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# Impact Evaluation of Operation Flood on Rural Dairy Sector

RK SHUKLA  
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National Council of Applied Economic Research

# **IMPACT EVALUATION OF OPERATION FLOOD ON RURAL DAIRY SECTOR**

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**NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH  
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## FOREWORD

Removal of poverty, especially rural poverty has been the principal aim of development policy in India. In India's agrarian economy, rural poverty is closely linked to the development of agriculture, comprising crop production and animal husbandry activities. Recognising the importance of the dairy sector in the rural economy and the need for improvement in this area, the country undertook several programmes and measures. Among them, Operation Flood was one of the major programmes, which helped change the lives of millions of farmers--particularly small farmers and landless people. Initiated in 1970, it aimed at an integrated economic approach to alleviate rural poverty and food problems. This programme has achieved remarkable success in bringing about a dramatic turn around in India's rural dairy sector and has also succeeded to a considerable extent in its professed objective of alleviating rural poverty. After more than a quarter of a century, the question arises: **Has this programme emerged as a successful tool for sustainable rural development?**

At the macro level, the dairy scene in India looks bright and is steadily marching ahead preparing itself for the challenges of the 21<sup>st</sup> century. The great value contributed by this programme will be the improved quality of life of millions of farm families. They are the ones who created the first miracle of Indian dairying. They will also be the ones to create the second miracle: transforming India into the world's leading dairy nation.

In order to fulfil the promise of dairying, the accumulated knowledge and experience already gained needs to be disseminated. It is in this context that the present book, *Impact Evaluation of Operation Flood on Rural Dairy Sector*, based on the two large-scale sample surveys conducted by the National Council of Applied Economic Research during 1988-89 and 1995-96, represents an important contribution. The appraisal of the performance of the dairy sector is done in terms of the overall goals of national economic development, namely, growth, social justice and self-reliance.

The results presented in this book, we believe will help in formulating policies for improving the rural economy, particularly in Operation Flood areas, and in developing future strategies to maximise milk production and widen the range of beneficiaries of the programme. In addition, these results will help in identifying and removing hurdles, if any, in the way of increased milk production and in channeling developmental efforts towards a self-sustaining rural economy.

The study was made possible with the cooperation of numerous people associated with the National Dairy Development Board (NDDB), the Milk Marketing Federations, Milk Unions, village level Dairy Cooperative Societies and the household level respondents. I would like to offer my special thanks to NDDB for sponsoring this study and to its officials who interacted with the NCAER team at various

stages of the survey and were a great source of help in conducting the study. The study team also wishes to place on record its appreciation of this help. Finally, I would like to thank I. Natarajan, the Project Director of the study team, R.K. Shukla, the Project Leader, and all the other members of the team for contributing to the successful completion of this survey.

**RAKESH MOHAN**

(Director General)

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## SUMMARY OF THE REPORT

The dairy cooperative societies (DCSs) in Operation Flood (OF) areas offer an assured market and a remunerative price for milk. This has resulted in rural milk producers receiving an incentive for higher production of quality milk and an overall improvement in their economic status. The small dairy farmer and the landless people that form the core of the milk-producing sector under Operation Flood are among the main beneficiaries. Furthermore, the very existence of a cooperative strengthens the position of a village milk seller. Not only does it offer its members the benefits of fortified fodder, veterinary services and facilities for upgrading livestock for improving milk yields, but also provides a stable milk market for milk producers as the purchase prices offered by it become benchmarks. This makes it necessary for the other players in the large informal sector of the milk market to offer higher prices than the cooperatives.

Since the inception of Operation Flood in 1970, milk production has grown rapidly. Though OF procures and markets only a small fraction of the total milk supply, the credit for the 'white revolution' goes to Operation Flood which created the necessary policy environment in the dairy sector. An important contribution of the programme has been the introduction of the necessary market orientation, technology and professional management practices in the rural milk sector.

### I. ABOUT THE STUDY

1. To generate a statistically appropriate database for assessing the impact and progress of Operation Flood, the National Dairy Development Board, Anand, commissioned the present study titled, **"Impact Evaluation of Operation Flood Programme on Rural Dairy Sector"**. The impact study focuses on some of the relevant aspects of the dairy sector, which include:
  - distribution of rural households owning milch animals by socio-economic groups;
  - bovine stock -- its distribution and composition;
  - composition and level of milk output from bovine milch animals;
  - productivity of bovine milch animals;
  - pattern of milk sale and prices received;
  - inputs used in milk production; and
  - production cost and revenue from the dairy sector.

The OF areas that were covered included villages in which dairy cooperatives were functional under the programme at the time of the survey. The area covered, and the estimates provided in this study do not refer to the whole country but are limited to the OF programme areas.

2. The data for the survey were collected during January to March 1996, which is the flush season in milk production.

3. The study involved collection of primary data from milk producing households in OF areas through a sample survey. A two-stage stratified sample design was used: villages, which had DCSs formed the first stage, and milch animal households formed the second stage. For the present survey, a sub-sample of DCSs used for the Baseline Study done in the year 1988-89 covering 25 regions has been adopted. A total number of over 239 DCSs and over 2,868 households were contacted for the primary data collection during the survey period. At the different regional levels, the sample sizes were not sufficient to provide reliable estimates of the parameters. Thus, the analysis of data in this report is generally limited to the four broadly defined zones, i.e., East, North, South and West rather than the 25 regions that have been covered.
4. The following sections provide a summary of the findings of the survey presented in chapters III to VIII. The figures cited in this study generally refer to the all-India (OF) averages.

## **II. GENERAL CHARACTERISTICS OF MILCH ANIMAL HOUSEHOLDS**

1. A milch animal is defined as a mature female bovine, and includes the cow and the buffalo. Among milch animal households, approximately 71 percent are DCS members. While the Western and Southern zones have high membership percentages, the Northern and Eastern zones have low rates of membership.
2. The proportion of literate heads of households is higher than illiterate heads of households. This proportion is marginally higher for member households (member-MAHs) as compared to non-member-MAHs.
3. Approximately 84 percent of rural milch animal households (RMAHs) belong to the 'other castes'—the dominant social groups in a village. The SC/ST households constitute the remaining 16 percent. In the Southern and Northern zones, the percentage of SC/ST households among the member-MAHs is low. Thus, greater efforts would be necessary to bring these households into the DCS ambit to help them get the benefits of OFP.
4. Approximately 70 percent and 6.6 percent of RMAHs in OF areas pursue agriculture and dairying as their primary occupation, which contribute towards the major portion of their incomes. Among heads of milch animal households, 65.2 percent pursue dairying as a primary or a secondary occupation.
5. While the capacity of large farms to maintain a large number of bovines is self-evident, it is not entirely true that the smaller farms have been left out of the OF coverage. Marginal and small farmers (<2 hectares) account for about 57 percent of all households, while their share in DCS membership is at a higher level of about 60 percent. The small farmer and the landless, in fact, form the core of the milk-producing sector.
6. Approximately 72.4 percent of RMAHs own either one or two milch animals, and 69.7 percent member-MAHs belong to this category. The dairy sector in the OF areas is dominated by the marginal/small farmers and the landless with one or two milch animals. Out of the total



RMAHs, about 40.2 percent own cows, 38.9 percent own buffaloes, and the remaining own both.

7. The available animal health care facilities in OF areas--through the Milk Unions and the DCSs, the government hospitals, and traditional medicines--are of a slightly higher order than in other areas. Among these services, government hospitals have been rated as the most important. Over 50 percent households have reported that veterinary mobile vans rarely visit villages or do so only during emergencies. Since high yielding crossbred bovines are more susceptible to diseases and are mainly confined to OF areas, animal health care facilities need further improvement.
8. The use of artificial insemination (AI) for breeding milch animals is found to be more widespread among cows than buffaloes. Crossbred cows are commonly bred through AI and it is seldom used for breeding indigenous cows and buffaloes. The common breed used for AI in the case of cows and buffaloes is the Jersey and Murrah, respectively.

### **III. COMPOSITION AND DISTRIBUTION OF BOVINE STOCK**

1. Bovine milch animal stock, comprising cows and buffaloes, contribute 49.9 percent to the total stock in Operation Flood areas of the country. In an increasing order of bovine stock, the East zone accounts for a very small proportion of bovines, followed by the Western, Northern and Southern zones.
2. The proportion of cows to buffaloes is smaller in the Northern and Western zones, as buffaloes are predominant in these zones. The other two zones have more cows than buffaloes.
3. Member-MAHs own over 71 percent of the bovine milch animal stock in OF areas.
4. The proportion of cattle is more than that of buffaloes among all bovines. But in the case of adult female bovines, the proportion of buffaloes is higher than that of the cows.
5. The share of crossbred cows to total milch animals at the all-India OF level is about 12.8 percent. Nearly two-thirds of all crossbred cows are found in the Southern zone, of which a major proportion is held by member-MAHs.
6. The proportion of desi cows to total milch animals is 32.4 percent at the all-India OF level; of this 37.6 percent is in the Southern zone, followed by 34.9 percent and 20.6 percent in Western and Northern zones, respectively.
7. Out of the total milch animal stock, the proportion of buffaloes is 54.9 percent. The Northern zone has the highest proportion and next in ranking is the Western zone.
8. The proportion of in-milk crossbred cows and buffaloes at the all-India OF level is 68.6 percent and 67.1 percent, respectively; while for the desi cows it is only 58.4 percent.
9. The sex ratio (females per 1,000 males) is 1,800 for the cattle population and 5,600 for the buffalo population.

10. Buffaloes outnumber desi cows, which in turn outnumber the crossbred cows. While this order is true in the case of desi and crossbred cows across all the four zones, desi cows outnumber buffaloes in the Southern and Eastern zones.
11. The percentages of crossbred cows, desi cows and buffaloes in the age group 3 - 6 years are 63 percent, 56 percent and 45 percent, respectively; of which, approximately 60 - 68 percent are in-milk.
12. Small and marginal farmers and the landless own the major proportion of milch bovines.

#### **IV. PRODUCTION, CONSUMPTION AND MARKETING OF MILK**

1. Milk is the major source of animal protein for a large number of Indians and its role in the nutritional status of the population can hardly be over-emphasised. An overwhelming number of milch animal owners belong to the category of small/marginal farmers and the landless, having one to two heads of milch bovines. These households form the core of the milk-producing sector, contributing over 65 percent of the total milk produced. Milk production seems to be the domain of the economically weaker sections of the rural population.
2. Buffalo milk forms about 59 percent of the total milk production, while that of the crossbred cows account for about 20 percent. Desi cows contribute towards the balance of the share. 73.9 percent of the total milk produced is contributed by member-MAHs, and a relatively higher share (85.5 percent) of that is from crossbred cows. There are, however, zonal variations in this pattern.
3. The Northern zone contributes the maximum amount to the total milk output of the OF areas, followed by the Southern and Western zones. The share of the East zone is only 2.7 percent.
4. While buffalo milk forms the major proportion of milk produced in the Northern and Western zones, in the Southern and Eastern zones the proportion of cow milk is higher than that of buffalo milk.
5. One of the objectives of Operation Flood has been to usher in a "white revolution" by raising the milk yielding capacity of milch bovines through improved bovine stock and proper feeding. The overall productivity is highest among crossbred cows and lowest among desi cows. The productivity of the desi cow, the crossbred cow and the milch buffalo is estimated at 1.91, 4.56 and 3.14 litres per day, respectively, for all OF areas.
6. Productivity of in-milk buffaloes is about 49 percent higher than that of all milch buffaloes. The maximum difference is found to be in the case of desi cows, and then in buffaloes and crossbred cows. This seems to suggest that producers keep crossbred cows and buffaloes for the milk that they yield while desi cows are kept mainly for providing draught animal power for various uses.
7. High productivity means high per capita availability of milk products. The overall per capita consumption of milk is estimated to be 339 ml. At the all-India OF level, per capita milk consumption is higher among non-members, 'other castes', and households with large farms, as

- compared to their counterparts. Drinking of milk and its intake along with beverages (tea/coffee) account for more than 70 percent.
8. Average milk consumption among females is about 69 percent of that among male members of RMAHs. For the different zones, it varies between 50 and 83 percent, indicating the level of male bias as compared to females. Across each zone, the male bias is more prominent among grown-up children and adults among SC/ST and households with small land holdings.
  9. Since the launching of Operation Flood in rural areas, the dairy cooperative societies have provided assured procurement of quality milk at remunerative prices and timely payment to milk producers. Approximately 88 percent of households, which own milch bovines, sell milk to different purchasing agencies--36 percent each sell buffalo and cow milk, and 16 percent sell both.
  10. The percentage of member households that do not sell milk ranges from 2.4 percent in the Eastern zone to 10.7 percent in the Northern zone, while this percentage is much higher for non-member households, ranging from 6.5 percent in the Southern zone to 47.9 percent in the Western zone. This clearly indicates that member-MAHs are contributing a major quantity of the milk sold in OF areas. The two major reasons reported by non-milk selling households were that there was 'no surplus milk production', and there was 'no milk production' during the period under reference.
  11. The survey reveals that of the total milk produced in OF areas about 53 percent is traded. The percentages range from 34.2 for the Eastern zone to 69.4 percent for the Southern zone.
  12. Dairy cooperative societies are the central plank of the programme, and play an important role in the purchase of milk offered for sale in OF areas. They procure about 63.4 percent and 60.9 percent of the marketable cow and buffalo milk, respectively. Other agencies, particularly 'private dairies', generally purchase milk through dudhiyas or middlemen who collect the milk from individual producers. An important reason why dudhiyas play a significant role as a procurement agency even in OF areas.
  13. The market-oriented strategy of dairy development provides a strong institutional support to a majority of milk producers who belong to the weaker sections of the rural community. The reliable pricing policy of the DCSs, despite their lower prices compared to the other agencies, brings more milk into the DCSs' pot. Keeping the long-term interests in view, a large number of milk producers prefer the DCS. Whereas producers who are looking for immediate monetary gains and are in need of financial support for buying and maintaining milch animals prefer the dudhiya. Though the DCS milk procurement prices are lower than that of the dudhiyas, the milk producers find that it is a dependable establishment; it pays an year end dividend to the members; provides balanced cattle feed (BCF) and artificial insemination (AI) services at subsidised rates. And in some OF areas extension services are run by the DCS for its members. These additional incentives offered by the DCS lowers the opportunity cost of selling milk to the dudhiyas.

14. A majority of the milk-selling households reported that the price received for milk from DCSs was based on scientific testing of milk for fat and solid not fat (SNF). The DCSs have been responsible for introducing fair and uniform means of determining milk price in OF areas of the country.
15. Payments in OF areas are made in cash. By and large, milk producers carry milk to the point of sale on foot. A small proportion of producers also reported that they sell milk in nearby towns using motorcycle/bus/railways as the means of transportation.

## **V. FEED/FODDER AND LABOUR USE IN DAIRY SECTOR**

1. Though cultivated fodder is fed to milch animals in cattle sheds, sending them out for grazing is a common practice in rural India. The grazing pattern across zones indicates that animals are largely grazed on land situated within a distance of 2 km, and owned by milk producers. Further, despite the benefits of grazing more than 36 percent of households do not allow their animals to graze. As regards the frequency and duration of grazing, approximately 75 percent of households allow their animals to graze daily, for about 2 to 6 hours.
2. Growing green fodder is more prevalent in the Northern zone than in the Southern and the Western zones. About 50 percent of the fodder-growing households used cultivable lands for the purpose, 13 percent used bunds, and another 28 percent used both.
3. The purchase of green fodder among member- MAHs is the lowest. The range of purchases varies from about 10 percent in the Eastern zone to 31.2 percent in the Southern zone. Likewise, in the case of dry fodder, about 17 percent of the total is purchased in the Northern zone by member- MAHs. The largest quantity, about 37.7 percent of the total, is purchased in the Southern zone.
4. Among concentrates, BCF is mostly purchased by milk producers from DCSs or from nearby markets.
5. The study found wide variations in the quantity of different kinds of feed/fodder fed to milch animals across zones and types of households. The quantity of green fodder and concentrates fed to in-milk animals is higher than that given to dry milch animals. Milch animals are fed both individually and collectively with wet as well as dry feed.
6. Approximately 64.6 percent households reported that their animals had access to enough feed. An important reason for its non-availability is said to be the high price of feed/fodder. In addition to this, small land holdings, and lack of funds and irrigation facilities are some of the reasons affecting increase in the production of green fodder. Thus, to enhance fodder production, it is essential that a package in terms of finance and other inputs is provided to milk producers. Greater availability of feed/fodder to animals will increase the productivity of milch animals.
7. The dairy enterprise in rural India is labour intensive. The data reveal that there is a greater use of family labour compared to that of hired labour in milch animal care. Also, that there is an extensive use of adult male labour (60 percent) and involvement of adult female labour is 35

percent. Among member-MAHs, adult female labour hours as a percentage of that of the adult male is as high as 90.6 in the Western zone and as low as 27.4 in the Eastern zone. On the other hand, involvement of child labour in the dairy sector is the lowest in the Western zone. The increased adult female labour participation in milch animal care in different zones is probably a result of the opportunity cost, in addition to other factors, such as tradition.

## **VI. MILK PRODUCTION COST AND REVENUE FROM DAIRY SECTOR**

1. The following components constitute the cost of milk production: feed, labour, depreciation of animals, recurring expenditure, depreciation of assets and equipment, and interest on capital. The revenue from the sale of milk is a function of the pricing policy. The cost of production forms the basis for price fixation. The pricing policy must consider a suitable margin of profit for the producer while determining the price of milk, and at the same time be mindful of the consumer's interest.
2. In an ongoing dairy enterprise the cost of feed/fodder and labour form the major portion of the cost of milk production. Therefore, to determine the total cost of production, the estimated cost of these two components is essential. About 77 percent and 67 percent of green and dry fodder, respectively, are home produced, and family labour accounts for about 94 percent of the total labour employed in the dairy sector. To estimate the economic contribution of dairying, the cost of home-produced feed/fodder and family labour cannot be overlooked. Thus, the cost estimates presented in this report are inclusive of these two components.
3. In the total production cost about 72 percent is accounted for by feed/fodder (both home-produced and purchased) at the aggregate level. This varies from 65.8 percent in the East zone to 80 percent in the Western zone. Purchased feed accounts for 14.4 percent of the total cost. While it is the lowest with 7.6 percent in the North zone, in the other zones it ranges between 17.8 and 19.1 percent.
4. Labour, with its share of 20.8 percent at the aggregate level, is the second important component in the total cost of milk production. Family resources provide about 88 percent of the labour input. The share of hired labour in the total cost varies from under 1 percent in the Western zone to 4.4 percent in the Southern zone.
5. In general, an increase in the size of a household's animal herd and operational land holding has an impact on the other cost components. The share of purchased feed in the cost of milk production declines, that of home-grown feed and hired labour increases, and family labour goes down. It has been observed that for households possessing 1 or 2 milch animals, the share of expenses on other items (which include animal health care) is significantly high in addition to the high share of purchased feed. Landless households, in particular, incur higher paid-out costs on purchase of feed/fodder, equipment and on maintenance of milch animals (including their health care). Purchased feed accounts for about 30 percent of the total cost incurred by the landless households: with 33.7 percent in the case of members, and 24.2 percent in the case of non-members.

6. At the all-India OF level, the average per-day cost on a crossbred cow and a buffalo are approximately equal, on an indigenous cow the cost is Rs. 15.2. The cost of keeping other bovines is lower as compared to that of milch animals.
7. At the aggregate level, member households seem to spend more than non-member households on the maintenance of their milch bovine stock except on crossbred cows. On the whole, for a rupee spent on a milch animal, a non-member would spend Rs. 0.95 as against Rs. 1.02 by a member-MAH. This indicates an overall effectiveness of the cooperative movement in the dairy sector as it enables members to spend more on the maintenance of their milch bovines.
8. Per-litre cost of milk production, at the aggregate level, is the lowest in the case of crossbred cows (Rs.5.40), followed by Rs. 7.67 for buffaloes and Rs. 7.96 in the case of indigenous cows. This trend is true for member as well as non-member households at the aggregate level. However, non-member households incur about 16 percent and 12 percent higher costs on crossbred and indigenous cows, respectively, as against member households. The cost per-litre of buffalo milk is equal among the two types of households. Overall, non-members incur about 8 percent higher cost per-litre of milk produced as against that of member households, which increases with decreasing animal holding size. The difference is as high as 27 percent in the case of households owning just 1 or 2 milch animals.
9. At the aggregate level, data reveal that the cost of milk production rises with an increase in the operational land holding size. Between the landless households and those with more than 4 hectares of operational land, the cost increases by more than 50 percent.
10. Home-produced feed/fodder costs could be evaluated either at the prevailing market rates; or at 80 percent of the market rates. Net revenue from dairying under these two alternatives is less than Rs. 2 per litre of milk produced. However, if only paid-out costs are considered, that is by excluding valuation of family resources, net revenue from dairying would range between Rs. 6 and Rs. 7 per litre for RMAHs. In order to boost the dairy enterprises in rural areas on a commercial basis, the pricing policy should take into account the cost of family resources.
11. Revenue from dairying is one of the sources of income for a household producing milk. At the aggregate level, dairying contributes about 27 percent towards the total household income while milk sale accounts for about 19 percent of the total income. Dairy enterprise accounts for the maximum share (40.4 percent) of household income in the Eastern zone. Revenue from crops is the highest in the Southern zone, and next in ranking are the Northern and Western zones.
12. The survey finds that member households have a higher share of income from dairying and cultivation of crops as compared to non-member households. With an increase in the animal holding size, the contribution of the dairy enterprise to the total household income is also observed to rise. However, households (member and non-member) rearing 1 or 2 milch animals seem to supplement their income from other sources, specially as wage earners in dairy related activities.

13. The landless households depend greatly on dairying, its contribution to their total income is over 50 percent. Income from dairy activity has a higher share in the total income among the DCS members as against that of non-members.

## VII. IMPACT EVALUATION OF OPERATION FLOOD ON RURAL DAIRY SECTOR

This section provides a comparative analysis of the key findings of the Impact Study (1996) and the Baseline Study conducted in 1988.

1. As a result of Operation Flood, between the two survey years, 1988 and 1996, rural milch animal households increased from 7.2 million to 11.7 million and member households increased from 4.5 million to 8.3 million. Thus, at the aggregate level, RMAHs and member-MAHs grew at the annual rate of 7.2 percent and 9.1 percent, respectively. While the shares of the Southern and Western zones in the total membership increased, the shares of the other two zones declined during this period.
2. The survey indicates that participation of SC/ST households as members of DCSs increased from 14.5 percent to 15.3 percent between 1988 and 1996. Though the member households pursuing agriculture as the main occupation has increased, this has been mainly due to the reduction in the proportion of member households engaged in other occupations, such as service, trade, business, etc. The proportion of wage earning households has remained more or less unchanged during this period.
3. Although the share of landless households in DCS membership has declined during this period, the increase in the membership share of marginal and small farmers is perhaps, the result of fragmentation of land holdings of large farmers and redistribution of surplus land among the weaker sections of the rural community. As regards milch animal holding size, the distribution of member households has more or less remained at the 1988-89 level. The majority of member households possess either 1 or 2 milch animals.
4. The proportion of member households using artificial insemination has only increased marginally over the period 1988-96. To make this useful technology more effective and widespread, the respondents felt that there was a need for further improvement in the existing infrastructure at the DCS level and the effective use of extension services towards creating an awareness of good dairy practices among milk producers.
5. While in-milk indigenous cows increased at the annual rate of 9.8 percent, in-milk buffaloes and crossbred cows grew at the rate of 6.1 percent and 5.3 percent, respectively. The Southern zone recorded the largest increase in in-milk crossbred and indigenous cows. In-milk Buffaloes increased across zones with the highest growth recorded in the North zone, followed by the Western and Southern zones.
6. The compound growth rates for young stock indicate that:
  - (a) Male cattle calves, particularly the indigenous, have increased across zones and at the all-India OF level, thereby reflecting a positive trend in the replacement rate of bullocks.

- (b) Female cattle calves have also shown a positive trend across zones indicating the replacement rate of cows used for breeding.
  - (c) Young stock of buffaloes (both male and female) have registered an increase, a trend across zones (except the Eastern zone) and at the all-India OF level.
  - (d) The positive growth rates of both cattle and buffaloes indicate that producers tend rear young stock either for replacement or for sale.
7. The compound growth rates for the draught animals show that at the aggregate level bullocks exhibited a negative growth and he-buffaloes had a drastic downward trend across zones. The declining rates of draught animals across zones between 1988 and 1995 may be due to the rapid mechanisation of agriculture.
  8. During the years 1988 and 1995, the proportion of adult females among indigenous cattle and buffaloes increased, while that of crossbred cows declined; however, adult females account for the major portion of the stock. And in-milk animals rose in each of the categories. In the case of young stock, while the change in the proportion of indigenous young cattle is significant, they are marginal in the case of young crossbred cattle and buffaloes. The increase in the proportions of adult females is due to a fall in the shares of adult males.
  9. Considering all bovines, the sex ratio (females:males) has not changed significantly over the period 1988-96. However, among desi cattle, though the sex ratio has increased by about 40 percent, there is virtually a one-to-one correspondence of females and males. In the case of crossbred cattle, we find that the number of females per male has declined by about 16 percent. If we consider the sex ratios for adult and young bovines separately, that of adult buffaloes (i.e., number of she-buffaloes per he-buffalo) has more than quadrupled over the period in all the zones. There has been an increase in the sex ratio of adult cattle in three zones, except for the East zone. Both crossbred and desi cattle follow this pattern at the individual zonal level as well, with the exception of the North zone in the case of crossbred cattle and the East zone in the case of desi cattle. In absolute terms, the changes in the sex ratios of young stock show a marginal decline. These changes, particularly in the case of adult bovines, are observed in higher magnitudes in the case of member households as compared to that of non-members. In view of their productivity levels that sustain milk production needs, buffaloes and crossbred cows are considered to be the main milch animals. Member households own a major part of these milch animals.
  10. Between 1988 and 1996, the total milk production in OF areas increased from 41.5 million litres per day to 66.9 million litres per day. Increasing at the rate of 7.1 percent per annum, it varied from 4.0 percent in the Eastern zone to 11.0 percent in the Southern zone. The share of the Southern zone in the total milk production rose from 26.6 percent in 1988 to 34.1 percent in 1996. However, the shares of Eastern and Northern zones declined; and the share of member households rose from 67.5 percent to 73.9 percent over the period.



11. The rate of growth in milk production, between 1988 and 1995, was the highest in the case of desi cows, followed by buffaloes and crossbred cows. This trend is mainly due to the increase in the number of milch animals (as a result of the rise in the DCS membership) and productivity gains.
12. The procurement of milk under Operation Flood area increased from 28.2 million litres per day in 1988-89 to about 35.4 million litres per day in 1995-96. Between 1988 and 1995, milk procurement grew at the rate of about 3.3 percent per annum which is lower than the growth rate of milk production (7.1 percent per annum). The overall growth in milk procurement is mainly due to the increased disposal of milk by member households.
13. The growth in milk procurement (i.e., sale of milk to dairy cooperative societies) is the central parameter for assessing the impact of Operation Flood on the rural dairy sector. For the period 1988-96, the share of the DCSs in the total procurement of milk declined for cow and buffalo milk. This has been mainly due to a sharp fall in the milk supply by non-member households to DCSs, and in addition, to the increased presence of private enterprises and other cooperative societies in OF areas.
14. Between 1988 and 1996, the dairy farmer's per capita consumption of milk increased from 290 to 339 ml per day at the aggregate level.
15. Increasing levels of awareness of the requirement of a balanced mix of feed/fodder, and the greater availability of BCF, have resulted in increased use of concentrates-- registering an increase of more than 50 percent. This increase has been offset by a slight decline in the proportion of roughage and a virtual elimination of other feed/fodder intake. In terms of roughage, the proportion of green fodder has increased, and that of dry fodder has decreased.
16. There is no doubt that Operation Flood, through its cooperative structure, has played a major role in the development of the dairy sector in India. To expand the role of the cooperatives in the future, it is essential to consider among other factors, the views of the milch animal households on the functioning of the dairy cooperatives.
17. Factors, such as management of the cooperatives, membership criteria, working of the executives of the societies, methods and timings of milk collection, and the basis, mode and frequency of payment were found to be satisfactory by the DCS members included in the survey. But they felt that animal health care services and supply of BCF were areas that needed further improvement.
18. Among DCS members, about 3.9 percent had left the cooperative fold at some point of time in the past. The proportion of such members, with 6.8 percent, is the highest in the Eastern zone. The major reasons that were given for quitting DCS membership included inability to supply milk regularly, and non-profitability of supplying milk.
19. In the sample survey, non-member households were asked about the reasons for not joining DCSs and if they had been members in the past, the reasons for quitting and not rejoining. Approximately 19 percent of these households were members of DCSs in the past. The main reasons given by them for quitting membership included, 'no surplus milk production' and

'insignificant benefits from the cooperative societies'. Among non-members, 52.4 percent intended to become members of DCSs.

20. Non-members who did not wish to join the cooperative movement - accounting for about 14 percent of the total RMAHs - gave a variety of reasons. These include, the existence of a better alternative, unfair functioning of DCSs, and social/caste factors. A significant proportion of non-members (12.7 percent) felt that they had a better alternative than joining the DCSs. This is due to the fact that dairy business has a large sector of private traders, which offers incentives, such as higher price for milk, advance payment for purchase of milch animals and for milk supplied. However, the so-called 'better alternative' is also open to other milk producers who have not been attracted by it. Perhaps, this is due to the poor economic status of these households, which need financial assistance to pursue their dairy business. This should be kept in view while developing future strategies to bring in a greater number of such households within the cooperative fold. The cooperatives also need to work harder if their services are to be perceived superior to that of the other private agencies.

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# **CHAPTER I**

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## **INTRODUCTION**

### **BACKGROUND**

A large number of people in rural India depend on agriculture for their livelihood. But the considerable developments that have taken place in Indian agriculture have not brought many benefits to these people, and have had little impact on alleviating rural poverty. To make matters worse, fragmentation of land holdings and distribution of surplus land among the weaker sections of rural communities have only increased marginal and small land holdings. In an over-populated country, the problem of rural poverty cannot possibly be resolved by redistribution of land that is in short supply. Despite technological and agricultural advances, even on small farms Indian agriculture has yet to emerge from subsistence farming to surplus production. A viable alternative would be to concentrate on projects that do not require large resources, are not capital-intensive and subject to physical/geographical constraints, and have a short income-generating span. One such area of investment is in dairy animals, which are comparatively easy to acquire and yet provide an economically viable mode of income-generation. Farm animals play an important role in agriculture:

- i. As converters of agricultural by-products into valuable products of animal origin
- ii. As sources of traction/draught
- iii. As source of manure
- iv. As a source of food for humans

Recent studies suggest that the dairy sector can play a key role in improving the socio-economic status of a large percentage of the rural population. Besides having a vast employment potential, livestock provides milk, hides and skin, bones and hooves and draught power, and supplements farm incomes. In addition, it contributes in alleviating poverty among landless people and small farmers by providing gainful employment opportunities. The sector can absorb the surplus labour in rural areas that is basically unskilled and does not have alternative avenues of employment.

Dairy development is most appropriate for India's programme of increasing food production, rural employment and equitable distribution of resources and incomes that would also improve the quality of life of the rural poor. Significantly enough, almost 70 percent of the milk producers are either landless or small/marginal farmers who only own one or two animals. The cattle provide them with

ready cash on a day-to-day basis, and perhaps, the reason why owning a milch bovine is considered an important asset by the rural poor. Therefore, any effective programme for poverty alleviation should include the dairy sector as its base to bring about maximum growth with minimum capital outlay.

Milk is a widely accepted and valuable food of animal origin. In recognition of the importance of milk in the daily diet of people, and the role of the dairy sector as an additional source of income for the rural masses, independent India undertook several programmes and measures. These were in the areas of animal health and breeding, animal feed, milk processing and marketing. The milk cooperative movement under Operation Flood is one of the major programmes in the dairy sector that has touched millions of milk producers and consumers in the country.

## **OPERATION FLOOD - A BRIEF OVERVIEW**

Operation Flood is perhaps the most significant rural employment project in the country today. It has developed an infrastructure that harnesses the productive energies of over seven million milk producers. And operates in some 267 districts in 22 states and Union Territories in the form of cooperative networks with over 70,000 village dairy cooperative societies (DCSs). These societies are managed by milk producers with the assistance of professionals in dairy development. Indian experience and experience from other parts of the world indicate that cooperatives are ideally suited to the dairy sector.

Operation Flood, supported by the World Food Programme, the European Economic Community (EEC) and the World Bank, was launched in 1970 by the Government of India. The major goal was to lay the foundation for a modern dairy industry that would meet the country's milk requirements and be capable of self-sustaining growth. The first phase of the programme, OF-I ended in 1981. With the launching of the second phase OF-II in 1981, the element of dynamism introduced into the dairy sector through OF-I gained further momentum due to the large-scale operation of this programme. The Financial support for Operation Flood II was provided by the EEC and the World Bank. In 1986, the third phase--OF-III was proposed by the Indian Government to consolidate the infrastructure for milk procurement, processing and marketing established under the first two phases. The National Dairy Development Board (NDDB) and the Indian Dairy Corporation, which later merged with the NDDB have been the major national-level institutions involved in the implementation of the successive phases of this programme.

The main thrust of the project was to provide a market orientation to milk production through an assured milk market to rural producers by linking village-level societies with urban milk markets. And to extend to them inputs, such as artificial insemination services for cross-breeding and milch animal stock upgrading, compounded cattle feed, and veterinary care for enhancing the productivity of milch animals.

The dairy cooperatives have succeeded in achieving the above goals by providing a stable milk marketing outlet that links rural milk producers with urban consumers through district milk unions. The milk-marketing channel, under the existing cooperative framework, offers a quality-linked remunerative price in a competitive environment. In addition, the DCSs' household income-augmenting function coupled with the availability of inputs has led to increased productivity in milch animals. These two supportive factors are directed to help reduce inequalities, alleviate poverty and generate additional employment among farming communities. Besides the increased milk production at the household level, OF is expected to raise the per capita availability and consumption of liquid milk to help increase the nutritional intake of the country's population.

## **THE COOPERATIVE STRUCTURE**

The cooperative pattern that has been adopted in most of the states under the programme has a three-tier structure:

**At the Village Level** there are dairy cooperative societies with members drawn from the village milk producers. The DCSs conduct the routine business of collecting, testing and paying milk producers for the supply of milk. These societies also provide micro-level inputs like compounded cattle feed, fodder seed, veterinary services and artificial insemination services for improving milk yields.

**At the District Level** there is a milk union of village dairy cooperative societies. The unions are responsible for transporting, processing and marketing of milk and its by-products. An important function of these unions has been to guide and supervise the village dairy cooperative societies in accordance with the model by-laws and guidelines.

**At the State Level** there is a cooperative milk marketing federation of the milk unions of the state. As the apex body, it coordinates the work of the milk unions and implements marketing programmes.

## **THE BASELINE STUDY - 1988-89**

For over two decades, a large number of dairy cooperatives have been set up across the country under Operation Flood. To assess the impact of OF on the target group of milk producers and the dairy sector, the National Dairy Development Board (NDDB) commissioned the National Council of Applied Economic Research (NCAER) to conduct a study for establishing relevant baseline data on different variables and parameters for the year 1988-89.

The study involved a sample survey of rural milk producing households in Operation Flood areas – each village covered had a dairy cooperative society. The OF areas of the country were divided into 25 regions to capture the regional variations in the milk economy. A total number of over 1,300 villages and 15,800 households were contacted twice—in the lean (i.e., April-June) and flush (i.e., December-February) seasons of milk production. Primary data were also collected from a set of

non-OF villages (where DCSs did not exist) for a comparative study of certain related variables from OF villages.

The baseline estimates generated by NCAER showed that OF has brought within its fold over 4.5 million households with milch animals as members of village dairy cooperative societies, constituting nearly 63 percent of all such households in rural India. It also revealed that nearly 57 percent and 74 percent of the marketable liquid milk surplus was handled by the village dairy cooperative societies in the lean and flush seasons, respectively, during 1988-89. These statistics indicate the progress achieved by OF in the dairy sector since its inception in 1970.

## **POLICY DEVELOPMENT SINCE 1987-88**

Significant policy developments have taken place in the dairy sector since the Baseline Study was conducted at the national and programme level. The policy changes since then vitiate some of the findings of the Impact Study when compared with the Baseline estimates. It is important to review these developments, at least briefly, for an objective evaluation of the findings of the Impact Study.

**First**, following the liberalised dairy licensing in 1991, private sector dairies and their middlemen thronged the village cooperatives, especially the villages with high production density and logistical advantages. Competing in a limited milk market, they offered incentives, such as advance payment for milk and purchase of animals, which are not offered by the DCSs. This seriously affected producers' organisations of the dairy cooperatives and their financial viability. Faced with such competition, many cooperatives had to tighten their procurement network, which meant that they could no longer cover some of the uneconomical procurement-routes and distant villages on a regular basis.

**Second**, the World Bank, the major funding source for Operation Flood III, laid down strict viability criteria for financial assistance for each sub-project (minimum 12 percent ROI). This meant that many of the cooperative unions covered under Operation Flood II could not be covered under Operation Flood III, though many such districts are included in the Impact Study.

**Third**, for reasons of efficiency and economy, under Operation Flood-II, cluster-AI Centres (one centre covering a cluster of 3-5 villages) replaced the earlier single-AI Centres. Further, in order to make it cost-effective, regular visits of the veterinary mobile van were replaced by provision of veterinary services only during an emergency.

**Finally**, to integrate the animal husbandry activities carried out by various agencies (the State Departments of Animal Health, the cooperatives and the NGOs) and to bring about greater economy in resource utilisation, the Government of India initiated the Technology Mission for Dairy Development (TMDD) in 1988. To avoid duplication of animal health and veterinary services, operational areas for each agency were identified. For example, under the Mission arrangement,

cooperative animal health and breeding services were withdrawn from areas where Departmental/NGO infrastructure already existed, and vice versa. In other words, the responsibility of input delivery in DCS villages no longer rests only with the cooperatives but is shared by other identified agencies as well.

## **OBJECTIVES OF THE STUDY**

Increasingly, the use of the state-of-the-art technology has become the key factor in development and growth, and is considered more important than conventional factors of production, like land, labour and capital. There is a growing tendency on the part of the corporate sector to enter agriculture and allied areas for procuring raw material supplies for agro-processing, and exports. In such a situation, the question arises as to what should be the optimal institutional structure in production and processing in the dairy sector, which will help maximise growth in incomes and ensure rural employment.

From whichever development angle one looks at India's livestock economy, it deserves more research attention than it has actually received. As the world's largest renewable natural resource, India's livestock economy is of immense importance. It is a significant source of nutrition for its people, and a substantial source of income and employment for the rural population, especially the rural poor. And last but not the least, it is a major strategic option for agricultural diversification and growth.

The prerequisite for empirical research and planning is the availability of reliable data. The quinquennial livestock census, the best source of statistics on livestock number, their age-structure and functional classification, has not maintained a uniform reporting pattern. The census is no longer conducted in the scheduled month of the census year. Worse still, the 1992 census, it is reported, had been conducted only in a few states of the country till 1995. There is no specific time in which this census data is collected or made available for public use or research purposes.

To generate a statistically appropriate database for assessing the impact and progress of Operation Flood, the National Dairy Development Board commissioned the present study titled, "Impact Evaluation of Operation Flood Programme on Rural Dairy Sector", with reference to the data provided from the 1988-89 Baseline Study. Although OF covers both the rural and urban segments of the regional and national economies, the focus of the present study, as in the case of the Baseline Study, is on the rural segment.

The study aims to evaluate the impact of OF on the following aspects of the rural dairy sector:

- (i) Socio-economic composition of members of village dairy cooperative societies
- (ii) Distribution pattern of milch animal-owning households (MAHs)
- (iii) Milch animal stock composition

- (iv) Milch animal productivity and the pattern of milk production
- (v) Milk marketing pattern vis-a-vis milk sales and prices received from purchasing agencies
- (vi) Availability and quality of input supply, veterinary health care and AI services
- (vii) Income from dairy enterprise

The major findings of the study are presented in this report. In Chapter II, we present the methodology of the study. Chapter III examines the general characteristics of households that own milch animals. Chapter IV looks at the composition and distribution of the bovine stock. Chapter V focuses on the production, consumption and marketing of milk. Chapter VI considers animal feed and labour- use pattern in the dairy sector. Chapter VII deals with the cost of milk production and revenue from dairying. The impact evaluation of Operation Flood on the rural dairy sector has been presented in the last chapter. This report primarily offers a comparative analysis of the key findings of the present survey and the Baseline Study conducted in 1988-89. A summary of the findings is presented in the beginning of the volume.

## **BENEFITS OF THE STUDY**

The appraisal of the performance of the dairy sector in this study is done in terms of the overall goals of national economic development, namely, growth, social justice and self-reliance. The results of this study, we believe will help in formulating a policy framework for bringing about an improvement in the rural economy, particularly in OF areas. And also for developing future strategies to maximise milk production and widen the target group and range of beneficiaries of the programme. In addition, these results will help in identifying and removing obstacles in terms of promoting and strengthening the dairy sector; and in channeling developmental efforts towards a self-sustaining rural economy.

## **LIMITATIONS OF THE STUDY**

- (i) The scope of the study is limited to OF areas where dairy cooperative societies are functioning and only includes households which have milch bovines.
- (ii) The data for the survey were collected from sample villages (with functioning DCSs) during January to March 1996, which is the flush season with maximum output of milk compared to other months of the year. Hence, some of the parameters may be overestimated in the data presented in the report.
- (iii) For the present survey, a sub-sample of DCSs covering the 25 regions used for the Baseline Study in the year 1988-89 has been adopted. Since the sample sizes were not sufficient to provide reliable estimates of parameters at the regional level, the data analysis in this report is generally limited to four broadly defined zones, i.e., East, North, South and West.

These limitations of the survey need to be kept in mind while comparing livestock data from other sources.



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## **CHAPTER II**

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### **METHODOLOGY**

#### **COVERAGE OF THE STUDY**

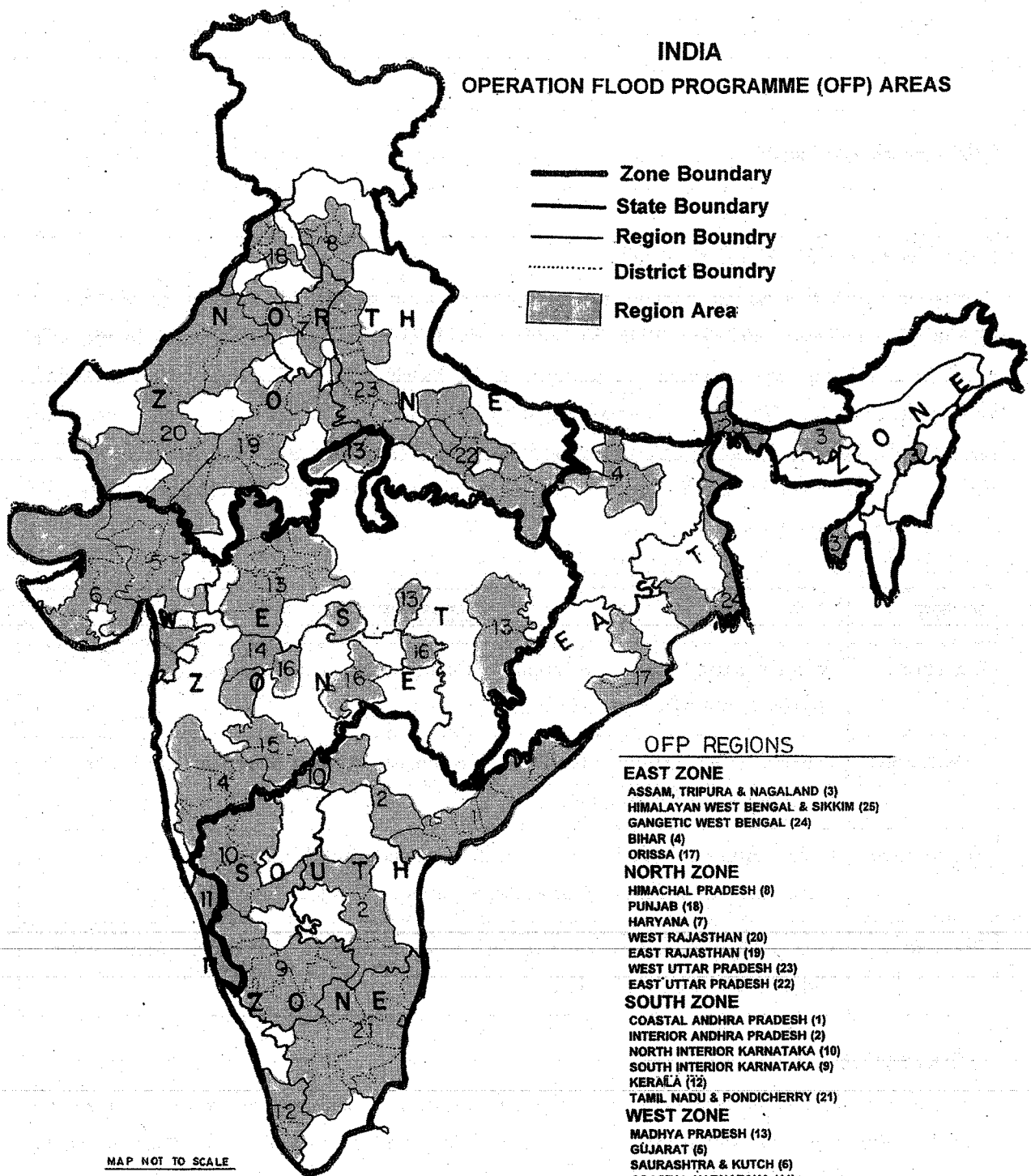
The study involved a sample survey of rural milk-producing households in areas covered under Operation Flood as of February 1996. In order to bring out the regional variations in the milk economy 25 regions were covered, the same as in the Baseline Study. The regions were defined, keeping in view the similarities in agro-climatic features, and in the types of bovines and their maintenance. The regions and their constituents with milksheds and districts are indicated in Fig. 2.1. For the sake of convenience, the 25 regions have been grouped into four zones. The composition of the four zones is as follows:

<b>ZONE</b>	<b>REGIONS</b>
<b>East zone</b>	Assam (Assam, Nagaland & Tripura ), Bihar, Orissa, Gangetic West Bengal and Sub-Himalayan West Bengal & Sikkim.
<b>North zone</b>	Haryana, Himachal Pradesh, Punjab, East Rajasthan, West Rajasthan, East Uttar Pradesh, West Uttar Pradesh.
<b>South zone</b>	Coastal Andhra Pradesh, Interior Andhra Pradesh, North Interior Karnataka, South Interior Karnataka, Kerala and Tamil Nadu & Pondicherry.
<b>West zone</b>	Gujarat, Saurashtra & Kutch, Coastal Karnataka, Madhya Maharashtra, Marathwada, Vidarbha and Madhya Pradesh.

#### **APPROACH**

A questionnaire-based approach was used to obtain information for assessing the impact of Operation Flood on the qualitative and quantitative aspects of the rural dairy sector. The Baseline Study, conducted in 1988-89, had adopted a two-stage stratified random sampling design. In the first stage, sample villages were selected from the Milk Union's list of village dairy cooperative societies. In the second stage, the households were selected from the sample DCSs. Stratification was done at both stages.

# INDIA OPERATION FLOOD PROGRAMME (OFF) AREAS



## **Selection Of Village Dairy Cooperative Societies (DCSs)**

The efficient functioning of DCSs has an impact on the development of dairy activities in villages in terms of productivity of milch animals, feeding and cattle maintenance practices, and the supply and marketing of milk. In the Baseline Study, DCSs in a region were stratified into three or more groups with different levels of milk procurement per member. The number of sample DCSs allocated to each effective stratum was in proportion to its total milk procurement. Based on the probability proportional to the level of milk procurement, a number of DCSs were selected. An average of 60 DCSs were selected for each zone and that formed the first stage of the sampling. A total number of 239 DCSs were covered for the purpose of the study.

For the present survey, a sub-sample of DCSs was selected from the list of sample DCSs used for the Baseline Study. This was done through systematic random sampling, representing all the unions covered in it.

## **Updating, Stratification and Selection of Sample Households**

The second stage of sampling constituted the milch animal households (MAHs). Between 1988 and 1995 there have been changes in DCS membership--with additions of new households and withdrawal of membership by member households. After updating the membership, MAHs in the selected DCSs were listed and classified under the following categories.

- (a) Households that were members of a dairy cooperative society and had:
  - (i) exotic/crossbred cows with some operated land;
  - (ii) improved breed of milch animal (cow or buffalo or both) but not exotic/crossbred cow and some operated land;
  - (iii) indigenous cow/buffalo (but not crossbred/exotic cow or improved breed of the same) and some operated land; and
  - (iv) same characteristics as the above 3 classes of households with respect to type of milch animals, but no operated land.
- (b) Milch animal households that were not members of the dairy cooperative societies were also classified according to the above criteria.
- (c) The last category was households that did not have milch animals.

Thus, at the second stage, the above listed households were stratified under 13 categories. The households listed in the 13th strata of 'non-owners of milch animals' were dropped from the sample frame. The stratification procedure ensured the representation of all the major types of MAHs. The MAHs (approximately 12 in each DCS) were selected from each effective stratum to ensure that households listed had an equal probability of selection.

**Table I : Sample size of Milksheds, DCSs and Households by Region**

(Numbers)

<b>Region/Zone</b>	<b>Milksheds</b>	<b>DCSs</b>	<b>Households</b>
Assam	3	4	48
Bihar	6	17	204
Orissa	3	4	48
Gangetic West Bengal	4	7	84
Sub-Himalayan West Bengal & Sikkim	3	4	48
<b>EAST ZONE</b>	<b>19</b>	<b>36</b>	<b>432</b>
Haryana	7	9	108
Himachal Pradesh	2	7	84
Punjab	8	11	132
West Rajasthan	6	8	96
East Rajasthan	8	14	168
East Uttar Pradesh	13	15	180
West Uttar Pradesh	13	16	192
<b>NORTH ZONE</b>	<b>57</b>	<b>80</b>	<b>960</b>
Coastal Andhra Pradesh	5	12	144
Interior Andhra Pradesh	5	10	120
South Interior Karnataka	8	10	120
North Interior Karnataka	5	7	84
Kerala	2	7	84
Tamil Nadu & Pondicherry	10	15	180
<b>SOUTH ZONE</b>	<b>35</b>	<b>61</b>	<b>732</b>
Gujarat	9	13	156
Saurashtra	5	5	60
Coastal Karnataka	2	3	36
Madhya Maharashtra	6	8	96
Marathwada	4	5	60
Vidarbha	4	4	48
Madhya Pradesh	7	24	288
<b>WEST ZONE</b>	<b>37</b>	<b>62</b>	<b>744</b>
<b>ALL ZONES</b>	<b>148</b>	<b>239</b>	<b>2868</b>

The households, thus selected, were contacted for collecting detailed information through structured questionnaires. As the focus was on the Operation Flood programme, the number of sample MAHs from strata 1-6 (member-MAHs) constituted approximately 64 percent of the total sample MAHs and the rest were from strata 7-12 (Non-member MAHs). Thus, for the purpose of the study, a total number of 2,868 households comprised the second stage of the sampling. The sample size for different zones and regions are presented in Table I.

## ESTIMATION PROCEDURE

Several parameters, such as totals, means, ratios and proportions, were estimated from the sample data. The population parameters were estimated by using household weights that were inversely

proportional to the probability of selection. There were as many distinct household weights for a region as the number of strata. If a certain stratum did not contain any listed households, then the household weight for that stratum would be a zero.

As an illustration, the following are some of the estimators that have been used:

- (a) Total milk supplied to the cooperative sector by the rural households in a region
- (b) Milk yield per day of an in-milk crossbred cow
- (c) Proportion of households having crossbred cows out of the total number of households with milch animals

For the purpose of illustration, let

$i = 1, 2, \dots, n_j$  = household number in  $j$ th stratum

$j = 1, 2, \dots, 12$  = stratum  $j$

$k = 1, 2, \dots, k_i$  =  $k$ th crossbred cow belonging to  $i$ th household.

**Case (a) :** Milk supplied to the cooperative sector

$$MS = \sum_j \sum_i ms_{ij} w_j$$

**Case (b) :** Milk yield per crossbred cow per day

$$MY = \sum_j \sum_i \sum_k (mp_{kij} W_j) / (\sum_j \sum_i U_{ij} \cdot w_j)$$

**Case (c) :** Proportion of households having crossbred cows

$$P = (\sum_j \sum_i W_j DCB_{ij}) / (\sum_j W_j n_j)$$

Where,

$W_j$  = Weight of any household of  $j$ th stratum;

$MS$  = Milk supplied to the society on an average per day in a season by the household;

$MS$  = Estimated milk supplied to the cooperative sector by all the households in a region;

$MY$  = Estimated average milk yield per in-milk crossbred cow per day;

$MP$  = Average milk produced per in-milk crossbred cow per day in a season;

$U$  = Number of in-milk crossbred cows in a household;

$P$  = Proportion of households maintaining crossbred cows out of the total number of rural households having milch animals; and

$DCB$  = Indicator variable taking the value of 1 if the household has a crossbred cow and '0' otherwise.

Therefore, while estimating totals, the estimator is a weighted sum of the household level values, and similarly in the case of ratios, the estimator is a ratio of weighted sum to the weighted denominator sum.

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## **CHAPTER III**

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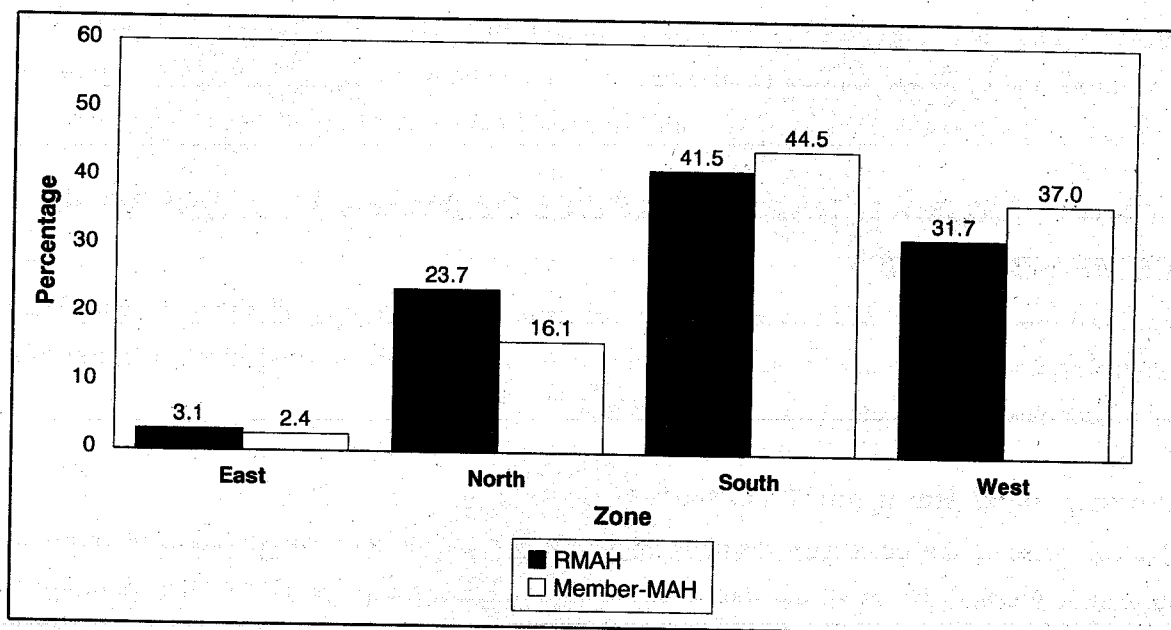
### **GENERAL CHARACTERISTICS OF MILCH ANIMAL HOUSEHOLDS**

Operation Flood, since its launching in 1970, has progressed rapidly by covering a large geographical area of the country and bringing in an increasing number of milk producers into its cooperative fold. The impact of OF on the milk economy of a region does not vary only with the length of time for which the programme has been in operation. But also varies with the extent of the spread of DCS membership, the socio-economic characteristics of the rural households, the conditions of milk production, and the effectiveness with which the cooperative structure has been functioning in a region. The production conditions existing in a region depend on the prevailing practices and awareness among households regarding housing of milch bovines, veterinary health care, and upgrading of the bovine stock. Equally important is the quality of support facilities provided by the dairy cooperative structure (via the milk unions and DCSs) to dairy entrepreneurs. The quality of services offered by milk unions and DCSs are indicators of the effective functioning of the cooperative structure in a given region. In this chapter, we examine these key issues in the growing dairy sector.

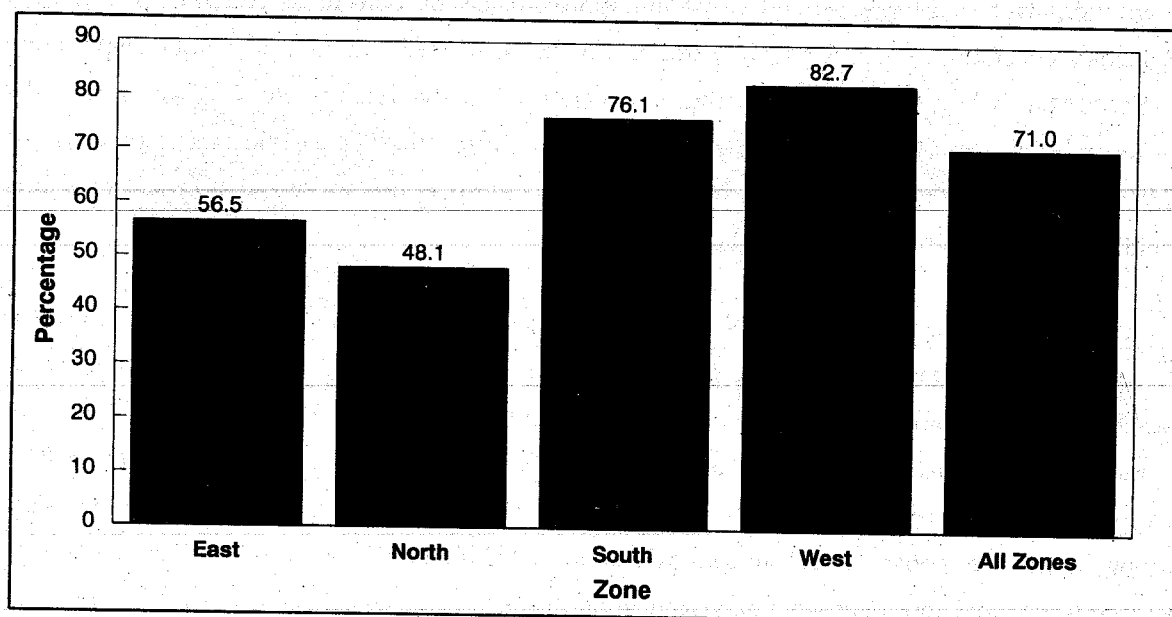
### **DCS MEMBERSHIP AMONG RURAL MILCH ANIMAL HOUSEHOLDS**

The extent of OF coverage in the four regions varies with the size of the territory and the length of period for which the programme has been in operation. Table 3.1 presents the estimated number of Rural Milch Animal Households (RMAHs) and the number of member-Milch Animal Households (member-MAHs) of DCSs under Operation Flood. At the aggregate level, approximately 11.7 million households possess milch bovine stock, of which about 8.3 million (71 percent) households have at least one member each in a DCS. The percentages of RMAHs range from 3.1 percent in the Eastern zone to 41.5 percent in the Southern zone. A similar trend is observed in the case of member-MAHs. The variations in RMAHs and member-MAHs among zones reflect the potential for future growth. The share of the Southern zone in respect to RMAHs and member-MAHs is the highest (41.5 percent and 44.5 percent, respectively) followed by the Western zone (31.7 percent and 37.0 percent) and the Northern zone (23.7 percent and 16.1 percent). The Eastern zone has the lowest share (3.1 percent and

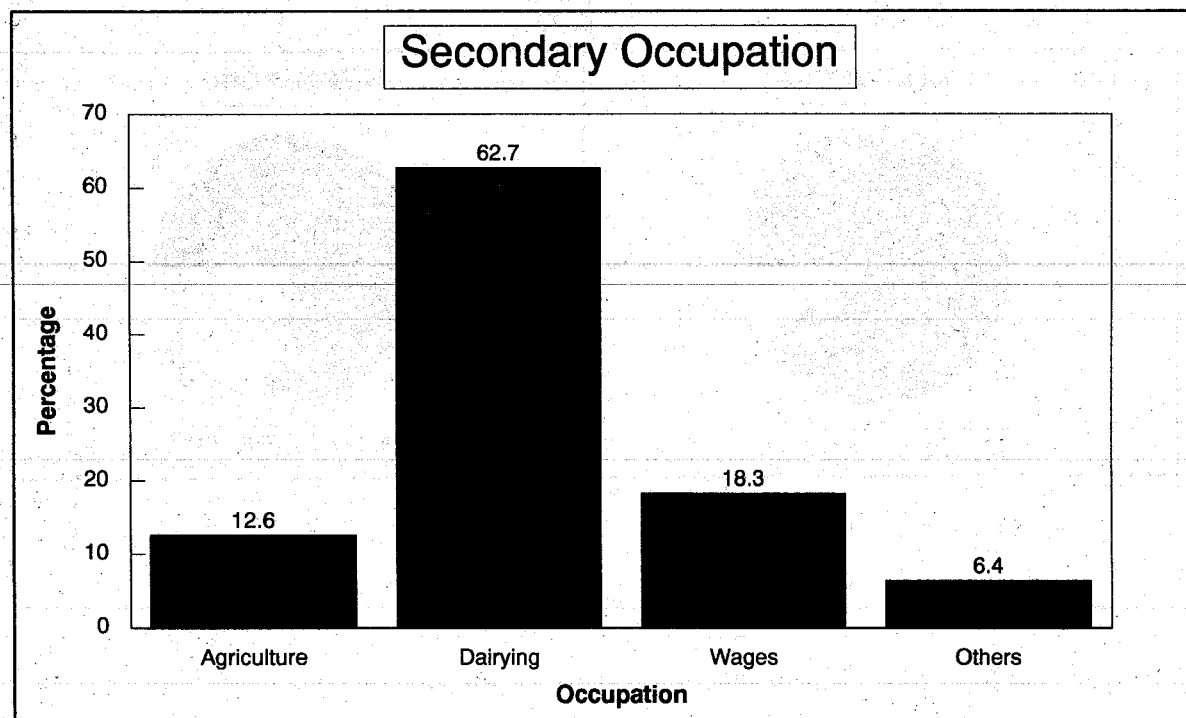
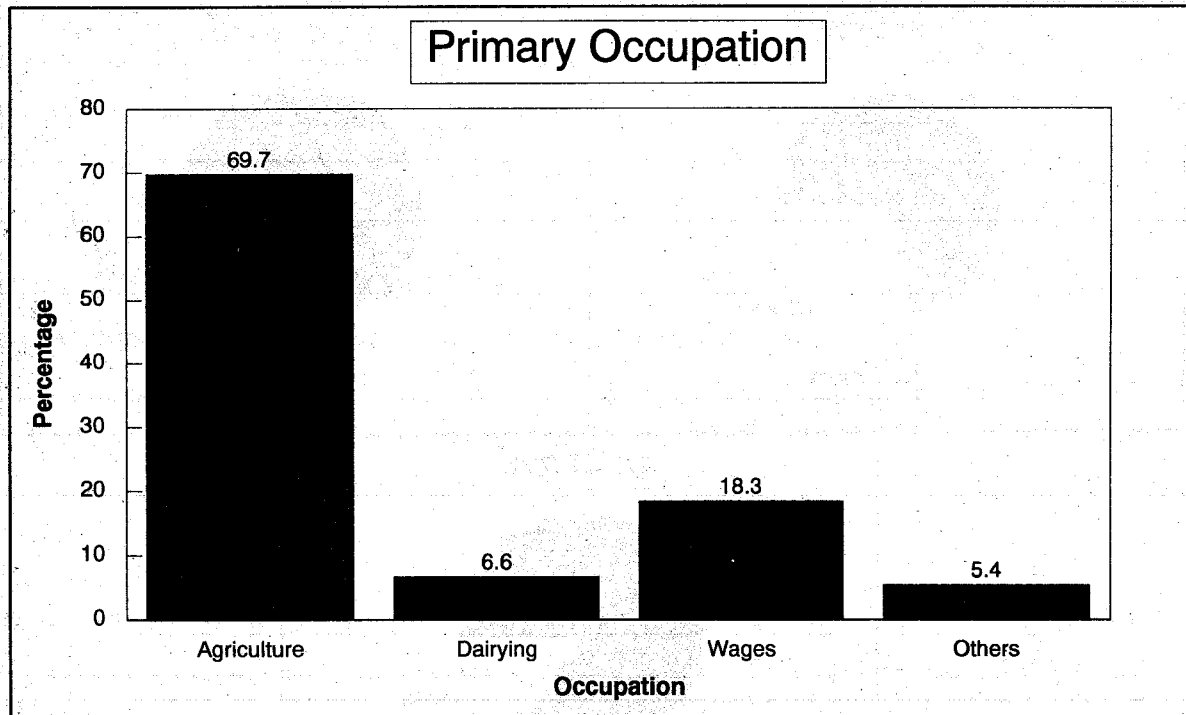
**Fig. 3.1a : Zone-wise Distribution of RMAHs and Member-MAHs in Operation Flood Areas**



**Fig. 3.1b : Zone-wise Share of Member-MAHs to RMAHs**



**Fig. 3.3 : Percentage Distribution of RMAHs by Occupation**





the East zone. This percentage is higher for member-MAHs in comparison to non-member-MAHs across zones. Among heads of households, 65.2 percent reported dairying either as a primary or secondary occupation.

### Operational Land and Milch Animal Holding

As seen in the previous section, the livestock sector in India is closely linked with agriculture. Households that have land to grow feed/fodder are more likely to keep and rear milch animals than landless households. At this point it would be useful to address certain questions that have been raised on the pattern of DCS membership: Is it only the bigger and well-to-do farmers who benefits from the programme, or do the benefits reach the other segments of the population as well? The answer to these questions lies in the pattern of the DCS membership. In order to understand the pattern milch animal households have been classified into the following groups.

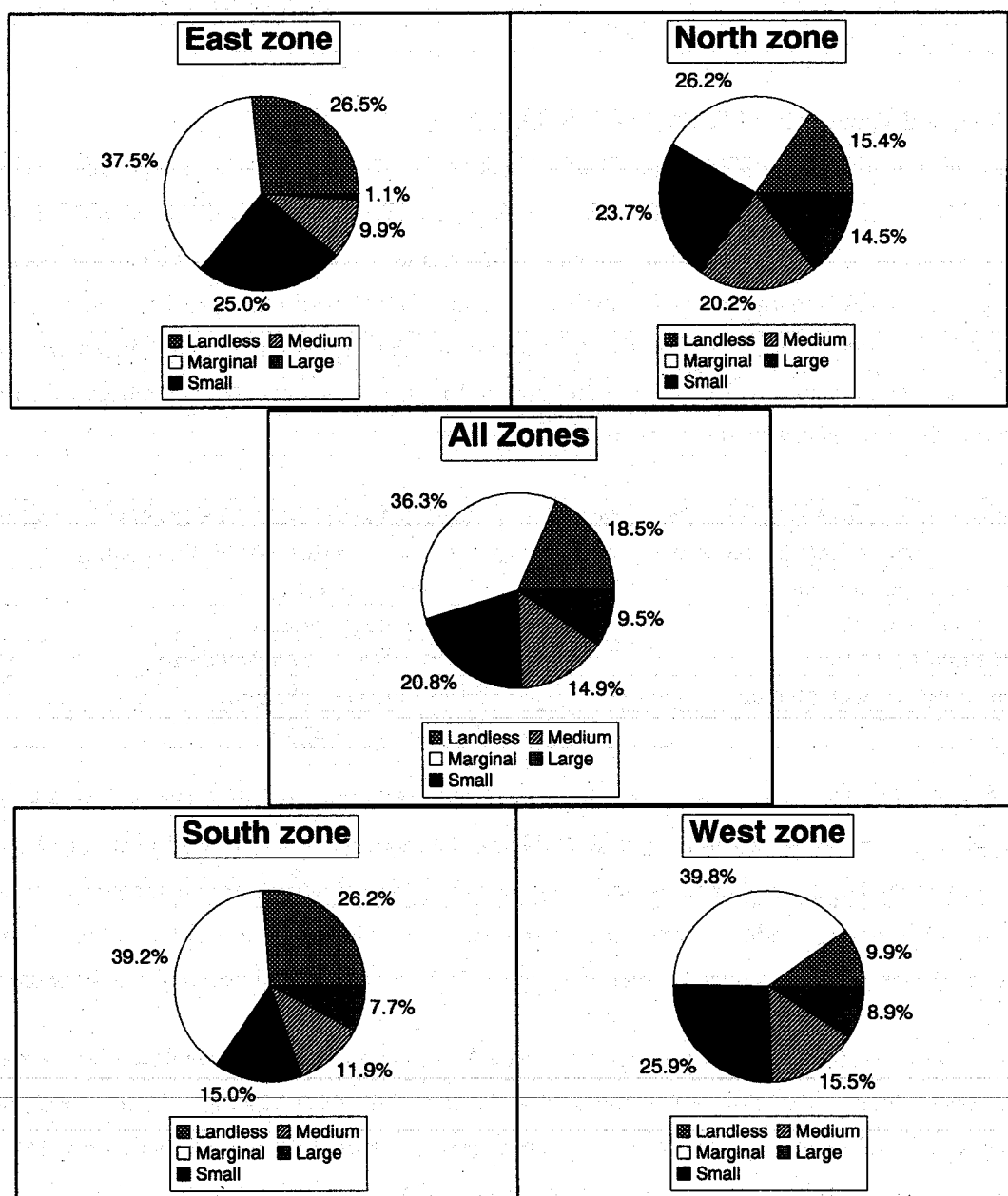
<b>MILCH ANIMAL HOLDING SIZE</b> <b>Household possessing</b>	<b>OPERATIONAL LAND HOLDING SIZE</b> <b>Household possessing</b>
1. Only one milch animal	< 1 hec. – Marginal
2. Two milch animals	1 to < 2 hec. – Small
3. Three milch animals	2 to < 3 hec. – Semi-medium
4. Four or more milch animals	3 to < 4 hec. – Medium
	= > 4 hec. – Large

Table 3.5 presents data on percentage distribution of RMAHs and member-MAHs by operational land holding groups. The zonal distribution of RAMHs can be seen in Fig. 3.4. While the ability of the large farms to maintain larger number of bovines is self-evident, it is not entirely true that small farms are left out of the OF coverage. The Marginal and small farmers (< 2 hectares) account for about 57 percent of all households, while their share in membership of DCSs is at a higher level of about 60 percent.

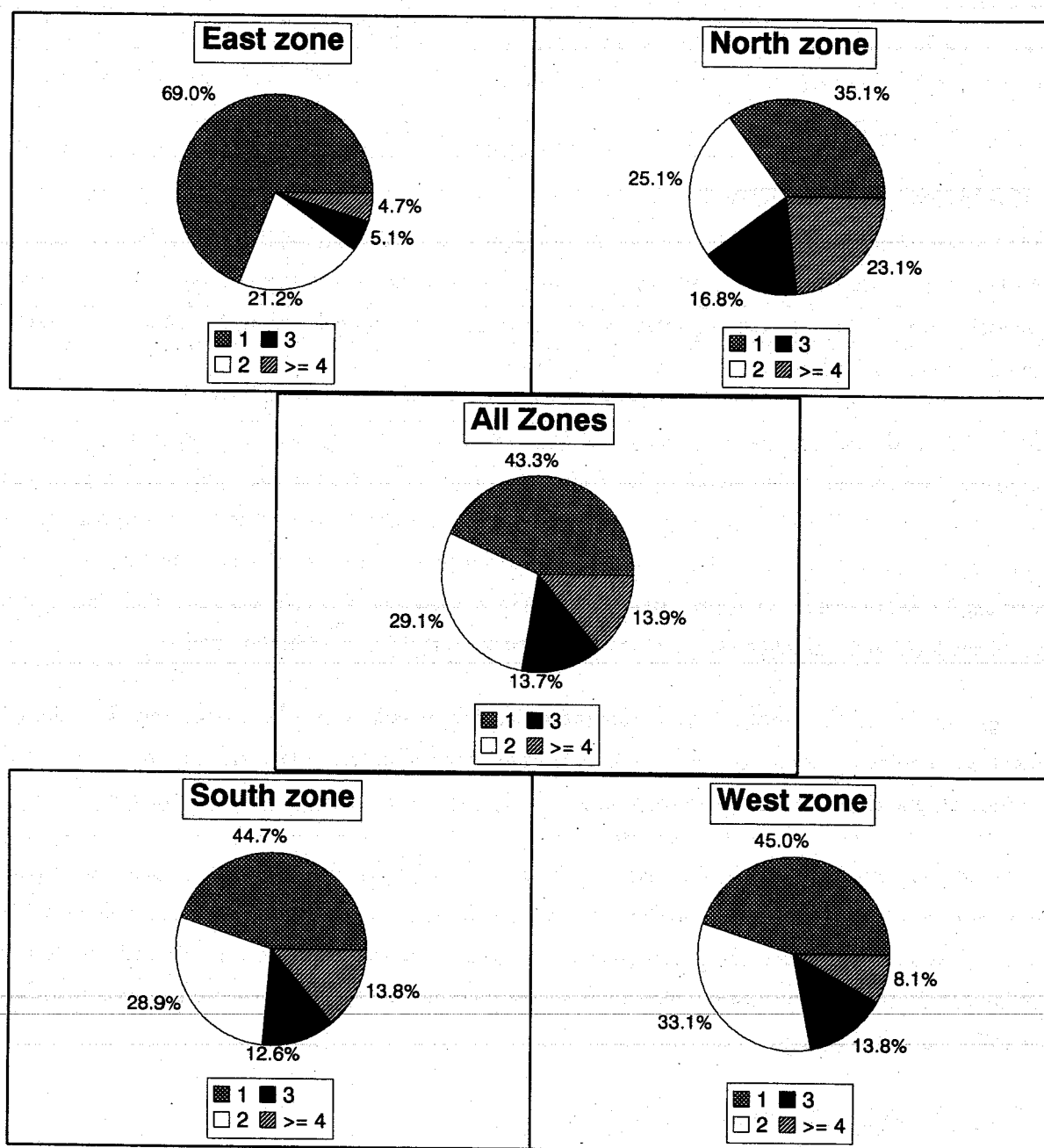
On the other hand, if one considers the milch animal holding size, out of the total number of RMAHs, 72.4 percent possess either one or two milch animals, and 69.6 percent member-MAHs belong to this category (Table 3.71 and Fig. 3.5). Table 3.5 shows that about 75.4 percent of member-MAHs either own less than 2 hectares of land or are landless. Thus, the dairy sector in the OF areas is predominantly that of the marginal/small farmers and the landless with one or two milch animals. Examining the relationship between animal holding size and membership, we find that the proportion of non-member-MAHs with one milch animal is more than that of member-MAHs, but as the animal holding size increases, the number of member-MAHs goes up.

Table 3.72 presents the percentage distribution of RMAHs by the type of milch animals that they hold and animal holding size. These households have been distributed into three categories of owners: of cows, buffaloes and households that own both animals. At the aggregate level, approximately 40.2

**Fig. 3.4 : Distribution of RMAH by Operational Land Holding Groups**



**Fig. 3.5 : Distribution of RMAH by Milch Animal Holding Size**



percent of households own cows and 38.9 percent own buffaloes. Among zones, while cows are predominant in the Eastern and Southern zones, it is the buffalo that is predominant in the other two zones. It is interesting to note that while at the aggregate level 20.9 percent of the households possess both cows and buffaloes, such households constitute about 31.4 percent in the North, followed by 24.1 percent in the West.

## **HOUSING OF ANIMALS**

Apart from proper feeding of the animal, the housing, health care and hygiene of the bovine stock is the key to the productivity of milch animals. Although it is not possible to measure these variables precisely, some indication can be obtained by studying the type and location, frequency of cleaning, sanitary condition and drainage systems of cattle stalls.

Table 3.81 and 3.82 present percentage distributions of RMAHs by factors relating to housing of animals. Approximately 54 percent of RMAHs keep animals in separate stalls. This percentage ranges from 29 percent in the Western zone to 68 percent in the Southern zone. With regard to the type of housing, a large number of RMAHs have reported the provision of kutchra housing for their milch animals. In each of the four zones, these percentages are lower in the case of member-MAHs. At the aggregate level, approximately 9.2 percent of RMAHs keep their bovines in the open.

A large number of households have reported the cleaning of stalls regularly or once a week. Although most households reported that their milch animals are housed in clean stalls, in more than 50 percent of the households except in the Southern zone, the drainage systems are far from satisfactory.

Only 62 percent of Milch animal households have provided sheds for animals to protect them from hot winds in summer. This is one of the major reasons for the low productivity of milch animals in the summer season. Therefore, the provision of a proper drainage system in the cattle stall and protection of animals from hot winds during the summer season are factors that need special attention in almost all OF areas of the country.

## **MILCH ANIMAL HEALTH CARE**

A successful livestock development programme requires a well-knit animal health care system for the protection of livestock wealth against diseases and pests. With the increase in productivity of dairy animals, the dairy farmer is now aware of the need to provide adequate health care to protect them, and follow better management practices. Diseases and poor health facilities can cause high mortality, but more often lead to morbidity that results in reduced milk production. Dairy farming is not commercially viable under such conditions. The availability of veterinary health care facilities, in terms

of quality and extent, differs across the regions. The facilities available in the the OF areas are of a higher order than in the other areas, as the dairy cooperatives provide services to the rural milch animal households in addition to those available through government and private veterinary hospitals. The data obtained in the present survey regarding the use of selected variables relating to the health of animals are presented in Tables 3.91 to 3.93.

Among the veterinary health care facilities offered in the rural areas, the services of government veterinary hospitals have been found to be the most important, followed by the DCS/Milk Union health care facilities which play a significant role in dairy development in OF areas. The DCS/Milk Union health care facilities are used by member-MAHs across zones except in the North zone.

The quality of veterinary health care facilities have been further examined in the tables by using criteria, such as frequency of visits of veterinary mobile vans, de-worming of animals, frequency of washing of animals, and type of medicines used by households.

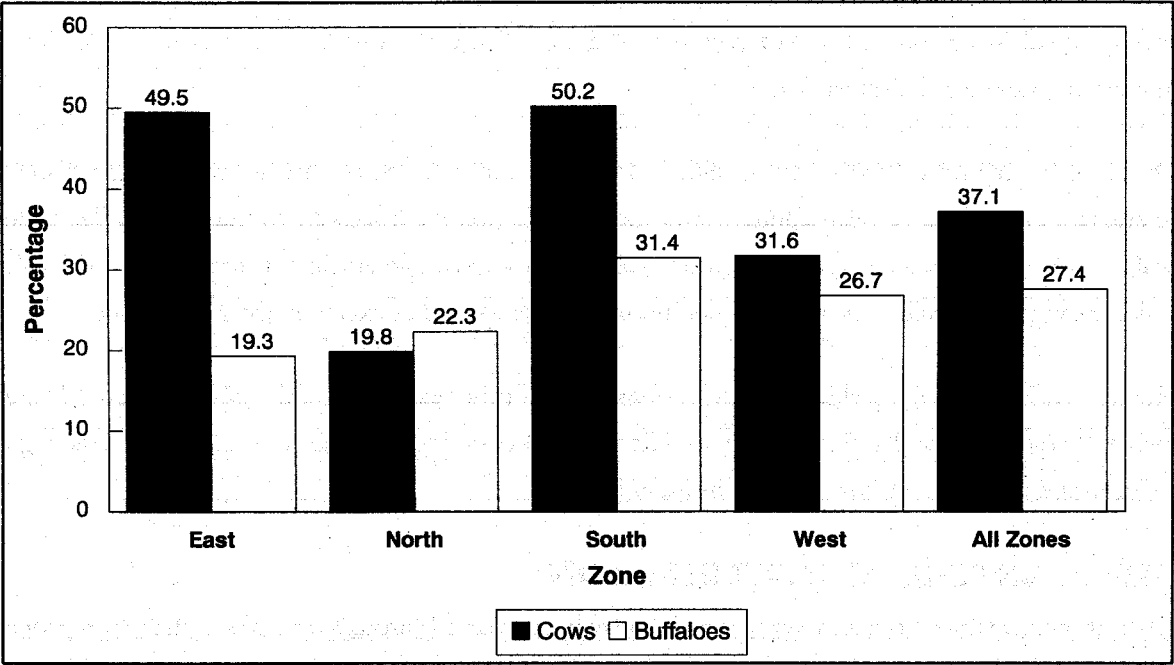
## **USE OF ARTIFICIAL INSEMINATION**

Most of the breeds of bovine stock that exist today have evolved through natural selection by a process of adaptation to the agro-ecological conditions. India has the world's best breeds of dairy buffaloes that have adapted to tropical conditions and are resistant to most of the tropical diseases. However, traditionally, cattle in India have been maintained as suppliers of draught power. But with the increase in human population, efforts were made to improve milk production through crossbreeding of select superior indigenous breeds and the upgrading of the low-milk yielding milch animals with superior exotic breeds. Here it would be useful to examine the extent to which artificial insemination (AI) has been used for upgrading the local low-yielding stock of milch bovines. Tables 3.101 and 3.102 present the relevant data.

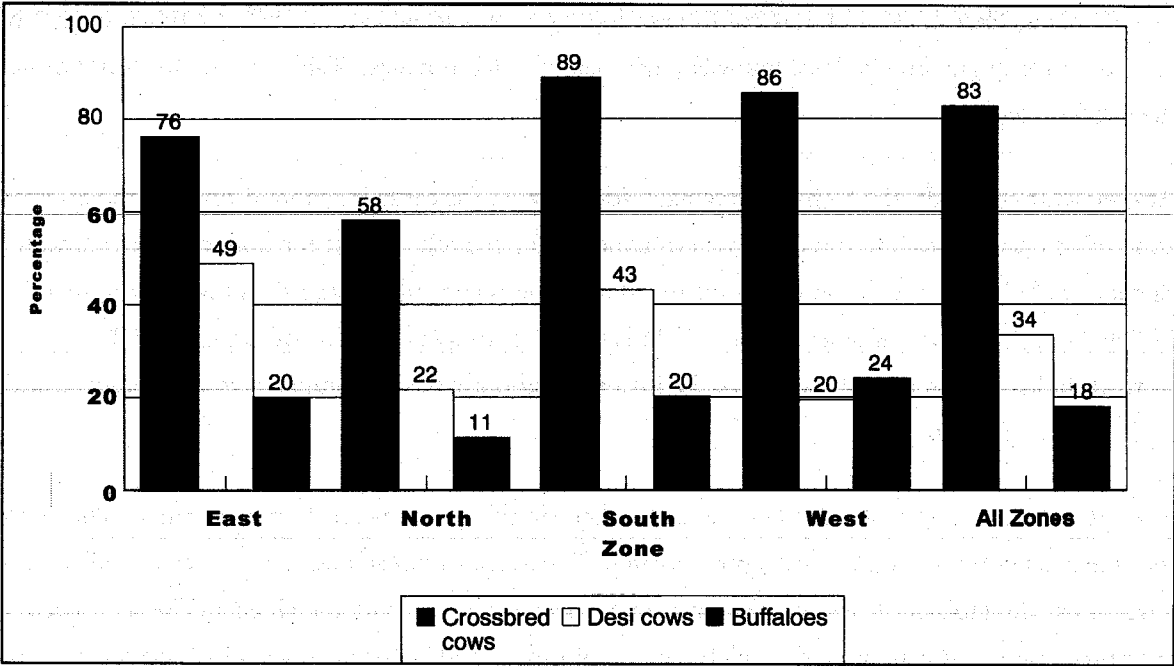
Among all households, the highest percentage adopting AI for cattle is reported to be in the Southern zone (50.2 percent), followed by the Eastern zone (49.5 percent). Across the zones, the proportion of member-MAHs that have adopted AI for breeding cattle is generally higher than that of non-member-MAHs. In the case of buffaloes, the use of AI is lower as compared to that of cattle. Only 27.4 percent of households have reported the use of AI for breeding buffaloes as compared to 37.1 percent in the case of cattle (Fig. 3.6).

The introduction of crossbred cows has made dairy farming commercially remunerative. The survey indicates that at the aggregate level, approximately 75 percent of households use the Jersey bull, and 14 percent use the Holstein-Friesian. The proportion of households using the Holstein-Friesian breed for crossbreeding of indigenous cattle is higher in the Northern and Western zones (23-28 percent) than in

**Fig. 3.6 : Percentage Distribution of RMAHs Using Artificial Insemination for Milch Animals**



**Fig. 3.7 : Proportion of Milch Animals Artificially Inseminated**



the other two zones. The Brown-Swiss breed is mostly used in the Southern zone. In the case of buffaloes, the Murrah breed is used for upgrading low-milk-producing breeds in OF areas.

The proportion of milch animals, crossbred and desi cows, and buffaloes varies considerably across the OF area. Table 3.103 indicates that 82.8 percent of crossbred cows, 33.5 percent of desi cows and 18 percent of buffaloes are impregnated through AI at the all-India OF level. At individual zonal levels, for the crossbred and desi cows, the percentages range from 89 percent and 43 percent in the Southern zone to 58 percent and 22 percent in the Northern zone. On the other hand, in the case of buffaloes, the proportion is highest in the Western zone (24 percent) and the lowest in the Northern zone (11 percent) (Fig. 3.7). Thus, the proportion of milch animals impregnated through AI is considerably lower for buffaloes than for cattle. In spite of the importance of buffalo as a dairy animal, it has not received due attention in the various improvement programmes. The major limitation has been in the selection of genetically superior he-buffaloes as there are only a few farms that conduct progeny testing. Further still, difficulties exist in obtaining good quality of buffalo semen throughout the year, and in preserving it.

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## **CHAPTER IV**

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### **COMPOSITION AND DISTRIBUTION OF BOVINE STOCK**

India has almost one-sixth of the cattle and one-half of the buffalo population of the world. Over a period of time, while the cattle have emerged as suppliers of motive power for use in agriculture and other areas, the buffalo has become the leading contributor towards India's milk production. Until the early sixties, the bovine stock had a large cattle population, but since the mid-sixties technological changes in crop cultivation have induced changes in its composition. This was essentially due to a weakening of the symbiotic relationship between crop cultivation and animal husbandry. Changes in the size and composition of the bovine stock are not just governed by livestock development strategies, but also depend on institutional, economic and technological factors. For instance, the religious taboo against cow-slaughter in the country makes it necessary to hold a larger number of cattle than is economically viable and optimal. And with the mechanisation of agriculture, a smaller number of animals are required for working in the fields. These changes besides affecting the bovine population also affect the composition of the stock between cattle and buffaloes, and within each of these two species. Consumer preference for buffalo milk, its higher fat content along with other minor components significantly higher than in cow's milk reflected in its higher price, may also result in a possible increase in the share of buffaloes in the bovine stock.

For designing appropriate policies for livestock development and to give a further boost to their productivity, it is essential that we focus on the nature and significance of the changes taking place in the bovine stock across the country. In order to do so, we shall examine the distribution of bovine wealth across Operation Flood areas of the country.



## BOVINE STOCK IN OF AREAS

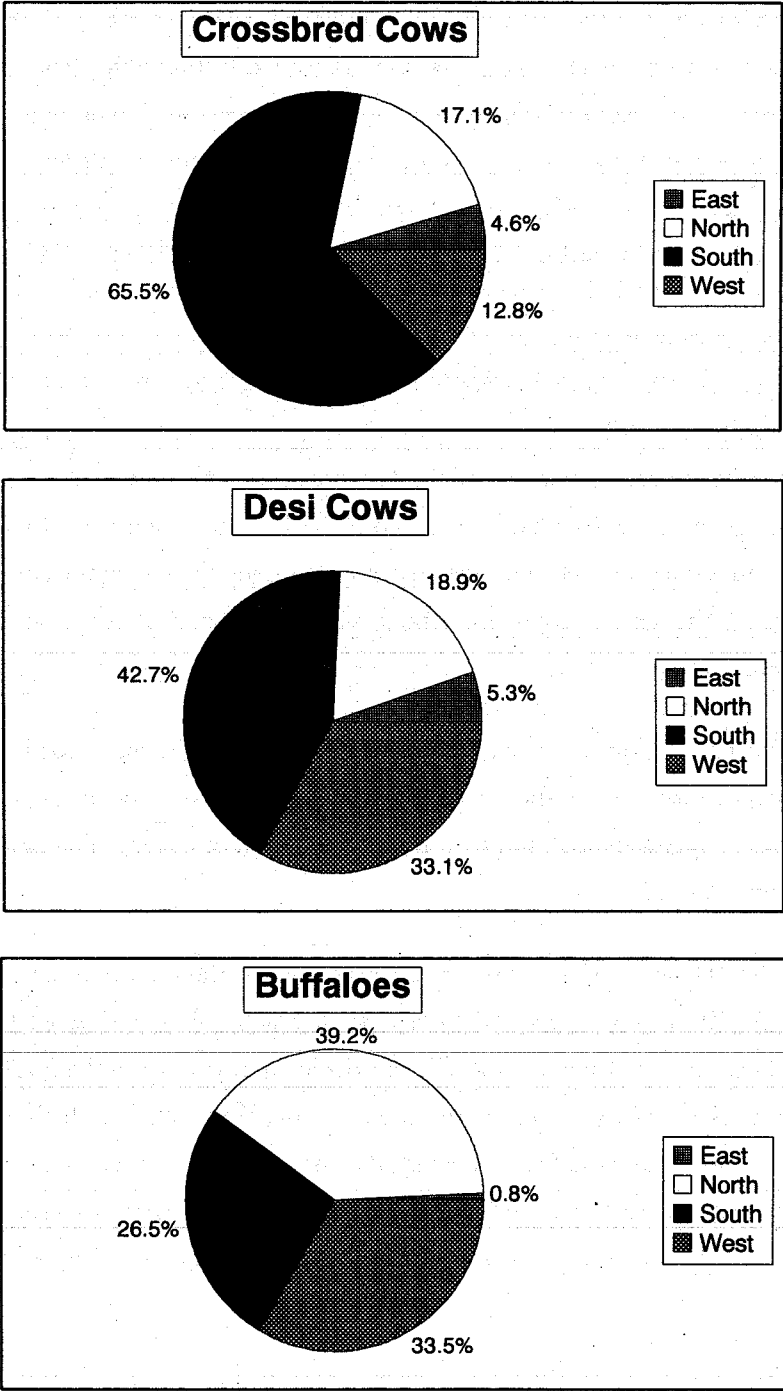
The direct impact of Operation Flood on milk producers is likely to be greater among members of cooperative societies than on non-members, and hence the discussion mainly relates to members of the primary milk producers' cooperative societies. While there are a large number of breeds among cattle and buffaloes in the various milkshed areas, this study is limited to providing estimates of three broad categories of bovines: (i) indigenous (desi) cows; (ii) crossbred cows (including exotic breeds and their crosses with indigenous breeds); and (iii) buffaloes. The data presented in Tables 4.1 and 4.2 present the composition and distribution of (MAH-owned) cattle and buffalo population. Table II and III present the percentage distribution of bovines by MAH-membership and type of animal in OF areas.

Bovine milch animals comprising cows and buffaloes constitute 49.9 percent of the total bovine stock in OF areas. While the Southern zone has approximately 38.1 percent of the total number of bovines, followed by the Northern and Western zones, the East zone accounts for a very small proportion. Member households have over 71 percent of the bovine stock. At individual zonal levels, members own a marginally higher number of bovines as compared to non-members. In the Southern and Western zones the difference between the two types of households are significant. This indicates an extensive adoption of the dairy cooperative movement in these two zones as compared to the Northern and Eastern zones.

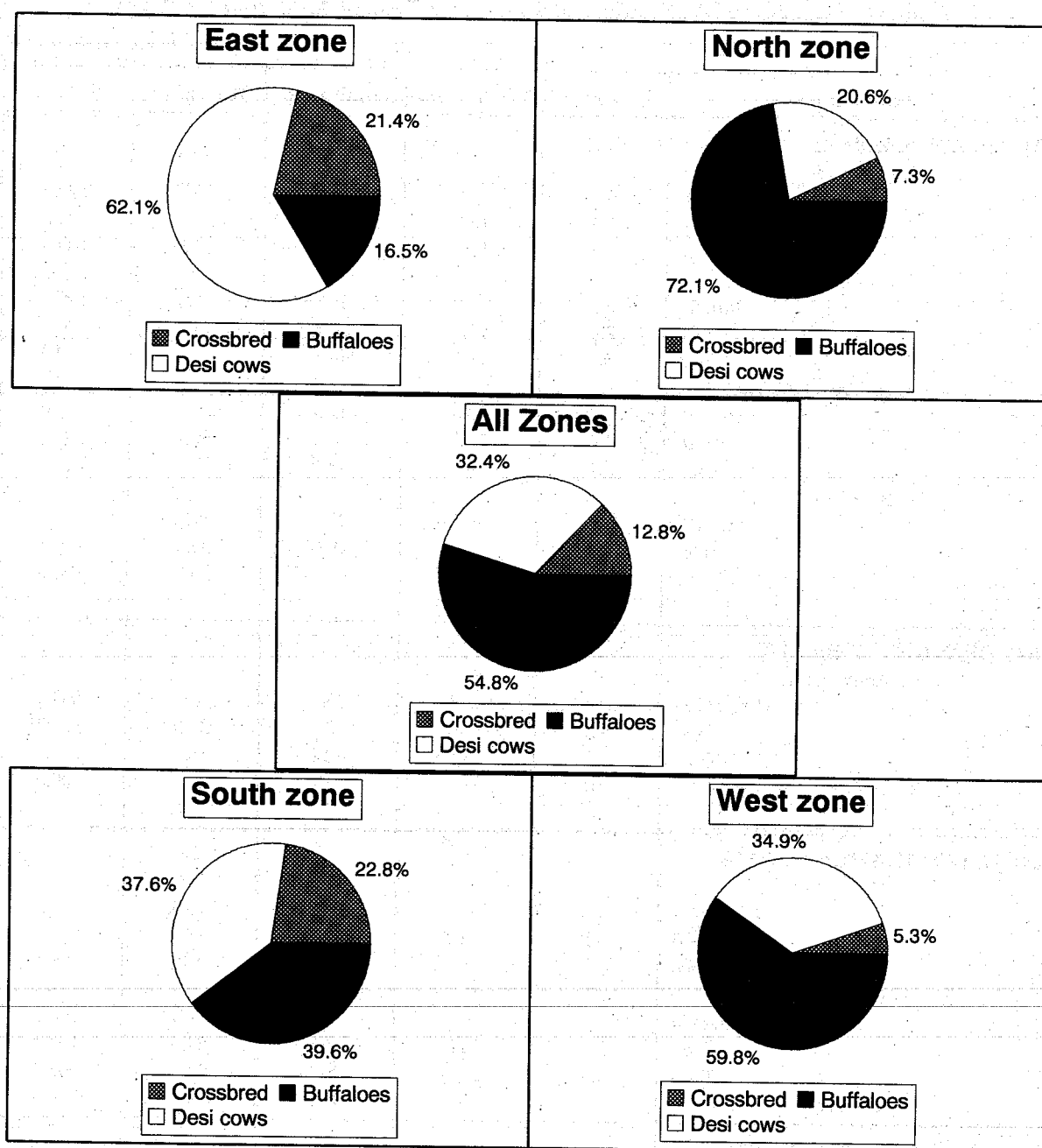
The proportion of cattle is more than that of buffaloes among all bovines. But in the case of adult female bovines, the proportion of buffaloes is higher than that of cows at the aggregate level. At the zonal level, buffaloes are predominant in the Northern and Western zones, while cows dominate in the Southern and Eastern zones.

At the aggregate level, the share of crossbred cows in relation to the total number of milch animals is around 12.8 percent. The relative shares of each type of milch animal within each zone and in the entire OF area are presented in Table III and IV, and depicted in Fig. 4.1 and 4.2. These figures reveal that while the share of crossbred cows to the total milch animal stock is higher than that at the aggregate level in the Southern zone (22.8 percent), the shares of Northern and Western zones are 7.3 percent and 5.3 percent, respectively. Although the Eastern zone's share of crossbred cows is the second highest, its contribution to the overall OF milch animal population is very small.

**Fig. 4.1 : Disribution of Milch Animal by Type**



**Fig. 4.2 : Zone-wise Distribution of Milch Animals by Type**



**Table II: Percentage Distribution of Bovines by Type of Animal in OF Areas**

*(January-March 1996)*

Type of animal		East zone	North zone	South zone	West zone	All Zones
<b>(I) MILCH ANIMALS</b>						
1. Desi cattle						
	In-milk	6.6	20.9	42.2	30.3	100.0
	Dry	3.4	16.1	43.3	37.2	100.0
	Total	5.3	18.9	42.7	33.1	100.0
2. Crossbred cattle						
	In-milk	5.4	16.8	65.3	12.5	100.0
	Dry	2.8	17.7	66.1	13.4	100.0
	Total	4.6	17.1	65.5	12.7	100.0
3. TOTAL CATTLE						
	In-milk	6.2	19.6	49.5	24.6	100.0
	Dry	3.3	16.5	48.5	31.7	100.0
	Total	5.1	18.4	49.1	27.4	100.0
4. Buffaloes						
	In-milk	0.8	42.1	25.1	31.9	100.0
	Dry	0.8	33.2	29.4	36.6	100.0
	Total	0.8	39.2	26.5	33.5	100.0
<b>(II) DRAUGHT ANIMALS</b>						
1. Adult cattle						
	Crossbred	3.4	66.3	25.4	4.8	100.0
	Desi	8.2	14.6	40.2	37.0	100.0
	Total	8.2	15.1	40.1	36.7	100.0
2. Adult he-buffaloes		0.0	52.4	42.2	5.4	100.0
<b>(III) CATTLE -YOUNG STOCK</b>						
1. Male calves						
	Crossbred	6.8	20.3	62.6	10.3	100.0
	Desi	4.5	17.9	50.9	26.7	100.0
	Total	4.9	18.3	52.9	23.9	100.0
2. Female calves						
	Crossbred	5.6	19.7	66.1	8.5	100.0
	Desi	7.1	24.2	36.4	32.3	100.0
	Total	6.6	22.7	46.1	24.5	100.0
3. Total calves		5.8	20.7	49.2	24.2	100.0
<b>(IV) BUFFALO -- YOUNG STOCK</b>						
1. Male calves		1.0	44.1	37.1	17.4	100.0
2. Female calves		1.1	39.1	24.0	35.7	100.0
	Total	1.1	40.9	28.7	29.4	100.0

**Table III : Percentage Distribution of Bovines by Membership of Households to DCSs**

Zone	Adult Male		Adult Female		Male Calves		Female Calves		Total
	Cattle	Buffalo	Cattle	Buffalo	Cattle	Buffalo	Cattle	Buffalo	
<b>East Zone</b>									
Member	0.5	0.0	0.8	0.1	0.3	0.0	0.5	0.1	2.3
Non-Member	0.3	0.0	0.4	0.1	0.1	0.0	0.3	0.1	1.3
All Household	0.8	0.0	1.1	0.2	0.5	0.0	0.8	0.1	3.6
<b>North Zone</b>									
Member	0.9	0.1	2.5	4.8	1.1	1.6	1.5	2.0	14.5
Non-Member	0.5	0.1	1.7	5.9	0.7	1.4	1.1	2.8	14.2
All Household	1.5	0.2	4.2	10.7	1.8	3.0	2.6	4.8	28.7
<b>South Zone</b>									
Member	2.9	0.1	8.4	5.9	3.2	2.1	4.3	2.3	29.3
Non-Member	1.0	0.0	2.7	1.3	1.9	0.4	0.9	0.6	8.8
All Household	3.9	0.1	11.1	7.3	5.1	2.5	5.2	3.0	38.1
<b>West Zone</b>									
Member	2.7	0.0	5.3	8.0	1.8	0.9	2.3	3.9	25.0
Non-Member	0.9	0.0	0.9	1.1	0.5	0.3	0.4	0.5	4.6
All Household	3.5	0.0	6.2	9.2	2.3	1.2	2.8	4.4	29.6
<b>All Zones</b>									
Member	7.0	0.2	16.9	18.9	6.5	4.6	8.7	8.3	71.1
Non-Member	2.6	0.1	5.6	8.5	3.2	2.2	2.6	4.0	28.9
All Household	9.6	0.3	22.5	27.4	9.6	6.8	11.3	12.3	100.0

**Table IV : Percentage Distribution of Milch Animals by Membership of Households to DCSs**

Zone	Crossbred Cows	Desi Cows	All Cows	She-buffaloes	Female		
					Cattle	Buffaloes	Total
<b>East Zone</b>							
Member	1.0	2.4	3.4	0.4	1.5	0.2	1.8
Non-Member	0.3	1.4	1.7	0.4	0.8	0.2	1.0
All Household	1.3	3.8	5.1	0.8	2.3	0.5	2.8
<b>North Zone</b>							
Member	3.1	7.9	11.0	17.6	5.0	9.6	14.6
Non-Member	1.8	5.6	7.4	21.6	3.4	11.8	15.2
All Household	4.8	13.6	18.4	39.2	8.3	21.5	29.8
<b>South Zone</b>							
Member	16.4	20.8	37.3	21.7	16.8	11.9	28.7
Non-Member	2.1	9.8	11.9	4.8	5.3	2.6	8.0
All Household	18.5	30.6	49.1	26.5	22.2	14.6	36.7
<b>West Zone</b>							
Member	3.5	19.9	23.3	29.3	10.5	16.1	26.6
Non-Member	0.1	3.9	4.0	4.2	1.8	2.3	4.1
All Household	3.6	23.8	27.4	33.5	12.3	18.4	30.7
<b>All Zones</b>							
Member	24.0	51.0	75.0	69.0	33.8	37.9	71.7
Non-Member	4.3	20.7	25.0	31.0	11.3	17.0	28.3
All Household	28.3	71.7	100.0	100.0	45.1	54.9	100.0

The proportion of desi cows to the total number of milch animals is 32.4 percent at the aggregate level; in the Southern zone it is 37.6 percent, followed by the Western (34.9 percent) and the Northern zones (20.6 percent). In the Eastern zone, desi cows account for about 62.1 percent of its milch animal stock, while it contributes only 5.3 percent at the aggregate level.

Likewise, the share of buffaloes is 54.9 percent of the total milch animal stock at the aggregate level. The Northern zone has the highest proportion with over 72 percent, followed by the Western (59.8 percent) and Southern zones (39.6 percent). The Eastern zone has the smallest proportion.

Crossbred cows play a key role in the strategy for increasing milk production in the country. Nearly two-thirds of all crossbred cows are found in the Southern zone, a major proportion of which is owned by DCS members. The share of the Western and Northern zones is 12.7 percent and 17.1 percent, respectively. The overwhelming share of the Southern zone is not surprising; not only is it a cow-dominated region, the proportion of artificially inseminated cows, and households adopting this method are also high.

## **PROPORTION OF IN-MILK MILCH ANIMALS**

All milch animals do not yield milk at the same time, the difference in the genotype influence the length of inter-calving periods and lactation cycles. To assess the milk production potential of milch animals, it is essential to estimate the proportion of lactating (in-milk) animals. The data presented in Table 4.3 shows that at the aggregate level, the proportions in the case of crossbred cows and buffaloes are 68.6 percent and 67.1 percent, respectively, while for the desi cows it is only 58.4 percent. Among the zones, the Northern zone has the highest percentage of in-milk buffaloes (about 72 percent), the corresponding percentages range from 63 to 69 for the other zones. The proportion of in-milk crossbred cows does not show much variation among the zones, except for the Eastern zone where it is about 81 percent; in the other three zones it is around 68 percent. In the case of desi cows, while the proportions in the Western and Southern zones are more or less the same as that at the aggregate level, it is higher in the Eastern and Northern zones.

We find a similar trend in the case of member and non-member MAHs, but the proportion of in-milk animals is higher among member-MAHs than among non-member MAHs across zones.

## **COMPOSITION OF BOVINE STOCK BY SEX, SPECIES AND AGE**

In the earlier sections we looked at the geographical distribution of the bovine stock in OF areas, we would now analyse its composition through factors, such as sex ratio, ratios between different species of milch bovines, and age.

Table V shows that, at the aggregate level, the sex ratio (females per 1,000 males) is 1,800 for the cattle population and 5,600 for that of the buffalo. At the zonal level, the sex ratio for cattle varies within a narrow range, but for buffaloes there is a wide variation--with the highest in the Western zone (11,000) and the lowest in the Southern zone (3,800).

At the aggregate level, buffaloes outnumber desi cows, which in turn outnumber the crossbred. While this order is true in the case of desi and crossbred cows across zones, desi cows outnumber buffaloes in the Southern and Eastern zones. As a matter of fact, in the East zone there are fewer buffaloes than crossbred cows.

**Table V : Composition of Bovine Stock by Sex and Type of Milch Animal**

Zone	Number of females per male					No. of cattle per buffalo	Cows per she-buffalo	Crossbred cows per desi cows	Crossbred cows per she-buffalo	She-buffaloes per desi cow
	Crossbred cattle	Desi cattle	All cattle	Buffalo	All bovines					
<b>East Zone</b>										
Member	4.6	1.1	1.5	5.0	1.6	10.7	6.9	0.4	2.1	0.2
Non-Member	3.5	1.4	1.5	6.0	1.9	4.4	3.3	0.2	0.5	0.4
All Household	4.4	1.2	1.5	5.5	1.7	7.3	5.1	0.3	1.3	0.3
<b>North Zone</b>										
Member	4.4	1.6	2.0	4.1	2.9	0.7	0.5	0.4	0.1	2.7
Non-Member	5.1	2.0	2.3	5.8	4.2	0.4	0.3	0.3	0.1	4.7
All Household	4.6	1.7	2.1	4.1	3.5	0.5	0.4	0.4	0.1	3.5
<b>South Zone</b>										
Member	6.4	1.3	2.1	3.7	2.5	1.8	1.4	0.8	0.6	1.3
Non-Member	5.7	1.0	1.3	4.3	1.7	2.7	2.0	0.2	0.4	0.6
All Household	6.3	1.2	1.8	3.8	2.3	2.0	1.5	0.6	0.6	1.1
<b>West Zone</b>										
Member	6.6	1.5	1.7	12.8	3.6	0.9	0.7	0.2	0.1	1.8
Non-Member	4.5	1.0	1.0	5.5	1.8	1.4	0.8	0.0	0.0	1.3
All Household	6.5	1.4	1.5	11.0	3.2	1.0	0.7	0.2	0.1	1.7
<b>All Zones</b>										
Member	5.9	1.4	1.9	5.6	2.9	1.2	0.9	0.5	0.3	1.6
Non-Member	5.2	1.2	1.4	5.5	2.6	1.0	0.7	0.2	0.1	1.8
All Household	5.8	1.4	1.8	5.6	2.8	1.1	0.8	0.4	0.2	1.7

Age is an important factor that determines the productivity of milch bovines. Tables 4.4 and 4.5 present the distribution of milch bovines and those that are in-milk by broad age groups (3-6 years, 7-10 years, 11-14 years and above 14 years). The percentages of crossbred cows, desi cows and buffaloes in the 3-6 year age group are as follows: 63 percent, 56 percent and 45 percent, respectively. Out of which, approximately 60-68 percent is in-milk bovines. As milch bovines age, their milk yield declines significantly. The data clearly indicate that in view of their commercial interests dairy farmers prefer to keep younger stock of milch bovines, although in some cases the proportion of in-milk bovines may be higher with increasing age.

## **DISTRIBUTION OF MILCH BOVINES BY SOCIAL AND OPERATIONAL LAND HOLDING GROUPS**

To assess the participation of different social groups in the dairy movement, it is important to analyse the distribution of milch animal stock by social groups and operational land holdings of households. The data on these variables are presented in Tables 4.61 to 4.75.

The small and marginal farmer and the landless own a major proportion of milch bovines. They account for about 64.8 percent at the aggregate level. A similar pattern is also observed among member and non-member MAHs, at individual zonal levels, and in the case of in-milk bovines.

## **CONCLUDING REMARKS**

Generally, exotic breeds are known to yield high quantities of milk. But a large-scale adoption of these breeds is not feasible in India, since obtaining high quantities of milk from these exotic animals would mean expensive health care, protection from adverse environmental factors and the need for good quality feed/fodder. However, the crossbred cows (crossbreeding of the indigenous cows with exotic breeds) are an attractive proposition for milk producers. These animals have the high milk yielding abilities of the exotic breeds and are at the same time well adapted to local conditions. Furthermore, the percentage shares of in-milk females are relatively higher among crossbred cattle and buffaloes than among the indigenous cattle across zones and at the aggregate level. And the proportion of indigenous male cattle is higher than that of male buffaloes and crossbred cattle. The findings of the survey reaffirm the following pattern of rearing milch animals adopted by milk producers in the Operation Flood areas:

- (a) Indigenous cattle are mainly reared by producers to sustain draught animal power and their milk is considered incidental;
- (b) Buffaloes are considered as the main milch animal, followed by crossbred cows to sustain milk production needs;
- (c) Producers rear young stock for replacement and/or sale; and
- (d) This pattern of rearing animals is based on economic logic and is not influenced by religious considerations.



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## **CHAPTER V**

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### **PRODUCTION, CONSUMPTION AND MARKETING OF MILK**

Since milk is the major source of animal protein in India, its role in the nutritional status of the population and the need for increased levels of milk production can hardly be over-emphasised. The small and marginal farmers and landless households, with one or two milch bovines, form the core of the milk-producing sector in India. A large number of milch bovines with low milk yield are maintained by feeding low fodder quantities in the form of crop residues. In addition, factors, such as the seasonal element in milk production, the perishable nature of milk, and the small-sized and widely dispersed milk producing units, have led milk producers to subsistence farming. These are some of the reasons for India's low milk productivity level despite its very large milch bovine stock.

The vital role of the milch bovine stock in increasing milk production and the need for improving the stock have been recognised since the inception of planning in India. Increasing milk production has been accorded the highest priority among the goals of livestock development. A Cross-breeding-cum-Commodity aid Strategy (CCS) was designed precisely to achieve this goal. As low productivity means low per capita availability of milk products, the urgent need to increase milk production, therefore, was apparent. This required the provision of an assured milk-marketing channel that is located near the rural milk producer, and would offer remunerative prices.

Operation Flood through its dairy cooperative societies has met this need by procuring milk in rural areas at remunerative prices, which are linked to the quality of milk. Though the cooperatives covered by OF procure and market only a small fraction of the total milk supply, the credit for the 'white revolution' goes to Operation Flood which created the necessary policy environment in dairying. This chapter analyses the pattern of production, consumption and marketing of milk.

## **PATTERN OF MILK PRODUCTION**

Table 5.1 presents the estimated milk production by different types of milch bovines in Operation Flood areas. The data indicate that buffalo milk constitutes about 59 percent of the total milk produced, while that of crossbred cow milk is about 20 percent, and the balance is the share of the desi cows. Member-MAHs contribute 73.9 percent to the total milk produced (Fig.5.1) and a relatively higher share (85.5 percent) of that is from crossbred cows at the aggregate level. At the zonal level, the North zone produces over 35.8 percent of the total milk output in OF areas. The contribution of the Southern and Western zones is 34.1 percent and 27.3 percent, respectively. The share of the East zone is a mere 2.7 percent.

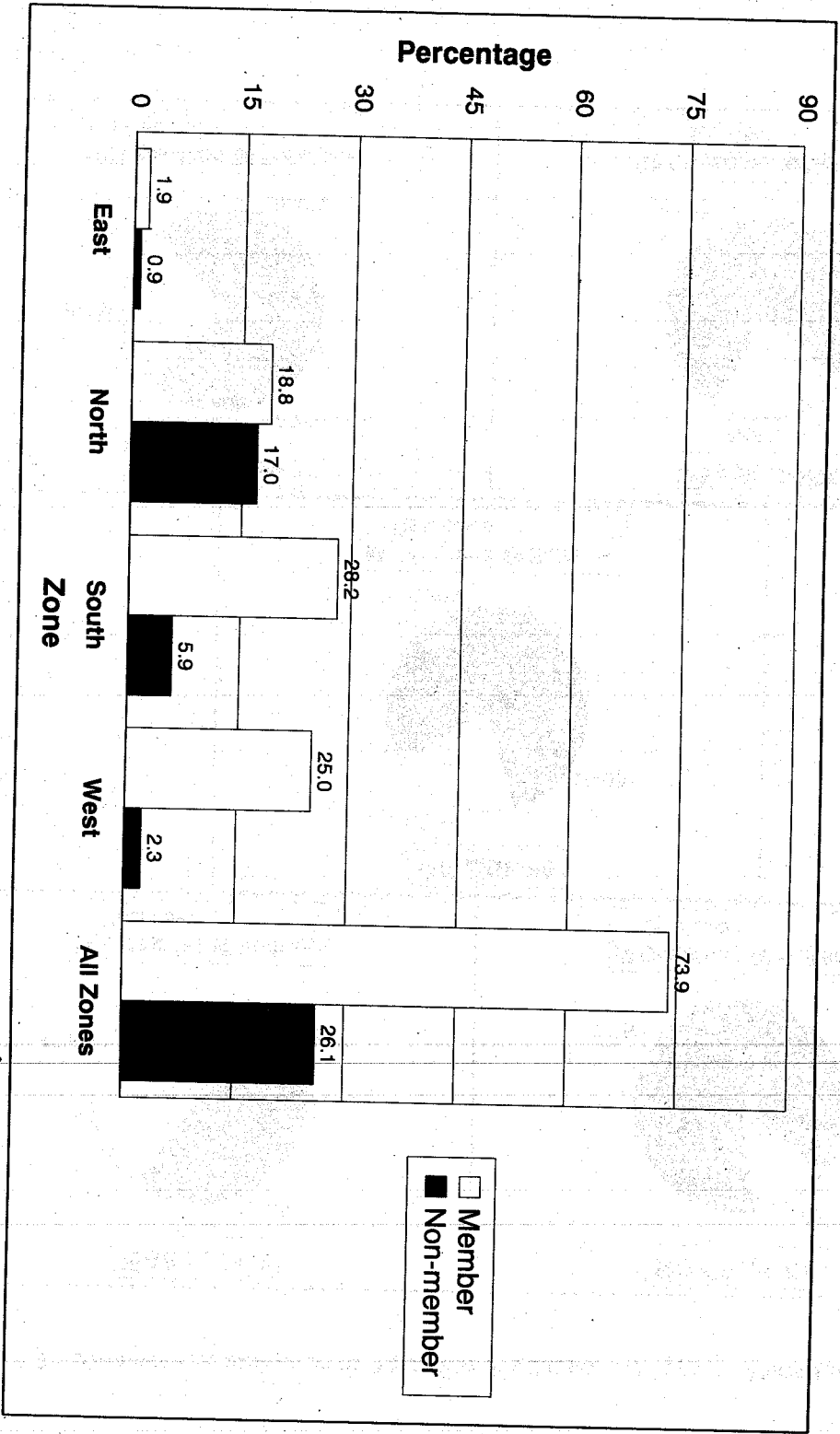
The share of the zones in the overall milk production varies due to the structure and composition of their milch animal herds and their productivity. For example, of the total quantity of buffalo milk produced, the North zone accounts for about 47.2 percent, followed by the Western and Southern zones. Likewise, the Southern zone contributes as much as 62.7 percent of the milk produced by crossbred cows, followed by the Northern and Western zones. Even in the case of desi cow milk, the major share is from the Southern zone.

The relative shares of the various breeds of milch bovines within each zone are presented in Fig. 5.2. Milk produced by crossbred cows is the highest in the Southern zone and almost equal to that of the buffalo milk produced in this zone. In the Western and Northern zones, the quantity of buffalo milk produced far exceeds the quantity of cow milk. Though the Eastern zone's contribution to the total milk production is nominal (2.7 percent), data show that cow milk far exceeds the quantity of buffalo milk. This is in keeping with the distribution pattern, presented in Chapter IV, of the milch bovine stock in the four zones.

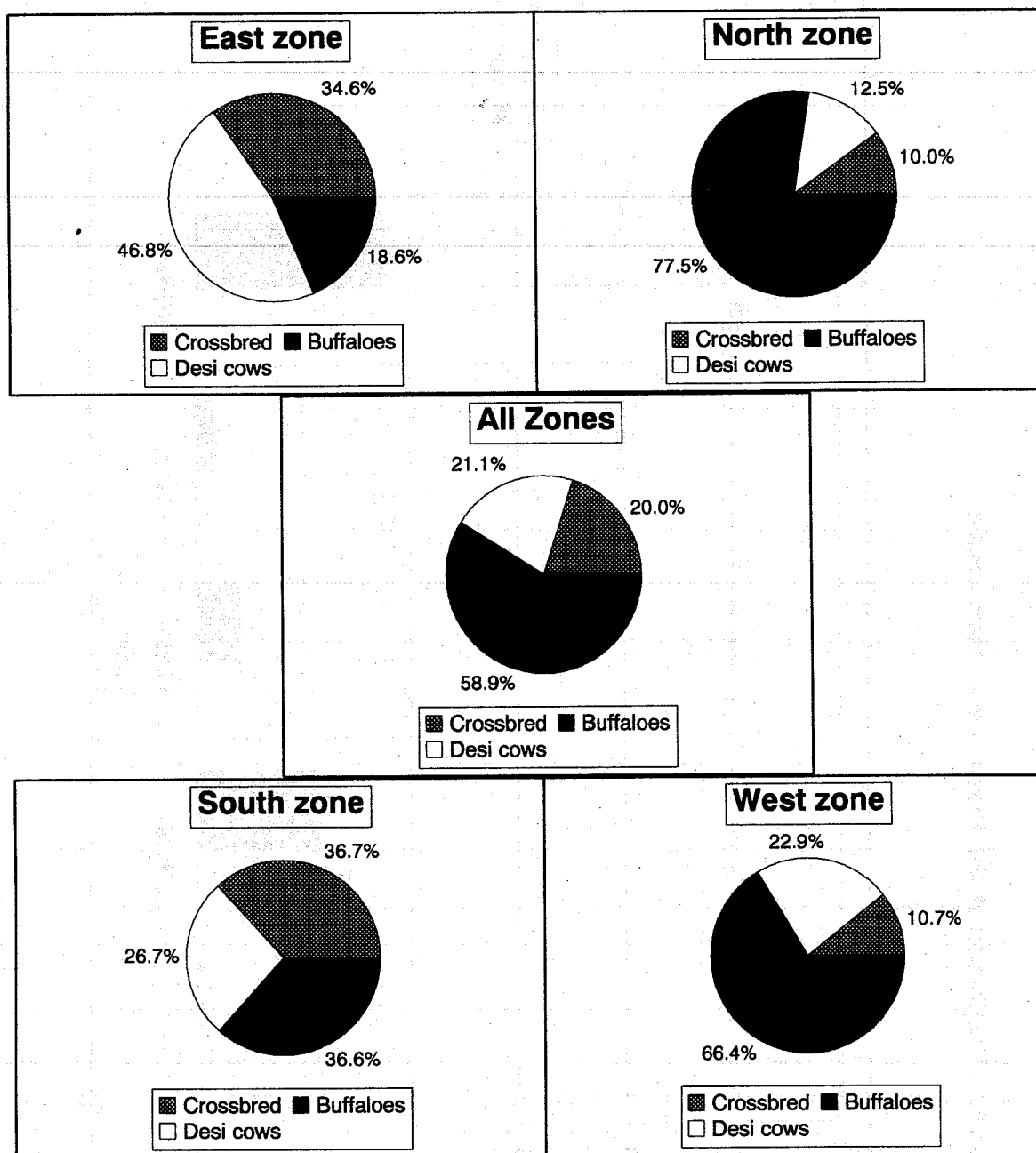
## **SHARE OF SOCIAL AND LAND HOLDING GROUPS IN MILK PRODUCTION**

The availability of feed and fodder has a strong bearing on milk production. This in turn is closely related to the size of operational land owned by the different social groups. Tables 5.21 to 5.23 present percentage shares of different categories of households - member and non-member - in the total milk produced in OF areas. At the aggregate level, small/marginal farmers and landless households contribute 65 percent towards the total milk production. The percentages range from 48.8 percent in the Northern zone to 83.7 percent in the Eastern zone. Among social groups, the major proportion of milk produced in OF areas is contributed by SC/ST households, which belong to the category of small/marginal farmers and the landless. The small/marginal and medium farmers contribute the major proportion of the total milk produced among 'other castes' households. The data clearly indicate that these categories of households form the core of the milk-producing sector in OF areas.

Fig. 5.1 : Distribution of Milk Production by Membership



**Fig. 5.2 : Zone-wise Contribution to Total Milk Production by Type of Milch Animal**



## PRODUCTIVITY OF MILCH BOVINES

The central objective of Operation Flood has been to usher in a 'white revolution' by raising the milk yielding capacity of milch bovines through improvements in their stock and proper feeding. The productivity of an animal is the function of its feed/fodder consumption level, age, breed, stage of lactation, and the season. But on the whole it reflects the efficiency of each genotype in converting feed into milk, and its response to proper and balanced feeding. The dairy cooperative societies provide member-MAHs with a stable milk market, cattle feed at fair price and veterinary health care. Therefore, it is important to examine whether these supportive factors have had an impact on the productivity of milch animals owned by member households in comparison to non-member-MAHs. Table 5.3 presents the productivity of the various breeds of milch and in-milk animals— their average milk yield per day.

The overall productivity of crossbred cows is the highest and that of the desi cows is the lowest across zones and at the all-India OF level. In absolute terms, among zones, the productivity of desi cows in member-MAHs ranges from 1.82 litres per day in the Western zone to 2.30 litres per day in the Northern zone. The average milk yield of crossbred cows in member-MAHs ranges from 4.36 litres per day in the Southern zone to 5.30 litres per day in the Western zone. Among non-member-MAHs, the productivity level of crossbred cows is observed to be the highest in the Southern zone (4.45 litres per day) which is higher than that of member-MAHs. However, in the other three zones it is lower than that of member MAHs.

The productivity of buffaloes is between the average milk yield estimates of the desi and crossbred cows. Among member-MAHs, it is lowest (2.53 litres per day) in the Southern zone and the highest (4.12 litres per day) in the Northern zone. In the case of non-member-MAHs, it is lower than that of member households and the buffalo milk yield ranges from 1.97 to 3.50 litres per day.

The above analysis is based on the total milch bovine stock, i.e., in-milk as well as dry milch animals. Since milk is obtained only from in-milk animals, it will be useful to examine trends in the productivity of in-milk animals. This will be a more appropriate indicator of the milk yielding capacity of different breeds. It is obvious that the productivity of in-milk animal must be higher than that of all milch animals. The maximum difference is seen in the case of desi cows (68.5 percent) followed by buffaloes and crossbred cows. This suggests that producers keep crossbred cows and buffaloes for their milk yield, while desi cows are kept mainly for providing draught animal power for various purposes, particularly in agriculture.

## MILK CONSUMPTION

In the earlier sections we found that a majority of MAHs are marginal farmers with few milch animals, and that a large number of them are members of the DCSs and contribute about 50 percent of the total milk produced in OF areas. And also that they sell more milk per household as compared to non-member households. While the sale of milk adds to the income of households, it is essential to examine whether this addition to income occurs at the cost of their own milk consumption. Do these households deprive themselves of nutritious food in lieu of obtaining higher incomes? Is the marketing channel of the dairy societies depriving them of milk for personal consumption? From the data obtained in the present survey, some broad insights can be provided on these issues.

The patterns of liquid milk consumption among milk producing households, by purpose, by membership, social groups and operational land holding size are presented in Tables 5.41 to 5.43. The overall per capita consumption of milk is estimated to be 339 ml. At the aggregate level, higher levels of per capita milk consumption are observed among non-members. Among social groups (Table 5.42), at the aggregate level, 'other castes' households consume 347 ml. of milk per head per day, whereas SC/ST households consume 294 ml. A similar trend is observed in the North zone, where the 'other castes' households have the highest level of milk consumption (548 ml. per head). By and large, milk consumption seems to be positively correlated to the size of the land holding.

### Pattern of Milk Utilisation

Milk consumption can be analysed further by the way it is consumed. At the household level, the use of milk could be broadly classified as follows: (a) by drinking it, (b) in tea/coffee, and (c) as dahi and other by-products.

Drinking of milk and its intake along with tea and coffee account for the major portion of milk consumption. More than 70 percent is consumed in this form in all the zones, across all categories of households. In the Eastern and Northern zones, a large portion of milk is consumed by drinking it; while the use of it in beverages account for a major portion in the other two zones.

The difference in the consumption of milk and the ways in which it is consumed appears to be insignificant among member and non-member MAHs in the East zone. In the other zones, the proportion of milk consumed by drinking among member households is higher than that of non-member households, except in the Northern zone. The level of milk intake (by drinking it) is higher among the 'other castes' households in three zones except the Southern zone where it is higher among the SC/ST households. Among MAHs with different operational land holding sizes, while the large farmers seem to consume milk mainly by drinking it, followed by dahi and other by-products; the landless households and small farmers consume more milk along with beverages than drinking it.

Having examined the pattern of milk consumption by purpose, we need to look at the per capita milk consumption (by drinking it) by gender and age in the different groups of households. The findings can help indicate the extent of gender bias that exists in terms of consumption of milk among girls and women. Tables 5.51 to 5.53 present estimates of per capita consumption of milk by drinking for the following broad age groups, infants (<1 year), children (1-10 years) and those above 10 years of age, separately for males and females. (Henceforth, in this section, the term 'milk consumption' will refer to per capita milk consumption by drinking, unless otherwise stated.)

At the aggregate level, milk consumption among females is about 69 percent of that among male members of the MAHs. This proportion is about 50 percent, 69 percent, 75 percent and 83 percent in the Western, Eastern, Northern and Southern zones, respectively, indicating the level of male bias against females. Across each zone, data also reveal that male bias is more pronounced among grown-up children and adults among SC/ST and households with small land holdings. At the aggregate level, females among member-MAHs consume about two-thirds of the milk consumed by their male counterparts, which is lower as compared to that of the non-member households (76 percent). As observed earlier, this is a reflection of the trend in the Northern zone, where non-members consume higher quantities of milk in comparison to the member-MAHs, and the overall milk consumption levels are significantly higher than in the other OF areas.

The lowest per capita consumption of milk (221 ml.) among females is observed in the Western zone (Table 5.41). In addition, Table 5.53 indicates that irrespective of the MAH's operational land holding size, significantly low levels of milk consumption have been recorded in the case of females above 10 years of age as compared to their male counterparts in the Western zone.

## **MARKETING AND DISTRIBUTION OF MILK**

Though rural households maintain milch animals for providing milk for the family, selling of milk is considered to be an important reason for keeping milch animal stock in Operation Flood areas.

Table 5.6 presents data on the percentage distribution of MAHs that sell surplus cow and buffalo milk. At the aggregate level, approximately 88 percent of the above households sell milk to different purchasing agencies - 36 percent each sell buffalo and cow milk and 16 percent sell both. The remaining households do not sell milk. As noted earlier, the Eastern and Southern zones are cow belts and the remaining two zones are buffalo dominated areas in terms of bovine stock and milk production. As a result, the type of milk sold follows the same pattern. In the Eastern and Southern zones, 72 percent and 60 percent of households, respectively, sell cow milk. On the other hand, in the Northern and Western zones, households that sell buffalo milk form the largest proportion - 48 percent and 46 percent, respectively.

Among MAHs, the proportion of member households that sell milk is higher. Table 5.6 shows that the percentage of member households that do not sell milk ranges from 2.4 percent in the Eastern zone to 10.7 percent in the North zone. While this percentage is much higher for non-member households, and ranges from 6.5 percent in the Southern zone to 47.9 percent in the Western zone. This clearly indicates that member households are contributing a major quantity of the milk sold in OF areas.

The second aspect that merits analysis is the distribution of non-milk selling households and their reasons for not selling milk. Data related to this is presented in Tables 5.71 to 5.75 for cow and buffalo milk in the different zones. These households gave the following reasons at the time of the survey:

- (i) 47.1 percent and 56.7 percent of the households reported that there was no surplus milk production during the period under reference (since they keep milk for family consumption); and
- (ii) 45.8 percent and 28.4 percent of households reported "no milk production" during the period under reference.

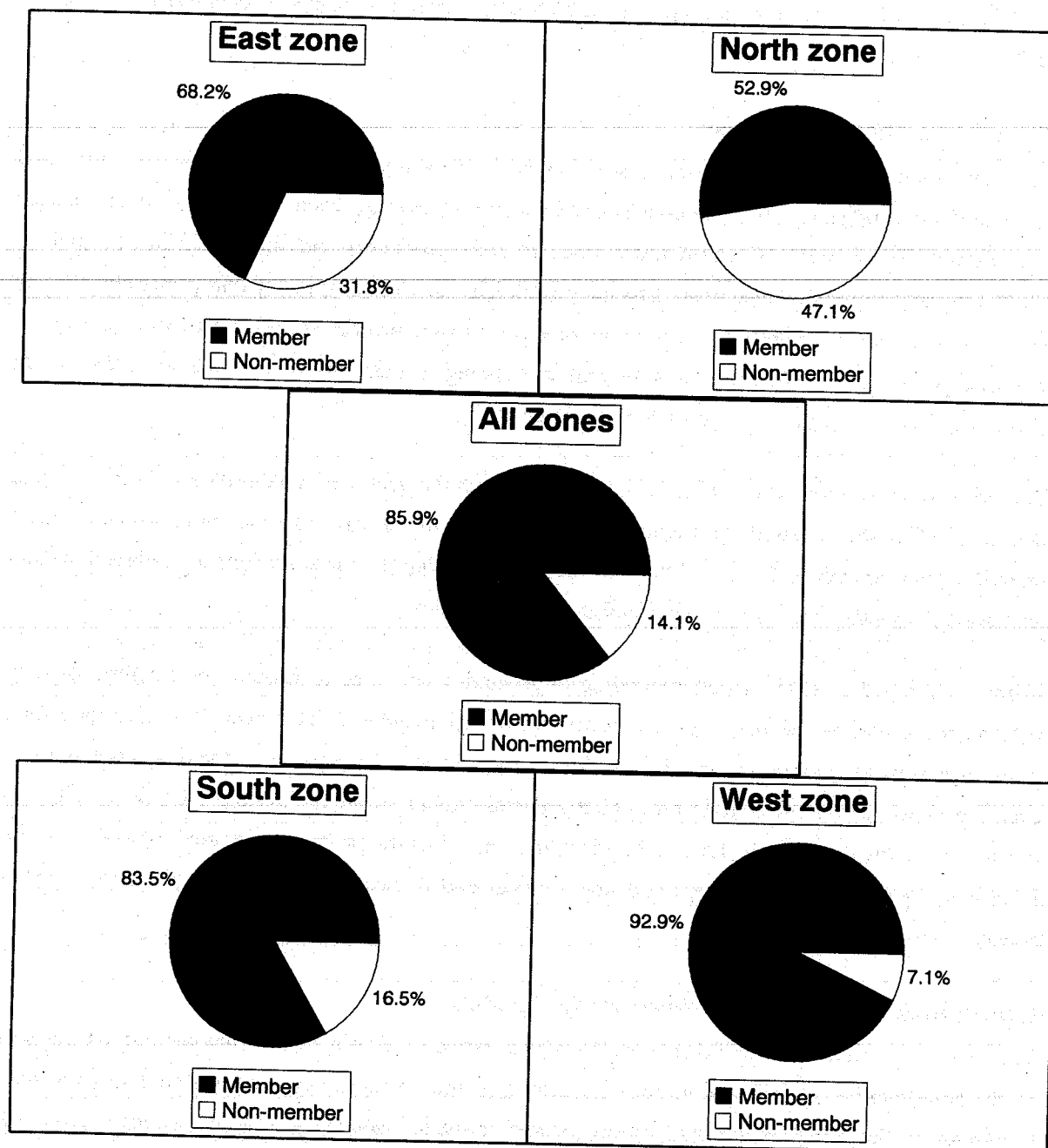
### **Liquid Milk Sale**

Milk has various end-uses at the household level, however surplus milk available with rural households is sold to customers and traders mostly in liquid form. This section deals mainly with the price structure and the share of liquid milk sales to various agencies, like DCSs, private dairies, households/dairy and sweet shops, and dudhiyas (Tables 5.81 and 5.82). In the present survey, the quantum of liquid milk offered for sale by rural households is considered as the marketable surplus at their level. Data presented in the tables reveal that 53 percent of the milk produced in OF areas is traded. The percentages range from 34.2 percent in the East zone to 69.4 percent in the Southern zone. Fig. 5.3 indicates the shares of member and non-member MAHs in the milk sale in each of the zones.

Producer's cooperatives are the central plank of Operation Flood, which link dairy development with milk marketing. Dairy cooperative societies play a very important role in the purchase of milk offered for sale in OF areas. On the whole, DCSs procure about 63.4 percent and 60.9 percent of the marketable cow and buffalo milk, respectively. The percentages range from 45.7 percent for the Eastern zone to 68 percent for the Western zone for cow milk, and 52.3 percent to 74.5 percent, respectively, for buffalo milk in these zones. While DCSs are a major outlet for milk for member households, almost one-quarter of the non-member households also sell their surplus milk to them. Thus, the presence of DCSs in villages not only helps members but non-members as well. Other agencies, particularly private dairies, purchase milk through dudhiyas who collect milk from individual



**Fig. 5.3 : Distribution of Milk Sale by Type of Household**



producers, and play the second most important role as a procurement agency in OF areas. Their share is approximately 23.8 percent to 27.6 percent of the total cow and buffalo milk sold in OF areas. With the exception of the East zone, they are the most important agency for the procurement of milk from non-member households. But with member households, their role is negligible as compared to that of DCSs.

### **Price Structure in OF Areas**

The main function of dairy cooperative societies is the procurement of liquid milk from the rural hinterland and supplying it to urban consumers through milk unions, where it is processed and packed for disposal. This ensures a remunerative price to milk producers and the availability of milk at reasonable rates to urban consumers. The integrated dairy development policy that is implemented by OF implies continued assurance of a remunerative price to the producers and acts as an incentive for increased productivity. The prices paid by milk purchasing agencies per litre of milk are presented in Tables 5.81 and 5.82 for cow and buffalo milk, respectively.

The price structure adopted by DCSs is closely linked with the quality of milk in terms of fat, and solid not fat (SNF) content based on scientific measurement. In the case of other purchasing agencies, scientific measurement of fat and SNF is not common and quality considerations are indirectly linked with separate pricing terms for cow and buffalo milk purchases.

Dairy cooperatives provide a milk-marketing outlet and a fair price to protect the interests of milk producers throughout the year. As a result other purchasing agencies have been forced to raise their purchasing prices to attract milk producers. Due to the reliable pricing policy of the dairy cooperatives, even their lower prices compared to the other agencies, bring in more milk into the DCSs' pot. This is due to the fact that though the DCS milk prices are lower than the procurement prices of dudhiyas, the DCS is a dependable establishment and pays an year end dividend and provides other dairy related services to its members.

### **Guidelines for Choosing a Marketing Agency**

The market-oriented strategy of dairy development is expected to provide a strong institutional support to the large number of milk producers who belong to the economically weaker sections of the rural communities. Since their marketable surplus of milk is small, institutional support becomes necessary. An extensive network of milk producers' dairy cooperative societies in OF areas has provided such an institutional framework for the marketing of milk. However, the importance of the other agencies in the large informal sector and their role in milk marketing in OF areas cannot be ignored. It is, therefore, important to analyse the reasons that govern milk producers in selecting milk procurement agencies. Data collected from sample households indicate their reasons for selling milk to a particular

agency. Though the list of reasons is not exhaustive, a fairly good indication of the basis for choosing a particular agency can be deduced.

As observed from Tables 5.81 and 5.82, the DCSs and dudhiyas procure more than 85 percent of the milk sold by households. Table 5.91 and 5.92 present data related to the reasons that influence producers in their selection of procurement agencies. The majority of milk producers who sell to DCSs do so because the price offered is directly related to the quality of milk. In view of the fact that the price paid by DCSs is marginally lower than that paid by other agencies, other factors, such as the incentives offered seem to play a vital role in the choice. Milk producers are attracted by other agencies since they offer advance payments (for buying milch animals) and pay a higher price for milk than the DCSs. The option to sell milk to dudhiyas is based on considerations, such as a better price and the convenience offered in terms of milk collection (the milk is collected from the house of the producer).

Based on the above analysis, we could conclude that an agency, such as the DCS would be preferred by milk producers in view of their long-term interests; and the dudhiya would be the choice of producers who are looking for an immediate monetary gain. On the whole, the milk producer's selection of a procurement agency is based on sound economic reasons. Undoubtedly, the DCSs have played a key role in bringing about this change in the rural dairy sector.

### **Distribution of Households by Factors Related to Milk Sale**

One of the merits of the milk producers' cooperatives is that it offers prompt and fair payment for milk supplied. Milk collection facilities also ensure that it is convenient to supply milk to DCSs. Information was sought from the sample households on the following factors related to the sale of milk.

- (i) The basis for determining the price received;
- (ii) The frequency and mode of payment by agencies;
- (iii) The mode of transportation and distance traveled from the production point to the point of sale.

Tables 5.101 to 5.104 present data on the milk sale related variables mentioned above. A large number of milk producers, especially member-MAHs, reported that scientific testing of milk for fat and SNF forms the basis for the price received for milk from DCS. However, other agencies adopt different norms for pricing milk, which is based on whether it is cow or buffalo milk, its volume/weight, etc. The findings indicate that the dairy cooperatives have introduced fair and uniform means of determining the price of milk in the OF areas.

In most areas under OF, the frequency of payment by different procurement agencies for milk purchased to producers is weekly or fortnightly. There have been no reports of irregular payments

from any of the zones. A substantial number of the private milk procuring agencies make immediate and advance payments for milk supplied, and coupled with this the marginally higher milk price offered by them is perhaps, the reason for the presence of these agencies even after the establishment of DCSs at the village level. As a large number of milk producers are from the small/marginal farmers and landless categories, advance/immediate payments made by the other agencies go a long way in helping them maintain their milch animals and in meeting their day-to-day requirements.

In general, the mode of payment in OF areas is cash. However, some dairy cooperative societies also pay in kind by providing cattle feed, veterinary health care facilities and fodder seed to producers for proper feeding and maintenance of milch bovines. And some producers prefer to take these inputs against sale of milk to the DCSs.

Data on the mode of transporting milk indicates that, quite often, the producers carry it to the point of sale on foot or the bicycle. A small proportion of non-member producers has reported the use of motorcycle/bus/railways for transporting milk.

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## **CHAPTER VI**

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### **ANIMAL FEED AND LABOUR USE IN DAIRY SECTOR**

An efficient system of milk production depends largely on three factors - the productivity of an animal, the level of its nutrition and its maintenance. And an efficient milch bovine is the result of inheritance and improved breeding. Its productivity, however, depends upon adequate inputs of feed and care. Since the up-keep of animals is a labour-intensive activity, most of the members including women and children in a milch animal household are involved in it.

The most important input for increasing productivity is the quality and quantity of feed provided to animals. Animal feed from different sources is traditionally classified as concentrates and roughage - dry and green fodder. Although high-yielding animals consume more feed, their increased levels of milk production more than compensates the cost of additional feed. This extra consumption is essential due to the fact that a portion of the total feed input is required to maintain the constant body weight of the animal regardless of its level of production. A properly balanced dairy-cattle ration should consist of both roughage and concentrates. Since fodder quality is invariably poor in India, high yielding milch bovines are unable to produce milk to their latent capacity unless they are fed concentrates in addition to roughage.

The animals generally get roughage either by grazing, stall-feeding or through a combination of both types of feeding. Though animal grazing is a common practice in India, little information is available on it. This chapter analyses following aspects related to the feeding of animals and employment pattern in the dairy sector in OF areas.

- (i) grazing profile of animals;
- (ii) distribution of milch animal households by factors relating to feeding practices;
- (iii) feeding pattern of bovines; and
- (iv) use of labour in the dairy sector.

## GRAZING PROFILE OF ANIMALS

Though cultivated fodder is fed to milch animals in cattle sheds, sending them out for grazing is a common practice in rural India. 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 analysing and understanding the relative fodder consumption patterns.

Tables 6.1 and 6.2 present the distribution of milch animal households by factors relating to grazing practices. The grazing pattern in the four zones indicates that animals are largely grazed on land owned by households - situated within a distance of 2 km., except for the Eastern zone where Government/Panchayat lands are used. Approximately 36.7 percent of households do not allow their animals to graze. This is highest (68 percent) in the Northern zone, and could be due to the fragmentation and re-distribution of land, and the Government's new land ceiling policy that has hardly left any open area for grazing. The higher incidence of stall-feeding in the North could be also due to the high cropping intensity and high levels of land under cultivation with little available for grazing. As a result, growing of green fodder is relatively more prevalent in the Northern zone.

Approximately 75 percent of households allow their animals to graze daily, usually for about 2 to 6 hours. Due to a variety of reasons in-milk animals are less frequently let out for grazing.

Animal feed is available from cultivated as well as uncultivated lands. Uncultivated lands as a source of feed include cultivable and non-cultivable waste lands, fallow lands, common pastures and grazing grounds, and accessible forest areas. As grazing does not entirely meet the roughage requirements of animals, it needs to be supplemented by feeding them in cattle-sheds with a proper mix of green/dry fodder and concentrates. The feed/fodder that is provided is either purchased or grown or 'collected free' by the households.

Growing green fodder is more prevalent in the North zone and to a lesser degree in the Southern and the Western zones (Table 6.3). The percentage is slightly lower for member households than non-member households at the aggregate level. About 50 percent of the households cultivated and also purchased green/dry fodder. Among the fodder-growing households, about 50 percent used cultivable lands for the purpose, about 13 percent used bunds, and another 28 percent used both.

The extent of purchase of each major group of animal feed from markets or other outlets is an aspect that needs to be analysed. Table 6.4 presents all-India OF and zonal level summary of the percentages of purchased feed to total feed/fodder fed by different types of households during the period under reference.

The purchase of green fodder among member-households is the lowest. The purchases range from about 10 percent in the East zone to 31.2 percent in the Southern zone. In the case of dry fodder, of the total amount, 17 percent is purchased by member-MAHs in the North zone. The largest quantity of green fodder, about 37.2 percent of the total, is purchased in the Southern zone.

The concentrate group of feed can be classified under four categories: grains, oilseeds cakes, balanced cattle feed (BCF) and 'others', which include bran, husk, etc. Milk producers usually purchase BCF from DCSs or from nearby markets. The share of purchased grains out of the total amount fed to animals is the highest in the East zone and the lowest in the Western zone. Likewise, the percentage of purchased oilseed cakes ranges from 37.8 percent in the North zone to 58.6 percent in the Southern zone. In the case of 'other' feeds, the percentage of the total amount purchased by member-MAHs ranges between 1 and 7.

At the aggregate level, the emerging picture of non-members is similar to that of member households. The extent of purchased feed/fodder out of the total amount seems to be marginally higher for non-member households except in the case of green fodder and oilseed cakes.

## FEEDING PATTERN OF BOVINES

The average consumption of feed/fodder per day for all types of bovines in the four zones is examined here, and the related data are presented in Table 6.5. The quantities obtained here refer to the feed/fodder provided in the stalls, excluding the feed intake of animals through grazing.

At the aggregate level, the average daily feed per cow consists of 8.5 kg of greens, 8.6 kg of dry roughage and 2.8 kg of concentrates. In terms of the total quantity, the average daily feed per buffalo consists of 12.4 kg of greens, 9.8 kg of dry fodder and 2.8 kg of concentrates. The consumption of almost all types of feed is higher in the case of in-milk cows and buffaloes than the dry cows and buffaloes. Similarly, for young stock and other bovines (i.e., adult males), the daily average feed consists of 3 kg and 5.4 kg of greens; 3 kg and 6.6 kg of dry fodder, and 0.5 kg and 0.9 kg of concentrates, respectively. Among zones, the highest amount of roughage (green and dry fodder) consumed is in the Northern zone, followed by the Western and the Southern zones, irrespective of the type of animal. However, in the case of concentrates, no definite trend has been observed. At the aggregate level, member-MAHs feed higher quantities of concentrates to cows as against non-member-MAHs, which seems to be reversed in the case of buffaloes. This observation is also true in the case of in-milk cows and buffaloes. Surprisingly, this is true only in the case of the Southern zone, while the opposite is true in the North zone. In the other two zones, the quantities of concentrates fed per bovine (by its type) are higher in the case of member-MAHs than those in the case of non-member-MAHs. In the Eastern zone, lower quantities of roughage fed to animals are supplemented by

enhanced quantities of concentrates, and this is higher in member than in non-member households.

Balanced feeding of milch bovines for increased productivity is determined by the frequency of feeding, type of feed and type of feeding (viz., group or individual). The practices that are followed in member and non-member households have been summarised in Table 6.6. At the aggregate level, over 95 percent of milch animals are fed more than once a day. A similar trend is seen in the Northern and Western zones. But in the East zone, buffaloes are generally fed twice a day.

Milch animals are fed both individually and collectively. At the aggregate level, the extent of individual feeding among member-MAHs is higher than in non-member-MAHs. Individual feeding of bovines is popular across zones except in the North zone, where milch animals are fed in groups.

Table 6.6 also indicates the type of feed fed to cows (by type) and buffaloes. We find that a majority of these animals are fed with wet as well as dry feed; the semi-liquid form enables animals to digest their intake easily.

Of the many constraints - social, cultural, economic and religious - in increasing livestock productivity in India, the most important one is the inadequate and poor quality of feed and fodder. The position has, in fact, worsened over time due to pressures from the increasing human population. Land meant for grazing is increasingly being used for cultivation and forest grazing is reduced and restricted. Grains and oil seed by-products are being used in processed foods for human consumption; oil cakes, bran and other milling products are increasingly being exported; and the availability of dry fodder from crop-residues is drastically reduced as more land is being used for cultivating dwarf varieties of hybrid crops. Tables 6.7 and 6.8 present data collected from households on the availability of feed/fodder, reasons for its non-availability and factors affecting higher fodder production.

At the aggregate level, approximately 64.6 percent households reported that their animals had access to enough feed. The highest percentage of such households is in the Northern zone (78.5 percent) followed by the Western (68 percent) and the Southern (55 percent) zones. The high price of feed/fodder is reported to be an important reason for its non-availability. According to the fodder-growing households, small land holdings and lack of funds and irrigation facilities are the major reasons for the inadequate green fodder production. Thus, there is an urgent need for the provision of a package in terms of finances as well as inputs to milk producing households to enhance fodder production. This would result in greater availability of feed/fodder for animals and help increase their productivity.



## LABOUR USE IN MILCH ANIMAL CARE

Labour is an important input in milk production and the dairy enterprise in rural India is labour intensive. The knowledge of milch animal care and the requisite skills needed in dairying determine the quality of labour, an input to enhance the productivity of milch animals. But in a low productivity framework, the work of maintenance and rearing of milch animals is done by non-professionals, as their opportunity cost is lower. The dairy sector provides gainful employment to rural households through out the year, and the use of family labour is more common than hired labour. In this section, we will examine the data on the use of labour in milk production.

Tables 6.9 to 6.11 present data on the composition of labour used in milch animal care. While computing percentages given in these tables, it is assumed that costs of all types of labour hours are the same. This under-values adult labour vis-a-vis child labour, and male labour vis-a-vis female. However, even with such an implicit bias, the extensive use of adult male labour (60 percent) is evident, and adult female labour use is 35 percent. While the participation of the adult female in dairy activity is observed to be the highest in the Western zone (45 percent), followed by the Northern, Southern and Eastern zones, that of the adult male is exactly in the reverse order. Among member households, adult female labour hours as a percent of adult male hours is as high as 90.6 in the Western zone and as low as 27.4 in the Eastern zone. However, among non-member households, it is 68.4 percent in the Western zone as against 23.9 percent in the East zone. The involvement of child labour in the dairy sector is observed to be the lowest in the Western zone.

In the case of member as well as non-member households, the overwhelming use of family labour, as compared to hired labour, is evident from Table 6.10. At the aggregate level, more than 50 percent of the average working time of labour is spent in dairy related activities, irrespective of the type of labour involved. This proportion appears to be higher in the Southern zone as compared to the other zones, which could be attributed to the prevailing feeding and grazing practices.

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## **CHAPTER VII**

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### **MILK PRODUCTION COST AND REVENUE FROM DAIRY SECTOR**

With the launching of Operation Flood, the dairy enterprise has grown across the country, especially in rural areas surrounding urban centres and towns. Dairying in India, by and large, is a secondary activity with significant inputs from family resources: which include labour for dairy related activities, and home-produced fodder for animals. This helps milk producers in reducing their paid-out costs. However, the increasing awareness of animal health care and nutritional requirements, and genetic upgrading of milch animals to increase productivity levels add to the overall cost of milk production. No doubt the added expenditure is worthwhile as the sale of milk and its by-products generate income for the milk-producing household. In this chapter, we will consider the overall cost of milk production and the revenue aspects of dairy enterprises in Operation Flood areas. Before presenting the cost/revenue estimates, we would like to explain the process involved in the computation of these estimates.

The major components in the cost of milk production include, animal feed, labour, depreciation of animals, recurring expenditure, depreciation of assets and equipment, and interest on capital. The revenue from the sale of milk is a function of the pricing policy and the cost of production forms the basis for price fixation. While determining the price of milk, the pricing policy must consider a suitable margin of profit for the producer, and at the same time be mindful of the consumer's interest.

The overall cost of production should take into account the costs of all the components. However, the computation of these costs is not easy, as it is difficult to quantify in some cases and even costs that can be quantified do not have accurate or reliable records (except for the producer's memory).

In an ongoing dairy enterprise, the cost of feed/fodder constitutes the major portion of the cost of milk production. Therefore, to determine the total cost of production, the cost of feed/fodder, even that is home grown, needs to be estimated. About 77 percent and 67 percent of green and dry fodder,

respectively, are home produced. Since the object here is to estimate the economic contribution of dairying and to compute the total cost of production, computing the exact cost of home-produced feed/fodder is essential.

So is the case with labour, which includes both family and hired labour. Family labour accounts for about 88 percent of the total labour employed in the dairy sector. In view of the fact that labour in the dairy enterprise has assumed value due to its rising cost and shortage in rural areas during peak periods, the overwhelming contribution of family labour cannot be ignored.

Since this is not a cost of production survey, estimation of indirect costs, such as depreciation on animals, funds, assets and equipment is not possible and have, therefore, been excluded from the cost structure. Having spelt out the importance of family labour and home-produced feed/fodder, the two cost components need to be evaluated.

The task of assessing the cost of home-produced feed and fodder is a difficult one. We have to first decide whether it should be evaluated at the prevailing market rates or at market rates minus the transportation cost or at the cost of production, and this is a debatable issue. The estimation of production cost of feed and fodder in itself is a complex exercise, requiring an in-depth study of the types of feed/fodder and agro-climatic diversity in India. Available sources suggest that the production costs of home-produced feed and fodder is about 25 to 30 percent lower than the market rate. The difference between the two seems to be rather high in view of the fact that in rural areas, feed/fodder is either home-produced or locally purchased, and hence the transportation cost is insignificant. In order to arrive at a realistic assessment of the cost, some compromise over the valuation procedure is necessary. Keeping this in view, the following alternative methods to evaluate home-produced feed/fodder can be considered: (i) at the prevailing market rates; and (ii) 20 percent lower than the market rates. The cost estimates presented in the statistical appendixes of this report are based on the second alternative. We shall examine the possible effects of the first alternative later in this chapter.

We believe that in order to give a boost to the rural dairy enterprise, family labour should be taken into account while framing the milk pricing policy. As a result, family labour has been valued at the prevailing local wage rates after calculating effective number of man-days spent in dairy activity. All payments made in kind (as reported by the respondents) have been valued at the prevailing market rates.

On the basis of the above observations, the cost structure of milk production in this report includes: purchased feed/fodder; home-grown feed/fodder; hired labour; family labour; and other expenses.

## COMPONENTS OF MILK PRODUCTION COST

The cost of milk production under the different components for households with various animal-holding sizes is presented in Table 7.11. Data show the share of animal feed to be the highest among the cost components. At the aggregate level, more than 72 percent of the cost is accounted for by feed (both home-produced and purchased). This varies from 65.8 percent in the East zone to 80 percent in the Western zone. Of the total cost, purchased feed accounts for 14.4 percent. At 7.6 percent, it is the lowest in the North zone, in the other zones it ranges from 17.8 to 19.1 percent.

Labour is another key component in the total cost of milk production, with its share of 20.8 percent at the aggregate level. Family resources provide 88 percent of the labour input. The share of hired labour in the total cost varies from under 1 percent in the Western zone to 4.4 percent in the Southern zone.

Expenses on items other than feed and labour in the rearing of milch animals account for about 8 percent of the total cost of milk production. Data in Table 7.11 also indicate that, in general, an increase in the size of a household's animal herd has an impact on the other cost components. The share of purchased feed in the cost of milk production declines, that of home-grown feed and hired labour increases, and that of family labour goes down. For households possessing 1 or 2 milch animals, the share of expenses on other items (which include animal health care) is significantly high in addition to the high share of purchased feed.

The composition of the costs of milk production for households in different land holding size categories is presented in Table 7.12. As expected, it reveals that while the share of purchased feed in the total cost declines, that of home-produced feed increases with the increase in the size of land operated by households. The opposite trend is observed in the case of labour, i.e., the share of family labour declines while that of hired labour increases. On the other hand, the shares of expenses on equipment and 'others' tend to fluctuate for different land holding sizes. Households with small land holdings spend more on the purchase of feed as compared to the other categories. Landless households incur higher paid-out costs on the purchase of feed/fodder, equipment and maintenance of milch animals (including their health care). Purchased feed accounts for about 30 percent of the total cost incurred by the landless households: it is 33.7 percent in the case of DCS members, and 24.2 percent in the case of non-members. Feed purchases amounting to over 50 percent of the total cost of milk production among landless member households in the Western zone (which has a well-established cooperative structure) is surprising and is a matter of concern. But, at the same time, the landless member households have also reported the lowest per litre milk production cost (Table 7.32). Though they maintain a relatively superior quality of high yielding milch animal requiring superior feeds, due to the efficient management of resources their production cost is the lowest. In brief, marginal returns on purchased feeds would exceed its marginal cost.

## PER-ANIMAL COST OF MILK PRODUCTION

The cost of an in-milk animal is higher than that of a dry/other milch animal. An average estimate of the cost per milch animal would be somewhere between the cost of these two milch animals and would cover the liability of the milk producer in terms of maintenance. Therefore, it would be useful to analyse the cost per milch animal to get an idea of the viability of the rural dairy enterprise.

Table 7.21 presents estimated cost per bovine by its type and by animal holding size, for member and non-member households. At the overall level, the average per day cost on a crossbred cow and a buffalo are Rs. 23.1 and Rs. 23.4, respectively, the cost on an indigenous cow is Rs. 15.2. The cost of keeping other bovines is lower as compared to that of milch animals.

At the zonal level, costs per animal are observed to be highest in the North zone. The Northern zone survey data pertains to the flush season of the year during which the energy requirement of buffaloes (the dominating bovine stock) is higher and hence their intake of quality feed/fodder is also higher. Besides this, the zone's overall higher feed levels as compared to the other zones could be the reason for the higher costs of animal upkeep in the North zone.

At the aggregate level, member households seem to spend more than non-member households on the maintenance of their milch bovine stock except on crossbred cows. On the whole, for a rupee spent on a milch animal, a non-member would spend Rs.0.95 as against Rs.1.02 by a member-MAH. This trend is true of all the zones except the East zone.

As expected, the cost per head of a bovine (irrespective of its type) declines considerably as the animal holding size increases. Apart from the animal holding size, the cost per animal would also depend upon the operational land holding size of the households.

Not surprisingly, data in Table 7.22 on the cost per animal by land holding size categories indicate that with increasing operational land holding size the cost rises initially and then stabilises. Almost three-fourths of the cost is accounted for by feed/fodder. Due to the efficient management of their resources, landless households incur the lowest cost. The costs incurred by land owning households are 33 to 50 percent higher than that of landless households.

## PER-LITRE COST OF MILK PRODUCTION

In the preceding section, per animal costs of milk production were presented which also provide the pattern of purchased inputs for different types of animals. The producer's allocation of purchased feed is based on the anticipated productivity levels and conversion efficiencies of milch animals. And this is reflected in the cost of production. Tables 7.31 and 7.32 present per litre costs for different milch animals owned by member and non-member households classified by animal and operational land

holding sizes.

In view of the productivity levels of milch animals, as seen in Chapter V, and the per-animal cost in the preceding section, Table 7.31 indicates that the per litre cost of milk production, at the aggregate level, is the lowest in the case of crossbred cows (Rs.5.40). For buffaloes it is Rs.7.67 and for the indigenous cows, it is Rs.7.96. This trend is observed to be true in the case of member as well as non-member households at the aggregate level. However, as compared to the members, non-member households incur about 16 percent and 12 percent higher costs on crossbred and indigenous cows, respectively. The cost per litre of buffalo milk is the same among the two types of households. Overall, non-members incur about 8 percent higher cost per litre of milk produced as compared to the cost incurred by member households, which more or less increases with decreasing animal holding size. This difference is as high as 27 percent in the case of households having just 1 or 2 milch animals.

The cost of milk produced in the North zone is Rs.7.69 per litre, significantly higher than in the other zones. For households with smaller animal herd sizes, especially cows, the cost goes beyond Rs.10.00. The cost per litre of crossbred cow milk is the lowest in the Western zone (Rs. 4.61), and the highest in the North zone (Rs.6.67). In the Eastern and Southern zones it is Rs.6.64 and Rs.5.14, respectively. It is higher among non-member households as compared to member households by about 32 percent, 27 percent and 19 percent in the Western, Eastern and Northern zones, respectively. But in the Southern zone, the DCS members incur about 8 percent higher cost on the production of a litre of crossbred cow milk.

As for indigenous cows, a litre of milk produced costs the highest at Rs.9.02 in the North zone, followed by Rs. 8.31 in the Southern zone, Rs. 7.14 in the Western zone and Rs. 5.93 in the Eastern zone. While the higher cost incurred in the Northern zone is due to a greater share of feed/fodder in the total milk production cost, in the Southern and Western zones, the high costs are attributable to lower productivity levels of indigenous cows. Non-member households incur as much as 23 percent higher cost on the production of a litre of indigenous cow milk as against that of member households in the Western zone. This difference in production cost gets reduced to about 17 percent, 10 percent and 4 percent, which is favourable to DCS members in the Eastern, Northern and Southern zones, respectively.

The production cost of per litre of buffalo milk is Rs. 8.65 in the Southern zone, Rs. 7.62 in the Northern zone, Rs. 7.12 in the Western zone and Rs. 6.41 in Eastern zone. In the Northern zone member households incur a cost of Rs. 7.83 per litre of buffalo milk produced, which is higher than that of non-member households by about 6 percent. While in the Southern zone there does not seem to be much difference between the costs incurred by the member and non-member households, it is about 25 percent higher in the case of non-members in the Eastern zone. However, since both these

zones are part of the cow belt, the emerging cost differentials between members vis-a-vis non-member households need not be a matter of concern. On the other hand, the cost incurred per litre of buffalo milk produced in the buffalo dominated Western zone, seems to be in favour of member households. Non-member households in this zone spend as much as Rs. 8.87 per litre, which is 28 percent higher than that of the member households.

Variations in the costs incurred per litre of milk produced by households in different land holding size categories are presented in Table 7.32. At the aggregate level, data reveal that the cost of milk production, in general, rises with an increase in the operational land holding size. From the landless category to those with more than 4 hectares of operational land, the cost goes up by more than 50 percent. This is compatible with the per animal cost given in the preceding section. Such a difference in costs suggests that smaller dairy farms are more efficient producers of milk.

## **REVENUE FROM MILK**

The dairy sector plays a major role in supplementing the income of rural households. The average cost of milk production, presented earlier, along with the average revenue from dairying can be analysed to examine the net revenue accrual. Though the sale of milk is not the only source of revenue for a dairy enterprise, it has a major impact on the rural milk economy under Operation Flood.

Table 7.4 presents estimated net revenue from milk sale, (i.e., from total receipts from dairying deducting the total cost of milk production) on a per-milch animal and per litre milk basis at the zonal level for member and non-member households. At the aggregate level, net revenue from dairying, on both per animal as well as per litre basis, is higher in the case of member households than that of non-member households. This is true of the Southern and the Western zones, which are strongholds of dairy cooperatives. The difference is significant especially in the Western zone. In the Northern and Eastern zones, the trend is reversed, non-member households get higher net revenue as compared to members by about a rupee per litre of milk produced. This trend among members and non-members is directly related to the pattern of milk sale in these two zones.

## **NET REVENUE FROM MILK PRODUCTION UNDER ALTERNATE COSTS**

While discussing the computation of production cost, we had given the following alternatives for evaluating home grown feed/fodder costs: (i) at the prevailing market rates; and (ii) at 80 percent of the prevailing market rates. The cost estimates presented in this report are based on the second alternative. Table VI gives a comparative analysis of the costs and net revenue under the two alternative methods of costing.

**Table VI : Cost and Revenue Under Two Alternative Methods***(Rs. per day)*

Membership	Alternative-I	Alternative-II	Alternative-I	Alternative-II
	<b>Cost per milch animal</b>		<b>Cost per litre</b>	
Member	24.45	21.76	8.15	7.12
Non-member	23.06	20.27	8.79	7.70
All households	24.01	21.28	8.33	7.28
	<b>Revenue per milch animal</b>		<b>Revenue per litre</b>	
Member	26.59		8.90	
Non-member	23.67		9.00	
All households	25.71		8.94	
	<b>Net revenue per milch animal</b>		<b>Net revenue per litre</b>	
Member	2.14	4.82	0.75	1.78
Non-member	0.61	3.40	0.21	1.30
All households	1.70	4.44	0.61	1.66

The above statistics reveal that the net revenue from dairying under these alternatives is less than Rs. 2 per litre of milk produced. However, if only paid-out costs are considered, that is by excluding the valuation of family resources, net revenue from dairying ranges between Rs. 6 and Rs. 7 per litre for RMAHs. Higher incremental net revenue per litre by members compared to non-members, under both the costing methodologies (Rs 0.54 and Rs. 0.48, respectively), could be considered as the net impact of cooperative dairying. In order to expand and support the dairy enterprises in rural areas on a commercial basis, the pricing policy should take family resources into account. In that event, cost and net revenue estimates presented here could be used appropriately.

## **CONTRIBUTION OF DAIRY REVENUE TO TOTAL HOUSEHOLD INCOME**

For a milk-producing household, revenue from dairying is a major supplementary source of income. A broad assessment of the contribution of dairying to the total household income is provided here. The estimated shares of income from dairying, crop husbandry and other sources are presented in Tables 7.51 and 7.52 for the various categories of milch animal households.

At the aggregate level, dairying contributes about 27 percent to the total household income, an increase from 21 percent in 1988-89. Milk sale accounts for about 19 percent of the total income. Dairying accounts for the maximum share (40.4 percent) of household income in the East zone. It is of great importance to milk-producing households as a major source of cash revenue that supplements the



other sources of income. The revenue from growing crops is predominant in the Southern zone and to a lesser degree in the Northern and Western zones.

This survey finds that member households have a higher share of income from milk production and crops as compared to non-members. With an increase in the animal holding size, the contribution of dairying to the total household income increases. However, households rearing 1 or 2 milch animals supplement their income from other sources, specially by earning wages through dairy related work, and this is true in the case of member and non-member households.

Table 7.52 shows that landless households depend a great deal on dairying, its contribution to the total income being over 50 percent. The relative share of income from dairy activity is much higher among member-landless households compared to that of the non-members. Generally, across the zones, with an increase in the operational land size, the expenditure on the rearing of milch animals decreases.

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## **CHAPTER VIII**

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### **IMPACT EVALUATION OF OPERATION FLOOD ON THE RURAL DAIRY SECTOR**

In 1995-96, the year this survey was conducted, rural milch animal households had increased to 11.7 million from 7.2 million in 1988-89. Member households too had increased from 4.5 million to 8.3 million. Between 1988 and 1995, at the aggregate level RMAHs and member-MAHs grew at the rate of 7.2 percent and 9.1 percent per annum, respectively. Thus, leading to a spectacular growth in the organisational base of the cooperatives in terms of its membership.

#### **DISTRIBUTION OF MILCH ANIMAL HOUSEHOLDS**

Table VII shows the regional distribution and growth rates of RMAHs and member-MAHs during the period 1988 to 1995. At the zonal level, the highest annual growth rate in membership was in the Southern zone, followed by the Western, Eastern and Northern zones. In terms of the total membership to dairy cooperative societies, the shares of the Southern and Western zones have increased, while they have declined in the other two zones.

**Table VII : Zonal Distribution of Rural Milch Animal Households and Member-MAHs**

Zone	Rural Milch-Animal Households (RMAHs)		Member-MAHs		CGR (% per annum)	
	1988-89	1995-96	1988-89	1995-96	RMAHs	Member-MAHs
East zone	3.4	3.1	2.7	2.4	5.6	7.8
North zone	29.5	23.7	22.4	16.1	3.9	4.0
South zone	37.3	41.5	40.4	44.5	8.8	10.6
West zone	29.8	31.7	34.6	37.0	8.2	10.2
<b>ALL ZONES</b>	100.0	100.0	100.0	100.0	7.2	9.1

An important goal of Operation Flood is to provide a better infrastructure to India's rural dairy sector that would improve the quality of life of its large number of milk producers who are small/marginal farmers and landless households. In view of that we shall first analyse the changes in the socio-economic characteristics of the member-households between 1988 and 1995. The data in Table VIII indicate that at the aggregate level, DCS membership among SC/ST households increased from 14.5 percent in 1988 to 15.3 percent in 1995. This is true of the other zones too, except for the Southern zone. The increase in households pursuing agriculture as the main occupation led to an increase in the membership of DCSs. This has been largely due to the decrease in the proportion of member households engaged in other occupations, such as service, trade, business, etc. This is also true of the four zones. The proportion of wage-earning households has remained more or less unchanged during this period.

As mentioned earlier, households with access to land that can be used for growing feed and fodder are more likely to keep and rear milch animals than the landless households. We shall now examine the pattern of DCS membership to find out if it is only the bigger and well-to-do farmers who benefit from the programme, or are the benefits open to the weaker sections of the rural population as well. The data in Table VIII indicate that, at the aggregate level, while membership share of the landless households has declined from 23.3 to 15.3 percent, the share of marginal/small farmers has increased from 51.3 percent to 60 percent. And that of the well-to-do farmers (with more than 2 hectares of operational land) has marginally declined over the period. Though the share of landless households has declined, the increase in the membership share of marginal and small farmers is largely the result of fragmentation of land holdings of large farmers and redistribution of surplus land among the weaker sections of the population. As regards milch animal holding size, the distribution of member households has more or less remained at the 1988-89 level. The majority of member households possess either 1 or 2 milch animals.

One of the major thrusts of Operation Flood has been to improve the quality of livestock through genetic upgrading. The goal is to improve the productivity of milch animals and bring about an increase in the overall milk production. Towards this end, the DCS provides artificial insemination services to its member households. The survey data on the use of AI services, in Table VIII, indicates that there has been only a marginal increase in its use among member households over the period 1988-96.

**Table VIII : Percentage Distribution of Member-MAHs by Socio-economic Status and Other Characteristics**

Particulars	East zone		North zone		South zone		West zone		All zones	
	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96
<b>1.Social group</b>										
SC/ST	21.2	23.4	9.9	15.2	11.4	9.0	19.6	22.3	14.5	15.3
Others	78.8	76.6	90.1	84.8	88.6	91.0	80.4	77.7	85.5	84.7
<b>2.Occupation</b>										
Agriculture	58.1	71.3	73.0	87.2	72.1	75.4	79.2	78.8	74.4	78.5
Wages	20.9	10.4	15.0	7.8	19.2	20.8	15.6	17.1	17.0	17.1
Others	21.0	18.3	12.0	5.0	8.7	3.8	5.2	4.1	8.6	4.4
<b>3. Operational land holding group</b>										
Landless	18.1	18.9	30.4	10.3	21.5	21.8	21.2	9.5	23.3	15.3
Marginal	47.7	38.0	17.5	26.8	35.5	39.7	37.2	41.4	32.4	38.2
Small	20.6	29.2	18.5	26.2	19.2	17.2	18.6	25.1	18.9	21.9
Semi-medium	7.3	10.4	13.2	10.9	9.7	9.0	10.9	11.6	10.8	10.3
Medium	3.0	2.2	5.6	8.0	3.8	3.8	2.9	3.0	3.9	4.2
Large	3.3	1.3	14.8	17.8	10.3	8.5	9.2	9.4	10.7	10.1
<b>4. Milch animal holding size</b>										
One	44.9	60.0	29.6	28.3	43.2	40.5	49.8	41.0	42.5	39.2
Two	31.2	26.2	31.2	27.2	28.0	28.6	28.0	34.4	28.8	30.5
Three	12.7	5.9	15.2	14.4	13.4	15.2	11.3	15.2	13.0	14.8
Four or more	11.2	7.9	24.0	30.1	15.4	15.7	10.9	9.4	15.7	15.5
<b>5. Use of artificial insemination for</b>										
Cows	33.8	56.9	27.4	28.4	59.8	55.6	32.5	35.3	42.4	43.7
Buffaloes	19.7	22.4	28.2	27.1	39.9	36.2	27.1	30.3	32.3	32.5

## BOVINE STOCK

Bovine milch animals comprising cows and buffaloes constitute 49.9 percent of the total bovine stock in Operation Flood areas. In this section we will look at the growth pattern of the milch and draught animals, and some of the changes that have taken place in the composition of the bovine stock.

### Compound Growth Rates

The expansion in the DCS membership level, at the rate of 9.1 percent per annum between 1988 and 1995, greatly affected the bovine population. Table IX shows that, at the aggregate level, indigenous in-milk cows increased at the rate of 9.8 percent, and that of in-milk buffaloes was 6.1 percent per annum.

In-milk crossbred cows, however, increased at the annual rate of 5.3 percent. In each of the zones, in-milk indigenous cows have increased, with the Southern zone accounting for the highest growth, followed by the Western zone. The Southern zone also registered the highest increase in in-milk crossbred cows, followed by the Eastern and Northern zones; the Western zone had a negative growth rate. In-milk Buffaloes increased across zones with the highest growth in the North zone followed by the Western and Southern zones; the East zone had a negative growth rate.

**Table IX : Compound Growth Rates of Bovines and Draught Animals Between  
1988-89 and 1995-96**

Type of animal		East	North	South	West	All zones
( I ) MILCH ANIMALS						
i)	Desi cattle					
	In-milk	5.05	1.64	15.32	12.83	9.82
	Dry	1.29	-0.75	5.65	9.27	5.32
	Total	3.92	0.74	10.41	11.06	7.77
ii)	Crossbred cattle					
	In-milk	4.44	1.32	8.38	-0.73	5.31
	Dry	2.59	0.73	3.47	-2.35	2.00
	Total	4.06	1.12	6.62	-1.28	4.18
iii)	TOTAL CATTLE					
	In-milk	4.87	1.55	12.00	9.51	8.22
	Dry	1.54	-0.40	4.92	7.57	4.48
	Total	3.96	0.84	8.85	8.61	6.65
iv)	Buffaloes					
	In-milk	-0.47	7.22	3.77	7.02	6.13
	Dry	-3.91	6.18	2.64	6.89	5.16
	Total	-1.64	6.92	3.35	6.98	5.80
( II ) DRAUGHT ANIMALS						
i)	Adult cattle					
	Desi	0.00	8.18	-5.25	-30.49	-4.74
	Crossbred	8.97	-9.89	0.26	-1.36	-2.15
	Total	8.92	-9.50	0.29	-1.54	-2.18
ii)	Adult he-buffaloes	-100.00	-12.85	-12.46	-22.88	-13.87
( III ) CATTLE YOUNG STOCK						
i)	Male calves					
	Desi	10.02	5.52	11.34	-2.03	7.87
	Crossbred	3.66	4.31	20.45	13.99	13.45
	Total	4.92	4.53	18.09	11.89	12.33
ii)	Female calves					
	Desi	4.28	4.11	7.57	-7.67	4.46
	Crossbred	6.28	1.85	10.65	9.60	7.36
	Total	5.69	2.45	9.12	5.99	6.34
iii)	Total calves	5.39	3.25	12.85	8.35	8.77
( IV ) BUFFALO YOUNG STOCK						
i)	Male calves	-2.09	6.65	7.67	3.40	6.24
ii)	Female calves	0.92	3.90	2.52	5.91	4.18
	Total	-0.13	4.89	4.64	5.32	4.88

Indigenous dry cows in the North zone had a negative growth rate, while the other zones recorded positive growth rates. In the case of dry crossbred cows, except for the Western zone, there has been a positive growth across zones and at the all-India OF level. The growth rates for in-milk animals were found to be much higher as compared to those of dry (and other) milch animals. This is possibly a result of the market orientation of the dairy sector in the OF areas of the country.

The compound growth rates for young stock indicate that

- (a) The male cattle calves, particularly indigenous male calves, have increased across all zones, indicating a positive replacement rate for bullocks.
- (b) Female cattle calves across zones have increased, indicating a positive replacement rate for breedable cows.
- (c) The young stock of buffaloes (male and female) has increased across zones, except in the Eastern zone.
- (d) The positive growth rates of cattle and buffaloes indicate that dairy farmers rear calves either for replacement or for sale.

The compound growth rates for draught animals indicate that bullocks showed a negative growth across zones, except for the Eastern zone; and he-buffaloes showed a drastic downward trend across zones. The probable reasons for declining rates of draught animals across zones between 1988 and 1995 could be the rapid mechanisation of agriculture and the opening of market outlets for milk and its by-products at the village level.

### **Changes in Composition of Bovine Stock**

We find from the preceding analysis of the survey findings on livestock that the relative growth pattern of the cattle and buffalo population has led to a change in the composition of the bovine stock. The changes in the composition of the bovine population for the years 1988-89 and 1995-96 are presented in Table X.

At the aggregate level, while the proportions of adult females in the case of indigenous cattle and buffaloes have increased, that of the crossbred cows has declined. These categories accounted for the major portion of the stock during both the years under study, and among these in-milk animals have risen. In the case of young stock, while the change in the proportion of indigenous cattle is significant, crossbred cattle and buffaloes have only undergone marginal changes over the period. The increase in the proportion of adult female has been mainly due to a fall in the share of the adult male.

In the cow dominated East zone, the proportion of adult female cattle in general, and those that are in-milk in particular, declined over the period 1988-96. The decline in the share of indigenous cows is accounted for by a rise in the share of bullocks and that of the female young stock. But in the case of crossbred cattle, the share of the female stock declined from 86.2 percent in 1988-89 to 81.3 percent in 1995-96.

**Table X : Compositional Changes in Bovine Population in Operation Flood Areas**

Zone	Type of Animal	Indigenous cattle		Crossbred cattle		Buffaloes	
		1988-89	1995-96	1988-89	1995-96	1988-89	1995-96
<b>East zone</b>	<b>i) Adult females</b>						
	In milk	25.8	24.6	40.1	38.5	33.1	35.9
	Dry	12.3	9.1	10.7	9.0	19.1	16.1
	Total	38.0	33.6	50.7	47.6	52.2	52.1
	<b>ii) Adult males</b>	25.1	30.9	0.7	0.5	4.6	0.0
	<b>iii) Young stock</b>						
	Male	16.2	14.1	13.1	18.2	16.0	15.5
	Female	20.6	21.4	35.5	33.7	27.2	32.5
	<b>GRAND TOTAL</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>North zone</b>	<b>i) Adult females</b>						
	In milk	20.8	25.6	36.9	33.3	37.2	41.3
	Dry	13.5	14.0	18.5	16.0	15.4	16.0
	Total	34.2	39.6	55.4	49.3	52.6	57.3
	<b>ii) Adult males</b>	34.2	18.1	1.9	2.7	3.5	0.9
	<b>iii) Young stock</b>						
	Male	12.5	18.5	12.6	15.1	15.0	16.1
	Female	19.1	23.8	30.2	32.9	28.9	25.7
	<b>GRAND TOTAL</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>South zone</b>	<b>i) Adult females</b>						
	In milk	15.0	22.7	35.0	37.2	35.2	35.8
	Dry	20.1	16.5	22.4	17.2	21.9	20.6
	Total	35.1	39.3	57.3	54.4	57.1	56.4
	<b>ii) Adult males</b>	39.8	21.9	0.7	0.3	3.5	1.1
	<b>iii) Young stock</b>						
	Male	11.2	23.1	10.4	13.4	14.9	19.6
	Female	13.9	16.8	31.5	31.9	24.6	23.0
	<b>GRAND TOTAL</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>West zone</b>	<b>i) Adult females</b>						
	In milk	14.3	21.2	33.9	41.9	37.5	39.6
	Dry	15.6	18.5	18.7	20.5	21.3	22.3
	Total	29.9	39.7	52.6	62.4	58.8	61.9
	<b>ii) Adult males</b>	45.2	26.2	3.3	0.3	1.1	0.1
	<b>iii) Young stock</b>						
	Male	9.9	15.9	11.6	13.0	9.9	8.2
	Female	15.0	18.2	32.6	24.2	30.3	29.7
	<b>GRAND TOTAL</b>	100.0	100.0	100.0	100.0	100.0	100.0
<b>ALL ZONES</b>	<b>i) Adult females</b>						
	In milk	17.1	22.9	35.4	37.1	36.6	39.2
	Dry	16.3	16.2	20.2	16.9	19.2	19.2
	Total	33.4	39.1	55.6	54.0	55.8	58.5
	<b>ii) Adult males</b>	38.9	23.1	1.5	0.8	2.8	0.7
	<b>iii) Young stock</b>						
	Male	11.5	19.5	11.2	13.9	13.5	14.7
	Female	16.2	18.4	31.7	31.3	27.9	26.3
	<b>GRAND TOTAL</b>	100.0	100.0	100.0	100.0	100.0	100.0

In the Northern zone, there was a rise in the proportions of buffaloes and indigenous cows, and those that are in-milk. On the other hand, there was a significant fall in the share of crossbred cows; and a decline in the adult male bovines.

In the Southern and Western zones, the changes in the stock compositions are more or less in line with

that at the aggregate level, except in the case of the adult male indigenous cattle which registered a significant decline. While its share fell, in the Southern zone, from 40 percent in 1988 to about 22 percent in 1995, the decline in the Western zone is by about 19 percentage points.

We shall now analyse the composition of the bovine stock in terms of sex ratios and ratios between different types of bovines. This would enable us to answer the basic question, whether these changes in the composition of bovine stock in OF areas are favourable for increasing milk production. Tables XI and XII present the relevant ratios of the bovine stock with member and non-member households.

Table XI indicates that at the overall level, the sex ratio (female: male) among bovines has not changed significantly over the period 1988-96, and this is also true of buffaloes. Among desi cattle, although the sex ratio has increased by about 40 percent, there is virtually a one-to-one correspondence of females and males. In the case of crossbred cattle, the number of females per male has declined by about 16 percent. These changes would be more meaningful, if sex ratios for adult and young bovines are considered separately.

From Table XII we find that the sex ratio among adult buffaloes (i.e., number of she-buffaloes per he-buffalo) has more than quadrupled over the period in all the four zones, and the rise is especially significant in the Western zone. There has been an increase in the sex ratio among adult cattle among three zones except for the Eastern Zone. The same pattern is seen among crossbred and desi cattle at the individual zonal level as well, with the exception of the North zone in the case of crossbred cattle, and the Eastern zone in the case of desi cattle. With regard to young stock, in absolute terms, the changes in the sex ratios show a marginal decline. It should be also noted that these changes, particularly in the case of adult bovines, are of a higher magnitude in the case of member households as compared to that of non-members. In Operation Flood areas buffaloes and crossbred cows--a major part of their stock owned by DCS members--are considered to be the main milch animals, in view of their high productivity levels to sustain milk production needs. The data show that the changes in the composition of the bovine stock have had a favourable impact on the Operation Flood programme.

## **TRENDS IN MILK PRODUCTION**

The total milk production in OF areas increased from 41.5 million litres per day in 1988-89 to 66.9 million litres per day in 1995-96, recording a 7.1 percent per annum increase. At the zonal level, the rate of increase varies from 4.0 percent per annum in the East zone to 11.0 percent in the Southern zone (Table XIII). At the aggregate level, the rate of growth among member households is more than double of that among non-member households. This difference in the rate of growth between the two households is seen in most parts of the OF area, except for the Northern zone, where the milk production by non-member households grew at a higher rate than that of the members.



Table XI: Composition of Bovine Stock by Sex and Type of Milch Animal

Zone	Membership	Number of female per male						No. of cattle per buffalo			Crossbred cows per desi cow			Crossbred cows she-buffalo			She-buffaloes per desi cow		
		Crossbred cattle		Desi cattle		All cattle		Buffalo		All bovines		All cattle		All cattle		All cattle		All cattle	
		1988	1995	1988	1995	1988	1995	1988	1995	1988	1995	1988	1995	1988	1995	1988	1995	1988	1995
East zone	Member	6.2	4.6	1.4	1.1	1.9	1.5	3.9	5.0	2.2	1.6	3.8	10.7	3.0	6.9	0.5	0.4	0.9	2.1
	Non-Member	6.3	3.5	1.4	1.7	1.5	1.5	3.7	6.0	1.9	1.9	5.5	4.4	4.2	3.3	0.2	0.2	0.8	0.5
	All Households	6.2	4.4	1.4	1.2	1.8	1.5	3.8	5.5	2.0	1.7	4.4	7.3	3.4	5.1	0.3	0.3	0.9	1.3
North zone	Member	5.8	4.4	1.2	1.6	1.6	2.0	4.2	4.1	2.6	2.9	0.8	0.7	0.6	0.5	0.4	0.4	0.2	0.1
	Non-Member	6.1	5.1	1.1	2.0	1.3	2.3	4.6	5.8	2.4	4.2	0.8	0.4	0.6	0.3	0.3	0.3	0.1	0.1
	All Households	5.9	4.6	1.1	1.7	1.4	2.1	4.4	4.8	2.5	3.5	0.8	0.5	0.6	0.4	0.3	0.4	0.2	0.1
South zone	Member	8.3	6.4	1.0	1.3	1.7	2.1	4.6	3.7	2.4	2.5	1.4	1.8	1.1	1.4	0.9	0.8	0.5	0.6
	Non-Member	7.1	5.7	1.0	1.0	1.5	1.3	4.0	4.3	2.1	1.7	1.4	2.7	1.0	2.0	0.6	0.2	0.4	0.4
	All Households	8.0	6.3	1.0	1.2	1.6	1.8	4.4	3.8	2.3	2.3	1.4	2.0	1.1	1.5	0.8	0.6	0.5	0.6
West zone	Member	6.1	6.6	0.7	1.5	1.0	1.7	8.6	12.8	2.5	3.6	0.9	0.9	0.5	0.7	0.5	0.2	0.2	0.1
	Non-Member	4.4	4.5	1.0	1.0	1.1	1.0	6.6	5.5	1.9	1.8	1.5	1.4	1.0	0.8	0.2	0.0	0.0	0.0
	All Households	5.7	6.5	0.8	1.4	1.1	1.5	8.1	11.0	2.3	3.2	1.1	1.0	0.6	0.7	0.3	0.2	0.2	0.1
ALL ZONES	Member	7.1	5.9	1.0	1.4	1.4	1.9	5.4	5.6	2.5	2.9	1.1	1.2	0.8	0.9	0.6	0.5	0.3	0.3
	Non-Member	6.2	5.2	1.0	1.2	1.3	1.4	4.7	5.5	2.2	2.6	1.2	1.0	0.8	0.7	0.3	0.2	0.2	0.1
	All Households	6.9	5.8	1.0	1.4	1.4	1.8	5.1	5.6	2.4	2.8	1.1	1.1	0.8	0.8	0.5	0.4	0.3	0.2

Table XII: Composition of Bovine Stock by Sex and Type of Milch Animal

Zone	Membership	Number of female per male						Number of female calves per male calf			All bovines			Buffalo			All bovines		
		Crossbred cattle		Desi cattle		All cattle		Buffalo		Desi cattle	All cattle		All cattle	All cattle		Buffalo	All bovines		All bovines
		1988	1995	1988	1995	1988	1995	1988	1995		1988	1995		1988	1995		1988	1995	
East zone	Member	52.7	97.2	1.6	1.0	2.3	1.5	16.2	—	2.9	1.7	2.1	2.6	1.2	1.3	1.5	1.5	1.6	1.5
	Non-Member	335.0	93.0	1.4	1.2	1.8	1.4	7.5	—	2.1	1.9	2.8	1.0	1.4	1.8	1.6	1.7	2.0	1.9
	All Households	72.9	96.3	1.5	1.1	2.0	1.5	11.3	—	2.5	1.7	2.7	1.9	1.3	1.5	1.5	1.6	1.7	1.7
North zone	Member	32.6	17.9	1.1	2.0	1.5	2.7	13.0	61.1	3.4	7.2	2.3	2.3	1.6	1.1	1.7	1.4	1.9	1.3
	Non-Member	24.8	18.8	0.9	2.5	1.1	3.2	17.9	63.9	2.9	12.2	2.6	2.0	1.5	1.5	1.6	1.6	1.9	2.0
	All Households	29.3	18.2	1.0	2.2	1.3	2.8	15.0	62.6	3.1	9.1	2.4	2.2	1.5	1.3	1.7	1.5	1.9	1.5
South zone	Member	97.0	274.0	0.9	1.6	1.6	2.9	17.2	47.8	2.9	4.8	3.0	2.4	1.2	0.9	1.7	1.3	1.7	1.3
	Non-Member	47.7	50.4	0.9	2.2	1.3	2.7	14.9	99.1	2.4	3.9	3.1	2.1	1.4	0.4	1.5	1.4	1.7	0.7
	All Households	79.9	182.4	0.9	1.8	1.6	2.9	16.5	52.8	2.8	4.6	3.0	2.4	1.2	0.7	1.8	1.0	1.7	1.1
West zone	Member	19.1	179.2	0.6	1.7	0.8	2.0	61.0	504.3	2.4	4.9	2.9	1.9	1.7	1.2	1.9	1.3	3.2	2.6
	Non-Member	8.7	—	0.9	1.0	1.0	1.1	35.2	745.0	1.9	2.4	2.6	1.1	1.3	0.9	1.4	0.9	2.7	1.7
	All Households	16.0	186.4	0.7	1.5	0.9	1.7	53.2	525.4	2.3	4.3	2.8	1.9	1.5	1.2	1.8	1.2	3.1	2.4
ALL ZONES	Member	43.8	92.2	0.8	1.7	1.3	2.4	20.8	86.3	2.8	5.0	2.8	2.3	1.4	1.1	1.8	1.3	2.2	1.8
	Non-Member	26.3	30.8	0.9	1.8	1.2	2.1	18.3	79.1	2.5	5.1	2.9	1.9	1.4	0.8	1.7	0.8	1.9	1.8
	All Households	37.8	70.8	0.9	1.7	1.3	2.3	19.9	83.9	2.7	5.0	2.8	2.3	1.4	1.0	1.7	1.2	2.1	1.9

Table XIII: Zone-wise Percentage Distribution of Milk Production and Compound Growth Rate Between 1988-89 and 1995-96

Zone	Membership	Zonal distribution of milk production by type of animal										Compound growth rate (per cent per annum)								
		Crossbred cows					Indigenous cows					All cows			Buffaloes			Total		
		1988-89		1995-96		1988-89	1995-96		1988-89		1995-96		1988-89	1995-96		1988-89		1995-96		Total
		1988-89	1995-96	1995-96	1988-89		1988-89	1995-96	1995-96	1988-89	1988-89	1995-96		1995-96	1988-89	1988-89	1995-96	1995-96		
East zone	Member	3.7	3.9	3.3	3.8	3.5	3.8	1.0	0.5	2.0	1.9	6.92	10.64	8.68	-2.30	6.15				
	Non-Member	1.6	0.9	3.1	2.3	2.3	1.6	0.7	0.4	1.4	0.9	-2.77	3.96	1.84	-3.98	0.17				
	All Households	5.2	4.8	6.4	6.1	5.8	5.4	1.7	0.9	3.4	2.7	4.55	7.71	6.27	-3.01	3.95				
North zone	Member	15.3	11.9	26.4	13.3	20.5	12.6	25.9	23.1	23.7	18.8	2.33	-1.48	0.12	5.18	3.57				
	Non-Member	7.7	6.0	20.8	7.8	13.9	6.9	22.8	24.1	19.2	17.0	2.21	-5.62	-2.92	7.76	5.25				
	All Households	23.0	17.9	47.2	21.1	34.4	19.6	48.6	47.2	42.9	35.8	2.29	-3.18	-1.04	6.44	4.34				
South zone	Member	39.9	55.5	16.6	32.3	28.9	43.6	14.3	17.5	20.2	28.2	11.15	19.47	13.78	10.04	12.30				
	Non-Member	9.5	7.2	5.7	10.8	7.7	9.1	5.6	3.7	6.4	5.9	1.96	19.08	9.85	0.67	5.71				
	All Households	49.4	62.7	22.2	43.1	36.6	52.6	19.9	21.1	26.6	34.1	9.71	19.37	13.02	7.87	10.91				
West zone	Member	19.7	14.2	15.1	26.4	17.5	20.5	24.5	28.2	21.6	25.0	1.24	17.68	9.75	9.10	9.32				
	Non-Member	2.7	0.4	9.0	3.3	5.7	1.9	5.3	2.6	5.5	2.3	-19.36	-6.09	-8.47	-3.43	-5.36				
	All Households	22.4	14.6	24.1	29.7	23.2	22.4	29.8	30.8	27.1	27.3	-0.21	11.88	6.74	7.43	7.20				
ALL ZONES	Member	78.5	85.5	61.3	75.8	70.4	80.5	65.6	69.3	67.5	73.9	7.34	11.95	9.38	7.75	8.45				
	Non-Member	21.5	14.5	38.7	24.2	29.6	19.5	34.4	30.7	32.5	26.1	0.18	1.57	1.05	5.18	3.76				
	All Households	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.03	8.60	7.29	6.91	7.06				

Table XIV: Zonal Composition of Milk Production by Type of Milch Animal

Zone	Membership	Zonal distribution of milk production by type of animal												Total		
		Crossbred cows						Indigenous cows						Buffaloes		
		1988-89			1995-96			1988-89			1995-96			1988-89		
		1988-89	1995-96	1995-96	1988-89	1995-96	1988-89	1995-96	1995-96	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96	1995-96
East zone	Member	39.4	41.4	42.4	31.8	42.4	71.1	83.9	83.9	28.9	16.1	28.9	16.1	100.0	100.0	100.0
	Non-Member	24.3	19.7	56.2	43.4	56.2	67.7	76.0	76.0	32.3	24.0	32.3	24.0	100.0	100.0	100.0
	All Households	33.2	34.6	46.8	36.5	46.8	69.7	81.4	81.4	30.3	18.6	30.3	18.6	100.0	100.0	100.0
North zone	Member	13.8	12.6	15.0	21.3	15.0	35.0	27.6	27.6	65.0	72.4	65.0	72.4	100.0	100.0	100.0
	Non-Member	8.6	7.0	9.7	20.8	9.7	29.3	16.7	16.7	70.7	83.3	70.7	83.3	100.0	100.0	100.0
	All Households	11.4	10.0	12.5	21.0	12.5	32.5	22.4	22.4	67.5	77.6	67.5	77.6	100.0	100.0	100.0
South zone	Member	42.2	39.3	24.2	15.7	24.2	57.9	63.5	63.5	42.1	36.5	42.1	36.5	100.0	100.0	100.0
	Non-Member	31.5	24.5	38.8	16.9	38.8	48.4	63.3	63.3	51.6	36.7	51.6	36.7	100.0	100.0	100.0
	All Households	39.6	36.7	26.7	16.0	26.7	55.6	63.5	63.5	44.4	36.5	44.4	36.5	100.0	100.0	100.0
West zone	Member	19.4	11.3	13.3	32.7	22.3	32.7	33.6	33.6	67.3	66.4	67.3	66.4	100.0	100.0	100.0
	Non-Member	10.6	3.5	30.0	31.6	30.0	42.2	33.4	33.4	57.8	66.6	57.8	66.6	100.0	100.0	100.0
	All Households	17.6	10.7	22.9	17.0	22.9	34.6	33.6	33.6	65.4	66.4	65.4	66.4	100.0	100.0	100.0
ALL ZONES	Member	24.8	23.1	17.4	42.2	21.7	42.2	44.8	44.8	57.8	55.2	57.8	55.2	100.0	100.0	100.0
	Non-Member	14.1	11.1	19.6	22.8	19.6	36.9	30.7	30.7	63.1	63.3	63.1	63.3	100.0	100.0	100.0
	All Households	21.4	20.0	21.1	19.1	21.1	40.5	41.1	41.1	59.5	58.9	59.5	58.9	100.0	100.0	100.0

Table XV: Zone-wise Distribution of Milk Sold and Compound Growth Rate Between 1988-89 to 1995-96 by Type of Animal and Membership

Zone	Membership	Cows			Buffaloes			Total			Percentage sold to DCSs				Compound growth rate (per cent per annum)			
		1988-89		1995-96	1988-89		1995-96	1988-89		1995-96	Cows		Buffaloes		Cows	Buffaloes	Total	
		1988-89	1995-96	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96	1988-89	1995-96							
East zone	Member	3.5	1.9	0.7	2.3	1.2	55.3	59.5	77.2	80.5	-5.3	-6.3	-5.6					
	Non-Member	1.9	0.8	0.4	1.4	0.6	29.1	12.7	35.4	5.0	-8.9	-9.6	-9.2					
	All Households	5.4	2.7	1.0	3.7	1.8	46.0	45.8	59.2	52.3	-6.5	-7.6	-6.9					
North zone	Member	18.1	7.1	20.4	20.3	14.4	76.3	68.3	64.0	74.0	-9.6	2.1	-1.6					
	Non-Member	11.8	3.4	20.6	15.1	12.9	40.0	23.6	37.4	13.8	-13.3	5.4	0.9					
	All Households	29.9	10.5	41.0	35.5	27.3	62.0	53.7	52.1	43.8	-11.0	3.6	-0.5					
South zone	Member	32.9	57.1	21.0	24.2	37.2	91.1	69.8	84.3	78.8	11.9	6.2	9.9					
	Non-Member	8.2	11.1	4.3	7.5	7.4	77.0	36.0	71.7	35.6	8.0	-3.4	3.1					
	All Households	41.1	68.2	25.3	31.6	44.6	88.2	64.3	80.7	71.4	11.2	4.0	8.5					
West zone	Member	18.6	17.6	30.1	23.8	24.5	93.6	70.4	89.9	77.9	2.6	4.3	3.7					
	Non-Member	5.0	1.0	2.6	5.5	1.9	76.9	25.3	67.7	34.2	-17.6	-8.3	-11.4					
	All Households	23.6	18.6	32.7	29.3	26.3	90.1	68.0	86.0	74.5	-0.0	2.7	1.8					
ALL ZONES	Member	73.1	83.7	72.2	70.5	77.3	86.3	69.6	79.9	77.1	5.4	4.0	4.7					
	Non-Member	26.9	16.3	27.8	29.5	22.7	57.3	31.6	50.4	18.9	-3.7	1.4	-0.5					
	All Households	100.0	100.0	100.0	100.0	100.0	78.5	63.4	70.6	60.9	3.4	3.2	3.3					

At the aggregate level, the rate of growth of milk production, between 1988 and 1995, is the highest in the case of desi cows, followed by buffaloes and crossbred cows. This trend is mainly due to the increase in the number of milch animals as a result of the rise in DCS members and also due to productivity gains.

Among member households, crossbred cow milk production grew positively at annual rates ranging from 1.2 percent in the Western zone to 11.2 percent in the Southern zone. In the case of desi cows, the growth in milk production has been phenomenal. It went up to over 11.0 percent per annum, ranging from 1.5 percent in the North zone to 19.5 percent in the Southern zone. Likewise, in the case of buffalo milk, the highest growth rate was recorded in the Southern zone, followed by the Western and Northern zones. The Eastern zone recorded a sharp decline in buffalo milk over the period.

Table XIII indicates that the share of the Southern zone in the total milk production has risen from 26.6 percent in 1988-89 to 34.1 percent in 1995-96. However, the shares of Eastern and Northern zones have declined. The share of member households has risen from 67.5 percent to 73.9 percent over the period; and so has the share of the different breeds of milch animals.

The higher rate of growth in milk production found among non-member households in the Northern zone was due to the increased buffalo milk production among non-members (7.8 percent per annum) than in the case of members (5.2 percent per annum). Whereas among the non-member households in the Western zone, the growth rate in milk production was found to be negative for all milch animals. The fall in their size of milch animal stock was perhaps, the major reason for the decline in milk production.

Consistent with the relative growth pattern of cow and buffalo milk, between 1988 and 1996 at the aggregate level (Table XIV), the shares of crossbred and desi cows and buffaloes in the total milk production did not change significantly. The share of buffalo milk increased in the Northern and Western zones over the period; but the Northern zone's desi cow milk share decreased. The share of crossbred cow milk declined across zones except for the Eastern zone.

## **CHANGE IN MILK SALE PATTERN**

Between 1988 and 1995, an important aspect of milk production has been the change in the pattern of milk sale by the rural milch households. The sale of milk in the OF area has increased from 28.2 million litres per day in 1988-89 to about 35.4 million litres per day in 1995-96. During this period milk sale grew at the rate of about 3.3 percent per annum, which is lower than the rate of growth of milk production (7.1 percent per annum). We also find that the overall growth in the milk sale has been mainly due to the increased disposal of milk by member households. Among types of milk, the quantum of buffalo milk sale has increased over the period at about 3 percent per annum in each of the

zones except in the Eastern zone. Whereas cow milk sale has declined across zones except in the Southern zone. The growth rates presented in Table XV are indicative of the type of milk that producers prefer to sell, depending on the market and price offered for sale. At the aggregate level, the contribution of member households towards total milk sold has risen for both types of milk.

With 44.6 percent of the total milk sale in 1995-96, the Southern zone had the highest share, followed by the Northern and Western zones. Whereas in the 1988 Baseline Study, the North zone had the highest share, followed by the Southern and Western zones. The contribution of the East zone has been the lowest during both the years and, in fact, declined in 1995.

The growth in milk procurement (i.e., obtainment of milk by dairy cooperative societies) is the central parameter for evaluating the impact of Operation Flood in rural areas. Table XV shows that during the period 1988-96 at the aggregate level, the share of DCSs in the total milk procurement has declined for both cow and buffalo milk, this is also true of all the four zones. A major factor for this decline is the sharp fall in milk supply by non-member households to DCSs. Another reason could be the increased involvement of private enterprises and other cooperative societies in the rural dairy sector.

## MILK CONSUMPTION PATTERN

As mentioned earlier, milk production in OF areas grew at the rate of 7.1 percent per annum between 1988 and 1995. However, the sale of milk grew only at the rate of about 3.3 percent. The difference in the rates of growth of production and sale of milk indicate that milk consumption, either in liquid form or as a by-product, has risen during the period. Data related to the change in liquid milk consumption are presented in Table XVI.

**Table XVI : Zone-wise Per Capita Consumption of Milk by Type of Household and Membership**

*(ml per day)*

Zone	1988-89			1995-96		
	Member	Non-member	All households	Member	Non-member	All households
East	190	190	190	242	234	238
North	530	460	490	475	592	530
South	170	160	170	309	279	302
West	220	190	210	221	224	221
All Zones	280	310	290	310	413	339

Data indicate that between 1988-89 and 1995-96, per day consumption of milk has increased from 290 to 339 ml at the aggregate level. A similar trend can be seen in individual zones. While the consumption of liquid milk among member households rose sharply in the Southern and Eastern zones and remained constant at about 220 ml per day in the Western zone, it declined by about 10 percent in the

Northern zone. We will now analyse the consumption patterns of different types of households. Among non-member households, the consumption level has risen during the period in each zone, but it has remained much below the consumption level of member households in the Southern zone. In the Western and Eastern zones, the difference in the levels of milk consumption between the two types of households has been marginal.

By linking rural milk producers with urban consumers through an expanding market network, including procurement, processing and distribution of milk, Operation Flood has succeeded in creating a viable market for milk and in increasing the per capita consumption of milk in India's rural hinterland. This pattern of milk production, sale and consumption is undoubtedly a measure of its success.

## CONSUMPTION OF FEED/FODDER

The productivity of milch animals depends upon the state of their health, which in turn is dependent on their nutritional status. Further, the nutritional status is determined, among other things, by the quality and quantity of feed/fodder fed to animals. Depending on the breed of the animal, balanced feed consists of concentrates and roughage (green and dry fodder). Though the supply of concentrates to milch animals is generally met through the practice of stall-feeding, milch animals get roughage through both stall-feeding and grazing, as the latter alone does not meet the roughage requirements of animals.

Tables XVII to XIX present comparative data on the composition of feed/fodder during 1988-96. Increasing levels of awareness among milk producers of the requirement of a balanced mix of feed/fodder and the availability of BCF have resulted in greater use of concentrates. Its consumption has registered an increase of more than 50 percent. This has been offset by a slight decline in the consumption of roughage and a virtual elimination of other feed/fodder intake. In the case of roughage, we find that while the proportion of green fodder has increased, that of dry fodder has declined.

**Table XVII: Percentage increase in the Consumption of Feed/Fodder in 1995-96 over 1988-89**

Animal type	Membership	Type of Feed/Fodder						
		Green fodder	Dry fodder	Grains	Oil seed cakes	BCF	Others	Total
Cows	Member	84.1	9.5	270.0	115.8	120.5	-76.5	41.8
	Non-Member	119.7	5.2	236.2	140.7	108.3	-79.3	49.2
	All-Households	93.2	8.2	247.2	125.6	128.8	-77.2	43.9
Buffaloes	Member	89.8	-0.8	235.0	131.7	50.3	-80.5	38.2
	Non-Member	89.4	10.3	253.8	78.4	193.8	-50.0	50.7
	All-Households	88.2	2.5	237.3	111.7	80.4	-72.6	41.7

The 1995-96 survey data indicate that over the period, the quantum of increases in the quantities of feed/fodder, especially the concentrates, to cows are higher than that in the case of buffaloes. This indicates an increased awareness among milk producers about the nutritional requirements of different breeds of cows (as in the case of crossbreeds) and ways to enhance (as in the case of indigenous breeds) their productivity levels. As a result, while there has been a considerable impact due to the introduction of exotic breeds and genetic upgrading of indigenous stock through crossbreeding in the case of cows, there has been little progress in the case of buffaloes.

**Table XVIII : Composition of total feed/fodder intake (Kg per day)**

Animal type	Membership	Type of Feed/Fodder					
		Green fodder	Dry fodder	Grains	Oil seed cakes	BCF	Others
		1988-89					
Cows	Member	4.50	7.86	0.14	0.46	0.60	0.43
	Non-Member	4.22	8.04	0.18	0.46	0.38	0.34
	All-Households	4.40	7.93	0.16	0.46	0.53	0.39
Buffaloes	Member	6.12	9.59	0.24	0.42	0.61	0.31
	Non-Member	7.62	9.47	0.26	0.53	0.33	0.26
	All-Households	6.59	9.54	0.25	0.45	0.52	0.29
		1995-96					
Cows	Member	8.28	8.62	0.53	1.00	1.32	0.10
	Non-Member	9.27	8.46	0.62	1.10	0.80	0.07
	All-Households	8.51	8.58	0.55	1.02	1.20	0.09
Buffaloes	Member	11.61	9.51	0.82	0.97	0.92	0.06
	Non-Member	14.43	10.44	0.92	0.94	0.96	0.13
	All-Households	12.42	9.78	0.85	0.96	0.93	0.08

The quantum and type of feed/fodder fed to animals is governed by factors, such as awareness, availability, income, etc. As mentioned earlier, milch animals get roughage through stall-feeding and grazing. The 1995-96 survey data show that approximately 37 percent of milch animal households do not allow their animals to graze. The percentage of such households was lower in 1988-89. The change could be due to the fact that forest areas are often prohibited for grazing to maintain forest cover, open grazing facilities are limited since permanent pastures and fallow lands are continuously declining, and village panchayat lands -- used for grazing earlier -- are considerably reduced. As a result, dairy farmers who rear livestock mostly stall-feed their milch and draught animals with crop residues and increased use of purchased roughage. This increase in the proportion of purchased dry fodder is higher than that of green fodder. In the case of grains and oil seed cakes, the proportion of the quantity purchased has declined significantly over the period. This decline could, perhaps, be attributed to the changes in the cropping pattern of oil seed crops.

Table XIX: Change in proportion of purchased feed/fodder to the total quantity consumed

(Percent)

Membership	Type of feed/fodder					
	Green fodder	Dry fodder	Grains	Oil seed cakes	BCF	Others
	1988-89					
Member	11.8	12.7	19.8	87.9	96.1	57.4
Non-Member	15.7	14.8	25.3	83.4	90.8	62.8
All-Households	13.2	13.4	21.5	86.3	94.8	59.0
	1995-96					
Member	23.4	32.7	11.7	53.6	\$	2.1
Non-Member	23.3	33.6	14.0	52.5	\$	2.8
All-Households	23.4	33.0	12.4	53.3	\$	2.3

\$ BCF is mostly purchased.

## LABOUR-USE PATTERN

A dairy enterprise is labour-intensive. Typically, most of the household members, including women and children, are involved in this activity throughout the year. The data from the surveys indicate an extensive use of adult male labour in member and non-member households. However, over the period, the participation of women and children has increased in both households. The increased adult female labour participation is probably a result of an opportunity cost, in addition to other factors such as tradition. We find that there is an overwhelming use of family labour as compared to hired labour in both the survey years and among member and non-member households (Table XX).

Table XX: Labour-use Pattern

	1988-89			1995-96		
	Adult Male	Adult Female	Children	Adult Male	Adult Female	Children
Member	70.7	28.0	2.0	59.3	35.7	5.0
Non-Member	72.9	25.0	2.1	60.4	32.7	6.9
All-Household	71.0	26.9	2.1	59.7	34.8	5.5
	1988-89			1995-96		
			Family Labour	Hired Labour	Family Labour	Hired Labour
Member			88.0	12.0	92.8	7.2
Non-Member			88.8	11.2	95.5	4.5
All-Household			88.2	11.8	93.7	6.3

## MAJOR CONSTRAINTS IN MILK PRODUCTION

In the preceding sections we discussed the impact of the Operation Flood programme on dairy farming and the changes it has brought about with respect to some of the important parameters in the rural dairy economy over the period 1988-96. It is heartening to note that the overall milk production in the OF area has gone up from 41.5 million litres per day in 1988-89 to 66.9 million litres per day in 1995-96. At an annual growth rate of 3.3 percent in milk procurement, the DCSs control over 60 percent of the marketable milk. This has been as a result of an expanded cooperative network covering



11.7 million milch animal households (1996) compared to that of 7.2 million in 1988-89. The increased milk production levels have been achieved through the enlarged cooperative network, and the targeted efforts of Operation Flood in bringing about compositional changes in the bovine stock. And thereby increasing the size of high yielding milch animals through the introduction of exotic breeds and cross-breeding techniques, better veterinary health care facilities and input supplies, such as feed/fodder.

However, the overall growth of the rural dairy economy has been inhibited by numerous constraints. We shall now examine some of the key constraints in the development of the dairy sector. We would also focus on areas in which Operation Flood could improve its performance and provide the necessary support and strength to the rural dairy sector.

### **Veterinary Health Care**

A successful livestock programme requires a well-knit animal health care system for the protection of animals against disease and pests. With the increased productivity of dairy animals, the dairy farmer in rural India is now aware of the need to adopt adequate health care and management practices to protect animals. The present survey highlights areas that need improvement in the existing veterinary health care facilities. Among the main sources of health care, government veterinary hospitals are found to be the most important by milch animal households. The health care services offered by the DCS and Milk Unions are mainly used by member households. However, the survey reveals that nearly 68 percent of the households reported that veterinary mobile vans did not visit regularly but only visited during an emergency. The DCSs/Milk Unions, besides providing primary health care facilities, also need to play an advisory role regarding animal health care as they are the most commonly used source by member households across zones, except for the Northern zone. In view of the above observations and the fact that high yielding exotic/crossbreeds (which are mainly confined to the OF area), and young stock (particularly buffaloes) are susceptible to diseases, animal health care facilities require further improvement at the village level. Better coordination between Government agencies and the NDDB/Milk Unions could possibly be a major part of the solution.

### **Availability of Feed/Fodder**

The consumption of feed/fodder by milch animals improved over the period 1988-96. In view of the increased productivity levels of milch animals, we need to examine whether the availability of feed/fodder is sufficient or optimal. In order to do so qualitative data were collected from milch animal households on factors, such as availability of enough feed/fodder, reasons for non-availability and factors affecting increased fodder production (Tables 6.7 and 6.8)

The survey indicates that a significant proportion (35.4 percent) of RMAHs and about a third of member-MAHs have reported that sufficient feed/fodder is not available for their milch animals. These percentages are higher in the Southern and Eastern zones. The high price of feed/fodder is

reported to be the main reason for its non-availability. Fodder growing households have reported that small land holdings and lack of funds and irrigation facilities to be the major reasons affecting increased green fodder production. In addition, there is a scarcity of grazing and pasture lands, grains and oil seed, bran and other milling products; and the availability of dry fodder from crop-residues is drastically reduced as more and more land is being covered under dwarf varieties of crops. In view of this scarcity of feed and fodder, there is a need for a package in terms of finances as well as other inputs to milk producing households to enhance fodder production. Such a package will ensure a free flow of feed/fodder to farmers for improving the productivity of their milch animals.

## **FUNCTIONING OF COOPERATIVES: PERCEPTIONS OF MILCH**

### **ANIMAL HOUSEHOLDS**

Undoubtedly Operation Flood, with its cooperative structure, has played a major role in the development of the dairy sector in India, but it needs to focus on some of its perceived drawbacks as indicated by the rural milch animal households. While planning for future expansion of the dairy cooperative structure, Operation Flood should consider, among other things, the views of RMAHs on the functioning of the cooperatives. An expansion of the programme that is merely based on targets might not realise its full potential.

The present survey provides the views of member households on the functioning of dairy cooperative societies; and the reasons for quitting membership, and not opting for membership by former members and non-members, respectively. The related data are presented in Tables XXI to XXIV.

Table XXI presents the perceptions of member households on the quality of services offered by the dairy cooperative societies. At the aggregate level, factors, such as management, membership criteria, working of executives of the societies, method and timings of milk collection, and the basis, mode and frequency of payments for milk supplied have been rated as satisfactory by the households. However, with regard to animal health care services and BCF supply, the assessment of milk producers, is either 'not satisfactory' or 'needs improvement'. Thus, even the milk producers who are members of the dairy cooperative societies perceive inadequate animal health care services and BCF supply to be the major constraints inhibiting the growth of milk production.

**Table XXI : Percentage Distribution of Member Households by Ratings of DCS Activities**

Zone	Functions of DCS	Satisfactory	Not satisfactory	Improvement required	No opinion
<b>East zone</b>	Management	78.7	18.1	2.4	0.8
	Membership criteria	88.4	7.8	0.5	3.3
	Working of executives	48.9	26.7	9.8	14.6
	Method/timing of milk collection	79.3	6.3	13.7	0.7
	Basis of payment	72.0	12.2	15.2	0.6
	Frequency of payment	72.4	13.0	14.1	0.5
	Animal health care facilities	33.9	41.5	20.5	4.1
	BCF supply	30.8	40.1	25.1	4.0
<b>North zone</b>	Management	87.3	5.9	4.2	2.6
	Membership criteria	85.8	7.9	3.8	2.6
	Working of executives	82.1	10.2	4.8	2.9
	Method/timing of milk collection	88.8	5.7	3.1	2.4
	Basis of payment	83.8	10.3	3.7	2.2
	Frequency of payment	86.7	9.0	2.1	2.2
	Animal health care facilities	40.6	45.4	10.2	3.8
	BCF supply	53.2	34.8	7.8	4.2
<b>South zone</b>	Management	82.2	6.4	8.9	2.5
	Membership criteria	76.0	11.2	7.3	5.5
	Working of executives	69.6	12.4	9.0	9.0
	Method/timing of milk collection	80.3	8.3	8.3	3.1
	Basis of payment	69.5	17.3	10.4	2.8
	Frequency of payment	72.6	11.0	10.4	6.0
	Animal health care facilities	55.9	28.6	11.5	4.0
	BCF supply	29.9	36.1	13.7	20.3
<b>West zone</b>	Management	88.1	6.1	0.4	5.4
	Membership criteria	80.1	5.6	0.7	13.6
	Working of executives	81.0	13.1	0.2	5.7
	Method/timing of milk collection	88.3	10.4	1.1	0.3
	Basis of payment	87.1	9.7	3.0	0.2
	Frequency of payment	91.1	7.8	0.9	0.2
	Animal health care facilities	51.2	39.5	5.3	4.0
	BCF supply	55.3	37.0	5.6	2.1
<b>ALL ZONES</b>	Management	85.1	6.5	4.8	3.6
	Membership criteria	79.4	8.5	4.1	8.0
	Working of executives	75.3	12.7	5.1	6.9
	Method/timing of milk collection	84.6	8.6	4.9	1.9
	Basis of payment	78.4	13.2	6.7	1.7
	Frequency of payment	81.7	9.6	5.6	3.1
	Animal health care facilities	51.2	35.6	9.2	4.0
	BCF supply	43.1	36.4	10.0	10.6

About 3.9 percent of DCS members had left the cooperative fold at some point of time in the past. This proportion of member-MAHs at 6.8 percent is the highest in the East zone. Their major reasons for quitting DCS membership included: 'inability to supply milk regularly' and 'non-profitability'.

**Table XXII: Proportion of Member-MAHs that had Quit DCS Membership in the Past and Reasons for Doing So**

Zone	Percentage	Distribution by reasons		
		Unable to supply milk regularly	Not profitable	Others
East zone	6.8	82.6	15.2	2.2
North zone	3.5	66.1	26.7	7.2
South zone	3.8	62.8	33.5	3.7
West zone	4.6	79.5	14.5	6.0
<b>ALL ZONES</b>	3.9	70.1	24.5	5.4

The fact that only 71 percent of the milch animal households have become members of the milk cooperatives suggests that in the competitive milk market, the DCSs need to make special efforts to improve their services if they are to attract new members. However, as noted earlier, a certain proportion of milch animal households hardly has any surplus milk for sale and hence cannot be considered as potential members. This situation could change with improved productivity of milch animals and availability of animal feed at a fair price to all households.

A sample of non-member households was asked the reasons for not joining the milk cooperatives, and if they had been members in the past the reasons for quitting and not rejoining. From the data presented in Tables XXIII and XXIV, we find that approximately 19 percent of non-member households were members of DCSs in the past. The highest percentage of such households is in the Southern zone, followed by the North zone. Their main reasons for quitting membership were 'no surplus milk production' and 'insignificant benefit' from the societies. 52.4 percent among these households intended to become members of the dairy cooperative societies.

**Table XXIII: Proportion of Non-member MAHs that Held DCS Membership in the Past and Reasons for Quitting**

Zone	Percentage	Distribution by reasons					
		No surplus milk production	Not profitable	Unfair functioning of DCS	Social factors	Have a better alternative	Others
East zone	1.3	33.0	20.2	29.1	1.5	8.0	8.2
North zone	24.5	52.9	25.4	2.8	1.1	10.1	7.7
South zone	26.2	51.7	23.9	3.5	5.7	12.8	2.4
West zone	11.5	58.3	11.5	6.7	7.4	8.9	7.2
<b>ALL ZONES</b>	18.6	44.8	20.6	14.9	3.7	9.6	6.4

**Table XXIV : Proportion of Non-member MAHs Not Interested in Becoming Members of DCS and Their Reasons for the same**

Zone	Percentage	Distribution by reasons					
		No surplus milk production	Not profitable	Unfair functioning of DCS	Social factors	Have a better alternative	Others
East zone	68.8	18.1	44.8	3.7	1.8	30.8	0.8
North zone	36.5	22.0	26.5	6.9	7.4	10.5	26.7
South zone	52.1	15.6	57.3	4.3	4.6	14.5	3.6
West zone	56.2	31.5	35.7	4.8	4.0	9.2	14.8
<b>ALL ZONES</b>	47.6	21.5	41.1	5.3	5.3	12.7	14.1

Non-members, about 14 percent of the total number of rural milch animal households, who do not wish to join the cooperative movement, have provided a variety of reasons. 'Have a better alternative, 'unfair functioning of DCSs' and 'social/caste factors' are among the reasons given. A significant proportion of non-members (12.7 percent) believes that better marketing agencies are available. The other milk marketing agencies are attractive as they offer incentives, such as advance payments for purchasing milch animals, and a higher price and advance payments for milk supply. However, the so-called 'better alternative' is also open to the other milk producers, who have not considered it a viable and reliable proposition. Perhaps, these incentives are of great importance for households of poor economic status, needing financial assistance to pursue the dairy business. Financial support to the economically weaker sections among milk producers would not only improve their lives, but also enable them to contribute effectively to the dairy sector. This needs to be kept in view while attempting to expand and strengthen the milk cooperatives in rural India. If the cooperatives are to be perceived as superior to the other agencies in the informal dairy sector they have to work harder. They need to go to the dairy farmers in the villages and find out their concerns in the areas of livestock, veterinary services and animal feed for the consolidation of the existing areas under Operation Flood and its future expansion in the country.



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**Table 3.1: Estimated Number of Rural Milch Animal Households (RMAHs) and Member Households (Member-MAHs)**

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Region/Zone	Number of milch animal households		Percentage of member-MAHs to RMAHs
	Total	Member-MAHs	
Assam	157	60	38.1
Bihar	1557	796	51.1
Orissa	617	463	75.0
Gangetic West Bengal	889	454	51.1
Sub-Himalyan West Bengal	390	267	68.5
<b>EAST ZONE</b>	<b>3609</b>	<b>2040</b>	<b>56.5</b>
Haryana	2784	1503	54.0
Himachal Pradesh	325	139	42.7
Punjab	9773	3160	32.3
West Rajasthan	1715	1059	61.8
East Rajasthan	5039	2535	50.3
East Uttar Pradesh	2934	2054	70.0
West Uttar Pradesh	5245	2942	56.1
<b>NORTH ZONE</b>	<b>27815</b>	<b>13392</b>	<b>48.1</b>
Coastal Andhra Pradesh	5768	4295	74.5
Interior Andhra Pradesh	3090	2198	71.1
South Int.Karnataka	9228	8132	88.1
North Int.Karnataka	3824	2590	67.7
Kerala	3972	3180	80.1
Tamil Nadu/Pondicherry	22762	16642	73.1
<b>SOUTH ZONE</b>	<b>48644</b>	<b>37039</b>	<b>76.1</b>
Gujarat	17226	16896	98.1
Saurashtra	1695	974	57.5
Coastal Karnataka	1468	1061	72.3
Madhya Maharashtra	10484	7674	73.2
Marathwada	1231	1038	84.3
Vidarbha	1362	1162	85.3
Madhya Pradesh	3780	1991	52.7
<b>WEST ZONE</b>	<b>37245</b>	<b>30796</b>	<b>82.7</b>
<b>ALL ZONES</b>	<b>117313</b>	<b>83267</b>	<b>71.0</b>

**Table 3.2 : Percentage Distribution of MAHs by Education of Head of Household**

Zone	Membership	Illiterate	Up to Middle	Higher Secondary	Others	Total
<b>East Zone</b>						
	Member	20.76	50.22	23.76	5.26	100.00
	Non-member	19.75	54.94	19.61	5.70	100.00
	All households	20.32	52.27	21.96	5.45	100.00
<b>North Zone</b>						
	Member	25.59	51.36	20.64	2.41	100.00
	Non-member	29.99	51.30	14.22	4.49	100.00
	All households	27.87	51.33	17.31	3.49	100.00
<b>South Zone</b>						
	Member	16.63	71.17	9.99	2.21	100.00
	Non-member	20.89	69.53	7.91	1.67	100.00
	All households	17.64	70.79	9.49	2.08	100.00
<b>West Zone</b>						
	Member	15.97	77.33	5.43	1.27	100.00
	Non-member	26.75	63.38	9.71	0.16	100.00
	All households	17.84	74.91	6.17	1.08	100.00
<b>ALL ZONES</b>						
	Member	17.93	69.75	10.35	1.97	100.00
	Non-member	25.80	59.97	11.46	2.77	100.00
	All households	20.21	66.91	10.68	2.20	100.00

**Table 3.3 : Percentage Distribution of MAHs by Social Groups**

Zone	Membership	SC/ST	Others	Total
<b>East Zone</b>				
	Member	23.40	76.60	100.00
	Non-member	35.97	64.03	100.00
	All households	28.87	71.13	100.00
<b>North Zone</b>				
	Member	15.24	84.76	100.00
	Non-member	20.70	79.30	100.00
	All households	18.08	81.92	100.00
<b>South Zone</b>				
	Member	8.98	91.02	100.00
	Non-member	10.62	89.38	100.00
	All households	9.36	90.64	100.00
<b>West Zone</b>				
	Member	22.32	77.68	100.00
	Non-member	21.25	78.75	100.00
	All households	22.13	77.87	100.00
<b>ALL ZONES</b>				
	Member	15.27	84.73	100.00
	Non-member	18.07	81.93	100.00
	All households	16.08	83.92	100.00

**Table 3.41 : Percentage Distribution of MAHs by Primary Occupation**

Zone	Membership	Agricul- ture	Dairying	Wages	Others	Total
<b>East Zone</b>						
	Member	63.08	8.15	10.42	18.35	100.00
	Non-member	48.16	13.52	20.54	17.78	100.00
	All households	56.60	10.48	14.82	18.10	100.00
<b>North Zone</b>						
	Member	82.15	4.99	7.77	5.09	100.00
	Non-member	72.29	6.71	11.90	9.10	100.00
	All households	77.04	5.88	9.91	7.17	100.00
<b>South Zone</b>						
	Member	69.27	6.06	20.80	3.87	100.00
	Non-member	56.67	9.50	30.31	3.52	100.00
	All households	66.27	6.88	23.07	3.78	100.00
<b>West Zone</b>						
	Member	71.14	7.74	17.07	4.05	100.00
	Non-member	64.48	0.73	26.20	8.59	100.00
	All households	69.99	6.53	18.65	4.83	100.00
<b>ALL ZONES</b>						
	Member	71.89	6.56	17.07	4.48	100.00
	Non-member	64.38	6.84	21.28	7.50	100.00
	All households	69.71	6.64	18.29	5.36	100.00

**Table 3.42 : Percentage Distribution of MAHs by Secondary Occupation**

Zone	Membership	Agricul- ture	Dairying	Wages	Others	Total
<b>East Zone</b>						
	Member	15.07	78.54	2.40	3.99	100.00
	Non-member	9.67	70.11	8.34	11.88	100.00
	All households	12.76	74.94	4.94	7.37	100.00
<b>North Zone</b>						
	Member	7.02	79.09	7.13	6.75	100.00
	Non-member	8.56	69.46	9.81	12.17	100.00
	All households	7.76	74.53	8.40	9.31	100.00
<b>South Zone</b>						
	Member	14.76	65.40	16.67	3.17	100.00
	Non-member	5.62	46.28	41.63	6.47	100.00
	All households	12.78	61.27	22.08	3.87	100.00
<b>West Zone</b>						
	Member	17.20	56.41	19.60	6.79	100.00
	Non-member	12.10	39.40	34.05	14.45	100.00
	All households	16.42	53.79	21.81	7.98	100.00
<b>ALL ZONES</b>						
	Member	14.29	65.15	15.65	4.92	100.00
	Non-member	8.07	55.93	25.65	10.36	100.00
	All households	12.64	62.70	18.29	6.37	100.00

**Table 3.5 : Percentage Distribution of MAHs by Operational Land-holding Groups**

Zone	Membership	Operational land-holding groups					Large	Total
		Landless	Marginal	Small	Semi-medium	Medium		
East Zone								
	Member	18.94	38.00	29.15	10.42	2.23	1.26	100.00
	Non-member	36.35	36.81	19.51	5.95	0.40	0.98	100.00
	All households	26.51	37.48	24.98	8.47	1.43	1.13	100.00
North Zone								
	Member	10.31	26.78	26.23	10.89	8.04	17.75	100.00
	Non-member	20.06	25.75	21.35	11.54	9.80	11.50	100.00
	All households	15.36	26.24	23.72	11.22	8.95	14.51	100.00
South Zone								
	Member	21.79	39.68	17.16	8.99	3.84	8.54	100.00
	Non-member	40.19	37.53	8.14	6.65	2.68	4.81	100.00
	All households	26.18	39.17	15.01	8.43	3.56	7.65	100.00
West Zone								
	Member	9.48	41.38	25.09	11.60	3.05	9.40	100.00
	Non-member	11.97	32.46	29.51	15.07	4.37	6.62	100.00
	All households	9.91	39.84	25.85	12.20	3.28	8.92	100.00
ALL ZONES								
	Member	15.32	38.19	21.86	10.29	4.18	10.16	100.00
	Non-member	26.14	31.55	18.31	10.28	5.91	7.81	100.00
	All households	18.46	36.26	20.83	10.29	4.68	9.48	100.00

**Table 3.61: Percentage Distribution of MAHs by Social and Operational Land-holding Groups**  
EAST ZONE

Member-ship	Social Group	Operational land-holding groups						Total
		Landless	Marginal	Small	Semi-medium	Medium	Large	
<b>Member</b>								
SC/ST								
	Row %	29.7	38.9	23.7	7.7	0.0	0.0	100.0
	Col %	36.7	24.0	19.0	17.2	0.0	0.0	23.4
Others								
	Row %	15.6	37.7	30.8	11.3	2.9	1.6	100.0
	Col %	63.3	76.1	81.0	82.8	100.0	100.0	76.6
Total								
	Row %	18.9	38.0	29.2	10.4	2.2	1.3	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Non-Member</b>								
SC/ST								
	Row %	59.4	25.4	10.1	4.0	1.1	0.0	100.0
	Col %	58.8	24.8	18.6	24.4	100.0	0.0	36.0
Others								
	Row %	23.4	43.2	24.8	7.0	0.0	1.5	100.0
	Col %	41.3	75.2	81.4	75.6	0.0	100.0	64.0
Total								
	Row %	36.4	36.8	19.5	6.0	0.4	1.0	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>All Households</b>								
SC/ST								
	Row %	45.8	31.6	16.3	5.7	0.6	0.0	100.0
	Col %	49.9	24.3	18.9	19.4	12.2	0.0	28.9
Others								
	Row %	18.7	39.9	28.5	9.6	1.8	1.6	100.0
	Col %	50.1	75.7	81.1	80.6	87.9	100.0	71.1
Total								
	Row %	26.5	37.5	25.0	8.5	1.4	1.1	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3.62: Percentage Distribution of MAHs by Social and Operational Land-holding Groups**  
**NORTH ZONE**

Member-ship	Social Group	Operational land-holding groups						Total	
		Landless	Marginal	Small	Semi-medium	Medium	Large		
<b>Member</b>									
	SC/ST	Row %	29.8	37.5	19.0	5.1	2.7	6.1	100.0
		Col %	44.0	21.3	11.0	7.2	5.1	5.2	15.3
	Others	Row %	6.8	24.9	27.5	11.9	9.0	19.9	100.0
		Col %	56.0	78.7	89.0	92.9	95.0	94.8	84.8
	Total	Row %	10.3	26.8	26.2	10.9	8.0	17.8	100.0
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Non-Member</b>									
	SC/ST	Row %	50.8	26.8	5.4	9.7	1.2	6.2	100.0
		Col %	52.4	21.5	5.3	17.4	2.5	11.1	20.7
	Others	Row %	12.0	25.5	25.5	12.0	12.0	12.9	100.0
		Col %	47.6	78.5	94.7	82.6	97.5	88.9	79.3
	Total	Row %	20.1	25.8	21.4	11.5	9.8	11.5	100.0
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>All Households</b>									
	SC/ST	Row %	42.2	31.1	10.9	7.8	1.8	6.1	100.0
		Col %	49.7	21.4	8.3	12.6	3.6	7.6	18.1
	Others	Row %	9.4	25.2	26.5	12.0	10.5	16.4	100.0
		Col %	50.3	78.6	91.7	87.4	96.4	92.4	81.9
	Total	Row %	15.4	26.2	23.7	11.2	9.0	14.5	100.0
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0



**Table 3.63: Percentage Distribution of MAHs by Social and Operational Land-holding Groups**  
**SOUTH ZONE**

Member-ship	Social Group	Operational land-holding groups								
		Landless	Marginal	Small	Semi-medium	Medium	Large	Total		
<hr/>										
Member	SC/ST	Row %	39.4	39.3	13.4	4.0	4.0	0.0	100.0	
		Col %	16.2	8.9	7.0	3.9	9.2	0.0	9.0	
	Others	Row %	20.1	39.7	17.5	9.5	3.8	9.4	100.0	
		Col %	83.8	91.1	93.0	96.1	90.8	100.0	91.0	
	Total	Row %	21.8	39.7	17.2	9.0	3.8	8.5	100.0	
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
	<hr/>									
	Non-Member	SC/ST	Row %	51.6	40.0	0.5	4.3	0.0	3.6	100.0
			Col %	13.6	11.3	0.6	6.8	0.0	8.0	10.6
		Others	Row %	38.8	37.2	9.0	6.9	3.0	4.9	100.0
Col %			86.4	88.7	99.4	93.2	100.0	92.0	89.4	
Total		Row %	40.2	37.5	8.1	6.7	2.7	4.8	100.0	
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
<hr/>										
All Households		SC/ST	Row %	42.7	39.5	9.9	4.0	2.9	1.0	100.0
			Col %	15.3	9.5	6.2	4.5	7.6	1.2	9.4
		Others	Row %	24.5	39.1	15.5	8.9	3.6	8.3	100.0
	Col %		84.7	90.6	93.8	95.5	92.4	98.8	90.6	
	Total	Row %	26.2	39.2	15.0	8.4	3.6	7.7	100.0	
		Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

**Table 3.64: Percentage Distribution of MAHs by Social and Operational Land-holding Groups**

		WEST ZONE						
Member-ship	Social Group	Operational land-holding groups						Total
		Landless	Marginal	Small	Semi-medium	Medium	Large	
<b>Member</b>								
	SC/ST							
	Row %	14.9	59.0	15.7	1.9	0.0	8.4	100.0
	Col %	35.2	31.8	14.0	3.7	0.0	20.0	22.3
	Others							
	Row %	7.9	36.3	27.8	14.4	3.9	9.7	100.0
	Col %	64.8	68.2	86.0	96.3	100.0	80.0	77.7
	Total							
	Row %	9.5	41.4	25.1	11.6	3.1	9.4	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Non-Member</b>								
	SC/ST							
	Row %	16.9	44.4	28.1	10.6	0.0	0.0	100.0
	Col %	30.0	29.1	20.2	15.0	0.0	0.0	21.2
	Others							
	Row %	10.6	29.2	29.9	16.3	5.6	8.4	100.0
	Col %	70.0	70.9	79.8	85.0	100.0	100.0	78.8
	Total							
	Row %	12.0	32.5	29.5	15.1	4.4	6.6	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>All Households</b>								
	SC/ST							
	Row %	15.3	56.6	17.8	3.4	0.0	7.0	100.0
	Col %	34.1	31.4	15.2	6.1	0.0	17.5	22.1
	Others							
	Row %	8.4	35.1	28.1	14.7	4.2	9.5	100.0
	Col %	65.9	68.6	84.8	90.9	100.0	82.5	77.9
	Total							
	Row %	9.9	39.8	25.9	12.2	3.3	8.9	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3.65: Percentage Distribution of MAHs by Social and Operational Land-holding Groups**  
ALL ZONES

Member-ship	Social Group	Operational land-holding groups						Total
		Landless	Marginal	Small	Semi-medium	Medium	Large	
Member								
SC/ST	Row %	24.3	49.6	15.9	3.2	1.5	5.5	100.0
	Col %	24.2	19.9	11.1	4.7	5.3	8.3	15.3
Others	Row %	13.7	36.1	22.9	11.6	4.7	11.0	100.0
	Col %	75.8	80.2	88.9	95.3	94.7	91.7	84.7
Total	Row %	15.3	38.2	21.9	10.3	4.2	10.2	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-Member								
SC/ST	Row %	44.2	33.2	9.9	8.3	0.7	3.7	100.0
	Col %	30.5	19.0	9.8	14.6	2.1	8.6	18.1
Others	Row %	22.2	31.2	20.2	10.7	7.1	8.7	100.0
	Col %	69.5	81.0	90.2	85.4	97.9	91.4	81.9
Total	Row %	26.1	31.6	18.3	10.3	5.9	7.8	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All Households								
SC/ST	Row %	30.8	44.3	14.0	4.8	1.2	4.9	100.0
	Col %	26.8	19.6	10.8	7.6	4.1	8.4	16.1
Others	Row %	16.1	34.7	22.1	11.3	5.5	10.3	100.0
	Col %	73.2	80.4	89.2	92.4	95.9	91.6	83.9
Total	Row %	18.5	36.3	20.8	10.3	4.7	9.5	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3.71 : Percentage Distribution of MAHs by Milch Animal-holding Size**

Zone	Membership	Milch Animal-holding size				Total
		1	2	3	>=4	
<b>East Zone</b>						
	Member	59.98	26.18	5.91	7.93	100.00
	Non-member	80.68	14.65	4.09	0.58	100.00
	All households	68.98	21.17	5.12	4.73	100.00
<b>North Zone</b>						
	Member	28.33	27.21	14.39	30.07	100.00
	Non-member	41.34	23.14	18.97	16.55	100.00
	All households	35.08	25.10	16.77	23.05	100.00
<b>South Zone</b>						
	Member	40.45	28.60	15.22	15.73	100.00
	Non-member	58.34	29.86	4.22	7.58	100.00
	All households	44.72	28.90	12.59	13.79	100.00
<b>West Zone</b>						
	Member	40.97	34.40	15.19	9.44	100.00
	Non-member	64.23	26.96	7.21	1.60	100.00
	All households	45.00	33.11	13.81	8.08	100.00
<b>ALL ZONES</b>						
	Member	39.17	30.46	14.84	15.53	100.00
	Non-member	53.29	25.76	11.03	9.92	100.00
	All households	43.27	29.10	13.74	13.89	100.00

Table 3.72 : Percentage Distribution of MAHS by Milch Animal-holding Size and Type of Animal

Zone	Membership	Only Cow Holding				Only Buffalo Holding				Both			Total
		<----->				<----->				<----->			
		1	2	3	>=4	1	2	3	>=4	2	3	>=4	
East Zone	Member	46.42	20.61	4.81	6.32	13.56	1.83	0.00	0.00	3.74	1.10	1.61	100.00
	Non-member	57.69	13.87	3.11	0.42	22.99	0.16	0.00	0.00	0.62	0.98	0.16	100.00
	All households	51.32	17.68	4.07	3.75	17.66	1.10	0.00	0.00	2.39	1.05	0.98	100.00
North Zone	Member	6.71	2.81	1.94	3.13	21.62	17.64	4.46	7.14	6.76	7.99	19.80	100.00
	Non-member	7.36	2.00	1.05	0.82	33.99	12.78	9.97	3.47	8.36	7.96	12.24	100.00
	All households	7.04	2.39	1.48	1.94	28.03	15.12	7.32	5.24	7.59	7.97	15.88	100.00
South Zone	Member	31.77	17.16	7.11	6.25	8.68	7.68	3.60	2.46	3.76	4.51	7.02	100.00
	Non-member	43.23	19.35	2.51	3.04	15.12	7.16	0.72	0.98	3.35	0.99	3.55	100.00
	All households	34.51	17.58	6.01	5.48	10.21	7.56	2.91	2.11	3.66	3.67	6.30	100.00
West Zone	Member	13.34	5.89	1.96	2.00	27.64	17.08	4.86	0.91	11.43	8.36	6.53	100.00
	Non-member	34.50	5.88	1.55	0.41	29.74	10.71	3.34	0.37	10.36	2.32	0.82	100.00
	All households	17.00	5.89	1.89	1.72	28.00	15.97	4.60	0.82	11.25	7.32	5.54	100.00
ALL ZONES	Member	21.28	10.77	4.32	4.18	17.89	12.61	4.12	2.58	7.08	6.41	8.76	100.00
	Non-member	27.04	9.20	1.73	1.48	26.24	9.89	5.10	1.87	6.68	4.20	6.57	100.00
	All households	22.95	10.31	3.57	3.40	20.31	11.82	4.40	2.38	6.98	5.76	8.12	100.00

Table 3.81 : Percentage Distribution of MAHs by Factors Relating to Housing of Animals

Zone	Membership	Location of Stall				Type of Stall				Frequency of cleaning			
		Seperate	Part	Open	Pucca	Kuchcha	Daily	Weekly	Fortnightly	Monthly	Rarely	Not at all	
East zone	Member	64.21		35.79	0.00	8.82	91.18	89.84	7.40	0.64	1.83	0.29	0.00
	Non-member	62.80		36.19	1.01	9.68	90.32	86.59	7.26	3.69	2.22	0.25	0.00
	All households	63.60		35.96	0.44	9.19	90.81	88.45	7.33	1.96	2.00	0.27	0.00
North zone	Member	64.75		32.16	3.09	39.87	60.13	89.78	8.08	0.92	0.66	0.35	0.20
	Non-member	56.30		38.48	5.22	37.73	62.27	88.71	9.70	1.55	0.04	0.00	0.00
	All households	60.36		35.44	4.20	38.77	61.23	89.25	8.91	1.25	0.34	0.17	0.09
South zone	Member	71.80		27.38	0.82	42.90	57.10	77.19	18.66	2.64	1.10	0.05	0.35
	Non-member	57.82		40.97	1.21	24.11	75.89	64.49	30.97	2.04	2.20	0.30	0.00
	All households	68.45		30.64	0.91	38.46	61.54	74.20	21.57	2.50	1.36	0.10	0.27
West zone	Member	28.54		42.91	28.54	19.10	80.90	92.22	6.05	0.77	0.00	0.04	0.92
	Non-member	30.83		64.28	4.89	11.74	88.26	92.31	6.18	0.37	0.09	0.60	0.46
	All households	28.94		46.62	24.44	17.54	82.46	92.25	6.08	0.68	0.01	0.16	0.82
ALL ZONES	Member	54.40		34.12	11.47	34.61	65.39	84.26	12.72	1.72	0.71	0.10	0.49
	Non-member	52.29		44.11	3.59	27.07	72.93	80.86	16.33	1.60	0.90	0.23	0.08
	All households	53.79		37.03	9.18	32.28	67.72	83.20	13.83	1.69	0.77	0.14	0.36

Table 3.82 : Percentage Distribution of MAHs by Factors Relating to Housing of Animals

Zone	Membership	Sanitary condition			Drainage		Protection from hot winds	
		Very clean	Clean	Not clean	Yes	No	Yes	No
<b>East zone</b>		5.11	81.20	13.69	34.45	65.55	67.24	32.76
	Member	2.49	82.36	15.15	17.97	82.03	70.91	29.09
	Non-member	3.98	81.70	14.32	27.28	72.72	68.83	31.17
	All households							
<b>North zone</b>		16.25	81.66	2.09	32.18	67.82	69.26	30.74
	Member	12.46	84.30	3.23	29.20	70.80	55.30	44.70
	Non-member	14.30	83.02	2.68	30.62	69.38	61.99	38.01
	All households							
<b>South zone</b>		27.29	70.50	2.21	74.75	25.25	75.46	24.54
	Member	21.89	76.89	1.22	71.88	28.12	74.50	25.50
	Non-member	26.01	72.01	1.98	74.07	25.93	75.23	24.77
	All households							
<b>West zone</b>		26.21	72.25	1.54	27.30	72.70	48.44	51.56
	Member	14.32	84.23	1.46	11.88	88.12	26.02	73.98
	Non-member	23.65	74.84	1.51	24.63	75.37	44.55	55.45
	All households							
<b>ALL ZONES</b>		24.43	73.27	2.30	49.42	50.58	64.23	35.77
	Member	15.62	81.62	2.76	39.97	60.03	57.01	42.99
	Non-member	21.73	75.83	2.44	46.67	53.33	62.13	37.87
	All households							

Table 3.91 : Percentage Distribution of MAHs by Factors Relating to Health of Animal

Zone	Membership	Health care services				Sources of advice received on animal health			
		Union/ Hospital	Govt. Medicine	Traditional	Others Doctor	Veterinary Sevak	Gram	DCS	Others
<b>East zone</b>									
	Member	62.78	31.38	0.75	5.09	42.03	3.15	49.68	5.14
	Non-member	55.36	33.87	5.59	5.18	51.70	4.71	32.66	10.93
	All households	59.56	32.46	2.85	5.13	46.23	3.83	42.28	7.66
<b>North zone</b>									
	Member	26.39	39.72	30.78	3.11	53.37	5.12	22.62	18.89
	Non-member	10.32	40.65	47.79	1.24	66.99	4.71	10.91	17.39
	All households	18.06	40.20	39.60	2.14	60.43	4.91	16.55	18.11
<b>South zone</b>									
	Member	53.10	44.72	1.89	0.29	76.79	1.54	18.78	2.89
	Non-member	28.45	64.04	6.35	1.16	79.69	6.65	10.90	2.76
	All households	47.21	49.33	2.96	0.50	77.48	2.75	16.90	2.87
<b>West zone</b>									
	Member	34.87	34.71	30.33	0.09	22.72	10.28	39.48	27.52
	Non-member	8.10	68.19	22.99	0.72	39.22	10.32	18.25	32.21
	All households	30.24	40.51	29.06	0.19	25.58	10.29	35.80	28.33
<b>ALL ZONES</b>									
	Member	42.29	39.89	17.03	0.79	52.17	5.38	27.81	14.64
	Non-member	18.16	53.53	27.02	1.29	65.35	6.43	13.30	14.92
	All households	35.29	43.85	19.93	0.93	56.00	5.69	23.60	14.71



Table 3.92 : Percentage Distribution of MAHs by Factors Relating to Health of Animal

Zone	Membership	Frequency of visit of veterinary mobile van						De-worming of animal			
		Daily	Weekly	Fortnightly	Monthly	Rarely	In emergency only	Not at all	Yes	No	Not aware
East zone											
	Member	3.87	0.26	1.35	19.18	26.31	36.19	12.84	84.80	13.72	1.48
	Non-member	3.86	0.00	3.65	17.84	19.84	40.11	14.70	76.34	20.99	2.67
	All households	3.86	0.14	2.35	18.60	23.50	37.89	13.66	81.12	16.88	2.00
North zone											
	Member	4.60	3.19	9.13	6.87	9.53	51.59	15.09	77.02	10.34	12.64
	Non-member	5.61	2.20	6.22	9.29	19.53	45.19	11.96	84.19	8.55	7.26
	All households	5.12	2.68	7.62	8.13	14.71	48.27	13.47	80.74	9.41	9.85
South zone											
	Member	6.69	21.49	1.68	14.70	28.86	19.47	7.11	63.33	30.55	6.12
	Non-member	5.68	9.78	2.16	24.48	25.96	23.35	8.59	55.94	34.87	9.19
	All households	6.45	18.70	1.79	17.04	28.17	20.40	7.45	61.57	31.58	6.85
West zone											
	Member	8.63	7.07	1.74	6.91	1.74	53.89	20.02	78.94	18.04	3.02
	Non-member	9.34	8.29	3.38	1.56	6.11	34.90	36.42	93.09	5.72	1.19
	All households	8.75	7.28	2.02	5.99	2.49	50.60	22.87	81.39	15.91	2.70
ALL ZONES											
	Member	7.00	12.69	2.89	10.67	15.66	37.77	13.32	71.83	22.26	5.91
	Non-member	6.26	5.84	4.18	13.40	19.19	35.56	15.57	75.89	17.56	6.55
	All households	6.79	10.70	3.26	11.46	16.68	37.13	13.98	73.01	20.89	6.10

Table 3.93 : Percentage Distribution of MAHs by Factors Relating to Health of Animals

Zone	Membership	Frequency of washing animals					Medicine used			
		Daily	Weekly	Fortnightly	Monthly	Rarely	Not at all	Allopathic	Traditional	Both
East zone										
	Member	49.63	34.99	6.44	5.86	2.00	1.08	57.02	7.99	34.99
	Non-member	53.93	31.98	5.55	5.84	1.73	0.97	56.33	9.70	33.97
	All households	51.50	33.68	6.05	5.85	1.88	1.04	56.72	8.73	34.55
North zone										
	Member	48.27	36.19	5.38	1.79	3.49	4.88	26.38	6.16	67.46
	Non-member	46.00	45.56	2.12	1.48	3.15	1.69	13.76	6.58	79.66
	All households	47.09	41.05	3.69	1.63	3.32	3.22	19.84	6.38	73.78
South zone										
	Member	36.26	39.49	13.60	6.58	4.07	0.00	59.92	3.94	36.14
	Non-member	32.23	38.96	11.38	9.91	4.46	3.06	50.91	5.73	43.36
	All households	35.30	39.36	13.07	7.38	4.16	0.73	57.77	4.37	37.86
West zone										
	Member	31.51	28.28	14.53	19.95	4.79	0.94	39.52	24.35	36.13
	Non-member	20.28	30.77	7.74	16.92	8.46	3.83	36.04	12.08	51.88
	All households	29.56	28.71	13.36	19.42	7.50	1.45	38.92	22.22	38.86
ALL ZONES										
	Member	36.76	34.70	12.45	10.74	4.19	1.16	46.91	11.94	41.15
	Non-member	36.80	39.88	6.50	7.48	6.81	2.53	32.60	7.48	59.92
	All households	36.77	36.21	10.72	9.79	4.95	1.56	42.76	10.65	46.59

**Table 3.101 : Percentage Distribution of MAHs by Usage of Artificial Insemination (AI)**

Zone	Membership	Cows	Buffaloes
<b>East zone</b>			
	Member	56.9	22.4
	Non-member	39.8	15.3
	All households	49.5	19.3
<b>North zone</b>			
	Member	28.4	29.1
	Non-member	11.8	15.9
	All households	19.8	22.3
<b>South zone</b>			
	Member	55.6	36.2
	Non-member	32.9	16.1
	All households	50.2	31.4
<b>West zone</b>			
	Member	35.3	30.3
	Non-member	13.8	9.3
	All households	31.6	26.7
<b>ALL ZONES</b>			
	Member	43.7	32.5
	Non-member	20.7	14.7
	All households	37.1	27.4

**Table 3.102 : Percentage Distribution of MAHs Reporting Usage of AI by Breed - Cows**

Zone	Membership	Jersey	Holstein Friesian	Brown Swiss	Others
<b>East zone</b>					
	Member	90.77	1.92	0.00	7.31
	Non-member	83.44	4.43	0.00	12.13
	All households	88.21	2.80	0.00	8.99
<b>North zone</b>					
	Member	60.96	29.73	0.00	9.31
	Non-member	67.71	14.36	0.00	17.93
	All households	63.75	23.38	0.00	12.87
<b>South zone</b>					
	Member	79.50	6.43	5.76	8.31
	Non-member	79.78	4.92	5.94	9.36
	All households	79.55	6.14	5.79	8.52
<b>West zone</b>					
	Member	67.23	28.73	1.04	3.00
	Non-member	70.91	16.22	0.69	12.18
	All households	67.56	27.63	1.01	3.80
<b>ALL ZONES</b>					
	Member	74.47	15.35	3.53	6.65
	Non-member	76.06	8.59	3.31	12.04
	All households	74.78	14.03	3.49	7.70

**Table 3.103 : Proportion of Milch Animals Artificially Inseminated**

Zone	Membership	Crossbred Cows	Desi Cows	Buffaloes
<b>East zone</b>				
	Member	71.1	47.8	27.3
	Non-member	95.8	50.7	11.0
	All households	76.2	48.9	20.0
<b>North zone</b>				
	Member	63.9	20.6	14.8
	Non-member	48.3	23.2	8.0
	All households	58.2	21.7	11.4
<b>South zone</b>				
	Member	90.2	47.0	23.1
	Non-member	80.4	30.5	6.7
	All households	89.1	43.2	20.2
<b>West zone</b>				
	Member	86.3	21.1	25.0
	Non-member	71.9	12.2	17.9
	All households	85.7	19.5	24.1
<b>ALL ZONES</b>				
	Member	85.5	35.9	21.5
	Non-member	67.8	26.2	9.2
	All households	82.8	33.5	18.0

Table 4.1: Estimated Cattle Population by Sex and Type

Zone	Membership	Adult female		Adult male		Female calves		Male calves		Total
		Crossbred	Desi	Crossbred	Desi	Crossbred	Desi	Cattle	Crossbred	
<b>East Zone</b>										
	Member	106.9	243.7	1.1	236.9	84.9	144.0	40.9	107.6	966.1
	Non-member	27.9	147.3	0.3	122.3	10.7	104.2	10.6	56.5	479.7
	All households	134.8	391.0	1.4	359.2	95.6	248.2	51.5	164.1	1445.8
<b>North Zone</b>										
	Member	315.7	818.8	17.6	408.5	248.8	438.5	110.2	382.4	2740.6
	Non-member	184.3	583.0	9.8	232.0	85.1	403.7	42.6	270.6	1811.2
	All households	500.0	1401.8	27.4	640.5	333.9	842.3	152.8	653.1	4551.8
<b>South Zone</b>										
	Member	1698.8	2151.5	6.2	1306.3	1011.5	965.3	417.7	1061.6	8618.9
	Non-member	216.9	1007.2	4.3	453.1	109.5	304.9	53.4	797.1	2946.4
	All households	1915.7	3158.8	10.5	1759.4	1121.0	1270.2	471.1	1858.6	11565.3
<b>West Zone</b>										
	Member	358.3	2051.1	2.0	1226.5	139.8	936.0	73.4	764.7	5551.8
	Non-member	14.4	401.7	0.0	391.8	4.9	189.7	4.3	211.4	1218.2
	All households	372.7	2452.8	2.0	1618.3	144.7	1125.7	77.7	976.1	6770.0
<b>ALL ZONES</b>										
	Member	2479.7	5265.2	26.9	3178.3	1485.0	2483.8	642.2	2316.3	17877.4
	Non-member	443.5	2139.3	14.4	1199.1	210.2	1002.5	110.9	1335.5	6455.5
	All households	2923.2	7404.4	41.3	4377.4	1695.2	3486.3	753.1	3651.8	24332.8

Table 4.2: Estimated Buffalo Population by Sex

(NUMBERS IN '000)						
Zone	Membership	Adult female	Adult male	Female calves	Male calves	Total buffalo
East Zone	Member	51.0	0.0	23.9	15.1	90.0
	Non-member	52.5	0.0	40.6	15.6	108.7
	All households	103.5	0.0	64.5	30.7	198.7
North Zone	Member	2206.0	36.1	928.1	731.2	3901.3
	Non-member	2711.1	42.4	1279.9	648.3	4681.7
	All households	4917.1	78.5	2208.0	1379.4	8583.0
South Zone	Member	2725.2	57.0	1075.4	958.3	4815.9
	Non-member	604.7	6.1	280.9	199.7	1091.5
	All households	3329.9	63.1	1356.3	1158.0	5907.4
West Zone	Member	3681.6	7.3	1785.6	419.3	5893.8
	Non-member	521.5	0.7	232.8	137.1	892.1
	All households	4203.1	8.0	2018.4	556.4	6785.9
ALL ZONES	Member	8663.8	100.4	3813.0	2123.9	14701.0
	Non-member	3889.9	49.2	1834.2	1000.6	6774.0
	All households	12553.7	149.6	5647.2	3124.5	21475.0

**Table 4.3: Estimated Proportion of In-Milk Milch Bovines**

Zone	Membership	Crossbred cows	Desi cows	Buffaloes
<b>East Zone</b>				
	Member	86.4	74.2	69.2
	Non-member	60.1	71.2	68.8
	All households	81.0	73.0	69.0
<b>North Zone</b>				
	Member	68.6	68.1	73.3
	Non-member	65.5	60.0	70.9
	All households	67.5	64.6	72.1
<b>South Zone</b>				
	Member	68.9	58.4	64.0
	Non-member	63.9	56.0	61.0
	All households	68.4	57.9	63.5
<b>West Zone</b>				
	Member	67.5	55.5	66.0
	Non-member	56.7	43.4	50.0
	All households	67.1	53.4	64.0
<b>ALL ZONES</b>				
	Member	69.4	59.3	67.5
	Non-member	64.1	55.7	66.3
	All households	68.6	58.4	67.1

Table 4.4: Percentage Distribution of Milch Bovines by Age Groups

Zone	Membership	Crossbred cows						Desi. Cows						(Age in Years)					
		<-----		----->		<-----		----->		<-----		<-----		<-----		<-----			
		3-6	7-10	11-14	>14	3-6	7-10	11-14	>14	3-6	7-10	11-14	>14	3-6	7-10	11-14	>14		
East Zone																			
North zone	Member	66.4	19.8	10.5	3.4	66.5	33.0	0.6	0.0	40.9	57.0	2.1	0.0	40.9	57.0	2.1	0.0		
	Non-member	64.8	33.6	0.9	0.7	63.9	33.0	3.0	0.1	45.8	54.2	0.0	0.0	45.8	54.2	0.0	0.0		
	All households	66.1	22.6	8.5	2.8	65.5	33.0	1.5	0.1	43.1	55.8	1.2	0.0	43.1	55.8	1.2	0.0		
South Zone	Member	76.6	20.3	2.5	0.6	47.9	46.7	3.7	1.7	41.3	53.3	4.5	0.9	41.3	53.3	4.5	0.9		
	Non-member	67.0	32.2	0.7	0.1	52.8	42.9	2.8	1.6	34.9	58.6	5.2	1.3	34.9	58.6	5.2	1.3		
	All households	72.6	25.2	1.8	0.4	49.9	45.1	3.3	1.6	38.2	55.9	4.8	1.1	38.2	55.9	4.8	1.1		
West Zone	Member	64.7	33.8	0.3	1.2	51.8	44.7	3.2	0.4	44.2	49.7	5.2	0.9	44.2	49.7	5.2	0.9		
	Non-member	49.4	45.1	0.3	5.2	58.9	38.8	1.5	0.9	41.2	53.9	2.9	2.0	41.2	53.9	2.9	2.0		
	All households	63.3	34.9	0.3	1.5	53.7	43.1	2.7	0.5	43.7	50.5	4.8	1.1	43.7	50.5	4.8	1.1		
ALL ZONES	Member	56.9	38.6	4.1	0.3	66.8	27.2	5.1	0.9	55.6	39.2	3.8	1.3	55.6	39.2	3.8	1.3		
	Non-member	57.0	42.0	1.0	0.0	44.6	45.7	8.2	1.6	43.6	47.0	5.6	3.8	43.6	47.0	5.6	3.8		
	All households	56.9	38.9	3.9	0.3	62.7	30.6	5.6	1.1	54.1	40.2	4.0	1.6	54.1	40.2	4.0	1.6		
ALL ZONES	Member	63.8	33.7	1.5	1.0	55.8	39.7	3.7	0.8	48.0	46.5	4.4	1.1	48.0	46.5	4.4	1.1		
	Non-member	55.8	40.7	0.5	3.0	54.9	40.9	3.1	1.2	37.3	56.2	4.8	1.7	37.3	56.2	4.8	1.7		
	All households	62.8	34.5	1.4	1.3	55.5	40.0	3.5	0.9	44.9	49.3	4.5	1.3	44.9	49.3	4.5	1.3		



Table 4.5: Proportion of Adult In-milk Female Bovines by Age Groups

		Crossbred cows							(Age in years)								
Zone	Membership	<----->				Desi Cows			<----->				Buffaloes				
		3-6	7-10	11-14	>14	3-6	7-10	11-14	>14	3-6	7-10	11-14	>14	3-6	7-10	11-14	>14
East Zone	Member	84.2	89.3	92.8	92.8	76.1	70.1	89.6	0.0	69.2	69.2	69.2	0.0	69.2	69.2	69.2	0.0
	Non-member	57.0	65.4	76.3	74.9	67.9	78.3	64.5	89.0	68.3	69.2	0.0	0.0	68.3	69.2	0.0	0.0
	All households	78.7	82.2	91.9	91.5	73.0	73.3	70.2	84.2	68.8	69.2	69.3	0.0	68.8	69.2	69.3	0.0
North Zone	Member	67.2	74.1	79.3	15.5	67.2	69.1	69.6	65.7	74.8	72.6	67.4	70.0	74.8	72.6	67.4	70.0
	Non-member	64.8	68.2	24.9	0.0	61.0	57.1	75.4	77.3	71.4	69.8	74.6	91.7	71.4	69.8	74.6	91.7
	All households	66.8	69.7	75.1	14.8	64.4	64.1	71.2	70.6	73.3	71.2	71.2	82.8	73.3	71.2	71.2	82.8
South Zone	Member	69.5	67.1	73.2	86.7	59.3	59.4	32.6	43.8	63.0	66.5	49.0	62.6	63.0	66.5	49.0	62.6
	Non-member	63.4	62.8	78.1	77.5	55.5	57.4	36.3	63.6	63.1	61.3	61.2	9.2	63.1	61.3	61.2	9.2
	All households	68.7	66.9	74.7	87.4	58.0	59.3	33.9	49.6	63.0	65.5	50.2	45.6	63.0	65.5	50.2	45.6
West Zone	Member	63.3	72.9	75.1	77.8	58.3	48.2	59.4	45.3	61.3	72.4	62.0	83.5	61.3	72.4	62.0	83.5
	Non-member	53.1	62.9	0.0	0.0	44.9	42.4	45.9	16.9	44.1	55.5	75.6	12.1	44.1	55.5	75.6	12.1
	All households	62.9	72.2	76.4	79.6	57.0	46.4	55.6	37.2	59.6	70.0	64.3	62.7	59.6	70.0	64.3	62.7
ALL ZONES	Member	68.8	69.7	82.4	82.2	60.5	58.9	48.6	48.5	64.9	70.8	59.1	73.8	64.9	70.8	59.1	73.8
	Non-member	63.2	64.8	40.2	76.0	56.7	55.0	48.1	58.1	65.5	66.8	71.7	50.5	65.5	66.8	71.7	50.5
	All households	67.7	69.3	78.2	84.2	59.5	57.8	48.7	50.9	65.0	69.5	62.9	64.5	65.0	69.5	62.9	64.5

**Table 4.61: Percentage Distribution of Milch Animal Population by Social and Operational Land-holding Groups**

EAST ZONE

Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
Member									
	SC/ST	Cow	23.8	50.4	19.0	6.8	0.0	0.0	100.0
		Buffalo	32.8	15.5	47.0	4.7	0.0	0.0	100.0
		Cow+Buffalo	25.4	44.5	23.8	6.4	0.0	0.0	100.0
	Others	Cow	8.0	40.0	30.1	11.2	8.4	2.4	100.0
		Buffalo	37.6	7.0	25.2	30.2	0.0	0.0	100.0
		Cow+Buffalo	12.1	35.4	29.4	13.8	7.2	2.1	100.0
	Total	Cow	10.8	41.9	28.1	10.4	6.9	2.0	100.0
		Buffalo	36.5	8.9	30.0	24.7	0.0	0.0	100.0
		Cow+Buffalo	14.6	37.1	28.3	12.4	5.9	1.7	100.0
Non-Member									
	SC/ST	Cow	38.0	39.2	17.2	4.7	0.9	0.0	100.0
		Buffalo	86.6	7.1	3.8	1.3	1.3	0.0	100.0
		Cow+Buffalo	53.2	29.2	13.0	3.6	1.0	0.0	100.0
	Others	Cow	22.7	51.8	15.8	6.9	0.0	2.8	100.0
		Buffalo	28.4	20.8	46.1	4.7	0.0	0.0	100.0
		Cow+Buffalo	23.6	36.8	20.7	6.5	0.0	2.3	100.0
	Total	Cow	27.0	48.3	16.2	6.3	0.2	2.0	100.0
		Buffalo	56.2	14.3	25.9	3.1	0.6	0.0	100.0
		Cow+Buffalo	33.1	41.1	18.3	5.6	0.3	1.6	100.0
All Households									
	SC/ST	Cow	30.1	45.4	18.2	5.8	0.4	0.0	100.0
		Buffalo	67.1	10.2	19.4	2.5	0.8	0.0	100.0
		Cow+Buffalo	39.0	36.9	18.5	5.0	0.5	0.0	100.0
	Others	Cow	12.6	43.6	25.6	9.8	5.8	2.5	100.0
		Buffalo	34.4	11.8	32.5	21.3	0.0	0.0	100.0
		Cow+Buffalo	15.7	39.0	26.6	11.5	4.9	2.2	100.0
	Total	Cow	16.3	44.0	24.1	9.0	4.6	2.0	100.0
		Buffalo	45.3	11.3	28.1	15.0	0.3	0.0	100.0
		Cow+Buffalo	21.2	38.5	24.7	10.0	3.9	1.7	100.0

**Table 4.62: Percentage Distribution of Milch Animal Population by Social and Operational Land-holding Groups**

NORTH ZONE

Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
Member									
	SC/ST	Cow	13.3	30.7	33.0	5.4	3.8	13.8	100.0
		Buffalo	30.0	33.7	15.2	8.3	1.0	11.8	100.0
		Cow+Buffalo	24.2	32.6	21.4	7.2	2.0	12.5	100.0
	Others	Cow	4.2	17.8	17.0	12.9	10.6	37.6	100.0
		Buffalo	3.7	20.9	27.4	12.2	9.6	26.2	100.0
		Cow+Buffalo	3.9	19.9	24.0	12.4	9.9	29.9	100.0
	Total	Cow	5.2	19.3	18.8	12.0	9.8	34.9	100.0
		Buffalo	6.4	22.2	26.1	11.8	8.7	24.7	100.0
		Cow+Buffalo	6.0	21.2	23.7	11.9	9.1	28.1	100.0
	Non-Member								
	SC/ST	Cow	36.8	20.2	10.9	11.5	7.0	13.6	100.0
		Buffalo	38.5	34.5	4.7	9.8	0.0	12.5	100.0
		Cow+Buffalo	38.1	30.7	6.4	10.2	1.9	12.8	100.0
	Others	Cow	4.1	16.8	18.8	13.8	17.8	28.7	100.0
		Buffalo	9.8	17.0	27.3	12.4	14.7	19.0	100.0
		Cow+Buffalo	8.3	16.9	25.1	12.7	15.5	21.5	100.0
	Total	Cow	9.7	17.4	17.4	13.4	15.9	26.2	100.0
		Buffalo	14.5	19.9	23.5	11.9	12.2	17.9	100.0
		Cow+Buffalo	13.2	19.2	22.0	12.3	13.2	20.1	100.0
	All Households								
	SC/ST	Cow	25.5	25.3	21.6	8.5	5.5	13.7	100.0
		Buffalo	35.2	34.2	8.8	9.2	0.4	12.2	100.0
		Cow+Buffalo	32.4	31.5	12.7	9.0	1.9	12.7	100.0
	Others	Cow	4.1	17.4	17.7	13.2	13.4	34.1	100.0
		Buffalo	6.6	19.1	27.3	12.3	12.0	22.7	100.0
		Cow+Buffalo	5.9	18.6	24.5	12.6	12.4	26.1	100.0
	Total	Cow	7.1	18.5	18.2	12.6	12.4	31.3	100.0
		Buffalo	10.4	21.1	24.9	11.9	10.5	21.4	100.0
		Cow+Buffalo	9.4	20.3	22.9	12.1	11.0	24.3	100.0

**Table 4.63: Percentage Distribution of Milch Animal Population by Social and Operational Land-holding Groups**

SOUTH ZONE

Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
Member									
	SC/ST	Cow	52.1	26.4	17.9	0.0	3.7	0.0	100.0
		Buffalo	19.5	57.8	5.4	11.6	5.8	0.0	100.0
		Cow+Buffalo	39.5	38.5	13.1	4.5	4.5	0.0	100.0
	Others	Cow	20.3	31.2	17.1	12.8	5.9	12.7	100.0
		Buffalo	10.5	27.5	23.3	14.2	5.0	19.5	100.0
		Cow+Buffalo	17.1	30.0	19.1	13.3	5.6	14.9	100.0
	Total	Cow	22.3	30.9	17.1	12.0	5.7	11.9	100.0
		Buffalo	11.2	30.1	21.9	14.0	5.1	17.8	100.0
		Cow+Buffalo	18.7	30.6	18.7	12.7	5.5	13.9	100.0
Non-Member									
	SC/ST	Cow	39.3	40.2	0.6	15.5	0.0	4.4	100.0
		Buffalo	56.5	29.9	0.0	13.7	0.0	0.0	100.0
		Cow+Buffalo	47.4	35.4	0.3	14.7	0.0	2.3	100.0
	Others	Cow	33.9	37.5	10.8	4.4	4.0	9.3	100.0
		Buffalo	29.9	34.6	3.7	11.3	4.3	16.2	100.0
		Cow+Buffalo	32.8	36.7	8.8	6.3	4.1	11.3	100.0
	Total	Cow	34.4	37.7	10.1	5.2	3.7	8.9	100.0
		Buffalo	34.0	33.8	3.1	11.6	3.7	13.8	100.0
		Cow+Buffalo	34.2	36.5	8.0	7.2	3.7	10.4	100.0
All Households									
	SC/ST	Cow	49.2	29.5	14.1	3.4	2.8	1.0	100.0
		Buffalo	30.0	49.9	3.9	12.2	4.1	0.0	100.0
		Cow+Buffalo	41.4	37.8	9.9	7.0	3.4	0.6	100.0
	Others	Cow	22.9	32.5	15.9	11.2	5.5	12.1	100.0
		Buffalo	13.7	28.7	20.1	13.7	4.9	18.9	100.0
		Cow+Buffalo	20.0	31.3	17.2	12.0	5.3	14.2	100.0
	Total	Cow	24.7	32.3	15.8	10.7	5.3	11.3	100.0
		Buffalo	15.3	30.7	18.5	13.6	4.8	17.1	100.0
		Cow+Buffalo	21.6	31.8	16.7	11.6	5.2	13.2	100.0

**Table 4.64: Percentage Distribution of Milch Animal Population by Social and Operational Land-holding Groups**

WEST ZONE										
Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding Small	Land-holding group Semi-medium	Medium	Large	Total	
<b>Member</b>										
	SC/ST									
	Others	Cow	15.4	36.3	36.6	3.5	0.0	8.2	100.0	
		Buffalo	14.2	66.9	10.2	0.6	0.0	8.2	100.0	
		Cow+Buffalo	14.6	56.3	19.3	1.6	0.0	8.2	100.0	
		Cow	6.7	30.0	21.5	17.3	5.9	18.6	100.0	
		Buffalo	5.5	33.0	28.9	16.5	5.2	10.9	100.0	
		Cow+Buffalo	6.0	31.8	25.9	16.8	5.4	14.1	100.0	
	Total									
		Cow	7.9	30.9	23.7	15.3	5.0	17.1	100.0	
		Buffalo	7.1	39.1	25.6	13.6	4.2	10.4	100.0	
		Cow+Buffalo	7.4	35.8	24.8	14.3	4.6	13.1	100.0	
SC/ST										
Others		Cow	14.6	41.2	27.3	16.9	0.0	0.0	100.0	
		Buffalo	18.6	33.3	47.3	0.9	0.0	0.0	100.0	
		Cow+Buffalo	16.6	37.2	37.3	8.9	0.0	0.0	100.0	
		Cow	8.2	24.7	28.5	21.7	7.6	9.3	100.0	
		Buffalo	11.4	29.3	26.3	12.6	5.6	14.8	100.0	
		Cow+Buffalo	10.0	27.2	27.3	16.7	6.5	12.3	100.0	
Total										
	Cow	9.5	27.9	28.3	20.8	6.1	7.5	100.0		
	Buffalo	12.6	30.0	29.8	10.7	4.6	12.3	100.0		
	Cow+Buffalo	11.2	29.0	29.1	15.3	5.3	10.1	100.0		
	<b>Non-Member</b>									
	SC/ST									
	Others	Cow	15.2	37.3	34.7	6.2	0.0	6.6	100.0	
		Buffalo	14.7	63.0	14.5	0.6	0.0	7.3	100.0	
		Cow+Buffalo	14.9	53.5	21.9	2.7	0.0	7.0	100.0	
		Cow	6.9	29.2	22.5	18.0	6.1	17.3	100.0	
		Buffalo	6.3	32.5	28.6	16.0	5.2	11.4	100.0	
		Cow+Buffalo	6.5	31.2	26.1	16.8	5.6	13.8	100.0	
Total										
	Cow	8.2	30.5	24.4	16.2	5.2	15.6	100.0		
	Buffalo	7.8	37.9	26.1	13.3	4.3	10.7	100.0		
	Cow+Buffalo	7.9	34.9	25.4	14.4	4.7	12.7	100.0		

**Table 4.65: Percentage Distribution of Milch Animal Population by Social and Operational Land-holding Groups**

ALL ZONES

Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
<b>Member</b>									
	SC/ST								
		Cow	30.2	32.3	27.5	2.6	2.1	5.3	100.0
		Buffalo	19.0	57.1	10.8	4.5	1.4	7.4	100.0
		Cow+Buffalo	23.9	46.3	18.1	3.7	1.7	6.5	100.0
	Others								
		Cow	14.6	29.5	18.5	13.9	6.5	17.1	100.0
		Buffalo	6.7	27.6	26.7	14.6	6.4	18.1	100.0
		Cow+Buffalo	10.8	28.6	22.4	14.2	6.5	17.5	100.0
	Total								
		Cow	16.1	29.7	19.4	12.8	6.1	16.0	100.0
		Buffalo	8.3	31.4	24.6	13.3	5.7	16.7	100.0
		Cow+Buffalo	12.3	30.5	21.9	13.0	5.9	16.3	100.0
<b>Non-Member</b>									
	SC/ST								
		Cow	32.6	32.4	12.6	13.0	2.9	6.6	100.0
		Buffalo	39.9	32.8	10.0	8.8	0.0	8.5	100.0
		Cow+Buffalo	37.1	32.6	11.0	10.4	1.1	7.7	100.0
	Others								
		Cow	20.8	30.1	16.0	9.8	8.5	14.8	100.0
		Buffalo	13.4	21.7	23.4	12.2	11.6	17.8	100.0
		Cow+Buffalo	16.7	25.4	20.1	11.1	10.2	16.5	100.0
	Total								
		Cow	22.4	30.4	15.5	10.2	7.7	13.7	100.0
		Buffalo	17.8	23.5	21.2	11.6	9.7	16.2	100.0
		Cow+Buffalo	19.8	26.5	18.7	11.0	8.8	15.1	100.0
<b>All Households</b>									
	SC/ST								
		Cow	30.9	32.4	23.1	5.7	2.3	5.7	100.0
		Buffalo	26.2	48.7	10.5	6.0	0.9	7.7	100.0
		Cow+Buffalo	28.2	41.8	15.8	5.9	1.5	6.9	100.0
	Others								
		Cow	15.9	29.6	17.9	13.0	7.0	16.6	100.0
		Buffalo	8.6	25.9	25.8	13.9	7.8	18.0	100.0
		Cow+Buffalo	12.3	27.8	21.8	13.4	7.4	17.3	100.0
	Total								
		Cow	17.5	29.9	18.5	12.2	6.5	15.4	100.0
		Buffalo	11.1	29.1	23.6	12.8	6.9	16.6	100.0
		Cow+Buffalo	14.2	29.5	21.1	12.5	6.7	16.0	100.0

**Table 4.71: Percentage Distribution of In-Milk Animal Population by Social and Operational Land-holding Groups**

EAST ZONE									
Membership	Social Group	Type of animal	Landless	Operational Marginal	Operational Small	Operational Land-holding groups Semi-medium	Operational Land-holding groups Medium	Operational Land-holding groups Large	Total
<b>Member</b>									
	SC/ST	Cow	28.9	45.0	18.6	7.5	0.0	0.0	100.0
		Buffalo	32.8	15.5	47.0	4.7	0.0	0.0	100.0
		Cow+Buffalo	29.8	38.7	24.7	6.9	0.0	0.0	100.0
	Others	Cow	8.7	41.2	29.5	9.0	9.0	2.6	100.0
		Buffalo	37.6	7.0	25.2	32.2	0.0	0.0	100.0
		Cow+Buffalo	13.1	35.9	28.8	12.2	7.7	2.2	100.0
	Total	Cow	11.9	41.8	27.8	8.7	7.7	2.2	100.0
		Buffalo	36.5	8.9	30.0	24.7	0.0	0.0	100.0
		Cow+Buffalo	15.9	36.4	28.1	11.3	6.4	1.8	100.0
	<b>Non-Member</b>								
	SC/ST	Cow	43.1	36.5	15.1	4.4	1.0	0.0	100.0
		Buffalo	87.6	7.2	2.6	1.3	1.3	0.0	100.0
		Cow+Buffalo	58.2	26.5	10.8	3.3	1.1	0.0	100.0
	Others	Cow	21.9	51.2	16.2	7.7	0.0	3.1	100.0
		Buffalo	28.4	20.8	46.1	4.7	0.0	0.0	100.0
		Cow+Buffalo	23.0	45.8	21.5	7.2	0.0	2.5	100.0
	Total	Cow	27.7	47.1	15.9	6.8	0.3	2.2	100.0
		Buffalo	56.5	14.4	25.4	3.1	0.6	0.0	100.0
		Cow+Buffalo	34.8	39.6	18.1	5.9	0.4	1.7	100.0
	<b>All Households</b>								
	SC/ST	Cow	35.7	40.9	16.9	6.0	0.5	0.0	100.0
		Buffalo	67.6	10.2	18.8	2.5	0.8	0.0	100.0
		Cow+Buffalo	44.6	32.3	17.4	5.0	0.6	0.0	100.0
	Others	Cow	12.8	44.3	25.3	8.6	6.3	2.7	100.0
		Buffalo	34.4	11.8	32.5	21.3	0.0	0.0	100.0
		Cow+Buffalo	16.3	39.1	26.5	10.6	5.3	2.3	100.0
	Total	Cow	17.3	43.6	23.7	8.1	5.1	2.2	100.0
		Buffalo	45.4	11.3	27.9	15.1	0.3	0.0	100.0
		Cow+Buffalo	22.6	37.6	24.5	9.4	4.2	1.8	100.0

**Table 4.72: Percentage Distribution of In-Milk Animal Population by Social and Operational Land-holding Groups**

Land-holding Groups						NORTH ZONE			
Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
Member									
	SC/ST	Cow	17.0	24.9	39.1	2.5	2.5	14.0	100.0
		Buffalo	35.6	35.8	12.4	7.0	0.0	9.2	100.0
		Cow+Buffalo	28.9	31.9	22.0	5.4	0.9	10.9	100.0
	Others	Cow	4.3	18.8	17.3	12.1	11.0	36.5	100.0
		Buffalo	4.4	19.6	29.3	12.7	8.2	25.8	100.0
		Cow+Buffalo	4.4	19.4	25.5	12.5	9.1	29.2	100.0
	Total								
		Cow	5.8	19.5	19.8	11.0	10.1	33.9	100.0
		Buffalo	7.4	21.2	27.6	12.1	7.4	24.2	100.0
	Cow+Buffalo	6.9	20.7	25.1	11.8	8.3	27.3	100.0	
Non-Member									
	SC/ST								
		Cow	36.9	19.4	11.3	12.5	7.7	12.3	100.0
		Buffalo	46.3	33.2	1.9	10.0	0.0	8.6	100.0
		Cow+Buffalo	43.1	28.6	5.0	10.9	2.6	9.8	100.0
	Others	Cow	3.5	18.0	15.5	14.4	18.1	30.5	100.0
		Buffalo	9.6	15.8	24.8	13.4	15.8	20.7	100.0
		Cow+Buffalo	8.0	16.4	22.4	13.6	16.2	23.2	100.0
	Total								
		Cow	10.1	18.3	14.7	14.1	16.0	26.9	100.0
		Buffalo	14.8	18.3	21.5	12.9	13.5	19.0	100.0
		Cow+Buffalo	13.6	18.3	19.7	13.2	14.2	21.1	100.0
	All Household								
	SC/ST								
		Cow	28.2	21.8	23.5	8.1	5.4	13.0	100.0
		Buffalo	41.9	34.3	6.2	8.8	0.0	8.8	100.0
		Cow+Buffalo	37.2	30.0	12.1	8.6	1.9	10.3	100.0
	Others	Cow	4.0	18.5	16.6	13.0	13.8	34.1	100.0
		Buffalo	6.8	17.8	27.1	13.0	11.8	23.4	100.0
		Cow+Buffalo	6.0	18.0	24.1	13.0	12.4	26.5	100.0
	Total								
		Cow	7.6	19.0	17.6	12.3	12.6	30.9	100.0
		Buffalo	11.0	19.8	24.6	12.5	10.4	21.7	100.0
		Cow+Buffalo	10.0	19.6	22.6	12.4	11.1	24.4	100.0



**Table 4.73: Percentage Distribution of In-Milk Animal Population by Social and Operational Land-holding Groups**

SOUTH ZONE									
Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium	Medium	Large	Total
<b>Member</b>									
	SC/ST	Cow	62.9	16.5	20.6	0.0	0.0	0.0	100.0
		Buffalo	17.3	63.4	6.1	6.6	6.6	0.0	100.0
		Cow+Buffalo	43.3	36.7	14.4	2.8	2.8	0.0	100.0
	Others	Cow	20.6	31.8	18.3	12.3	4.3	12.7	100.0
		Buffalo	10.1	30.4	22.2	15.6	4.0	17.6	100.0
		Cow+Buffalo	17.1	31.3	19.6	13.4	4.2	14.4	100.0
	Total	Cow	23.1	30.9	18.4	11.5	4.1	12.0	100.0
		Buffalo	10.7	33.2	20.8	14.9	4.3	16.1	100.0
		Cow+Buffalo	18.9	31.7	19.3	12.7	4.1	13.4	100.0
	<b>Non-Member</b>								
	SC/ST	Cow	34.2	41.1	0.7	18.8	0.0	5.3	100.0
		Buffalo	55.9	27.1	0.0	17.0	0.0	0.0	100.0
		Cow+Buffalo	44.2	34.6	0.4	18.0	0.0	2.9	100.0
	Others	Cow	33.2	39.5	11.8	4.9	3.1	7.5	100.0
		Buffalo	31.7	33.4	3.0	10.2	5.4	16.3	100.0
		Cow+Buffalo	32.8	37.9	9.4	6.3	3.7	9.8	100.0
	Total	Cow	33.3	39.7	11.0	5.9	2.9	7.3	100.0
		Buffalo	35.4	32.5	2.6	11.2	4.6	13.8	100.0
		Cow+Buffalo	33.9	37.6	8.6	7.4	3.4	9.2	100.0
	<b>All Households</b>								
	SC/ST	Cow	56.0	22.4	15.8	4.5	0.0	1.3	100.0
		Buffalo	27.6	53.8	4.5	9.3	4.8	0.0	100.0
		Cow+Buffalo	43.5	36.2	10.9	6.6	2.1	0.7	100.0
	Others	Cow	23.2	33.4	17.0	10.8	4.1	11.6	100.0
		Buffalo	13.5	30.8	19.2	14.8	4.2	17.4	100.0
		Cow+Buffalo	20.1	32.6	17.7	12.1	4.1	13.5	100.0
	Total	Cow	25.2	32.7	16.9	10.4	3.8	11.0	100.0
		Buffalo	14.9	33.1	17.8	14.3	4.3	15.8	100.0
		Cow+Buffalo	21.8	32.8	17.2	11.7	4.0	12.6	100.0

**Table 4.74: Percentage Distribution of In-Milk Animal Population by Social and Operational Land-holding Groups**

WEST ZONE

Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding Small	groups Semi-medium	Medium	Large	Total
Member									
	SC/ST								
		Cow	19.0	40.9	25.1	4.3	0.0	10.8	100.0
		Buffalo	16.2	64.9	6.6	0.4	0.0	11.9	100.0
		Cow+Buffalo	17.2	55.9	13.6	1.9	0.0	11.5	100.0
	Others								
		Cow	7.0	33.1	22.0	15.1	4.9	17.9	100.0
		Buffalo	4.8	31.1	33.4	16.0	4.3	10.3	100.0
		Cow+Buffalo	5.8	32.0	28.5	15.6	4.5	13.6	100.0
	Total								
		Cow	8.7	34.2	22.4	13.6	4.2	17.0	100.0
		Buffalo	6.7	36.8	29.0	13.4	3.6	10.6	100.0
	Cow+Buffalo	7.5	35.7	26.2	13.5	3.8	13.3	100.0	
Non-Member									
	SC/ST								
		Cow	20.7	35.6	42.3	1.5	0.0	0.0	100.0
		Buffalo	16.8	50.1	33.0	0.0	0.0	0.0	100.0
		Cow+Buffalo	18.8	42.7	37.8	0.8	0.0	0.0	100.0
	Others								
		Cow	10.7	28.7	23.7	23.6	4.8	8.5	100.0
		Buffalo	20.5	30.0	16.2	15.3	7.0	11.0	100.0
		Cow+Buffalo	16.0	29.4	19.7	19.1	6.0	9.7	100.0
	Total								
		Cow	12.8	30.2	27.7	18.8	3.8	6.7	100.0
		Buffalo	19.8	33.7	19.3	12.5	5.7	9.0	100.0
	Cow+Buffalo	16.5	32.0	23.3	15.4	4.8	7.9	100.0	
All Households									
	SC/ST								
		Cow	19.2	40.0	27.9	3.8	0.0	9.1	100.0
		Buffalo	16.3	63.4	9.2	0.4	0.0	10.7	100.0
		Cow+Buffalo	17.4	54.3	16.5	1.7	0.0	10.1	100.0
	Others								
		Cow	7.4	32.7	22.2	16.0	4.9	17.0	100.0
		Buffalo	6.2	31.0	31.9	16.0	4.5	10.4	100.0
		Cow+Buffalo	6.7	31.7	27.7	16.0	4.7	13.2	100.0
	Total								
		Cow	9.1	33.7	23.0	14.2	4.2	15.9	100.0
		Buffalo	7.9	36.5	28.1	13.4	3.8	10.4	100.0
	Cow+Buffalo	8.4	35.3	25.9	13.7	3.9	12.7	100.0	

**Table 4.75: Percentage Distribution of In-Milk Animal Population by Social and Operational Land-holding Groups**

Land holding groups							ALL	ZONES	
Membership	Social Group	Type of animal	Landless	Operational Marginal	Land-holding groups Small	Semi-medium Medium	Large	Total	
Member									
	SC/ST	Cow	36.5	29.0	25.2	2.5	0.4	6.4	100.0
		Buffalo	21.1	57.2	8.4	3.4	1.6	8.3	100.0
		Cow+Buffalo	28.0	44.7	15.9	3.0	1.0	7.5	100.0
	Others	Cow	15.1	30.8	19.4	12.8	5.4	16.5	100.0
		Buffalo	6.7	27.4	28.3	15.0	5.3	17.3	100.0
		Cow+Buffalo	11.1	29.2	23.6	13.8	5.4	16.9	100.0
	Total	Cow	17.0	30.7	19.9	11.9	5.0	15.6	100.0
		Buffalo	8.5	30.9	25.9	13.6	4.9	16.2	100.0
		Cow+Buffalo	12.9	30.8	22.8	12.7	4.9	15.9	100.0
Non-Member									
	SC/ST	Cow	34.3	30.0	13.9	11.4	3.5	6.9	100.0
		Buffalo	46.5	32.9	5.2	9.7	0.1	5.7	100.0
		Cow+Buffalo	41.3	31.6	8.9	10.4	1.6	6.2	100.0
	Others	Cow	22.0	32.9	14.2	9.6	7.4	14.0	100.0
		Buffalo	14.6	20.3	20.4	12.9	13.0	18.8	100.0
		Cow+Buffalo	18.0	26.1	17.5	11.4	10.4	16.6	100.0
	Total	Cow	23.7	32.5	14.1	9.8	6.9	13.0	100.0
		Buffalo	19.5	22.2	18.0	12.4	11.0	16.8	100.0
		Cow+Buffalo	21.4	26.9	16.3	11.2	9.1	15.1	100.0
All Households									
	SC/ST	Cow	35.8	29.3	21.6	5.3	1.4	6.6	100.0
		Buffalo	29.5	49.2	7.3	5.5	1.1	7.4	100.0
		Cow+Buffalo	32.3	40.4	13.6	5.4	1.2	7.1	100.0
	Others	Cow	16.6	31.3	18.3	12.1	5.8	15.9	100.0
		Buffalo	8.9	25.4	26.1	14.4	7.4	17.7	100.0
		Cow+Buffalo	12.8	28.4	22.1	13.2	6.6	16.8	100.0
	Total	Cow	18.5	31.1	18.6	11.4	5.4	15.0	100.0
		Buffalo	11.5	28.5	23.7	13.3	6.6	16.4	100.0
		Cow+Buffalo	15.0	29.8	21.1	12.4	6.0	15.7	100.0

**Table 5.1 : Estimated Milk Production by Type of Milch Animals**  
(ooo'litres/day)

Zone	Membership	Crossbred cows	Desi cows	Buffaloes	Total production
<b>East Zone</b>					
	Member	520.8	533.7	203.1	1257.6
	Non-member	114.2	325.5	139.2	578.8
	All households	634.9	859.2	342.2	1836.4
<b>North Zone</b>					
	Member	1588.9	1883.3	9088.7	12560.9
	Non-member	796.9	1101.9	9489.0	11387.8
	All households	2385.8	2985.2	18577.7	23948.7
<b>South Zone</b>					
	Member	7404.4	4561.2	6885.0	18850.6
	Non-member	966.0	1531.0	1445.3	3942.2
	All households	8370.4	6092.2	8330.2	22792.8
<b>West Zone</b>					
	Member	1898.2	3731.1	11111.2	16740.5
	Non-member	53.2	462.0	1026.6	1541.8
	All households	1951.4	4193.1	12137.8	18282.3
<b>ALL ZONES</b>					
	Member	11412.3	10709.4	27287.9	49409.6
	Non-member	1930.2	3420.4	12100.1	17450.7
	All households	13342.5	14129.8	39388.0	66860.2

**Table 5.21 : Percentage Distribution of Cow Milk Production by Social and Operational Land-holding Groups**

(Percent)

Zone	Membership	Social	Landless	Operational Land-holding groups					Total
		Group		Marginal	Small	Semi-medium	Medium	Large	
East zone									
	Member	SC/ST	26.1	44.2	20.4	9.2	0.0	0.0	100.0
		Others	9.9	40.0	29.6	9.1	9.0	2.3	100.0
		Total	12.8	40.8	28.0	9.1	7.4	1.9	100.0
	Non-member	SC/ST	44.9	30.3	20.0	4.5	0.2	0.0	100.0
		Others	24.6	48.4	15.8	9.2	0.0	2.0	100.0
		Total	29.9	43.7	16.9	8.0	0.1	1.5	100.0
	All households	SC/ST	33.9	38.5	20.3	7.3	0.1	0.0	100.0
		Others	13.9	42.3	25.9	9.1	6.5	2.2	100.0
		Total	18.3	41.7	24.4	8.7	5.0	1.8	100.0
North zone									
	Member	SC/ST	15.2	12.9	59.5	1.6	1.6	9.4	100.0
		Others	4.7	15.0	14.1	14.3	11.7	40.3	100.0
		Total	6.1	14.7	20.0	12.6	10.4	36.3	100.0
	Non-member	SC/ST	35.0	15.5	7.9	12.5	9.9	19.3	100.0
		Others	1.9	12.1	14.2	19.1	23.6	29.1	100.0
		Total	7.2	12.7	13.2	18.0	21.4	27.5	100.0
	All households	SC/ST	24.2	14.1	36.0	6.6	5.3	13.9	100.0
		Others	3.7	14.0	14.1	15.9	15.8	36.4	100.0
		Total	6.5	13.9	17.3	14.8	14.8	32.7	100.0
South zone									
	Member	SC/ST	58.3	15.6	26.2	0.0	0.0	0.0	100.0
		Others	21.4	28.7	18.1	13.6	5.6	12.6	100.0
		Total	23.8	27.9	18.6	12.7	5.3	11.8	100.0
	Non-member	SC/ST	22.1	40.1	0.6	32.5	0.0	4.7	100.0
		Others	36.6	36.4	9.8	4.7	2.3	10.2	100.0
		Total	35.5	36.7	9.1	6.8	2.1	9.8	100.0
	All households	SC/ST	51.5	20.1	21.4	6.0	0.0	0.9	100.0
		Others	24.0	30.0	16.6	12.1	5.0	12.2	100.0
		Total	25.7	29.3	17.0	11.8	4.7	11.5	100.0
West zone									
	Member	SC/ST	13.3	47.3	25.8	3.9	0.0	9.7	100.0
		Others	6.5	36.9	22.6	16.0	3.2	14.9	100.0
		Total	7.6	38.5	23.1	14.1	2.7	14.1	100.0
	Non-member	SC/ST	22.3	23.1	52.0	2.6	0.0	0.0	100.0
		Others	11.1	27.7	23.3	30.9	2.7	4.2	100.0
		Total	13.0	26.9	28.2	26.1	2.2	3.5	100.0
	All households	SC/ST	14.0	45.4	27.9	3.8	0.0	8.9	100.0
		Others	6.9	36.1	22.6	17.2	3.1	14.0	100.0
		Total	8.0	37.7	23.4	15.0	2.7	13.3	100.0
ALL ZONES									
	Member	SC/ST	34.2	28.0	30.7	2.1	0.2	4.9	100.0
		Others	14.8	29.1	19.0	14.1	6.1	16.9	100.0
		Total	18.1	29.2	20.0	12.9	5.3	14.6	100.0
	Non-member	SC/ST	30.3	26.7	11.5	17.5	4.2	9.8	100.0
		Others	21.5	28.2	13.0	12.3	9.5	15.5	100.0
		Total	24.9	29.0	12.2	11.7	8.0	14.3	100.0
	All households	SC/ST	33.3	27.7	26.4	5.5	1.1	6.0	100.0
		Others	16.1	28.9	17.9	13.7	6.7	16.6	100.0
		Total	19.4	29.1	18.5	12.7	5.8	14.5	100.0

**Table 5.22 : Distribution of Buffalo Milk Production by Social and Operational Land-holding Groups**

(Percent)

Zone	Membership	Social Group	Landless	Operational Land-holding groups					Total
				Marginal	Small	Semi-medium	Medium	Large	
East zone									
	Member	SC/ST	30.6	21.5	44.8	3.1	0.0	0.0	100.0
		Others	36.7	5.6	22.6	35.1	0.0	0.0	100.0
		Total	35.4	9.0	27.3	28.3	0.0	0.0	100.0
	Non-member	SC/ST	87.2	6.6	2.3	1.7	2.2	0.0	100.0
		Others	25.9	13.2	54.6	6.4	0.0	0.0	100.0
		Total	55.5	10.0	29.4	4.1	1.0	0.0	100.0
	All households	SC/ST	65.0	12.5	19.0	2.2	1.3	0.0	100.0
		Others	33.4	7.9	32.5	26.2	0.0	0.0	100.0
		Total	43.5	9.4	28.1	18.5	0.4	0.0	100.0
North zone									
	Member	SC/ST	42.0	34.5	9.4	5.7	0.0	8.4	100.0
		Others	4.6	19.1	29.8	10.8	8.8	26.9	100.0
		Total	8.0	20.5	28.0	10.4	8.0	25.2	100.0
	Non-member	SC/ST	53.8	29.6	3.6	7.8	0.0	5.2	100.0
		Others	6.7	15.0	23.8	15.3	18.6	20.7	100.0
		Total	12.1	16.7	21.4	14.4	16.4	18.9	100.0
	All households	SC/ST	48.8	31.6	6.1	6.9	0.0	6.5	100.0
		Others	5.7	17.0	26.8	13.1	13.7	23.8	100.0
		Total	10.1	18.5	24.6	12.4	12.3	22.0	100.0
South zone									
	Member	SC/ST	16.7	68.5	7.2	0.0	7.6	0.0	100.0
		Others	12.3	32.1	19.4	13.7	3.8	18.7	100.0
		Total	12.7	35.4	18.3	12.5	4.1	17.0	100.0
	Non-member	SC/ST	52.5	29.5	0.0	18.1	0.0	0.0	100.0
		Others	30.2	30.6	3.82	9.9	5.3	20.2	100.0
		Total	33.3	30.4	3.3	11.1	4.6	17.4	100.0
	All households	SC/ST	25.8	58.6	5.4	4.6	5.7	0.0	100.0
		Others	15.3	31.8	16.8	13.1	4.1	18.9	100.0
		Total	16.4	34.5	15.6	12.3	4.2	17.1	100.0
West zone									
	Member	SC/ST	15.8	61.1	4.9	0.2	0.0	18.0	100.0
		Others	4.5	30.1	35.5	16.7	4.8	8.4	100.0
		Total	6.3	34.9	30.8	14.2	4.0	9.9	100.0
	Non-member	SC/ST	18.7	46.8	34.5	0.0	0.0	0.0	100.0
		Others	25.1	34.4	16.3	10.1	4.4	9.8	100.0
		Total	24.0	36.4	19.3	8.5	3.7	8.2	100.0
	All households	SC/ST	16.0	60.0	7.3	0.2	0.0	16.6	100.0
		Others	6.3	30.5	33.9	16.1	4.7	8.6	100.0
		Total	7.7	35.0	29.9	13.7	4.0	9.8	100.0
ALL ZONES									
	Member	SC/ST	22.8	55.4	7.2	1.6	1.7	11.4	100.0
		Others	6.8	26.7	29.3	14.0	5.9	17.4	100.0
		Total	8.9	30.2	26.4	12.6	5.3	16.7	100.0
	Non-member	SC/ST	52.1	29.9	5.9	8.3	0.1	3.6	100.0
		Others	11.1	18.4	21.0	14.2	15.7	19.6	100.0
		Total	16.5	20.0	18.9	13.4	13.6	17.6	100.0
	All households	SC/ST	32.4	47.0	6.8	3.8	1.2	8.9	100.0
		Others	8.1	24.2	26.7	14.1	8.9	18.1	100.0
		Total	11.2	27.0	24.1	12.8	7.9	17.0	100.0

**Table 5.23 : Distribution of Total (Cow+Buffalo) Milk Production by Social and Operational Land-holding Groups**

(Percent)

Zone	Membership	Social	Landless	Operational		Land-holding groups			Total
		Group		Marginal	Small	Semi-medium	Medium	Large	
East zone									
	Member	SC/ST	27.2	39.0	26.0	7.8	0.0	0.0	100.0
		Others	15.0	33.5	28.3	14.1	7.2	1.9	100.0
		Total	17.3	34.4	27.9	12.9	5.9	1.5	100.0
	Non-member	SC/ST	61.6	21.0	13.0	3.4	1.0	0.0	100.0
		Others	24.8	41.5	23.5	8.6	0.0	1.6	100.0
		Total	36.5	35.0	20.2	7.0	0.3	1.1	100.0
	All households	SC/ST	43.5	30.5	19.9	5.7	0.5	0.0	100.0
		Others	17.7	35.7	26.9	12.6	5.2	1.8	100.0
		Total	23.9	34.6	25.2	10.9	4.0	1.4	100.0
North zone									
	Member	SC/ST	31.0	25.6	29.9	4.0	0.6	8.8	100.0
		Others	4.7	17.8	24.9	11.9	9.7	31.0	100.0
		Total	7.4	18.6	25.4	11.1	8.8	28.8	100.0
	Non-member	SC/ST	48.2	25.4	4.9	9.2	2.9	9.4	100.0
		Others	5.6	14.3	21.7	16.1	19.7	22.6	100.0
		Total	11.0	15.8	19.5	15.2	17.6	20.9	100.0
	All households	SC/ST	40.2	25.5	16.6	6.8	1.9	9.1	100.0
		Others	5.1	16.2	23.4	13.9	14.4	27.1	100.0
		Total	9.1	17.2	22.5	13.1	13.0	25.0	100.0
South zone									
	Member	SC/ST	46.2	31.0	20.6	0.0	2.2	0.0	100.0
		Others	19.4	29.5	18.3	13.6	5.2	13.9	100.0
		Total	21.3	29.6	18.5	12.7	5.0	13.0	100.0
	Non-member	SC/ST	33.6	36.1	0.4	27.0	0.0	2.9	100.0
		Others	35.1	35.1	8.4	5.9	3.0	12.5	100.0
		Total	35.0	35.2	7.7	7.8	2.7	11.6	100.0
	All households	SC/ST	43.6	32.1	16.4	5.6	1.8	0.6	100.0
		Others	22.1	30.4	16.7	12.3	4.8	13.7	100.0
		Total	23.6	30.5	16.7	11.9	4.6	12.7	100.0
West zone									
	Member	SC/ST	14.6	54.9	14.3	1.8	0.0	14.3	100.0
		Others	5.5	33.2	29.5	16.3	4.1	11.3	100.0
		Total	6.9	36.5	27.3	14.1	3.4	11.8	100.0
	Non-member	SC/ST	20.3	36.4	42.2	1.2	0.0	0.0	100.0
		Others	19.1	31.9	19.1	18.9	3.6	7.5	100.0
		Total	19.3	32.3	23.1	16.0	3.0	6.2	100.0
	All households	SC/ST	15.1	53.4	16.6	1.8	0.0	13.1	100.0
		Others	6.6	33.1	28.7	16.5	4.0	11.0	100.0
		Total	7.8	36.2	27.0	14.3	3.4	11.4	100.0
ALL ZONES									
	Member	SC/ST	29.0	40.5	19.9	1.8	0.9	7.9	100.0
		Others	11.0	27.8	23.9	14.1	6.0	17.2	100.0
		Total	14.4	29.6	22.5	12.8	5.3	15.5	100.0
	Non-member	SC/ST	43.1	28.6	8.2	12.1	1.8	6.2	100.0
		Others	14.4	21.4	18.4	13.8	13.9	18.4	100.0
		Total	20.1	23.9	16.0	12.7	11.2	16.2	100.0
	All households	SC/ST	32.9	37.2	16.7	4.7	1.1	7.4	100.0
		Others	11.8	26.1	22.5	14.0	8.1	17.5	100.0
		Total	15.8	28.2	21.0	12.8	6.7	15.6	100.0

**Table 5.3 : Productivity of Milch and In-Milk Animals by Type of Milch Animal**

Zone	Membership	In-Milk Animals			All Milch Animals		
		Crossbred cows	Desi cows	Buffaloes	Crossbred cows	Desi cows	Buffaloes
<b>East Zone</b>							
	Member	5.64	2.95	5.76	4.87	2.19	3.98
	Non-member	6.81	3.10	4.92	4.09	2.21	3.39
	All households	5.82	3.01	5.39	4.71	2.20	3.72
<b>North Zone</b>							
	Member	7.34	3.38	5.62	5.03	2.30	4.12
	Non-member	6.60	3.15	4.94	4.32	1.89	3.50
	All households	7.07	3.29	5.25	4.77	2.13	3.78
<b>South Zone</b>							
	Member	6.32	3.63	3.95	4.36	2.12	2.53
	Non-member	6.97	2.71	4.02	4.45	1.52	2.45
	All households	6.39	3.35	3.96	4.37	1.93	2.51
<b>West Zone</b>							
	Member	7.84	3.28	4.57	5.30	1.82	3.02
	Non-member	6.52	2.65	3.94	3.69	1.15	1.97
	All households	7.80	3.19	4.51	5.24	1.71	2.89
<b>ALL ZONES</b>							
	Member	6.63	3.42	4.68	4.60	2.03	3.15
	Non-member	6.79	2.87	4.68	4.35	1.60	3.11
	All households	6.65	3.27	4.68	4.56	1.91	3.14



**Table 5.41 : Per Capita Consumption of Milk of MAHs by Use**  
(Millilitre per day)

Zone	Membership	Drinking as milk	Tea & Coffee	Dahi & Others	Total
<b>East Zone</b>					
	Member	179	44	19	242
	Non-Member	172	41	21	234
	All Households	176	43	20	238
<b>North Zone</b>					
	Member	218	108	149	475
	Non-Member	240	142	210	592
	All Households	228	124	178	530
<b>South Zone</b>					
	Member	82	149	77	309
	Non-Member	51	160	68	279
	All Households	75	151	75	302
<b>West Zone</b>					
	Member	96	91	34	221
	Non-Member	73	111	40	224
	All Households	92	94	35	221
<b>ALL ZONES</b>					
	Member	119	116	75	310
	Non-Member	151	135	127	413
	All Households	128	122	90	339

**Table 5.42 : Per Capita Consumption of Milk of MAHs by Social Groups**  
(Millilitre per day)

Zone	Social group	Drinking as milk	Tea & Coffee	Dahi & Others	Total
<b>East Zone</b>					
	SC/ST	144	41	21	207
	Others	188	43	20	251
<b>North Zone</b>					
	SC/ST	163	124	154	441
	Others	241	124	183	548
<b>South Zone</b>					
	SC/ST	81	123	58	261
	Others	75	154	77	306
<b>West Zone</b>					
	SC/ST	89	104	17	210
	Others	92	92	39	224
<b>All Zones</b>					
	SC/ST	115	110	69	294
	Others	130	124	93	347

**Table 5.43 : Per Capita Consumption of Milk of MAHs by Operational Land-holding Groups**

(Millilitre per day)

Zone	Operational land-holding group	Drinking as milk	Tea & Coffee	Dahi & Others	Total
<b>East Zone</b>					
	Landless	180	31	13	224
	Marginal	180	62	22	264
	Small	176	38	24	239
	Semi-medium	182	34	27	243
	Medium	167	43	27	237
	Large	179	37	30	245
<b>North Zone</b>					
	Landless	205	124	123	452
	Marginal	190	106	125	422
	Small	239	129	147	515
	Semi-medium	231	116	195	541
	Medium	241	156	290	687
	Large	275	134	269	678
<b>South Zone</b>					
	Landless	77	166	62	304
	Marginal	44	165	62	271
	Small	90	121	97	308
	Semi-medium	95	116	94	304
	Medium	111	140	50	300
	Large	124	153	112	389
<b>West Zone</b>					
	Landless	86	110	16	212
	Marginal	85	99	28	212
	Small	96	99	39	234
	Semi-medium	93	83	60	236
	Medium	112	75	39	226
	Large	98	81	29	208
<b>ALL ZONES</b>					
	Landless	114	139	65	318
	Marginal	95	126	64	285
	Small	142	111	86	339
	Semi-medium	138	101	109	348
	Medium	166	128	149	444
	Large	175	123	147	445

Table 5.51 : Per Capita Consumption of Liquid Milk of MAHS by Gender

Zone	Membership	Male				Female				Total				(Millilitre per day)
		< 1 year				< 1 year				< 1 year				
		1-10 year	>10 year	Total	Total	1-10 year	>10 year	Total	Total	1 year	1-10 year	>10 year	Total	
East Zone														
North Zone	Member	453	364	125	210	344	249	84	143	410	310	106	179	
	Non-Member	326	309	128	199	339	216	80	137	331	267	106	172	
	All Households	392	338	126	205	342	234	82	141	373	290	106	176	
North Zone	Member	460	368	199	253	357	267	137	177	415	323	170	218	
	Non-Member	398	357	228	265	420	237	190	210	408	302	211	240	
	All Households	428	363	213	258	389	253	162	193	411	313	190	228	
South Zone														
South Zone	Member	173	213	46	89	214	158	41	74	191	187	44	82	
	Non-Member	54	119	31	56	113	103	17	46	81	111	24	51	
	All Households	133	190	43	82	177	144	36	68	153	168	39	75	
West Zone														
West Zone	Member	255	235	91	126	247	149	28	61	252	194	62	96	
	Non-Member	113	161	62	91	82	153	21	52	102	158	43	73	
	All Households	235	219	87	120	233	149	27	60	234	187	59	92	
ALL ZONES														
ALL ZONES	Member	281	262	96	141	263	182	57	93	273	225	78	119	
	Non-Member	235	243	139	170	263	177	104	129	247	213	123	151	
	All Households	265	257	108	149	263	181	70	103	264	221	90	128	

Table 5.52 : Per Capita Consumption of Milk of MAHS by Social Groups and Gender

Zone	Social groups	Male					Female					Total				
		< 1 year					< 1 year					< 1 year				
		1-10 year	>10 year	Total	< 1 year	>10 year	1-10 year	>10 year	Total	< 1 year	>10 year	1-10 year	>10 year	Total	< 1 year	>10 year
East Zone																
	SC/ST	347	301	73	166	320	195	56	117	339	252	66	144			
	Others	416	354	146	221	349	252	91	149	389	307	121	188			
North Zone																
	SC/ST	328	270	146	190	342	187	103	132	334	236	125	163			
	Others	446	387	226	272	397	267	174	204	424	331	202	241			
South Zone																
	SC/ST	268	110	55	74	29	171	61	88	129	137	58	81			
	Others	125	199	41	83	192	141	33	66	155	171	37	75			
West Zone																
	SC/ST	76	216	105	129	272	84	15	39	218	163	65	89			
	Others	247	220	82	118	222	161	30	64	236	192	57	92			
ALL ZONES																
	SC/ST	280	218	103	138	240	154	56	86	259	191	82	115			
	Others	263	264	109	151	267	186	72	106	265	227	92	130			

Table 5.53 : Per Capita Consumption of Milk of MAH by Operational Land-holding and Gender

Zone	Operational Land-holding groups	(Millilitre per day)													
		Male					Female								
		< 1 year	1-10 year	>10 year	Total	< 1 year	1-10 year	>10 year	Total	< 1 year	1-10 year	>10 year	Total		
East Zone															
North Zone	Landless	382	312	123	209	374	207	83	144	380	262	105	180		
	Marginal	325	354	163	214	240	263	100	141	285	315	134	180		
	Small	461	344	105	203	414	269	68	142	444	311	88	176		
	Semi-medium	394	394	100	210	296	230	80	146	358	317	92	182		
	Medium	323	193	100	159	500	110	100	173	423	137	100	167		
South Zone	Large	190	256	166	193	269	193	109	159	221	222	145	179		
	Landless	368	356	181	243	311	226	131	161	345	303	156	205		
	Marginal	448	288	168	214	297	224	133	164	371	259	151	190		
	Small	500	375	232	271	446	212	187	203	468	296	211	239		
	Semi-medium	526	376	215	269	529	294	136	184	527	339	179	231		
West Zone	Medium	174	416	226	257	252	292	200	218	207	363	215	241		
	Large	408	462	256	307	519	337	194	238	447	402	228	275		
	Landless	65	183	42	82	22	153	41	71	50	169	42	77		
	Marginal	49	143	18	46	148	97	20	42	100	121	19	44		
	Small	176	209	76	105	144	134	50	71	155	173	64	90		
ALL ZONES	Semi-medium	235	203	55	111	614	120	45	76	311	167	50	111		
	Medium	455	190	92	121	330	284	25	99	868	233	63	111		
	Large	305	289	48	131	453	220	52	117	357	254	50	124		
	Landless	170	259	83	120	276	148	16	46	222	210	53	86		
	Marginal	149	184	90	113	222	131	16	52	186	158	56	85		
ALL ZONES	Small	279	213	96	126	381	160	29	62	330	190	64	96		
	Semi-medium	374	242	64	122	55	179	24	61	306	211	44	93		
	Medium	65	186	107	124	223	135	81	102	205	162	93	112		
	Large	225	285	79	126	137	152	43	67	190	224	62	98		
	Landless	178	246	84	133	156	173	60	93	170	213	73	114		
ALL ZONES	Marginal	187	204	78	111	212	146	46	77	200	177	63	95		
	Small	352	269	133	169	320	179	83	112	334	229	110	142		
	Semi-medium	373	276	111	168	380	190	65	104	375	236	89	138		
	Medium	253	282	156	183	276	238	112	146	268	262	137	166		
	Large	339	349	144	200	415	244	104	147	366	298	125	175		

**Table 5.6 : Percentage Distribution of MAHs by Type of Milk Sold**

Zone	Membership	Cow Milk	Buffalo Milk	Both	No Sale	Total
<b>East zone</b>	Member	78.0	14.9	4.8	2.4	100.0
	Non-Member	64.4	22.4	1.8	11.4	100.0
	All households	72.1	18.2	3.5	6.3	100.0
<b>North zone</b>	Member	11.9	52.0	25.5	10.7	100.0
	Non-Member	4.7	45.7	16.6	33.1	100.0
	All households	8.2	48.7	20.9	22.3	100.0
<b>South zone</b>	Member	59.3	22.7	14.1	3.9	100.0
	Non-Member	62.7	22.7	8.2	6.5	100.0
	All households	60.1	22.7	12.7	4.5	100.0
<b>West zone</b>	Member	24.5	48.6	21.1	5.9	100.0
	Non-Member	11.5	36.0	4.6	47.9	100.0
	All households	22.2	46.4	18.2	13.2	100.0
<b>All Zones</b>	Member	39.3	36.8	18.3	5.7	100.0
	Non-Member	28.5	34.9	10.8	25.8	100.0
	All households	36.1	36.2	16.1	11.5	100.0

**Table 5.71 : Percentage Distribution of MAHs that Produce Milk but do not Sell - by Reason and Land-holding Groups**

		EAST ZONE								
Membership	Operational land holding groups		<----- Cow Milk----->				<----- Buffalo Milk----->			
			1	2	3	Total	1	2	3	Total
<b>Member</b>										
Landless	Row %	-	100.0	-	100.0					
	Col %	-	12.2	-	5.6					
Marginal	Row %	45.3	54.7	-	100.0					
	Col %	61.1	87.8	-	73.3					
Small	Row %	100.0	-	-	100.0					
	Col %	38.9	-	-	21.2					
Semi-medium	Row %	-	-	-	-	ALL				
	Col %	-	-	-	-					
Medium	Row %	-	-	-	-					
	Col %	-	-	-	-					
Large	Row %	-	-	-	-					
	Col %	-	-	-	-					
Total	Row %	54.4	45.6	-	100.0	HOUSEHOLDS				
	Col %	100.0	100.0	-	100.0					
<b>Non-Member</b>										
Landless	Row %	75.9	24.1	-	100.0	SELLING				
	Col %	12.3	7.1	-	8.2					
Marginal	Row %	44.7	28.1	27.2	100.0					
	Col %	45.4	51.8	64.1	51.3					
Small	Row %	65.1	34.9	-	100.0	BUFFALO				
	Col %	42.3	41.1	-	32.7					
Semi-medim	Row %	-	-	100.0	100.0					
	Col %	-	-	35.9	7.8					
Medium	Row %	-	-	-	-					
	Col %	-	-	-	-					
Large	Row %	-	-	-	-	MILK				
	Col %	-	-	-	-					
Total	Row %	50.5	27.8	21.8	100.0					
	Col %	100.0	100.0	100.0	100.0					
<b>All households</b>										
Landless	Row %	64.2	35.8	-	100.0	IN				
	Col %	9.6	8.7	-	7.6					
Marginal	Row %	44.9	35.5	19.7	100.0					
	Col %	49.0	62.8	64.1	55.9					
Small	Row %	70.3	29.7	-	100.0	THE				
	Col %	41.5	28.5	-	30.3					
Semi-medium	Row %	-	-	100.0	100.0	EAST ZONE				
	Col %	-	-	35.9	6.2					
Medium	Row %	-	-	-	-					
	Col %	-	-	-	-					
Large	Row %	-	-	-	-					
	Col %	-	-	-	-					
Total	Row %	51.3	31.6	17.2	100.0					
	Col %	100.0	100.0	100.0	100.0					

Reason code : No surplus milk production - 1, No milk production - 2, Others - 3.

**Table 5.72 : Percentage Distribution of MAHs that Produce Milk but do not Sell - by Reason and Land-holding Groups**

Land-holding Groups		NORTH ZONE							
Membership	Operational land holding groups	<----- Cow Milk----->				<----- Buffalo Milk----->			
		1	2	3	Total	1	2	3	Total
<b>Member</b>									
Landless	Row %	61.9	38.1	-	100.0	61.8	10.2	28.0	100.0
	Col %	6.1	4.0	-	4.8	9.4	1.4	11.7	6.1
Marginal	Row %	41.4	52.5	6.1	100.0	11.4	70.2	18.4	100.0
	Col %	32.4	43.8	45.3	38.3	7.2	39.4	31.8	25.3
Small	Row %	21.4	58.3	20.2	100.0	42.2	57.8	-	100.0
	Col %	6.1	17.7	54.7	13.9	19.6	23.7	-	18.6
Semi-medium	Row %	37.0	63.0	-	100.0	67.0	33.0	-	100.0
	Col %	7.4	13.5	-	9.9	38.1	16.6	-	22.8
Medium	Row %	80.1	19.9	-	100.0	28.8	51.0	20.3	100.0
	Col %	29.9	7.9	-	18.3	7.2	11.4	13.9	10.1
Large	Row %	59.9	40.1	-	100.0	43.4	20.0	36.6	100.0
	Col %	18.2	13.0	-	14.9	18.5	7.6	42.7	17.1
Total	Row %	49.0	45.9	5.1	100.0	40.1	45.2	14.7	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Non-Member</b>									
Landless	Row %	77.2	22.8	-	100.0	68.5	17.5	14.0	100.0
	Col %	14.8	12.0	-	13.8	30.2	37.8	49.3	33.2
Marginal	Row %	86.5	13.5	-	100.0	78.0	20.3	1.7	100.0
	Col %	46.8	20.0	-	38.9	22.7	28.9	3.9	21.9
Small	Row %	34.4	57.8	7.8	100.0	79.4	7.6	13.0	100.0
	Col %	7.7	35.5	65.8	16.1	21.7	10.1	28.4	20.5
Semi-medium	Row %	11.2	82.4	6.4	100.0	74.3	25.7	0.0	100.0
	Col %	1.2	23.2	24.8	7.4	8.8	14.9	0.0	8.9
Medium	Row %	100.0	-	-	100.0	70.1	3.4	26.5	100.0
	Col %	11.5	-	-	8.3	6.1	1.5	18.3	6.5
Large	Row %	83.0	15.9	1.2	100.0	88.3	11.7	-	100.0
	Col %	18.0	9.4	9.4	15.6	10.5	6.8	-	9.0
Total	Row %	71.8	26.3	1.9	100.0	75.2	15.4	9.4	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>All households</b>									
Landless	Row %	75.2	24.8	-	100.0	68.2	17.2	14.6	100.0
	Col %	12.8	8.6	-	11.1	27.7	22.2	38.6	27.7
Marginal	Row %	73.1	25.1	1.8	100.0	62.9	31.6	5.5	100.0
	Col %	43.5	30.2	24.2	38.7	20.9	33.4	11.9	22.6
Small	Row %	30.9	58.0	11.1	100.0	72.5	17.0	10.6	100.0
	Col %	7.4	27.9	59.9	15.5	21.4	15.9	20.3	20.1
Semi-medium	Row %	20.6	75.4	4.1	100.0	71.5	28.5	0.0	100.0
	Col %	2.6	19.1	11.6	8.1	12.3	15.6	0.0	11.7
Medium	Row %	90.3	9.7	-	100.0	58.4	16.9	24.7	100.0
	Col %	15.7	3.4	-	11.3	6.2	5.7	17.1	7.2
Large	Row %	76.3	22.9	0.8	100.0	73.6	14.4	12.0	100.0
	Col %	18.1	10.9	4.4	15.4	11.5	7.1	12.1	10.6
Total	Row %	65.0	32.2	2.9	100.0	68.1	21.4	10.5	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Reason code : No surplus milk production - 1, No milk production - 2, Others - 3.



**Table 5.73: Percentage Distribution of MAHs that Produce Milk but do not Sell - by Reason and Land-holding Groups**

SOUTH ZONE										
Membership	Operational land holding groups		<----- Cow Milk----->				<----- Buffalo milk----->			
			1	2	3	Total	1	2	3	Total
Member										
Landless	Row %	-	100.0	-	-	100.0	-	-	100.0	100.0
	Col %	-	31.7	-	-	25.4	-	-	100.0	1.6
Marginal	Row %	-	89.8	10.2	-	100.0	-	-	-	-
	Col %	-	58.3	-	-	41.5	-	-	-	-
Small	Row %	53.0	47.0	-	-	100.0	-	-	-	-
	Col %	63.3	10.1	-	-	17.2	-	-	-	-
Semi-medium	Row %	100.0	-	-	-	100.0	-	-	-	-
	Col %	36.7	-	-	-	5.3	-	-	-	-
Medium	Row %	-	-	-	-	-	-	-	-	-
	Col %	-	-	-	-	-	-	-	-	-
Large	Row %	-	-	-	-	-	100.0	-	-	100.0
	Col %	-	-	-	-	-	100.0	-	-	98.4
Total	Row %	14.4	80.3	5.3	-	100.0	98.4	-	1.6	100.0
	Col %	100.0	100.0	0.0	-	100.0	100.0	-	100.0	100.0
Non-Member										
Landless	Row %	-	100.0	-	-	100.0	100.0	-	-	100.0
	Col %	-	98.3	-	-	58.4	60.6	-	-	28.8
Marginal	Row %	100.0	-	-	-	100.0	35.6	62.0	2.4	100.0
	Col %	100.0	-	-	-	40.6	39.4	100.0	6.3	52.5
Small	Row %	-	-	-	-	-	-	-	100.0	100.0
	Col %	-	-	-	-	-	-	-	93.8	18.7
Semi-medium	Row %	-	100.0	-	-	100.0	-	-	-	-
	Col %	-	1.7	-	-	1.0	-	-	-	-
Medium	Row %	-	-	-	-	-	-	-	-	-
	Col %	-	-	-	-	-	-	-	-	-
Large	Row %	-	-	-	-	-	-	-	-	-
	Col %	-	-	-	-	-	-	-	-	-
Total	Row %	40.6	59.4	-	-	100.0	47.5	32.6	20.0	100.0
	Col %	100.0	100.0	-	-	100.0	100.0	100.0	100.0	100.0
All households										
Landless	Row %	-	100.0	-	-	100.0	96.6	-	3.4	100.0
	Col %	-	47.7	-	-	35.3	26.3	-	4.8	18.3
Marginal	Row %	25.0	67.4	7.6	-	100.0	35.6	62.0	2.4	100.0
	Col %	54.6	44.3	100.0	-	48.7	17.1	100.0	6.0	32.2
Small	Row %	53.0	47.0	-	-	100.0	-	-	100.0	100.0
	Col %	28.7	7.7	-	-	12.1	-	-	89.2	11.5
Semi-medium	Row %	92.4	7.6	-	-	100.0	-	-	-	-
	Col %	16.7	0.4	-	-	4.0	-	-	-	-
Medium	Row %	-	-	-	-	-	-	-	-	-
	Col %	-	-	-	-	-	-	-	-	-
Large	Row %	-	-	-	-	-	100.0	-	-	100.0
	Col %	-	-	-	-	-	56.6	-	-	38.0
Total	Row %	22.3	74.0	3.7	-	100.0	67.2	20.0	12.9	100.0
	Col %	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	100.0

Reason code : No surplus milk production - 1, No milk production - 2, Others - 3.

**Table 5.74: Percentage Distribution of MAHs that Produce Milk but do not Sell - by Reason and Land-holding Groups**

Land-holding groups		WEST ZONE							
Membership	Operational land holding groups	<----- Cow Milk----->				<----- Buffalo milk----->			
		1	2	3	Total	1	2	3	Total
<b>Member</b>									
Landless	Row %	3.4	96.6	-	100.0	28.6	47.9	23.5	100.0
	Col %	0.6	16.2	-	8.6	15.8	21.7	20.4	19.3
Marginal	Row %	26.8	69.4	3.9	100.0	-	66.4	33.6	100.0
	Col %	19.9	47.2	100.0	35.0	-	66.7	64.7	42.8
Small	Row %	77.2	22.8	-	100.0	43.4	28.9	27.7	100.0
	Col %	54.4	14.8	-	33.3	7.3	4.0	7.3	5.9
Semi-medium	Row %	40.1	59.9	-	100.0	100.0	-	-	100.0
	Col %	8.4	11.5	-	9.9	15.2	-	-	5.3
Medium	Row %	-	100.0	-	100.0	50.0	-	50.0	100.0
	Col %	-	2.6	-	1.4	2.4	-	3.8	1.7
Large	Row %	66.7	33.3	-	100.0	83.5	13.1	3.4	100.0
	Col %	16.8	7.7	-	11.9	59.3	7.6	3.8	24.9
Total	Row %	47.2	51.5	1.4	100.0	35.1	42.7	22.3	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Non-Member</b>									
Landless	Row %	74.8	19.1	6.1	100.0	53.5	46.5	-	100.0
	Col %	11.5	3.9	2.9	7.4	4.9	3.2	-	2.9
Marginal	Row %	52.0	22.9	25.1	100.0	21.3	78.7	-	100.0
	Col %	29.5	17.3	43.5	27.3	3.9	10.5	-	5.7
Small	Row %	32.3	65.3	2.4	100.0	48.7	51.3	-	100.0
	Col %	19.1	51.3	4.3	28.4	75.5	58.6	-	49.2
Semi-medium	Row %	53.4	30.8	15.7	100.0	3.3	-	96.7	100.0
	Col %	23.4	18.0	21.0	21.0	1.5	-	54.6	14.2
Medium	Row %	35.2	13.2	51.6	100.0	-	-	100.0	100.0
	Col %	6.0	3.0	26.7	8.2	-	-	37.2	9.4
Large	Row %	65.9	30.5	3.6	100.0	24.4	64.5	11.2	100.0
	Col %	10.5	6.5	1.8	7.7	14.3	27.8	8.2	18.6
Total	Row %	48.1	36.1	15.8	100.0	31.7	43.1	25.2	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>All households</b>									
Landless	Row %	54.2	41.4	4.4	100.0	31.7	47.7	20.6	100.0
	Col %	8.8	8.0	2.8	7.7	10.8	12.7	9.9	11.4
Marginal	Row %	44.2	37.2	18.5	100.0	2.4	67.8	29.9	100.0
	Col %	27.1	27.2	45.1	29.3	1.8	39.3	31.4	24.9
Small	Row %	45.3	53.0	1.7	100.0	48.1	48.8	3.1	100.0
	Col %	28.1	39.2	4.1	29.7	38.6	30.5	3.6	26.8
Semi-medium	Row %	51.6	34.9	13.5	100.0	30.9	-	69.1	100.0
	Col %	19.6	15.8	20.4	18.2	8.9	-	28.1	9.6
Medium	Row %	33.3	17.9	48.8	100.0	8.1	-	91.9	100.0
	Col %	4.5	2.9	25.9	6.4	1.3	-	21.0	5.4
Large	Row %	66.2	31.5	2.3	100.0	59.2	34.2	6.6	100.0
	Col %	12.1	6.9	1.7	8.8	38.6	17.4	6.1	21.8
Total	Row %	47.9	40.1	12.0	100.0	33.5	42.9	23.7	100.0
	Col %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Reason code : No surplus milk production - 1, No milk production - 2, Others - 3.

**Table 5.75: Percentage Distribution of MAHs that Produce Milk but do not Sell - by Reason and Land-holding Groups**

		ALL ZONES								
Membership	Operational land holding groups		<----- Cow Milk----->				<----- Buffalo milk----->			
			1	2	3	Total	1	2	3	Total
Member										
Landless	Row %		5.5	94.5	-	100.0	34.9	40.3	24.8	100.0
	Col %		2.6	23.0	-	15.4	11.3	12.6	17.8	13.0
Marginal	Row %		16.0	76.4	7.7	100.0	3.6	67.6	28.9	100.0
	Col %		21.7	53.6	82.6	44.4	3.0	54.5	53.4	33.6
Small	Row %		58.7	37.9	3.5	100.0	42.6	49.3	8.1	100.0
	Col %		37.2	12.4	17.4	20.7	11.5	12.8	4.9	10.8
Semi-medium	Row %		58.4	41.6	-	100.0	74.8	25.2	-	100.0
	Col %		13.6	5.0	-	7.6	22.8	7.4	-	12.3
Medium	Row %		74.4	25.6	-	100.0	32.6	41.7	25.7	100.0
	Col %		11.5	2.0	-	5.0	4.1	5.1	7.2	5.1
Large	Row %		63.0	37.0	-	100.0	75.4	12.6	12.1	100.0
	Col %		13.4	4.1	-	7.0	47.3	7.6	16.8	25.2
Total	Row %		32.6	63.3	4.1	100.0	40.2	41.7	18.2	100.0
	Col %		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-Member										
Landless	Row %		42.3	56.4	1.3	100.0	69.3	17.6	13.1	100.0
	Col %		12.1	25.8	2.4	16.1	28.1	20.5	25.4	26.1
Marginal	Row %		73.1	15.9	11.0	100.0	70.1	28.2	1.7	100.0
	Col %		44.5	15.5	42.0	34.1	21.0	24.3	2.4	19.3
Small	Row %		34.9	61.3	3.8	100.0	64.7	25.7	9.6	100.0
	Col %		12.8	36.0	8.7	20.6	27.2	31.1	19.5	27.1
Semi-medium	Row %		42.9	41.6	15.5	100.0	50.7	17.1	32.2	100.0
	Col %		10.0	15.5	22.7	13.1	7.8	7.5	23.6	9.8
Medium	Row %		63.9	7.4	28.8	100.0	48.3	2.4	49.4	100.0
	Col %		7.9	1.5	22.1	6.9	5.2	0.7	25.6	6.9
Large	Row %		76.4	21.5	2.1	100.0	63.1	32.5	4.4	100.0
	Col %		12.8	5.8	2.2	9.4	10.7	15.8	3.6	10.9
Total	Row %		56.0	35.0	9.0	100.0	64.3	22.3	13.4	100.0
	Col %		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households										
Landless	Row %		28.6	70.6	0.8	100.0	62.9	21.8	15.3	100.0
	Col %		9.6	24.3	1.9	15.8	24.4	16.9	22.5	22.0
Marginal	Row %		47.6	42.9	9.5	100.0	40.7	45.6	13.7	100.0
	Col %		38.5	35.6	50.9	38.0	17.0	38.2	21.8	23.7
Small	Row %		44.0	52.3	3.7	100.0	61.3	29.3	9.4	100.0
	Col %		19.3	23.5	10.6	20.6	23.8	22.7	13.9	22.0
Semi-medium	Row %		47.0	41.6	11.4	100.0	59.4	20.0	20.6	100.0
	Col %		10.9	10.0	17.6	11.0	11.1	7.5	14.6	10.6
Medium	Row %		67.2	13.0	19.8	100.0	44.4	12.2	43.5	100.0
	Col %		8.8	1.8	17.2	6.2	5.0	2.7	18.6	6.4
Large	Row %		72.2	26.4	1.4	100.0	69.4	22.3	8.3	100.0
	Col %		13.0	4.9	1.7	8.5	18.8	12.0	8.6	15.3
Total	Row %		47.1	45.8	7.1	100.0	56.7	28.4	14.9	100.0
	Col %		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Reason code : No surplus milk production - 1, No milk production - 2, Others - 3.

Table 5.81 : Percentage of Cow Milk Sold to and Price Received from Different Purchasing Agencies

Zone	Membership	Quantity Sold (000' lt/day)	Percentage of milk sold to					Average price received. ( Rs. per litre )						
			1	2	3	4	5	<	1	2	3	4	5	Total
East Zone	Member	301	59.52	0.00	0.00	20.92	19.56	6.67	-	-	-	7.90	6.40	6.64
	Non-member	125	12.70	0.00	0.00	51.38	35.92	6.49	-	-	-	8.00	8.40	7.65
	All households	426	45.76	0.00	0.00	29.87	24.37	6.65	-	-	-	8.03	7.28	6.93
North Zone	Member	1127	68.29	0.00	0.00	1.26	30.45	6.48	-	-	-	7.10	8.70	6.53
	Non-member	547	23.57	0.92	13.08	3.74	58.69	6.10	7.00	8.90	8.90	6.60	8.96	8.12
	All households	1674	53.67	0.30	4.27	2.07	39.68	6.43	7.00	8.90	8.90	6.80	8.94	7.04
South Zone	Member	9112	69.81	0.00	0.00	8.82	21.37	7.70	-	-	-	8.60	7.40	7.70
	Non-member	1770	35.99	4.32	6.92	13.78	38.99	6.10	7.35	8.05	8.05	8.60	8.28	7.29
	All households	10882	64.31	0.70	1.13	9.63	24.24	7.60	7.35	8.05	8.05	8.60	8.23	7.67
West Zone	Member	2801	70.44	0.07	0.05	16.56	12.88	6.49	7.86	7.50	7.50	7.90	7.90	6.50
	Non-member	162	25.27	23.31	12.71	19.35	19.36	6.08	6.50	7.50	7.50	6.60	7.70	6.57
	All households	2964	67.96	1.34	0.74	16.71	13.24	6.48	6.52	7.54	7.54	7.25	7.71	6.51
ALL ZONES	Member	13341	69.58	0.01	0.01	10.08	20.31	7.24	7.86	7.50	7.50	8.40	7.32	7.25
	Non-member	2605	31.59	4.58	8.24	13.83	41.76	6.15	7.18	8.14	8.14	8.22	8.62	7.45
	All households	15946	63.38	0.76	1.36	10.69	23.82	7.19	7.18	8.14	8.14	8.29	8.47	7.32

Agency codes : DCS =1, Others =2, Private dairy = 3, Households/Sweet shop/Dairy shop =4 and Duddiya = 5

Table 5.82 : Percentage of Buffalo Milk Sold to and Price Received from Different Purchasing Agencies

Zone	Membership	Quantity Sold (000' lt/day)	Percentage of milk sold to					Average price received ( Rs. per litre )					
			1	2	3	4	5	1	2	3	4	5	Total
<b>East Zone</b>													
	Member	127	80.49	-	-	-	19.51	7.81	-	-	-	7.81	7.81
	Non-member	75	4.98	-	-	77.81	17.21	7.60	-	-	8.94	9.30	8.91
	All households	202	52.27	-	-	29.08	18.65	7.80	-	-	8.94	9.25	8.19
<b>North Zone</b>													
	Member	3984	74.01	1.05	0.61	1.73	22.60	8.17	7.20	9.68	8.50	8.20	9.20
	Non-member	4009	13.75	13.75	5.30	17.32	49.88	8.02	8.10	9.50	10.00	8.30	8.80
	All households	7993	43.79	7.42	2.96	9.55	36.28	8.15	8.05	9.48	9.83	8.32	8.46
<b>South Zone</b>													
	Member	4085	78.77	-	-	1.79	19.44	7.81	-	-	8.09	8.48	7.81
	Non-member	841	35.55	9.18	4.49	23.49	27.29	7.79	8.85	8.30	7.43	8.49	7.98
	All households	4925	71.39	1.57	0.77	5.50	20.77	7.81	8.85	8.30	7.62	8.49	7.83
<b>West Zone</b>													
	Member	5870	77.88	-	0.39	0.35	21.38	7.95	-	8.45	8.77	8.78	7.98
	Non-member	499	34.21	3.78	13.19	17.75	31.07	7.53	8.92	8.57	7.89	8.31	7.95
	All households	6369	74.46	0.30	1.39	1.71	22.14	7.94	8.92	8.54	8.05	8.58	7.97
<b>ALL ZONES</b>													
	Member	14066	77.06	0.30	0.34	1.16	21.14	7.96	7.20	9.18	8.34	8.49	7.98
	Non-member	5424	18.89	11.93	5.83	19.16	44.19	7.88	8.25	9.23	9.28	8.34	8.60
	All households	19490	60.88	3.54	1.86	6.17	27.55	7.95	8.19	9.22	9.16	8.36	8.12
Agency codes : DCS =1, Others =2, Private dairy = 3, Households/Sweet shop/Dairy shop =4 and Dudhiya = 5													

Agency codes : DCS =1, Others =2, Private dairy = 3, Households/Sweet shop/Dairy shop =4 and Dudhiya = 5



Table 5.91 : Distribution of Milk-selling Households by Agency and Reasons for Choice of Cow Milk

Zone	Membership	Agency	1	2	3	Reasons for choice of agency					9	Total
			4	5	6	7	8					
East zone	Member	DCS	65.0	10.3	1.3	3.7	0.0	0.0	0.0	18.3	1.3	100.0
		Hhd/DS/SSH	39.9	0.0	20.3	0.0	0.0	0.0	0.0	0.0	39.8	100.0
		Dudhiya	16.9	0.0	0.0	0.0	27.4	12.4	4.6	0.0	38.7	100.0
		Total	56.5	8.4	1.7	3.0	4.4	2.0	0.7	14.9	8.5	100.0
	Non-member	DCS	57.4	2.6	13.6	0.0	0.0	0.0	0.0	26.3	0.0	100.0
		Hhd/DS/SSH	46.7	24.8	4.9	0.0	16.3	7.3	0.0	0.0	0.0	100.0
		Dudhiya	17.7	4.1	0.5	0.0	42.3	17.5	5.8	0.0	12.0	100.0
		Total	38.8	14.1	4.9	0.0	22.3	9.5	2.0	4.5	4.0	100.0
	All households	DCS	64.1	9.4	2.7	3.3	0.0	0.0	0.0	19.3	1.2	100.0
		Hhd/DS/SSH	46.1	22.6	6.3	0.0	14.9	6.6	0.0	0.0	3.5	100.0
		Dudhiya	17.4	2.3	0.3	0.0	35.8	15.3	5.3	0.0	23.6	100.0
		Total	49.7	10.6	2.9	1.8	11.3	4.9	1.2	10.9	6.8	100.0
North zone	Member	DCS	54.5	3.0	10.9	25.3	0.0	0.0	0.0	6.2	0.0	100.0
		Hhd/DS/SSH	12.9	69.3	0.0	0.0	0.0	17.8	0.0	0.0	0.0	100.0
		Dudhiya	2.9	31.0	0.0	0.0	22.8	14.8	21.6	6.9	0.0	100.0
		Total	51.2	6.0	10.1	23.6	1.0	1.1	1.0	6.1	0.0	100.0
	Non-member	DCS	38.6	18.3	25.0	0.0	0.0	0.0	0.0	18.2	0.0	100.0
		Private Dairy	20.0	0.0	80.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	37.8	0.0	42.0	0.0	10.0	0.0	10.1	0.0	0.0	100.0
		Dudhiya	21.5	6.2	12.3	0.0	28.8	8.4	22.8	0.0	0.0	100.0
	All households	Others	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
		Total	51.2	6.0	10.1	23.6	1.0	1.1	1.0	6.1	0.0	100.0
		DCS	51.6	5.8	13.5	20.7	0.0	0.0	0.0	8.4	0.0	100.0
		Private Dairy	20.0	0.0	80.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Hhd/DS/SSH	28.0	27.4	25.4	0.0	6.1	7.0	6.1	0.0	0.0	100.0	
	Dudhiya	18.8	9.8	10.5	0.0	27.9	9.4	22.6	1.0	0.0	100.0	
	Others	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	
	Total	51.2	6.0	10.1	23.6	1.0	1.1	1.0	6.1	0.0	100.0	
South zone	Member	DCS	44.9	10.8	23.6	14.1	0.0	0.0	0.0	5.5	1.1	100.0
		Hhd/DS/SSH	46.5	23.6	8.6	0.0	12.1	0.0	8.2	0.0	1.0	100.0
		Dudhiya	1.8	14.2	1.8	0.0	38.3	43.9	0.0	0.0	0.0	100.0
		Total	42.5	11.0	22.3	13.4	2.1	2.4	0.0	5.2	1.1	100.0
	Non-member	DCS	48.9	21.4	24.9	0.0	0.0	0.0	0.0	4.8	0.0	100.0
		Private Dairy	28.4	17.2	54.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	19.6	28.8	23.4	0.0	8.7	0.0	19.5	0.0	0.0	100.0
		Dudhiya	36.0	6.2	7.1	0.0	16.0	19.2	13.6	0.0	2.0	100.0
	All households	Others	32.5	17.9	12.1	0.0	0.0	26.2	11.3	0.0	0.0	100.0
		Total	37.9	17.8	21.9	0.0	5.9	6.5	7.5	2.0	0.6	100.0
		DCS	45.4	12.1	23.7	12.4	0.0	0.0	0.0	5.4	1.0	100.0
		Private Dairy	28.4	17.2	54.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Hhd/DS/SSH	20.6	28.6	22.9	0.0	8.9	0.0	19.0	0.0	0.0	100.0	
	Dudhiya	23.2	9.2	5.1	0.0	24.3	28.5	8.5	0.0	1.3	100.0	
	Others	32.5	17.9	12.1	0.0	0.0	26.2	11.3	0.0	0.0	100.0	
	Total	41.4	12.7	22.2	10.1	3.0	3.4	1.8	4.4	0.9	100.0	
West zone	Member	DCS	70.1	6.3	9.6	7.3	0.0	0.0	0.0	5.7	1.0	100.0
		Private Dairy	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	6.3	4.9	0.7	0.0	17.6	3.3	59.2	1.7	6.3	100.0
		Dudhiya	0.0	0.0	0.0	0.0	0.0	0.0	62.4	0.0	37.6	100.0
	Non-member	Others	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
		Total	68.3	6.2	9.4	7.1	0.4	0.2	1.6	5.6	1.2	100.0
		DCS	95.5	0.0	1.4	0.0	0.0	0.0	0.0	0.0	3.2	100.0
		Private Dairy	0.0	0.0	0.0	0.0	44.0	15.7	15.7	0.0	24.5	100.0
	All households	Hhd/DS/SSH	29.9	16.7	9.5	0.0	0.0	31.0	6.3	0.0	6.6	100.0
		Dudhiya	81.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.6	100.0
		Others	35.3	10.1	8.3	0.0	0.0	46.3	0.0	0.0	0.0	100.0
		Total	62.5	5.4	3.9	0.0	3.9	13.4	3.2	0.0	7.7	100.0
	DCS	71.0	6.1	9.3	7.0	0.0	0.0	0.0	5.5	1.1	100.0	
	Private Dairy	6.6	0.0	0.0	0.0	41.2	14.7	14.7	0.0	22.9	100.0	
	Hhd/DS/SSH	17.6	10.5	4.9	0.0	9.2	16.5	34.0	0.9	6.5	100.0	
	Dudhiya	72.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	20.8	100.0	
ALL ZONES	Member	Others	27.7	8.0	6.5	0.0	0.0	57.8	0.0	0.0	0.0	100.0
		Total	67.8	6.2	9.0	6.5	0.7	1.3	1.7	5.2	1.7	100.0
		DCS	53.5	8.8	17.8	13.0	0.0	0.0	0.0	6.0	1.0	100.0
		Private Dairy	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Non-member	Hhd/DS/SSH	37.9	22.6	7.1	0.0	12.0	1.6	15.8	0.3	2.8	100.0
		Dudhiya	7.3	13.3	0.7	0.0	29.7	24.5	8.6	1.8	14.2	100.0
		Others	0.0	0.0	0.0	0.0	0.0	27.1	0.0	0.0	72.9	100.0
		Total	51.3	9.1	16.9	12.3	1.4	1.1	0.5	5.8	1.6	100.0
	All households	DCS	51.4	18.4	22.5	0.0	0.0	0.0	0.0	7.5	0.3	100.0
		Private Dairy	24.5	12.6	54.9	0.0	3.5	1.3	1.3	0.0	2.0	100.0
		Hhd/DS/SSH	27.8	24.5	19.2	0.0	9.4	5.3	13.1	0.0	0.8	100.0
		Dudhiya	31.8	5.8	7.8	0.0	21.3	15.4	15.1	0.0	2.8	100.0
	Others	30.1	15.1	10.5	0.0	0.0	35.7	8.6	0.0	0.0	100.0	
	Total	37.9	15.0	19.4	0.0	8.3	7.9	7.4	2.9	1.2	100.0	
	DCS	53.2	9.8	18.3	11.6	0.0	0.0	0.0	6.2	0.9	100.0	
	Private Dairy	24.9	12.5	54.6	0.0	3.5	1.3	1.3	0.0	2.0	100.0	
	Hhd/DS/SSH	29.6	24.1	17.0	0.0	9.8	4.6	13.6	0.0	1.2	100.0	
	Dudhiya	23.9	8.2	5.5	0.0	24.0	18.3	13.0	0.6	6.5	100.0	
	Others	29.4	14.8	10.3	0.0	0.0	35.5	8.4	0.0	1.6	100.0	
	Total	48.2	10.5	17.5	9.4	3.0	2.6	2.1	5.1	1.5	100.0	

Note:- Price related to quality=1, Fairness in quality/quantity measurement=2, Sale convenient=3, Bonus incentives=4  
Purchaser collects milk from home=5, Immediate payment=6, Advance payment=7, Sense of belonging=8, Others=9

**Table 5.92 : Distribution of Milk-selling Households by Agency and Reasons for Choice of Buffalo Milk**

Zone	Membership	Agency	Reasons for choice of agency									Total	
			1	2	3	4	5	6	7	8	9		
East zone													
	Member	DCS	74.4	2.3	2.2	19.9	0.0	0.0	0.0	1.2	0.0	100.0	
		Total	74.4	2.3	2.2	19.9	0.0	0.0	0.0	1.2	0.0	100.0	
	Non-member	DCS	60.5	0.0	0.0	0.0	0.0	0.0	0.0	39.5	0.0	100.0	
		Hhd/DS/SSh	42.4	18.3	0.0	0.0	1.9	10.2	10.2	6.8	10.2	100.0	
		Dudhiya	37.3	47.6	4.5	0.0	6.2	4.5	0.0	0.0	0.0	100.0	
		Total	43.3	20.1	0.5	0.0	2.3	8.7	8.2	8.6	8.2	100.0	
	All households	DCS	73.5	2.2	2.1	18.6	0.0	0.0	0.0	3.6	0.0	100.0	
		Hhd/DS/SSh	42.4	18.3	0.0	0.0	1.9	10.2	10.2	6.8	10.2	100.0	
		Dudhiya	37.3	47.6	4.5	0.0	6.2	4.5	0.0	0.0	0.0	100.0	
		Total	60.3	10.4	1.4	10.9	1.0	4.0	3.7	4.6	3.7	100.0	
	North zone												
		Member	DCS	54.2	3.4	12.3	21.5	0.0	0.0	0.0	8.5	0.1	100.0
Private Dairy			0.0	0.0	0.0	0.0	0.0	31.6	68.4	0.0	0.0	100.0	
Hhd/DS/SSh			13.1	37.3	29.0	0.0	5.6	0.0	0.0	15.1	0.0	100.0	
Dudhiya			16.9	15.2	0.0	0.0	5.4	6.2	56.3	0.0	0.0	100.0	
Others			62.8	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
Total			51.0	5.2	11.7	19.3	0.4	0.5	3.7	8.0	0.1	100.0	
Non-member		DCS	57.9	7.1	15.7	0.0	0.0	0.0	0.0	19.4	0.0	100.0	
		Private Dairy	9.0	9.0	51.8	0.0	0.0	9.0	15.7	0.0	5.5	100.0	
		Hhd/DS/SSh	41.1	5.4	11.2	0.0	13.6	1.8	27.0	0.0	0.0	100.0	
		Dudhiya	10.9	5.7	3.3	0.0	37.6	12.2	29.5	0.8	0.0	100.0	
		Others	40.9	0.0	9.7	0.0	0.0	33.9	5.8	0.0	9.7	100.0	
		Total	27.7	5.5	13.8	0.0	19.2	13.2	18.5	1.3	0.9	100.0	
All households	DCS	54.9	4.1	13.0	17.1	0.0	0.0	0.0	10.7	0.1	100.0		
	Private Dairy	8.0	8.0	46.0	0.0	0.0	11.6	21.6	0.0	4.9	100.0		
	Hhd/DS/SSh	37.2	9.8	13.6	0.0	12.5	1.5	23.2	2.1	0.0	100.0		
	Dudhiya	11.6	6.8	2.9	0.0	33.9	11.5	32.6	0.7	0.0	100.0		
	Others	44.8	6.7	7.9	0.0	0.0	27.8	4.8	0.0	7.9	100.0		
	Total	39.4	5.3	12.7	9.8	9.7	6.8	11.0	4.7	0.5	100.0		
South zone													
	Member	DCS	60.8	14.0	11.2	9.9	0.0	0.0	0.0	3.2	0.8	100.0	
		Hhd/DS/SSh	68.6	0.0	0.0	0.0	0.0	22.6	8.9	0.0	0.0	100.0	
		Dudhiya	0.0	0.0	0.0	0.0	0.0	76.9	23.1	0.0	0.0	100.0	
		Total	60.3	13.3	10.6	9.4	0.0	1.9	0.7	3.0	0.8	100.0	
	Non-member	DCS	75.3	2.6	13.6	0.0	0.0	0.0	0.0	8.5	0.0	100.0	
		Private Dairy	76.8	0.0	23.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
		Hhd/DS/SSh	37.5	17.5	19.0	0.0	0.0	23.8	2.2	0.0	0.0	100.0	
		Dudhiya	11.9	10.5	3.7	0.0	4.0	17.6	41.8	0.0	10.5	100.0	
		Others	71.1	14.4	14.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
		Total	49.3	9.5	13.1	0.0	1.0	10.7	10.9	3.0	2.6	100.0	
	All households	DCS	62.0	13.1	11.4	9.1	0.0	0.0	0.0	3.7	0.8	100.0	
		Private Dairy	76.8	0.0	23.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
Hhd/DS/SSh		49.9	10.5	11.4	0.0	0.0	23.3	4.8	0.0	0.0	100.0		
Dudhiya		9.8	8.7	3.0	0.0	3.3	28.0	38.6	0.0	8.7	100.0		
Others		71.1	14.4	14.4	0.0	0.0	0.0	0.0	0.0	0.0	100.0		
Total		58.2	12.5	11.1	7.6	0.2	3.6	2.6	3.0	1.1	100.0		
West zone													
	Member	DCS	80.9	9.4	2.6	2.4	0.0	0.0	0.0	3.6	1.2	100.0	
		Private Dairy	14.3	0.0	0.0	0.0	0.0	0.0	58.2	0.0	27.5	100.0	
		Hhd/DS/SSh	41.6	10.6	2.3	0.0	0.0	14.6	20.4	10.6	0.0	100.0	
		Dudhiya	1.3	0.0	0.0	0.0	60.2	3.5	34.0	0.0	1.1	100.0	
		Total	77.9	9.1	2.5	2.3	1.9	0.2	1.4	3.5	1.3	100.0	
	Non-member	DCS	86.0	0.0	2.6	0.0	0.0	0.0	0.0	8.5	2.9	100.0	
		Private Dairy	47.5	0.0	11.2	0.0	0.0	16.7	24.5	0.0	0.0	100.0	
		Hhd/DS/SSh	91.2	0.0	0.0	0.0	0.0	1.9	5.0	0.0	1.9	100.0	
		Dudhiya	45.7	0.0	0.0	0.0	4.3	2.2	36.4	0.0	11.4	100.0	
		Others	27.3	56.5	3.6	0.0	0.0	12.6	0.0	0.0	0.0	100.0	
	All households	Total	75.5	2.8	2.2	0.0	0.6	3.1	9.1	3.3	3.4	100.0	
		DCS	81.1	9.0	2.6	2.2	0.0	0.0	0.0	3.8	1.3	100.0	
Private Dairy		37.9	0.0	8.0	0.0	0.0	11.9	34.3	0.0	8.0	100.0		
Hhd/DS/SSh		85.5	1.2	0.3	0.0	0.0	3.3	6.8	1.2	1.7	100.0		
Dudhiya		17.5	0.0	0.0	0.0	39.8	3.0	34.8	0.0	4.8	100.0		
ALL ZONES	Member	Others	27.3	56.5	3.6	0.0	0.0	12.6	0.0	0.0	0.0	100.0	
		Total	77.6	8.4	2.4	2.0	1.7	0.5	2.3	3.5	1.5	100.0	
		Non-member	DCS	68.3	9.5	7.5	9.3	0.0	0.0	0.0	4.6	0.8	100.0
			Private Dairy	8.4	0.0	0.0	0.0	0.0	13.0	62.4	0.0	16.2	100.0
			Hhd/DS/SSh	52.6	9.9	7.0	0.0	1.3	16.4	8.1	4.7	0.0	100.0
	Dudhiya		7.9	6.6	0.0	0.0	28.7	14.1	42.2	0.0	0.5	100.0	
	Others		62.8	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
	Total	65.9	9.5	7.2	8.7	0.9	0.8	1.7	4.4	0.8	100.0		
	Non-member	DCS	68.3	4.4	12.3	0.0	0.0	0.0	0.0	14.3	0.6	100.0	
		Private Dairy	29.7	5.2	36.7	0.0	0.0	9.6	15.5	0.0	3.2	100.0	
		Hhd/DS/SSh	52.0	8.6	9.7	0.0	5.6	8.6	13.5	0.6	1.4	100.0	
		Dudhiya	13.3	6.3	3.2	0.0	30.5	12.3	31.5	0.6	2.2	100.0	
Others		48.4	10.5	10.4	0.0	0.0	21.5	3.5	0.0	5.7	100.0		
Total	41.0	6.5	9.6	0.0	12.5	8.4	15.6	4.5	1.9	100.0			
All households	DCS	68.3	9.0	8.0	8.4	0.0	0.0	0.0	5.5	0.8	100.0		
	Private Dairy	26.5	4.4	31.1	0.0	0.0	10.1	22.7	0.0	5.2	100.0		
	Hhd/DS/SSh	52.2	8.9	9.1	0.0	4.7	10.3	12.3	1.5	1.1	100.0		
	Dudhiya	12.3	6.4	2.6	0.0	30.2	12.7	33.6	0.5	1.9	100.0		
	Others	50.0	13.6	9.2	0.0	0.0	19.0	3.1	0.0	5.1	100.0		
Total	59.4	8.7	7.8	6.5	3.9	2.8	5.3	4.4	1.1	100.0			

Note:- Price related to quality=1, Fairness in quality/quantity measurement=2, Sale convenient=3, Bonus incentives=4  
Purchaser collects milk from home=5, Immediate payment=6, Advance payment=7, Sense of belonging=8, Others=9



**Table 5.101 : Percentage Distribution of Milk-selling MAHs by Agency and Basis of Payment**

Zone	Membership	Agency	1	2	3	4	Total
East zone							
	Member	DCS	97.1	2.9	0.0	0.0	100.0
		Hhd/DS/SSH	0.0	100.0	0.0	0.0	100.0
		Dudhiya	1.3	48.4	50.4	0.0	100.0
		Total	78.8	13.1	8.1	0.0	100.0
	Non-member	DCS	92.3	7.7	0.0	0.0	100.0
		Hhd/DS/SSH	13.8	27.4	54.7	4.1	100.0
		Dudhiya	1.9	55.7	28.0	14.4	100.0
		Total	23.6	33.4	36.2	6.8	100.0
	All households	DCS	96.6	3.5	0.0	0.0	100.0
		Hhd/DS/SSH	12.6	33.8	49.9	3.7	100.0
		Dudhiya	1.6	52.5	37.7	8.1	100.0
		Total	57.6	20.9	18.9	2.6	100.0
North zone							
	Member	DCS	88.5	4.5	0.4	6.7	100.0
		Hhd/DS/SSH	17.8	12.9	0.0	69.3	100.0
		Dudhiya	17.3	47.5	35.3	0.0	100.0
		Total	83.5	6.6	1.9	8.0	100.0
	Non-member	DCS	65.4	16.3	18.3	0.0	100.0
		Private Dairy	100.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	0.0	62.2	37.8	0.0	100.0
		Dudhiya	9.9	49.1	39.8	1.2	100.0
	All households	Others	100.0	0.0	0.0	0.0	100.0
		Total	39.6	32.5	27.4	0.5	100.0
		DCS	84.2	6.6	3.7	5.4	100.0
		Private Dairy	100.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	7.0	42.7	22.9	27.4	100.0
		Dudhiya	11.0	48.9	39.1	1.0	100.0
		Others	100.0	0.0	0.0	0.0	100.0
		Total	67.8	15.9	11.1	5.3	100.0
South zone							
	Member	DCS	85.0	7.9	7.0	0.1	100.0
		Hhd/DS/SSH	0.0	16.0	83.1	1.0	100.0
		Dudhiya	0.0	14.2	85.9	0.0	100.0
		Others	0.0	0.0	0.0	100.0	100.0
	Non-member	Total	79.4	8.3	11.9	0.4	100.0
		DCS	77.1	4.1	18.8	0.0	100.0
		Private Dairy	66.2	0.0	33.8	0.0	100.0
		Hhd/DS/SSH	2.3	27.6	70.1	0.0	100.0
	All households	Dudhiya	46.1	16.0	36.8	1.2	100.0
		Others	80.0	8.8	11.3	0.0	100.0
		Total	55.6	11.0	33.1	0.3	100.0
		DCS	84.0	7.4	8.5	0.1	100.0
		Private Dairy	66.2	0.0	33.8	0.0	100.0
		Hhd/DS/SSH	1.1	21.7	76.7	0.5	100.0
		Dudhiya	41.4	15.8	41.8	1.1	100.0
		Others	69.8	7.6	9.9	12.7	100.0
	Total	73.6	9.0	17.1	0.4	100.0	
West zone							
	Member	DCS	95.6	2.1	0.1	2.2	100.0
		Private Dairy	100.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	6.3	16.0	77.7	0.0	100.0
		Dudhiya	0.0	100.0	0.0	0.0	100.0
	Non-member	Others	100.0	0.0	0.0	0.0	100.0
		Total	93.2	2.5	2.1	2.1	100.0
		DCS	72.4	24.2	0.0	3.4	100.0
		Private Dairy	53.7	14.9	31.4	0.0	100.0
	All households	Hhd/DS/SSH	5.4	39.7	38.3	16.7	100.0
		Dudhiya	8.5	87.6	3.9	0.0	100.0
		Others	91.7	8.3	0.0	0.0	100.0
		Total	45.2	34.6	14.0	6.2	100.0
		DCS	94.8	2.9	0.1	2.2	100.0
		Private Dairy	56.7	13.9	29.4	0.0	100.0
		Hhd/DS/SSH	5.9	27.3	58.9	8.0	100.0
		Dudhiya	7.5	89.0	3.5	0.0	100.0
		Others	93.5	6.5	0.0	0.0	100.0
		Total	89.6	5.0	3.0	2.4	100.0
ALL ZONES							
	Member	DCS	88.7	5.8	4.3	1.3	100.0
		Private Dairy	100.0	0.0	0.0	0.0	100.0
		Hhd/DS/SSH	2.1	17.9	75.4	4.7	100.0
		Dudhiya	4.9	36.5	58.6	0.0	100.0
	Non-member	Others	27.1	0.0	0.0	72.9	100.0
		Total	83.5	6.8	8.2	1.6	100.0
		DCS	75.2	8.0	16.5	0.3	100.0
		Private Dairy	71.7	1.2	27.1	0.0	100.0
	All households	Hhd/DS/SSH	4.9	31.5	60.7	2.9	100.0
		Dudhiya	31.3	30.7	35.8	2.3	100.0
		Others	83.5	7.9	8.6	0.0	100.0
		Total	49.4	18.5	30.8	1.3	100.0
		DCS	87.2	6.0	5.6	1.2	100.0
		Private Dairy	71.8	1.2	27.0	0.0	100.0
		Hhd/DS/SSH	3.6	25.4	67.3	3.7	100.0
		Dudhiya	27.1	31.6	39.4	1.9	100.0
		Others	76.1	6.9	7.5	9.6	100.0
		Total	75.8	9.4	13.3	1.5	100.0

Note:- Fat & SNF-1, Cow/buffalso milk basis-2, Volume/weight basis=3, Others=4

Table 5.102 : Percentage Distribution of Milk-selling MAHs by Agency and Frequency of Payment

Zone	Membership	Agency	1	2	3	Frequency of payment	4	5	6	7	Total
East zone											
	Member	DCS	5.6	4.7	45.2	40.0	0.0	0.0	0.0	4.6	100.0
		Hhd/DS/SSH	39.8	0.0	0.0	0.0	0.0	0.0	60.2	100.0	
		Dudhiya	31.0	0.8	14.9	45.9	0.0	7.4	0.0	100.0	
		Total	10.7	3.9	39.0	39.7	0.0	1.2	5.5	100.0	
	Non-member	DCS	37.7	0.0	18.7	38.9	0.0	0.0	4.8	100.0	
		Hhd/DS/SSH	5.3	0.7	13.6	16.7	24.6	14.9	24.2	100.0	
		Dudhiya	16.0	3.0	20.7	42.8	3.0	1.1	13.4	100.0	
		Total	14.5	1.4	16.9	29.3	13.1	7.7	17.2	100.0	
	All households	DCS	9.4	4.1	42.0	39.8	0.0	0.0	4.6	100.0	
		Hhd/DS/SSH	8.3	0.7	12.4	15.2	22.4	13.6	27.4	100.0	
		Dudhiya	22.5	2.0	18.2	44.1	1.7	3.9	7.6	100.0	
		Total	12.2	2.9	30.5	35.7	5.0	3.7	10.0	100.0	
North zone											
	Member	DCS	8.7	4.3	18.1	65.1	2.7	0.0	1.1	100.0	
		Hhd/DS/SSH	30.7	0.0	69.3	0.0	0.0	0.0	0.0	100.0	
		Dudhiya	2.9	2.6	23.6	14.4	0.0	56.6	0.0	100.0	
		Total	9.0	4.1	19.7	61.2	2.5	2.5	1.0	100.0	
	Non-member	DCS	21.7	18.3	20.2	38.3	1.5	0.0	0.0	100.0	
		Private Dairy	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	
		Hhd/DS/SSH	0.0	0.0	25.0	10.0	42.0	23.0	0.0	100.0	
		Dudhiya	41.8	8.2	4.0	6.0	0.0	39.1	0.9	100.0	
		Others	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	
		Total	26.9	10.5	11.2	28.3	3.5	19.2	0.4	100.0	
	All households	DCS	11.1	6.9	18.5	60.1	2.5	0.0	0.9	100.0	
		Private Dairy	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	
Hhd/DS/SSH		12.1	0.0	42.5	6.1	25.4	13.9	0.0	100.0		
Dudhiya		35.9	7.3	7.0	7.3	0.0	41.7	0.8	100.0		
Others		0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0		
Total		15.4	6.4	16.6	49.4	2.8	8.5	0.8	100.0		
South zone											
	Member	DCS	4.8	2.2	50.5	10.5	29.9	0.0	2.1	100.0	
		Hhd/DS/SSH	8.5	2.1	29.1	13.6	22.6	4.6	19.5	100.0	
		Dudhiya	1.8	0.0	96.4	0.0	1.8	0.0	0.0	100.0	
		Others	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	
		Total	5.0	2.1	49.7	10.6	29.1	0.3	3.2	100.0	
	Non-member	DCS	4.3	5.4	68.0	3.5	11.5	0.0	7.3	100.0	
		Private Dairy	0.0	20.6	62.1	0.0	17.2	0.0	0.0	100.0	
		Hhd/DS/SSH	11.9	0.0	39.0	13.7	10.4	12.8	12.3	100.0	
		Dudhiya	11.2	11.3	61.5	0.0	10.2	5.8	0.0	100.0	
		Others	37.5	0.0	10.9	35.3	16.4	0.0	0.0	100.0	
		Total	8.4	7.4	58.6	5.2	11.7	3.7	5.1	100.0	
	All households	DCS	4.7	2.6	52.8	9.6	27.5	0.0	2.8	100.0	
Private Dairy		0.0	20.6	62.1	0.0	17.2	0.0	0.0	100.0		
Hhd/DS/SSH		10.2	1.0	33.9	13.7	16.6	8.7	15.9	100.0		
Dudhiya		10.2	10.2	65.1	0.0	9.3	5.2	0.0	100.0		
Others		32.7	0.0	9.5	30.8	14.3	0.0	12.7	100.0		
Total		5.8	3.4	51.9	9.3	24.9	1.1	3.7	100.0		
West zone											
	Member	DCS	6.3	0.2	6.6	53.8	23.5	3.1	6.4	100.0	
		Private Dairy	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	
		Hhd/DS/SSH	33.6	7.0	6.5	0.0	0.0	52.9	0.0	100.0	
		Dudhiya	0.0	0.0	37.6	0.0	62.4	0.0	0.0	100.0	
		Others	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	
		Total	7.0	0.4	6.7	52.4	22.9	4.4	6.2	100.0	
	Non-member	DCS	45.3	3.4	1.4	33.5	16.5	0.0	0.0	100.0	
		Private Dairy	0.0	0.0	68.6	15.7	0.0	15.7	0.0	100.0	
		Hhd/DS/SSH	36.4	4.3	28.5	4.9	5.2	0.0	20.8	100.0	
		Dudhiya	20.3	3.9	0.0	0.0	18.6	0.0	57.1	100.0	
		Others	0.0	0.0	47.5	17.3	35.3	0.0	0.0	100.0	
		Total	32.4	3.2	18.0	18.5	13.5	1.4	13.0	100.0	
All households	DCS	7.7	0.3	6.4	53.1	23.3	3.0	6.1	100.0		
	Private Dairy	0.0	0.0	70.6	14.7	0.0	14.7	0.0	100.0		
	Hhd/DS/SSH	34.9	5.7	17.0	2.3	2.5	27.7	9.9	100.0		
	Dudhiya	18.0	3.5	4.3	0.0	23.7	0.0	50.6	100.0		
	Others	0.0	0.0	37.3	35.1	27.7	0.0	0.0	100.0		
	Total	8.9	0.6	7.5	49.9	22.2	4.1	6.7	100.0		
ALL ZONES											
	Member	DCS	5.6	1.9	35.0	28.7	24.6	0.9	3.3	100.0	
		Private Dairy	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	
		Hhd/DS/SSH	14.7	2.7	27.0	10.3	17.1	12.1	16.2	100.0	
		Dudhiya	12.1	0.9	48.0	19.6	2.1	17.2	0.0	100.0	
		Others	0.0	0.0	0.0	27.1	0.0	0.0	72.9	100.0	
		Total	6.1	1.9	34.8	27.8	23.9	1.6	3.9	100.0	
	Non-member	DCS	11.8	7.3	52.6	13.2	9.8	0.0	5.3	100.0	
		Private Dairy	0.0	15.1	50.8	20.3	12.6	1.3	0.0	100.0	
		Hhd/DS/SSH	12.6	0.7	31.4	13.0	15.0	12.4	14.9	100.0	
		Dudhiya	20.3	9.5	40.4	5.3	7.1	14.3	3.2	100.0	
		Others	28.5	0.0	15.4	38.3	17.8	0.0	0.0	100.0	
		Total	14.1	7.2	43.6	12.3	10.4	6.6	5.8	100.0	
All households	DCS	6.3	2.5	36.9	27.0	23.0	0.8	3.5	100.0		
	Private Dairy	0.0	15.0	51.1	20.2	12.5	1.3	0.0	100.0		
	Hhd/DS/SSH	13.5	1.6	29.4	11.8	15.9	12.3	15.5	100.0		
	Dudhiya	19.0	8.2	41.6	7.5	6.3	14.8	2.7	100.0		
	Others	24.8	0.0	13.4	36.8	15.4	0.0	9.6	100.0		
	Total	7.9	3.1	36.8	24.3	20.9	2.7	4.3	100.0		

Note:- Daily=1, Twice a week=2, weekly=3, Once in 10 days=4, Fortnightly=5, In advance=6, Others=7

**Table 5.103 : Percentage Distribution of Milk-selling MAHs by Agency and Mode of Payment**

Zone	Membership	Agency	1	Mode of 2	payment 3	Total
East zone						
	Member	DCS	71.2	28.4	0.4	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Total	76.7	23.0	0.3	100.0
	Non-member	DCS	66.8	33.2	0.0	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Total	94.2	5.8	0.0	100.0
	All households	DCS	70.7	29.0	0.3	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Total	83.4	16.4	0.2	100.0
North zone						
	Member	DCS	67.5	28.0	4.5	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	92.6	7.4	0.0	100.0
		Total	69.5	26.3	4.2	100.0
	Non-member	DCS	59.7	24.0	16.2	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	93.8	0.4	5.8	100.0
		Others	100.0	0.0	0.0	100.0
		Total	82.0	9.2	8.7	100.0
	All households	DCS	66.1	27.2	6.7	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	93.6	1.5	4.9	100.0
		Others	100.0	0.0	0.0	100.0
		Total	74.0	20.2	5.8	100.0
South zone						
	Member	DCS	87.6	11.1	1.3	100.0
		Hhd/DS/SSh	96.9	2.2	1.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	0.0	0.0	100.0	100.0
		Total	88.1	10.5	1.5	100.0
	Non-member	DCS	84.6	15.4	0.0	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	100.0	0.0	0.0	100.0
		Total	93.4	6.6	0.0	100.0
	All households	DCS	87.2	11.6	1.1	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	98.4	1.1	0.5	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	87.3	0.0	12.7	100.0
		Total	89.4	9.5	1.1	100.0
West zone						
	Member	DCS	83.1	12.0	5.0	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	100.0	0.0	0.0	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	100.0	0.0	0.0	100.0
		Total	83.6	11.6	4.8	100.0
	Non-member	DCS	90.3	9.7	0.0	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	93.4	4.9	1.7	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	100.0	0.0	0.0	100.0
		Total	93.9	5.6	0.5	100.0
	All households	DCS	83.4	11.9	4.8	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	96.8	2.3	0.8	100.0
		Dudhiya	100.0	0.0	0.0	100.0
		Others	100.0	0.0	0.0	100.0
		Total	84.4	11.2	4.5	100.0
ALL ZONES						
	Member	DCS	84.0	13.4	2.6	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	97.6	1.6	0.7	100.0
		Dudhiya	98.1	1.9	0.0	100.0
		Others	27.1	0.0	72.9	100.0
		Total	84.7	12.7	2.6	100.0
	Non-member	DCS	80.2	17.0	2.8	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	99.2	0.6	0.2	100.0
		Dudhiya	98.3	0.1	1.6	100.0
		Others	100.0	0.0	0.0	100.0
		Total	91.4	6.9	1.6	100.0
	All households	DCS	83.5	13.8	2.6	100.0
		Private Dairy	100.0	0.0	0.0	100.0
		Hhd/DS/SSh	98.5	1.1	0.4	100.0
		Dudhiya	98.3	0.4	1.3	100.0
		Others	90.4	0.0	9.6	100.0
		Total	86.2	11.4	2.4	100.0

Note:- Only cash-1, Cash and cattle feed-2, Others-3

Table 5.104 : Percentage Distribution of Milk-selling MAHs by Distance of Sale and Mode of Transport

Zone	Membership	Distance (kilometre)				Mode of Transport						
		< Within village	1-5	>=6	Total	< On foot	Bycycle	Motor-cycle	camel-catr	Bus/Railways	Others	Total
East zone	Member	82.0	13.0	5.0	100.0	80.7	15.8	0.0	0.0	0.0	3.4	100.0
	Non-Member	67.2	27.0	5.8	100.0	76.0	18.6	0.2	0.0	3.0	2.3	100.0
	All households	75.9	18.8	5.3	100.0	78.8	17.0	0.1	0.0	1.2	3.0	100.0
North zone	Member	92.9	5.7	1.3	100.0	95.3	2.7	0.6	1.2	0.0	0.3	100.0
	Non-Member	94.1	5.4	0.5	100.0	82.1	8.4	0.0	0.0	0.0	9.5	100.0
	All households	93.3	5.7	1.0	100.0	89.4	5.3	0.3	0.6	0.0	4.4	100.0
South zone	Member	69.8	27.2	3.0	100.0	86.6	12.1	0.0	0.0	0.5	0.9	100.0
	Non-Member	64.0	30.4	5.6	100.0	81.4	16.6	0.0	0.0	0.0	2.0	100.0
	All households	68.5	28.0	3.6	100.0	85.4	13.1	0.0	0.0	0.4	1.1	100.0
West zone	Member	95.8	4.0	0.2	100.0	91.7	4.8	0.6	0.0	0.4	2.5	100.0
	Non-Member	96.7	2.8	0.6	100.0	77.7	4.6	0.0	0.0	0.6	17.1	100.0
	All households	95.9	3.9	0.3	100.0	90.2	4.8	0.6	0.0	0.4	4.1	100.0
ALL ZONES	Member	83.2	15.0	1.8	100.0	89.6	8.1	0.3	0.2	0.4	1.5	100.0
	Non-Member	79.9	17.0	3.1	100.0	80.9	12.0	0.0	0.0	0.3	6.9	100.0
	All households	82.5	15.5	2.1	100.0	87.5	9.0	0.2	0.1	0.3	2.8	100.0

Table 6.1 : Percentage Distribution of MAHs by Factors Relating to Grazing of Animal

Zone	Place of grazing						Distance (Km.)		
	<----->		<----->		<----->		<----->		
	Own land	Panchayat/ Govt. land	Forest	Others	No grazing	Up to 2	2-4	4-6	Above 6
<b>East zone</b>									
Member	9.60	37.66	1.06	7.45	44.23	78.11	20.33	1.56	0.01
Non-member	6.81	36.89	4.99	6.41	44.90	55.94	43.62	0.00	0.44
All households	8.39	37.33	2.77	7.00	44.52	68.42	30.51	0.89	0.18
<b>North zone</b>									
Member	20.67	11.19	1.39	1.77	64.98	59.14	33.04	7.10	0.72
Non-member	17.48	6.97	1.19	3.51	70.85	73.74	19.58	4.49	2.19
All households	19.01	9.00	1.29	2.67	68.03	65.92	26.79	5.89	1.40
<b>South zone</b>									
Member	55.28	12.34	13.38	8.81	10.19	69.72	25.28	1.14	3.86
Non-member	38.59	19.97	24.50	6.55	10.38	59.37	30.34	1.45	8.84
All households	51.31	14.16	16.03	8.27	10.23	67.23	26.50	1.22	5.05
<b>West zone</b>									
Member	24.87	14.62	5.23	4.18	51.10	60.02	34.88	4.93	0.18
Non-member	35.67	16.43	16.14	3.33	28.43	71.89	27.46	0.53	0.12
All households	26.74	14.93	7.12	4.03	47.18	62.91	33.07	3.86	0.16
<b>ALL ZONES</b>									
Member	37.35	13.62	8.13	5.93	34.96	66.42	28.40	2.66	2.52
Non-member	27.63	14.57	12.15	4.65	41.01	64.95	28.13	1.78	5.14
All households	34.53	13.89	9.30	5.56	36.72	66.00	28.31	2.42	3.27

Table 6.2 : Percentage Distribution of MAHS by Factors Relating to Grazing of Animals

Zone	Frequency			Duration of grazing									
	Daily	Alternate	Others	<-----All animals----->	<-----All milch animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->	<-----All in-milk animals----->
		day		Full day	2-6 hrs.	< 2 hrs.	Full day	2-6 hrs.	< 2 hrs.	Full day	2-6 hrs.	< 2 hrs.	< 2 hrs.
<b>East zone</b>													
Member	89.06	8.44	2.50	3.34	43.86	1.83	2.01	33.17	13.69	0.93	1.18	0.00	0.00
Non-member	88.43	2.13	9.44	11.15	24.76	3.70	1.41	42.22	15.64	0.00	1.13	0.00	0.00
All households	88.79	5.67	5.54	6.79	35.44	2.65	1.73	37.17	14.54	0.51	1.16	0.00	0.00
<b>North zone</b>													
Member	61.25	37.95	0.81	15.40	28.29	10.71	2.87	17.86	12.42	1.42	10.45	0.58	0.58
Non-member	57.87	41.43	0.71	8.16	24.92	15.72	9.69	13.87	21.33	1.53	3.24	1.53	1.53
All households	59.65	39.59	0.76	11.97	26.70	13.08	6.10	15.97	16.63	1.46	7.05	1.05	1.05
<b>South zone</b>													
Member	77.90	15.96	6.14	6.51	20.20	2.28	8.59	16.08	12.36	10.69	17.88	5.40	5.40
Non-member	68.46	19.85	11.69	4.79	22.16	1.78	9.41	15.17	21.88	4.10	18.10	2.61	2.61
All households	75.63	16.90	7.48	6.10	20.67	2.16	8.79	15.86	14.66	9.10	17.94	4.72	4.72
<b>West zone</b>													
Member	72.87	9.40	17.73	9.99	13.75	2.91	14.72	12.73	1.83	12.65	31.27	0.15	0.15
Non-member	92.22	4.72	3.06	18.40	38.20	1.82	19.14	10.01	3.73	2.62	5.91	0.16	0.16
All households	77.42	8.30	14.28	11.99	19.54	2.67	15.76	12.08	2.30	10.27	25.26	0.14	0.14
<b>ALL ZONES</b>													
Member	75.28	15.87	8.85	8.20	19.59	3.20	9.67	15.64	9.45	10.23	20.63	3.39	3.39
Non-member	72.62	20.03	7.34	8.91	26.55	4.82	11.37	14.85	17.31	3.05	11.44	1.70	1.70
All households	74.56	17.00	8.44	8.40	21.50	3.64	10.13	15.43	11.60	8.25	18.12	2.94	2.94

Table 6.3 : Percentage Distribution of MAHs by Source of Fodder and Place of Growing Home-produced Fodder

Zone	<-----Source----->			<-----Place of growing *----->					
	Home produced	Purchased	Both	Others	1	2	3	4	5
East zone									
Member	17.06	21.41	57.85	3.68	43.60	18.39	26.32	3.74	7.95
Non-member	11.48	36.35	47.75	4.42	44.56	14.79	17.92	6.31	16.42
All households	14.63	27.91	53.46	4	43.99	16.91	22.86	4.81	11.43
North zone									
Member	36.86	10.9	48.67	3.57	56.02	7.35	27.81	3.80	5.02
Non-member	35.61	14.97	43.12	6.3	54.79	6.56	28.04	2.79	7.81
All households	36.21	13.01	45.79	4.99	55.39	6.95	27.92	3.29	6.44
South zone									
Member	25.91	27.83	43.17	3.09	45.83	15.68	27.81	6.43	4.26
Non-member	24.26	35.8	35.61	4.33	45.67	18.48	18.66	11.64	5.55
All households	25.52	29.73	41.37	3.38	45.79	16.30	25.80	7.57	4.54
West zone									
Member	16.84	16.22	65.95	0.99	49.44	13.46	32.29	2.54	2.27
Non-member	24.55	15.2	59.07	1.18	49.46	11.67	33.20	1.45	4.22
All households	18.18	16.04	64.76	1.02	49.44	13.15	32.44	2.36	2.61
ALL ZONES									
Member	24.1	20.65	52.84	2.41	48.87	13.49	29.49	4.44	3.70
Non-member	28.53	23.1	43.79	4.58	50.46	11.64	25.76	5.41	6.73
All households	25.39	21.36	50.22	3.03	49.32	12.97	28.45	4.71	4.55

\*Place of growing : Cultivable land-1, Bund-2, Both-3, Non-cultivable fellow-4, Others-5.

**Table 6.4 : Percentage of Purchased to Total Feed/Fodder Fed to Cattle and Buffaloes**

Zone	Membership	Green Fodder	Dry Fodder	Grains	Oil Seed Cakes	Others
<b>East zone</b>	Member	10.1	31.4	21.0	46.3	5.4
	Non-member	16.9	45.3	31.4	56.3	2.4
	All households	13.1	37.4	25.5	50.7	4.1
<b>North zone</b>	Member	10.9	17.1	14.8	37.8	7.3
	Non-member	14.4	20.6	15.0	41.9	4.8
	All households	12.7	18.9	14.9	39.9	6.0
<b>South zone</b>	Member	31.2	37.2	13.2	58.6	1.1
	Non-member	39.2	48.7	14.7	69.1	1.5
	All households	33.1	40.0	13.5	61.1	1.2
<b>West zone</b>	Member	20.4	34.1	8.1	54.8	0.8
	Non-member	16.4	32.6	6.3	45.6	0.4
	All households	19.7	33.9	7.8	53.2	0.7
<b>ALL ZONES</b>	Member	23.4	32.7	11.7	53.6	2.1
	Non-member	23.3	33.6	14.0	52.5	2.8
	All households	23.4	33.0	12.4	53.3	2.3

Note : BCF is mostly purchased from DCSs and nearby markets by RVHs



Table 6.5 : Average Feed-Fodder Fed Per Animal Per Day (Kgs.)

Zone	Membership	Feed/Fodder Type	Quantity fed per animal per day (kgs.)						
			Cows	Buffaloes	Cows In milk	Buffaloes In milk	Young Stock	Other Bovines	All Bovines
-----									
East zone	Member	Green fodder	6.52	5.89	6.76	5.89	1.94	3.44	3.99
		Dry fodder	6.88	6.13	6.82	6.13	2.22	6.15	4.80
		Grains	0.49	0.80	0.51	0.80	0.18	0.66	0.42
		Oil seed cakes	0.67	0.89	0.66	0.89	0.17	0.91	0.53
		BCF	1.37	3.87	1.46	3.87	0.46	0.17	0.90
	Others	0.90	0.10	0.95	0.10	0.45	0.81	0.65	
	Non-member	Green fodder	6.79	5.53	6.83	5.53	2.29	3.65	4.22
		Dry fodder	7.58	6.25	7.59	6.27	2.35	6.04	5.04
		Grains	0.71	0.76	0.74	0.75	0.19	0.86	0.54
		Oil seed cakes	0.85	0.91	0.83	0.90	0.19	0.68	0.55
BCF		0.89	0.84	0.95	0.84	0.33	0.12	0.50	
Others	0.53	0.00	0.58	0.00	0.14	0.56	0.34		
North zone	All households	Green fodder	6.61	5.73	6.78	5.73	2.07	3.51	4.07
		Dry fodder	7.12	6.18	7.09	6.19	2.27	6.11	4.89
		Grains	0.57	0.78	0.59	0.78	0.18	0.73	0.46
		Oil seed cakes	0.73	0.90	0.72	0.89	0.18	0.83	0.54
		BCF	1.21	2.52	1.28	2.52	0.41	0.15	0.75
	Others	0.78	0.05	0.82	0.05	0.34	0.72	0.54	
	Member	Green fodder	12.14	15.66	12.63	16.14	3.07	9.55	9.29
		Dry fodder	9.31	11.21	9.30	11.15	2.40	8.62	6.96
		Grains	0.99	1.07	1.03	1.08	0.16	0.55	0.63
		Oil seed cakes	0.56	0.77	0.57	0.79	0.06	0.13	0.39
BCF		1.13	1.00	1.30	1.04	0.05	0.01	0.55	
Others	0.23	0.08	0.30	0.09	0.01	0.17	0.08		
South zone	Non-member	Green fodder	13.23	17.23	13.85	17.57	4.02	10.87	10.77
		Dry fodder	9.80	10.72	9.56	10.58	2.96	8.67	7.21
		Grains	1.13	1.11	1.22	1.15	0.14	0.63	0.68
		Oil seed cakes	0.71	0.95	0.75	0.98	0.04	0.16	0.49
		BCF	1.15	1.10	1.31	1.08	0.02	0.01	0.59
	Others	0.09	0.16	0.11	0.21	0.03	0.11	0.09	
	All households	Green fodder	12.59	16.44	13.15	16.84	3.50	10.06	9.97
		Dry fodder	9.51	10.97	9.41	10.87	2.66	8.64	7.08
		Grains	1.04	1.09	1.11	1.12	0.15	0.58	0.65
		Oil seed cakes	0.86	0.99	0.64	0.89	0.05	0.14	0.43
BCF		1.14	1.05	1.30	1.06	0.03	0.01	0.57	
Others	0.17	0.12	0.22	0.15	0.02	0.15	0.09		
South zone	Member	Green fodder	6.87	8.54	6.87	8.70	2.50	4.33	5.04
		Dry fodder	8.44	8.91	8.47	8.79	3.11	6.39	6.11
		Grains	0.44	0.76	0.46	0.74	0.25	0.35	0.40
		Oil seed cakes	1.19	0.73	1.23	0.75	0.28	0.42	0.65
		BCF	1.36	0.67	1.34	0.63	0.16	0.17	0.61
	Others	0.03	0.09	0.03	0.09	0.00	0.00	0.02	
	Non-member	Green fodder	7.59	9.08	7.49	9.13	2.35	3.78	5.07
		Dry fodder	7.84	10.63	7.87	10.71	2.59	3.71	5.45
		Grains	0.44	0.71	0.45	0.74	0.19	0.44	0.37
		Oil seed cakes	1.54	0.80	1.48	0.84	0.27	0.55	0.77
BCF		0.60	0.88	0.60	0.67	0.10	0.32	0.39	
Others	0.03	0.13	0.02	0.11	0.00	0.00	0.03		
South zone	All households	Green fodder	7.01	8.63	7.00	8.77	2.47	4.23	5.04
		Dry fodder	8.32	9.21	8.34	9.11	3.00	5.91	5.98
		Grains	0.44	0.75	0.45	0.74	0.24	0.36	0.40
		Oil seed cakes	1.25	0.74	1.29	0.76	0.28	0.44	0.67
		BCF	1.21	0.71	1.18	0.64	0.15	0.19	0.57
	Others	0.03	0.09	0.03	0.09	0.00	0.00	0.02	

Table 6.5 : (Cont...)

Zone	Membership	Feed/Fodder Type	Quantity fed per animal per day (kgs.)							
			Cows	Buffaloes	Cows In milk	Buffaloes In milk	Young Stock	Other Bovines	All Bovines	
West zone										
Member	Green fodder	Green fodder	9.76	11.13	9.60	11.67	3.52	5.36	7.48	
		Dry fodder	8.90	8.81	9.17	8.70	3.96	6.49	6.84	
		Grains	0.50	0.68	0.48	0.67	0.09	0.06	0.36	
		Oil seed cakes	0.83	1.29	0.86	1.32	0.14	0.19	0.66	
		BCF	1.32	1.00	1.41	1.10	0.17	0.28	0.69	
	Non-member	Others	0.08	0.04	0.08	0.05	0.01	0.01	0.03	
		Green fodder	7.27	7.66	8.03	9.12	2.03	5.63	5.12	
		Dry fodder	7.93	9.22	8.24	9.71	2.83	8.06	6.38	
		Grains	0.13	0.29	0.18	0.46	0.23	0.14	0.20	
		Oil seed cakes	0.61	1.05	0.83	1.59	0.06	0.52	0.49	
All zones	Member	BCF	0.66	0.37	0.77	0.50	0.03	0.07	0.25	
		Others	0.01	0.00	0.01	0.00	0.00	0.00	0.00	
		Green fodder	9.38	10.70	9.43	11.44	3.28	5.43	7.10	
		Dry fodder	8.75	8.86	9.07	8.79	3.78	6.89	6.76	
		Grains	0.44	0.63	0.45	0.65	0.11	0.08	0.34	
	All households	Oil seed cakes	0.79	1.26	0.86	1.34	0.13	0.27	0.64	
		BCF	1.22	0.93	1.34	1.05	0.15	0.23	0.62	
		Others	0.07	0.03	0.07	0.04	0.01	0.01	0.03	
		Member	Green fodder	8.28	11.61	8.26	11.90	2.89	5.22	6.61
			Dry fodder	8.62	9.51	8.69	9.41	3.17	6.68	6.47
Grains	0.53		0.82	0.53	0.81	0.19	0.31	0.44		
Oil seed cakes	1.00		0.97	1.04	0.98	0.19	0.34	0.60		
BCF	1.32		0.92	1.35	0.95	0.14	0.18	0.63		
Non-member	Others	Others	0.10	0.06	0.10	0.07	0.02	0.06	0.05	
		Green fodder	9.27	14.43	9.48	15.10	3.11	6.04	7.78	
		Dry fodder	8.46	10.44	8.42	10.45	2.79	6.40	6.43	
		Grains	0.62	0.92	0.68	1.01	0.17	0.42	0.50	
		Oil seed cakes	1.10	0.94	1.15	1.01	0.13	0.46	0.59	
	All households	BCF	0.80	0.96	0.86	0.95	0.06	0.16	0.47	
		Others	0.07	0.13	0.08	0.17	0.02	0.07	0.07	
		Green fodder	8.51	12.42	8.54	12.79	2.95	5.41	6.92	
		Dry fodder	8.58	9.78	8.63	9.70	3.07	6.61	6.46	
		Grains	0.55	0.85	0.57	0.87	0.18	0.33	0.45	
Non-member	Oil seed cakes	1.02	0.96	1.06	0.99	0.17	0.37	0.59		
	BCF	1.20	0.93	1.24	0.95	0.12	0.17	0.59		
	Others	0.09	0.08	0.10	0.10	0.02	0.06	0.06		

Table 6.6 : Percentage Distribution of Milch Animals by Feeding Practices and Type of Animal

Zone		Frequency of feeding/day			<--Type of feed --->			Type of feeding	
		Once	Twice	Thrice	Wet	Dry	Both	Group	Individual
East zone	All Cows								
		0.33	39.20	60.47	2.04	2.10	95.86	12.2	87.80
		2.99	53.27	43.74	5.41	4.64	89.95	17.59	82.41
	All households	1.23	43.97	54.80	3.18	2.96	93.86	14.03	85.97
	Crossbred								
		0.66	33.02	66.32	3.25	2.13	94.62	11.93	88.07
		3.53	34.08	62.39	12.10	2.11	85.79	18.34	81.66
	All households	1.35	33.28	65.37	5.38	2.12	92.50	13.47	86.53
	Desi Cows								
		-	45.36	54.64	0.84	2.06	97.10	12.47	87.53
		2.75	61.81	35.44	2.43	5.76	91.81	17.25	82.75
	All households	1.14	52.18	46.68	1.50	3.60	94.90	14.46	85.54
North zone	Buffaloes								
		-	73.12	26.88	-	-	100.00	31.05	68.95
		-	90.48	9.52	-	3.60	96.40	6.81	93.19
	All households	-	80.87	19.13	-	1.61	98.39	20.24	79.76
	All Cows								
		-	30.76	69.24	1.87	9.43	88.70	66.68	33.32
		-	19.96	80.04	1.65	8.23	90.12	59.82	40.18
	All households	-	26.29	73.71	1.78	8.93	89.29	63.84	36.16
	Crossbred								
		-	25.38	74.62	1.64	1.89	96.47	80.23	19.77
		-	9.85	90.15	0.61	0.94	98.45	70.23	29.77
	All households	-	19.31	80.69	1.24	1.52	97.24	76.32	23.68
Desi Cows									
	-	32.37	67.63	1.94	11.69	86.37	62.62	37.38	
	-	22.64	77.36	1.91	10.17	87.92	57.07	42.93	
All households	-	28.28	71.72	1.93	11.05	87.02	60.28	39.72	
South zone	Buffaloes								
		-	17.16	82.84	6.82	3.95	89.23	66.52	33.48
		-	18.62	81.38	2.45	5.34	92.21	67.76	32.24
	All households	-	17.88	82.12	4.67	4.63	90.70	67.13	32.87
	All Cows								
		5.03	47.83	47.14	1.92	14.09	83.99	26.76	73.24
		6.64	27.29	66.07	1.60	15.19	83.21	38.54	61.46
	All households	5.35	43.80	50.85	1.85	14.31	83.84	29.07	70.93
	Crossbred								
		2.75	55.19	42.06	1.59	12.43	85.98	27.16	72.84
		6.55	27.39	66.06	3.77	10.04	86.19	47.67	52.33
	All households	3.22	51.77	45.01	1.86	12.13	86.01	29.68	70.32
Desi Cows									
	7.86	38.70	53.44	2.32	16.16	81.52	26.27	73.73	
	6.68	27.24	66.08	0.59	17.59	81.82	34.28	65.72	
All households	7.54	35.59	56.87	1.85	16.55	81.60	28.45	71.55	
Buffaloes									
	17.38	33.67	48.95	0.77	5.94	93.29	52.96	47.04	
	7.28	49.30	43.42	-	8.90	91.10	51.59	48.41	
All households	15.58	36.45	47.97	0.63	6.47	92.90	52.71	47.29	

Table 6.6 : (Cont...)

Zone		Frequency of feeding/day			<--Type of feed -->			Type of feeding	
		Once	Twice	Thrice	Wet	Dry	Both	Group	Individual
West zone	All Cows								
		2.98	13.89	83.13	6.53	21.25	72.22	9.63	90.37
		0.72	49.04	50.24	0.14	58.26	41.60	13.05	86.95
	All households	2.63	19.28	78.09	5.54	26.93	67.53	10.15	89.85
	Crossbred								
		-	9.38	90.62	6.55	11.10	82.35	8.60	91.40
		-	12.61	87.39	-	33.50	66.50	9.83	90.17
	All households	-	9.62	90.38	6.06	12.77	81.17	8.69	91.31
ALL ZONES	Desi Cows								
		5.86	18.25	75.89	6.49	31.09	62.42	10.62	89.38
		0.93	59.21	39.86	0.18	65.17	34.65	13.96	86.04
	All households	4.79	27.19	68.02	5.12	38.52	56.36	11.35	88.65
	Buffaloes								
		0.51	15.58	83.91	2.74	23.17	74.09	4.30	95.70
		0.28	43.42	56.30	0.41	50.87	48.72	11.59	88.41
	All households	0.48	19.03	80.49	2.46	26.60	70.94	5.20	94.80
	All Cows								
		3.70	36.71	59.59	3.08	14.91	82.01	27.24	72.76
		3.45	29.76	66.79	1.60	19.07	79.33	40.14	59.86
	All households	3.64	35.11	61.25	2.74	15.86	81.40	30.20	69.80
	Crossbred								
		1.82	41.08	57.10	2.90	11.11	85.99	25.26	74.74
		3.94	21.66	74.40	3.04	10.26	86.70	46.61	53.39
	All households	2.11	38.37	59.52	2.92	10.99	86.09	28.24	71.76
	Desi Cows								
		5.53	32.45	62.02	3.26	18.61	78.13	29.16	70.84
		3.27	32.73	64.00	1.07	22.30	76.63	37.78	62.22
	All households	4.85	32.53	62.62	2.60	19.72	77.68	31.75	68.25
	Buffaloes								
		5.45	21.82	72.73	3.29	12.36	84.35	36.87	63.13
		1.21	27.89	70.00	1.74	12.37	85.89	56.48	43.52
	All households	4.23	23.57	72.20	2.85	12.36	84.79	42.53	57.47

**Table 6.7 : Percentage Distribution of RMAHs Reporting Non-availability of Enough Feed/Fodder and Reasons for it**

Zone	Membership	Percentage	Distribution by reasons		
			Insufficient	High price	Others
<b>East zone</b>					
	Member	44.2	13.7	84.2	2.1
	Non-member	53.0	10.7	89.3	0.0
	All households	48.1	12.2	86.7	1.1
<b>North zone</b>					
	Member	21.1	30.2	55.3	14.5
	Non-member	21.9	44.3	43.1	12.6
	All households	21.5	37.6	48.9	13.5
<b>South zone</b>					
	Member	41.8	30.5	65.9	3.6
	Non-member	54.2	18.0	77.3	4.7
	All households	44.8	26.9	69.2	3.9
<b>West zone</b>					
	Member	27.9	26.4	70.2	3.4
	Non-member	51.1	27.0	67.7	5.3
	All households	31.9	26.6	69.5	3.9
<b>ALL ZONES</b>					
	Member	33.4	28.6	66.8	4.6
	Non-member	40.1	25.7	68.0	6.3
	All households	35.4	27.7	67.2	5.1

Table 6.8 : Percentage Distribution of RMAHs Reporting Major Factors Affecting Increased Fodder Production

Zone	Membership	<-----Distribution of RMAH by factors----->					Lack of Others irrigation
		Small holding	Lack of funds	Not profitable	Non-availability of quality seed	Lack of	
<b>East zone</b>							
	Member	22.8	19.8	27.5	10.2	13.4	6.3
	Non-member	25.3	20.1	30.7	7.9	9.6	6.5
	All households	23.9	20.0	28.9	9.1	11.7	6.5
<b>North zone</b>							
	Member	27.6	20.8	9.5	15.1	11.9	15.2
	Non-member	21.2	33.0	6.3	12.8	6.0	20.9
	All households	24.2	27.1	7.8	13.9	8.8	18.1
<b>South zone</b>							
	Member	30.4	19.2	17.7	3.7	21.7	7.2
	Non-member	33.3	24.0	19.7	3.1	15.4	4.6
	All households	31.1	20.4	18.2	3.6	20.2	6.6
<b>West zone</b>							
	Member	20.8	31.1	11.0	7.4	23.5	6.2
	Non-member	25.3	25.0	12.1	0.6	29.7	7.4
	All households	21.6	30.0	11.2	6.3	24.6	6.4
<b>ALL ZONES</b>							
	Member	26.2	23.9	14.2	7.1	20.6	8.1
	Non-member	26.3	27.8	13.1	6.9	13.8	12.1
	All households	26.2	25.0	13.9	7.0	18.6	9.3

Table 6.9 : Percentage Distribution of Labour Employed in Dairy Sector by Sex

Zone	Membership	Female children	Male children	Female adult	Male adult	Total
East zone	Member	1.7	5.7	19.9	72.7	100.0
	Non-member	1.2	6.5	17.8	74.5	100.0
	All households	1.5	6.0	19.1	73.4	100.0
North zone	Member	3.1	4.8	34.7	57.3	100.0
	Non-member	3.3	3.7	34.9	58.1	100.0
	All households	3.2	4.3	34.8	57.7	100.0
South zone	Member	1.0	4.1	26.2	68.7	100.0
	Non-member	1.9	7.0	23.1	68.0	100.0
	All households	1.2	4.7	25.6	68.5	100.0
West zone	Member	1.0	1.6	46.3	51.1	100.0
	Non-member	2.4	1.6	39.0	57.0	100.0
	All households	1.3	1.6	45.0	52.2	100.0
ALL ZONES	Member	1.6	3.4	35.7	59.3	100.0
	Non-member	2.8	4.1	32.7	60.4	100.0
	All households	1.9	3.6	34.8	59.7	100.0

Table 6.10 : Percentage Distribution of Labour Employed in Dairy Sector by Sex and Work Status

Zone	Membership	Family worker	Permanent servant	Casual labour	Total
		Female	Male	Female	Male
East zone	Member	20.2	71.9	0.4	3.1
	Non-member	18.3	78.0	0.7	3.0
	All households	19.5	74.3	0.5	3.0
North zone	Member	37.8	58.0	0.0	3.0
	Non-member	37.4	58.7	0.4	2.2
	All households	37.6	58.3	0.2	2.6
South zone	Member	25.3	60.7	0.6	6.7
	Non-member	23.1	68.4	0.0	1.5
	All households	24.9	62.3	0.5	5.6
West zone	Member	46.8	50.7	0.4	0.8
	Non-member	41.3	56.7	0.1	1.6
	All households	45.8	51.7	0.4	1.0
ALL ZONES	Member	36.3	56.5	0.4	3.5
	Non-member	34.6	60.9	0.3	2.0
	All households	35.8	57.9	0.4	3.0



Table 6.11 : Percentage Distribution of Labour Employed by Sex  
and Proportion of Hours Spent in Dairy Sector

Zone	Membership	Male	Female	Total
<b>East zone</b>				
	Member	58.0	47.0	55.7
	Non-member	66.2	50.8	63.5
	All households	61.1	48.3	58.7
<b>North zone</b>				
	Member	51.1	50.9	51.0
	Non-member	47.7	46.9	47.4
	All households	49.4	48.8	49.2
<b>South zone</b>				
	Member	65.2	60.3	63.9
	Non-member	65.8	71.3	67.2
	All households	65.4	62.4	64.6
<b>West zone</b>				
	Member	54.4	50.1	52.4
	Non-member	52.5	47.5	50.5
	All households	54.0	49.7	52.1
<b>ALL ZONES</b>				
	Member	57.8	53.0	56.1
	Non-member	53.1	50.5	52.2
	All households	56.3	52.2	54.8

**Table 7.11 : Percentage Distribution of Cost Components by Milch Animal-holding Size**

Zone/Membership	Components of cost	Animal-holding size				Total	
		1	2	3	>= 4		
East zone							
Member	Feed purchased	9.2	21.1	17.5	15.9	16.7	
	Feed home-produced	45.9	33.1	39.9	56.4	50.8	
	Labour hired	0.0	0.2	7.8	3.1	3.2	
	Labour-family	32.1	38.4	26.2	17.8	22.1	
	Equipment	2.0	2.5	2.4	2.0	2.1	
	Others	10.9	4.8	6.1	4.9	5.1	
	Total	100.0	100.0	100.0	100.0	100.0	
	Nonmember	Feed purchased	25.2	26.4	20.1	15.9	19.7
		Feed home-produced	32.1	29.0	31.1	53.5	43.2
		Labour hired	0.0	0.0	9.4	2.1	2.3
Labour-family		29.7	35.3	33.7	22.7	27.9	
Equipment		3.9	3.0	2.2	1.9	2.3	
Others		9.1	6.3	3.5	4.0	4.6	
Total		100.0	100.0	100.0	100.0	100.0	
All households	Feed purchased	13.6	24.0	18.5	15.9	17.8	
	Feed home-produced	42.1	30.9	36.7	55.5	48.0	
	Labour hired	0.0	0.1	8.4	2.8	2.9	
	Labour-family	31.4	36.7	29.0	19.4	24.2	
	Equipment	2.5	2.8	2.3	1.9	2.2	
	Others	10.4	5.6	5.2	4.6	5.0	
	Total	100.0	100.0	100.0	100.0	100.0	
	North zone						
	Member	Feed purchased	7.5	10.4	9.0	7.4	7.8
		Feed home-produced	32.4	42.3	52.2	62.9	59.6
Labour hired		2.2	1.5	0.7	2.1	1.9	
Labour-family		49.9	34.2	28.5	18.9	21.7	
Equipment		3.3	4.6	3.4	3.3	3.4	
Others		4.7	7.0	6.3	5.4	5.6	
Total		100.0	100.0	100.0	100.0	100.0	
Nonmember		Feed purchased	14.8	8.4	7.2	6.9	7.5
		Feed home-produced	25.9	52.9	49.3	65.2	60.2
		Labour hired	0.0	0.3	1.3	2.1	1.7
	Labour-family	41.6	29.5	28.9	16.6	20.6	
	Equipment	8.0	3.9	5.6	4.1	4.4	
	Others	9.8	5.0	7.6	5.2	5.6	
	Total	100.0	100.0	100.0	100.0	100.0	
All households	Feed purchased	12.6	9.2	8.1	7.2	7.6	
	Feed home-produced	27.9	48.4	50.8	64.0	59.9	
	Labour hired	0.7	0.8	1.0	2.1	1.8	
	Labour-family	44.1	31.5	28.7	17.9	21.2	
	Equipment	6.6	4.2	4.5	3.7	3.9	
	Others	8.3	5.9	6.9	5.3	5.6	
	Total	100.0	100.0	100.0	100.0	100.0	
	South zone						
	Member	Feed purchased	22.3	26.0	19.5	17.3	18.7
		Feed home-produced	32.2	37.0	57.3	54.8	52.3
Labour hired		3.4	3.8	2.1	5.2	4.8	
Labour-family		32.1	25.8	15.6	15.9	17.5	
Equipment		1.4	1.8	1.7	2.5	2.4	
Others		8.6	5.6	3.8	4.1	4.4	
Total		100.0	100.0	100.0	100.0	100.0	
Nonmember		Feed purchased	22.3	23.0	20.8	19.1	20.8
		Feed home-produced	28.0	40.7	47.3	49.7	45.3
		Labour hired	0.8	3.8	1.0	2.1	2.5
	Labour-family	43.6	25.4	23.3	19.6	23.2	
	Equipment	0.9	1.7	2.0	4.7	3.2	
	Others	4.4	5.4	5.7	4.9	5.1	
	Total	100.0	100.0	100.0	100.0	100.0	

Table 7.11 : (Contd..)

Zone/Membership	Components of cost	Animal-holding size				Total
		1	2	3	>= 4	
All households						
	Feed purchased	22.3	24.8	19.8	17.6	19.1
	Feed home-produced	30.9	38.4	55.2	54.2	51.0
	Labour hired	2.6	3.8	1.9	4.8	4.4
	Labour-family	35.6	25.7	17.2	16.4	18.5
	Equipment	1.3	1.8	1.8	2.8	2.5
	Others	7.3	5.5	4.2	4.2	4.5
	Total	100.0	100.0	100.0	100.0	100.0
West zone						
Member						
	Feed purchased	34.7	32.7	20.1	13.8	18.8
	Feed home-produced	37.3	39.7	56.1	71.0	62.0
	Labour hired	0.0	0.1	0.5	1.0	0.7
	Labour-family	22.5	19.3	15.2	9.5	12.5
	Equipment	2.4	3.6	4.3	1.9	2.6
	Others	3.2	4.5	3.9	2.9	3.3
	Total	100.0	100.0	100.0	100.0	100.0
Nonmember						
	Feed purchased	23.1	17.5	15.3	15.7	16.4
	Feed home-produced	35.3	48.4	61.5	62.6	57.8
	Labour hired	0.9	0.9	0.2	0.7	0.6
	Labour-family	32.0	26.7	17.1	16.4	19.6
	Equipment	3.5	2.3	3.2	2.0	2.4
	Others	5.3	4.3	2.7	2.7	3.2
	Total	100.0	100.0	100.0	100.0	100.0
All households						
	Feed purchased	32.0	30.5	19.2	14.0	18.5
	Feed home-produced	36.8	41.0	57.1	70.1	61.5
	Labour hired	0.2	0.2	0.4	0.9	0.7
	Labour-family	24.7	20.4	15.5	10.2	13.4
	Equipment	2.7	3.4	4.1	1.9	2.6
	Others	3.7	4.5	3.7	2.9	3.3
	Total	100.0	100.0	100.0	100.0	100.0
All zones						
Member						
	Feed purchased	23.0	26.2	17.0	13.3	15.6
	Feed home-produced	34.4	39.0	55.0	61.8	57.4
	Labour hired	1.8	1.7	1.2	3.0	2.6
	Labour-family	32.8	24.7	19.0	15.1	17.2
	Equipment	2.2	3.1	3.4	2.6	2.7
	Others	5.8	5.3	4.6	4.2	4.4
	Total	100.0	100.0	100.0	100.0	100.0
Nonmember						
	Feed purchased	17.5	16.5	11.8	9.8	11.6
	Feed home-produced	27.6	46.1	51.3	62.2	56.4
	Labour hired	0.3	1.7	1.3	2.0	1.8
	Labour-family	40.6	27.9	25.4	17.3	21.2
	Equipment	5.9	2.7	4.3	3.9	3.9
	Others	8.1	5.2	6.0	4.9	5.2
	Total	100.0	100.0	100.0	100.0	100.0
All households						
	Feed purchased	20.6	22.7	15.5	12.4	14.4
	Feed home-produced	31.3	41.5	53.9	61.9	57.1
	Labour hired	1.1	1.7	1.2	2.8	2.4
	Labour-family	36.3	25.9	20.9	15.7	18.4
	Equipment	3.9	3.0	3.6	2.9	3.1
	Others	6.8	5.3	5.0	4.4	4.7
	Total	100.0	100.0	100.0	100.0	100.0

**Table 7.12 : Percentage Distribution of Cost Components by Operational Land-holding Groups**

Zone/Membership	Components of cost	Operational land holding groups						Total
		Landless	Marginal	Small	Semi-medi	Medium	Large	
East zone								
Member	Feed purchased	25.6	15.3	16.2	17.0	10.5	29.1	16.7
	Feed home-produced	24.6	50.8	56.5	52.1	63.0	40.8	50.8
	Labour hired	1.0	4.7	2.0	5.9	0.0	0.0	3.2
	Labour-family	40.7	21.6	18.6	20.6	15.3	21.4	22.1
	Equipment	2.6	2.1	2.1	1.9	1.6	4.2	2.1
	Others	5.5	5.4	4.7	2.6	9.6	4.5	5.1
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Nonmember	Feed purchased	30.3	17.1	16.3	14.0	8.1	2.5
Feed home-produced		23.4	47.8	50.7	53.9	44.7	64.7	43.2
Labour hired		0.1	4.3	1.7	0.0	0.0	0.0	2.3
Labour-family		37.5	24.0	25.6	25.9	37.3	28.5	27.9
Equipment		2.8	2.2	1.9	2.5	4.8	2.1	2.3
Others		5.9	4.6	3.8	3.9	5.1	2.3	4.6
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households		Feed purchased	28.3	16.0	16.2	16.2	10.5	16.6
	Feed home-produced	23.9	49.6	54.8	52.5	62.5	52.1	48.0
	Labour hired	0.5	4.6	1.9	4.5	0.0	0.0	2.9
	Labour-family	38.9	22.6	20.7	21.9	15.9	24.7	24.2
	Equipment	2.7	2.1	2.0	2.0	1.7	3.2	2.2
	Others	5.7	5.1	4.4	2.9	9.5	3.5	5.0
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	North zone							
Member	Feed purchased	22.7	9.5	6.5	6.4	7.4	5.9	7.8
	Feed home-produced	28.9	53.1	64.7	58.2	58.4	66.2	59.6
	Labour hired	0.0	1.2	1.0	3.9	1.8	2.6	1.9
	Labour-family	36.9	26.7	19.9	21.8	23.0	16.5	21.7
	Equipment	5.1	3.4	2.7	4.2	4.4	3.1	3.4
	Others	6.4	6.2	5.2	5.5	5.0	5.7	5.6
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Nonmember	Feed purchased	14.4	10.4	6.8	3.3	7.3	5.1
Feed home-produced		39.6	55.2	61.1	69.0	65.6	64.5	60.2
Labour hired		0.0	0.2	1.4	1.0	1.7	4.8	1.7
Labour-family		33.5	23.8	20.4	16.7	19.3	15.1	20.6
Equipment		4.6	4.4	5.1	4.6	2.6	4.6	4.4
Others		8.0	6.1	5.2	5.5	3.6	6.0	5.6
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households		Feed purchased	17.1	9.9	6.6	4.7	7.3	5.6
	Feed home-produced	36.1	54.0	63.0	63.9	62.2	65.5	59.9
	Labour hired	0.0	0.7	1.2	2.4	1.7	3.5	1.8
	Labour-family	34.6	25.4	20.1	19.1	21.0	15.9	21.2
	Equipment	4.7	3.9	3.8	4.4	3.4	3.7	3.9
	Others	7.5	6.1	5.2	5.5	4.2	5.8	5.6
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	South zone							
Member	Feed purchased	32.5	21.4	12.9	13.4	12.7	16.8	18.7
	Feed home-produced	24.0	49.4	60.6	61.4	54.4	59.5	52.3
	Labour hired	2.9	3.2	3.7	6.6	6.7	7.8	4.8
	Labour-family	31.2	19.4	16.2	13.9	18.5	9.3	17.5
	Equipment	3.7	1.7	1.7	1.6	3.6	3.5	2.4
	Others	5.8	4.9	5.0	3.1	4.2	3.2	4.4
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Nonmember	Feed purchased	32.2	16.8	16.5	18.5	9.2	15.3
Feed home-produced		19.8	57.2	41.6	54.7	58.7	55.5	45.3
Labour hired		2.4	2.3	4.5	4.5	0.0	1.3	2.5
Labour-family		35.6	18.5	26.7	13.8	27.3	14.2	23.2
Equipment		3.8	1.1	4.2	2.1	3.1	8.2	3.2
Others		6.2	4.0	6.5	6.5	1.7	5.5	5.1
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households		Feed purchased	32.4	20.4	13.1	14.0	12.1	16.6
	Feed home-produced	22.7	51.2	59.3	60.6	55.1	59.0	51.0
	Labour hired	2.7	3.0	3.7	6.3	5.5	7.0	4.4
	Labour-family	32.6	19.2	16.9	13.9	20.1	9.9	18.5
	Equipment	3.7	1.6	1.8	1.7	3.5	4.1	2.5
	Others	5.9	4.7	5.1	3.5	3.7	3.5	4.5
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 7.12 : (Contd...)

Zone/Membership	Components of cost	Landless	Marginal	Operational land holding groups				Total
				Small	Semi-medi	Medium	Large	
West zone								
Member	Feed purchased	50.9	24.2	17.1	15.2	12.2	8.3	18.8
	Feed home-produced	13.8	53.9	64.4	70.4	75.0	74.0	62.0
	Labour hired	0.1	0.3	0.6	0.2	0.3	2.6	0.7
	Labour-family	24.6	15.3	11.6	10.4	8.1	9.0	12.5
	Equipment	3.8	2.6	3.1	1.5	1.8	2.9	2.6
	Others	6.8	3.8	3.1	2.3	2.6	3.2	3.3
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nonmember	Feed purchased	38.4	17.5	15.7	16.8	9.5	4.9	16.4
	Feed home-produced	26.3	52.8	58.7	61.0	62.5	77.9	57.8
	Labour hired	0.3	0.5	0.2	0.6	0.0	2.3	0.6
	Labour-family	27.3	24.0	19.3	16.3	23.5	9.9	19.6
	Equipment	2.7	1.9	3.1	2.5	1.5	2.2	2.4
	Others	5.0	3.3	3.0	2.9	3.0	2.8	3.2
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households								
	Feed purchased	48.0	23.5	16.9	15.4	11.8	8.0	18.5
	Feed home-produced	16.7	53.8	63.7	69.1	73.0	74.4	61.5
	Labour hired	0.1	0.3	0.6	0.2	0.3	2.6	0.7
	Labour-family	25.2	16.2	12.6	11.3	10.5	9.1	13.4
	Equipment	3.5	2.5	3.1	1.6	1.8	2.8	2.6
	Others	6.4	3.7	3.1	2.4	2.7	3.1	3.3
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All zones								
Member	Feed purchased	33.7	19.6	12.7	12.5	9.9	10.4	15.6
	Feed home-produced	23.2	51.9	63.0	63.8	61.7	65.7	57.4
	Labour hired	1.9	1.8	1.8	3.6	2.5	4.5	2.6
	Labour-family	31.4	19.6	15.7	14.6	18.0	12.1	17.2
	Equipment	3.9	2.4	2.5	2.2	3.5	3.2	2.7
	Others	6.1	4.8	4.4	3.4	4.3	4.2	4.4
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nonmember	Feed purchased	24.2	13.6	9.3	7.7	7.6	6.6	11.6
	Feed home-produced	29.7	55.1	59.0	65.5	64.8	64.4	56.4
	Labour hired	1.0	1.2	1.4	1.4	1.4	4.0	1.8
	Labour-family	34.2	22.2	20.8	16.4	20.2	14.5	21.2
	Equipment	4.0	3.0	4.6	3.9	2.6	4.9	3.9
	Others	6.9	5.0	4.9	5.2	3.4	5.6	5.2
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All households								
	Feed purchased	29.6	18.0	11.8	11.1	9.0	9.4	14.4
	Feed home-produced	25.9	52.7	62.0	64.3	63.0	65.4	57.1
	Labour hired	1.5	1.6	1.7	3.0	2.1	4.3	2.4
	Labour-family	32.6	20.3	17.0	15.1	18.9	12.7	18.4
	Equipment	3.9	2.6	3.0	2.7	3.1	3.7	3.1
	Others	6.4	4.8	4.5	3.9	4.0	4.5	4.7
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 7.21 : Cost Per Animal by Type and Milch Animal-holding Size

(Rs. per day)

Zone/Membership	Type of Bovine	1	2	3	Animal-holding size >=4	Total
East zone						
Member						
	Crossbred cow	33.31	31.92	32.88	29.30	29.86
	Desi cow	14.68	13.62	13.38	11.10	11.83
	Buffalo	0.00	26.02	25.88	19.51	22.50
	All Milch Animals	23.19	19.16	19.19	17.54	18.06
	Calves	0.00	15.51	13.99	10.56	11.67
	Other Bovines	0.00	0.00	22.36	18.36	18.60
Non-member						
	Crossbred cow	0.00	35.48	35.08	29.81	31.84
	Desi cow	16.78	15.86	13.49	12.72	13.91
	Buffalo	0.00	26.11	22.96	21.17	24.00
	All Milch Animals	16.74	19.56	16.93	15.64	17.18
	Calves	0.00	13.00	15.43	10.96	12.21
	Other Bovines	0.00	0.00	23.71	19.38	19.66
All households						
	Crossbred cow	33.31	33.61	33.36	29.38	30.26
	Desi cow	15.71	14.66	13.47	11.68	12.62
	Buffalo	0.00	26.07	24.75	20.05	23.17
	All Milch Animals	20.26	19.51	18.43	17.00	17.78
	Calves	0.00	14.14	14.56	10.68	11.86
	Other Bovines	0.00	0.00	22.86	18.72	18.98
North zone						
Member						
	Crossbred cow	31.09	32.11	31.68	30.41	30.62
	Desi cow	20.12	19.73	19.68	19.40	19.45
	Buffalo	37.27	34.39	34.75	30.38	31.27
	All Milch Animals	32.52	31.69	30.53	27.01	27.76
	Calves	0.00	22.49	19.20	10.36	11.59
	Other Bovines	0.00	0.00	28.52	24.71	24.97
Non-member						
	Crossbred cow	32.39	33.98	35.15	30.37	31.22
	Desi cow	15.72	13.14	13.00	18.97	17.64
	Buffalo	31.37	29.41	24.56	23.97	25.16
	All Milch Animals	29.70	28.07	21.84	23.12	23.88
	Calves	0.00	21.11	16.42	12.36	13.54
	Other Bovines	0.00	24.17	26.17	28.47	28.26
All households						
	Crossbred cow	31.69	32.76	33.59	30.39	30.87
	Desi cow	17.34	16.01	16.14	19.31	18.76
	Buffalo	34.47	31.90	29.16	26.85	27.91
	All Milch Animals	31.62	30.01	25.98	25.04	25.80
	Calves	0.00	21.67	17.68	11.24	12.48
	Other Bovines	0.00	24.17	27.49	26.13	26.23
South zone						
Member						
	Crossbred cow	32.69	21.37	18.73	21.86	21.93
	Desi cow	23.58	21.61	23.62	14.79	16.91
	Buffalo	28.92	21.75	24.47	20.53	21.18
	All Milch Animals	31.01	21.59	23.31	21.45	21.86
	Calves	0.00	11.54	9.38	7.39	8.01
	Other Bovines	0.00	46.61	13.76	13.04	13.22
Non-member						
	Crossbred cow	25.77	23.38	21.10	18.01	20.76
	Desi cow	16.49	17.45	12.03	9.97	12.63
	Buffalo	28.80	21.37	18.85	20.13	20.70
	All Milch Animals	23.48	19.45	16.31	14.37	16.46
	Calves	0.00	11.78	8.18	5.33	7.16
	Other Bovines	0.00	0.00	18.99	8.86	9.68

Table 7.21 :(Contd...)

Zone/Membership	Type of Bovine	Milch Animal-holding size				Total
		1	2	3	>=4	
All households						
	Crossbred cow	30.74	21.88	19.10	21.64	21.82
	Desi cow	21.74	21.47	20.00	13.33	15.72
	Buffalo	28.88	21.60	23.15	20.48	21.09
	All Milch Animals	28.93	21.36	21.65	20.09	20.66
	Calves	0.00	11.63	9.13	7.02	7.83
	Other Bovines	0.00	46.61	15.47	12.32	12.59
West zone						
Member						
	Crossbred cow	27.51	22.64	24.66	23.07	23.49
	Desi cow	14.68	13.94	13.22	11.74	12.26
	Buffalo	24.33	22.29	19.01	19.70	20.37
	All Milch Animals	20.27	21.31	19.04	17.34	18.56
	Calves	0.00	9.36	13.18	8.40	9.19
	Other Bovines	0.00	15.46	14.58	14.06	14.16
Non-member						
	Crossbred cow	24.34	21.41	19.65	20.44	21.54
	Desi cow	14.73	11.48	8.57	8.08	9.56
	Buffalo	22.71	16.59	14.36	18.43	16.94
	All Milch Animals	18.09	15.21	12.26	14.56	14.40
	Calves	0.00	9.94	8.70	6.37	7.53
	Other Bovines	0.00	17.98	15.77	16.58	16.39
All households						
	Crossbred cow	25.98	22.60	24.60	22.85	23.35
	Desi cow	14.51	13.16	11.57	11.29	11.74
	Buffalo	24.11	21.61	18.18	19.57	19.95
	All Milch Animals	19.64	20.54	17.81	17.07	18.03
	Calves	0.00	9.45	12.02	8.11	8.92
	Other Bovines	0.00	16.04	15.27	14.57	14.72
All zones						
Member						
	Crossbred cow	31.69	22.30	22.82	22.74	22.91
	Desi cow	19.38	17.46	18.69	15.02	15.80
	Buffalo	29.18	24.16	23.45	23.05	23.42
	All Milch Animals	26.74	23.03	22.88	21.17	21.76
	Calves	0.00	11.67	12.81	8.43	9.21
	Other Bovines	0.00	20.75	16.86	14.97	15.15
Non-member						
	Crossbred cow	25.43	24.78	26.93	23.39	24.22
	Desi cow	15.78	16.43	11.33	13.08	13.68
	Buffalo	30.09	24.01	20.16	22.87	23.18
	All Milch Animals	26.01	21.16	17.73	19.98	20.27
	Calves	0.00	14.02	12.35	9.43	10.50
	Other Bovines	0.00	18.47	18.14	16.73	16.96
All households						
	Crossbred cow	29.62	22.80	23.32	22.80	23.07
	Desi cow	18.26	17.50	16.16	14.46	15.21
	Buffalo	30.26	24.14	22.46	23.00	23.37
	All Milch Animals	26.91	22.49	21.32	20.75	21.28
	Calves	0.00	12.46	12.66	8.69	9.57
	Other Bovines	0.00	20.27	17.47	15.36	15.58

**Table 7.22 : Cost Per Animal by Type and Operational Land-holding Groups**  
(Rs. per day)

Zone/Membership	Type of Bovine	Operational Land-holding groups						Total
		Landless	Marginal	Small	Semi-medi	Medium	Large	
East zone								
Member	Crossbred cow	25.20	30.51	31.88	30.03	26.17	27.10	29.86
	Desi cow	9.77	12.37	13.12	9.63	12.18	11.46	11.83
	Buffalo	18.41	23.56	27.72	21.85	0.00	0.00	22.50
	All Milch Animals	14.51	17.91	21.01	14.90	20.85	16.25	18.06
	Calves	10.84	13.23	11.50	8.33	11.60	8.53	11.67
	Other Bovines	8.64	17.18	20.93	16.59	20.94	16.77	18.60
	Crossbred cow	30.83	34.03	29.37	26.70	0.00	0.00	31.84
	Desi cow	13.23	14.79	13.45	11.88	12.58	12.19	13.91
	Buffalo	26.23	25.38	19.14	17.52	24.50	0.00	24.00
	All Milch Animals	18.20	17.63	15.69	14.20	15.96	12.16	17.18
	Calves	11.88	13.34	11.64	9.13	9.80	10.54	12.21
	Other Bovines	7.93	20.15	21.36	16.51	14.73	0.00	19.66
All households	Crossbred cow	28.03	31.38	31.63	29.11	26.17	27.10	30.26
	Desi cow	11.55	13.32	13.31	10.25	12.51	11.74	12.62
	Buffalo	22.74	24.58	24.20	21.46	24.50	0.00	23.17
	All Milch Animals	16.69	17.69	19.59	14.74	20.59	14.87	17.78
	Calves	11.42	13.27	11.54	8.53	11.52	9.15	11.86
	Other Bovines	8.14	18.39	21.10	16.57	20.39	16.77	18.98
North zone								
Member	Crossbred cow	23.98	31.67	36.07	29.08	34.61	29.77	30.62
	Desi cow	12.24	17.84	18.81	21.81	21.69	20.54	19.45
	Buffalo	22.11	30.85	31.30	31.35	36.04	32.27	31.27
	All Milch Animals	19.75	26.87	28.24	28.72	31.23	28.21	27.76
	Calves	10.15	13.85	10.94	11.81	15.37	10.05	11.59
	Other Bovines	15.42	21.59	25.44	27.62	29.50	26.94	24.97
	Crossbred cow	26.20	29.31	26.95	27.23	26.96	36.14	31.22
	Desi cow	15.50	20.11	19.12	18.11	16.89	15.50	17.64
	Buffalo	18.34	26.25	25.13	29.56	24.86	26.79	25.16
	All Milch Animals	18.27	24.98	24.46	26.76	22.82	24.85	23.89
	Calves	11.83	14.02	15.04	14.94	13.46	11.78	13.54
	Other Bovines	17.09	32.94	23.66	26.90	27.47	33.31	28.26
All households	Crossbred cow	25.03	31.17	31.71	28.61	29.86	32.40	30.87
	Desi cow	14.00	18.76	18.98	20.04	19.18	19.06	18.76
	Buffalo	20.20	28.27	27.89	30.39	29.52	29.15	27.91
	All Milch Animals	19.31	25.87	26.33	27.77	26.58	26.44	25.80
	Calves	11.26	13.93	12.66	13.42	14.30	10.67	12.48
	Other Bovines	15.72	24.93	24.79	27.23	28.49	29.28	26.23
South zone								
Member	Crossbred cow	25.63	21.81	21.66	16.70	21.55	23.80	21.93
	Desi cow	11.17	17.50	19.43	18.15	23.38	22.49	16.91
	Buffalo	15.42	22.33	25.21	24.51	17.24	16.42	21.18
	All Milch Animals	18.60	20.78	25.21	22.78	25.03	21.97	21.85
	Calves	6.10	8.14	9.39	8.42	6.65	8.82	8.01
	Other Bovines	10.10	10.29	13.82	15.29	15.74	15.96	13.22
	Crossbred cow	18.62	22.63	29.41	18.30	0.00	20.44	20.76
	Desi cow	9.75	15.13	9.42	17.66	12.13	14.44	12.63
	Buffalo	16.18	22.95	20.02	23.57	18.93	24.51	20.70
	All Milch Animals	13.38	18.21	13.38	21.44	14.06	20.33	16.46
	Calves	6.41	7.82	7.13	9.48	4.64	5.64	7.16
	Other Bovines	8.13	8.44	8.67	10.31	12.43	11.50	9.68
All households	Crossbred cow	24.44	21.91	21.96	16.80	21.55	23.42	21.82
	Desi cow	11.19	17.10	16.41	17.39	18.08	20.03	15.76
	Buffalo	15.73	22.45	25.06	24.36	17.47	17.57	21.09
	All Milch Animals	17.14	20.22	23.51	22.29	23.05	21.51	20.66
	Calves	6.19	8.06	9.20	8.56	6.45	8.30	7.83
	Other Bovines	9.58	10.01	13.24	14.26	14.12	15.38	12.59



Table 7.22 : (Contd...)

Zone/Membership	Type of Bovine	Landless	Marginal	Operational Land-holding groups				Total
				Small	Semi-medi	Medium	Large	
West zone								
Member	Crossbred cow	15.20	22.80	24.52	18.98	28.31	29.52	23.49
	Desi cow	11.85	12.75	13.09	11.15	10.57	12.56	12.26
	Buffalo	18.99	17.99	22.57	23.42	22.82	19.88	20.37
	All Milch Animals	16.37	17.84	20.46	18.55	18.90	18.06	18.56
	Calves	5.37	9.23	10.83	10.34	6.18	8.56	9.19
	Other Bovines	8.56	13.87	13.71	13.37	13.16	15.35	14.16
Non-member	Crossbred cow	19.71	22.73	25.89	20.06	0.00	23.20	21.54
	Desi cow	11.34	9.74	9.29	11.29	6.43	6.94	9.56
	Buffalo	13.45	17.67	15.23	18.97	15.07	21.82	16.94
	All Milch Animals	13.67	15.11	13.00	15.48	10.55	17.60	14.40
	Calves	6.32	6.71	8.60	7.94	7.51	7.92	7.53
	Other Bovines	12.22	14.60	14.94	17.79	18.96	18.99	16.39
All households								
	Crossbred cow	16.03	22.79	24.56	19.37	28.31	29.30	23.35
	Desi cow	11.73	12.08	12.14	11.13	9.68	12.13	11.74
	Buffalo	17.88	17.96	21.53	22.97	21.78	20.16	19.95
	All Milch Animals	15.86	17.57	19.33	18.14	17.64	18.04	18.03
	Calves	5.56	8.84	10.43	9.91	6.45	8.50	8.92
	Other Bovines	10.01	14.10	14.10	15.12	14.02	15.77	14.72
All zones								
Member	Crossbred cow	24.67	22.66	23.33	17.88	22.71	25.86	22.91
	Desi cow	10.04	15.23	17.37	16.21	19.75	19.29	15.80
	Buffalo	18.27	21.86	25.66	25.68	25.91	22.99	23.42
	All Milch Animals	17.40	20.49	24.12	22.12	24.94	22.81	21.76
	Calves	6.46	9.47	10.30	9.65	8.87	9.25	9.21
	Other Bovines	10.37	12.95	15.99	16.04	17.05	16.82	15.15
Non-member	Crossbred cow	19.96	24.19	27.96	20.81	26.96	29.51	24.22
	Desi cow	11.05	15.44	12.79	15.35	13.50	13.62	13.68
	Buffalo	17.20	23.66	23.01	27.13	24.02	25.92	23.18
	All Milch Animals	15.33	20.27	20.60	23.52	21.09	23.49	20.27
	Calves	8.42	9.92	12.49	12.21	11.58	10.15	10.50
	Other Bovines	8.79	16.75	16.84	17.73	19.05	20.44	16.96
All households								
	Crossbred cow	23.79	22.82	23.63	18.22	22.97	26.48	23.07
	Desi cow	10.62	15.39	16.03	15.94	17.24	17.76	15.21
	Buffalo	18.09	22.21	24.87	26.04	25.43	23.89	23.37
	All Milch Animals	16.76	20.32	23.09	22.33	23.69	22.89	21.28
	Calves	7.16	9.60	10.81	10.31	9.70	9.47	9.57
	Other Bovines	9.95	13.82	16.20	16.58	17.73	17.39	15.58

**Table 7.31 : Cost Per Litre of Milk Produced by Type of Milch Animal and Milch Animal-holding Size (Rs. per litre)**

Zone/Membership	Type of Bovine	Animal-holding size				Total
		1	2	3	>=4	
East zone						
Member	Crossbred cow	7.50	6.82	4.94	6.40	6.32
	Desi cow	6.54	6.35	6.17	5.26	5.57
	Buffalo	0.00	7.28	6.68	4.89	5.83
	All Milch Ani.	7.17	6.74	5.93	5.75	5.93
Non-member	Crossbred cow	0.00	7.07	8.91	8.54	8.03
	Desi cow	8.22	6.46	6.55	6.39	6.49
	Buffalo	0.00	8.11	6.65	6.39	7.30
	All Milch Ani.	8.22	7.08	6.91	6.91	7.00
All households	Crossbred cow	7.50	6.95	5.54	6.70	6.64
	Desi cow	7.58	6.41	6.30	5.62	5.93
	Buffalo	0.00	7.76	6.67	5.31	6.41
	All Milch Ani.	7.54	6.93	6.21	6.03	6.27
North zone						
Member	Crossbred cow	7.50	7.69	7.13	6.11	6.28
	Desi cow	10.65	8.91	7.50	8.82	8.72
	Buffalo	10.10	9.22	8.78	7.53	7.83
	All Milch Ani.	10.06	9.02	8.42	7.54	7.77
Non-member	Crossbred cow	11.39	11.16	12.37	6.75	7.45
	Desi cow	9.75	8.96	8.39	9.84	9.63
	Buffalo	12.07	8.03	8.10	6.89	7.42
	All Milch Ani.	11.91	8.13	8.45	7.13	7.60
All households	Crossbred cow	8.75	8.52	9.18	6.32	6.67
	Desi cow	10.18	8.93	7.82	9.14	9.02
	Buffalo	11.48	8.44	8.46	7.22	7.62
	All Milch Ani.	11.32	8.47	8.43	7.36	7.69
South zone						
Member	Crossbred cow	7.21	5.40	4.65	5.13	5.19
	Desi cow	9.46	8.29	8.48	8.10	8.23
	Buffalo	9.24	8.30	7.99	8.74	8.63
	All Milch Ani.	8.53	7.39	7.48	7.07	7.19
Non-member	Crossbred cow	8.60	5.16	6.58	3.89	4.81
	Desi cow	10.85	10.45	8.24	7.27	8.57
	Buffalo	10.69	10.08	8.17	8.15	8.71
	All Milch Ani.	10.07	8.85	7.91	6.81	7.68
All households	Crossbred cow	7.55	5.32	4.95	5.03	5.14
	Desi cow	9.87	9.10	8.44	7.92	8.31
	Buffalo	9.66	8.89	8.02	8.66	8.65
	All Milch Ani.	8.95	7.89	7.56	7.03	7.27
West zone						
Member	Crossbred cow	5.50	4.49	4.60	4.55	4.57
	Desi cow	9.19	8.93	8.11	6.44	6.95
	Buffalo	8.53	8.87	5.54	6.65	6.96
	All Milch Ani.	8.48	8.34	5.68	6.35	6.66
Non-member	Crossbred cow	7.28	6.30	5.49	5.52	6.02
	Desi cow	10.37	9.91	10.00	7.00	8.57
	Buffalo	9.49	8.98	8.64	8.89	8.87
	All Milch Ani.	9.76	9.17	8.97	8.15	8.67
All households	Crossbred cow	5.92	4.51	4.60	4.58	4.61
	Desi cow	9.54	9.13	8.48	6.48	7.14
	Buffalo	8.64	8.88	5.84	6.82	7.12
	All Milch Ani.	8.74	8.42	5.99	6.48	6.83
All zones						
Member	Crossbred cow	6.94	5.32	4.90	5.27	5.28
	Desi cow	9.38	8.35	8.11	7.51	7.75
	Buffalo	9.25	8.81	6.72	7.58	7.66
	All Milch Ani.	8.80	8.05	6.69	6.98	7.12
Non-member	Crossbred cow	8.54	5.77	9.54	5.67	6.11
	Desi cow	10.27	9.72	8.58	8.12	8.67
	Buffalo	11.76	8.52	8.19	7.13	7.69
	All Milch Ani.	11.16	8.45	8.38	7.13	7.70
All households	Crossbred cow	7.32	5.43	5.48	5.32	5.40
	Desi cow	9.68	8.85	8.21	7.64	7.96
	Buffalo	10.47	8.72	7.07	7.44	7.67
	All Milch Ani.	9.77	8.18	7.05	7.02	7.27

**Table 7.32 : Cost Per Litre of Milk Produced by Type of Milch Animal and Operational Land-holding Groups**

(Rs. per litre)

Zone/Membership	Type of Bovine	Landless	Marginal	Operational Land-holding group				Total
				Small	Semi-medi	Medium	Large	
East zone								
Member	Crossbred cow	4.15	6.72	6.77	4.80	6.17	6.69	6.32
	Desi cow	3.75	5.88	7.02	4.64	4.82	4.11	5.57
	Buffalo	4.89	6.14	7.75	5.02	0.00	0.00	5.83
	All Milch Ani.	4.27	6.26	7.01	4.82	6.04	5.16	5.93
Non-member	Crossbred cow	6.68	9.26	8.40	6.75	0.00	0.00	8.03
	Desi cow	4.34	8.03	6.64	5.77	6.33	5.80	6.49
	Buffalo	6.62	7.33	8.66	6.65	7.81	0.00	7.30
	All Milch Ani.	5.57	8.27	7.67	6.26	7.58	5.80	7.00
All households	Crossbred cow	5.18	7.24	6.94	5.57	6.17	6.69	6.64
	Desi cow	4.07	6.72	6.90	4.90	4.87	4.72	5.93
	Buffalo	5.76	6.65	8.12	5.16	7.81	0.00	6.41
	All Milch Ani.	4.92	6.91	7.17	5.13	6.07	5.32	6.27
North zone								
Member	Crossbred cow	4.72	7.98	8.76	5.93	5.66	6.07	6.28
	Desi cow	4.62	7.86	7.29	9.75	9.85	10.45	8.72
	Buffalo	4.45	8.34	7.37	8.83	9.83	7.94	7.83
	All Milch Ani.	4.50	8.25	7.42	8.43	9.21	7.90	7.77
Non-member	Crossbred cow	7.20	8.93	10.63	7.30	6.88	6.94	7.45
	Desi cow	6.14	10.88	10.56	8.68	9.46	10.58	9.63
	Buffalo	6.16	8.84	7.79	6.98	7.11	7.14	7.42
	All Milch Ani.	6.19	9.01	8.06	7.19	7.32	7.37	7.60
All households	Crossbred cow	5.38	8.11	9.50	6.19	6.31	6.35	6.67
	Desi cow	5.21	8.77	7.99	9.24	9.66	10.48	9.02
	Buffalo	5.50	8.57	7.55	7.74	7.98	7.58	7.62
	All Milch Ani.	5.47	8.58	7.69	7.77	8.00	7.69	7.69
South zone								
Member	Crossbred cow	2.82	5.33	4.46	6.49	6.27	7.91	5.19
	Desi cow	5.17	8.67	10.46	10.64	8.89	9.71	8.23
	Buffalo	5.81	7.52	9.67	10.71	10.92	9.71	8.63
	All Milch Ani.	4.28	7.36	7.47	8.59	7.78	9.05	7.19
Non-member	Crossbred cow	4.15	3.16	5.79	5.78	0.00	7.45	4.81
	Desi cow	6.67	9.80	7.48	11.55	11.38	12.42	8.57
	Buffalo	7.18	10.07	8.82	10.61	6.56	8.61	8.71
	All Milch Ani.	6.33	8.34	7.34	8.72	8.65	8.74	7.68
All households	Crossbred cow	3.02	4.94	4.50	6.42	6.27	7.83	5.14
	Desi cow	5.66	8.94	9.86	10.75	10.83	10.08	8.31
	Buffalo	6.31	7.89	9.64	10.70	10.14	9.53	8.65
	All Milch Ani.	4.83	7.55	7.46	8.61	7.88	9.00	7.27
West zone								
Member	Crossbred cow	2.91	3.98	6.36	5.45	4.93	4.94	4.57
	Desi cow	3.76	7.09	7.28	6.93	8.02	7.48	6.95
	Buffalo	4.41	7.04	6.59	7.98	8.16	7.46	6.96
	All Milch Ani.	4.04	6.46	6.71	7.52	7.92	7.20	6.66
Non-member	Crossbred cow	5.14	5.14	6.24	7.03	0.00	8.30	6.02
	Desi cow	6.70	9.29	8.37	8.81	9.16	8.89	8.57
	Buffalo	7.35	7.83	10.06	11.01	11.89	11.56	8.87
	All Milch Ani.	7.17	8.07	9.18	9.60	11.05	11.05	8.67
All households	Crossbred cow	3.05	3.99	6.36	5.66	4.93	4.97	4.61
	Desi cow	4.17	7.32	7.46	7.14	8.17	7.51	7.14
	Buffalo	5.19	7.11	6.78	8.14	8.47	7.76	7.12
	All Milch Ani.	4.71	6.59	6.90	7.68	8.20	7.39	6.83
All zones								
Member	Crossbred cow	2.95	4.94	5.25	6.30	6.09	6.83	5.28
	Desi cow	4.84	7.96	8.24	8.14	9.06	9.07	7.75
	Buffalo	4.94	7.48	7.41	8.87	9.53	8.28	7.66
	All Milch Ani.	4.27	7.10	7.13	8.06	8.34	8.09	7.12
Non-member	Crossbred cow	4.68	4.17	8.68	6.33	6.87	7.11	6.11
	Desi cow	6.35	9.65	8.42	8.93	9.80	10.85	8.67
	Buffalo	6.58	8.89	8.02	7.55	7.21	7.48	7.69
	All Milch Ani.	6.30	8.61	8.13	7.64	7.50	7.72	7.70
All households	Crossbred cow	3.22	4.85	5.51	6.30	6.22	6.89	5.40
	Desi cow	5.32	8.35	8.28	8.30	9.38	9.33	7.96
	Buffalo	5.69	7.80	7.56	8.45	8.29	8.02	7.67
	All Milch Ani.	4.97	7.41	7.34	7.96	7.97	7.99	7.27

**Table 7.4 : Cost of Milk Production and Gross and Net Revenue from Milk Sale**  
(Rs. per day)

Zone	Membership	Cost per milch animal	Cost per litre	Revenue per milch animal	Revenue per litre	Net revenue per animal	Net revenue per litre
East zone	Member	18.06	5.93	20.61	6.48	2.55	0.55
	Non-member	17.18	7.00	22.08	8.40	4.90	1.40
	All Households	17.78	6.28	21.19	7.08	3.41	0.81
North zone	Member	27.76	7.77	30.59	8.24	2.83	0.47
	Non-member	23.89	7.60	29.21	8.90	5.32	1.30
	All Households	25.80	7.69	29.79	8.55	3.99	0.86
South zone	Member	21.85	7.19	26.62	9.71	4.77	2.52
	Non-member	16.46	7.69	18.12	9.42	1.66	1.73
	All Households	20.66	7.26	24.84	9.50	4.17	2.24
West zone	Member	18.56	6.66	24.89	9.03	6.33	2.38
	Non-member	14.40	8.67	14.42	8.83	0.02	0.16
	All Households	18.03	6.83	23.41	9.01	5.38	2.18
All zones	Member	21.76	7.12	26.59	9.01	4.82	1.89
	Non-member	20.27	7.70	23.67	8.76	3.40	1.06
	All Households	21.28	7.28	25.71	8.95	4.43	1.68

**Table 7.51 : Percentage Distribution of Total Household Revenue by Source for Different Milch Animal-holding Sizes**

Zone	Membership	Milch Animal Holding Size	Dairying	Crop husbandry	Others	Total
East zone	Member	1	33.30	12.77	53.94	100.00
		2	36.49	13.32	50.19	100.00
		3	29.88	32.67	37.46	100.00
		>=4	46.97	30.70	22.33	100.00
		Total	42.21	28.33	29.45	100.00
	Non-member	1	36.02	8.28	55.71	100.00
		2	38.84	9.23	51.92	100.00
		3	45.38	23.50	31.12	100.00
		>=4	35.81	42.75	21.44	100.00
		Total	37.76	30.11	32.13	100.00
	All households	1	34.49	10.79	54.71	100.00
		2	37.85	10.95	51.20	100.00
		3	34.30	30.05	35.65	100.00
		>=4	42.87	35.13	22.00	100.00
		Total	40.43	29.04	30.52	100.00
North zone	Member	1	19.96	42.52	37.52	100.00
		2	20.49	55.67	23.83	100.00
		3	30.98	44.70	24.32	100.00
		>=4	38.16	47.11	14.73	100.00
		Total	35.58	47.49	16.93	100.00
	Non-member	1	18.13	41.17	40.69	100.00
		2	18.90	39.64	41.46	100.00
		3	25.45	52.77	21.78	100.00
		>=4	31.93	51.39	16.69	100.00
		Total	28.30	49.59	22.11	100.00
	All households	1	18.43	41.39	40.19	100.00
		2	19.57	46.38	34.05	100.00
		3	27.19	50.23	22.58	100.00
		>=4	35.06	49.23	15.70	100.00
		Total	31.57	48.65	19.79	100.00
South zone	Member	1	22.64	48.51	28.85	100.00
		2	19.74	54.74	25.52	100.00
		3	25.00	58.59	16.41	100.00
		>=4	21.71	66.92	11.37	100.00
		Total	21.73	64.82	13.44	100.00
	Non-member	1	8.42	84.15	7.44	100.00
		2	13.03	73.63	13.35	100.00
		3	21.16	46.99	31.85	100.00
		>=4	23.10	59.23	17.67	100.00
		Total	17.28	67.04	15.69	100.00
	All households	1	14.62	68.60	16.78	100.00
		2	16.43	64.06	19.52	100.00
		3	24.38	56.73	18.88	100.00
		>=4	21.86	66.12	12.02	100.00
		Total	20.91	65.24	13.86	100.00
West zone	Member	1	27.69	41.39	30.92	100.00
		2	31.81	40.56	27.63	100.00
		3	36.08	47.68	16.24	100.00
		>=4	36.24	44.77	18.98	100.00
		Total	34.96	44.48	20.55	100.00
	Non-member	1	21.47	53.06	25.47	100.00
		2	22.82	54.79	22.40	100.00
		3	31.17	43.70	25.13	100.00
		>=4	34.76	43.54	21.71	100.00
		Total	28.62	48.77	22.61	100.00
	All households	1	26.40	43.80	29.79	100.00
		2	30.28	42.98	26.74	100.00
		3	35.89	47.52	16.59	100.00
		>=4	36.12	44.67	19.21	100.00
		Total	34.33	44.91	20.76	100.00
All zones	Member	1	24.55	43.89	31.56	100.00
		2	25.34	48.07	26.58	100.00
		3	32.07	50.07	17.86	100.00
		>=4	28.07	58.31	13.62	100.00
		Total	28.13	55.65	16.22	100.00
	Non-member	1	15.63	54.47	29.90	100.00
		2	16.38	61.43	22.18	100.00
		3	25.54	50.98	23.48	100.00
		>=4	30.10	52.57	17.33	100.00
		Total	25.05	54.61	20.34	100.00
	All households	1	19.14	50.31	30.55	100.00
		2	21.68	53.53	24.79	100.00
		3	30.19	50.33	19.48	100.00
		>=4	28.53	57.01	14.46	100.00
		Total	27.28	55.36	17.36	100.00

**Table 7.52 : Percentage Distribution of Total Household Revenue by Source for different Operational Land-holding Groups**

Zone	Membership	Operational land holding group	Dairying	Crop Husbandry	Others	Total
East zone	Member	Landless	45.54	0.00	54.46	100.00
		Marginal	39.11	22.36	38.52	100.00
		Small	44.93	32.10	22.96	100.00
		Semi-medium	41.32	48.17	10.51	100.00
		Medium	29.08	55.58	15.34	100.00
		Large	29.51	57.94	12.55	100.00
		All	42.21	28.33	29.45	100.00
	Non-member	Landless	49.26	0.00	50.74	100.00
		Marginal	39.67	23.74	36.59	100.00
		Small	29.77	55.60	14.63	100.00
		Semi-medium	28.04	54.83	17.13	100.00
		Medium	19.77	78.34	1.89	100.00
		Large	15.82	67.33	16.85	100.00
		All	37.76	30.11	32.13	100.00
	All households	Landless	47.70	0.00	52.30	100.00
		Marginal	39.35	22.94	37.71	100.00
		Small	40.38	39.15	20.46	100.00
		Semi-medium	36.92	50.37	12.70	100.00
		Medium	27.32	59.88	12.80	100.00
		Large	21.81	63.22	14.97	100.00
		All	40.43	29.04	30.52	100.00
North zone	Member	Landless	64.01	0.00	35.99	100.00
		Marginal	50.59	19.10	30.31	100.00
		Small	32.35	47.33	20.32	100.00
		Semi-medium	33.95	50.80	15.25	100.00
		Medium	36.78	48.59	14.62	100.00
		Large	30.67	60.68	8.65	100.00
		All	35.58	47.49	16.93	100.00
	Non-member	Landless	40.99	0.00	59.01	100.00
		Marginal	34.16	25.20	40.64	100.00
		Small	27.62	55.71	16.67	100.00
		Semi-medium	27.32	55.89	16.79	100.00
		Medium	31.11	58.96	9.93	100.00
		Large	23.19	59.39	17.42	100.00
		All	28.30	49.59	22.11	100.00
	All households	Landless	47.65	0.00	52.35	100.00
		Marginal	41.62	22.43	35.95	100.00
		Small	29.99	51.51	18.50	100.00
		Semi-medium	29.28	54.38	16.34	100.00
		Medium	33.91	53.85	12.24	100.00
		Large	27.02	60.05	12.92	100.00
		All	31.57	48.65	19.79	100.00
South zone	Member	Landless	56.35	0.00	43.65	100.00
		Marginal	25.85	53.16	20.99	100.00
		Small	23.83	65.49	10.68	100.00
		Semi-medium	24.44	64.72	10.84	100.00
		Medium	20.32	70.05	9.63	100.00
		Large	13.50	79.01	7.50	100.00
		All	21.73	64.82	13.44	100.00
	Non-member	Landless	45.78	0.00	54.22	100.00
		Marginal	18.39	65.43	16.18	100.00
		Small	13.48	74.14	12.38	100.00
		Semi-medium	12.36	74.09	13.55	100.00
		Medium	10.45	81.10	8.45	100.00
		Large	13.39	78.60	8.01	100.00
		All	17.28	67.04	15.69	100.00
	All households	Landless	54.53	0.00	45.47	100.00
		Marginal	23.30	57.35	19.35	100.00
		Small	21.69	67.27	11.04	100.00
		Semi-medium	22.56	66.17	11.26	100.00
		Medium	18.74	71.82	9.44	100.00
		Large	13.49	78.98	7.53	100.00
		All	20.91	65.24	13.86	100.00

Table 7.52 : (Contd....)

Zone	Membership	Operational land holding group	Dairying	Crop Husbandry	Others	Total
West zone	Member	Landless	63.03	0.00	36.97	100.00
		Marginal	35.95	40.44	23.61	100.00
		Small	36.64	44.18	19.18	100.00
		Semi-medium	27.57	50.96	21.48	100.00
		Medium	26.22	56.06	17.71	100.00
		Large	27.54	62.35	10.11	100.00
		All	34.96	44.48	20.55	100.00
	Non-member	Landless	55.38	0.00	44.62	100.00
		Marginal	29.48	45.76	24.76	100.00
		Small	34.42	42.54	23.04	100.00
		Semi-medium	24.94	50.53	24.53	100.00
		Medium	22.22	55.03	22.75	100.00
		Large	14.39	75.40	10.21	100.00
		All	28.62	48.77	22.61	100.00
All households	Landless	61.82	0.00	38.18	100.00	
	Marginal	35.44	40.86	23.70	100.00	
	Small	36.44	44.04	19.52	100.00	
	Semi-medium	27.20	50.90	21.91	100.00	
	Medium	25.72	55.93	18.34	100.00	
	Large	25.77	64.11	10.12	100.00	
	All	34.33	44.91	20.76	100.00	
All zones	Member	Landless	58.37	0.00	41.63	100.00
		Marginal	32.50	44.36	23.13	100.00
		Small	31.42	51.87	16.70	100.00
		Semi-medium	27.28	59.15	13.58	100.00
		Medium	25.54	61.99	12.47	100.00
		Large	18.59	73.38	8.03	100.00
		All	28.13	55.65	16.22	100.00
	Non-member	Landless	43.79	0.00	56.21	100.00
		Marginal	24.02	52.24	23.74	100.00
		Small	25.16	58.57	16.27	100.00
		Semi-medium	24.69	58.73	16.58	100.00
		Medium	24.78	64.78	10.44	100.00
		Large	20.67	64.22	15.11	100.00
		All	25.05	54.61	20.34	100.00
All households	Landless	53.08	0.00	46.92	100.00	
	Marginal	30.14	46.55	23.30	100.00	
	Small	29.67	53.75	16.58	100.00	
	Semi-medium	26.25	58.98	14.76	100.00	
	Medium	25.33	62.77	11.91	100.00	
	Large	19.02	71.48	9.50	100.00	
	All	27.28	55.36	17.36	100.00	