# External Monitoring and Evaluation of National Dairy Plan Phase I (National Dairy Support Project)

## Baseline Study
## Final Report
## 2013

**Development and Research Services Pvt. Ltd.**

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# Acknowledgements

The report of the baseline study for External Monitoring and Evaluation of the National Dairy Plan Phase I (National Dairy Support Project) is an outcome of the contract (No. HO: PMU: M&E: NDP I/01) between the Project Management Unit (PMU), National Dairy Plan I (National Dairy Support Project), National Dairy Development Board (NDDB), Anand and Development and Research Services Pvt. Ltd., New Delhi.

The report outlines the baseline findings on the four Project Development Objective (PDO) level result indicators and a bevy of other issues related to the dairying sector in the NDP I project area.

This study has benefited substantially from inputs and support from the senior management, officials of the PMU and technical/ sector experts of the NDDB at Anand and other locations across the country. The whole team of NDDB has worked very closely at all stages of the preparation, execution and finalization of the study. We express our gratitude to the whole team of the PMU and the NDDB.

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# Disclaimer

The Baseline study findings are based on the data collected from the sample households selected from the 189 districts across 14 NDP I project states. These districts have relatively superior endowment in milk production and infrastructure for milk procurement and milk processing.

All the findings in the report are with reference to only these districts of the country.  Any generalization for the whole state or the whole country based on the findings of this study may not reveal true picture of the entire geographical territory of the state or the country. Thus, comparison with secondary evidences may not be appropriate and relevant.

The responses from the sample households were obtained through recall method. The social group, economic group, land holding data are also based on the information as reported by the respondents.

Dairying in India shows a seasonal pattern. This survey was carried out during winter months and hence comparison with the findings of this study with the surveys conducted in different seasons may not be valid.

# Table of Contents

# List of Annexures

# List of Abbreviations

| | |
|---|---|
| APL | Above Poverty Line |
| AP | Andhra Pradesh |
| AI | Artificial Insemination |
| BAIF | Non - Government Organisation Providing AI Service |
| BPL | Below Poverty Line |
| BUFF/ Buff | Buffalo |
| BQ | Black Quarter |
| CB | Crossbred Cows |
| DAH | Department of Animal Husbandry, Government of India |
| DCS | Dairy Cooperative Society, synonymously used for TDC |
| DRS | Development and Research Services Pvt. Ltd., the external M&E study agency |
| EIA | End Implementing Agency |
| FSU | First Stage Unit |
| FMD | Foot and Mouth Disease |
| GoI | Government of India |
| Ha | Hectare |
| HH | Household |
| HGM | High Genetic Merit |
| HS | Haemorrhagic Septicaemia |
| IC | Indigenous Cow |
| Kg | Kilogram |
| Ltr(s) | Litre(s) |
| M&E | Monitoring and Evaluation |
| MAH | Milch Animal Owning Households |
| MLPD | Million Litres Per Day |
| MoS | Measure of Size |

| | |
|---|---|
| MPI | Milk Producer Institutions |
| MP | Madhya Pradesh |
| NDDB | National Dairy Development Board |
| NDP I | National Dairy Plan Phase I |
| NDSP | National Dairy Support Project |
| NGC | New Generation Cooperative, synonymously used for PC |
| NS | Natural Service |
| OBC | Other Backward Class, an economic group recognized by the Government of India |
| PC | Producer Company, synonymously used for NGC |
| PDO | Project Development Objective |
| PIP | Project Implementation Plan of NDP I |
| PMU | Project Management Unit |
| PPS | Probability Proportional to Size |
| PSU | Primary Sampling Unit |
| RS | Random Start |
| Rs. | Indian Rupee |
| SC | Scheduled Caste, a social group recognized by the Government of India |
| SHG | Self Help Group |
| SI | Sampling Interval |
| SOP | Standard Operating Procedure |
| SSU | Secondary Sampling Unit |
| ST | Scheduled Tribe, a social group recognized by the Government of India |
| TDC | Traditional Dairy Cooperative, synonymously used for DCS |
| ToT | Training of Trainer |
| TSU | Tertiary Sampling Unit |
| UP | Uttar Pradesh |
| WB | West Bengal |

# List of Hindi Words

| Hindi Word | Meaning |
|---|---|
| Antyodaya | Poorest among the poor, an economic group recognized by the Government. of India |
| Chunni | Mixture of broken grains and husk |
| Dudhia | Informal dairy trader |
| Gud/Gur | Jaggery |
| Jowar | Sorghum |
| Kharif | The autumn crop sown at the beginning of the monsoon, i.e. mid June mid July |
| Kachcha | Uncemented/ made of mud |
| Lobia | Black-eyed bean |
| Makkai | Corn |
| Mohalla/Pada | Locality/colony within a village |
| Murrah | A breed of buffalo |
| Pucca | Cemented |
| Ragi | Finger millet |
| Rathi | A breed of indigenous cow |
| Sawa(n) | An agricultural/ fodder crop |
| Taluka/Tehsil/Mandal | An administrative unit smaller than a district |
| Pradhan/ Mukhiya | Head man of a village, an elected representative |
| Khoya | Concentrated milk product |
| Gopalak | Semi–trained animal breeding service provider |

# Executive Summary

## 1.0  Background

India's smallholder dairy system has made a significant contribution to growth in the dairy sector during the last four decades. In 2011-12, the national milk production was estimated at about 127.9 million tonnes. Emerging trends indicate that milk demand is likely to reach about 150 million tonnes by 2016-17, end year of 12th Five Year Plan. It is further projected that the milk demand could reach between 200 and 210 million tonnes by 2021-22. For domestic supply to meet the projected demand, incremental annual milk production of about 6 million tonnes per annum is needed over the next 15 years compared to the actual achievement of about 3 million tonnes annually over the last 15 years.

### The National Dairy Plan Phase I (NDP I)

The National Dairy Plan Phase I (NDP I) also referred to as the National Dairy Support Project (NDSP), was launched on 19 April 2012. It has been designed to address the challenges of meeting projected demand of milk, increasing milk production by enhancing productivity of milch animals and by providing greater access to the organized milk-processing sector. It is a multi-state initiative with a focused approach to breeding and feeding. The project will get the support of the State and the National Governments through appropriate policy and regulatory measures.

NDP I gives priority to the 14 major dairying states having higher potential to enhance milk production. These states are Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal for project implementation. These states contribute to 90 percent of the nation's milk production, 87 percent of the breedable cattle and buffalo population and 98 percent of the fodder resources.

Under the project, initially 189 districts out of the 427 districts in these 14 states (based on Human Population Census 2001) were identified for the implementation of the project.  The choice of the districts was driven by the milk production potential of the district, besides eligibility of the EIAs to be part of the NDP I.

### The Project Evaluation Plan

The achievements of the project development objectives (PDOs) of NDP I would be measured through four PDO level result indicators and a number of intermediate outcome indicators to assess project performance under various project sub-components. However, the focus of the External Monitoring and Evaluation study (EM&E study) during the complete project period is on the PDO level indicators. The following PDO level indicators will be estimated during each round of the study:

(a)     Percent increase in milk production per in-milk animal (to go up by 10 percent over, the baseline value in 6 years)

(b)     Proportion of 'in-milk' female animals to adult female animals (to go up by 3 percent over the baseline value in 6 years)

(c)     Proportion of total milk sold to total production (to stay at baseline value)

(d)     Percent increase in share of milk sold to the organized sector (to go up by 25 percent over baseline value in 6 years)

i

## Overall Framework and Scope of the External M&E Study

The External Monitoring and Evaluation Study of the NDP I envisages 7 rounds of studies one round every year. This includes including 3 comprehensive surveys and 4 annual surveys. The comprehensive surveys are Baseline survey, Mid-term survey and End line survey. Two rounds of annual surveys are to be conducted between two comprehensive surveys. While the comprehensive surveys are proposed to be conducted with a sample size of 15,120 households, the annual surveys are proposed to be conducted on only one-third of the sample size employed during the comprehensive surveys i.e. around 5,040 households.

# 2.0 Methodology

## Sample Design

A three-stage sample design was adopted for selecting sample households for the baseline survey. In villages with more population, it became a four-stage sample design due to segmentation of the villages. The primary sampling unit was Taluka, the secondary sampling unit was a village, and the tertiary sampling unit was a milch animal owning household. The sampling methodology is broadly a self-weighting design.

## Survey Methodology

Personal interviews were conducted with the households and other respondent groups to obtain the requisite information. Four types of structured survey tools administered in the field were

1. Listing Schedule

2. Household Schedule

3. Village Schedule

4. Dudhia Schedule (Informal trader schedule)

All the schedules were finalized in consultation with the relevant stakeholders after pre-testing them in the field. All the schedules were bilingual and used any two languages from the three language options - English, Hindi and a regional language. The schedules were translated into 9 different languages, including Hindi.

## Sample Sizes – Planned vs. Achieved

As per the sampling design, 30 Talukas (Sub-districts) were selected in each state. Within each sampled Taluka, 3 villages were selected and in each selected village, 12 milch animal owning households (MAH) were selected. Thus, at the project level the survey was conducted in 1,260 villages selected from 420 Talukas in the 14 states.

All the households were contacted in the selected villages or selected segments of the villages for canvassing the listing schedule. A total of 3,44,229 households were listed in the project area. This sample frame was used for selection of those households who were interviewed through the household schedule. The data collected from 14,992 households selected from 1257 villages in 420 Talukas were used for analysis.

## Data Collection and Data Quality Management

The data was collected in the field between October 2012 and February 2013 using finalized bilingual schedule. Appropriate steps were taken at different stages of the study in order to ensure consistency in quality of the data across the states.

## Data Analysis and Estimation Procedure

All the findings in the study are based mainly on the data collected from sampled households in the study area. The PDO level result indicators are in the form of ratios and percentages. During analyses, these ratios and percentages were derived as ratios of weighted estimates of each parameter. In addition to the PDO indicators, milk production per household, per capita milk consumption, per household milk consumption by various variables, distribution of MAH by various categories and average land holding are based on weighted estimates.

# 3.0 Household Profile

### Household Level Indicators

Thirty-five percent of the households in the project area own milch animals. The findings on select indicators at the project area level for MAH are as under:

Dairying in India is primarily small holder dairying as each MAH on an average has just 1.8 bovine milch animals and 83 percent of the households have only one or two adult bovine animals.

Nearly half (49 percent) of the MAH belong to OBC category, the balance is almost equally distributed between households from General category (27 percent) and other categories (SC: 18 percent and ST: 6 percent). More than half (54 percent) of the MAH belong to APL category. Nearly two-thirds (64 percent) of the MAH are either landless (23 percent) or marginal farmers (41 percent). While 27 percent of the MAH are small and semi-medium farmers, 6 percent is medium farmers and 1 percent is large farmer. Average land holding of the land owning MAH is 1.2 hectare.

### Demographic Indicators of the MAH

The average household size of the MAH in the project area is 5.1. The sex ratio (number of women per 1000 men) of the MAH in the project areas is 922. As many as 63 percent of the members in the MAH are between 11 and 45 years of age and 15 percent are in between 46 and 60 years. The rest 22 percent are either up to 10 years of age or are above 60 years. The daunting task of communicating with the MAH using print media can be assessed with the fact that 32 percent of members in the MAH are either illiterate or have received no formal education and almost an equal proportion of the members have studied till only 8th standard. While crop cultivation is the most important source of household income for majority of the MAH, dairying is the most important source of income for only 8 percent MAH. Dairying is the second most source of income for another 19 percent of the MAH.

# 4.0  Animal Holding Profile

## Composition of Bovine Animal

In the project area, Buffalo is the most important animal category followed by Indigenous animals and Crossbred animals, with their respective shares being at 44 percent, 33 percent and 23 percent of the herd. Across all animal categories, 79 percent of the bovine animals are female – 86 percent in crossbred cattles, 82 percent in buffaloes and 69 percent in indigenous cattles. Further, among the female animals, 69 percent are adult– 74 percent among crossbred cattles, 69 percent among buffaloes and 66 percent among indigenous cattles.

## Composition of Milch Animals

Buffaloes constitute nearly half (49 percent) of the milch animals in the project area and the balance is distributed almost equally between Crossbred cows (26 percent) and Indigenous cows (25 percent). The project area has substantial variation in composition of milch animals across states. Indigenous cows in West Bengal, Odisha, Madhya Pradesh and Bihar constitute 78 percent, 70 percent, 48 percent and 40 percent respectively of the total milch animals. Crossbred animals account for a high share of milch animals in Kerala (84 percent), Tamil Nadu (74 percent), Karnataka (41 percent) and Maharashtra (34 percent). Haryana, Gujarat, Uttar Pradesh, Punjab, Andhra Pradesh and Rajasthan have significant buffalo population. Buffalo population in these states ranges from 82 percent in Haryana to 63 percent in Rajasthan. While more than half of the milch animals are owned collectively by landless MAH (20 percent) and marginal MAH (39 percent), small and semi-medium MAH own 30 percent of milch animals. Medium and large farmers own just 10 percent of the animals.

## Calving of Milch Animals

The average age at first calving is the least for Crossbred cows (37 months), followed by Indigenous cows (43 months) and Buffaloes (45 months). At least half of the milch animals are young as more than half (55 to 59 percent) of the milch animals have calved only once, twice or thrice.

## In-Milk to Adult Female Ratio

In the project area, In-milk to Adult female animal ratio was found to be at 63. This ratio is relatively high in case of Crossbred cows (69 percent), followed by Buffaloes (66 percent) and Indigenous cows (49 percent).

This is a PDO level result indicator and is expected to improve by 3 percent point (63 percent to 66 percent) during the project period. Improvement in this ratio can be expected mainly with the change in animal composition in favour of crossbred cows or buffaloes that too on priority in the states having higher share of indigenous cows.

# 5.0 Milk Production

## Milk Producing Households

Among the MAH, more than three fourths (79 percent) of the households were found to be producing milk i.e. were having in-milk animals at the time of survey.

## Milk Yield per In-Milk Animal

In the NDP I project area, the milk yield per day per in-milk animal is estimated at 5.03 litres. During the project period, milk yield is expected to increase by 10 percent point over the baseline value i.e. it is expected to reach to 5.53 litres per day. Improvement in milk requires long term and short term focus. The improvement in milk yield can become visible in a short term through effective implementation of the RBP and improving the access of milk producers to organised sector by improving village level milk collection infrastructure. Breed improvement can sustain the momentum of improvement in milk yield in the long run.

Current milk yield has been analysed by several other variables. The key points emerging from the analysis are as below:

- The milk yield varies substantially across the project area with Kerala having an yield as high as 9.0 litres on the one hand and West Bengal having just 2.2 litres on the other hand.
- The milk yield of crossbred cows is 6.3 litres. It is 5.1 litres for buffaloes and 3.1 litres for indigenous cow.
- Milk yield and animal holding size follow same directional trend with milk yield of 4.46 litres in one milch animal owning households and it goes up to 5.73 litres in more than 4 milch animal households.
- Average milk yield is 4.57 litres during first lactation and it goes upto 5.3 litres during third lactation. Milk yield stagnates or shows a declining trend after third lactation.
- The milk yield among OBC (5.20 litres) and General households (5.10 litres) is almost equal. This pattern is similar among ST households and SC households with the yield of 4.40 litres and 4.30 litres respectively.
- The milk yield is more among better off economic groups. It is 5.3 litres among APL households and 4.6 litres among households of other categories.

## Milk Production

Indegeneous cows, Crossbred cows and buffaloes contribute 12 percent, 35 percent and 53 percent to the total milk production against their population share of 23 percent, 26 percent, and 49 percent respetively.

In the NDP I project area, the daily average milk production in milk producing households is 7.2 litres per day. It ranges between 5.4 litres among SC category households and 7.8 litres in General category households. The milk production is 7.6 litres in OBC category households and 6.3 litres in ST category households. Average milk production in APL and BPL/Antyodaya households is 8.0 litres and 6.3 litres respectively.

The average milk production per MAH irrespective of their milk production status was found to be 5.68 litres per day.

# 6.0 Milk Sales and Consumption

## Milk Sales

More than half (55 percent) of the MAH in the project area sells milk. A much larger proportion of households sell milk in Kerala (91 percent), Tamil Nadu (86 percent) and Andhra Pradesh (80 percent).

Proportion of total milk sold to total production is a PDO level result indicator. This proportion is estimated to be 65 percent during the baseline study. It is expected to remain static at 65 percent during the whole project period.

Of total milk sold, the share of organized sector is found to be 45 percent. The share of milk sold to organised sector is also a PDO level result indicator. The share of organised sector in the total milk sold is expected to increase by 25 percent over the baseline value. Thus, it is expected to reach from 45 percent to 56 percent during the project period. All the interventions under NDP I focussing on improved access to organised sector would improve the share of milk sold to organised sector.

This share varies widely across the states with Karnataka leading the tally at 89 percent, followed by Gujarat at 83 percent and West Bengal being at the bottom of the chart where just 10 percent of the milk is sold to the organised sector.

While cooperatives collect 32 percent of the total milk sold, only 13 percent of milk is procured by private dairies. Dudhias' share in total milk sold is 39 percent. The milk producers sell 15 percent of their milk directly to consumer households and shops. Private dairies are strong in the project area of Andhra Pradesh, Maharashtra and Madhya Pradesh with a share of 52 percent, 47 percent and 24 percent of total milk sold by the MAH respectively.

Nearly 90 percent of the milk selling MAH sell milk within an hour of milking their animals. Nearly two-third of the households sell milk within half an hour in the morning and nearly three-fourths of the households sell milk within this time-frame in the evening.

## Milk Transaction Issues

At the overall project area level, more than 90 percent of milk selling households get paid in cash cutting across all the milk procurement channels. While cooperatives pay 96 percent of the milk pourers in cash, private dairies and Dudhias pay in cash in 91 and 99 percent of the cases respectively. Dudhias while collect bulk or total quantity of the milk produced, it pays for part of the milk in cash. Some households selling milk to cooperatives and private dairies also reported receiving payment by cheque or through direct credit to bank.

Ninety-three percent or more of the milk producers do not get payment from any channel daily and they get it at least after a week. Dudhias pay to most of the producers either weekly or monthly. While 88 percent and 84 percent milk pourers to milk cooperatives and private dairies respectively get paid within a fortnight, only 53 percent of the MAH selling milk to Dudhias get paid during this time-frame.

Price of Cow and Buffalo milk paid by the DCS/ NGC is more than the private dairies and Dudhias. Across the channels, the price paid for buffalo milk is more than that of cow milk. In the project area, while the price of cow milk paid to the producers ranges between Rs. 18 and Rs. 23 per litre, it ranges between Rs. 24 and Rs. 30 per litre for buffalo milk and between Rs 20 and Rs. 22 per litre for mixed milk.

The households selling milk to organised sector prefer the channel primarily due to price of milk and regular/ timely payment. Dudhias are preferred mainly due to doorstep collection of milk and lack of choice in channel for selling milk.

## Milk Consumption in MAH

In the project area, 69 percent of the household members consume milk.  The incidence of milk consumption varies marginally across age groups. It does not vary across gender in different age groups.

In the project area, per capita daily milk consumption in milk consuming MAH is 428 ml per day. The consumption is substantially high in Northern states followed by Western, Southern and Eastern states, except in Bihar where per capita milk consumption is substantially higher than the other states of the Eastern Zone. Per capita milk availaibility and per capita consumption for all MAH works out to 1057.37 ml per day and 350 ml per day respectively.

Milk consumption per household in milk consuming MAH is 2.3 litres per day. On an average, MAH consume nearly one third (32 percent) of the milk produced. However, at an overall level milk consumption per MAH irrespective of whether the MAH consumes milk or not is estimated to be 1.92 litres per day.

# 7.0  Animal Breeding Services

## Coverage of Breeding Services

The breeding service related data has been captured for any breeding service received during the period prior to two years from the date of survey. In such animals, 47 percent received only AI service, 51 percent received only NS and 2 percent received both AI service and NS.

Among the animals that received only AI service, the AI coverage is the highest among Crossbred cows (85 percent) followed distantly by Indigenous Cows and Buffaloes (35 percent and 32 percent) respectively. Among the animals that received only NS, the NS coverage among buffaloes (65 percent) and Indigeneous cows (63 percent) is much above the NS coverage among Crosssbred cows (12 percent).

The adoption of best practice like AI service for animals is substantially higher among the MAH that have greater dependence on dairying for their household income. It is evident from the fact that AI adoption is better among landless and small land holding MAH compared to the MAH having bigger land holding. The same is true for BPL/ Antyodaya households vis-a-vis APL households with higher proportion of BPL/ Antyodaya households reporting adoption of AI services.

## Breeding Service Preference

In the project area, the AI service is preferred method of breeding for cows with as many as 64 percent of the MAH reporting their preference for AI among cows. In case of buffaloes, nearly half of the respondents have not indicated their preference for any service, 30 percent prefer NS and only 18 percent prefer AI.

## Breeding Service Providers

In the project area, more than half of the animals receive subsidised AI service. Government and Cooperatives put together provide AI service to 53 percent of the animals vis-a-vis NGOs/ Private sector which provides this service to 39 percent of the animals. Private Bull facility is the most prominent source for natural service followed by traditional breeders.

Better progeny, and higher chances of conception are the two common reasons influencing choice of a breeding service provider for both AI service as well as NS. Besides the above two generic reasons for choice of a service provider of the MAH, the households have indicated their preference for AI service due to low cost of the service and non-availability of bull in the village. A large number of households use NS as they have been using the service traditionally or bull is available in the village or the service is available at the doorstep.

In this study, all the services provided within the village have been treated as doorstep service. In the project area, three

fourths of the animals receiving AI service received it at the doorstep against less than one-fifth of the animals in case of NS.

## Cost of Breeding Service

The total reported amount paid by the MAH for availing one breeding service for an animal has been taken as the cost of breeding service. In the project area, the cost of AI is lower than the cost of NS for both cows as well as buffaloes. While each AI costs Rs. 107 and Rs. 116 for cows and buffaloes respectively, each NS costs Rs. 121 and Rs. 201 for cows and buffaloes respectively. The NS among buffaloes costs more than the NS for cows.

# 8.0 Feed, Fodder and Grazing

## Feeding of Animals

Besides grasses, Berseem/ Lucerne, Jowar/Sorghum and Maize are the important green fodder fed to bovine animals in the project area. The dry biomass from crops of Paddy, Wheat, Jowar and Bajra are the important dry fodder fed to the animals. Mustard cake, cotton seed cake, wheat bran, rice bran and balanced cattle feed are the top five concentrates given to bovine animals. There is substantial variation in feeding of green fodder, dry fodder and concentrates to animals across the states due to variation in crop cultivation practices.

In the project area, while 61 percent MAH purchase concentrates, 39 percent purchase dry fodder and 21 percent purchase green fodder. There are large variations in this regard across states in the project area. Sixty-four percent of the MAH buy concentrates for more than 6 months of their animals' requirement. The MAH purchases green fodder and dry fodder mainly from fellow farmers. Open market is the key source for purchase of concentrates to as many as 82 percent of the households who buy concentrates. This offers ample opportunity to supply them cattle feed with balanced nutrition.

Group feeding of milch animals for green as well as dry fodder is more prevalent than the concentrates. At an overall level, 77 percent of the MAH feed concentrates to their animals. In in-milk animal owing MAH, 76 percent feed concentrates to their in-milk animals.

## Fodder Cultivation

Thirty-three percent of the MAH grow fodder in any of the seasons. While 26 percent of the MAH grow fodder crops in winter, 22 percent grow it in rainy season. In summer season, only 7 percent of the milch animal owning households grow fodder crops. Fodder cultivation is more prevalent in the Northern states.

Fodder growing households purchase fodder seed from more than one source. Private seed shops are the main source of fodder seed for 71 percent of the fodder growing MAH.  The MAH also meets the seed requirement from seeds grown in own farm and by fellow farmers. Only a negligible number of MAH source fodder seed from cooperatives.

Though 72 percent of fodder growing households are aware of certified or truthfully labelled seeds, majority of the fodder growing households use local seeds for fodder cultivation. The top-most purpose of growing fodder

is to meet fodder requirements of their own animals (93 percent). Forty-six percent households grow fodder crops for seed production and they could be the potential growers of the truthfully labelled and certified seeds in this project. Eighty percent of fodder growers use fertilizers and only 17 percent use pesticides.

### Grazing Practice

In the project area, 39 percent of the MAH send their animals for grazing. Of these, 82 percent of the households send animals for grazing regularly i.e. more than 3 months in a year. Among the MAH sending their animals for regular grazing, 53 percent send their indigeneous cows for grazing. This percentage is much lower for crossbreed cows at 23 percent. It is 42 percent for buffaloes.

## 9.0 Animal Health and Management

### Animal Health

About one-third of the MAH opted for vaccination of their animals against at least one disease in the last 12 months. Among the households that opted for preventive vaccination, adoption of vaccination for Foot and Mouth disease is the most prevalent (76 percent). Forty-three percent of the households adopted vaccination for their animals against Haemorrhagic Septicaemia. The adoption of vaccination follows the trend of prevalence of diseases in the project area. A very small number of households (6 percent) are aware of zoonotic diseases.

### Animal Management

In the project area, adequate quantity of water is available for animals in at least 88 percent of the households in all the seasons. A higher proportion of households have access to adequate quantity of water during winter and rainy seasons. Over 90 percent of the households give water from safe sources through out the year to their animals for drinking. The main source of safe drinking water for animals across seasons is nearly consistent. The important sources of safe drinking water in these households are hand pump, piped water and bore well.

A large majority of the households store dung in open area (65 percent) and in manure or slurry pit (38 percent). As little as one percent of the households use dung in biogas plant. Many of the MAH put dung to more than one use. The households use dung mainly for manure (79 percent) and dung cake (61 percent). Drainage structure in animal shed is Kachcha in majority of the households (63 percent). The structure is pucca/ cemented drainage in 18 percent households and it is brick lined in 14 percent households. Some households have no drainage facility in the animal shed. The MAH generally dispose of waste water of animal shed in open area, pit or sewerage. Some of them dispose of waste water to agricultural field as well.

## 10.0 Social Aspects

### Important Sources of Income

Crop cultivation is the most important source of income in more than half of the MAH (57 percent) in all the states except Kerala, where dairying is the most important source of income for the largest group of surveyed households. In the project area, dairying is the dominant source of income only in 8 percent of the MAH. It is the second most important source of income in 19 percent of the households.

### Involvement in Dairying by Duration

Of the total time spent on routine activities for rearing bovine animals, the MAH spends 49 percent of their time in feeding related activities, 41 percent of the time on hygiene related activities and 10 percent of time on milking and milk marketing. Women's share in the total time spent on dairying by all the household members is 64 percent. While women spend more time in activities that can be done at home, men spend more time on activities that require going out of home.

### Challenges to Dairying Sector

Rearing of milch animals provides milk for household requirement, income and employment to family members and manure for farms; nearly half of the MAH are facing difficulty in rearing milch animals. The key challenges to the small holder dairying sector in the project area are high cost of feed and fodder, low price of milk realised by them. Unavailability of marketing opportunities and difficulty in access to institutional credit are the two other challenges faced by the milk producers. Successful implementation of RBP, improved access of milk producers to the organised sector and policy changes to facilitate availability of credit to milk producers can mitigate the impact of these challenges to a great extent.

Availability of better avenues of income outside dairying is leading to shortage of family members and family labour to look after dairying. and, disinterest of majority of the youngsters in dairying is posing serious challenge to the milk production. Despite of these challenges, more than half (53 percent) of the MAH in the project area is interested in increasing their present animal holding size. However, the geographies where family labour is becoming scarce and where households are interested in increasing size of the animal holding are different, Meeting the social responsibility of keeping milk price low and yet making the dairying sector more remunerative can be a daunting challenge and may require innovative approaches to address this.

# 11.0 Extension Services

### Training & Demonstration

During the period of one year, preceding the date of survey, while 0.84 percent members of the MAH participated in training on a dairy related subject, only 0.33 percent MAH members participated in demonstrations. Participation of men in both training and demonstration is higher than that of women. A large group of the MAH members desire to Participate in training (44 percent) and demonstration (40 percent).

### Involvement in Decision Making for Dairying

Sixty-two percent household members above the age of 14 years participate in decison making related to dairying. Participation of women in decision making is nearly 15 percent lower than those of men. The institutional participation of women is relatively low in the project area as only 28 percent members of DCS are women.

# 12.0 Characteristics and Trade Practices of Dudhia

Nearly 300 Dudhias, were interviewed to understand their profile and trade practices. Most of the Dudhias were interviewed in the Northern states as they are important milk trade channel in these states.

In the project area, while 59 percent of the Dudhias are from OBC category, 33 percent are from General category. The rest belong to other socials groups. The primary occupation of nearly three-fourths of the Dudhias is selling milk. Seventy-two percent of Dudhias are in milk business for the last 15 years and seem to have occupied the space of organised sector in areas where milk production has increased but organised sector has not been able to increase its milk procurement capacity. Most of the Dudhias are small players operating in a small catchment area, collecting milk from a small number of villages and a small number of households. Nearly 83 percent of Dudhias handle only up to 300 litres of milk in a day.

In Dudhias' perception, the two most important reasons for household selling milk to them are milk collection from producers' home and prompt payment. Trust of the households, belongingness to the community or family relationships also help them get producers' patronage.

Most of the Dudhias use traditional method of assessing thickness (Fat) of milk by dipping fingers for fixing price of the milk they buy. Almost all Dudhias claim that, while pricing milk, they do not make a distinction between a normal milk producer and the one who has taken loan from them or the households which are headed by women.

## Backward Linkages

As many as 48 percent of the Dudhias lend money to households from whom they buy milk. Most of the Dudhias extend loan for purchase of animals or purchase of feed and fodder. Two-thirds (66 percent) of the Dudhias advance money to a small number (up to 10) of milk producing households. A large majority of dudhias extend loan of a small amount.

Dudhias take into account producers' milk supply capacity and commitment to supply milk for advancing money to them. They assess the milk supply capacity of the producers mainly by total milk production, daily milk supply and lactation stage of the animals in the milk producing households.

More than 90 percent of Dudhias do not charge any interest on the loan extended to the milk producers and they get their money back by purchasing milk from the households that take loan from them.

Nearly one-third of the Dudhias also supply fodder to money borrowing households.

## Forward Linkages

In the project area, 92 percent of Dudhias sell only liquid milk, 2 percent sell only milk products and 6 percent sell both liquid milk and milk products. Many of the Dudhias sell milk to more than one channel. While more than half of the Dudhias sell milk to shops or consumer households in nearby towns, 28 percent of Dudhias sell liquid milk to private dairies and only 11 percent sell it to milk contractors.

Majority of the Dudhias are financially strong to take care of financing milk procurement business. But, 13 percent of Dudhias do borrow money from other agencies or contractors. Majority of the Dudhias' borrowings from their financers is linked to regular supply of milk by them.

xi

Chapter - I

# Introduction

National Dairy Plan I

# Introduction

This chapter provides brief information on the NDP I, its various components, project area, characteristics of the project area and overall framework of the External M&E Study over the NDP I project implementation period.

## 1.1 Background

India has 640,867 villages and the population in these villages constitutes 68.87 percent of the total population of the country (Census 2011). About 70 million rural households are engaged in milk production, with a very high proportion being landless, marginal and small farmers.

In the last four decades, India's smallholder dairy system has made a significant contribution to growth in the dairy sector. Currently, national milk production stands at about 127.9 million tonnes in 2011-12 (Annual Report of DAH, D&E GoI; 2012-13, Annexure-II, p-103) of milk compared to about 80 million tonnes in 2000-01.

Presently, close to half of the country's milk production is consumed in the villages and the balance is sold to various buyers, including dairy processors. Per capita availability of milk has increased from 217 g/day in 2000-01 to 291 g/day in 2011-12: (Annual Report of DAH, D&E, GOI 2012-13; p-47) The organized milk-processing sector has an aggregate registered capacity of about 90 million liters per day (MLPD) and a substantial proportion of this capacity is operational. About half of the registered processing capacity is in the cooperative and public sectors, and the other half rests with the private sector.

3

Emerging trends indicate that milk demand is growing rapidly and is likely to reach about 150 million tonnes by 2016-17 (end year of 12th Five Year Plan). It is further projected that the milk demand could reach between 200 and 210 million tonnes by 2021-22. For domestic supply to meet the projected demand, incremental annual milk production of about 6 million tonnes per annum is needed over the next 15 years (compared to the actual achievement of about 3 million tonnes annually over the last 15 years). If milk production fails to increase at the required pace (6 million tonnes per annum), the demand-supply gap would continue to widen, which could lead to dependence on imports.

India has about 127 million breedable buffaloes and cows. With appropriate and scientific approach to enhancing milk production, India has the potential to meet its domestic requirements of milk and products.

# 1.2 The National Dairy Plan Phase I (NDP I)

The National Dairy Plan Phase I (NDP I) is designed to address these challenges by seeking to increase milk production by increasing productivity of milch animals and helping rural milk producers with greater access to the organized milk-processing sector. The NDP I has been developed as a scientifically planned multi-state initiative with a focused approach to breeding and feeding. In addition, the project will be supported by appropriate policy and regulatory measures. The first phase of the NDP, also referred to as NDP I or National Dairy Support Project (NDSP), was launched on 19 April, 2012.

The main development objectives of National Dairy Support Project (NDSP) are:

i) To help increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk; and

ii) To help provide rural milk producers with greater access to the organized milk-processing sector.

The project envisages pursuing these objectives through adoption of scientific and systematic processes in provision of technical inputs supported by appropriate policy and regulatory measures.

# 1.3. Components and Sub-components of the NDP I

There are three interwoven components to the NDP I as mentioned below:

## Component A: Productivity Enhancement

*Sub-component A1:*
Improvement in the genetic merit of cattle and buffalo. This sub-component is expected to support:

a) Production of high genetic merit (HGM) cattle and buffalo bulls and import of Jersey/ HF Bulls for semen production

b) Strengthening of Semen Stations/ Starting new stations for producing high quality disease free semen doses

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)

*Sub-component A2:*
Scientific approach to feeding of milch animals to produce milk commensurate with their genetic potential and to reduce methane emission.

This sub-component is expected to support:

a) Ration Balancing Program (RBP)

b) Extension initiatives/ interventions for fodder development

4

## Component B

Village based milk procurement systems for weighing, testing quality of milk received and making payments to milk producers.

This component includes:

a) Setting up/ strengthening village dairy cooperative societies (DCS) and promoting new milk producer institutions (MPIs)/New Generation Cooperatives (NGCs)

b) Training and capacity building of milk producers and functionaries

c) Investments in village level infrastructure for milk collection and bulking

## Component C: Project Management & Learning (PM&L)

This component focuses on ensuring smooth implementation and coordination of project activities, regular and timely monitoring of implementation process and outputs/ outcomes achieved, and learning through feedback to management.

The various Result & Output Indicators for these components of NDP I are outlined in Exhibit-I.

# 1.4 The Project Evaluation Plan

The achievement of objectives of NDP I will be evaluated through four PDO levels result indicators and a number of intermediate outcome indicators. The focus of the External Monitoring and Evaluation Study is on PDO level indicators. The following PDO level indicators have to be estimated in each round of survey including baseline survey to measure achievement of project development objectives:

(a) Percent increase in milk production per animal

(b) Proportion of 'in-milk' female animals to adult female animals

(c) Proportion of total milk sold to total production

(d) Percent increase in share of milk sold to the organized sector (as a share of milk sold)

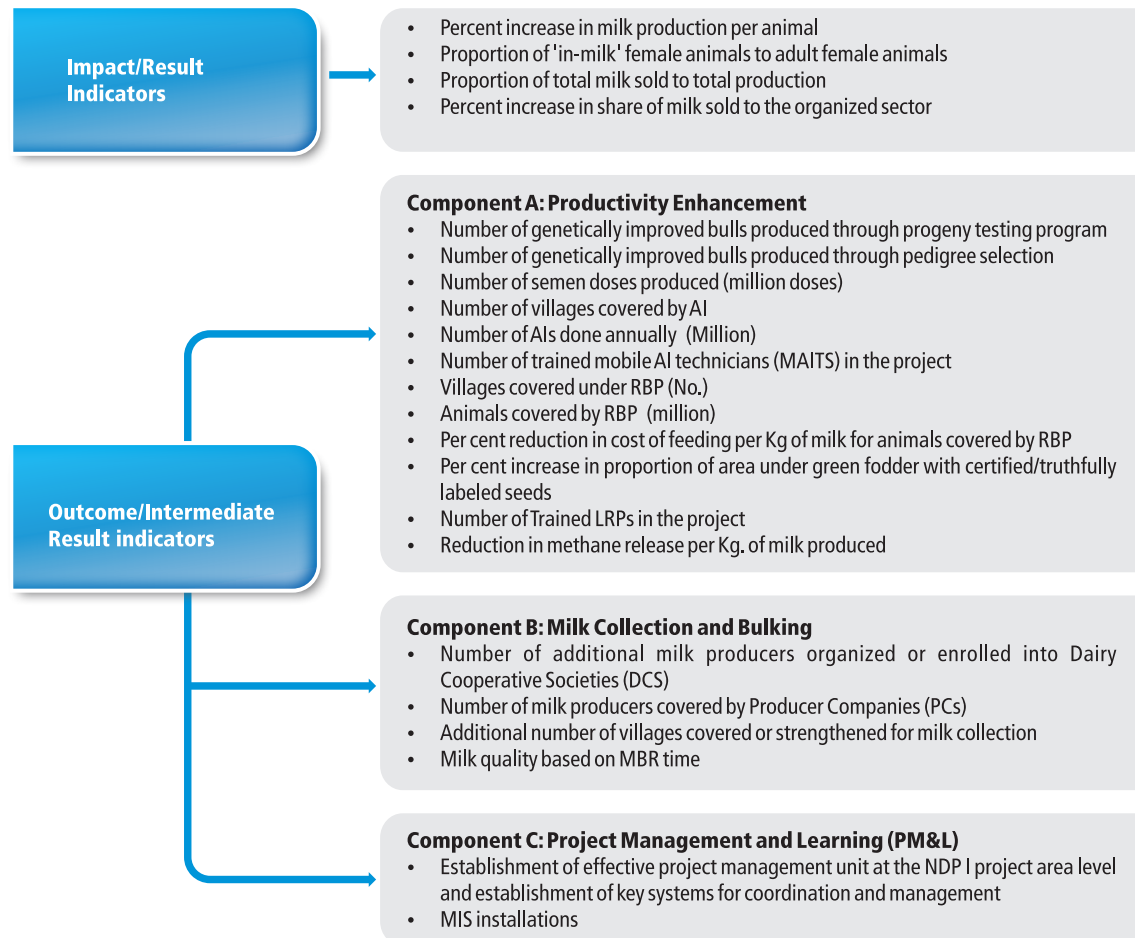Year-wise change in the PDO indicators as proposed is as below:

| PDO Level Results Indicators | Unit of Measure | Base line # | Cumulative Target Values# | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 |
| Project Development Objectives (PDO): | To increase productivity of in-milk animals and increase market access of milk producers in project areas | | | | | | | |
| **Indicator One:** Per cent increase in milk production/ animal | % | 0 | 0 | 2 | 3 | 5 | 7 | 10 |
| **Indicator Two:** Proportion of "in-milk" female animals to adult female animals | % | 60 | 60 | 60 | 61 | 61 | 62 | 63 |
| **Indicator Three:** Proportion of total milk sold to total production | % | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| **Indicator Four:** Percent increase in share of milk sold to the organised sector. | % | 0 | 2 | 5 | 10 | 15 | 20 | 25 |

**# these indicators have been revised in the report through baseline survey results for the NDP I project area.**

In addition to the PDO level indicators, a number of intermediate outcome indicators have been defined to assess project performance under various project sub-components.

Exhibit–1: Result & Outcome Indicators

**Impact/Result Indicators**

- Percent increase in milk production per animal
- Proportion of 'in-milk' female animals to adult female animals
- Proportion of total milk sold to total production
- Percent increase in share of milk sold to the organized sector

**Outcome/Intermediate Result indicators**

**Component A: Productivity Enhancement**
- Number of genetically improved bulls produced through progeny testing program
- Number of genetically improved bulls produced through pedigree selection
- Number of semen doses produced (million doses)
- Number of villages covered by AI
- Number of AIs done annually (Million)
- Number of trained mobile AI technicians (MAITS) in the project
- Villages covered under RBP (No.)
- Animals covered by RBP (million)
- Per cent reduction in cost of feeding per Kg of milk for animals covered by RBP
- Per cent increase in proportion of area under green fodder with certified/truthfully labeled seeds
- Number of Trained LRPs in the project
- Reduction in methane release per Kg. of milk produced

**Component B: Milk Collection and Bulking**
- Number of additional milk producers organized or enrolled into Dairy Cooperative Societies (DCS)
- Number of milk producers covered by Producer Companies (PCs)
- Additional number of villages covered or strengthened for milk collection
- Milk quality based on MBR time

**Component C: Project Management and Learning (PM&L)**
- Establishment of effective project management unit at the NDP I project area level and establishment of key systems for coordination and management
- MIS installations

## 1.5 Overall Framework and Scope of the External M&E Study

The External Monitoring and Evaluation Study of the NDP I envisages 7 rounds of studies, one round every year - 3 comprehensive surveys and 4 annual surveys. The comprehensive surveys are Baseline survey, Mid-term survey and End line survey.

The present survey is baseline survey for the NDP I implementation. After the baseline survey, two rounds of annual surveys will be undertaken followed by a Mid-term survey. Two rounds of annual surveys will be undertaken again after Mid-term survey followed by End line survey.

The Baseline, Mid-term, and End line surveys are proposed as comprehensive surveys with a sample size of 15,120 households, while the annual surveys

are planned to be conducted employing one-third of the sample size adopted for the comprehensive surveys i.e. around 5,040 households.

The annual surveys are proposed to be conducted focusing on the PDO indicators and one thematic area.

This survey will be conducted on a sub-sample of primary sampling units (PSUs) where the previous round of comprehensive survey is undertaken.

The overall framework of the study is depicted in Exhibit-2:

## Exhibit-2: Plan of Proposed Evaluation
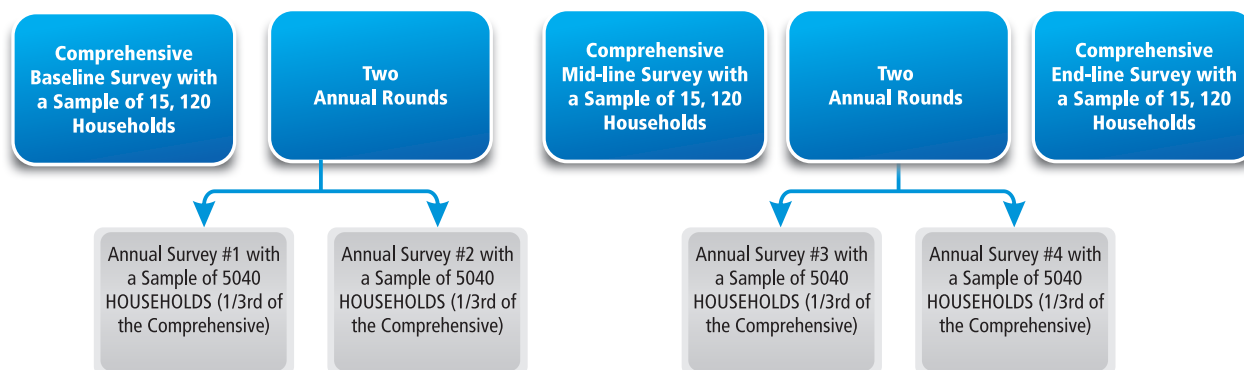


## 1.6 NDP I Project Area

The key consideration for selection of 14 major dairying states for NDP I was higher potential to enhance milk production.

Given the rapidly increasing demand for milk, it was felt necessary to give priority to those areas that have a higher potential to enhance milk production. The fourteen major dairying states which account for more than 90 per cent of the country's milk production, over 87 per cent of the breedable cattle and buffalo population and 98 per cent of the country's fodder resources have been given priority in NDP I. These states are Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. (NDP I, Project Implementation Plan, Vol-I, p-46).

These states are also the states that have either already undertaken key policy/ regulatory measures to create a more enabling state level policy environment for activities to be supported under NDP I or have conveyed that they will do so within a stipulated time line.

In the 14 major dairying states, there are 427 districts as per of Human Census 2001. By the time of commencement of the baseline survey, a list of 189 districts identified by various EIAs in these 14 states were selected for implementation of the project across the country. The list of these 189 districts is available as Annexure-IIa. The choice of the districts was driven by milk production potential of the districts. As can be seen from the map, the distribution of these districts in different states is not uniformly spread out across each of these states.

**Map Showing Proposed Districts in NDP I States**
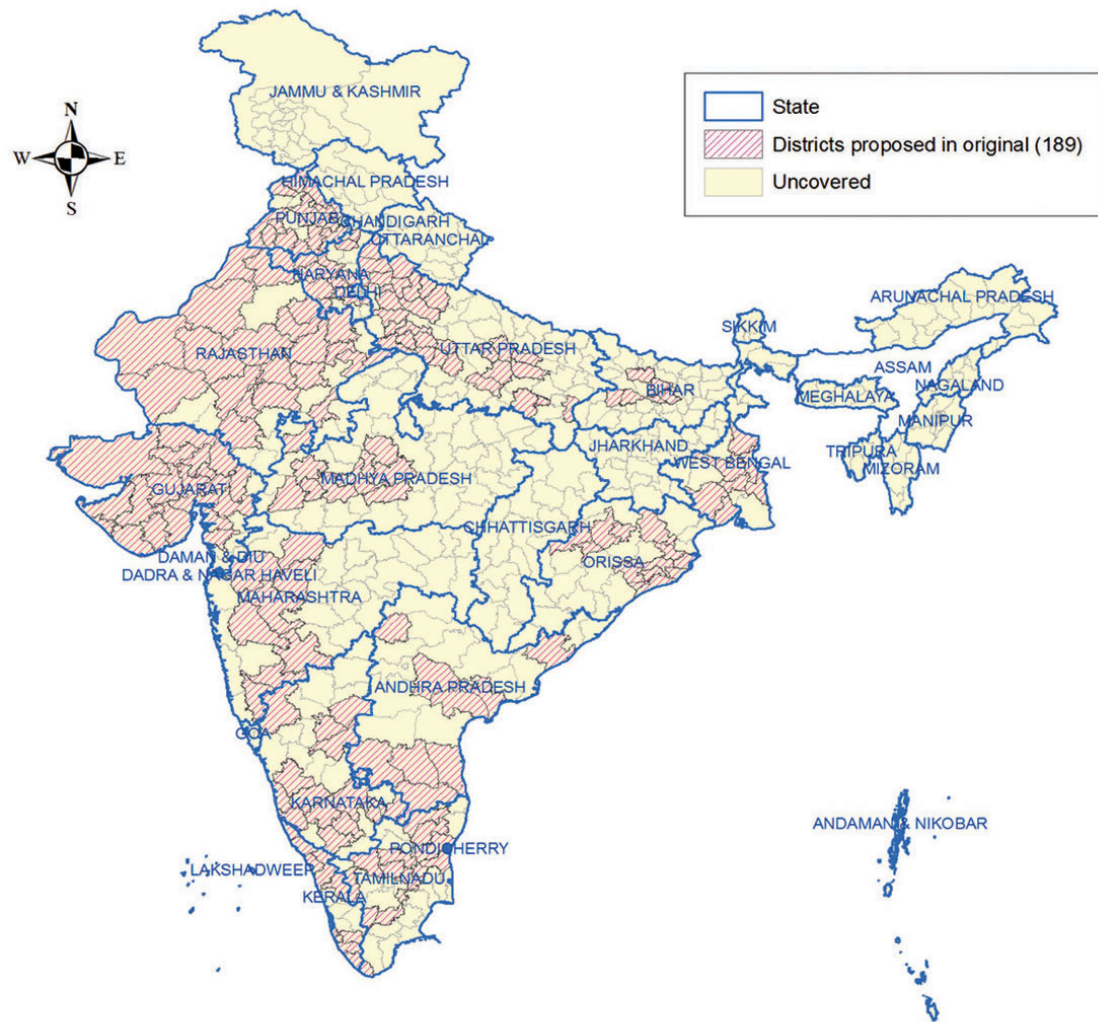


## 1.7 Characteristics of the NDP I Area

The 189 districts, which constitute 44 percent of all the districts in the 14 major states, are uniquely positioned within these states with respect to dairying indicators.

These districts cover 49 percent of the geographical area and total population. These districts have 43 percent of villages. Forty-seven percent of the rural households and rural population live in these districts. As per the secondary information, these 189 districts contribute to 62 percent of milk production and 86 percent of the milk procurement in these states. Although, only 47 percent of the rural households live in these districts, they have a much larger share of adult female cattle and buffalo population. These districts rear 53 percent of total adult female animals in major 14 states. A closer look at the share of adult female animals by their category reveals the importance of these districts further. Out of the total animal population in all the districts of major 14 states, these 189 districts account for 64 percent crossbred adult female cows, 58 percent adult female buffaloes and 43 percent adult female indigenous cows.

8

Chapter - 2

# Methodology

National Dairy Plan I

# Methodology

This chapter discusses various aspects of the sample design, treatment and control sample, survey methodology (including survey tools, sample size), data collection and data quality, data analysis and estimation procedure.

## 2.1 Sample Design

A three-stage sample design was adopted for selecting the sample households in baseline survey. The first stage involved selection of Primary Sampling Units (PSUs), i.e., talukas, with probability proportional to population size (PPS); the second stage involved the selection of Secondary Sampling Units (SSUs), i.e., villages, with probability proportional to population size (PPS) systematic sampling and the third stage involved selection of Tertiary Sampling Units (TSUs) i.e. households having adult cows/ buffaloes within each village using equal probability systematic sampling.

Selection at first as well as second stages was done with size measures as the number of adult cow/ buffalo population in the respective sampling units. Selection at third stage was done with size measures as the number of adult cow/ buffalo population in the households of the selected SSUs/ villages i.e. household level herd size of milch animals.

This sampling methodology makes the sampling broadly a self-weighing design.

11

## 2.1.1 Sample Selection

### 2.1.1a Sampling Frame for First and Second Stages

The 2001 Census list of talukas (mandals in Andhra Pradesh) and villages in the 189 project intervention districts under NDP I served as the sampling frame for the first and second stage sample selection respectively. The Primary Census Abstract (PCA) of the Census of India, 2001, provides data on the number of households for all the villages in each taluka/ district. Villages with less than fifty households were not considered for sampling i.e. did not constitute sampling frame. Since the population in all such villages constitute a very small percent ago of the total rural population, the exclusion of small villages from the sampling frame is not expected to disturb the representativeness of the sample.

Livestock Census 2007 provides data on the number of adult cows/ buffaloes by taluka and village (except for the state of Bihar). This was used as the Measure of Size (MoS) in the selection of talukas in the first stage and villages in the second stage adopting systematic probability proportional to size (PPS) sampling method in all states except Bihar and Kerala. The definition of taluka in Kerala was not consistent with the rest of the states.

### 2.1.1b Sampling Procedure

In the PPS Systematic sampling procedure, the selection probabilities of talukas are proportional to size measure, which is presented below:

$$X_i = \text{Size measure for the } i^{th} \text{ population unit; in the present case, number of cows/ buffaloes in the } i^{th} \text{ taluka,}$$

$p_i = \dfrac{X_i}{X}$, $p_i$ is the initial probability; $\left(\sum_{i=1}^{N} p_i = 1\right)$

X is the total of all $X_i$'s in a state.

$\pi_i = np_i$, $\pi_i$ is the selection probability or inclusion probability for including $i^{th}$ unit in the sample; n is the sample size (30).

As the selection at second stage was also done with PPS systematic sampling, the conditional inclusion probability of selection for jth village, given that ith taluka has already been selected is given by

Where m is the number of villages selected in each taluka, $X_{ij}$ and $X_i$ are the size measures associated with ij$^{th}$ village and i$^{th}$ taluka respectively. Thus, the joint selection probability for j$^{th}$ village in the i$^{th}$ selected taluka is given by

$$\pi_{ij} = nm \frac{X_{ij}}{X}$$

### 2.1.1c Sampling Frame at the Third Stage

A household listing operation was carried out in each sampled village prior to undertaking survey to generate the necessary frame for selecting households at the third stage. In sampled villages having less than 400 households (Stratum-I), households living in the entire village were listed to develop the sampling frame. However, villages having more than 400 households (Stratum-II) were segmented into two or more segments (depending on the number of households in the village) of approximately equal size. Segmentation of villages was such that the segments were natural wherever possible (such as mohalla, pada, etc.) and were mutually exclusive, exhaustive and easily identifiable. Two segments were selected for the survey using PPS sampling. In all such large villages, the sampling design became a four-stage design.

### 2.1.1d   Selection of Households

The third and final stages of sampling was selection of "eligible" households. A household having at least one adult female milch animal (cow/ buffalo) was an eligible household for the purpose of this survey. A household was treated as the entire group of persons, who commonly live together in the same house and usually take their meals from a common kitchen. The selection of the required number of households (fixed as 12 per village) was done using systematic sampling.

## Selection Procedure of Talukas/ First Stage Units (FSUs) using PPS

The procedure adopted for the selection of first stage units adopting PPS Systematic sampling is described below:

1.   All the talukas (mandals in A.P.) in the intervention districts and their adult cow/ buffalo population were taken from the Livestock Census 2007.

2.   The running cumulative population total of female milch animals (cows + buffaloes) was calculated. The last cumulative number in the last taluka in the respective state in the project area is the total population of cows/ buffaloes.

3.   As 30 talukas were to be selected in each state, the total adult cow/ buffalo population of the project area in a state was divided by 30 which is the number of talukas to be selected in each state. The result so derived is the Sampling Interval (SI).

4.   A random number was generated between 1 and the SI. This is the Random Start (RS). The taluka where this number falls in the cumulative series was selected as the first sampled taluka in the state.

5.   Thereafter, the SI was added to the Random start to select the second random number. The taluka where this number lies in the cumulative total series was selected as the second sampled taluka. Likewise, adding SI each time to the previous number, 30 numbers were generated as a series. Each of the 30 numbers generated as above corresponds to a taluka on the list of talukas. Continuing in this manner, the desired number of 30 talukas was selected.

For Bihar, due to lack of taluka-wise data from Livestock Census 2007, taluka-wise human population from Census 2001 was used as the Measure of Size.

Thirty talukas were selected from each state for the baseline survey adopting the procedure described above. The list of selected talukas and the manner in which sample was drawn using PPS Systematic sampling in every state is enclosed in Annexure-II.

In Haryana, the number of selected talukas is 28 against the targeted number of 30. This happens as some of the talukas are very large in terms of Measure of Size i.e. number of cows and buffaloes compared to the standard interval (SI).

In these rare cases, the selected large talukas were divided into two pseudo units by a "conceptual split" where each pseudo unit were considered to be of the same size in terms of female cow+buffalo population. The unit (in this case, taluka) was still one "physical" unit and a second stage sample of next stage units (in this case, village) was selected for each pseudo-unit separately. A "weight adjustment" was applied to account for the "conceptual split" because the original unit now represented two pseudo-units.

13

## 2.2 Treatment vs. Control Sample

Baseline survey did not select any sample designated as "control" sample as only a small percent of villages in any district was expected to get project intervention prior to next round of survey. In such a scenario, areas not receiving interventions would serve as the control or comparison sample.

Some talukas outside the project intervention districts could also have been selected as 'control' area but finding talukas or villages outside 189 project intervention districts that are almost similar to the treatment area would have been difficult.

Keeping the above factors in mind, it was decided to conduct the survey in 30 randomly selected talukas that would provide baseline estimates for all the study variables for the entire project area as a whole and a prior no sample taluka was identified as a treatment or control taluka.

It was decided to post-stratify sample talukas (and villages) as treatment area and control area, and analyze the baseline data separately for the two types of areas later when more information on the implementation status becomes available.

## 2.3 Survey Methodology

Personal face-to-face interviews were conducted with the households and other respondent groups to obtain information from different stakeholders in the project. Pen and Paper Method was used for recording the data.

### 2.3.1 Survey Tools

Four types of survey tools were administered in the field:

1. Listing Schedule
2. Household Schedule
3. Village Schedule
4. Dudhia Schedule (Informal trader schedule)

All the schedules were bilingual. The schedules used English or Hindi and regional language. The schedules were translated in 9 languages, including Hindi. All the schedules were finalized after pre-testing and discussions with the PMU, NDDB and the World Bank. All the schedules are furnished in Annexure-IIa or b.

### 2.3.2 Sample Sizes Planned vs. Achieved

A sample size of 1080 households was required in each state. These 1080 households were to be selected from 30 PSUs (Taluka/ Tehsil/ Block/ Mandal) selected from each state. In each state, 3 villages were planned to be selected from each taluka. Thus, in each state, 30 talukas and 90 villages (3 from each taluka) were to be selected.

At the project level, the survey covered the targeted sample sizes. It was planned to conduct the survey in the whole project area comprising 420 talukas and 1260 sample villages.

#### 2.3.2a Listing Schedule

House listing was administered in all selected villages to develop a comprehensive sampling frame of households through door-to-door survey of the households.

A complete listing of all households in the sample villages was done. The listed households owning adult female bovine animals became the frame for selection of sample households for detailed survey. A total of 3,44,229 households were listed for preparing a sampling frame for selection of households eligible for canvassing the household schedule. The number of households listed in each is presented in the Annexure-II.

#### 2.3.2b Household Schedule

The sample size for household schedule was decided keeping the estimation requirements of the PDO indicators in mind. The detailed note on Sample Size Determination and related details is presented in Annexure-IIb (Sample Size Determination).

14

Appropriate sample size for the household interview was assessed as 15120 households for the whole project area i.e. 14 states. The household schedule was planned to be canvassed in 420 taluka and 1260 villages. Baseline met the stipulated target on coverage of taluka, villages and households.

### 2.3.2c Village Schedule

In each surveyed village, one village schedule was administered. Thus, the village schedule was administered in a total of 1260 villages.

### 2.3.2d Dudhia Schedule

During comprehensive and annual surveys, it was proposed to interview the informal milk trading channel (i.e. Dudhias) to understand their milk procurement operations. Against 300 Dudhias proposed to be surveyed from 14 states, 293 Dudhias were surveyed. More Dudhias were purposively selected from the Northern states where informal trade channel is prominent. The sample was further increased to compensate for the shortfall in the southern states. Dudhia could not be found in the surveyed villages in some of the states.

## 2.4 Data Collection and Data Quality Management

The data was collected using approved bilingual schedule. The data was collected in the field between October 2012 and February 2013. From the very beginning of the survey, a number of initiatives were taken to get quality data from the field. These initiatives included:

### 2.4.1 Use of Pre-tested Bilingual Schedules

Bilingual schedules were developed after several rounds of discussions with technical team on the project. These schedules were pre-tested in actual settings. Pre-testing was of immense help in firming up the flow of questions, codes, and modification in questions as well as in responses. Bilingual schedules were helpful in getting better response and were found convenient to administer in the field.

### 2.4.2 Training of Core Team and Trainers

NDDB team spent a week familiarizing the experts and core team of DRS about the key subjects and issues under NDP I. Subsequent to this, two-layered training was organized – Training of Trainers (ToTs) and training for supervisors and interviewers.

Training of trainers was organized for master trainers and second layer of the research and field team. Three ToTs were organized for equipping the key professionals and state level field managers involved in the study. Two ToTs were organized in Delhi and one in Hyderabad. Twenty-four trainings were organized in the 14 NDP I states, at least one training was organized in each state.

Experienced field executives who had undertaken similar studies in the past in their respective states were selected for attending ToT. The state level training was imparted in the regional language by only those who had participated in the ToT.

All the trainings were of 4 days' duration including, one day of field practice/ visit.  Uniform training content was used in each round of training. It focused on theoretical as well as the practical aspects of the issues related to the survey. This was followed by a field practice by the participants. NDDB officials were present in all ToTs and most of the state level trainings.

### 2.4.3 Deployment of Trained Team

Only trained enumerators, supervisors and state coordinators were deployed for data collection. A team of 2 persons worked in each village completing all the surveys in the selected village. A supervisor managed work of 3 teams of enumerators. Supervisors were also responsible for monitoring the quality of work in the field and sharing the summary information with the core team working on this study.

### 2.4.4 Quality Monitoring in the Field

Well-defined and objective quality control guidelines were prescribed. It focused on coverage and content checks. The field supervisor and the district coordinators scrutinized some of the randomly selected schedules filled in by the interviewers, every day. They shared their

15

observations with the interviewers during the data collection period itself for necessary improvisation. The data collection was done with prior information to the client.

Regular summary information was obtained from the field to monitor the quality of data by the core team.

### 2.4.5 Quality Check in Office

The filled in schedules were thoroughly scrutinized, edited and coded in the office before they were sent for data entry. The data entry was done using data entry software designed specifically for this project. The software had in-built logical checks. The data was again validated using software as well as manual data validation checks.

## 2.5 Analysis and Estimation Procedure

An appropriate estimation procedure was used in conformity with the sampling design for estimating PDO indicators. Individual weights were worked out, which are essentially inverse of the selection probabilities for each selected household. Population totals for each characteristic of interest such as number of animals, in-milk animals, milk production, milk sales etc. were estimated using the individual village level weight with necessary adjustment for shortfall in coverage of the village or the household.

Most of the PDO indicators are in the form of ratios and percentages. Ratio and percentages were derived as ratios of estimated totals.

The details on Sample Weights, estimation procedure and percentage CV calculation method is discussed in Annexure-IIc (Estimation Procedure)

Chapter - 3

# Household Profile

National Dairy Plan I

# Household Profile

This chapter summarises the profile of milch animal owning households (MAH) in the NDP I project area. The findings on profile of rural households on household level indicator of MAH, demographic indicators and milk consumption pattern are presented in this chapter.

## 3.1 Incidence of Milch Animal Ownership

Data from 3.44 Lakh households listed in the project area shows that 35 percent of the rural households own milch animals. These households have been termed as Milch Animal Owning Households (MAH) in the report. The animal ownership varies widely across the states. The state-wise details can be referred to in the Annexure-III (Table 3.1).

## 3.2 Household Level Indicators of MAH

This section covers various household level indicators of the rural MAH. The household level indicators of the MAH covered in this section are average household size, adult female animal holding size, distribution of MAH by select variables and profiles of household members.

### 3.2.1 Household Size of MAH

Average household size of MAH in NDP I project area is 5.1. The state-wise details can be referred to in the Annexure-III (Table 3.2a).

19

### 3.2.2 Adult Female Animal Holding Size per MAH

Each milch animal owning household in the project area on an average has 1.8 adult female animals. This information for each state is given in Table 3.2b of Annexure-III.

### 3.2.3 Distribution of MAH by Number of Adult Female Bovine Animals

The estimates at the project level show that 83 percent of the MAH have one or two adult female animals.

More than half of the milch animals owning households have one adult female animal. While over

**Chart 3.1a:** Distribution of MAH by Number of Adult Female Bovine Animals
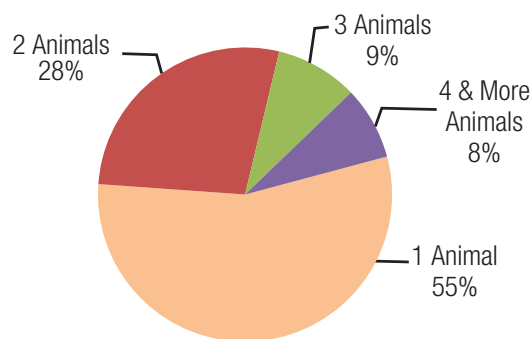


one-fourth of the households own two animals, less than one out of ten households have three animals. Four or more animals owning households are only 8 percent of the total MAH. The state-wise details can be referred to the Table 3.2c of Annexure-III.

### 3.2.4 Distribution of MAH by Social Group

Nearly half of the MAH are from OBC category. Another 27 percent and 18 percent MAH are from General and SC categories respectively. Only 6 percent of the MAH are from ST category households. The state-wise details can be referred to in the Annexure-III (Table 3.2d).

**Chart 3.1b:** Distribution of MAH by Social Group (%)
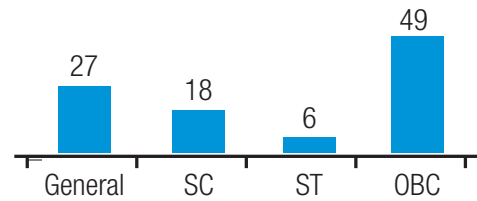


### 3.2.5 Distribution of MAH by Economic Group

In the project area, at least three fourths of the MAH belong to either OBC or General category

**Chart 3.1c:** Distribution of MAH by Economic Group (%)
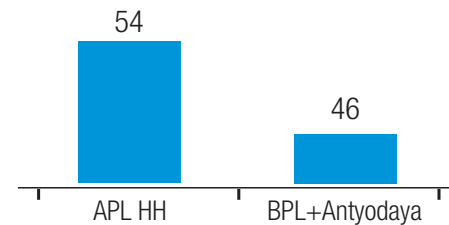


households. In India, the households are categorised as (Above the Poverty Line), BPL (Below the Poverty Line) and Antyodaya (poorest among the BPL) based on their economic status. The information about this categorisation of the respondent's households is based on their claimed economic status. While APL category MAH constitute 54 percent of the total MAH, BPL and Antyodaya category MAH together form 46 percent of the total MAH. The state-wise details can be referred to in the Annexure-III (Table 3.2e).

### 3.2.6 Distribution of MAH by Land Holding Class

The sample data of the whole project area reveals that MAH who are marginal farmers and who are landless collectively constitute 66 percent of the MAH. Small and semi-medium farmers are 27 percent of the MAH. Only 7 percent of the MAH are medium or large farmer. The state-wise details can be referred to in the Annexure-III (Table 3.2f).
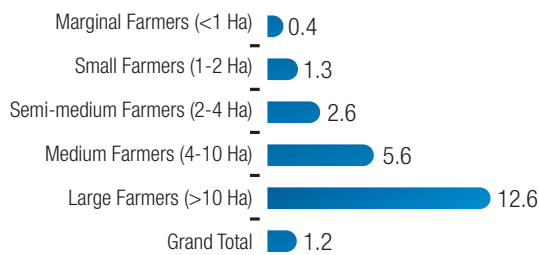
**Chart 3.1d:** Distribution of MAH by Land Holding Class (%)



- Landless: 23
- Marginal Farmers (<1 Ha): 43
- Small Farmers (1-2 Ha): 16
- Semi-medium Farmers (2-4 Ha): 11
- Medium Farmers (4-10 Ha): 6
- Large Farmers (>10 Ha): 1
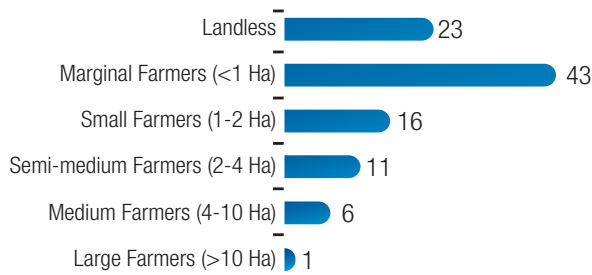
### 3.2.7 Average Land Holding by Land Holding Class (in Ha)

Chart 3.1e summarises estimated average land holding of the land owning MAH for the project area. The same information for each state is available in Table 3.2g of Annexure-III.

**Chart 3.1e:** Average Land Holding of MAH by Land Holding Class (In Ha)



- Marginal Farmers (<1 Ha): 0.4
- Small Farmers (1-2 Ha): 1.3
- Semi-medium Farmers (2-4 Ha): 2.6
- Medium Farmers (4-10 Ha): 5.6
- Large Farmers (>10 Ha): 12.6
- Grand Total: 1.2

At an overall level, average land holding of the MAH who have land is 1.2 hectare. Average land holding of marginal farmers is 0.4 hectare. Average land holding of small farmers and semi-medium farmers is found to be 1.3 hectares and 2.6 hectares respectively. It is 5.6 hectares for medium farmers. As far as large farmers are concerned, their average land holding is 12.6 hectares.

## 3.3 Demographic Indicators of MAH

The findings in this section are presented from sampled household data. This section covers sex ratio (women to men ratio), distribution of MAH members by age group, educational qualification and occupation.

### 3.3.1 Women to Men Ratio (Sex Ratio)

Sex ratio indicates number of women per 1000 men. The overall sex ratio among the MAH is 922. State-wise sex ratio in the project area is given in the Annexure-III (Table 3.2h).

### 3.3.2 Human Population Distribution by Age Group

In the MAH of the project area, 25 percent of the household members are up to the age of 18 years, 16 percent of the persons are in the age group of 19 to 45 years, 44 percent are in the age group of 46 to 60 years and 15 percent are senior citizens. As many as 25 percent of the persons in the MAH are between 11 to 45 years of age. The state-wise information on this is available in Annexure-III (Table 3.2i).

**Chart 3.2a:** Human Population Distribution by Age Group (%)



- Upto 5 Years: 8
- 6 Years to 10 Years: 8
- 11 Years to 18 Years: 9
- 19 Years to 45 Years: 16
- 46 Years to 60 Years: 44
- >60 Years: 15
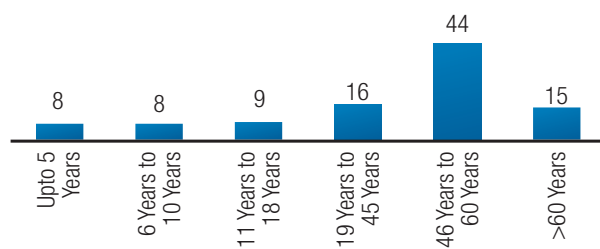
### 3.3.3 Educational Qualification of MAH Members and Head of the MAH

In the project area, 42 percent of the members of the MAH are either illiterate or have not received formal education and an equal number of members have studied up to 8th standard. While 23 percent of the household members have studied in any class from 9th to 12th, only 4 percent of the members have studied till graduation or above levels. The state-wise information on this is available in Annexure-III (Table 3.2j).

**Chart 3.2b:** Educational Qualification of MAH Members (%)



- Illiterate/ No formal education: 42
- Till Class 8: 31
- Class 9 to 12: 23
- Graduation and above: 4
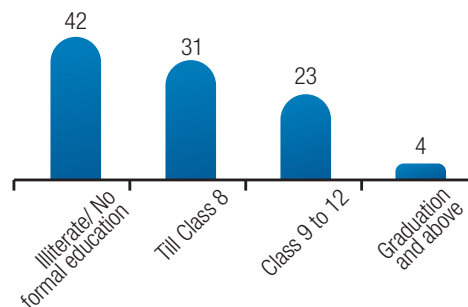
A relatively larger proportion of head of the MAH is illiterate or has not received formal education. The state-wise information on this is available in Annexure-III (Table 3.2k).
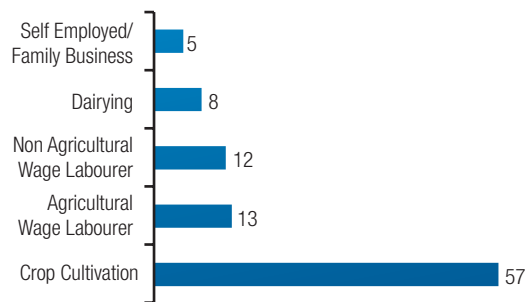
### 3.3.4  Main Occupation of the MAH

Chart 3.2c presents the distribution of MAH in the project area by the occupation that contributes to maximum income of the household.

It is evident that crop cultivation is the most important source of income in maximum number of the MAH. In the MAH of the project area, agricultural wage labour and non-agricultural wage are the second and third most important sources of income for the MAH. In one-fourth of the MAH, income from wage labour (both agricultural and non-agricultural) contributes to the maximum income of the household. Dairying is the most important source of income for only 8 percent of the MAH.

The state-level finding on this is available in Table 3.2l.

**Chart 3.2c:** Main Occupation of MAH *(% of MAH)*



| | |
|---|---|
| Self Employed/ Family Business | 5 |
| Dairying | 8 |
| Non Agricultural Wage Labourer | 12 |
| Agricultural Wage Labourer | 13 |
| Crop Cultivation | 57 |

## 3.4  Milk Consumption Pattern of Household Members

### 3.4.1 Incidence of Milk consumption

At an overall level in the project area, more than two-third (69 percent) of the household members consume milk.  There is substantial variation in milk consumption across the states.

*3.4.1a  Incidence of Milk Consumption by Gender*

The gender-wise milk consumption pattern in the project area, as in Chart 3.3a brings forth an interesting finding. The incidence of milk consumption does not differ across gender. The state-wise data along with base can be referred to in Table 3.3a (Annexure-III).

**Chart 3.3a:** Incidence of Milk Consumption by Gender (%)



70  69  69

■ Men    ■ Women    ■ All
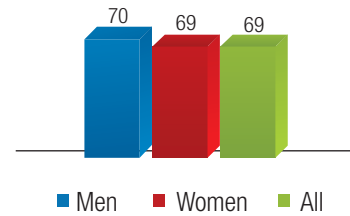
*3.4.1b  Incidence of Milk Consumption by Age Groups and Gender*

At an overall level in the project area; the milk consumption pattern among MAH members in different age-groups and across gender in different age groups are presented in Chart 3.3b and Chart 3.3c. The state-wise details can be referred to in Table 3.3b and Table 3.3c of Annexure-III.

**Chart 3.3b:** Incidence of Milk Consumption Pattern by Age Group (%)



75  75  73  68  68  65  69

■ Up to 5 yrs    ■ 6-10 yrs    ■ 11-18 yrs    ■ 19-45 yrs
■ 46-60 yrs    ■ >60 yrs    ■ All
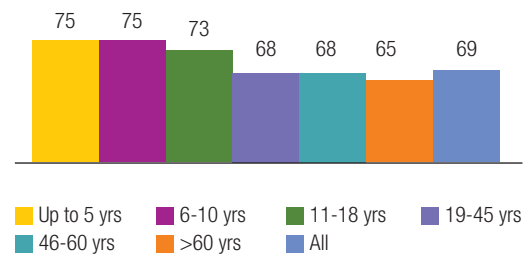
Milk consuming members remain almost same among children and teens. Percent of milk consuming members decreases slightly among the upper age groups. This trend is consistent for women as well as men of the household.

There is near-consistency across the gender and age-groups in terms of consumption of milk.

**Chart 3.3c:** Incidence of Milk Consumption Pattern by Gender and Age Group (%)



**Women**                    **Men**

74  74  72  67  67  64  69        75  75  73  68  68  65  69

■ Up to 5 yrs    ■ 6-10 yrs    ■ 11-18 yrs    ■ 19-45 yrs
■ 46-60 yrs    ■ >60 yrs    ■ All

22
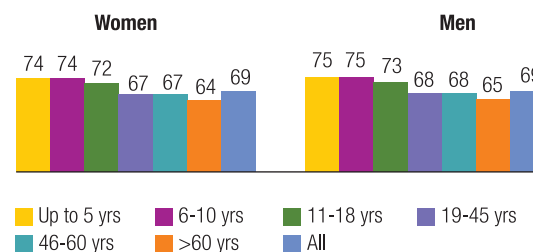
Chapter - 4

# Animal Holding Profile

# Animal Holding Profile

This chapter presents the findings from the listing schedule and household schedule. These findings are related to characteristics of the herd.

## 4.1 Composition of Bovine Animal Holding

Animal holding profile is a reflection of the economic importance of the animals for the MAH. Table 4.1 shows animal holding profile by animal category in the NDP I project area based on household schedule data. In the project area, Buffalo is the most important animal category followed by Indigenous Cow and Crossbred Cow. Buffaloes, Indigenous Cows and Crossbred Cows constitute 44 percent, 33 percent and 23 percent of the herd respectively.

Composition of bovine animal holding is available in Table 4.1a (Annexure-IV).

*Table 4.1: Composition of Bovine Animals (Male+Female)*

| Sl No | Animal Category | Percent |
|---|---|---|
| 1 | Indigenous Animals | 33 |
| 2 | Crossbred Animals | 23 |
| 3 | Buffalo | 44 |
| **All categories** | | **100** |

## 4.2 Profile of Bovine Animals by Gender

Table 4.2 shows animal holding profile by gender of the animal across animal categories. At an overall level, across the animal categories, male and female bovine animals constitute 21 percent and 79 percent of the total herd. Male bovine is the least among Crossbred Cows (14 percent). It is 18 percent among Buffaloes and 31 percent among Indigenous Cows. More female animals are found among Crossbred Cows and Buffaloes. Female bovine population is 86 percent among Crossbred Cattle. It is 82 percent among Buffaloes and 69 percent among Indigenous Cattle.

Similar detail with regard to animal holding profile for each category is available in Annexure-IV (Table 4.2a).

*Table 4.2: Profile of Bovine Animals by Gender*

Values in percent

| Sl No | Animal Category | Bovine Animals | | |
|---|---|---|---|---|
| | | Male | Female | All |
| 1 | Indigenous Cattle | 31 | 69 | 100 |
| 2 | Crossbred Cattle | 14 | 86 | 100 |
| 3 | Buffaloes | 18 | 82 | 100 |
| **All Categories** | | **21** | **79** | **100** |

### 4.2.1 Profile of Female Bovine Animals by Growth Stage

Table 4.3 presents findings on distribution of female bovine animals by the growth stage. In the project area, 31 percent of the female bovine animals are youngstock and 69 percent are adult. Adult females constitute 66 percent of the total indigenous female animals. Adult females among crossbred female cattle and female buffaloes constitute 74 percent and 69 percent of the total females in their respective categories.

State-wise information on this is available in Table 4.3a (Annexure-IV).

26

*Table 4.3: Profile of Female Bovine Animals by Growth Stage*

Values in percent

| Sl No | Animal Category | Female Bovine Animals | | |
|---|---|---|---|---|
| | | Youngstock | Adult | All |
| 1 | Indigenous Cattle | 34 | 66 | 100 |
| 2 | Crossbred Cattle | 26 | 74 | 100 |
| 3 | Buffaloes | 31 | 69 | 100 |
| **All categories** | | **31** | **69** | **100** |

## 4.3 Composition of Milch Animals

The composition of milch animals for the project area is presented in Chart 4.1. Buffaloes constitute nearly half of the milch animals in the project area and the balance is distributed between Indigenous cows and Crossbred cows almost in equal proportion. The state-level findings are available in Table 4.4 of Annexure-IV.

There is substantial difference in the composition of animals in different states. The states having higher share of different categories of animals are listed as on the next page:

**Chart 4.1:** Composition of Milch Animals



IC, 25%
Buffalo 49%
CB, 26%
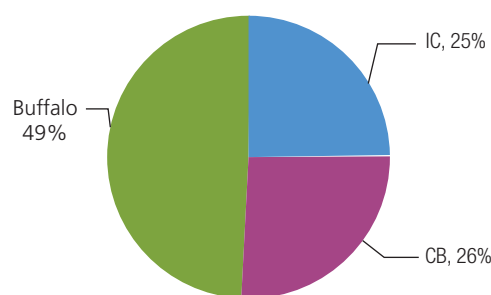
| Sl No. | States having Indigenous cow more than the project Area Average of 25 percent | States having Crossbred cow more than the project Area Average of 26 percent | States having Buffaloes more than the project Area Average of 49 percent |
|---|---|---|---|
| 1 | West Bengal (78 percent) | Kerala (84 percent) | Haryana (82 percent) |
| 2 | Odisha (70 percent) | Tamil Nadu (74 percent) | Gujarat (76 percent) |
| 3 | Madhya Pradesh (48 percent) | Karnataka (41 percent) | Uttar Pradesh (75 percent) |
| 4 | Bihar (40 percent) | Maharashtra (34 percent) | Punjab (72 percent) |
| 5 | Karnataka (27 percent) | Odisha (27 percent) | Andhra Pradesh (70 percent) |
| 6 | — | — | Rajasthan (63 percent) |

## 4.4 In-Milk to Adult Female Ratio

This ratio is one of the PDO level result indicators and has been termed as "Proportions of In-Milk Female Animals to Adult Female Animals." Adult female animals include in-milk animals, dry animals and animals of other category like old and not even calved once. During the project period, this indicator is expected to improve by 3 percentage points over the baseline value. During the baseline survey, this ratio was estimated to be at 63. The revised value of this PDO indicator across the years for whole project period is as below:

*Table 4.5: Revised Target for PDO Level Result Indicator TWO*
Proportion of "in-milk" female animals to adult female animals

| Particulars | Baseline | Cumulative Target Values | | | | | |
|---|---|---|---|---|---|---|---|
| | # | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 |
| PIP Values (%) | 60 | 60 | 60 | 61 | 61 | 62 | 63 |
| Revised Values (%) | 63 | 63 | 63 | 64 | 64 | 65 | 66 |
| # Standard Error for Baseline Value: 0.006, Percentage CV for Baseline Value: 0.91 | | | | | | | |

### 4.4.1 In-Milk to Adult Female Ratio by Animal Category

At the overall level for the project area, this ratio is the best for Crossbred cows (69) followed by Buffaloes (66) and Indigenous cows (49). This ratio varies substantially across the states even within each animal category. While it ranges from 35 to 66 for indigenous cows; it is between 48 and 81 for crossbred cows, and between 58 and 79 for buffaloes.

The state-wise findings on the PDO Indicator 2 are given in Table 4.5a (Annexure-IV).

**Chart 4.2:** In-Milk to Adult Female Ratio in Different Animal Categories (%)



49 — IC
69 — CB
66 — Buff
63 — All
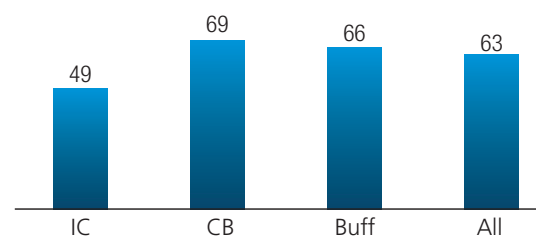
## 4.5 Share of Crossbred Cows in Total Cow Population

In the project area across 14 states; crossbred cows constitute half of the total cow population. This varies substantially in different states and ranges between 12 percent in Madhya Pradesh and 88 percent in Kerala.

## 4.6  Distribution of Milch Animals

This section discusses distribution of Milch Animals by Animal related attiributes and land holding class of the MAH. In the NDP I project area; the average age at first calving for bovine animals is 42 months. The ages at first calving for Indigenous cows, Crossbred cows, and Buffaloes are 43 months, 37 months and 45 months respectively.

### 4.6.1 Distribution of Milch Animals by Age at First Calving

Chart 4.3 presents distribution of milch animals by age at first calving for NDP I project area. It shows that the ages at first calving for 60 percent crossbreds cows, 60 percent indigenous cows and 53 percent buffalo are between 24 months and 48 months. A much larger group (37 percent) of crossbred cows calved between the age of 24 months and 36

**Chart 4.3:** Distribution of Milch Animals by age at First Calving (Age in Months, Values as % of Animals)



IC: 0 | 21 | 39 | 10 | 30
CB: 1 | 37 | 23 | 3 | 36
Buffalo: 0 | 16 | 37 | 12 | 35

- 0-23 Months
- 24-36 Months
- 37-48 Months
- >48 Months
- No Recall
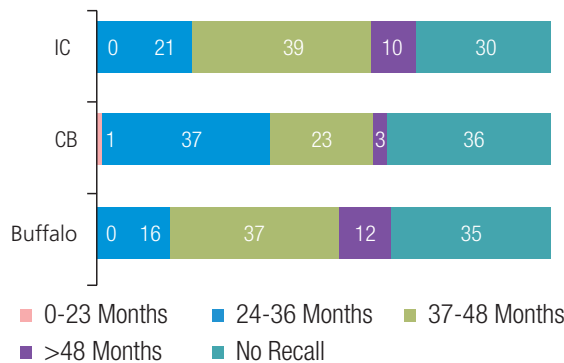
months. Only 21 percent Indigenous Cows and 16 percent buffaloes calved during this age bracket. One percent of Crossbred cows calved at an age younger than 2 years.

It may be noted that many respondents could not provide information on the age at first calving for some animal which they own as they either purchased the animal recently or were unable to recall it. The state-wise details can be referred to in Table 4.6a, Table 4.6b and Table 4.6c in Annexure-IV.

### 4.6.2 Distribution of Milch Animals by Number of Calves Born

Chart 4.4 presents the distribution of milch animals by the number of calves born. The state-wise details can be referred to in Table 4.7a, Table 4.7b and Table 4.7c of Annexure-IV.

**Chart 4.4:** Distribution of Milch Animals by No. of Calves Born (%)



Buffalo: 23 | 27 | 18 | 7 | 5
Crossbred Cow: 27 | 26 | 13 | 6 | 3
Indigenous Cow: 28 | 26 | 13 | 6 | 3

- Calf
- 2 Calves
- 3 Calves
- 4 Calves
- >4 Calves
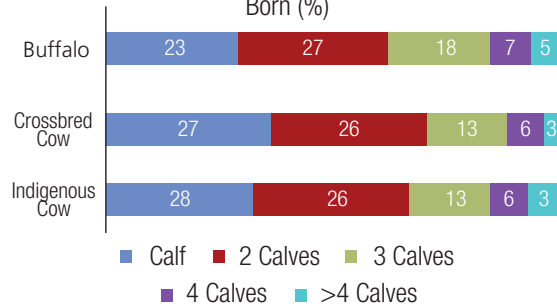
Base : MAH that could share information on calvings

The findings in this section are based on the recall of the respondents. Some respondents could not answer this question as the household had purchased the animal recently or were not sure of the information.

There is near uniformity among 3 animal categories with regard to distribution of milch animals by number of calvings. At least half of the animals have calved only once or twice (IC: 57 percent, CB: 53 percent and Buffalo: 50 percent).

### 4.6.3 Distribution of Milch Animals by Land Holding Class

In the project area, 64 percent of the MAH are landless and marginal farmers. These households own 59 percent of the bovine milch animals. Small and semi-medium farmers collectively own 30 percent of the milch animals. The state-wise details can be referred to in Table 4.8 (Annexure-IV).

**Chart 4.5:** Distribution of Milch Animals by Land Holding Class (%)



Landless: 20
Marginal Farmers (<1Ha): 39
Small Farmers (1-2Ha): 17
Semi-medium Farmers (2-4Ha): 13
Medium Farmers (4-10Ha): 8
Large Farmers (>10Ha): 2
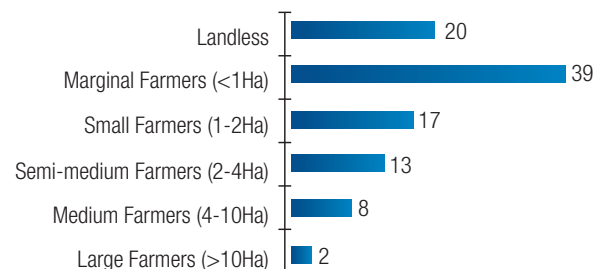
Chapter - 5

# Milk Production

National Dairy Plan I

# Milk Production

This chapter summarizes the findings related to households having in-milk animals, milk yield per in-milk animal and milk production per household.

## 5.1  Milk Producing Households

As seen in Chapter–III, 35 percent of the rural households have adult female bovine animals. Such households have been termed as Milch Animal Owning Households (MAH).

Seventy-nine percent of the MAH reported milk production on the day or the day before the date of survey. Thus, 28 percent of the rural households are milk producing households.

## 5.2  Share of Milk Production by Animal Category

As seen in animal composition, indigenous cows, crossbred cows and buffaloes constitute 25 percent, 26 percent and 49 percent of the total milch animal population respectively.

The Chart 5.1 summarises the project level contribution of the 3 categories of milch animals to the total milk production. The state-wise information on this is available in Table 5.1 of Annexure-V.

Indigenous Cows, Crossbred Cows and Buffaloes contribute to 12 percent, 35 percent and 53 percent of the total milk

**Chart 5.1:** Share of Milk Production by Animal Category
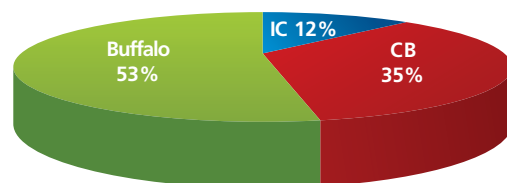


production. From this, it is evident that the indigenous cows contribute substantially lower than their share in milch animals. Contrary to this, Crossbred Cows contribute substantially high and buffaloes contribute reasonably high share in the total milk production vis-a-vis their share in milch animal population.

## 5.3 Milk Yield per In-Milk Animal

Milk yield presented in this chapter has been calculated as ratio of estimated milk production and estimated number of in-milk animals.

Milk Yield is high in the states having higher share of crossbred cows and buffalo. The states with higher share of indigenous cows have lower milk yield. This becomes evident when we look at the milk yield by animal category.

Milk Yield per In-Milk Animal has been estimated by several variables like animal category, milch animal holding size, lactation completed, social group, economic group and land holding classes.

Milk Yield per In-Milk animal in litres per day is one of the PDO level result indicators. During the baseline survey, milk yield per in-milk animal for the whole project areas is estimated at 5.03 litres per day. The targeted value of this PDO indicator is expected to improve by 10 percent point during the project period. Milk yield is expected to be at 5.53 litres by the end of the project period. The year-wise expected improvement is shown in the Table 5.1:

*Table 5.1: Revised Target for PDO Level Result Indicator ONE*

Milk production/ In-Milk animal (Litres/day)

| Particulars | Baseline # | Cumulative Target Values | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 |
| PIP Value (%) | 0 | 0 | 2 | 3 | 5 | 7 | 10 |
| Revised Value (%) | 5.03 | 5.03 | 5.13 | 5.18 | 5.28 | 5.38 | 5.53 |
| # Standard Error for Baseline Value: 0.17, Percentage CV for Baseline Value: 3.42 | | | | | | | |

### 5.3.1 Milk Yield by Animal Category

Chart 5.2 summarizes milk yield per in-milk animal of different categories at an overall level in the project area. Across the states, the milk yield of Indigenous Cows is 3.06 litres per in-milk animal.

**Chart 5.2:** Milk Yield by Animal Category
(in Litres per in-milk animal per day)
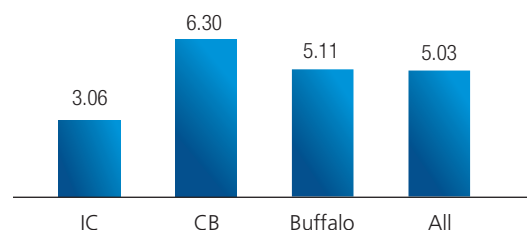


The milk yield of Crossbred cows is very high compared to Indigenous Cows. The yield of crossbred cows is almost double of the indigenous cows. The milk yield of crossbred cows is higher than the Indigenous Cows not only at an overall level but also for each state.

At the project area level, milk yield of buffaloes is 5.11 litres per in-milk animal. It is between the yield of Indigenous Cows and Crossbred Cows. Milk yield of buffaloes is higher than the NDP I area average in all states with the exception of Andhra Pradesh having large share of buffalo population. The state-level findings on PDO indicator I are presented in Table 5.2a of Annexure-V.

32

### 5.3.2  Milk Yield by Milch Animal Holding Size

Milk yield by animal holding of the milch animals is presented in Chart 5.3 at an overall level for the project area. The same information for each state is available in Table 5.2b of Annexure-V.

**Chart 5.3:** Milk Yield by Milch Animal Holding Size
(in Litres per in-milk animal per day)
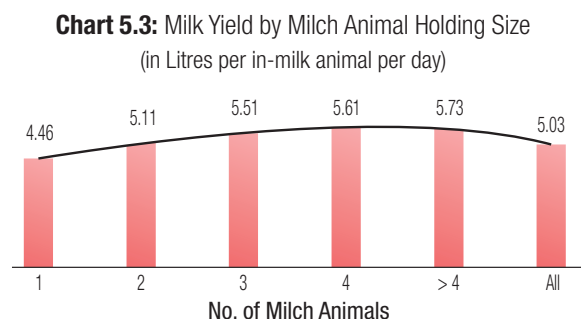


No. of Milch Animals

The milk yield and the milch animal holding size of the households follow the same directional trend. It is 4.46 litres, the least in one milch animal owning households and it increases to 5.73 litres in more than 4 milch animal owning households.

### 5.3.3  Milk Yield by Lactations Completed

Chart 5.4 presents milk yield by number of lactations at the project area level. The same information for each state is available in Table 5.2c of Annexure-V.

Some of the MAH could not share the information about the number of lactations for animals that were purchased recently. Such animals have been excluded from the analysis. The milk yield is low (4.57 litres) for animals that are in-milk after first calving, the yield increases with the number of calving till 3 calving and it stagnates till 5 calving. After 5 calving milk yield drops.

**Chart 5.4:** Milk Yield by Lactations Completed
(in Litres per in-milk animal per day)



No. of Lactations
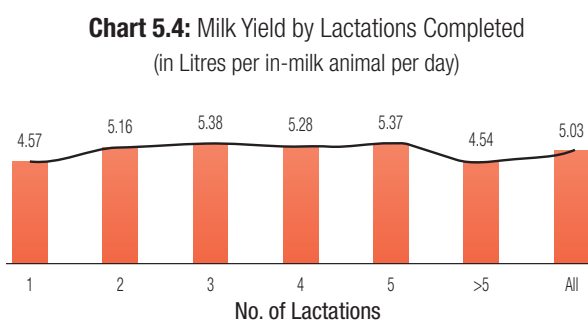
### 5.3.4  Milk Yield by Social Group

The analysis of milk yield per in-milk animal in households of different social groups at the project area level is illustrated in Chart 5.5. This information for each state is available in Table 5.2d (Annexure-V).

**Chart 5.5:** Milk Yield by Social Group
(in Litres per in-milk animal per day)
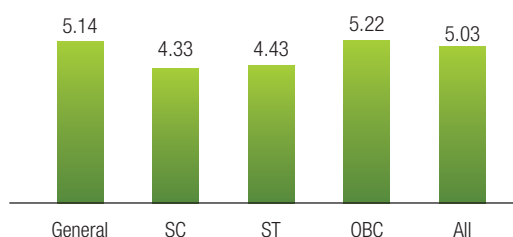


The milk yield is highest among OBC households followed by General households, ST households and SC households. The milk yield in the project area ranges between 5.22 litres among OBC households and 4.33 litres among SC households. It may be noted that the number of in-milk animals in ST households is small and the distribution across states is not uniform.

### 5.3.5  Milk Yield by Economic Group

The economic category of the MAH is based on respondent's claim. It was not validated through documentary evidence.

The milk yield by economic group is presented in Chart 5.6. The state-wise findings for the same are available in Table 5.2e of Annexure-V.

**Chart 5.6:** Milk Yield by Economic Group
(in Litres per in-milk animal per day)
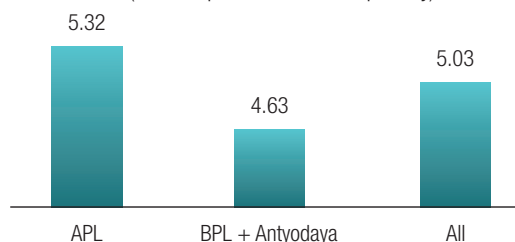


The milk yield is higher in APL category households than those of BPL and Antyodaya category households.

### 5.3.6 Milk Yield by Land Holding Class

Chart 5.7 presents estimated milk yield per In-Milk animal by land holding size at the project area level. The same information for each state is available in Table 5.2f of Annexure-V.

**Chart 5.7:** Milk Yield by Land Holding Class
(in Litres per in-milk animal per day)
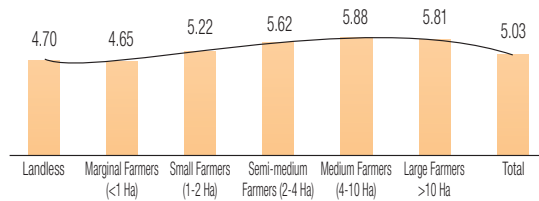


Milk yield among MAH who are landless and marginal farmers is less than the national average of 5.03 litres. It is 4.65 litres among MAH who are marginal farmers and 4.70 litres among landless MAH. The yield increases from 5.22 litres among small farmers to 5.62 among semi-medium farmers and further to 5.88 litres among Medium farmers.

## 5.4 Milk Production per Household

Milk production per milk producing household has been calculated as a ratio of estimated milk production and estimated milk producing households for the whole project area. The average milk production in households having in-milk animals is 7.23 litres per day.

### 5.4.1 Milk Production per Household by Social Group

As can be seen in Chart 5.8, the daily milk production per milk producing household ranges between 5.39

**Chart 5.8:** Milk Production per HH by Social Group
(in Litres)
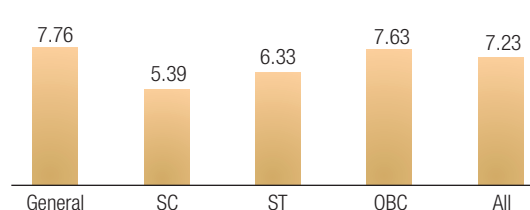


litres among SC category households and 7.76 litres in General category households. Milk production in OBC category households is almost equal to General category households. The state-wise findings on this can be referred to the Table 5.3a of Annexure-V.

### 5.4.2 Milk Production per Household by Economic Group

Chart 5.9 presents milk production per household among milk producing households of different economic groups.

Milk production per household is 7.99 litres in APL households and it is substantially low in households of other economic categories. The state-wise details can be referred to the Table 5.3b of Annexure-V.

**Chart 5.9:** Milk Production per HH by Economic Group (in Litres)
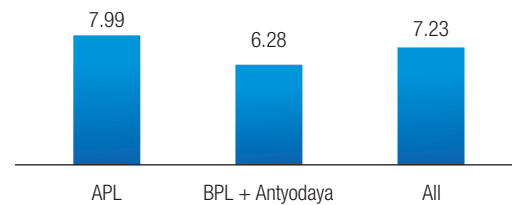


### 5.4.3 Milk Production per Household by Land Holding Class

Chart 5.10 presents milk production per household by land holding class of the milk producing households. The milk production per household and land holding size of the households follow same directional trend. The milk production per household is the least among landless households with 6.11 litres per day and it goes up to 12.97 litres per day in the MAH who are large farmers. The state-wise findings are given in Table 5.3c of Annexure-V.

**Chart 5.10:** Milk Production per HH by Land Holding Class (in Litres)
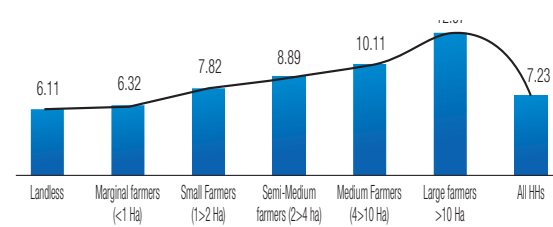
Chapter - 6

# Milk Sales and Consumption

National Dairy Plan I

# Milk Sales and Consumption

This chapter consolidates the findings on various aspects of milk sales and milk consumption. Linkages between milk production and sales are drawn from the household survey.

## 6.1 Milk Sales

### 6.1.1 Milk Producing and Milk Selling MAH

As seen earlier, 35 percent of the rural households in the project area are Milch Animal Owning Households. Seventy-nine percent of the MAH had in-milk animals and reported producing milk at the time of survey. These MAH are milk producing households. More than half of the MAH (55 percent) sold milk on the day or the day before the date of survey.



All MAH (100%)

Milk Producing Households (79%)

Milk Selling Households (55%)

37
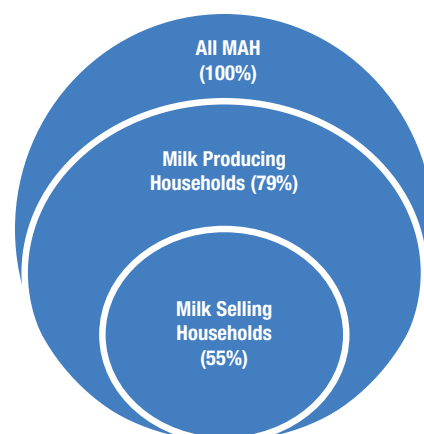
Milk selling households follows a regional trend with more than three-fourths of the household selling milk in the Southern states followed by Western and Eastern states. The state-wise details are presented in Table 6.1a of Annexure-VI.

## 6.1.2 Liquid Milk Sold as Percent of Milk Production

At the project area level, 65 percent of the milk produced is sold as liquid milk. This means that 35 percent of the milk produced is either consumed or processed in-house. The state-wise details are presented in Table 6.1b of Annexure-VI.

## 6.1.3 Proportion of Total Milk Sold to Total Production

This is one of the PDO level result indicators. The estimated value for this indicator in the project area reveals that 65 percent of the milk produced is sold. This proportion is expected to remain static over the project period and hence the target value for this indicator has been set at the same level across years as in Table 6.1c

*Table 6.1c: Revised Targets for PDO Level Result Indicator THREE*
Proportion of total milk sold to total production

| Particulars | Baseline # | Cumulative Target Values | | | | | |
|---|---|---|---|---|---|---|---|
| | | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 |
| PIP Value (%) | 54 | 54 | 54 | 54 | 54 | 54 | 54 |
| Revised Value (%) | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| # Standard Error for Baseline Value: 0.024, Percentage CV for Baseline Value: 3.70 | | | | | | | |

## 6.1.4 Share of Milk Sold to the Organised Sector

Share of milk sold to the organised sector is a PDO level result indicator. The finding on this is based on estimates for NDP I project area as a whole. The milk sold to the organised sector is found to be 45 percent of the total milk sold. During the project period, this share is expected to increase by 25 percent point over the baseline value. The year-wise expected improvement on this indicator is shown in Table 6.2:

It can be observed that the disparity in milk sold to organised sector varies substantially across states.

*Table 6.1d: Revised Targets for PDO Level Result Indicator FOUR*
Share of milk sold to the organized sector

| Particulars | Baseline # | Cumulative Target Values | | | | | |
|---|---|---|---|---|---|---|---|
| | | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 |
| PIP Value (%) | 0 | 2 | 5 | 10 | 15 | 20 | 25 |
| Revised Value (%) | 45 | 46 | 47 | 50 | 52 | 54 | 56 |
| # Standard Error for Baseline Value: 0.04, Percentage CV for Baseline Value: 9.59 | | | | | | | |

## 6.1.5 Share of Different Channels in Total Milk Sold

Chart 6.2 presents share of milk sold by the milk procurement channel. In the NDP I project area; both Dudhias and cooperatives procure a very large share of milk sold. These two channels together collect 71 percent of the milk sold. Cooperatives procure nearly two-and-half times more milk than the private dairies.

In the project area, only 13 percent of the milk sold is procured by private dairies. While private dairies are present in all the states, their reach and milk collection varies substantially in NDP I area of different states. The state-wise findings can be referred to in Table 6.1e (Annexure-VI).

**Chart 6.2:** Share of Milk Sold by Channel
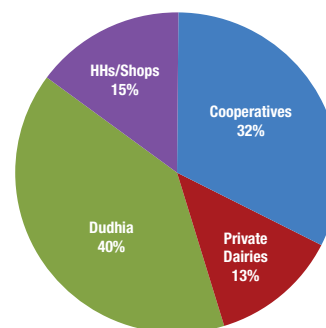
# 6.2 Milk Transactions

## 6.2.1 Mode of Payment across Channels

As can be seen in Chart 6.3, more than 90 percent of the milk selling households get paid in cash across the milk purchase channels. Cash payment is the predominant mode of payment in cooperative sector (96 percent) as payment through bank is done to only 2 percent milk pourers.

**Chart 6.3:** Mode of Payment in different Channels



- Cash
- Bank
- Bus Correspondent
- Others
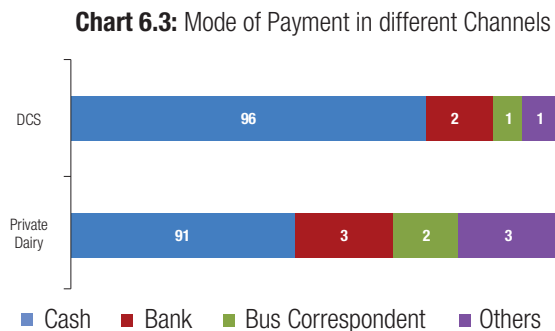
The private dairies pay in cash in 91 percent of the cases and by bank in 3 percent cases. The state-wise data can be referred to in Table 6.2a and Table 6.2b of Annexure-VI.

## 6.2.2 Frequency of Payment across Channels

A comparative study of the frequency of payment to the milk producers by the three categories of milk procurement channels namely, DCS/NGC, Private Dairies and Dudhia is illustrated under Chart 6.4.

**Chart 6.4:** Frequency of Payment across Channels



- DCS
- Private Dairy
- Dudhia
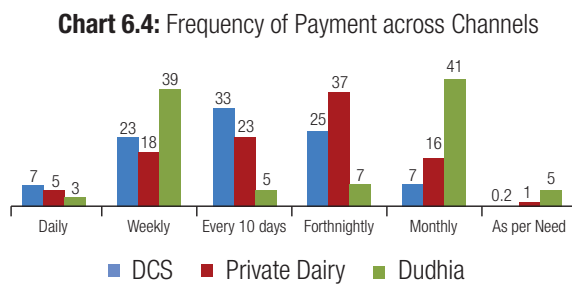
One very important implication out of this finding is that 93 percent or more of the milk producers do not get payment from any channel daily and they get it at least after a week. Dudhia pay to most of the producers either weekly or monthly.

In the project area, 7 percent of the milk producers get payment from the DCSs/NGCs on a daily basis whereas 23

percent of them get paid once a week, 33 percent receive payment once in 10 days, 25 percent of them receive payment every fortnight, and 7 percent receive it monthly. At the project level, 5 percent of the milk producers get payment by the private dairies on a daily basis; whereas 18 percent of them get once a week, 23 percent once in 10 days, 38 percent fortnightly, 16 percent monthly and just 1 percent of them as and when required by the milk producers.

Only 3 percent of the milk producers get payment by the Dudhias on a daily basis, 39 percent once a week, 5 percent once in 10 days, 7 percent once in 15 days, 42 percent once in a month and 5 percent as and when required.

The state-wise details are given in Table 6.2c, Table 6.2d and Table 6.2e of Annexure-VI.

## 6.2.3 Price Received by the Milk Producers as Reported by the MAH

Chart 6.5 summarises the milk price received by the milk producers in the NDP I project area by milk type (cow and buffalo). It may be noted that the price of milk was collected during the survey irrespective of composition of milk in terms of FAT and SNF.

**Chart 6.5:** Price Received by the Milk Producers as Reported by the MAH (Price in Rs./Litre)



- DCS/NGC
- Private Dairy
- Dudhia
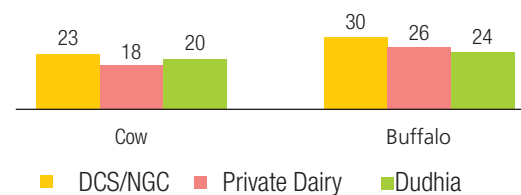
At the project area level, there is a variation in the price of milk paid to the milk producers by various procurement channels. DCS/NGC pays higher price for both Cow and Buffalo in comparison to the price paid by private dairies and the Dudhia. For buffalo milk, cooperatives pay a much higher price than both private dairies and the Dudhia.

At an overall level in the project area, the average price paid for cow milk across channels ranges between Rs. 18 and Rs. 23 per litre. The price of buffalo milk ranges between Rs. 24 and Rs. 30 per litre.

Table 6.2f in Annexure-VI shows that there are geographical/regional variations in the average price of milk paid to the milk producers.

## 6.2.4 Reasons for Selling Milk to a Channel

Out of the various reasons for selling milk to the DCSs/NGCs put up under Chart 6.6a, five significant reasons namely, better price (32 percent), regular/ timely payment (27 percent), nearby collection centre (15 percent), bonus i.e. price differential paid at the end of the year (7 percent), various services (6 percent) are found to account for milk flow to DCS/ NGC in the project area.

**Chart 6.6a:** Reasons for selling Milk to Cooperative Sector (Percent of HHs selling milk)
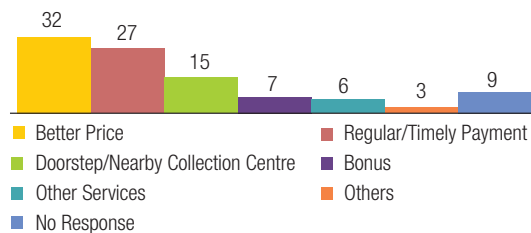


Choice of Private Dairies for selling milk is driven by similar reasons, however in a different order. The top three reasons for choosing private dairy for milk sales are regular/ timely payment (33 percent) followed by better price (27 percent) and milk collection from the doorstep or a near by milk collection center (21 percent).

Interestingly, more than half of the households could not specify any reason for selling milk to Dudhia.

**Chart 6.6b:** Reasons for Selling Milk to Private Dairies (Percent of HHs Selling Milk)
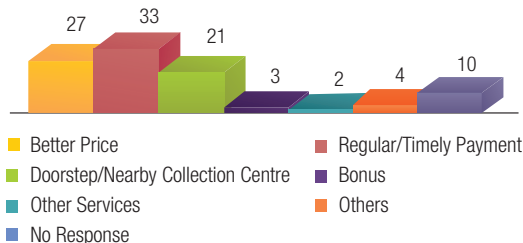


Out of the various reasons for selling milk to Dudhia put up under Chart 6.6c, the three reasons, namely regular/ timely payment (20 percent), doorstep milk collection/ nearby milk collection facility (13 percent), and better price (12 percent) accounts for milk flow to Dudhias.

**Chart 6.6c:** Reasons for Selling Milk to Dudhia (Percent of HHs Selling Milk)
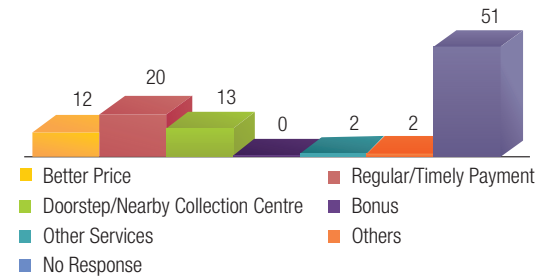


Out of the 5 prime reasons influencing choice of a milk producer for a channel, DCS/NGC stand ahead of Dudhia on all dimensions and are ahead of private dairies on four dimensions, namely price, nearby collection center, bonus and services. Private dairies have a lead over DCS/ NGC on regular/timely payment. The state-wise findings are available in Tables 6.2g, 6.2h and 6.2i of Annexure-VI.

# 6.3 Per Capita Milk Consumption in MAH

This section provides information on the per capita milk consumption in MAH consuming milk. Per capita consumption has been arrived at from project area level estimates about number of households and the milk consumption.

In the project area, per capita milk consumption in the MAH consuming milk is 428 ml per day. Per capita milk consumption is substantially high in Northern states followed by Western states and Southern states.

## 6.3.1 Per Capita Milk Consumption MAH Consuming Milk by Social Group

Per capita milk consumption across social groups is illustrated in Chart 6.7. The state-wise findings are presented in Table 6.3a of Annexure-VI.

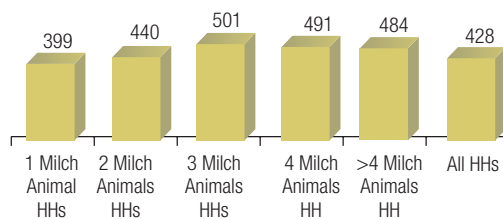**Chart 6.7:** Per Capita Milk Consumption in MAH Consuming Milk by Social Group (ml/day)
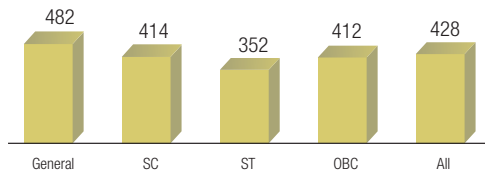


Per capita milk consumption is highest among General households followed by SC, OBC and ST households. The per capita milk consumption across social group varies widely from 482 ml in General households to 352 ml in ST households.

## 6.3.2 Per Capita Milk Consumption in MAH Consuming Milk by Milch Animal Holding Size

Per capita milk consumption has also been analysed for the household category by animal holding size of the milch animals. The same is illustrated in Chart 6.8. The state-wise findings are presented in Table 6.3b of Annexure-VI.

The finding reveals that the per capita milk consumption is the least (399 ml) in one milch animal owning households. It increases with the increase in milch animal holding size till 3 milch animals holding households after which it tapers to lesser consumption.

**Chart 6.8:** Per Capita Consumption in MAH Consuming Milk by Milch Animal Holding Size (ml/day)



## 6.3.3 Per Capita Milk Consumption in MAH Consuming Milk by Economic Group

At the project level, per capita milk consumption in MAH consuming milk by economic group is illustrated in Chart 6.9. The economic status of the respondents' household is based on their claimed economic status.

**Chart 6.9:** Per Capita Milk Consumption in MAH Consuming Milk by Economic Group (ml/day)
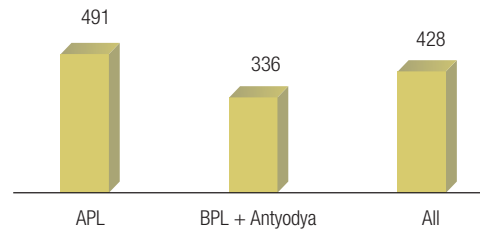


Per capita milk consumption is the highest (491 ml) in APL Households followed distantly by Antyodaya and BPL Households as a group. The state-wise findings are presented in Table 6.3c of Annexure-VI.

## 6.3.4 Per Capita Milk Consumption in MAH Consuming Milk by Land Holding Class

Chart 6.10 presents project area level, per capita milk consumption in MAH consuming milk by land holding class. This information for each state is available in Table 6.3d of Annexure-VI.

**Chart 6.10:** Per Capita Milk Consumption in MAH Consuming Milk by Land Holding Class (ml/day)
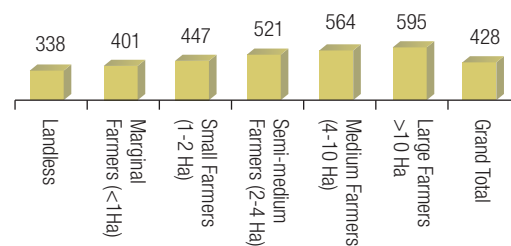


Per capita milk consumption increases in the MAH as the land holding size increases. As expected, per capita milk consumption is the least (338 ml) among landless milk producing households. It stands at 401 ml and 447 ml among marginal and small farmers respectively. It is 521 ml and 564 ml for semi-medium and medium farmers respectively. Per capita milk consumption is highest (595 ml) among the large farmers.

41

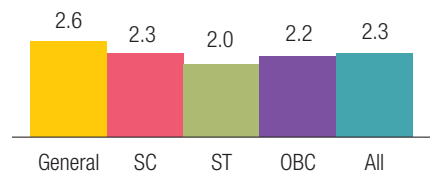## 6.4 Milk Consumption per MAH in Milk Consuming MAH

Seventy-nine percent of the MAH have in-milk animals and at least one person in 82 percent of the MAH consumes milk, implying that nearly 3 percent of the households consume milk by buying milk when their animals are not in-milk.

Milk Consumption per household provides information on estimated average milk consumption per MAH in milk consuming households. The average daily milk consumption in such households is 2.3 litres per household.

### 6.4.1 Per MAH Milk Consumption in Milk Consuming MAH by Social Group

The social group of the households has been recorded as reported by the respondents. In the NDP I project area, General Household consumes maximum milk (2.6 litres) per day followed by SC households (2.3 litres), OBC households (2.2 litres) and ST households (2.0 litres). The state-wise findings on the same are available in Table 6.4a of Annexure-VI.

**Chart 6.11:** Per MAH Milk Consumption in Milk Consuming MAH by Social Group (in litres/day)



### 6.4.2 Per MAH Milk Consumption in Milk Consuming MAH by Milch Animal Holding Size

Chart 6.12 presents project level findings on milk consumption in milk consuming MAH by milch animal holding size. The average milk consumption in 1 milch animal owning household is the 2.1 litres per

**Chart 6.12:** Per MAH Milk Consumption in Milk Consuming MAH by Milch Animal Holding Class (in litres/day)
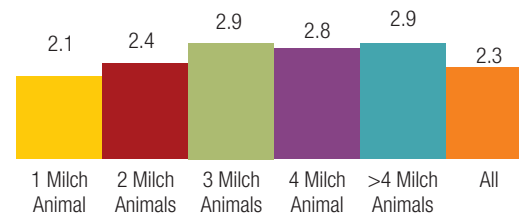


household and it increases till 2.9 litres in 3 milch animals owning HHs. It hovers around 2.8 and 2.9 litres per household in 3 or more milch animal owning households. The state-wise findings on the same are available in Table 6.4b of Annexure-VI.

### 6.4.3 Per MAH Milk Consumption in Milk Consuming MAH by Economic Group

Chart 6.13 summarizes the findings for the project area on milk consumption per MAH in milk consuming households by economic groups. The economic groups have been recorded as reported by the respondents and the same was not verified during the survey.

**Chart 6.13:** Per MAH Milk Consumption in Milk Consuming MAH by Economic Group (in litres/day)
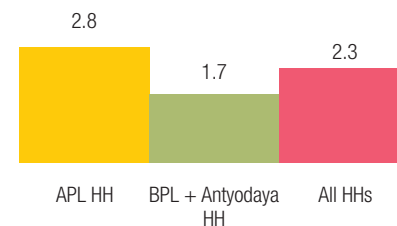


Daily milk consumption in APL Households is much above other economic groups. While milk consumption

per household in APL household is 2.8 litres, it is only 1.7 litres in other economic groups. The state-wise findings on the same are available in Table 6.4c of Annexure-VI.

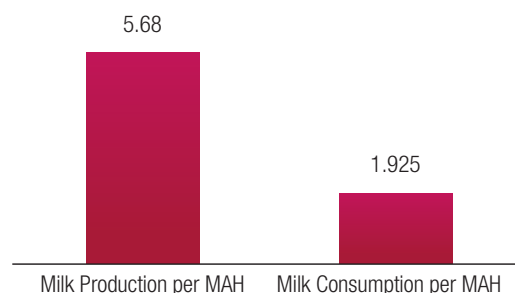### 6.4.4 Per MAH Milk Consumption in Milk Consuming MAH by Land Holding Class

Milk Consumption per MAH in milk consuming households has been estimated for the project area by land holding size of the milk consuming households. Average milk consumption per MAH increases in households with increase in the land holding size. Milk Consumption per Household is the least (1.7 litres) in landless MAH and it increases to 4.1 litres among the large farmers. Milk consumption among landless MAH is less than half of the MAH who are large farmers. The state-level findings on this are available in Table 6.4d of Annexure-VI.

**Chart 6.14:** Per MAH Milk Consumption in Milk Consuming MAH by Land Holding Size (in litres/day)
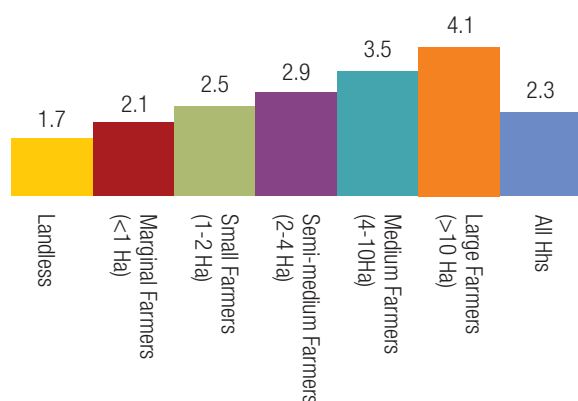


## 6.5 Milk Production and Milk Consumption per MAH

The earlier sections summarised milk production per household for milk producing households and milk consumption per household for milk consuming households. This section presents the findings on milk production and milk consumption per MAH irrespective of their milk production or milk consumption status.

As can be seen in the Chart 6.15, milk production and milk consumption per MAH are 5.68 litres per day and 1.92 litres per day respectively. The state-level findings are available in Table 6.5 of Annexure-VI.

**Chart 6.15:** Milk Production and Milk Consumption per MAH (Litres per/ day)
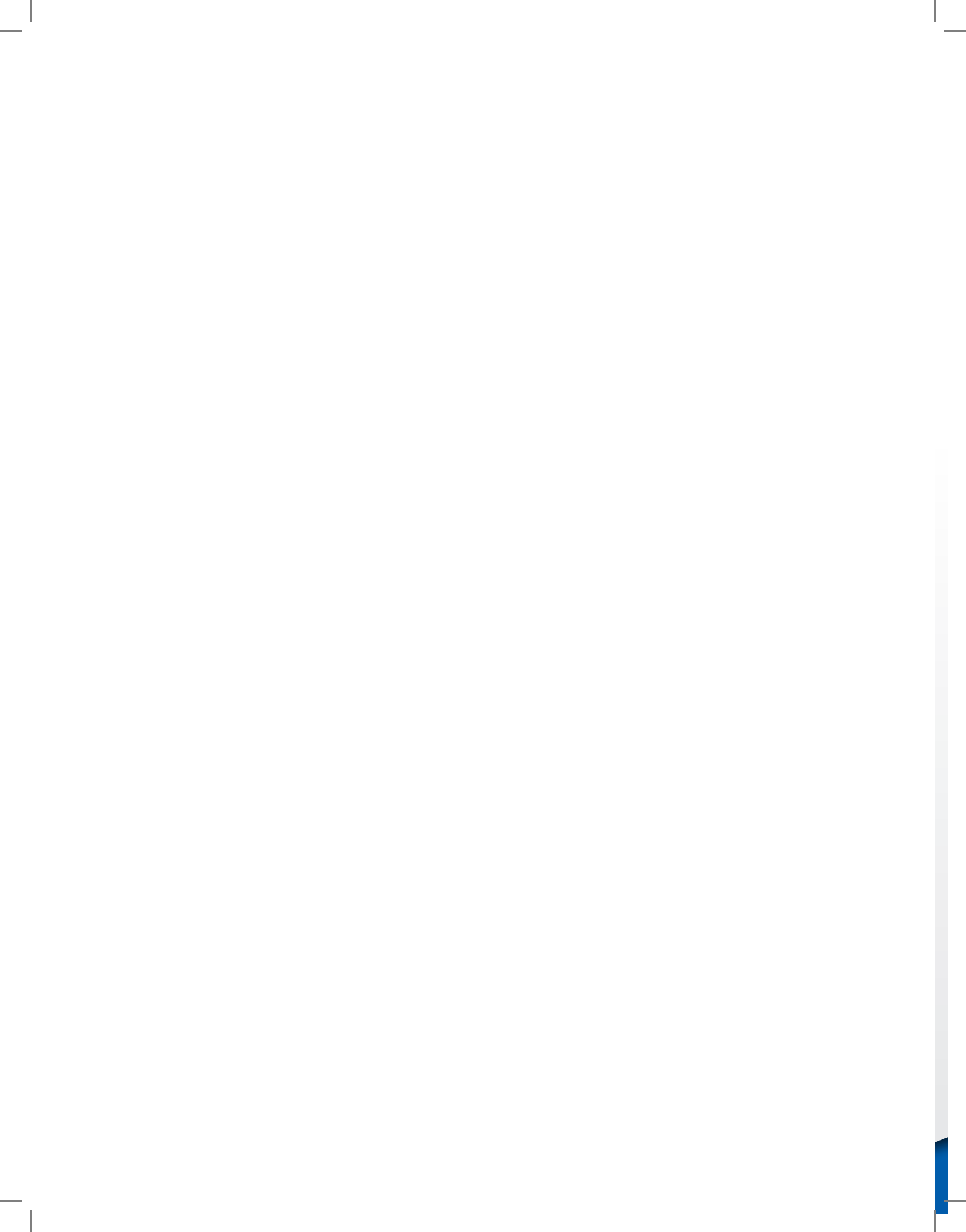


## 6.6 Per Capita Milk Availability and per Capita Milk Consumption

The earlier sections summarised per capita milk consumption in milk consuming MAH. This section presents the findings on per capita milk consumption for all MAHs.

As can be seen in the Chart 6.16, per capita milk availability and per capita milk consumption are 1057.37 ml per day and 358 ml per day respectively. The state-level findings are available in Table 6.6 of Annexure-VI.

**Chart 6.16:** Per Capita Milk Avaliability and Per Capita Milk Consumption (ml/ day)
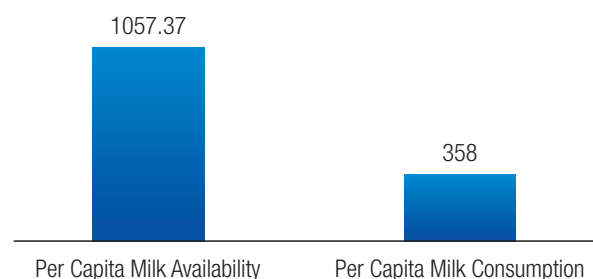
Chapter - 7

# Animal Breeding Services

National Dairy Plan I

# Animal Breeding Services

This chapter presents the findings related to the breeding services availed by the MAH for their animals. The chapter covers subjects like coverage of breeding services, conception related issues, breeding services received by provider type, preference for provider of a breeding services, doorstep provision of breeding service, cost of breeding services, and preference for breeding service and incidence of AI in different categories.

## 7.1 Coverage of Breeding Services

The data on the breeding services availed by adult bovine animals is available for 24,809 animals. The breeding service related data has been captured for any breeding service received during the period of two years prior to the date of survey. As can be seen in the Chart 7.1, out of all the animals that received any breeding service during the last 2 years, 47 percent of animals received only AI service, 51 percent received only NS and 2 percent received both AI service and NS.

**Chart 7.1:** Coverage of Breeding Services
(Percent of animals receiving breeding service)



47

51

2

Only AI       Only NS   Both AI & NS

47
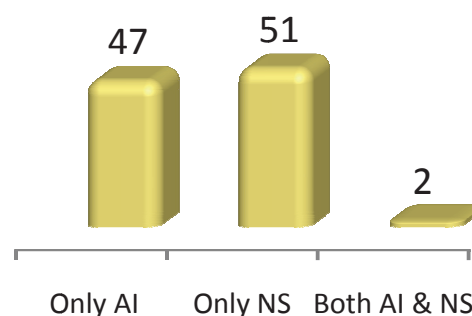
The state-wise finding on this is available in Table 7.1 of Annexure-VII.

The finding on the animals that received only AI services and only NS is discussed in the subsequent paragraphs of this section.

### 7.1.1 AI Coverage across Animal Categories

AI coverage has been calculated as the percent of animals that received only AI service among all the animals of that category that received any type of breeding service. The animals that received both AI service and NS are excluded from the analysis.

**Chart 7.1a:** Only AI Coverage
(Percent of animals in the category)
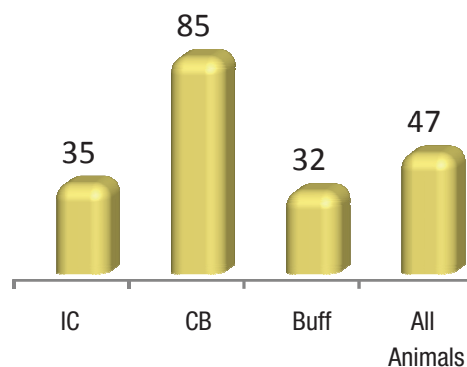


As seen above, the overall coverage for AI in the NDP I project area is 47 percent. Chart 7.1a presents findings on AI coverage in animals of different categories. AI coverage is the highest among crossbred cows (85 percent) followed distantly by Indigenous Cows and Buffaloes (35 percent and 32 percent) respectively. The state-wise findings on AI coverage can be referred to in Table 7.1a (Annexure-VII).

### 7.1.2 NS Coverage across Animal Categories

NS coverage has been calculated as the percent of animals that received only NS out of all the animals of that category that received any type of breeding service. The animals that received both AI service and NS are excluded from the analysis.

The overall Natural Service coverage in the NDP I project area is 51 percent. The NS coverage in different animal categories is presented in Chart 7.1b. The NS coverage among buffaloes (65 percent) and Indigeneous cows (63 percent) is much above NS coverage of crosssbred cows which stands at 12 percent. The state-wise details on the NS coverage can be referred to in Table 7.1b (Annexure-VII).

**Chart 7.1b:** NS Coverage
(Percent of adult animals in the category)
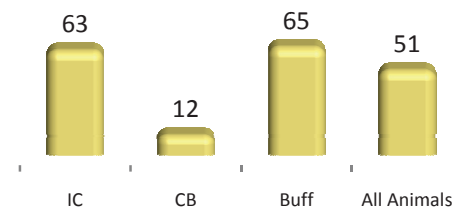


**Base**: Animals that recieved any breeding service

## 7.2 Conception Related Issues

Data required for arriving at conception rate, intercalving period, and pregnancy status of milch animals was also collected during the survey.

### 7.2.1 Conception Rate

The data was collected on the number of AI services or NS received by each animal in the household during the last 2 years. The data was also collected on the types of breeding service that resulted in the last conception. Both the data points have reference to activities that happened long time back. The recall of respondents about data on number of breeding services taken for animals seems to be poor as the conception rate calculated from the data appears unrealistic. Therefore, the same is not presented.

### 7.2.2 Intercalving Period

In order to estimate intercalving period the data was captured on the number of months during which each animal was in-milk and was dry prior to the last calving of the animal.

These data points also refer to a period which is difficult to recall correctly. The findings for this is not presented because not only the response rate is poor but also the recalled data seems to be unrealistic in Indian condition. Such data is best captured through recording of events.

### 7.2.3  Pregnancy Status

The respondents were asked to share information for each animal about their pregnancy status on the date of survey. In India, disclosing pregnancy status is a taboo especially if the animal is of high economic value. The findings on the pregnancy status was not in line with the well established biological parameters relevant for different animal categories and hence, the same has not been presented here.

## 7.3 Breeding Services Received by Provider Type

The breeding service provider related data was collected for all animals that conceived either through AI or NS during the last 2 years. This section presents information on the animals that received AI service or natural service from different providers. The findings are based on the perception of the MAH about association of the provider with the type of institution or provider category.

### 7.3.1  AI Services Received by Provider Type

Chart 7.2a presents distribution of milch animals that received only AI by the type of provider for AI services.

**Chart 7.2a:** AI Service Received by Provider Type
(Values as percent of milch animals)
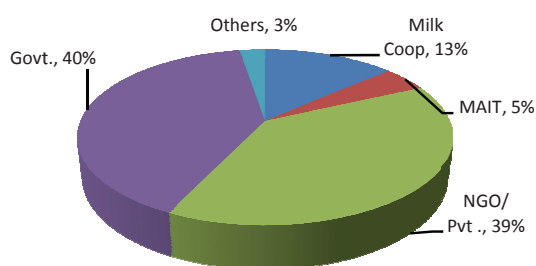


**Base:** Milch animals that recieved only AI

In the NDP I area, Government and NGOs/ Private sector service providers together provide AI service to 79 percent of animals - 40 percent by Government and 39 percent by NGO/ Private Service Provider. Milk Cooperatives are the third important AI service provider with coverage of 13 percent animals.  Mobile AI technicians of IndiaGen (MAITs) has also been reported as a service provider in some states.

During the field survey it was noticed that in some places cooperatives have stopped providing AI services but the same staff continue to provide the service as an entrepreneurial activity. In such cases, same respondent may have reported milk cooperatives as a provider of AI service. In many cases, MAH could not distinguish between the representatives of IndiaGen and other similar providers like JK Trust and BAIF. The state-wise detail on this is presented in Table 7.2a in Annexure-VII.

### 7.3.2  Natural Service Received by Provider Type

Chart 7.2b presents distribution of milch animals that received NS by the type of provider for AI services. State-wise findings can be referred to in Annexure-VII (Table 7.2b).

**Chart 7.2b:** Natural Service Received by Provider Type
(Values as percent of milch animals)
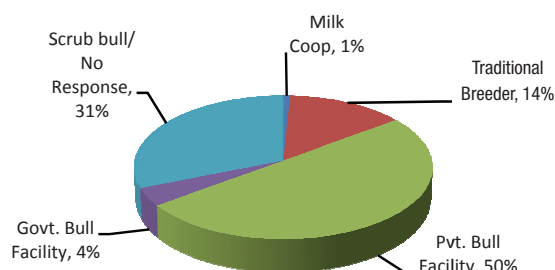


In NDP I project area, private bull facility was the most prominent source for natural service distantly followed by the traditional breeders.

These two collectively provide natural service to 64 percent milch animals. Government bull facility and milk cooperatives provided natural service to a very small group of animals. Traditional Breeders are important NS provider

49

in some states. Either the service provider related information could not be shared by the respondent or scrub bull provided service to a substantially large group of animals that received NS especially in the Eastern states, namely Odisha, West Bengal and Bihar.
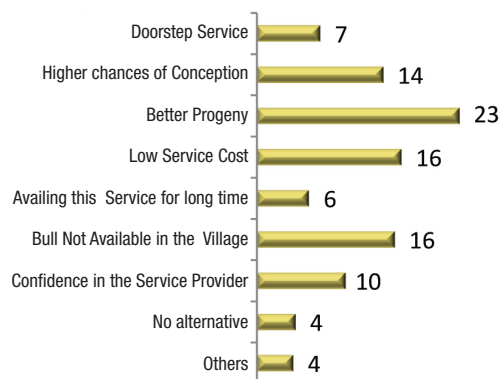
# 7.4 Preference of Provider for Breeding. Service

## 7.4.1 Preference of Provider for AI Service

The top four reasons for availing AI service for the animals across the service provider types are

- Better progeny
- Low cost of service
- Non availability of bull in the village and
- Higher chances of conception

Chart 7.3a and Chart 7.3b present the reasons for preferring Govt. and NGO/Private sector respectively as an AI service provider.

**Chart 7.3a:** Reasons for Preferring Government as AI Service Provider for Animals

(Value as percent of MAH that availed the service)

| Category | Value |
|---|---|
| Doorstep Service | 7 |
| Higher chances of Conception | 14 |
| Better Progeny | 23 |
| Low Service Cost | 16 |
| Availing this Service for long time | 6 |
| Bull Not Available in the Village | 16 |
| Confidence in the Service Provider | 10 |
| No alternative | 4 |
| Others | 4 |

There is not much difference in the reasons for preferring the two important AI service providers except that a larger group of the MAH have shown confidence in Government AI service providers than the NGOs/Private sector service providers. A relatively larger number of MAH reported preferring NGO/Private AI providers because of higher chances of conception. The state-wise summary tables are presented in Annexure-VII (Table 7.3a and Table 7.3b).

**Chart 7.3b:** Reasons for Preferring NGO/Private as AI Service Provider for Animals

(Value as percent of MAH that availed the service)

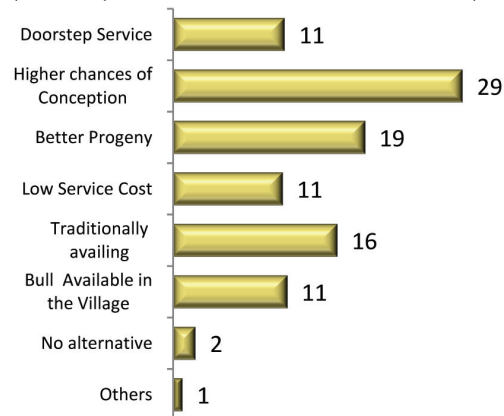| Category | Value |
|---|---|
| Doorstep Service | 10 |
| Higher chances of Conception | 19 |
| Better Progeny | 26 |
| Low Service Cost | 14 |
| Availing this Service for long time. | 5 |
| Bull Not Available in the Village | 13 |
| Confidence in the Service Provider. | 5 |
| No alternative | 3 |
| Others | 5 |
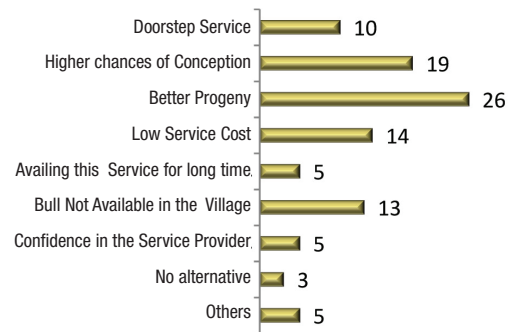
## 7.4.2 Preference of Provider for Natural Service

Chart 7.3c and Chart 7.3d present information on reasons for preference of Private Bulls and Traditional Breeder as a NS provider.

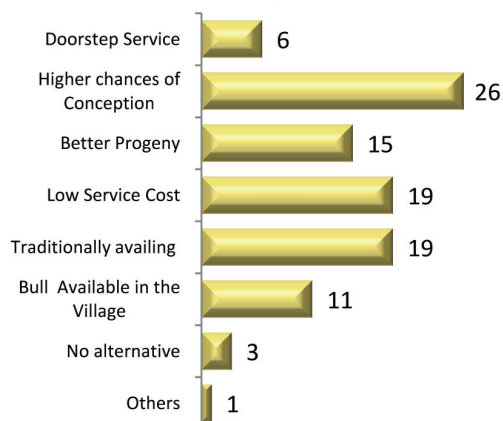The Main reasons for preferring NS are as under:

- Higher chances of conception
- Better progeny
- Traditionally using this service
- Availability of bull in the village, and
- Doorstep service.

**Chart 7.3c:** Reasons for Preferring Private Bull as NS Service Provider for Animals

(Value as percent of MAH that availed the service)

| Category | Value |
|---|---|
| Doorstep Service | 11 |
| Higher chances of Conception | 29 |
| Better Progeny | 19 |
| Low Service Cost | 11 |
| Traditionally availing | 16 |
| Bull Available in the Village | 11 |
| No alternative | 2 |
| Others | 1 |

There is not much difference in MAH's preference between the private bull and traditional breeder as NS providers except on two issues. While a relatively larger group of the households prefer traditional breeders due to low cost of service, private bulls are preferred due to the doorstep service.

State-wise details on this are presented in Annexure-VII (Table 7.3c and Table 7.3d).

**Chart 7.3d:** Reasons for Preferring Traditional
Breedeer as NS Service Provider for Animals
(Value as percent of MAH that aviled the service)



| | |
|---|---|
| Doorstep Service | 6 |
| Higher chances of Conception | 26 |
| Better Progeny | 15 |
| Low Service Cost | 19 |
| Traditionally availing | 19 |
| Bull Available in the Village | 11 |
| No alternative | 3 |
| Others | 1 |

## 7.5 Doorstep Delivery of Breeding Services

Place of breeding service provision was asked for only those animals that conceived through either AI or NS. Quite often, breeding service providers provide the service at a centralised location within the village or at the doorstep of the MAH. All the services provided with in the village or at the doorstep were treated as doorstep service for the present study.

### 7.5.1 Doorstep Delivery of AI by Provider Type

The Chart 7.4a summarises information on percent of animals that received AI service at the doorstep among all the animals that received only AI service from a particular service provider. The state-wise information is provided in Table 7.4a (Annexure-VII).

**Chart 7.4a:** Doorstep Delivery of AI by Provider Type
(Values as percent of animals)



| | |
|---|---|
| Total | 75 |
| Govt. | 67 |
| NGO/Pvt | 86 |
| MAITS | 77 |
| Milk Coop | 70 |

**Base:** Milch animals receiving only AI service by respective providers

In the project area, across the service provider categories, three-fourths of the animals that received AI service, received it at the doorstep. Doorstep delivery of AI service is most commonly practiced by NGO/ Private AI service providers. It is the least common among the Government providers which indicates that a nearly one-third of the AI services are provided to the animals coming to the Government AI facility from nearby villages.
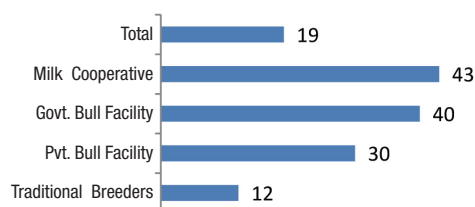
### 7.5.2 Doorstep Delivery of NS by Provider Type

At the project level findings on share of doorstep delivery of natural service by provider type is summarised in Chart 7.4b.

In the project area, nearly one-fifths of milch animals that received only NS received the service at the doorstep. Milk Cooperatives and the Government are the leaders in providing NS at the doorstep. The trend on this varies substantially across the states. Private Bull Facility provides NS at the doorstep only in a small number of cases.

The state-wise information is provided in Table 7.4b (Annexure-VII).

**Chart 7.4b:** Doorstep Delivery of NS by Provider Type
(Values as percent of animals that received only NS)



| | |
|---|---|
| Total | 19 |
| Milk Cooperative | 43 |
| Govt. Bull Facility | 40 |
| Pvt. Bull Facility | 30 |
| Traditional Breeders | 12 |

**Base:** Milch animals receiving only NS service by respective providers

## 7.6 Reported Cost of Breeding Services

This section discusses the findings on cost of one AI service for cows and buffaloes. The cost of AI service or NS service was asked for the latest service availed for any cow and or any buffalo in the household.The cost of AI as well as NS has been taken as the total amount paid by the MAH for availing one service for an animal.

### 7.6.1   Reported Cost of AI Service

Chart 7.5a and Chart 7.5b present the findings at the project area level on the cost of AI service for cows and buffaloes.

The average cost to the MAH for taking one AI service for buffaloes is slightly more than the cost of availing it for cows. This is true across the provider category except Milk Cooperatives where the reported cost of availing AI service for cows is higher.
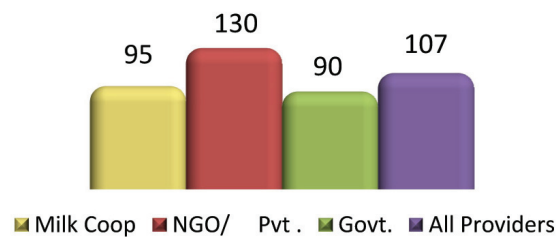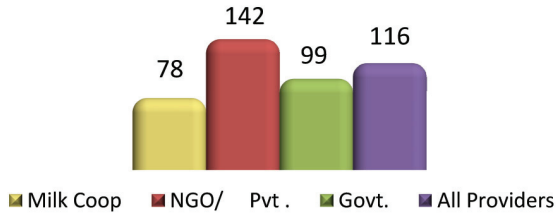
**Chart 7.5a:** Cost of AI per Service (in Rs)
Cows



**Chart 7.5b:** Cost of AI per Service (in Rs)
Buffaloes



The cost of each AI service varies across AI service providers. NGO and Private sector providers charge substantially more than the milk cooperatives and Govt AI service providers. The NGOs/Pvt providers charge Rs 130 and Rs 142 for each service to cows and buffaloes respectively against the overall average cost of Rs 107 and Rs 116 respectively for these animal categories.

State-wise data tables can be referred to in Annexure-VII. (Table 7.5a and Table 7.5b).

### 7.6.1a Distribution of MAH Receiving AI Services across Price Ranges

Chart 7.5c presents distribution of MAH that received AI for cows in different price brackets.

Nearly one-fifth of the MAH reported receiving AI service for cows within Rs 50. A very large group of MAH (46 percent) reported availing it at a price between Rs 50 and 100.

**Chart 7.5c:** AI across Price Ranges among Cows
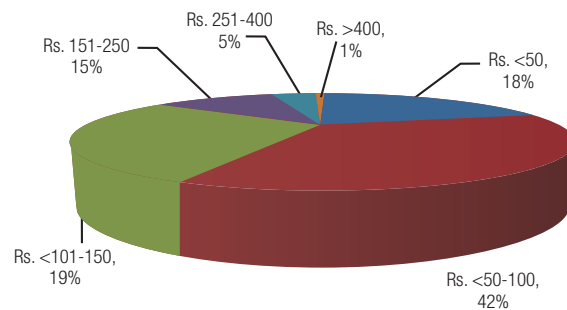(Values as percent of MAH)



**Base: 2625**
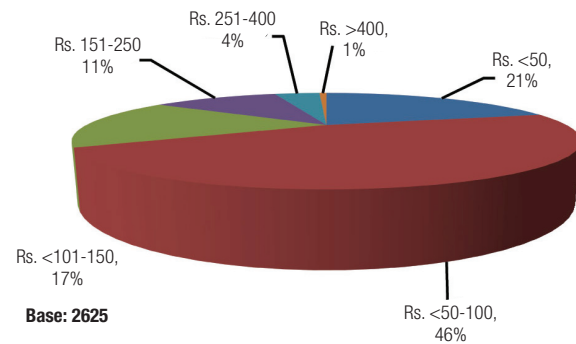
**Chart 7.5d:** AI across Price Ranges among Buffaloes
(Values as percent of MAH)



Slightly more than one-fourth of the households avail the service at a price ranging between Rs 101 and Rs 250. Only a small group of households pay more than Rs.250 per service for AI among cows.

Chart 7.5d presents findings on the percent of MAH availing AI service for their buffaloes in different price brackets. In case of buffaloes, while a large number of MAH (42 percent) received AI service at a price ranging between Rs. 50 and Rs. 100, another one -third received the service at a price ranging between Rs. 101 and Rs. 250.

State-wise data tables can be referred to in Annexure-VII (Table 7.5c and Table 7.5d).

52

## 7.6.2   Reported Cost of Natural Service

Chart 7.5e and Chart 7.5f present findings on cost of NS for cows and cost of NS for buffaloes. In the  project area, overall cost for  each NS is Rs. 121 for cows and Rs. 201 for buffaloes. Natural service costs more than the AI for cows as well as buffaloes. Availing NS for buffaloes is more expensive than availing it for cows irrespective of the service provider.
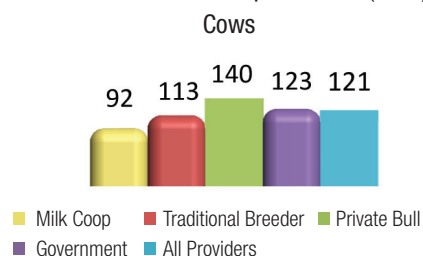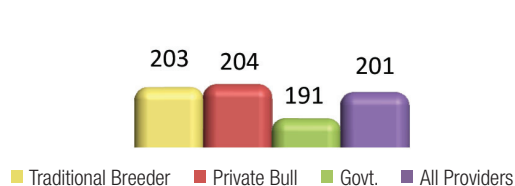
**Chart 7.5e:** Cost of NS per Service (in Rs)
Cows



| 92 | 113 | 140 | 123 | 121 |

■ Milk Coop       ■ Traditional Breeder   ■ Private Bull
■ Government    ■ All Providers

**Chart 7.5f:** Cost of NS per Service (in Rs)
Buffaloes



| 203 | 204 | 191 | 201 |

■ Traditional Breeder    ■ Private Bull    ■ Govt.    ■ All Providers

The cost of each NS for cows varies across service providers. While the cost of availing NS for cows from traditional breeder is only Rs. 113, it costs Rs. 140 in case for private bulls. The cost of availing each NS is buffaloes from the Government is less (Rs.191) compared to traditional breeder and private bull who charge Rs. 203 and Rs. 204 respectively. State-wise data tables can be referred to in Annexure-VII (Table 7.5e and Table 7.5f).

## 7.6.2b  Distribution of MAH that Received NS across Price Ranges

Chart 7.5g presents findings on the percent of MAH availing NS service in different price brackets. More than  half of the MAH  paid an amount between Rs. 50 and Rs 100 for NS among cows. Nearly another one-third of MAH availed NS among cows at a cost ranging between Rs. 101 and Rs. 250. Only six percent of the MAH paid Rs. 251 or more for NS cows.

State-wise data tables can be referred to in Annexure-VII (Table 7.5g).

**Chart 7.5g:** NS across Price Ranges among Cows
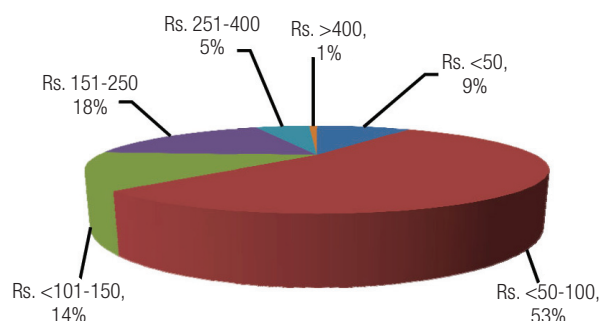(Values as percent of MAH)



Chart 7.5h presents findings on the percent of MAH availing NS in different price brackets. Over one-third of the  MAH paid  between Rs. 151 and Rs.250 for NS for their buffaloes. One-fifth of the MAH  paid between Rs. 251 and Rs. 400 for the buffaloes. Seventeen percent of the MAH  paid between Rs. 50 and Rs. 100 and Rs. 101 to Rs. 150 each. As little 5 percent of the MAH paid less than Rs. 50 and 4 percent MAH paid more than Rs. 400.

**Chart 7.5h:** NS across Price Ranges among Buffaloes
(Values as percent of MAH)
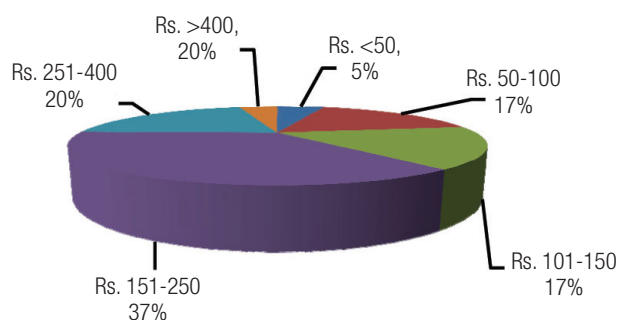


State-wise data tables can be referred to in Annexure-VII (Table 7.5h).
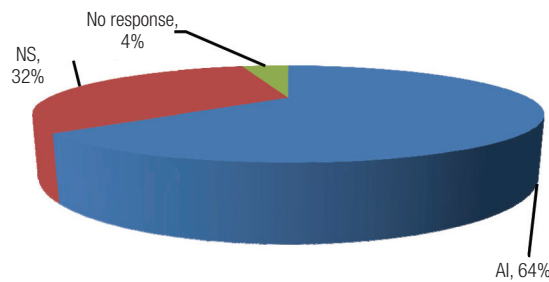
## 7.7 Breeding Service Preference

The reasons for preference about the type of breeding service availed were probed for cows and buffaloes separately.

### 7.7.1 Breeding Service Preference for Cows

The Chart 7.6a presents the MAH preference between AI Service and NS among cows at the project area level.

In the project area, AI is the preferred method of breeding for cows. AI Service for cows is preferred by double the number of the households preferring NS. While 64 percent of the households prefer AI among cows, only 32 percent prefer NS among cows.

**Chart 7.6a:** Preference between AI and NS for Cows (Percent of MAH)



There is substantial variability on this in the project states. State-wise data tables can be referred to in Annexure-VII (Table 7.6a).

### 7.7.2 Breeding Service Preference for Buffaloes

Almost half of the MAH seem to be indifferent on their preference for AI and NS for their buffaloes. While NS

**Chart 7.6b:** Preference between AI and NS for Buffalo (Percent of MAH)
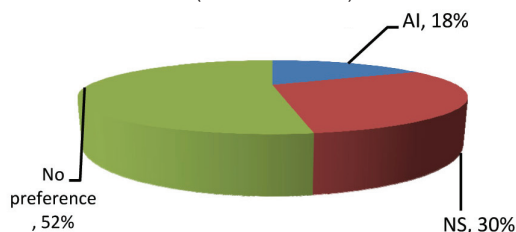


is preferred by 30 percent of the households, a little more than half of NS preferring households preferred AI for buffaloes.

State-wise data tables can be referred to in Annexure-VII (Table 7.6b).

## 7.8 Reasons for Preference of Breeding Services

### 7.8.1 Reasons for Preference of AI

Chart 7.7a and Chart 7.7b presents the key reasons for preference of AI for cows and buffaloes respectively. The state-wise details are given in Annexure-VII (Table 7.7a and Table 7.7b)

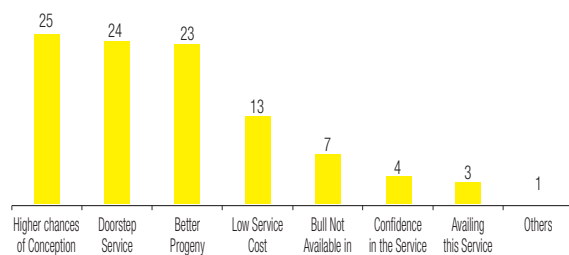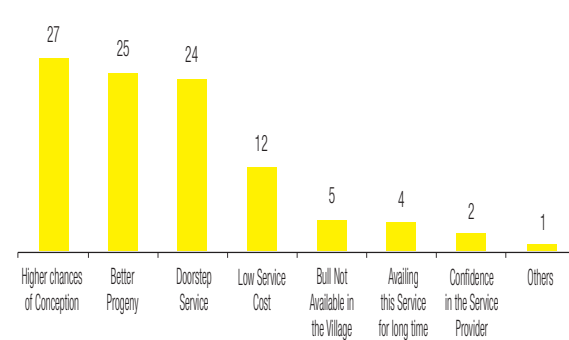**Chart 7.7a:** Reasons for Preference of AI among Cows



**Chart 7.7b:** Reasons for Preference of AI among Buffaloes



The MAH preferred AI among cows and buffaloes for similar reasons. There is not much variation in reasons for preference of AI among cows and buffaloes. The key reasons for preference of AI among cows and buffaloes are as follows:

- Higher chances of conception
- Doorstep service
- Better Progeny
- Low cost of service

54

As much as 24 percent of the MAH prefer AI as well as NS for cows primarily due to doorstep service.

## 7.8.2  Reasons for Preference of NS
The common factors that drive preference of NS among cows as well as buffaloes in a large group of households are higher chances of conception, availing NS traditionally,

**Chart 7.7c:** Reasons for Preference of NS among Cows



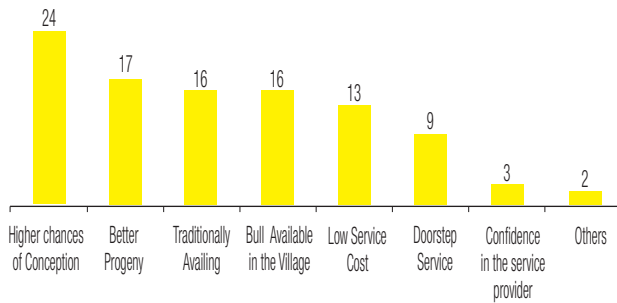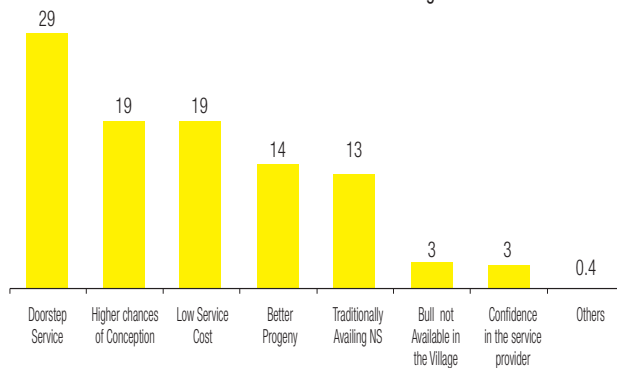**Chart 7.7d:** Reasons for Preference of NS among Buffaloes



better progeny and low cost. Availability of bull in the village is an important factor for availing NS for cow. Doorstep service has emerged as the most important reason for preferring NS among buffaloes.

The state-wise details are given in Annexure-VII (Table 7.7c and Table 7.7d).

# 7.9  Adoption of only AI
This section presents the summary findings on the adoption of AI for animals. Adoption of AI is presented as percentage of animals availing only AI service among all the milch animals that received any type of breeding service during the last two years. As seen earlier, at an overall level in the

project area, 47 percent of the milch animals received only AI service. The subsequent sub-sections under this head present incidence of AI by select classification categories.

## 7.9.1  Adoption of Only AI in MAH by Land Holding Class
Chart 7.8a presents adoption of AI by land holding size of the MAH at the project area level. State-wise data tables can be referred to in Table 7.8a of Annexure-VII.

**Chart 7.8a:** Adoption of AI by Land Holding Class (Percent of Animals)
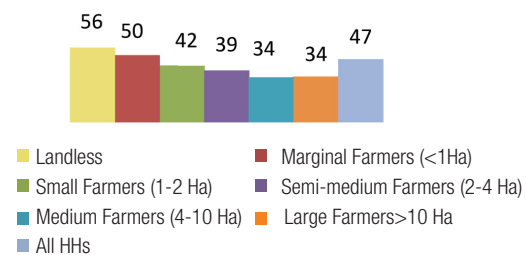


Adoption of AI services for the animals in the MAH is the highest among landless farmers and it declines as the land holding size of the households increase.

This may be treated as a surrogate indicator for higher level of commercial dairying among the MAH having smaller land holding. It also indicates MAHs higher dependence on animals in households having less land.

## 7.9.2  Adoption of Only AI in MAH by Animal Holding Size
Chart 7.8b summarises the findings on adoption of AI by Animal Holding Size of the MAH for the whole project area.

**Chart 7.8b:** Adoption of AI by Animal Holding Size (Percent of Animals)



55
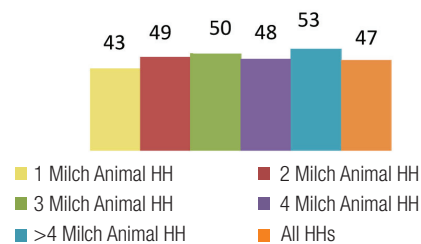
Adoption of AI improves in the households with increase in animal holding with the exception of slight dip in adoption of AI among 4 milch animal holding households. It varies from 43 percent in case of one milch animal household to 53 percent in more than 4 milch animal holding households.
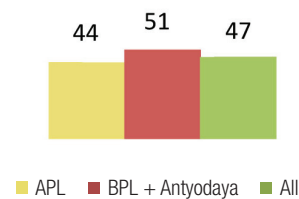
The state-wise data tables can be referred to in the Table 7.8b of Annexure-VII.

### 7.9.3  Adoption of Only AI in MAH by Economic Group

Chart 7.8c summarises incidence of AI for animals in the MAH.

Adoption of AI is higher in economically less privileged housheholds than the APL households. Dependency of the economically weaker MAHs on dairying seems higher and hence they seem to be adopting AI service for animals that can reduce the chances of missed conception.

**Chart 7.8c:** Adoption of AI by Economic Group
(Percent of Animals)
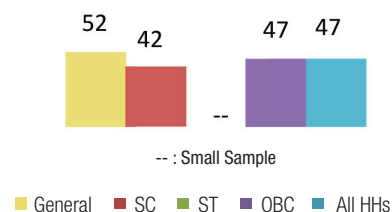


44   51   47

APL   BPL + Antyodaya   All

The state-wise data tables can be referred to in the Table 7.8c of Annexure-VII.

### 7.9.4  Adoption of Only AI in MAH by Social Group

Chart 7.8d summarises adoption of AI for animals by social group of the MAH.

**Chart 7.8d:** Adoption of AI by Social Group
(Percent of Animals)



52   42   --   47   47

-- : Small Sample

General   SC   ST   OBC   All HHs

Adoption of AI is the highest in General category housheholds followed by OBC households and SC households.

The state-wise data tables can be referred to in the Table 7.8d of Annexure-VII.

Chapter - 8

# Feed, Fodder and Grazing

# Feed, Fodder and Grazing

One of the notable characteristics of India's milk economy is that almost its entire feed requirement is met from crop residues and by-products; green grass, weeds and tree leaves gathered from cultivated and uncultivated lands; and grazing on common lands and harvested fields. Land allocation to cultivation of green fodder crops is limited and has hardly ever exceeded 5 percent of the gross cropped area.

## 8.1  Consumption of Feed including Concentrates

Development and growth of livestock are conditioned by the availability of fodder from arable land and forest. The nutritive value of feed and fodder has a sig nificant bearing on productivity of livestock. According to Planning Commission of India and other sources, a large gap exists between requirement and availability of feed and fodder in the country. As per the Planning Commission, Government of India, India is short in dry fodder by about 23.5 percent, green fodder by about 62.8 percent and concentrates by 30.0 percent. Feed and fodder costs constitute about 60 to 70 percent of cost of milk production.

(Source: V. D. Shah and others, Economics of Production, Processing and Marketing of Fodder Crops in Gujarat, Agro-Economic Research Centre, Vallabh Vidyanagar, Research Study No. 144, November 2011).

Regional deficits in availability of feed and fodder are more prominent. Of 55 micro agro-eco-regions of India, 43 are deficient in feed and fodder. Most of the deficient regions lie in the arid and semi-arid agro-ecological zones. The feed deficiency is due to heavy population pressure, the quantitative

59

and qualitative deterioration in common grazing lands resulting in low biomass production, and the lack of adoption of improved fodder production technologies.

(Source: R. Pandey & A. Mishra, Forest Research Institute, Dehradun, Livestock Fodder Requirements and Households Characteristics in Rural Economy of Hilly Region, Uttarakhand).

Most common livestock feed resources are:

- Crop residues (straw, stoves, haulms, etc.)
- Grass and, alpine, sub-alpine and pasture lands
- Community land, common property resources and wastelands
- Cultivated fodder
- Weeds
- Vegetable and fruit waste
- Forest lands
- Cut and carry grasses
- Unconventional feeds and top feeds
- Coarse grains
- Oilseeds / cakes / meals
- Cereal bran, hulls and husks
- Agro-Industrial By-products

In animal feed supply, coarse cereals have a major role and five major cereals, viz. maize, barley, wheat, sorghum and pearl millet account for about 44 percent of the total cereals. Many minor types of millet, viz. finger millet /ragi, little millet, kodo millet, foxtail millet, proso millet, barnyard millet and savan millet, are also important for fodder. (Source: Accelerated Fodder Development Programme, Paper 2).

Of the total concentrate feed consumed by livestock in the country, cereals comprise 48.2 percent, pulses 8.3 percent, and oilseeds, oilcakes and meals 37.3 percent. Manufactured feed comprise 6.2 percent. (Source: V. D. Shah and others, Economics of Production, Processing and Marketing of Fodder Crops in Gujarat, Agro-Economic Research Centre, Vallabh Vidyanagar, Research Study No. 144, November 2011).

Findings emerging from the baseline survey regarding common feed and fodder given to cattle and buffalo is summarised in the subsequent paragraphs.

**60**

### 8.1.1 Top Five Green Fodders Fed to Animals

Chart 8.1a shows that in project area, various grasses are fed to bovine animals as green fodder in maximum (34 percent) households. Berseem (Egyptian clover), Jowar (Sorghum) and Maize are popularly used as green fodder. It may be noted that many of the households may be feeding more than one type of green fodder.

**Chart 8.1a:** Top Five Green Fodder Fed (Percent of MAH)
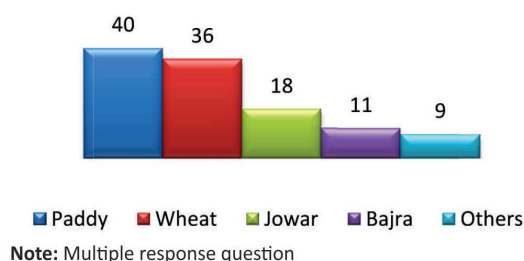


**Note:** Multiple response question
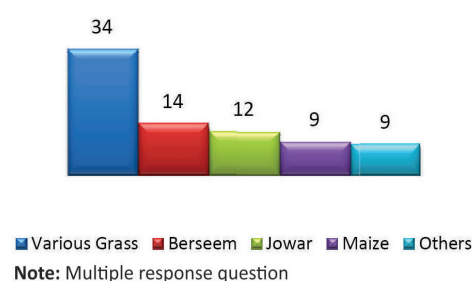
The state-wise information on top 5 green fodders fed to animals in different states is available in Table 8.1a (Annexure-VIII). Berseem (Egyptian clover) is the major green fodder fed to animals by households in Punjab and Haryana. Use of sugarcane ranks first as a green fodder in the states of Maharashtra and Uttar Pradesh, where sugarcane is grown on a very large scale. Lucerne (Alfalfa) is reported to be the first choice among green fodders in Gujarat. Jowar (Sorghum) as a green fodder plays a pivotal role in Tamil Nadu and Karnataka. Bajra (Pearl Millet), Maize, Lobia (Cowpea) are the other important green fodder crops in the project area. These findings coincide with the data on area under forage crops of the country.

### 8.1.2 Top Five Dry Fodder Fed to Animals

Chart 8.1b shows that crop biomass of Paddy, Wheat, Jowar (Sorghum), Bajra (Pearl Millet) and Maize are fed to bovine animals as dry fodder in large number of MAHs in the project area. While Paddy is fed in 40 percent households, Wheat is fed in 36 percent households. Dry fodder from Jowar and Bajra stem

is fed in 18 percent and 11 percent MAHs respectively. Soyabean, Ragi (finger millet) and Groundnut (shells) are the other dry fodder crops reported in some of the states.

**Chart 8.1b:** Top Five Green Fodder Fed
(Percent of MAH)



**Note:** Multiple response question

These findings are based on the data collected through a multiple response question. Information on top 5 dry fodders in different state is available in Table 8.1b (Annexure-VIII).

### 8.1.3 Top Five Concentrates Fed to Animals

As can be seen in Chart 8.1c the top 5 concentrates fed to bovine animals in the NDP I project area are Mustard cake (18 percent MAH), Cotton seed cake (18 percent MAH), Wheat bran (11 percent MAH), Rice bran (9 percent MAH) and Balanced Cattle feed (9 percent MAH). It is important to mention that some of the households may be feeding more than one type of concentrates. Information on top 5 concentrates fed in different states is available in Table 8.1c (Annexure-VIII).

**Chart 8.1c:** Top Five Concentrates Fed
(Percent of MAH)



Note : Multiple response question
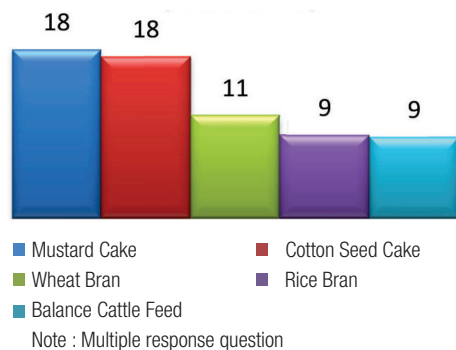
## 8.2 Incidence of Purchase of Feed and Fodder

Because of comparatively very low net returns, farmers have the least preference for growing fodder crops. Fodder markets being unorganized and unregulated; fodder production is a low priority enterprise in potential production areas of the country. Further, fodder being a low-value, high volume produce is costly to transport and hence normally consumed locally.

**Chart 8.2:** Households Purchasing Feed and Fodder
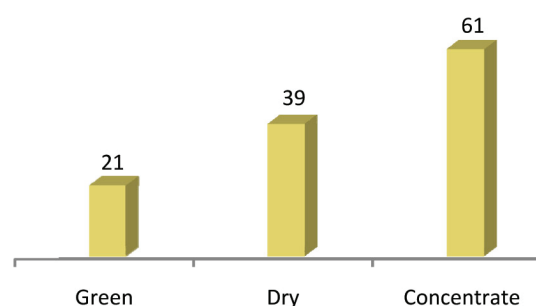(Percent of MAH)



Chart 8.2 presents information on percent of households purchasing feed and fodder for feeding their animals. The state-wise information on households purchasing feed and fodder is presented in Table 8.2 (Annexure-VIII).

It is observed that in the NDP I project area, while nearly 61 percent households purchase concentrates, 39 percent households purchase dry fodder, and merely 21 percent households purchase green fodder.

### 8.2.1 Households Purchasing Feed and Fodder by Duration of Requirement

As discussed above, the number of households purchasing different types of feed and fodder varies substantially. Therefore, the data on duration of purchase of feed and fodder has been analysed separately for green fodder, dry fodder and concentrates.

Summary data for the project area on households purchasing feed and fodder is presented in Chart 8.2a, Chart 8.2b and Chart 8.2c.  Table 8.2a, Table 8.2b and Table 8.2c in Annexure-VIII have this information for each state. While 61 percent of the households purchase green fodder for their animals requirements of up to 6 months,

61

**Chart 8.2a:** Purchase of Green Fodder by Duration of Requirement
(Percent of green fodder buying MAH)
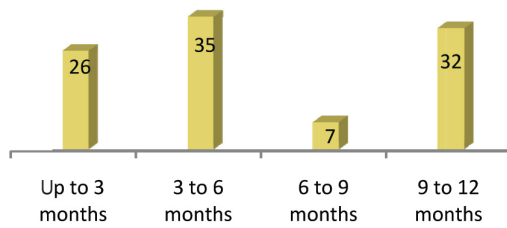


39 percent households are dependent on purchase of green fodder for a period longer than six months.

Fifty-five percent of MAH who purchase dry fodder to meet their dry fodder requirement buy it to meet the requirement of 6 months or longer duration.

**Chart 8.2b:** Purchase of Dry Fodder by Duration of Requirement
(Percent of dry fodder buying MAH)
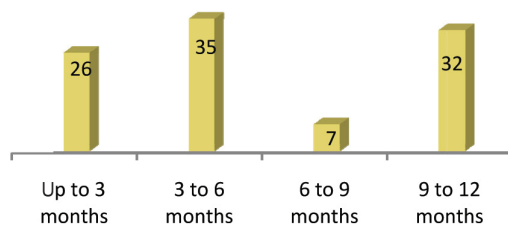


As seen above, 61 percent MAH buy concentrates. Fifty-four percent of the MAH who purchase concentrates buy it to meet 9 to 12 months of their animal requirement.

**Chart 8.2c:** Purchase of Concentreate by Duration of Requirement
(Percent of Concentrate buying MAH)
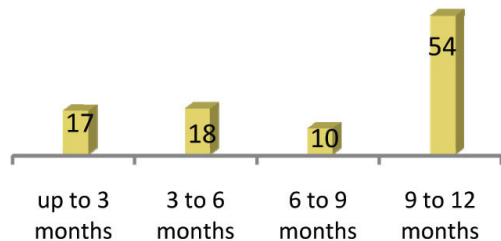


Ten percent MAH buy it for 6 to 9 months requirement, and 35 percent MAH buy it for less than 6 months of their animal's requirement.

# 8.3 Sources of Feed and Fodder Purchase

Considering the fact that the number of households purchasing different feed/ fodder varies substantially, the sources of purchase for green fodder, dry fodder and concentrates have been analyzed separately. The sources of purchase have been analysed only for those households that purchased the particular type of feed/ fodder. The overall findings on the sources of purchase of feed and fodder are presented in Chart 8.3a, Chart 8.3b and Chart 8.3c. The state level findings are given in Table 8.3a, Table 8.3b and Table 8.3c of Annexure-VIII.

**Chart 8.3a:** Sources of Feed and Fodder Purchase : Green Fodder
(Percent of MAH that purchase Green fodder)
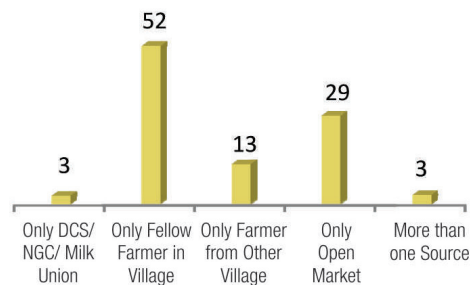


The trend on source of purchase of dry fodder as well as green fodder is similar. At an overall level, fellow farmers are the most important source for purchase of green fodder as well as for dry fodder followed by open market. More than half of the farmers purchase these fodders from farmers in their villages.

**Chart 8.3b:** Sources of Feed and Fodder Purchase : Dry Fodder
(Percent of MAH that purchase dry fodder)
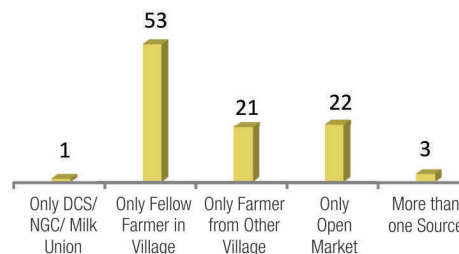
While 13 percent of the MAH purchase green fodder from farmers of other village, 21 percent buy dry fodder from this source. Purchase of green fodder from open market is more prevalent in the Southern states.

Open market is the key source of purchase for concentrate among an overwhelmingly large group (78 percent) of MAH who purchase concentrates. Cooperatives are the distant second source for purchase of concentrates.

**Chart 8.3c:** Sources of Feed and Fodder
Purchase : Concentrates
(Percent of MAH that purchase concenrates)
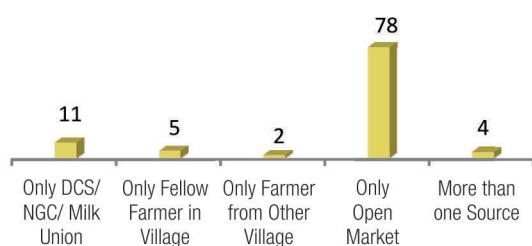


## 8.4  Fodder Cultivation

Fodder crops are the plant species that are cultivated and harvested for feeding in the form of forage (cut green and fed fresh), silage (preserved under anaerobic conditions) and hay (dehydrated green fodder). Sorghum (Jowar/Chari) amongst the Kharif crops and Berseem (Egyptian clover) amongst the Rabi crops occupy more than half of the total cultivated fodder cropped area. Lucerne (Alfalfa), Pearl millet (Bajra), Maize (Makka/Makai), Lobia (cowpea), Cluster Bean (Guar) and Oat (Jai) are the other important forage crops grown in the country.

Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, is implementing Accelerated Fodder Development Programme (AFDP) under Rashtriya Krishi Vikas Yojna. The programme envisages accelerating production of fodder through promotion of integrated technologies and processes for enhancing the availability of fodder throughout the year. The programme proposes a multi-pronged strategy to achieve the stated objective as below:
1.    Production of quality seeds
2.    Production of fodder crops
3.    Adoption of appropriate technologies for post-harvest management

### 8.4.1  Households Growing Fodder Crops

Information on proportion of households growing fodder in different seasons is summarized in Chart 8.4a. The state-wise information is presented in Table 8.4a of Annexure-8.

**Chart 8.4a:** Households Growing Fodder Crops
(Percent of MAH)
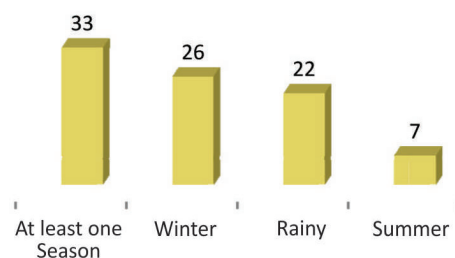


It is evident that in the project area as a whole' only one-third of the milch animal owning households grows fodder in at least one season. Nearly one-fourth of the milch animal owning households grows some fodder crops in the winter. Fodder cultivation is more prevalent in Northern region where most of the states have large population of buffaloes. The peak milking period of buffaloes coincides with winter season during which a relatively larger number of MAH prefer to grow fodder. During rainy season, the grasses from non-agricultural area and weed from the cultivated area is available in plenty and hence a smaller group of milch animal owning households grow fodder in rainy season. This is evident from the findings as the fodder growing households get reduced to 22 percent during rainy season. During summer, only 7 percent of the milch animal owning households grow fodder crops because of the scarcity of water. There is large variation with regards to this across the states. In the Northern states, a very large number of milch animal owning households grow fodder crops in different seasons. In the Southern states in general, cultivation of fodder crops by milch animal owning households is very much on lower side as compared to the Northern states.

### 8.4.2  Sources of Fodder Seeds

Seed quality is an important parameter in the cultivation of fodder crops. Sources of fodder seed among the farmers is summarized in Chart 8.4b. Data on sources of fodder seed obtained from the fodder growing households in any season is presented in Table 8.4b (Annexure-8). It is revealed

63

that among the fodder growing households, private seed shops are the main source of fodder seeds (71 percent) followed by own farms (42 percent) and fellow farmers (39 percent) in the project area as a whole. At an overall level, share of DCS/ NGC in this regard is practically negligible.

**Chart 8.4b:** Sources of Purchase of Seeds
(Percent of fodder growing households)
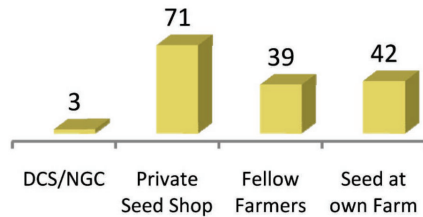


**Note:** Multiple response question

### 8.4.3 Awareness about Certified / Truthfully Labelled Seeds

During the survey, information regarding awareness about Certified / Truthfully Labelled Seeds was collected from fodder growing households. As noted earlier, only 33 percent of the milch animal owning households grow fodder crops in at least one season. Among these households, it is seen that as a whole 72 percent of the households are aware of certified/ truthfully labelled/ seeds i.e. only 24 percent of the milch animals owning households are aware of such seeds. The data for each state is summarized in Table 8.4c of Annesure-VIII.

**Chart 8.4c:** Awareness about Certified / Truthfully Labelled Seeds (%)
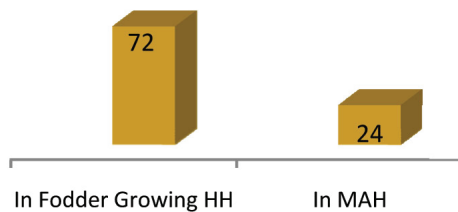


### 8.4.4 Types of Seeds Used for Fodder Cultivation

Chart 8.4d summarises the findings on the type of seed used for fodder cultivation by the fodder growing MAH. While more than half (54 percent) of the fodder growing MAH use only local seeds, 4 percent use only Certified/ Truthfully Labelled Seeds and 4 percent use both types of seeds. Nearly, 38 percent fodder growers were not sure of what type of seed is used in their household.

These figures translate to a very small number when the percentages are calculated on all MAH. While 18 percent of the MAH use only local seeds, just 1 percent use only truthfully labelled/ certified seeds. One percent of the MAH use both seeds. Thirteen percent of the MAH were not sure of the seed type

**Chart 8.4d:** Types of Seeds Used for Fodder Cultivation (Percent of fodder growing HHs)
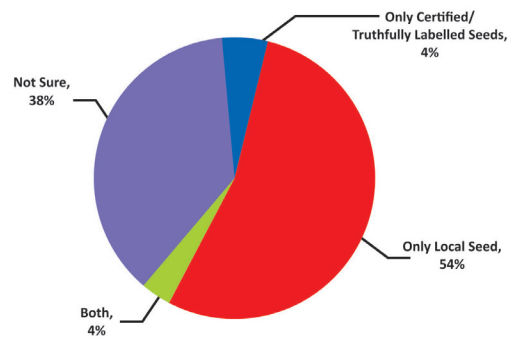


used in their households and the rest were non-growers of the fodder.

The state-wise findings on this can be refered to the in Table 8.4d of Annexure-VIII.

**Chart 8.4e:** Types of Seeds Used for Cultivation (Percent of MAH)

### 8.4.5 Purpose of Growing Fodder Crops

The reasons for growing fodder crops has been analysed at the project area level and the same is presented in Chart 8.4f. The state-wise summary data is presented in Table 8.4e (Annexure-VIII).

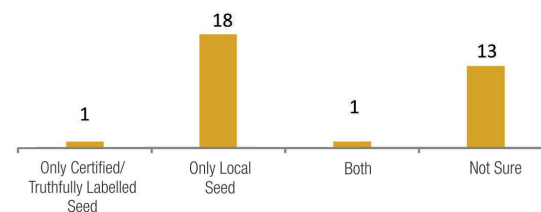It is evident that the milch animal owning households primarily grow fodder crops to meet the feed requirement of their own animals (93 percent). Cultivation of fodder crops for seed production is another major reason for growing fodder crop. Thus, over 40 percent of the fodder growing household have the potential of becoming fodder seed producers under NDP I.

**Chart 8.4f:** Purpose of Growing Fodder Crop
(Percent of fodder growing MAH)
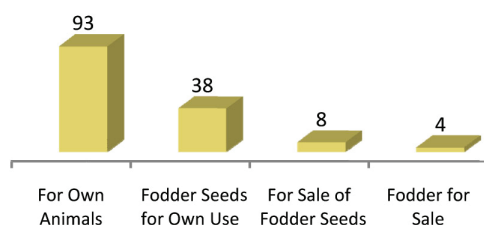


**Note:** Multiple response question

### 8.4.6 Households Using Chemical Fertilizers and Pesticides for Fodder Cultivation

Use of chemical fertilizers and pesticides is the major input in cultivation of fodder crops. Use of chemical fertilizers is reported by 80 percent of fodder growing households. It is also found that only 17 percent of the fodder growing households have reported use of pesticides. The same is presented in Chart 8.4g.

The state level summary is given in Table 8.4f (Annexure-VIII).

**Chart 8.4g:** Households Using  Chemical Fertilizers/Pesticides for Fodder Cultivation
(Percent of fodder growing MAH)
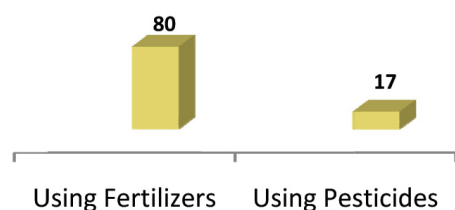


## 8.5 Animal Feeding Practices

Though cultivated fodder is fed to milch animals in cattle sheds, sending them out for grazing is a common practice in rural India. Animal feed from different sources is traditionally classified as concentrates and roughage – dry and green fodder. A properly balanced dairy cattle ration should consist of both roughage and concentrates. The animals generally get roughage either by grazingv, stall-feeding or through a combination of both types of feeding. It is difficult to arrive at a quantitative measurement of feed/fodder consumption through grazing. However, qualitative information on grazing practices would be useful in analyzing and understanding the relative fodder consumption pattern.

Role of Common Property Resources (CPR) is very important. It has been a tradition to have community pasture land in each village, which has been an important source of feed for cattle particularly of weaker sections like landless/ small/ marginal farmers. Similarly, forest areas also substantially cater to the needs of animal feed and fodder especially in the tribal belts.

(Source: Ramesh Raval, Feed & Fodder Requirements for Milk Production in India, BAIF Development Research Foundation, New Delhi).

### 8.5.1 Animal Feeding Practice by Group

Baseline information obtained from the household survey in the project area on households' feeding practices – Individual versus Group is presented in Chart 8.5a. The state-wise information is available in Table 8.5a (Annexure-VIII).

**Chart 8.5a:** Household Feeding Practice
(Percent of MAH)
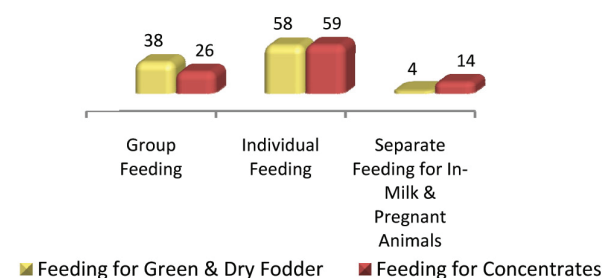


Analysis of the same reveals that in the NDP I project area, individual animal feeding of all the feeds i.e. green fodder, dry fodder and concentrates is the most common feeding practice in the project area. Nearly 58 percent households

65

have reported individual feeding of animals for fodder as well as concentrates. Group feeding of green and dry fodder is more prevalent than the concentrate. Separate feeding of in-milk and pregnant animals is adapted on a small scale.

## 8.5.2 Animal Feeding Practice by Feed and Fodder Type

The MAH feeds green fodder, dry fodder and concentrate to the animals. The responses are based on whether the households feed a particular type of feed and fodder. It does not specify whether they fed their animals the specific type of feed or fodder yesterday. It is possible that the MAH may have responded positively even if the animal is fed occasionally with a specific type of feed/ fodder during any time of the year.
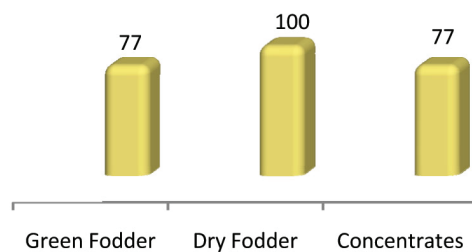
**Chart 8.5b:** Household Feeding Practice by Feed and Fodder Type
(Percent of MAH)



Summary findings on household feeding practices by feed and fodder type is presented in Chart 8.5b. The state-wise information on the same is available in Table 8.5b (Annexure-VIII).

All households (100 percent) feed dry fodder to their animals, while use of green fodder and concentrates has been reported by nearly three-fourth of the surveyed households in the NDP I project area. Use of silage and hay is practiced on a very miniscule number of households in the project area.

## 8.5.3 Incidence of Concentrate Feeding by Animal Type

Survey findings on incidence of concentrate feeding are presented in Chart 8.5c. The state-wise details are

given in Table 8.5c of Annexure-VIII. As seen earlier, 77 percent of the households feed concentrates to their animals. It is intresting to observe that same MAH feed different concentrates to different types

**Chart 8.5c:** Concentrate Feeding Practice by Animal Type
(Percent of MAH having animal as in base)



**Base**: # MAH having In-Milk Animals
@ MAH having Dry Animals
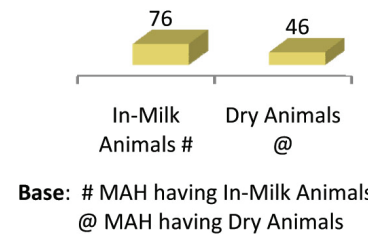
of animals. However irrespective of the concentrate type fed, it is found that 76 percent of the in-milk animal owing households feed concentrate to their in-milk animals. Incidence of concentrate feeding to dry animals is 46 percent in dry animal owing households.

## 8.5.4 Incidence of Chaffed Fodder Feeding

The data on feeding of chaffed and unchaffed fodder has been analyzed separately for green fodder. Chart 8.5d presents findings on this subject at an overall level. The state-wise details are presented in Table 8.5d of Annexure-VIII.

As noted earlier, 77 percent of the MAH feed green fodder to their animals. More than half of these households feed only chaffed green fodder and nearly one out of every third household feeds only unchaffed

**Chart 8.5d:** Incidence of Chaffed Fodder Feeding
(Percent of MAH feeding green fodder)
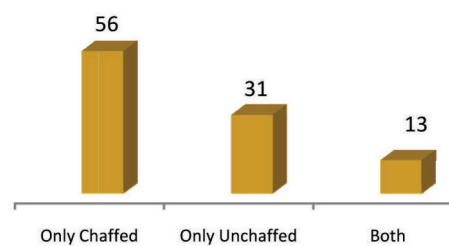


green fodder. Thirteen percent of the household feed green fodder after chaffing or without chaffing.

66

# 8.6 Grazing Practice

## 8.6.1   Incidence of MAH Sending Animals for Grazing

Nearly two-fifths (39 percent) of the milch animal owning households send their animals for grazing. The state-wise details are presented in Table 8.6a (Annexure-VIII).

## 8.6.2   Duration of Grazing

Duration for which the animals are sent for grazing in a year is illustrated in Chart 8.6a. The state-wise details are given in Table 8.6b (Annexure-VIII). In the project area as a whole, (82 percent) of the households send animals for grazing for a period of more than 3 months in a year.

**Chart 8.6a:** Duration of Grazing
(Percent of all MAH sending animals for grazing)



## 8.6.3   Grazing Trend in Regular Grazing Households

The households that send their animals to grazing out side the animal shed for more than 3 months can be considered as a regular grazing household. All sub-sections under this present the findings for only those households who send their animal for grazing regularly.

## 8.6.3a Regular Grazing by Animal Type

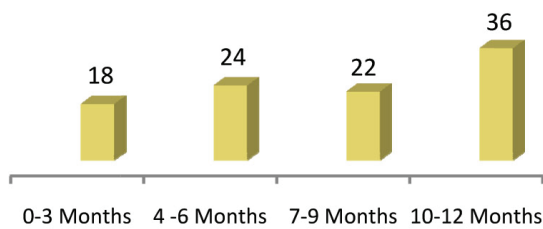Information on grazing by types of animals is presented in Chart 8.6b. It can be seen that in the project area as

**Chart 8.6b:** Regular Grazing by Animal Type
(Percent of all regular grazing MAH)
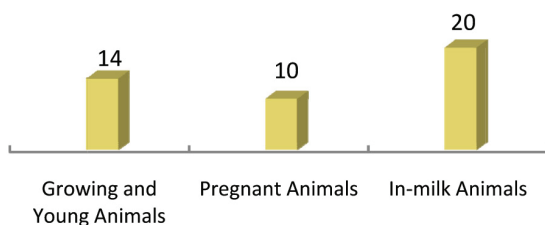


a whole, nearly one-fifth (20 percent) of the households send their in-milk animals for grazing. The corresponding share for pregnant animals and growing and young animals is 10 percent and 14 percent respectively. However, wide variations are observed in this regard across the states.

The state-wise details are given in Table 8.6c (Annexure-VIII).

## 8.6.3b Regular   Grazing   by   Animal Category

Survey results on grazing practices by category of animals are summarized in Chart 8.6c. In the project area as a whole, more than half (53 percent) of the households reported sending Indigenous cows for grazing for more than 3 months. This percentage is much lower for crossbred cows (23 percent), and for buffaloes (42 percent).

**Chart 8.6c:** Regular Grazing by Animal Category
(Percent of all regular grazing MAH)
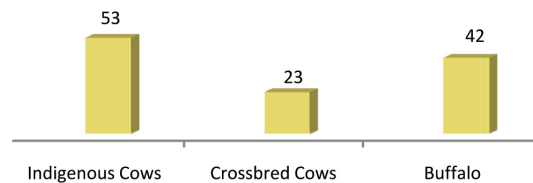


The state-wise details are given in Table 8.6d (Annexure-VIII).

## 8.6.3c Place of Regular Grazing

Data on places where the animals are grazed is presented in Chart 8.6d.

In the project area, non-agricultural land is the most preferred place where bovine animals are sent for grazing followed by other uncultivated land and own land. The state-wise details are given in Table 8.6e (Annexure-VIII).

**Chart 8.6d:** Place for Regular Grazing
(Percent of regular grazing MAH)
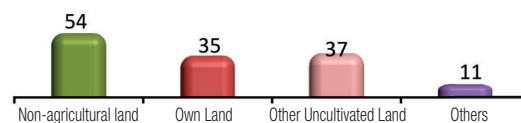
Chapter - 9

# Animal Health and Management

National Dairy Plan I

# Animal Health and Management

This chapter consolidates the findings on animal health and management related issues. Some of these may qualify as environmental issues as well.

## 9.1 Animal Health

This section covers adoption of vaccination, prevalence of diseases among animals, type of treatment taken for them and awareness about zoonotic diseases.

### 9.1.1    Incidence of Preventive Vaccination

All MAH were asked about the preventive vaccination given to their bovine animals during the last 12 months and their vaccination against specific diseases. The response from 14, 992 households regarding details of adoption of preventive vaccination was recorded.

Bovine animals in 35 percent MAH of the project area were vaccinated against atleast one disease in the last 12 months. The state-wise information on this is provided in Table 9.1a of Annexure- IX.

## 9.1.2 Adoption of Vaccination for Various Diseases

The findings on vaccination against the specific diseases in the MAH show that the adoption of vaccination works out to 26 percent for Foot and Mouth Disease, 15 percent for Haemorrhagic Septicaemia and 5 percent for Black Quarter.

**Chart 9.1a:** Adoption of Vaccination for Various Diseases in MAH (%)

26    15    5    9

■ Foot and Mouth Disease    ■ Haemorrhagic Septicaemia
■ Black Quarter    ■ Others
Base: All HAH
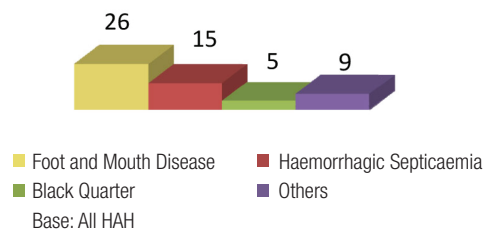
When this information is seen for those households who opted for preventive vaccination, adoption of vaccination in bovine animal owing household is highest for Foot and Mouth Disease (76 percent) followed by Haemorrhagic Septicaemia (43 percent) and Black Quarter (14 percent). It seems that the MAH members could not indentify the diseases like Theileriosis and Brucellosis and, therefore, there could be error or ambiguity to say these vaccinations were carried out. Therefore, the baseline data for these diseases are not presented. Adoption level for disease specific vaccination also varies widely across the states. The Table 9.1b and Table 9.1c in Annexure-IX summarise state-wise information on adoption of vaccination in bovine animal owning households and the households that got their animals vaccinated during the last 12 months for any disease.
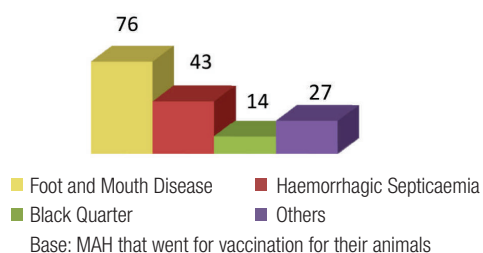
**Chart 9.1b:** Diseases Specific Adoption of Vaccination (Percent of base)

76    43    14    27

■ Foot and Mouth Disease    ■ Haemorrhagic Septicaemia
■ Black Quarter    ■ Others
Base: MAH that went for vaccination for their animals

## 9.1.3 Incidence of Disease Occurance during the Last Year

The MAH were probed for incidence of diseases in their household during the last 12 months. All the households where any animal suffered from any of the listed diseases or died from the same during the last 12 months were taken into account for calculating prevalence of diseases. Chart 9.1c presents prevalence of the important diseases in the project area.

**Chart 9.1c:** Incidence of Disease Occurance During Last year (Percent of MAH)

6    5    2    9

■ FMD    ■ HS    ■ BQ    ■ Others
Base: All MAH
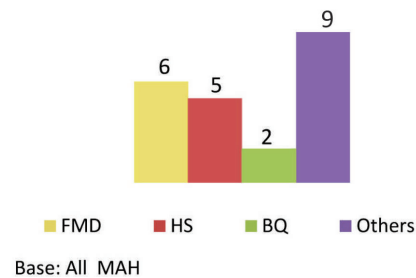
The state-wise details are given in Table 9.1d of Annexure-IX. In the project area, the prevalence of Foot and Mouth Disease was highest (6 percent of MAH), followed by Haemorrhagic Septicaemia (5 percent) and Black Quarter (2 percent). Other diseases were reported by nearly 9 percent MAH.

## 9.1.4 Type of Treatment Taken for Animals

The Chart 9.1d shows the type of treatment dairy farmers opted for their animals. Table 9.1e and Table 9.1f in Annexure-IX present state-wise information on types of treatment availed for animals.

A large majority (93 percent) of the MAH opted for treatment of their diseased animals.

Out of all the households that got their animals treated during the last 12 months, maximum number of household opted for First Aid (51 percent) followed by Routine Treatment (42 percent) and Emergency Visit (35 percent). Some households (8 percent) also opted for Health Camp for treatment of their animals.

**Chart 9.1d:** Type of Treatment Taken for Animals (Percent of MAH)



First Aid — 51 · Routine Treatment — 42 · Emergency Visit — 35 · Health Camp — 8

Base: MAH that went for Treatment
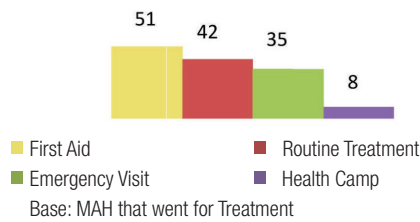
### 9.1.5  Awareness on Zoonotic Diseases
At an overall level, only 6 percent of the MAH are aware about zoonotic diseases. The Tables 9.1g in Annexure-IX presents state-wise details regarding awareness about zoonotic diseases.

### 9.1.6 Practice of Boiling Milk Before Consuming
Transmission of tuberculosis can be reduced by consuming boiled milk. The MAH were also probed on the practice of boiling milk in their households. The finding at the overall level reveals that 92 percent of the households boil milk before consuming it and hence are not at the risk of contracting tuberculosis by consuming milk. The Table 9.1h in Annexure-IX presents state-wise details on practice of boiling milk before consuming.

## 9.2 Animal Management

### 9.2.1 Time Lag between Milking and Milk Selling/ Pouring Time: Morning and Evening
The survey findings on time lag between milking and milk pouring/ selling are presented in Chart 9.2a and 9.2b for the morning and the evening respectively.

The households having in-milk animals were asked about milking time in the morning and evening. Similarly, the households selling milk were asked about the time of selling milk or pouring milk at the milk collection centre. The time lag between milking and milk selling has been arrived at from this data for the households that reported time for milking as well as selling.

**Chart 9.2a:** Time Lag between Milking and Milk Sale: Morning (Percent of milk selling MAH)



More than 2 Hours — 2; 1 Hour to 2 Hours — 9; 31 Minutes to 1 Hour — 23; Up to 30 minutes — 66
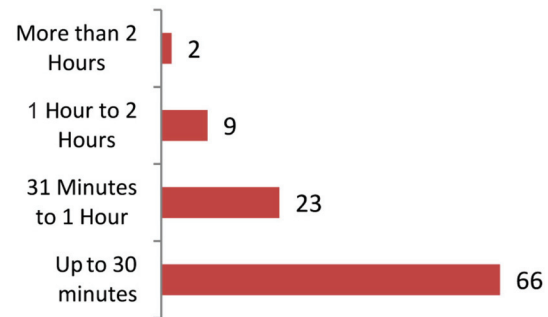
It is interesting to note that nearly 90 percent of the milk selling MAH sell milk within an hour of milking their animals. Two-thirds to three-fourths of the MAH in the morning (66 percent) and in the evening (74 percent) sell the milk within 30 minutes of milking.

**Chart 9.2b:** Time Lag between Milking and Milk Sale: Evening (Percent of milk selling MAH)



More than 2 Hours — 1; 1 Hour to 2 Hours — 6; 31 Minutes to 1 Hour — 19; Up to 30 minutes — 74
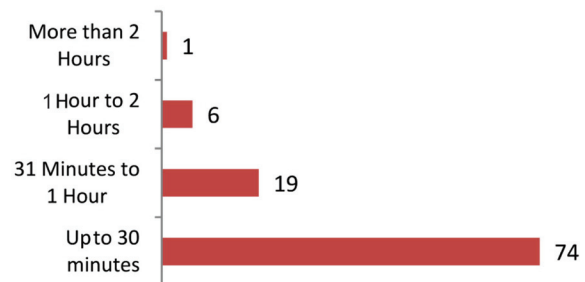
The state level findings are presented in Table 9.2a and 9.2b of Annexure-IX.

### 9.2.2 Availability of Adequate Quantity of Water for Animals
Milk animal owning households were asked about the availability of adequate quantity of water for the animals in different seasons. While 95 percent of the MAH confirmed availability of adequate quality of water during rainy and winter seasons, it was so in case of 88 percent MAH in summer season.

The state level findings are presented in Table 9.2c of Annexure-IX.

**Chart 9.2c:** Availability of Adequate Qauntity of
Water for Animals
(Percent of MAH)

95    88    95

■ Winter    ■ Summer    ■ Rainy

## 9.2.3 Main Sources of Drinking Water for Bovine Animals

Chart 9.2d, Chart 9.2e and Chart 9.2f summarise sources of drinking water for bovine animals in the project area during 3 seasons. The Table 9.2c, Table 9.2d and Table 9.2e in Annexure-IX present the same information at the state level.

The main sources of drinking water for animals across seasons do not vary much. They are namely hand pump (38 to 39 percent), Piped water supply (34 to 36 percent), well (20 percent), Pond/River (14 to 18 percent) and canal water supply (4 to 7 percent).

**Chart 9.2d:** Sources of Drinking Water during Winters
(Percent of MAH)

39  36  20  19  15  6  2

■ Hand Pump          ■ Piped Water Supply
■ Well               ■ Bore well/Pumping set
■ Pond/River         ■ Canal
■ Other

Note: Multiple response question

**Chart 9.2e:** Sources of Drinking Water during Summer
(Percent of MAH)

39  35  20  19  14  4  2

■ Hand Pump          ■ Piped Water Supply
■ Well               ■ Bore well/Pumping set
■ Pond/River         ■ Canal
■ Other

Note: Multiple response question

74

**Chart 9.2f:** Sources of Drinking During Rainy Season
(Percent of MAH)

38  34  20  18  18  7  2

■ Hand Pump          ■ Piped Water Supply
■ Well               ■ Bore well/Pumping set
■ Pond/River         ■ Canal
■ Other

Note: Multiple response question

The source of water has also been analysed for safe water sources and surface water sources. The summary findings at the project level is presented in Chart 9.2g.

The hygienic condition of water used for drinking of bovine animals has impact on health of the animals. Ground water and piped water is considered safe for drinking purposes. Surface water source included pond, river and canal. Well is included in ground water source.

**Chart 9.2g:** Sources of Drinking During Water
Safe Water vs Surface Water (Percent of MAH)
(Percent of MAH)

**Safe Water**          **Surface Water**

94  93  91              17  19  23

■ Summer    ■ Winter    ■ Rainy

It is interesting to note that more than 90 percent of the households give safe water to their animals for drinking across all the seasons. At an overall level, less than one-fourth of the milch animals owning households give surface water to their animals for drinking across all the seasons. While only 17 percent households give surface water for drinking in summers, 19 percent give for drinking during winters and 23 percent during the rainy season.

### 9.2.4 Dung Management in the Households

*9.2.4a Methods of Dung Storage*

Chart 9.2h presents findings on the methods of dung storage at an overall level. Table 9.2g of Annexure-IX presents state-wise details on the same.

A large majority of the MAH store dung in open area followed by manure/slurry pit. Some MAH store dung using more than one method.

**Chart 9.2h:** Methods of Dung Storage
(Percent of MAH)

65    38    1    2

■ Open Storage          ■ Manure pit/Slurry pit
■ Bio-gas plant         ■ Others

Note: Multiple response question
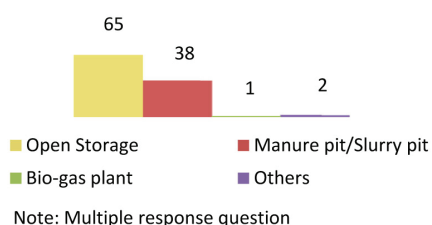
*9.2.4b Uses of Dung*

Many MAH put dung to more than one use. The Chart 9.2i shows that dung at the household level is used mostly for manure as well as dung cake. A very small number of households use it in biogas plant.

**Chart 9.2i:** Use of Dung
(Percent of MAH)

79    61    1    6

■ Manure                ■ Dung Cake for Fuel in the HH
■ Biogas Plant          ■ Others

Note: Multiple response question
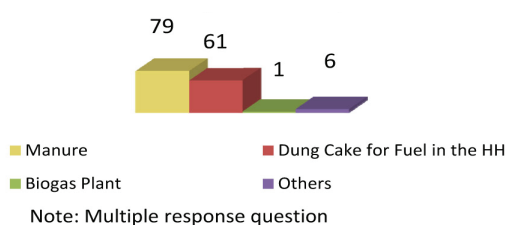
State-wise details on this are presented in Table 9.2h of Annexure-IX.

### 9.2.5 Drainage Type

Chart 9.2j presents the findings on drainage type used in animal shed. State-wise details on this are presented in Table 9.2i of Annexure-IX.

Kachcha drainage structure is available in maximum number of households (63 percent) followed by pucca/

cemented (18 percent) and brick lined (14 percent). Very small number of the MAH (5 percent) have no drainage structure in the animal shed.

**Chart 9.2j:** Drainage Type
(Percent Of MAH)

63    18    14    5

■ Kuchha                ■ Pucca Cemented
■ Brick Lined           ■ No Drainage

Note: Multiple response question
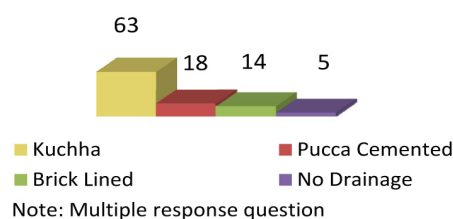
### 9.2.6 Disposal of Waste Water

The Chart 9.2k presents findings on disposal of waste water used for washing animal and cleaning the shed. State-wise details on this are given in Table 9.2j of Annexure-IX.

Over one-third (31 percent) households use open area for waste water disposal. The second popular choice for drainage is a Pit (34 percent). Nearly one-fourth of the MAH also drain waste water to sewerage (23 percent). In 5 percent households waste water is drained to agricultural field.

**Chart 9.2k:** Disposal of Waste Water
(Percent of MAH)

31    34    23    5    1    6

■ Open Area        ■ Pit              ■ Sewerage
■ Agricultural Field  ■ Biogas Plant   ■ Others

Note : Multiple response question
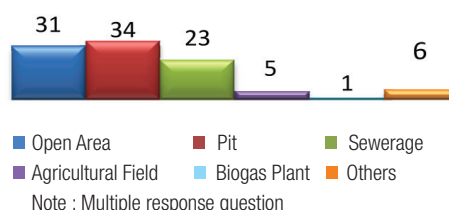
Chapter - 10

# Socio-Economic Aspects

National Dairy Plan I

# Socio-Economic Aspects

Dairy development in India is recognized as an effective instrument for ameliorating the economic conditions of rural families, particularly those of the small and marginal farmers, landless agricultural labourers, socially and economically disadvantaged sections of the society. The dairy sector has become crucial to the Indian rural economy. There is a close relationship between dairy and agriculture sectors in our country. Participation of women in both dairying and agriculture plays critical role in driving these sectors. Agriculture and Dairying are interdependent sectors. Crop residue and grain from agriculture reduces dependence of the MAHs on purchase of feed and fodder. In rural areas, owning of milch animals contributes not only to the dairy sector, but also to agriculture by way of providing manure, dung fuel, utilising feed wastages and providing animal labour. In this chapter, an attempt has been made to analyze the socio-economic aspects of dairy sector in the NDP I project area based on the data collected from 14,992 households.

## 10.1 Dairying as a Source of Income

In the project area, dairying is the most important source of income to only 8 percent of the MAH. It is the second most important source of income among another 19 percent MAH. Thus, in the project area' dairying is the most important or second most important source of income for 27 percent of the MAH.

The state-wise information on this is presented in Table 10.1 of Annexure-X.

## 10.2 Involvement in Dairying

Questions related to involvement in dairying were asked for only those persons who were above 14 years of age.

### 10.2.1 Time Spent in Dairying by Activity

Chart 10.1 summarizes the share of time spent by the MAH on various dairying activities in the project area. Of the total time spent on rearing bovine animals, the MAH spends 49 percent of their time in feeding related activities (feeding of animals, fodder collection, and chaffing of fodder). Animal washing, cleaning of shed and dung collection/ cake preparation take 43 percent of the total time spent on rearing animals. Milking and milk marketing take 10 percent of the total time spent on various routine dairying activities.

The state-wise information on this is presented in Table 10.2a of Annexure-X.

**Chart 10.1:** Share of Time Spent by HH members by Activity Type
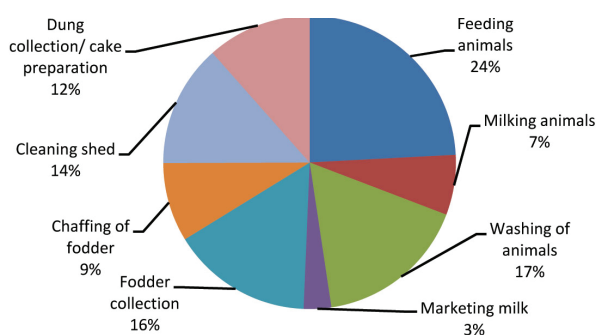


### 10.2.2 Time Spent on Dairying Activities by Gender

At an overall level in the NDP I project area women's share in total time spent on dairying is 64 percent. Women spend more time in activities that can be done at home and men spend more time that requires going out of home.

**Chart 10.2:** Time Spent on Dairying Activities by Gender
(Values as % of total time)
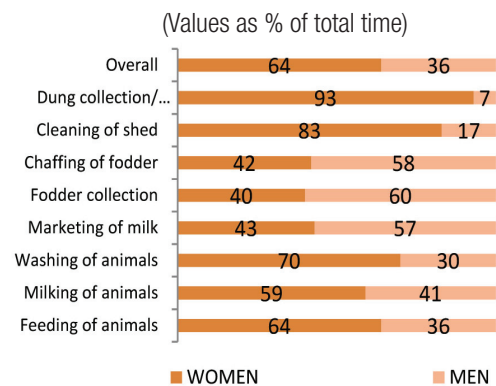


There is a remarkable variation in the share of time spent by women on each activity. In the total time spent on a specific activity reveals that, women's share is substantially high in dung collection/ cake preparation, cleaning of shed washing of animals, feeding of animals and milking. Men spend more time in all other activities. The state-wise details are presented in Table 10.2b and Table 10.2c of Annexure-X.

### 10.2.3 Participation of Women Headed Households in Dairying

In the project area, 9 percent of the MAH are women headed. Such households are substantially high in some Southern states.

The state-wise information on this is available in Table 10.2d of Annexure-X.

## 10.3 Reasons for Rearing Milch Animals

Chart 10.3 shows the reasons for rearing milch animals in the project area. This information for each state is given in Table 10.3 (Annexure-X).

**Chart 10.3:** Reasons for Rearing Milch Animals



| | |
|---|---|
| Lack of Alternatives | 3 |
| Others | 7 |
| Enabling Environment | 8 |
| Availability of Resources | 13 |
| Income | 16 |
| Employment | 17 |
| Meets requirement of Milk and Manure | 36 |

Note: Multiple response question

In the project area as a whole, the MAH in rural India rears animals mainly because it helps meet the family requirement of milk, provides employment and income to the family. The MAH rear the animals also because it helps in meeting the requirement of manure for farm, household level resources like manpower, feed and fodder are available besides enabling environment like milk procurement infrastructure, access to market and access to credit.
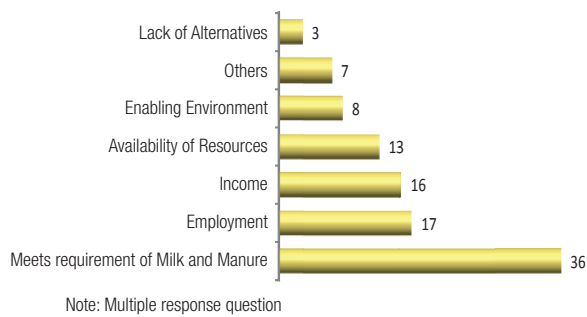
Lack of alternative occupation is considered as a reason for rearing milch animals by only nearly one-tenth of the households. Over one-fifth of the households have attributed various other reasons for rearing milch animals, including social status.

# 10.4 Problems Faced in Rearing Milch Animals

Chart 10.4 shows that high cost of feed and fodder and low price of milk are the major concerns in rearing milch animals in the project area. Unavailability of marketing opportunities, shortage of family labour and unavailability of credit are the other important concerns in rearing the animals.

**Chart 10.4:** Nature of Problems Faced in Rearing Milch Animals



| | |
|---|---|
| Others | 2 |
| Availaibility of Other Avenues | 3 |
| Shortage of labour | 15 |
| Low Price of Milk | 26 |
| Lack of Enabling Environment | 26 |
| High Cost of Feed & Fodder | 28 |

Note: Normalised percentage from a multiple response question
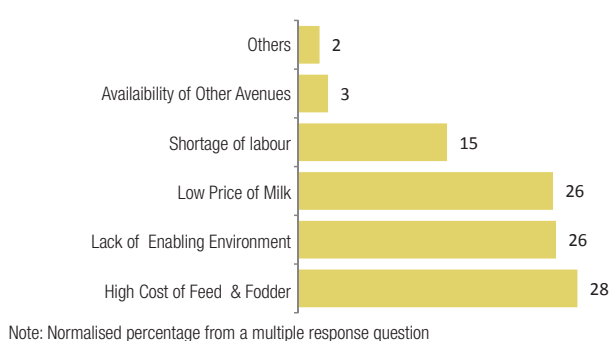
The state-wise findings are presented in Table 10.4 of Annexure-X.

# 10.5 Interest in Dairying

Interest in dairying can be assessed by two key parameters, namely interest in increasing animal holding and interest of young generation in dairying.

As many as 53 percent of MAHs are interested in increasing their present animal holding size implying that more than half of the MAH offer the potential of intensive dairying. Only 42 percent MAH reported that the young generation

**Chart 10.5:** Interest in Dairying and Animal Holding (Percent of MAH)



42    53

■ Young Generation intrested in Dairying
■ Intrested in Increasing Animal Holding
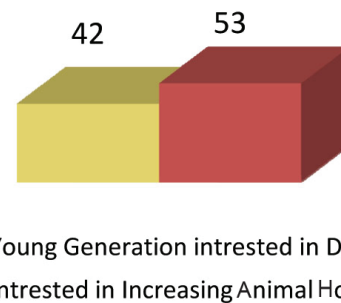
in their household is interested in dairying. The newer and more opportunities in urban areas have resulted in declining interest of the MAH and the youth in dairying. The NDP I faces the challenge of addressing the declining interest of households and youth in dairying.

The state-level findings on the same are available in Table 10.5 of Annexure-X.
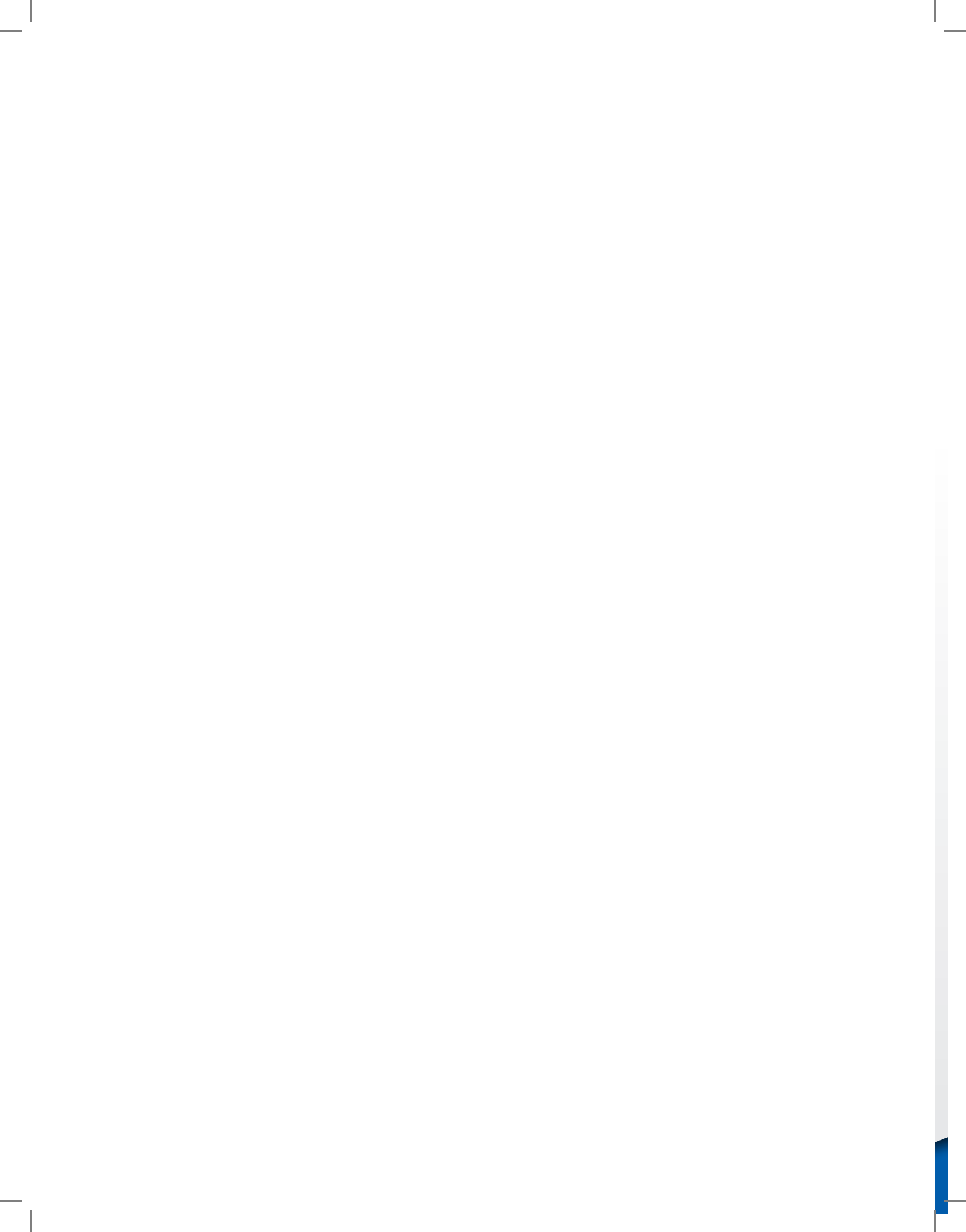
Chapter - 11

# Extension Services

National Dairy Plan I

# Extension Services

This chapter is based on the data collected for each household member above 14 years of age in MAH. The broad areas covered include participation of household members in training and demonstration, their felt needs, involvement in dairying and decision making in dairying, DCS membership and women membership in DCS.

## 11.1 Participation in Training & Demonstration

Each family member above the age of 14 years was asked whether they have participated in training on any dairying related subject during the last one year. A similar question was also asked about their participation in demonstration also.

Chart 11.1 depicts participation of household members in training and demonstration at the project level. The state-wise findings are available in Table 11.1a, Table 11.1b, and Table 11.1c of Annexure-XI.

**Chart 11.1:** Participation in Training and Demonstration (Percent of MAH members)



85

It is evident from the Chart 11.1 that during the last one year, while only 0.84 percent of the MAH members participated in training; it was 0.33 percent for demonstration. In other words, out of 10,000 members of the MAH, on an average 84 persons participated in training and 33 persons participated in demonstration during the last 12 months.

Participation of women in both training and demonstration is less than that of men. On an average, 0.69 percent women participated in training and 0.28 percent participated in demonstration. In a simple language, out of 10,000 women, 69 participated in training and 28 participated in demonstration. On an average, 0.98 percent men participated in training and 0.38 percent participated in demonstration i.e of 10,000 men 98 participated in training and 38 participated in demonstration.

## 11.2 Felt Need for Training & Demonstration

Every family member above the age of 14 years was asked whether they need any training or demonstration on dairying related subject. The data has been analysed by gender.

Felt need for training and demonstration among milch animal owning household members of the project area is illustrated in Chart 11.2. At the project area level, at least one member in 44 percent of the MAH desire to participate in training programs and it is so for 40 percent households in case of demonstration.

The state-wise findings are presented in Table 11.2a, Table 11.2b and Table 11.2c of Annexure-XI.

**Chart 11.2:** Felt Need for Training and Demonstration (Percent of MAH)
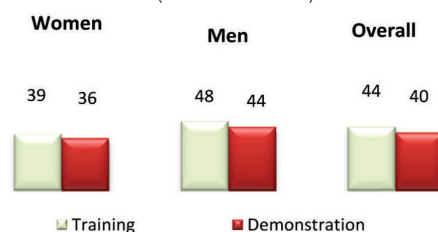


At an overall level, women in over one third of the MAH felt the need for both training and for demonstration.

Men in more than 4 out of every ten men of the MAH felt the need for training (48 percent) and demonstration (44 percent) on a dairying related subject. As compared to women, men in a larger group of MAH felt the need for training (9 percent) and demonstration (8 percent).

## 11.3 Decision Making at Household Level

These findings are confined to only those family members who are above the age of 14 years. The project level findings summarised in Chart 11.3 shows decision making MAH member as percent of the MAH members of their respective genders who are involved in dairying.

**Chart 11.3:** Decision Making at Household Level (Percent of MAH Members)
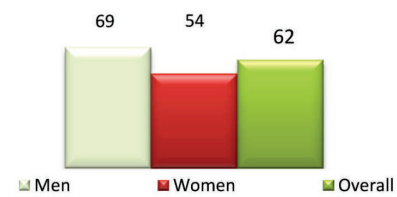


**BASE:** MEN/WOMEN/HH MEMBERS WHO PARTICIPATED IN DAIRYING

In the project area, 62 percent of the household members are involved in decisions related to dairying. Substantially, lesser number of women are involved in decision making. At the project level, 54 percent of the women are decision makers for dairying related activities.

The state-wise details can be referred to in Table 11.3a, Table 11.3b and Table 11.3c (Annexure-XI).

86

## 11.4 Share of Women in DCS Membership

In the project area, only eight percent of the MAH members are members of a DCS/NGC. Among all the members of the DCS in MAH, 28 percent members are women. The state-wise findings on the same is presented in Table 11.4 of Annexure-XI. Membership is substatntially high in states like Gujarat, Kerala, Karnataka and Maharashtra.
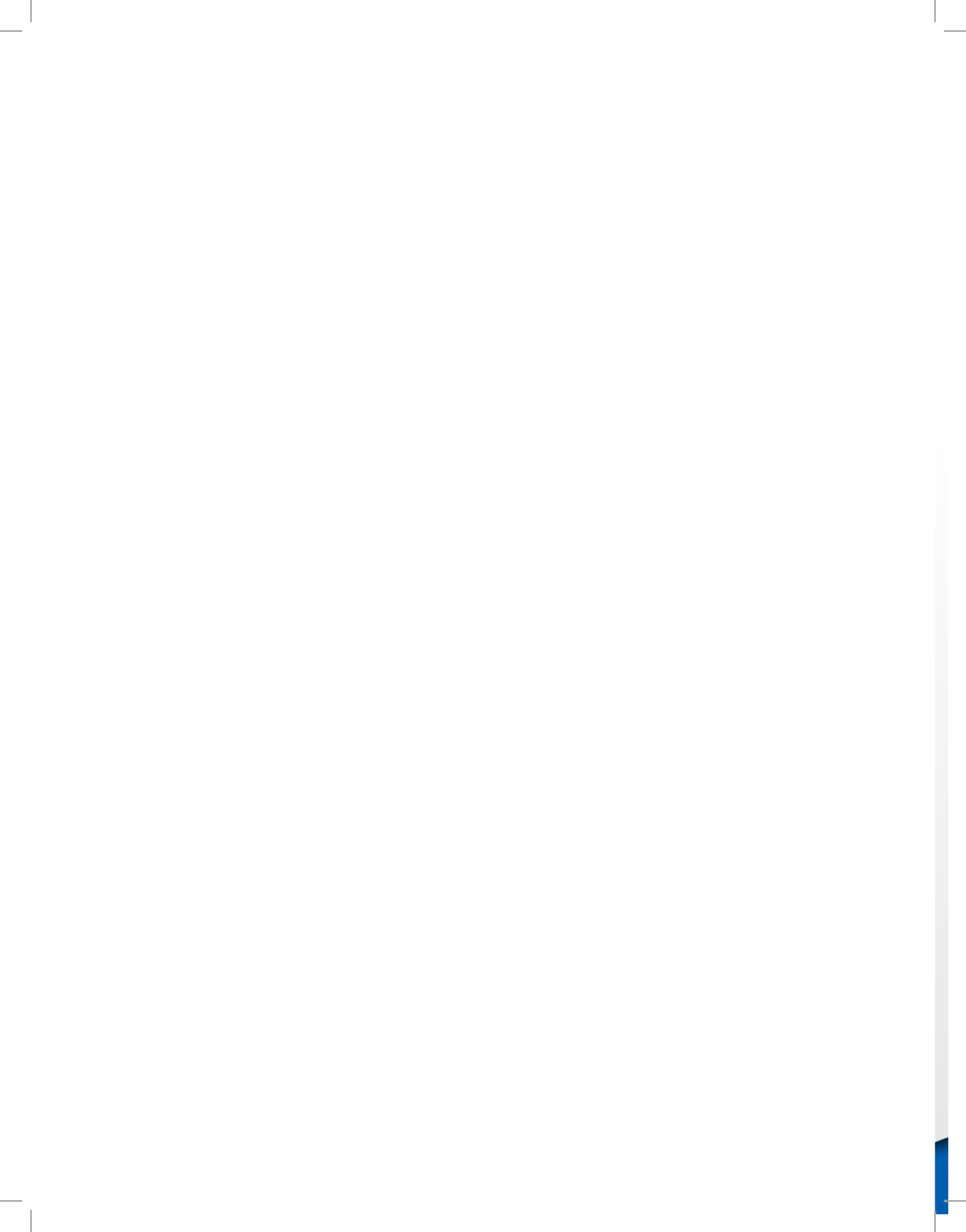
Chapter -12

# Characteristics and Trade Practices of Dudhia

National Dairy Plan I

# Characteristics and Trade Practices of Dudhia

Dudhias are as a part of an informal trade channel and are a link between the milk producer and buyers of milk. Quite often they operate as an individual or as a family enterprise handling small volume of milk. However, some Dudhias handle substantial volume of milk at the village level.

This Chapter presents the findings emerging from interviews with Dudhias. Broadly, the findings are organized under sections namely, Coverage, Profile of Dudhia, Milk Procurement by Dudhia, Milk Price and Pricing Mechanism, Backward Linkage and Forward Linkages.

91

## 12.1 Coverage of Dudhia

A total of 293 dudhias were interviewed. Nearly, two-third of the dudhia interviews were conducted in the Northern states as they are one of the important milk trade channels in these states. Dudhias could not be contacted in the sample villages of Tamil Nadu and Kerala. The state wise coverage of Dudhia is presented in Table 12.1 (Annexure-Xll).

## 12.2 Profile of Dudhia

This section presents the findings on general profile of Dudhia. It includes Social Group, Primary Occupation and Duration in the Business and Contribution of Income from milk sale to total income.

### 12.2.1 Social Group

At the project area, only 33 percent of Dudhias are from General category. It is interesting to note that around 59 percent of the Dudhias are from OBC category. Only 7 percent are from SC category.

*Table 12.2.1: Social Group*

| Sl No | Social Group | Percent of Base |
|-------|--------------|-----------------|
| 1 | General | 33 |
| 2 | SC | 7 |
| 3 | ST | 1 |
| 4 | OBC | 59 |
| Total | | 100 |

*Base: 293 Dudhias*

### 12.2.2 Primary Occupation

The segmentation of Dudhias based on selling milk as primary occupation reveals that 74 percent mentioned selling milk as their primary occupation. A large group of Dudhias' primary occupation is selling of milk in Uttar Pradesh (89 percent) and Bihar (94 percent).

*Table 12.2.2: Primary Occupation*

| Sl No | Milk Primary Occupation | Percent of Base |
|-------|-------------------------|-----------------|
| 1 | Yes | 74 |
| 2 | No | 26 |
| Total | | 100 |

*Base: 293 Dudhias*

### 12.2.3 Years in this Business

The duration for which the Dudhias are in the milk business as reported by them is presented in Chart 12.1.

**Chart 12.1:** Years in Milk Business (% of Dudhia)
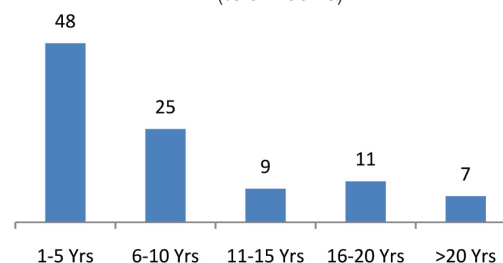


The findings on this reveal that during the last 15 years, Dudhias have taken the space left uncovered by the organized sector channels of milk procurement. It is observed that most of the Dudhias are in the milk business for last 15 years and only nearly one-fifth are in this business for a longer period. In the project area, 82 percent of Dudhias are in milk business for up to 15 years. While nearly half (48 percent) of the Dudhias are in milk business for up to 5 years, nearly one-fourth are in the business for 6 to 10 years and nearly one-tenth (9 percent) are in milk business for 11 to 15 years. Only 18 percent of the Dudhias are in milk business for more than 15 years.

## 12.3 Milk Procurement by Dudhia

This section presents analysis on milk procurement by Dudhia, number of villages and households covered by Dudhia for milk collection, their milk production volume of milk collection, and type of milk purchased by them.

### 12.3.1 Villages Covered for Milk Collection

Data on collection of milk from the households or sale of milk by the households to Dudhias shows that bulk of the Dudhias have a small catchment area for milk collection. The response shows that 54 percent of the Dudhias collect milk from only one village, 43 percent of the Dudhias collect milk from 2-5 villages. Only less than 3 percent of the Dudhias collect milk from more than 5 villages.

*Table 12.3.1: Villages Covered for Milk Collection*

| Sl No | Number of  Villages | Percent of Base |
|-------|--------------------|-----------------|
| 1 | 1 | 54 |
| 2 | 2 – 5 | 43 |
| 3 | 6-10 | 3 |
| Total | | 100 |

*Base: 293 Dudhias*

### 12.3.2 Households Covered for Milk Collection

Eighty-five percent of Dudhias purchase milk from up to 50 households. Twelve percent Dudhias purchase milk from 51 to 100 households and just 3 percent Dudhias collect milk from more than 100 households.

*Table 12.3.2: Households Covered for Milk Collection*

| Sl No | Number of Households | Percent of Base |
|-------|---------------------|-----------------|
| 1 | 0- 10 | 1 |
| 2 | 11-50 | 84 |
| 3 | 51- 100 | 12 |
| 4 | >100 | 3 |
| Total | | 100 |

*Base: 293 Dudhias*

### 12.3.3 Milk Production by Dudhia

The study also tried to find out Dudhias' status as milk producers and the volume of milk produced by them.

Nearly one-third (32 percent) of Dudhias are milk producers. More than half of such Dudhias produce 10 to 15 litres of milk every day. While nearly another one-fourth Dudhia Households produce 16-20 Litres of milk daily, 10 percent produce milk between 21 and 30 litres. Nine percent milk producer Dudhias produce more than 30 litres of milk every day.

*Table 12.3.3: Milk Production by Dudhia*

| Sl No | Milk Production (in Litres) | Percent of Base |
|-------|----------------------------|-----------------|
| 1 | 10 – 15 | 54 |
| 2 | 16 – 20 | 27 |
| 3 | 21 – 25 | 5 |
| 4 | 26 – 30 | 5 |
| 5 | >30 | 9 |
| Total | | 100 |

*Base: 94 Dudhias*

### 12.3.4 Volume of Milk Collection

In the project area, 83 percent of Dudhias collect less than 300 litres per day. Around 54 percent of the Dudhias' collection is between 101-200 litres per day and 29 percent of the Dudhias collect between 201-300 litres per day.

*Table 12.3.4: Volume of Milk Collection (in Litres or Kg)*

| Sl No | Milk Collection (in Kg or  Litre) | Percent of Base |
|-------|-----------------------------------|-----------------|
| 1 | Up to 200 | 54 |
| 2 | 201-300 | 29 |
| 3 | 301-500 | 11 |
| 4 | More than 500 | 5 |
| Total | | 100 |

*Base: 293 Dudhias*

### 12.3.5 Type of Milk Purchased

In the project at an overall level, two-third of the Dudhias buy cow milk and Buffalo milk separately.  This pattern in some

states is different from the overall project area pattern. In the project area, only 31 percent of the Dudhias buy mixed milk. However, a much larger group of Dudhias purchase mixed milk in Rajasthan (56 percent) and Uttar Pradesh (48 percent).

*Table 12.3.5: Type of Milk Purchased*

| Sl No | Type of Milk | Percent of Base |
|---|---|---|
| 1 | Cow milk | 68 |
| 2 | Buffalo milk | 67 |
| 3 | Mixed milk | 31 |

*Base: 293 Dudhias*

# 12.4 Milk Price and Pricing Mechanism

## 12.4.1 Milk Pricing Method
The study tried to find out methods used by Dudhias to decide the rate of the milk per litre. The Dudhias were asked to mention the methods they chose in fixing the rate of milk which they bought. The responses were to be any one reason or a combination of reasons such as thickness of milk, quantity of Khoya per litre or kg of milk, price fixed by the cooperatives, price fixed by the private dairies and milk fat testing.

Dudhias assess viscosity of milk by dipping fingers into milk. In common parlance, it is called "Thickness of Milk". At an overall level in the project area, 59 percent of Dudhias fix milk price by assessing thickness of milk. Though this is the pattern at the project area, in Haryana, 96 percent decide milk price on the thickness of milk and in Uttar Pradesh, 80 percent follow this method. Twenty-three percent of Dudhias fixed milk price by testing fat.

*Table 12.4.1: Milk Pricing Method*

| Sl No | Methods | Percent of Base |
|---|---|---|
| 1 | Thickness of milk | 47 |
| 2 | By testing fat of milk | 23 |
| 3 | Quantity of Khoya per litre or kg of milk | 16 |
| 4 | Price fixed by the Organized Sector | 7 |
| 5 | Others | 6 |

*Base: 293 Dudhias*

## 12.4.2 Frequency of Payment
The survey tried to find out the frequency of payment by the Dudhia to the producers. Eighty-nine percent Dudhias claimed to pay the producers in a week to a month's time. Nearly two-third of the Dudhias claimed to pay producers within a fortnight.

*Table 12.4.2: Frequency of Payment*

| Sl No | Reasons for Frequent Payment | Percent of Base |
|---|---|---|
| 1 | Whenever milk collected | 2 |
| 2 | Once in 2-3 days | 5 |
| 3 | Once a week | 30 |
| 4 | Once in 15 days | 37 |
| 5 | Once in a month | 22 |
| 6 | As and when required | 4 |
| Total | | 100 |

*Base: 293 Dudhias*

94

# 12.5 Backward Linkages

This section discusses various aspects of Backward Linkages of Dudhias with respect to money lending and various services offered.

## 12.5.1 Money Lending By Dudhias

At the project area level, as much as 48 percent of the Dudhias lend money to households from whom they buy milk. This shows financial dependence of the households on Dudhias.

Table 12.5.1: Money Lending by Dudhias

| Sl No | Lending money | Percent of Base |
|---|---|---|
| 1 | Yes | 48 |
| 2 | No | 52 |
| Total | | 100 |

Base: 293 Dudhias

## 12.5.2 Purpose of Money Lending

The survey tried to find out the purpose for which Dudhias extend credit/ loan/ advance to the borrowing MAH. While 71 percent of the Dudhias give loan/ advance for purchase of animals, 69 percent for purchase of feed and fodder, 45 percent for treatment of animals. Over one-third of Dudhias also extend loan for social activities.

Table 12.5.2: Purpose of Money lending

| Sl No | Purpose | Percent of Base |
|---|---|---|
| 1 | Purchase of Animals | 71 |
| 2 | Purchase of Feed & Fodder | 69 |
| 3 | Treatment of Animals | 45 |
| 4 | Family Function | 36 |
| 5 | Others | 7 |

Base: 140 Dudhias
Note: Multiple Responses

## 12.5.3 Number of Households Taken Loan

As seen earlier, most of the Dudhias are small players. The same is corroborated from this finding as two thirds of the Dudhia advance money to up to 10 MAH and another 24

percent Dudhia extend loan to 11 to 20 households. Five percent of Dudhias advance money to 21 to 30 households and the balance 6 percent dudhias extent loan to more than 30 milk producer households.

Table 12.5.3: Number of Households Taken Loan

| Sl No | Money Borrowing Households | Percent of Base |
|---|---|---|
| 1 | 1 - 10 | 66 |
| 2 | 11 - 20 | 24 |
| 3 | 21 - 30 | 5 |
| 4 | > 30 | 6 |
| Total | | 100 |

Base: 105 Dudhias

## 12.5.4 Amount of Loan Extended

The study tried to find out the extent of credit provided by Dudhias to milk producing households. In the project area, more than half (58 percent) of the Dudhias extended loan up to Rs 30,000/-, 12 percent extended loan between Rs 31,000 and Rs 50,000, 16 percent gave loan between amounts of Rs 51,000 and Rs 100,000.Ten percent Dudhias each extended the loan of Rs 100,000 and Rs 200, 000 and Rs 200,000 to Rs 500,000.

Table 12.5.4: Amount of Loan Extended

| Sl No | Loan Amount (in Rs) | Percent of Base |
|---|---|---|
| 1 | 1,000 – 10,000 | 29 |
| 2 | 11,000 – 20,000 | 18 |
| 3 | 21,000 – 30,000 | 11 |
| 4 | 31,000 – 50,000 | 12 |
| 5 | 51,000 – 100,000 | 16 |
| 6 | 1,00,001 – 2,00,000 | 10 |
| 7 | 2,00,001 – 5,0,0,000 | 10 |
| 8 | 5,00,001 – 8,00,000 | 1 |
| Total | | 100 |

Base: 105 Dudhias

## 12.5.5 Mechanism to Secure Loan

Milk collection from borrowing households is the most important mechanism to secure loan given to milk producers. Prior to advancing loan, Dudhias assess the repayment capacity of the households through household level milk production. .

### 12.5.5a Rationale behind Extending Loan

The picture emerging from the survey about the criteria for giving loan to milk producing households by Dudhias has an interesting pattern. Milk supply capacity of the producers has emerged as the key criterion for advancing money to them. Daily milk production, daily milk supply and lactation stage of the animals are the possible determinants for deciding the potential of the households for advancing the loan. As expected, Dudhias also take into account individual credibility and past credit history while advancing loan.

*Table 12.5.5a: Rationale behind Extending Loan*

| SI No | Basis for Credit | Percent of Base |
|---|---|---|
| 1 | Milk Production per Day | 85 |
| 2 | Daily Milk to be supplied | 51 |
| 3 | Individual Credibility | 49 |
| 4 | Lactation Stage of the Animals | 21 |
| 5 | Past Credit History | 17 |
| 6 | Others | 2 |

*Base: 140 Dudhias*

### 12.5.5b Collateral Security Taken by Dudhia

The survey also looked at if any collateral security is taken for advancing loan/ credit to the milk producing households by the Dudhias at the time of lending money. 72 percent of the Dudhias claimed that they never took any collateral for giving loan to milk producing households. At an overall level, only 9 percent of the Dudhias mentioned that they always take some collateral or security for advancing loan/ credit. Fourteen percent Dudhias take collateral security on a case-to-case basis. Further, only 5 percent Dudhias insist on collateral security in most of the cases.

*Table 12.5.5b: Collateral Security Taken by Dudhia*

| SI No | Parameters | Percent of Base |
|---|---|---|
| 1 | Yes always | 9 |
| 2 | Yes-in most of cases | 5 |
| 3 | Yes-in select cases | 14 |
| 4 | Never | 72 |
| Total | | 100 |

*Base: 140 Dudhias*

### 12.5.5c Pre-conditions for Loan

As regards understanding with milk producers or pre-conditions for extending loan to milk producer household, it is found that 25 percent of the Dudhias insisted on selling the entire quantity of surplus milk exclusively to them. However, 43 percent Dudhias insisted that the borrowing households must supply committed quantity of milk.

*Table 12.5.5c: Pre-conditions for Loan*

| SI No | Parameters | Percent of Base |
|---|---|---|
| 1 | Must supply full quantity of milk sold | 25 |
| 2 | Must supply fixed quantity of milk | 43 |
| 3 | Others | 32 |
| Total | | 100 |

*Base: 129 Dudhias*

## 12.5.6 Expected Repayment Period

The study captured the duration (in months) during which the Dudhias expected a borrower to repay loan/advance. Dudhias, by and large, link loan repayment period to milk production cycle. More than two-thirds of the Dudhias expect borrowers to repay within a year.

*Table 12.5.6: Expected Repayment Period*

| Sl No | Expected Repayment Period | Percent of Base |
|---|---|---|
| 1 | Within 6 months | 23 |
| 2 | More than 6 months to 1 year | 45 |
| 3 | More than 1 year to 2 years | 23 |
| 4 | More than 2 years | 9 |
| Total | | 100 |

*Base: 140 Dudhias*

## 12.5.7 Method of Loan Recovery

### 12.5.7a Recovery of Loan

Dudhias who had advanced money were enquired about the recovery mechanism of loan given to MAH. It is found that 92 percent of the Dudhias get their money back by purchasing milk from the households that take loan from them. Only 8 percent of Dudhias recover their loan in cash instalments.

*Table 12.5.7a: Recovery of loan*

| Sl No | Parameters | Percent of Base |
|---|---|---|
| 1 | Supply of milk | 92 |
| 2 | Cash repayment in instalments | 8 |
| Total | | 100 |

*Base: 140 Dudhias*

### 12.5.7b Loan Recovery in Bad Cases

The survey found out from the Dudhias the method of recovery of loan in case of default. Ninety-four percent Dudhias stated that they would wait till the next animal comes to lactation. This shows that Dudhias' prime interest is to collect milk.

*Table 12.5.7b: Loan recovery in Bad Cases*

| Sl No | Recovery Methods | Percent of Base |
|---|---|---|
| 1 | Wait till next animal comes to lactation | 94 |
| 2 | Take away the animal | 2 |
| 3 | Take away movable assets | 1 |
| 4 | Start cultivating milk producer's land | 1 |
| 5 | Others | 3 |
| Total | | 100 |

*Base: 140 Dudhias*

## 12.5.8 Services Offered

### 12.5.8a Supply of Feed and Fodder

On the question, whether Dudhias supply fodder to the households who sell milk to them, 69 percent of the Dudhias said that they do not supply fodder to milk supplying households. However, 31 percent of the Dudhias mentioned that they do supply fodder to milk supplying households. While 18 percent Dudhias supply fodder against price, 11 percent adjust the cost of fodder against the milk price. Two percent Dudhias claim to supply fodder free of cost to milk supplying households.

*Table 12.5.8a: Supply of Fodder*

| Sl No | Parameters | Percent of Base |
|---|---|---|
| 1 | Yes, on payment basis | 18 |
| 2 | Yes, for free | 2 |
| 3 | Yes, against milk sold | 11 |
| 4 | No | 69 |
| Total | | 100 |

*Base: 140 Dudhias*

### 12.5.8b Supply of Cattle Feed

The survey found that only 25 percent of the Dudhias supply cattle feed to the households who sell milk to them.

*Table 12.5.8b: Supply of Cattle Feed*

| SI No | Supply of Cattle Feed | Percent of Base |
|-------|----------------------|-----------------|
| 1 | Yes | 25 |
| 2 | No | 75 |
| **Total** | | **100** |

*Base: 140 Dudhias*

# 12.6 Forward Linkages

In this section, various forward linkages of Dudhia in terms of milk form sold, different milk sales channel, loan taken by Dudhia and its repayment terms are discussed.

## 12.6.1 Form of Milk Sold

Ninety-two percent Dudhias in the project area sell only liquid milk, 2 percent sell milk products and 6 percent sell both milk and milk products.

*12.6.1: Form of Milk Sold*

| SI No | Milk from | Percent of Base |
|-------|-----------|-----------------|
| 1 | Only Liquid milk | 92 |
| 2 | Milk Product | 2 |
| 3 | Both | 6 |
| **Total** | | **100** |

*Base: 293 Dudhias*

## 12.6.2 Milk Sales Channel

Most of Dudhias sell milk to other shops (58 percent) or individual households in nearby towns (55 percent). Twenty eight percent of the Dudhias sell liquid milk to

private dairies. Only 11 percent Dudhias sell milk to milk contractors.

*Table 12.6.2: Milk Sales Channel*

| SI No | Channels | Percent of Base |
|-------|----------|-----------------|
| 1 | Shops | 58 |
| 2 | HH in town | 55 |
| 3 | Private Dairy | 28 |
| 4 | Milk Contractor | 11 |
| 5 | Others | 14 |

*Base: 287 Dudhias*
*Note: Multiple Responses*

## 12.6.3 Loan Taken by Dudhias

The study tried to find out whether Dudhias have also taken loan. Majority of the Dudhias are financially strong to take care of financing milk procurement business. But, 13 percent Dudhias do take money from other agencies or contractors.

*Table 12.6.3: Loan Taken by Dudhias*

| SI No | Particulars | Percent of Base |
|-------|-------------|-----------------|
| 1 | Yes | 13 |
| 2 | No | 87 |
| **Total** | | **100** |

*Base: 293 Dudhias*

## 12.6.4 Amount of Loan Taken

In the project area, more than one-third of the Dudhias have taken loan of Rs. 15,000 or less. Thirty-eight percent of Dudhias have taken loan of an amount between Rs 15,001 and Rs 65,000. Nearly another one fourth of Dudhias have taken loan of an amount ranging between Rs 65,001 and Rs 1, 50,000. Only 3 percent of Dudhias have taken loan of an amount more than Rs 2, 00,000/-.

*Table 12.6.4: Loan Taken by Dudhias*

| SI No | Loan Amount (in Rs.) | Percent of Base |
|---|---|---|
| 1 | Below 5,000 | 6 |
| 2 | 5,001-15,000 | 28 |
| 3 | 15,001 – 65,000 | 38 |
| 4 | 65,001-1,50,000 | 17 |
| 5 | 1,50,001-2,00,000 | 8 |
| 6 | 2,00,001-4,00,000 | 3 |
| Total | | 100 |

*Base: 37 Dudhias*

## 12.6.5 Repayment Terms for Loan

The transaction between the Dudhias and their financiers is claimed to be interest-free as only 24 percent of Dudhias pay interest on a monthly basis. However, 70 percent of Dudhias take loan by committing supply of milk to the financier, who is generally a contractor.

For 85 percent of Dudhias, there is no fixed duration for repayment of loan and 15 percent of Dudhias take loan with the condition of paying loan with in a fixed period of time. Six percent dudhias who took loan have agreed to the condition of supplying milk to the financer at a lower rate for milk. This highlights the flexibility in borrowing by the Dudhias vis-a-vis their (Dudhias) financiers.

*Table 12.6.5: Repayment Terms for Loan*

| SI No | Repayment Term | Percent of Base |
|---|---|---|
| 1 | Interest rate charged per month | 24 |
| 2 | Fixed duration for repayment | 15 |
| 3 | Commitment on litres of daily milk supply | 70 |
| 4 | Lower milk price per litre | 6 |

*Base: 33 Dudhias*