes	64.0	63.0	63.5
	If yes then specify avg. service period (in months)	Before RBP	4.20	4.60	4.4
		After RBP	3.03	2.93	2.98
3	Improved lactation length	No	34.0	31.0	32.5
		Yes	66.0	69.0	67.5
	If yes then specify avg. lactation length (in months)	Before RBP	10.19	10.51	10.35
		After RBP	11.81	11.6	11.71
4	Reduced inter-calving period	No	48	33	40.5
		Yes	52	67	59.5
	if yes then specify avg. inter calving period (in months)	Before RBP	14.31	15.39	14.85
		After RBP	12.05	12.77	12.41
5	Reduction in repeat breeding	No	59.0	41.0	50.0
		Yes	41.0	59.0	50.0
6	Help to Control prolapsed of uterus	No	93.0	92.0	92.5
		Yes	7.0	8.0	7.5
7	Help to Control anestrous	No	91.0	67.0	79.0
		Yes	9.0	21.0	15.0
		cannot say	0.0	12.0	6.0
8	Any other (specify)	No	30.0	58.0	44.0
		Yes	0.0	1.0	0.5
		cannot say	70.0	41.0	55.5

Source: Field survey data.

Besides improvement in the health and digestive system of animals, the respondents have mentioned the other benefits as well. Around two third of the selected household mentioned that after adoption of RBP, rate of conception has increased which had resulted into reduction in average number of artificial inseminations to half from 2.57 to 1.20. The reduction in service period was noted by more than 63 per cent of households (from 4.4 to 2.98) while more than 66 per cent f households observed improvement in lactation length (from 10.4 to 11.7). Almost half of the respondents experienced reduction in inter-calving period and repeat breeding. The adoption of RBP advisory has helped in controlling the diseases such as prolapsed of uterus as well as anestrous.

The few suggestions were given by the selected households for the improvement of RBP and its benefits such as regular supply of nutrient and feed, regular health check up of animal health, regular visit and availability of veterinary doctor at village level, need to have subsidy on animal feed and concentrates, and LRP should work seriously.

Table 5.5: Suggestions for Improvement of RBP

Sr. No.	Suggestions	RBP adopters (% to total)		
		Surat	Banaskantha	Av.
1	Regular Supply of Nutrient & Feed	15.0	0.0	7.5
2	Provide Meaning Equipment	25.0	9.0	17.0
3	Animal Health checkup Camp Facility	8.0	0.0	4.0
4	Training should be provide for animal breeding	10.0	0.0	5.0
5	Subsidy for Animal Food	8.0	0.0	4.0
6	LRP should work properly	0.0	10.0	5.0
7	Regular Veterinary Doctor Facility	0.0	16.0	8.0
8	Concentrate & Food price should be Decrease or Provide Subsidy rate	0.0	7.0	3.5

Source: Field survey data.

5.4 Performance of LRPs:

As it has been noted earlier that selected households suggested that LRP should work seriously. Therefore, this section provides the data on selected parameters to assess the performance of selected LRP. The data were collected from selected beneficiary households on selected parameters related to working and approach of LRP which is presented in Table 5.6.

Table 5.6: Performance of Selected LRPs

Sr. No.	**RBP adopters**		Performance of LRP (% to responses)		
			Surat	Banaskantha	Total
1	LRP gave brief on benefits of RB initially	No	2.0	5.0	3.5
		Yes	86.0	81.0	83.5
		Somewhat	12.0	14.0	13.0
2	RB advice slip was given by LRP	No	3.0	5.0	4.0
		Yes	97.0	95.0	96.0
3	Advice slip is kept & displayed properly	No	1.0	11.0	6.0
		Yes	99.0	89.0	94.0
4	LRP is visiting/contacting over phone after giving RB recommendation to follow up	never	7.0	10.0	8.5
		sometimes	31.0	35.0	33.0
		always	62.0	55.0	58.5
5	Contacted with LRP anytime for ration re-formulation when there was a change in feed items	never	13.0	17.0	15.0
		sometimes	40.0	43.0	41.5
		always	47.0	40.0	43.5
6	Get any additional service from LRP	No	42.0	85.0	63.5
		Yes	52.0	10.0	31.0
		sometime	6.0	5.0	5.5
7	Trying to feed balanced ration to animals which are not covered under RBP	never	11.0	7.0	9.0
		sometimes	45.0	28.0	36.5
		most often	44.0	65.0	54.5
9	Willingness to pay-Like to adopt RB on payment basis after the end of programme	No	28.0	23.0	25.5
		Yes	63.0	65.0	64.0
		Can't say	9.0	12.0	10.5
9	On a 10 point scale, points given to LRP		8.4	8.1	8.3

Source: Field survey data.

It can be seen from the table that more than 80 per cent of households had received brief on RBP from selected LRP, while more than 89 per cent households had kept advice slip and was displayed properly. More than 90 per cent of selected households mentioned that LRP is visiting/contacting them (sometime/always) over phone to follow up the advisory given by him, while most of households themselves contacted the LRP for ration re-formulation when there was a change in feed items. Some households have used same advisory to feed the animals not covered under RBP. On an average, out of 10 points, 8.3 performance points were given to LRP by the selected respondents indicating better working of LRP in selected areas of Surat and Banaskantha. About two third of respondents mentioned their willingness to pay/like to adopt RB advisory on payment basis after the end of programme, while about one fifth of households refused to pay or mentioned unwillingness to adopt the RBP after the end of the programme on payment basis.

5.5 Milk Unions: Implementation, Monitoring and Evaluation of RBP

The data from selected district milk unions on selected parameters related to adoption of RBP were collected to estimate the impact of this programme at union level. It can be seen from the Table 5.7 that after implementation of RBP in selected coverage area of Union, there was increase in milk procurement, number of DCS as well as pourer members, milk fat, daily milk yield as well as conception rate in both the selected district unions. Though other parameters also recorded positive growth after RBP, but less number of veterinary visits is a matter of concern.

The steps taken by the Unions for positive implementation of programme are presented in Table 5.8. It can be seen from this table that selected unions had given incentives to selected LRP on the basis of

enrollment of animals and subsequent delivery of advisory to selected household. Besides, promoting LRP, Milk Unions had organized Village Awareness Programme (VAP) in selected villages. In order to have proper monitoring of progress of programme, monthly LRP meeting was conducted to solve the problems through discussion (hardware, software and net connectivity queries). Milk unions had put suitable mechanism in place to ensure sustainability of the programme, such as commission on sale of Mineral Mixture was provided to LRP @Rs 5/kg to LRP. The Unions also mentioned their willingness to continue the programme after completion of its period by providing the commission to LRP on the sale of mineral mixture, concentrates, etc.

Table 5.7: Impact of RBP at Union Level

Sr. No.	Particulars	Surat		Banaskantha	
		Before RBP	After RBP	Before RBP	After RBP
		annual average (Jun 2014*)	annual average# (Jun 2015)	annual average (Jun 2014.*)	annual average# (Jun 2015)
1	Milk procurement (lit.)	17365207	18070354	2904389	3591663
2	DCS members (no.)	88744	98512	326196	337796
3	Pourer members (no.)	87794	95263	243600	279600
4	Milk fat (%)	5.538	5.613	5.04	5.14
5	Daily milk yield (liter/member)	4.92	5.11	8.51	8.96
6	Mineral mixture sale (kg.)	100	1850	242609	475944
7	Cattle feed sale (tons)	5565	4649	321976	367947
8	Bypass Fat sale (kg.)	80	1236	49688	96522
9	De-wormer (doses)	383	252	711345	886593
10	Veterinary Visits	11568	10361	311748	306541
11	Conception Rate	39.97	45.60	48.23	48.50

Source: selected unions.

Table 5.8: Implementation, Monitoring and Evaluation of RBP

Sr. No.	Particulars	Surat	Banaskantha
A	Incentives provided to LRP	1. During 1st year, Sumul Dairy paid Rs 1500/month to each LRP 2. 2nd year Rs 2250/month 3. 3rd Year Rs 3000/month	1. Incentive to LRP on basis of performance 2. If he covers 60-79 Animals, then Rs 1000/month 3. 80-99 Animals, then Rs. 2000/month 4. 100 and above Animals = Rs. 3000/month 5. Rs.5 / kg commission on banas mineral and chilled mineral 4. Rs. 20 / 5 Kg of Banasdaan 6. Rs. 10/ 2Kg of Pashu Sanjivani
B	Innovative practices for programme implementation	1. If he covers more animal than 30, then incentives were given as : addition than 30-59 transaction-Rs 1500 more, 60 & above-Rs 3000/-	1. Follow up of farmers 2. Village Awareness Programme (VAP) for beneficiary
C	Monitoring system: provide information about review meetings, field visits	1. Monthly LRP meeting conducted for problem solving through discussion (hardware, software and net connectivity queries). 2. Frequent field visit of Sumul Vet. Officers to improve LRP performance.	1. LRP review meeting after every 2-3 months 2. Project progress meeting with staff at every first week of month and review meeting with MD and staff at every quarter 3. Regular field visit of 8-10 villages by 5 Vetenary officers
D	Evaluation system: provide information about record keeping system	1. RBP Advice Register maintained by LRP 2. Stock maintained at RBP store (Union level)	1. This is software based program so all data generated in INAPH form where we take the record 2. Also at village level, LRP maintain two registers- animal recommendation and number of farmers covered
E	Any mechanism put in place to ensure sustainability of the programme	1. Commission on sale of Mineral Mixture @Rs 5/kg to LRP 2. Incentives provided to LRP (1st yr Rs 1500, 2nd yr Rs 2250,in 3rd yr Rs 3000)	1. Yes, after completion of the project , Union/ Dairy society would continue the program 2. Banas Dairy paid incentive on selling of feed supplements like mineral, bypass fat 3. Banas dairy would give Rs. 5 /transaction in future

Though at overall level, the programme has registered the positive growth, Milk Union have faced the constraints while implementing the RBP, such as due to less stipend proper selection of LRP is a tedious task as well as continuation of same person is also overwhelming, there is internet connectivity problem at field level may be due to improper internet service provider selection at that place, and laptop battery problem. The selected unions did not face financial problem so far in implementation of this programme.

Table 5.9: Constraints faced by Milk Union in implementation of RBP

Sr. No.	Particulars	Surat	Banaskantha
1	Manpower constraints (eg. problems in recruiting staff, lrp, etc.)	Due to less stipend proper selection of LRP is a tedious task as well as continuation of same person is also overwhelming.	Due to the low remuneration in scheme, very difficult of sustain LRP for long time and difficult to get good LRP
2	Technical constraints: (eg. problems in availability of inputs, net connectivity, shortfall in technical assistance provided, etc.)	There is internet connectivity problem at field level may be due to improper internet service provider selection at that place, This problem can be avoided if Modem/Dongle is provided suitable and suggested by LRP based on local situation Due to warranty period, Net books repairing gets delayed to much	Due to change in rate of laptop of second model, we purchased it very late Some areas have internet network problem
3	Governance issues: (eg. procedure of procurement, shortcomings in monitoring and evaluation system, etc.)	Procurement procedure is too lengthy	Laptop battery problem
4	Financial constraints	No	No

Table 5.10: Opinions and Suggestions of Milk Union on of RBP

Particulars	Surat	Banaskantha
1. Has program improved the capacity of DCSs for delivering goods and services to farmers	Yes	• Yes, day by day farmers are understanding the modern practice of animal keeping/rearing • DCS regularly supply feed supplement (received from union)
2. Most critical components to achieve programme objectives	LRP, ICP (Inter Calving period), AFC (Age of first calving)	• LRP remunerations
3. Do you plan to extend coverage of RBP beyond the mandatory targets. if yes what will be source of funds	Yes, source would be EIA,DCS and RBP beneficiary	Yes , after completion of present scheme, DCS will pay to LRP
4. Are beneficiary households likely to continue receiving RBP advisory services after the program ends	If funds and net books are available then this will be possible	Yes
5. Are LRPs likely to continue operating and remain financially viable after the program ends	If funds and net books are available then this will be possible	Yes, If he get good income
6. How the RBP would be implemented by the EIA after the financial support from NDP-I is withdrawn	If funds and net books are available then this will be possible	With help of DCS (Financial help)
7. Does gender of LRP make difference to effectiveness of programme specially in ensuring retention of LRPs for longer period with the programme	NO	May not that much
8. What are the main lessons that can be drawn from the program experience since its inception	Proper selection of LRP, Stipend, Net book as well as Dongle Quality, Net connectivity at field level	Actually this is farmers benefit programme, but due to low remuneration, LRP is not taking interest in this program
9. What has been the main lessons learned regarding targeting and working with vulnerable households	-	1. Not to much 2. Farmers are not accepting scheme/advisory for long time

10. What actions are recommended to follow up or reinforce initial benefits from the program	Proper selection of LRP, STIPEND, Net book as well as Dongle Quality, Net connectivity at field level	1. If LRP get good remuneration, program can run more easily and he feels that he is doing good job.
11. What corrective actions are recommended regarding the program	LRP STIPEND, Procurement procedure Net book & Dongle quality as well as their durability To much frequent format fill up for same data by various department of NDDB must be avoided	LRP remuneration must be high Ok Ok Ok Ok

The selected milk unions were asked to give their opinions and suggestions about programme and responses ate presented in Table 5.10. It can be seen from this table that program has improved the capacity of DCSs for delivering goods and services to farmers. The important factor for success of program is amount paid as remuneration to LRP and they may continue working as LRP if paid remunerative commission on work assigned.

The last chapter presents conclusions and policy implications.

Chapter VI

Conclusions and Policy Implications

6.1 Backdrop

Dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities particularly for marginal and women farmers. Most of the milk is produced by animals reared by small, marginal farmers and landless labourers. It has been witnessed over the years that the stability in dairy income is far stronger than the income realised from agricultural activities. Though India stands at first position in terms of cattle and buffalo population in the world, the productivity of dairy animals in India is very low as compared to other countries. The reason cited for this is inappropriate feeding as well as inadequate supplies of quality feeds and fodder in addition to the low genetic profile of the Indigenous breeds. It is not be possible to achieve higher productivity in a milch animal by merely increasing its genetic potential, due attention needs to be given on proper feeding of milch animal. There is evidence to show that when a milch animal is fed a balanced diet, it receives the required nutrients to produce milk commensurate with its genetic potential. Research and field trials indicates that this approach to feeding has the potential to increase milk yield, reduce cost of milk production, and contribute to reducing methane emissions. Milch animals are usually fed one or two locally available concentrate feed ingredients, grasses and crop residues. This often leads to an imbalanced ration–resulting in proteins, energy, minerals and vitamins being either in excess or deficient. Imbalanced feeding adversely impacts not only the health and productivity of animals but also affects income from milk production since an estimated 70 percent of the total

cost of milk production is contributed by feed. Therefore, there is a need to educate milk producers on feeding balanced ration to their animals so that the nutrients required by their individual milch animals is fulfilled in an optimum manner, thereby improving milk production efficiency and the economic return.

With an aim to increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk as well as to provide rural milk producers with greater access to the organised milk-processing sector, Government of India had approved the scientifically planned multi-state initiative, i.e. National Dairy Plan Phase I (NDP I) as a Central Sector Scheme for a period of for a period of six years from 2011-12 to 2016-17. This plan was launched to cover 14 major milk producing States viz. Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal which account for over 90 per cent of the country's milk production, having 87 per cent of breedable cattle and buffalo population and 98 per cent of the fodder resources. In June/August 2015, the union government has included three more states viz. Uttarakhand, Jharkhand and Chhattisgarh and it has been extended up to 2018-19. This plan is implemented wholly by National Dairy Development Board, Anand (Gujarat) through milk co-operatives and state agencies.The project includes a number of programs, of which Ration Balancing Program (RBP) is design with an aim to provide advisory on balance ration in order to improve milk yield of milch animals, reduce the feeding costs/kg of milk produced and reduction in methane release per kg of milk produced by animals. It is expected that through RBP programme, 40000 trained LRPs would provide ration balancing advisory services for about 2.7 million milch animals in 40000 villages.

NDP-I is being implemented in 18 major milk producing states including state of Gujarat. Gujarat is a leading state in terms of its quality milch animals and milk production. Gujarat harbours some of the elite breeds of livestock like Girand, Kankrej, Mehsani, Surti, Jafarabadi and Banni buffalows, which have high milk yields. The Eighteenth Livestock Census (2007) of India has placed total livestock population at 529.7 million, out of which, 235.15 lakhs livestock (4.44%) was in the state of Gujarat. Gujarat ranks third position in terms of milk production in the country with the milk production of 116.91 lakh tonnes which is 7.99 per cent of entire country in 2014-15. The milk production in the state has increased by 99.4 per cent (from 5862 thousand tonnes in 2001-02 to 11691 thousand tonnes in 2014-15). Animal Husbandry is not only a subsidiary source of livelihood in rural Gujarat, it is a major economic activity, especially in the arid and semi-arid regions of the state. This sector plays a vital role in the rural economy of the state and has significant impact on employment generation for marginal, sub-marginal and landless farmers. Major share of motive power of agriculture comes from livestock. Livestock keeping- an integral part of farming system as land, labours and water can be efficiently utilized. An intensive animal vaccination program was launched in all the villages at the *Krushi Mahotsav* held since four years, so as to focus on disease management and the rearing of healthy livestock In addition to vaccinating the livestock, animal health camps were also held. Farmers feeding balanced ration in different regions of the country/state have experienced an increase in their net daily income in the range of Rs 15 to 25 per animal. It is now four years since RBP is being implemented in the State of Gujarat and there is a need to access the performance of the scheme at ground level. Therefore present study was undertaken in Gujarat to evaluate the efficacy of RBP in increasing milk yield and/or reducing feed cost

6.2 Data and Methodology:

The study is based on both, the secondary and primary level data. The secondary data pertain to the details of statewise milk production, NDP-I program, selected EIA and animal covered, selected villages, etc. were compiled from the published sources, NDDB and other websites. The primary data were collected from the sample dairy farmers. The programme has been implemented in 4 EIAs of Gujarat, namely, Surat, Mehsana, Sabarkantha and Banaskantha. EIAs / Milk Unions are district level organizations, for implementation of RBP 200 (one module) / 400 (two module) villages are selected as EIA. For the present study, out of four EIAs, two EIA were selected, namely Surat and Banaskantha. The selection of EIA was made keeping in view the diversity of livestock animal and agro-climatic conditions in these two selected regions of Gujarat so that appropriate picture can be captured. Total 10 villages under each EIA were selected randomly out of the villages where RBP is being implemented. The selection of sample villages has been done in consultation with the EIAs. The twin criteria followed was: i) RBP programme should implemented at least for a period of 6 months at the time of village selection, ii) the villages should geographically well represent the study area, that is should not be concentrated in one tehsil of area of the district/milk shed area. A sample of 10 beneficiary dairy farmers from each village was selected randomly. In case the number of beneficiaries in the selected village is less than 10, a cluster of proximate villages was constituted the sample frame for selection of beneficiary respondents.A sample of 10 non-beneficiary dairy farmers from each village were selected randomly as the control group for analysis. In case, the number of non-beneficiaries in the selected village were less than 10, a cluster of proximate villages was constituted the sample frame for selection of beneficiary respondents. All the milch animals on the sample households (both beneficiary and non-beneficiary) were covered for impact assessment.

The LRP operating in each of the selected villages were interviewed for fulfilling the objectives of the study. Thus, data were collected from the total sample of 200 beneficiaries, 200 non-beneficiaries and 20 LRPs from 20 selected villages from two districts unions (Banaskantha and Surat) of Gujarat. Four types of survey schedules were canvassed in the study area.

6.3 NDDB's Ration Balancing Programme (RBP):

The estimation of nutrient requirement of an animal depends on factors like animal type, class, age, pregnancy status, body weight, milk yield, milk fat, months of calving etc. Information on nutrients availability from the feeds and fodder being fed is required to assess the nutrients supply. Based on nutrient requirement and availability of feed resources, a least cost animal ration shall be formulated. This formulation is a complex exercise and is very difficult to work out manually. Therefore, National Dairy Development Board (NDDB) has developed the software, Information Network for Animal Productivity and Health (INAPH), which formulate least cost balanced ration.

The objective of NDDB's RBP is to produce an optimum quantity of milk at the least cost from milch animals by readjusting, wherever required, the proportion of locally available dietary feed ingredients, so as to provide them adequate amounts of proteins, minerals, vitamins as well as energy. NDDB developed user-friendly software for ration balancing is used by dedicated local resource persons (LRPs). The LRP is trained by the implementing agency to effectively use the software in the local language and involves the following steps: (a) assessing nutrient status of animals; (b) assessing chemical composition of locally available feed resources; (c) assessing nutrient requirement of animals; (d) formulating least cost balanced ration using locally available resources.

The LRP revisits the milk producer according to his/her requirement and keeps a record of the various observations related to the quality and quantity of milk, including the cost of milk production before and after implementation of the RBP and increase in the net daily income per animal. For this purpose, implementing agencies provide the necessary facilities such as a personal digital assistant/ netbook loaded with NDDB's RBP software, a weighing balance, measuring tape and ear tags with applicators, to the LRP. The LRP functions in a dedicated manner to implement the RBP in a village and provides services to the farmers.

6.4 About Selected District/District Milk Union

As mentioned earlier, this programme has been implemented in four district cooperative milk unions of Gujarat (Surat, Mehsana, Sabarkantha and Banaskantha). These unions are named as End Implementation Agency (EIA). Out of these four EIAs, two EIA were selected for the study, viz. Surat and Banaskantha. Surat EIA cover 1500 villages and 1128 primary cooperative milk societies spread over two districts. Banaskantha EIA covers relatively less number of villages (1409) but more number of milk societies (1250) compared to Surat. The annual collection of Banaskantha dairy was around 11724 lakh liters while same was around 3903 lakh litres in Surat. The dominance of milch cows was found in Surat while large number of milch buffaloes were recorded in Banaskantha. The official inception of RBP in Banaskantha was in July 2012 while it was in February 2013 in Surat. Both the unions are yet to achieve the target fixed.

6.5 About Selected Villages

The selected villages in Banaskantha are relatively bigger than villages selected in Surat, because the households in villages of Banaskantha district are scattered in nature as compared to compact

households in villages of Surat. The farmers in Banaskantha district have constructed their houses on farm and thus village area is relatively higher. Also the villages in Banaskantha are populous than villages in Surat district. The average size of selected households in Banaskantha is larger (6.14 persons) than villages of Surat (i.e. 4.72 persons). The seven out of ten villages in Surat district has dominance of tribal population, while remaining four villages also has significant share of tribal population in village total. However, rate of literacy was very high (around 70 percent) in the villages of Surat as compared to around 53 percent in the villages of Banaskanatha district.

As far as the distribution of population as workers is concerned, the total workers to total population was found to be higher in selected villages of Surat (around 49 percent) than Banaskantha district (around 37 percent). Same trend was observed in case of share of main workers to total population, for which average figures were estimated to be 93 percent and 82 per cent receptively. It indicates that the large numbers workers in the villages of Banaskantha work less than six month period in a year. The share of cultivators in main workers was estimated to be 50 percent in Banaskantha followed by 26 percent workers as agricultural labours, while the same share was found opposite as 30 percent and 48 percent respectively in Surat district. Thus, the dominance of agricultural labour in main workers group in Surat indicate that due smaller holding size of land, the workers opt to work as agricultural labours on other farmers field.

It is important to know about the dairy related or supportive amenities available in and around the selected villages. All the selected villages of both districts are well connected through pucca road, having self help groups established and availability of electricity of domestic as well as agriculture purpose. However, except one village in Banaskantha district, no other village has veterinary hospital, which is located nearby takula places. The availability of agricultural credit

societies and public distribution centre was found better in selected villages of Banaskantha than Surat. Excpet two villages in Surat, all other villages are located more than 10 kms away from the nearest town, mostly the taluka places.

Except two villages in Banaskantha, all other selected villages of both districts have significant land under irrigation. The groundwater is the only source of nine villages in Banaskantha while one is dependent on canal water for irrigation purpose. In case of villages in Surat, nine villages are dependent on canal water while one village also has groundwater availability for irrigation purpose. Thus, the selected villages have well support of irrigation.

6.6 About Sample Households

- The average size of selected household was 5.5 members which was found similar in both categories (BEN-beneficiary & NBEN-non beneficiary households). Across selected districts, same trend was found in both categories, while household size was relatively large in Banaskantha (5.8 members) as compared to Surat (around 5.2 members).
- The family composition indicates that around 38 percent were male, followed by 37 percent female and remaining were children. The ratio of female was better in Surat than Banaskantha, while opposite the case of children.
- The average age of respondents of both categories was around 43 years, which was relatively higher in Surat than respondents having age between 37-39 years in Banaskantha district. Also, in case of average family age, it was around 33 years in Surat and 27-28 years in Banaskantha.
- The figures on average level of education of family indicate that higher rate of literacy was found in beneficiary households (77%) than non beneficiary households (70.8%). As Surat is a well

developed district, the level of education was found relatively higher in the selected households than selected households in Banaskantha.

- All the selected households belongs to Hindu religion, of which dominance of scheduled tribe population was observed in Surat district while majority of selected households belongs to other backward class category in Banaskantha district.
- The main occupation of the selected households was agriculture comprised of cultivation of land as a farmer along with supportive allied activity of animal husbandry and dairying.
- The data on operational land holding indicates that selected households in Surat has very small piece of land of 4-5 bigha while same figures for Banaskantha was 12-13 bigha, having more than 85 percent land under irrigation. In fact irrigated area share in total area was found higher in Surat (around 95 percent) than Banaskantha (87.2 %). Higher size of land holding with irrigation support may have resulted in high level of income in Banaskantha as around 80 percent of households are categorized above poverty line as compared to around 57 per cent in Surat. The tribal population dominance is some pockets of Surat are reflected in relatively large number of households under below poverty line. Same trend was observed in case of dwelling structure where almost two third households are pucca structure in Banaskantha while same was with one third number in Surat district.
- The details on frequency of extension contact, mass media exposure and exposure of any training to the selected household indicate that in case of beneficiary households, the local resource person (LRP) had regularly visited 68 percent households in Surat and 78 percent households in Banaskantha while 32 and 46 percent households respectively received regular support of Veterinary

assistant surgeons. The non beneficiary households also received same extent of support of veterinary assistant surgeon and from LRP as well. Though few farmers has received support from other extension agency/personal, but majority of both the categories of households had mentioned that they had never received any support of Dairy Extension Officers, B.D.O., Scientist from KVK, progressive farmers, neighbours/friends, input dealer and output buyer.

- The frequency of mass media exposures through television and educational film was relatively low and majority of the selected households had not received magazine, newspaper and pamphlets. It was also observed that sometime selected households had attended the common functions such as dairy training, group meeting, while majority of them has never got chance to attend dairy mela/cattle show, dairy exhibition, educational tour, farmer's day, and any demonstration.
- The cropping pattern details shows that sample households from Surat had highest area under sugarcane crop followed by cereals and fodder crop. While farmers of Banaskantha district had grown more oilseed crops in kharif, followed by fodder crops, cereal and pulses. The area under rabi oilseeds and vegetables was also significant in Banaskantha district. The beneficiary households had put relatively more area under fodder crops than non-beneficiary households. The cropping intensity was found higher in case of beneficiary farmers of Surat district, while opposite picture was noticed in Banaskantha district.

6.7 About Local Resource Persons (LRP)

- The details about the selected LRPs indicate the male LRP dominance in selected villages of Banaskantha than Surat district. The average age of LRP ranges between 22-29 years and half of them were married.

- As most of the area selected for the study in Surat district union fall in hilly area and categorized as tribal area, all the LRP belongs to scheduled tribe caste, while dominance of LRP belonging to Other Backward Classes caste category was found in Banaskantha milk union area.
- The education level of selected LRPs was relatively higher in Banaskantha than Surat, and same trend was observed in case of own land holding and holding of milch animals.
- Though the selected LRP receive fixed salary, most of them have earned incentives on sale of other product as well as through other assignments. Most of the LRPs have puccka house with electric facility.

6.8 Findings from Field Survey

6.8.1 Livestock holdings/Herd Strength

- All together, numbers of cattle covered under RBP were higher than buffalos in selected areas of both districts. However, among the cattle, crossbreed cattle dominated the numbers. Among district, selected households in Banaskantha district milk union area had relatively higher herd strength than selected households in Surat district.
- At overall level, except number of buffalos in Surat, beneficiary households had higher herd strength than non-beneficiary households in both districts. The number of animals reared were very high in Banaskantha than Surat district, having dominance of cattle population in Surat whereas both cattle and buffaloes in Banaskantha.
- Total 114 cattle and 33 buffaloes of selected households of Surat were covered under RBP while corresponding figure for selected households in Banaskantha were 224 and 180 respectively. As per the RBP guidelines, in-milk cow and buffalos are preferred

first to select under programme followed by adult female cattle and buffaloes and heifers, the data confirmed the coverage of animals as per guidelines stipulated.

6.8.2 Breedable Animals

- On an average, in both beneficiary and non-beneficiary group, the age at first calving of local cattle was found higher than crossbred cows that to it was recorded longer in Surat than Banaskantha.
- The average age of first calving ranges from 32-39 months in case of cows and 40-47 months in case of buffalos. The average level of peak yield recorded during the present lactation was found higher than earlier lactation in all cases and both groups.
- In case of beneficiary households, except local cow yield in Banaskantha, the peak yield level of milk of all other animal type and breed have found higher in case of animals covered under RBP than animals not covered under RBP as well as the level yield level recorded of animals with non-beneficiary households.
- The average milk recorded was higher in crossbred cows than local cows as well as buffaloes. In fact the crossbred cows from selected households in Banaskantha had yielded as high as 18.63 kg which was covered under RBP, while a corresponding figure for Buffalo was recorded of 12.63 kg. Thus, the positive effect of programme on ration balancing could be broadly seen from the high level of peak yield figures.
- It was found that except in few cases of cows (cross breed in Surat and local in Banaskantha), the milk yield of animals covered under RBP was found higher than animals not covered under RBP of beneficiary households as well as milch animals of non beneficiary households.

- The highest milk yield of about 14 kg/day was recorded in case of crossbreed cows in Banaskantha and lowest was of local cows in Surat (6.8 kg), both from RBP group. While highest buffalo milk yield on earlier day was recorded in Banaskantha (8.51 kg/day). The same trend was found in case of milk yield of animals with non-beneficiary households.
- The data on milk fed to calves shows mixed results which indicate that with few exceptions, milk fed to calf was marginally lower RBP group than its counterpart, both beneficiary and non beneficiary groups.

6.8.3 Details on Feed and Fodder

- All the animals selected under RBP were feeded at stall, which is mandatory requirement to balance the diet of particular animal. As it was expected Banaskantha being rainfed and fodder deficient area, the selected households were dependent on purchased fodder to feed their animals, while selected households from Surat used fodder from both sources (self cultivated & purchased fodder).
- The animals were also feeded with concentrates which were mostly purchased from the market from the market. It is very interesting to note here is that animals covered under RBP in Banaskantha were fed with very lesser amount of concentrates as compared to not only the animals covered under RBP in Surat but also animals not covered under RBP of both groups. Besides feeding the animals at stall in shed, the selected households in Surat could graze their animals every day for about 4-5 hours on their own agriculture land or common grazing land of the village.

6.8.4 Details on Prices of Feed and Fodder, Wages & Value of Animals

- There was not much difference between the rate paid for fodder and concentrates by the beneficiary and non beneficiary households in both districts.
- The dry and green fodder was found very costly in Banaskantha district, which was almost the double the rate paid by Surat households. Same trend was noticed in case of wages of labour and rental value of land.
- Thus rearing the animal in selected areas of Banaskantha district was costlier than rearing in the areas of Surat district. In general, salvage value of cross breed cow was recorded the highest followed by salvage value for adult buffalo and the local cows.
- The present value of unproductive adult cross breed cows in Surat was found higher than buffalo, while opposite picture was notices in Banaskantha.
- About 85 percent dung was used for manure an remaining was used to make dung cakes by selected households in Surat, while corresponding figures for Banaskantha were 99 and 1 per cent respectively.

6.8.5 Details on Veterinary and Breeding Services and Expenditures

- Almost all the animals were given vaccinations (such as FMD, HS, BQ, Deworner, Thailera, Swell in Feet, etc), which was mostly received free of cost.
- Besides, some of the selected households had incurred expenditure on medicine and doctor fee as and when some of animals fell sick. On an average, beneficiary household had incurred medicine plus doctor fee cost ranging between Rs. 400-800/- per animal during the year while corresponding figures for Banaskantha was at higher side which ranges between Rs.400-900/animal.

- The amount spent towards cost of medicine and doctor on animals not covered RBP by beneficiary households was relatively higher than animals covered under RBP. While expenditure incurred by non beneficiary households on medicine and doctor was at lower range.
- During the visit to the field and discussion with the selected household, it was observed that despite of various efforts made by the government; availability of veterinary doctor is one of the bottleneck in dairy development.
- On an average, every year total number of visit of veterinary doctor ranges between 3-4 only. Thus, most of the households had either depend on the alternative source of advisory and medical support for their animals.
- Though under cooperative dairy sector, member of dairy can register a complaint at diary society and doctor visit the animals, it sometimes takes long time to get doctor visited and thus delayed visit and prescription of doctor sometime result in extra expenditure on medicine and doctor as well as loss in income due to low milk yield (in case of milch animal).
- Beside natural service, artificial insemination facility was availed by the selected households for their animals and on an average, rate of conception of AI was less than 2.

6.8.6 Labour Use Pattern:

- Labour use pattern by the selected sample households indicate that dominance of use family labour who were engaged in both the activities and out of total time worked in a day, about half of the time was spent on dairy and household activities while remaining time was spent on field.
- Though some of the household had hired casual labour, which were mainly used for agriculture activities, while tendency of

having permanent labour was very rare and found with few households only. Thus, activities of dairy were carried out mostly by the household members.

6.8.7 Handling of Feeding and Income from Dairying

- In majority of the cases, feeding as well as income from dairy was handled by the female members in Surat district, whereas in Banaskantha district, feeding animal work responsibility was with female while income was handled by male member. It may due to the fact that distance between the households and dairy cooperative in Surat is close, thus female pour milk every day in dairy cooperative and also collect the money toward same.
- The households in selected areas of Banaskantha district are scattered and located far from dairy, thus, male member generally pour milk in society and thus collect the payment form dairy.

6.8.8 Production and Disposal of Milk

- The details on disposal of milk by selected households indicate that on an average, about 90 percent of milk produced had been disposed by the selected households. Thus, hardly around 10 per cent of total milk produced must have either used for the home purpose and used for preparation of further value added products, such as ghee, curd, etc.
- In case of beneficiary households, more than 97 per cent of milk was deposited with cooperative milk society and remaining milk was sold to consumer and sweet shop owner. While in case of non beneficiary households, around 55 per cent of milk was sold to Cooperative milk society followed by around 45 percent milk was sold to consumers.

6.9 Outreach, Perception & Constraints

- More than 92 percent of beneficiaries were aware about the programme, while corresponding figure for the non beneficiary household was about 51 percent. The major source of information about the programme for more than 75 percent of beneficiary household was LRP itself, followed by the dairy cooperative society and other sources such as friends, progressive farmer in village and relatives. About same number of beneficiary households had seen documentary on RBP.
- Around two third of the beneficiary households mentioned that they had seen poster/banner on RBP, while one third of non beneficiary households got exposure to programme through the same. Though the pamphlets were also distributed about the programme, about two third of beneficiary households and one fifth non beneficiary households had received the same source.
- The village awareness programme was attended by the 67 percent of beneficiary and 42 per cent of non beneficiary households. The pattern was found same in both the selected districts.
- About one third of the selected beneficiary households were not aware about ration balancing before adopting RBP. On an average, total nine advisory/recommendations were received till date by the beneficiary households in Surat whereas same figure was higher side in Banaskantha district having about 14 recommendations. More than 77 percent of beneficiary households from both districts opined that benefits of RBP has increased their interest in dairy and would like increase the herd strength.
- The success of RBP can be seen from the fact that more than 88 percent of farmers were following the recommended ration

advisory given by LRP, while more than 80 percent household felt that they are in programme.

- Though most of beneficiary households followed the advice given by the LRP, some of them had faced the constraints in regular feeding of recommended ration such as shortage of mineral mixture, frequent change in feed items, LRP do not visit timely and they are not convinced about the recommendations. More than 88 per cent of respondents had mentioned that they would recommend the other dairy farmers also to join the RBP and rank programme with 8.5 points (out of 10).
- The changes realized by the RBP adopted in various parameters indicate that more than 78 per cent of beneficiary households opined that milk production has increased by around 15 percent after adoption of RBP, i.e. about 1.5 litre/day. Not only milk production was increased, the composition of milk was also improved. More than 79 per cent households has realized that on an average milk fat and SNF level has increased before adopting the programme. Most of the households have also reported that health of animals is also improved after adoption of RBP. Decrease in digestive disorders of animals after adoption of RBP was experienced by selected sample households. By following the recommended ration given by the LRP under programme, more than half of the selected households have realized reduction in feed cost while feed cost was increased in case of one fourth households and same was unchanged in case of remaining households. Though one fourth of households mentioned that additional expenditure (money/labour) is involved in adopting RBP while three fourth of selected households mentioned that no change in employment opportunity was experienced after RBP.

- More than 73 per cent of households realized that monthly income from dairy has increased after adoption of RBP while about 78 percent households mentioned that their savings from dairy have increased which was utilized for education, nutrition and health as well as for expanding the dairy business. Despite of all benefits discussed above, actual consumption of milk in household did not increase significantly as expected.
- Besides improvement in the health and digestive system of animals, the respondents have mentioned the other benefits as well. Around two third of the selected household mentioned that after adoption of RBP, rate of conception has increased which had resulted into reduction in average number of artificial inseminations to half from 2.57 to 1.20. The reduction in service period was noted by more than 63 per cent of households (from 4.4 to 2.98) while more than 66 per cent f households observed improvement in lactation length (from 10.4 to 11.7). Almost half of the respondents experienced reduction in inter-calving period and repeat breeding. The adoption of RBP advisory has helped in controlling the diseases such as prolapsed of uterus as well as anestrous.
- The few suggestions were given by the selected households for the improvement of RBP and its benefits such as regular supply of nutrient and feed, regular health check up of animal health, regular visit and availability of veterinary doctor at village level, need to have subsidy on animal feed and concentrates, and LRP should work seriously.

6.10 Performance of LRPs:

- More than 80 per cent of households had received brief on RBP from selected LRP, while more than 89 per cent households had kept advice slip and was displayed properly. More than 90 per

cent of selected households mentioned that LRP is visiting/contacting them (sometime/always) over phone to follow up the advisory given by him, while most of households themselves contacted the LRP for ration re-formulation when there was a change in feed items. Some households have used same advisory to feed the animals not covered under RBP.

- On an average, out of 10 points, 8.3 performance points were given to LRP by the selected respondents indicating better working of LRP in selected areas of Surat and Banaskantha. About two third of respondents mentioned their willingness to pay/like to adopt RB advisory on payment basis after the end of programme, while about one fifth of households refused to pay or mentioned unwillingness to adopt the RBP after the end of the programme on payment basis.

6.11 Milk Unions: Implementation, Monitoring and Evaluation of RBP

- After implementation of RBP in selected coverage area of Union, there was increase in milk procurement, number of DCS as well as pourer members, milk fat, daily milk yield as well as conception rate in both the selected district unions.
- Though other parameters also recorded positive growth after RBP, but less number of veterinary visits is a matter of concern.
- The selected unions had given incentives to selected LRP on the basis of enrolment of animals and subsequent delivery of advisory to selected household. Besides, promoting LRP, Milk Unions had organized Village Awareness Programme (VAP) in selected villages. In order to have proper monitoring of progress of programme, monthly LRP meeting was conducted to solve the problems through discussion (hardware, software and net connectivity queries).

- Milk unions had put suitable mechanism in place to ensure sustainability of the programme, such as commission on sale of Mineral Mixture was provided to LRP @Rs 5/kg to LRP. The Unions also mentioned their willingness to continue the programme after completion of its period by providing the commission to LRP on the sale of mineral mixture, concentrates, etc.
- Though at overall level, the programme has registered the positive growth, Milk Union have faced the constraints while implementing the RBP, such as due to less stipend proper selection of LRP is a tedious task as well as continuation of same person is also overwhelming, there is internet connectivity problem at field level may be due to improper internet service provider selection at that place, and laptop battery problem. The selected unions did not face financial problem so far in implementation of this programme.
- The important factor for success of program is amount paid as remuneration to LRP and they may continue working as LRP if paid remunerative commission on work assigned.

6.12 Policy Implications:

- Adequate supply of nutrient and feed should be ensured either by the district milk unions or by dairy department of state government. Dairy union should provide nutrient and feed on subsidised rate to member dairy farmer.
- The regular health check up of animal health, regular visit and availability of veterinary doctor at village level need to be arranged and monitored by both Government and milk union.
- The remuneration of LRP should be lucrative so as to encourage the local youth to get involved in this program as well as proper

monitoring of work assigned to LRP should be done by respective milk union.

- Along with the ration balancing advisory services, milk producers also need to be educated, through an efficient extension service, about the importance of quality of drinking water, proper feeding mangers, colostrum feeding to newly born calves, suitable chaffing of fodder, de-worming, vaccination, and timely insemination, among others. Some of these messages could be put across through regular group meetings with suitable follow up meetings wherever the ration balancing programme is being carried out.

- As no selected dairy farmer had insured their livestock. Therefore, link should be establish between RBP program and animal insurance scheme
- The project needs to be implemented in the areas with less sizeable population of cattle and buffaloes.
- Government should make necessary arrangement to have adequate supply of concentrate & supplement for milch animal in deficient area.

References

GOI (2011), Census 2011, Office of the Registrar General and Census Commissioner, India.

GOI (2016), Basic Animal Husbandry & Fisheries Statistics-2016, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Government of India

IFCN (2015), Dairy Report 2015, International Farm Comparison Network, IFCN Dairy Research Centre, Schauenburgerstrabe, Germany.

NDDB (2014), Inaugural address of Shri T Nanda Kumar, Chairman, NDDB, at the two-day seminar-cum-workshop on 'Convergence of Productivity Enhancement Activities to Meet Future Demand of Milk and Milk Products' (http://www.business-standard.com /article /economy-policy/estimated-milk-demand-by-2016-17-to-be-about-155-mn-tonnes-nddb-chairman-114082601068_1.html)

Shiyani, R.L. (1996), "An Economic Inquiry into the Impact of Dairy Co-operatives on Milk Production", *Indian Journal of Agricultural Economics,* Vol. 51, no. 3, July-September, pp. 396 –406.

NAAS (2003), "Export Potential of Dairy Products, Policy Paper 23, National Academy of Agricultural Sciences, India, December.

Kumar, Ayush and Jignesh Shah (2016), "Dairying as an Instrument for Ensuring Socio-Economic and Nutritional Security in Rural India", *Indian Journal of Agricultural Economics,* Vol. 71, No. 1, January March, pp. 78-89.

Websites visited:

http://www.clal.it/clal20/en/index.php?section=dwt_trial

http://www.fao.org/agriculture/dairy-gateway/milk-and-milk-products/en/

http://dahd.nic.in

http://www.nddb.org/sites/default/files/pdfs/guidelines/PIP-Vol-V-Guidelines-on-RBP-FD.pdf

http://sumul.com

https://en.wikipedia.org/wiki/Banaskantha_district

http://banasdairy.coop/aboutus.html

http://www.censusindia.gov.in

https://www.dnvgl.com/

http://gujaratinformation.net/showpage.aspx?contentid=107

F.No.22-23/2011-DP
Government of India
Ministry of Agriculture
Department of Animal Husbandry, Dairying & Fisheries
Krishi Bhawan, New Delhi-110001
Dated the 16th March, 2012

OFFICE MEMORANDUM

Subject:- Administrative Approval of Central Sector Scheme "National Dairy Plan Phase-I (NDP-I)"

The undersigned is directed to convey the Administrative Approval of Government of India for implementation of Central Sector Scheme "National Dairy Plan" phase I for a period of six years from 2011-12 to 2016-17 with the following objectives:,

a) To help increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk.
b) To help provide rural milk producers with greater access to the organised milk-processing sector.

These objectives would be pursued through the adoption of focused scientific and systematic processes in provision of technical inputs supported by appropriate policy and regulatory measures.

2. NDP-I will be implemented with a total investment of about Rs.2,242 crore comprising Rs.1584 crore as International Development Association (IDA) credit, Rs.176 crore as GoI share, Rs.282 crore as share of End Implementing Agencies (EIAs) that will carry out the projects in participating States and Rs.200 crore by National Dairy Development Board (NDDB) and its subsidiaries for providing technical and implementation support to the project.

3. Pattern of funding under the scheme will be 100% grant-in-aid for nutrition and breeding activities. In the case of new semen station, 25% of the project cost of the capital expenditure and in the case of village milk procurement systems, 50% of the cost of capital items will be shared by the End Implementing Agencies. Administrative expenses including training expenses under the scheme would be kept within the admissible 6% ceiling of total expenditure proposed under the scheme.

4. The key components of NDP-Phase I are:

[A]. Productivity Enhancement

a). Production of high genetic merit (HGM) cattle and buffalo bulls and import of Jersey/ HF Bulls for semen production
   i) Progeny testing
   ii) Pedigree Selection
   iii) Import of bulls (equivalent embryos)

b). Strengthening existing semen stations / starting new stations for producing high quality disease free semen doses
   i) Strengthening existing semen stations -(A & B grade semen stations only)
   ii) New Semen stations

c). Setting up a pilot model for viable doorstep AI delivery services (based on Standard Operating Procedures [SOPs]) through a professional service provider including animal tagging and performance record

d). Improving nutrition of milch animals to produce milk commensurate with their genetic potential and for reducing methane emission
   i) Ration Balancing Program
   ii) Fodder Development

[B]. Village based milk procurement systems for weighing, testing quality of milk received and making payment to milk producers

a) Milk weighing, testing and collection
b) Milk cooling
c) Support for creating institutional structure
d) Training

[C] Project Management and Learning

a) ICT Based MIS
b) Learning & Evaluation

5. NDP-I would focus on 14 major milk producing States - Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa and Kerala which account for over

90% of the country's milk production. Coverage of NDP I will however be across the country in terms of benefits accruing from the scheme.

6. The scheme will be implemented by NDDB through end implementing agencies (EIAs) comprising State Livestock Boards, State Cooperative Dairy Federations, District Cooperative Milk Producer Unions, cooperative forms of enterprises such as Producer Companies, Trusts (NGO's, Section 25 companies), subsidiaries of statutory bodies, ICAR institutes and Veterinary/Dairy Institutes/Universities and any other entity as may be decided by the National Steering Committee to be set up under the NDP-I. The EIAs will be eligible for funding of various components based on the eligibility criteria which will comprise geographical, technical, financial and governance parameters.

7. NDP-I is to be implemented in States where the respective state governments commit to undertake the necessary regulatory/ policy support to prepare an environment for successfully implementing the scheme. The regulatory / policy support to be provided by the state governments are:

a) Having in place an appropriate breeding policy;
b) AI delivery services not being notified as a Minor Veterinary Service (MVS);
c) Charges for AI delivery being raised gradually to cover full cost;
d) Semen for AI delivery in the state being sourced only from semen stations graded A or B;
e) Adoption of common protocols and SOPs issued by DADF for all breeding activities; and
f) Notification of State Rules under the Prevention and Control of the Infectious Diseases in Animals Act.

8. Projects under the scheme will be approved and monitored by the Committees as indicated below.

(a) National Steering Committee (NSC) chaired by Secretary, DADF, GoI would approve State Plans, Annual Action Plans, sanction release of funds to NDDB as well as re-appropriation of funds, and generally oversee and review implementation of NDP I. The NSC would have the authority to consider and approve changes in eligibility criteria with reference to implementing agency, project area, norms of unit cost of components/items, composition of National & Project Steering Committees, component structure and re-appropriation proposals. The composition of the NSC will be as below:

i) Secretary, DADF, GOI – Chairman,
ii) Chairman, NDDB,
iii) Animal Husbandry Commissioner, GoI,
iv) Additional Secretary & Financial Adviser, DADF,
v) Joint Secretary (Dairy Development), DADF,
vi) Principal Secretary/Secretary (AH & Dairying) (from two States on rotation basis)
vii) Managing Director, NDDB as Mission Director, NDP I

(b) Project Steering Committee (PSC) to be headed by Mission Director (NDP I) will have representatives of DADF and NDDB. The Secretary (AH & Dairying) of the concerned State Government or his representative would be an invitee while discussing proposals pertaining to that particular state. The project proposals received from EIAs are to be examined and recommended by Project Management Unit (PMU), NDDB and will be placed before the PSC for approval and sanction of funds for disbursement. The PSC will sanction project proposals and have project oversight. PSC will meet as frequently as necessary to ensure that sub project proposals are considered/sanctioned within one month of submission by the PMU. The PSC will have powers to authorize the re-appropriation of funds within a project component and between EIAs that are implementing the projects in the same State. The composition of the PSC will be as below:

i) Managing Director, NDDB as Mission Director, NDP-I
ii) Representatives of DADF,
iii) Representatives of NDDB,
iv) The Secretary (AH & Dairying) of the concerned State Government or his representative (would be an invitee while discussing proposals pertaining to that particular state).

(c) Implementation of the project will be managed by a Project Management Unit (PMU) located at NDDB and will be headed by the Mission Director. PMU will appraise the project proposals received from EIAs and recommend the proposals to PSC for sanction, provide technical assistance in project implementation and monitoring as may be required.

9. **The guidelines for approval of project under the Scheme are as follows: -**

i. The PMU in NDDB will examine and appraise the project proposal submitted by the EIA. After the EIA has incorporated any changes, that may be required and resubmitted the proposal, the PMU, NDDB will recommend the project proposal and circulate the same to the members of the Project Steering

Committee for approval. PSC will consider the project proposals and on approval of the project the earmarked amount will be released to EIAs by NDDB.

ii. The NDDB would convene PSC meeting and be responsible for all financial and accounting functions related to NDP-I.

iii. The NDDB shall maintain separate books of accounts and all transactions pertaining to NDP-I. It will be accounted under a new project code (and named as 'NDP-I Fund') which will be separate and distinct from all other accounts of NDDB. A separate bank account will be maintained for the receipt of funds from DADF for onward disbursement to EIAs as Grant-in-aid. Authorized signatories of the NDDB will operate the account.

iv. The NDDB will draw funds from DADF, for passing on to EIAs for implementing approved projects, as an advance, usually on a half-yearly/ yearly basis. The NDDB shall make necessary arrangements to obtain audited Fund Utilization Certificates (FUCs) from the EIAs for the funds received by them during the year (on a suitable periodicity – quarterly/ half-yearly) and forward the same to DADF on a yearly basis or as and when required by DADF.

v. For activities related to ICT based MIS under the head Project Management and Learning, support for project coordination/management units at Department of Animal Husbandry & Fisheries (DADF), NDDB and State/district levels as needed will be provided for (i) project monitoring, evaluation and learning activities involving DADF, State Governments, NDDB and EIAs; (ii) services of external agencies for carrying out baseline, mid-term and project completion surveys and other special surveys/studies as may be needed; (iii) technical assistance for MIS; and (iv) providing support for emerging needs and innovations during implementation.

vi. The EIAs will maintain separate books of accounts and all transactions pertaining to NDP-I will be accounted under a new project code (and named as 'NDP-I Fund') which will be separate and distinct from all other accounts of EIAs. A separate bank account will be maintained for the receipt of funds from NDDB. Authorized signatories of the concerned EIA will operate the account.

vii. Funding will be through a line of credit from the International Development Association (IDA), which along with the share of the Government of India, will flow from the DADF to NDDB and in turn to EIAs.

viii. The expenditure incurred by the implementing agency / EIAs on the items of work 12 months prior to the approval of World Bank Board' after following World Bank procedures, are eligible for reimbursement under retroactive financing. Normally, it would not exceed limit of 20% of the budgetary amount of Loan/Credit received in a financial year.

ix. The utilization of at least 60 percent of already released funds would be considered necessary for the release of estimated requirements for the subsequent year. However, before the release of the funds for the next year, the EIAs will satisfy full utilization of funds availed until then.

x. Administrative expenses including training expenses on each component under the scheme should be kept within the admissible 6% ceiling of total expenditure proposed under each component under the scheme.

xi. The evaluation of scheme as a whole and projects under the scheme will be done by a third party external monitoring & evaluation agency. The evaluation would include baseline, annual, mid-term and end-term surveys. The details of procedure to be followed for survey/studies would be prepared and circulated by NDDB after seeking the approval of National Steering Committee.

xii. Where feasible, the services of ATMA may be utilized by EIAs for carrying out information and education campaigns to create awareness amongst milk producers about the new scientific approach and technologies that could be adopted to increase milk productivity and milk production. The services of KVKs, village based community resource persons and other field staff will be used for capacity building of milk producers, wherever feasible.

xiii. Project Implementation Plan would form the basis for NDDB to determine the components to be funded and the objective to be achieved under the scheme.

10. The following points may be noted for preparing the sub project proposals under the scheme:

i. The project proposal under the scheme will be prepared by the End Implementing Agencies (EIAs) and be submitted to the PMU, NDDB.

ii. The duration of the project period to be submitted by EIAs shall be between 2011-12 to 2016-17.

iii. It must be ensured that there is no duplication of activities under NDP I and the existing schemes of the Department. The activities under ongoing

schemes should not overlap with the activities under NDP I in their specific areas. A certificate in this regard needs to be issued by the concerned EIA while submitting the project proposal.

iv. A background note and present status of dairy development in the covered area especially in respect of components proposed needs to be incorporated in the proposal.

v. The project proposal shall contain a fact sheet showing the salient features of the proposal as per the given format.

vi. Component/Item-wise justification needs to be provided elaborately supported with facts and figures.

vii. The project proposal shall provide the relevant information on existing Animal Husbandry and Dairy Development infrastructure available in the proposed area as per the given format

viii. All the components proposed under the project should clearly indicate its unit costs as well as detailed cost break up based on prevailing market price and based on the unit costs of similar ongoing schemes of DADF.

ix. The project proposal would comprise of a number of Annexures which are to be filled up based on data available with Government sources, benchmark survey, international agencies of repute (eg United Nations website, International Dairy Federation, United States Department of Agriculture and other Government sources). Source of data needs to be mentioned suitably in the annexures. The list annexures would be available in the website of NDDB and DADF.

11. A total sum of Rs.176 crore has been allocated under the scheme as Government of India's share of which an amount of Rs.12.76 crore has been earmarked for implementation of NDP-I during 2011-12.

12. This issues with the concurrence of Integrated Finance Division (IFD) of the Department of Animal Husbandry, Dairying and Fisheries vide their Diary No.5680 AS&FA dated 15.03.2012.

(K.C.Patra)
Under Secretary to the Government of India

To,

1. Managing Director, National Dairy Development Board, P.B.No.40, Anand-388001, Gujarat.
2. Secretary, Department of Expenditure, Ministry of Finance, North Block, New Delhi
3. Secretary, Department of Economic Affairs, Ministry of Finance, North Block, New Delhi
4. Secretary, Department of Agriculture & Cooperation, Ministry of Agriculture, Krishi Bhawan, New Delhi
5. Secretary, Department of Rural Development, Ministry of Rural Development, Krishi Bhawan, New Delhi
6. Principal Accounts Officer, Ministry of Agriculture, Department of Animal Husbandry & Dairying, 16 Akbar Road Hutments .New Delhi.
7. Accountant General Commerce, Works & Misc., AGCR Building, Near I. T .0. New Delhi.
8. Chief Controller of Accounts, Ministry of Agriculture, Room No. 242, .Krishi Bhawan, New Delhi-110001.
9. Principal Adviser (Agriculture), Planning Commission, Room .No.I06, Yojna Bhawan, New Delhi.
10. Adviser (PAMD), Planning Commission, Room No.228, Yojna Bhawan, New Delhi. .
11. All Secretaries In charge of Dairy Development in all States/U.Ts.
12. All Managing Directors of State Level Co-operative Dairy Federations.

Copy for information to: -

PPS to Secretary (ADF) / PPS to AS&FA/ PPS to JS(C&DD)/ Dir(DD) / AC (DD) / US (Finance) / AO (Budget)

(K.C.Patra)
Under Secretary to the Government of India

F.No.22-23/2011-DP
Government of India
Ministry of Agriculture
Department of Animal Husbandry, Dairying & Fisheries

Krishi Bhawan, New Delhi-110001
Dated: 03/08/2015

ADDENDUM

Subject:- Administrative Approval of Central Sector Scheme "National Dairy Plan Phase-I (NDP-I)" during 2015-16.

In continuation to this Department's OM of even no. dated 19.05.2015, the undersigned is directed to convey that Government of India has approved extension of implementation period and coverage of States under National Dairy Plan-I. The period of implementation of NDP-I has been extended by two years up to 2018-19 and three new States namely Uttarakhand, Jharkhand and Chhattisgarh have been included under NDP-I. Thus the NDP-I implementation period will now be of 8 years i.e, from 2011-12 to 2018-19 and number of States covered under the scheme would be eighteen with immediate effect.

2. Accordingly, the para 5 and para 10(iii) in the OM of even number dated 19.05.2015 will now be read as;

(i) "Para 5. NDP-I would now focus on 18 major milk producing States(*after Andhra Pradsh was bifurcated into Andhra Pradesh and Telangana*) viz; Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Uttarakhand, Jharkhand, Chhattisgarh, Orissa and Kerala which account for over 90% of the country's milk production. Coverage of NDP I will however be across the country in terms of benefits accruing from the scheme."

(ii) "Para10(iii) The duration of the project period to be submitted by EIAs shall be 2015-16 to 2018-19".

3. All other remaining paras in the OM of even number dated 19.05.2015 will remain unchanged.

4. This OM has been issued with the approval of Joint Secretary (C&DD) vide Diary No.7219/JS(CDD) dated 03/08/2015.

(K.C.Patra)
Under Secretary to the Government of India

(K. C. PATRA)
Under Secretary
Govt. of India
Ministry of Agriculture
Dept. of A. H. D. & Fisheries
Krishi Bhawan, New Delhi

To,

1. Managing Director, National Dairy Development Board, P.B.No.40, Anand, 388001, Gujarat.
2. Secretary, Department of Expenditure, Ministry of Finance, North Block, New Delhi
3. Secretary, Department of Economic Affairs, Ministry of Finance, North Block, New Delhi

(K. C. PATRA)
Under Secretary
Govt. of India
Ministry of Agriculture
Dept. of A. H. D. & Fisheries
Krishi Bhawan, New Delhi

4. Secretary, Department of Agriculture & Cooperation, Ministry of Agriculture, Krishi Bhawan, New Delhi
5. Secretary, Department of Rural Development, Ministry of Rural Development, Krishi Bhawan, New Delhi
6. Principal Accounts Officer, Ministry of Agriculture, Department of Animal Husbandry & Dairying, 16 Akbar Road Hutments .New Delhi.
7. Accountant General Commerce, Works & Misc., AGCR Building, Near I.T.O. New Delhi.
8. Chief Controller of Accounts, Ministry of Agriculture, Room No. 242, .Krishi Bhawan, New Delhi-110001.
9. Principal Adviser (Agriculture), Planning Commission, Room .No.l06, Yojna Bhawan, New Delhi.
10. Adviser (PAMD), Planning Commission, Room No.228, Yojna Bhawan, New Delhi. .
11. All Secretaries In charge of Dairy Development in all States/U.Ts.
12. All Managing Directors of State Level Co-operative Dairy Federations.

Copy for information to: -

PPS to Secretary (ADF) / PPS to AS&FA/ PPS to JS(C&DD)/ Dir(DD) / AC (DD) / US (Finance) / AO (Budget)

(K.C.Patra)
Under Secretary to the Government of India

(K. C. PATRA)
Under Secretary
Govt. of India
Ministry of Agriculture
Deptt. of A. H. D. & Fisheries
Krishi Bhawan, New Delhi

બનાસકાંઠા જિ ા સહકારી દૂધ ઉત્પાદક સંઘ લિ., પાલનપુર

પેજ નં. 014

આર.ડી.પી. ભલામણ રજીસ્ટર

મંડળીનું નામ : ડેલા કોડ નં. ૫૬૨ તાલુકો : વડગામ તારીખ : 12/9/24

પશુ માલિકનું નામ : પટેલ પુરાભાઈ માવાભાઈ સભાસદ/ગ્રાહક નં. :

વિગત	પશુ-૧	પશુ-૨
પશુનો ટેગ નં.	૩૨૦૦૨૨૬૭૫૬૩	૩૨૦૦૧૫૨૦૫૧૬૦
પશુનું નામ		
પશુની જાત : શંકર ગાય / દેશી ગાય / ભેંસ	ભેંસ	ભેંસ
વેતર, ગાભણ મહિના, છેલ્લા વિયાણના મહિના	૨ / ૬ / ૨	૨ / ૬ / ૨.૮
પશુનું વજન (કિ.ગ્રા.)	૫૦૦	૪૦૦
દૂધ (લિ.) અને ફેટ%	૮ / ૬.૮	/
અગાઉની ભલામણનો અમલ કરેલ છે?	હા / ના	હા / ના

પશુ આહારનું નામ	પાત્રનું માપ: ૧પાત્ર=કિ.ગ્રા./ગ્રામ	માત્રા: હાલની (કિ.ગ્રા.)	માત્રા: RBP પછી (કિ.ગ્રા.)	ભલામણ
ખોળ દાણ		૪	૨	
કપાસ		૧	૧	
ગાભણી સૂકા		૨	૨	
રજવાડ ફીડ		૩૦	૩૫	
ગાભણી પુખા		૬	૬	
મીનરલ મીક્ષ્ચર			૨૫૦ગ્રા	
પ્રતિ લિટર દૂધ માટેનો ખોરાકનો ખર્ચ રૂ.		૫૮.૫૦	૭૧.૦૭	

માત્રા: હાલની (કિ.ગ્રા.)	માત્રા: RBP પછી (કિ.ગ્રા.)	ભલામણ
૪	૪	
૧	૧	
૨		
૩૦	૩૦	
૬	૬	

NPP-Dairy-W (27) ~ Job No.