CALPI PROGRAMME SERIES 2 DECEMBER, 2006

Towards Accelerated Growth in Dairying

An Action Research to Improve the Traditional Milk Sector

KHAMMAM, ANDHRA PRADESH

Summary Report

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Action Research
Led by Catalyst Management Services, Bangalore and participated by the National Dairy Research Institute, Bangalore, two facilitating NGOs ACTIVE and SECURE and supported by the Animal Husbandry and the Dairy Development Departments, Govt. of Andhra Pradesh.

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CALPI

Series 2

Snapshots of the Traditional Milk Sector

Contents

Abbreviations

AP	Andhra Pradesh
APDDCF	Andhra Pradesh Dairy Development Cooperative Federation
AR	Action Research
CALPI	Capitalisation of Livestock Programme Experiences India
CBO	Community Based Organisation
CMS	Catalyst Management Services Private Limited
DIIS	Desktop Interactive Information System
DoAH	Department of Animal Husbandry
DRDA	District Rural Development Agency
FAO	Food and Agriculture Organization
HH	Households
IC	Intercooperation
IIM-A	Indian Institute of Management, Ahmedabad
ISAP	Indian Society for Agribusiness Professionals
ILRI	International Livestock Research Institute, Nairobi
LACG	Local Actions Core Group
lpd	Litre per day
MBRT	Methylene Blue Reduction Test
NDDB	National Dairy Development Board
NDRI	National Dairy Research Institute
NRMPA	Natural Resource Management Programme, Andhra Pradesh
OMS	Organised Milk Sector
PPLPI	Pro-Poor Livestock Policy Initiative
PRA	Participatory Rural Appraisal
RRG	Research Reference Group
SDC	Swiss Agency for Development and Cooperation
SHG	Self Help Group
SMILDA	State Management Institute for Livestock Development, AP
SNF	Solids Non-Fat
T0R	Terms of Reference
TMS	Traditional Milk Sector
TS	Total Solids

Acknowledgements

The Action Research Team sincerely acknowledges the contributions of hundreds of milk producers, milk vendors, consumers and processors who shared information on the traditional milk market and cooperated at every stage, making this research possible, effective and realistic.

Our special thanks to all our partners in the government, particularly Mr Neerab Kumar Prasad, Dairy Development Commissioner and Dr Ravikumar of the Department of Animal Husbandry, government of Andhra Pradesh, the representatives of the District Rural Development Agency, Khammam, public health authorities and the cooperative and private dairies which supported the action research, provided information, facilitated the process and participated in various activities on the field.

The contributions towards implementation of the action research by Dr Sathish Kulkarni and his team from the National Dairy Research Institute and Mr K. Jayanand and Mr K. Venu Madhav of the two facilitating agencies - ACTIVE and SECURE - in their work with the communities at the field level, were vital for smooth conduct of the research.

The research team is thankful to representatives of the collaborating agencies, namely Prof. Vijay Paul Sharma and Prof. Vinod Ahuja of the Indian Institute of Management, Ahmedabad, Ms Rupa Mukerji of Intercooperation in India, Hyderabad, Dr N. Anantham and Dr Srinivasa Rao of the State Management Institute for Livestock Development in Andhra Pradesh and Dr Hanumantha Reddy of the Andhra Pradesh Dairy Development Cooperative Federation. We extend our appreciation to all our other partners - Dr Steven J. Staal of the International Livestock Research Institute, Dr A. K. Joseph of CALPI and Ms Rebecca Katticaren of the Natural Resource Management Programme, Andhra Pradesh - who, in addition to guiding the action research through the Research Reference Group, also visited the research sites periodically and provided vital inputs and suggestions in making this initiative rigorous, effective and focused.

We especially acknowledge the financial assistance from CALPI, the Swiss Agency for Development and Cooperation and the special staff support from it as also ILRI, NRMPA, the government of Andhra Pradesh and other partners for spearheading this study of the traditional milk sector.

We trust that this report will provide enormous insights into the dynamics of the traditional milk sector and valuable learnings for improving it not only within India but also in other developing countries.

The quest for improvements: the researcher - vendor interaction

N. Raghunathan
Team Leader
Action Research on the Traditional Milk Market, Catalyst Management Services, Bangalore

Foreword

The Swiss Agency for Development and Cooperation and the Intercooperation in India have been actively involved in the livestock livelihoods and Natural Resource Management (NRM) domains in India for a few decades. Capitalisation of Livestock Programme Experiences India (CALPI) capitalises on the vast experiences, competencies and partnerships generated through its various programmes to positively influence the economic, legal and policy frame conditions affecting poor livestock keepers, both men and women.

India has made significant progress in dairy production and marketing in the past 30 years. However, market access for smallholder livestock producers still remains a major constraint in many parts of India. An estimated 77 per cent of the milk marketed in India reaches the consumers through the Traditional Milk Sector, which covers many low-potential areas and serves millions of small milk producers, consumers, vendors and market agents, generating high livelihood support and employment potential.

The 'Action Research (AR) to Improve the Traditional Milk Sector' formed one among the 17 activity lines taken up by CALPI. It followed a unique design characterised by a multi-stakeholder participatory process involving a consortia approach and resource pooling. The research was guided and directed by a Steering Committee, led and chaired by the Dairy Development Commissioner of the state. The active participation of producers, consumers, vendors and market agents alongside partners of the AR, ensured authenticity and ownership of the data collected.

Although, geographically, the AR covered only limited areas of Khammam and Vjayawada districts of Andhra Pradesh, it took into account almost all the aspects of the sector. With active participation of all concerned stakeholders including the government, the AR identified a number of required interventions. While some interventions have already been completed, some are currently on and the others are scheduled for the future. Those for the future include stakeholder institution-building and development, capacity development of key stakeholders, improvement in milk quality and milk prices involving both the producer and consumer, improvement in the scale of vendor operations, milk productivity enhancement, and policy advocacy.

This summary report is one among the five outputs expected of the AR, capturing in a nutshell, the key outcomes of the research as also the outcome of the actions taken up and proposed. The others comprise the main report and its annexure consisting of the data outputs, the process documentation, a Desktop Interactive Information System pack in a CD and the video highlights. Being one among the very few authentic reports/publications available on TMS, this report might find versatile use as an instrument for improving the market access of the low-potential areas, thus impacting millions of resource-poor farmers. It also has the potential to stimulate a number of policy reforms, triggering tremendous growth in the areas devoid of any worthwhile market access.

Rupa Mukerji
Delegate
Intercooperation in India
Hyderabad

PREFACE

This report contains the summary of the Action Research on the Traditional Milk Sector conducted in the Khammam and Vijayawada districts of Andhra Pradesh, India, between April 2005 and July 2006. It aimed at understanding the dynamics of the traditional milk market and identifying interventions for improving the sector. The AR was initiated, supported and funded by CALPI, a programme of SDC and the Intercooperation.

Milk producers mould their plans together with the Action Research team

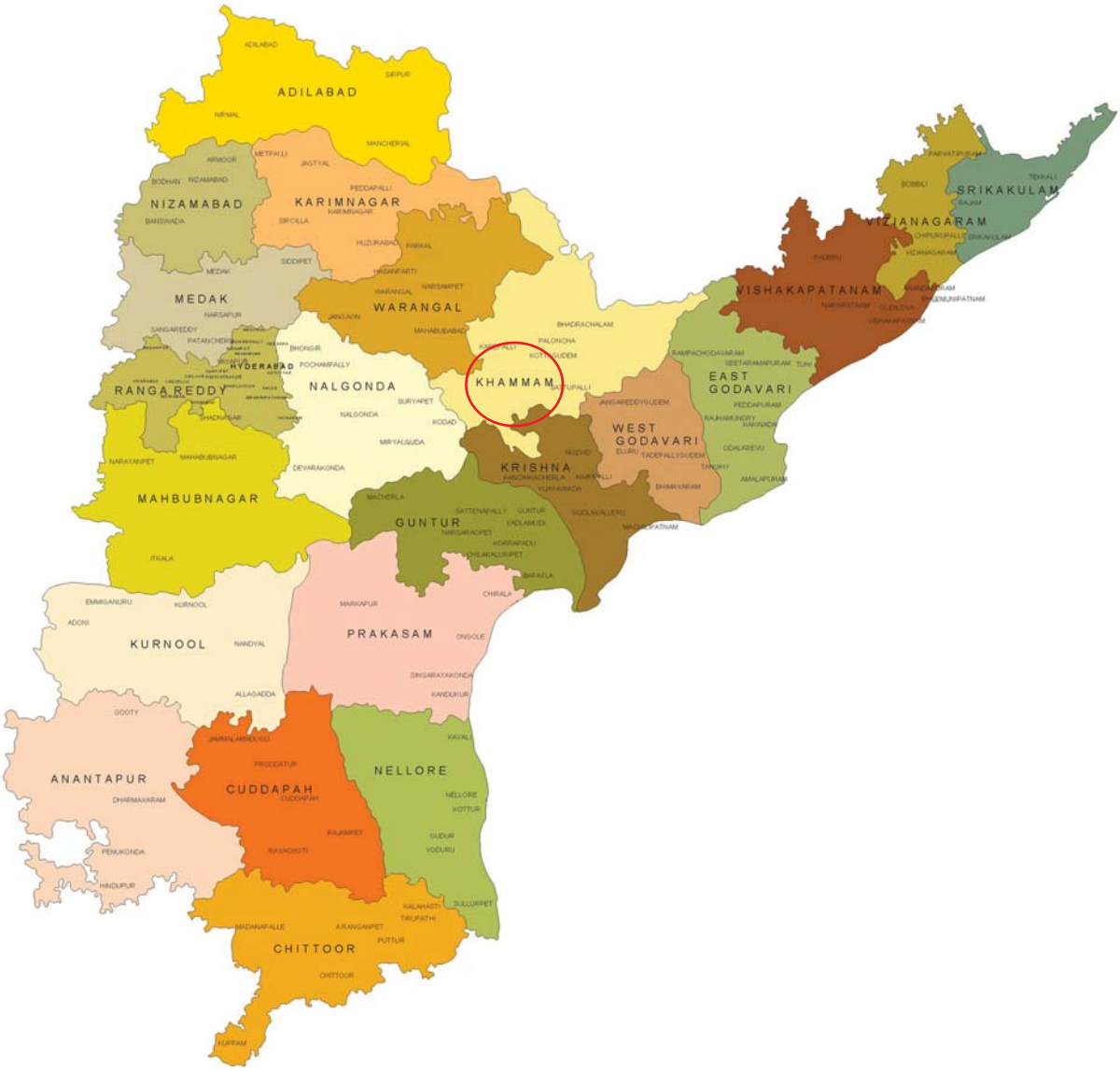
The action research was carried out by a team led by Catalyst Management Services, Bangalore. The others in the research team comprised experts from the Department of Animal Husbandry, AP, the National Dairy Research Institute, Bangalore and the two facilitating non-governmental organisations, ACTIVE and SECURE. Representatives from ILRI, CALPI and NRMPA have, in addition to providing conceptual and design support, contributed valuable inputs and suggestions.

The implementation of the AR generated wide interest and participation from the state dairy development and the animal husbandry departments, the District Rural Development Agency, the Velugu programme, a vast number of producers, vendors and consumers and a wide spectrum of partners. The TMS in India is widespread, with immense potential for stimulating growth in dairying, impacting the lives and livelihoods of millions of resource-poor farmers, consumers and market intermediaries/vendors dependent on it. To sustain the livelihoods of these millions and to trigger accelerated growth in milk production, particularly in the low-potential areas, the sector deserves investment support and hand-holding by the government and other development agencies.

The support to the sector may be in the form of infrastructural facilities to improve the quality and food safety aspects of milk, the scale of operations at the vendor level, the returns to producers on the milk supplied and the value for money to consumers, and capacity building of the stakeholders. It also provides space for a review of the minimum criteria for coverage of areas under dairy development, the food standards and regulatory mechanisms. In this respect, it is hoped that the observations and findings of the AR will provide pointers to the way ahead in stimulating milk production and supporting livelihoods in the areas served by the sector.

AK Joseph
Senior Programme Coordinator
CALPI

An Action Research to Improve the Traditional Milk Sector Main Project District - Khammam



Map I

Towards Accelerated Growth in Dairying

An Action Research to Improve the Traditional Milk Sector

Summary Report

1. Background and Rationale

The Indian dairy sector has made significant progress in the past 30 years. The country is now the largest milk producer in the world, with dairying providing an important livelihood support for the rural poor in India. The profitability of dairy enterprises, to a large extent, is dependent on the efficiency of the marketing network. However, market access for smallholder livestock producers remains a major constraint in many parts of India. Realising the need to address the issue, CALPI[1] took up 'livestock products marketing' as one of its major thrust areas with the aim of supporting small livestock holders in improving their incomes through better market access.

Table I

Milk Market Overview - 2005-06

Parameter	Total	Covered by OMS[2]	Left out of OMS[2]	% left out of OMS[2]
Districts	597	338	266	44
Villages	6,22,035	1,88,365	4,50,000	70
Milk producing house holds (Min.)	66.94	20.33	46.61	70
Quantity of milk marketed Min. mt	63.19	14.19	49.00	77
Milk purchasing households (Min.)	143.6	32.3	111.5	77

Source : Derived using data from Dairy India 2007, NDDB Annual Report 2005-06, Animal Husbandry statistics, Department of AH, Dairy and Fisheries, Govt. of India.

An estimated 77 per cent of the milk marketed in India, (some 1,340 lakh litre per day in 2005-06) reaches the consumers unprocessed through the Traditional Milk Sector (TMS). TMS covers many low-potential areas and serves an estimated 46 million small milk producer households, some 111 million consumer households (See Table 1) and a few million market agents/vendors. This sector provides high livelihood support and employment potential for a vast number of urban and rural poor. In this respect, TMS has vast size, spread, reach and impact potential on the poor. A review of the growth of the sector also indicates that if it is addressed appropriately, the sector has the capacity to mitigate regional imbalances leading to equitable development.

CALPI, with technical support from the Pro-poor Livestock Policy Initiative (PPLPI) of FAO (Food and Agricultural Organization), commissioned a desk study of the informal milk market through the Indian Society for Agribusiness Professionals (ISAP). It identified some of the strengths, deficiencies and data gaps and highlighted the need for a comprehensive study of TMS to understand its functioning. It concluded that the unorganised market agents are likely to continue playing critical roles in the marketing of milk, and it is important to understand the micro-dynamics of the market behaviour of various market agents so as to capitalise on their strengths for the benefit of poor rural producers and urban consumers. A methodology for understanding the dynamics, engagement with the traditional sector in new interventions and to bring together stakeholders and facilitating actions at the habitations were considered important, while bringing in methodological rigour and conceptual focus. Further consultations with the Indian Institute of Management, Ahmedabad (IIMA), the International Livestock Research Institute (ILRI), other partners and the Steering Committee of CALPI led to a consensus for integrating both qualitative and quantitative methods through

[1] Capitalisation of Livestock Programme Experiences India, a programme of SDC and IC
[2] Organised Milk Sector

Box I

Action Research[3]

Action Researchv is a flexible spiral process that allows action (improvements, changes) and research (understanding, knowledge) to be achieved at the same time. At each stage, the strategies, methods and activities are reflected upon and refined. AR bridges the gap between the deciders and the doers. People affected by the decisions (milk producers, consumers, channel partners, etc.) join those who plan the processes, carry them out and regulate the decisions (like NGOs, CBOs, dairy dept officials, health authorities). They (the people who decide as also those afftected by the decision and carry them out), remain at the centre of assessing the process and effects, extracting learnings, taking decisions and implementing them. The process generates participation and thus guarantees commitment for action. It integrates both qualitative and quantitative approaches.

an Action Research (AR) process. The principles of AR are summarised in Box I.

1.1 Objectives and Methodology

Based on the outputs of the desk research, CALPI initiated this AR to understand this sector and facilitate actions to strengthen it. The major objectives of the AR are summarised in Box II.

The AR was conducted by Catalyst Management Services (CMS) and the National Dairy Research Institute (NDRI), in partnership with two facilitating agencies (SECURE and ACTIVE) and steered by a Research Reference Group (RRG). It was actively supported and backed by partners from the Department of Animal Husbandry (DoAH), government of Andhra Pradesh, CALPI, ILRI, NRMPA, Intercooperation, the State Management Institute for Livestock Development in Andhra Pradesh (SMILDA) and the Andhra Pradesh Dairy Development Cooperative Federation (APDDCF). The AR was also extended conceptual, technical and steering support by two senior faculty members of the Indian Institute of Management, Ahmedabad. The details of the research partners, their roles and nature of involvement are presented in the main report of the AR. The members of the RRG, who guided and steered the programme and the role played by the RRG are presented in Box III.

The study was conducted in the Khammam district of Andhra Pradesh (AP), after a careful selection process[4]. AP scored high in the selection process because of the balance in the presence of the organised and the traditional milk sectors. Within AP, the district selection was done using the criteria of dairy animal population, the balance between cow and buffalo populations, estimated milk production and the extent of milk marketed through TMS. Khammam (See map 1 on page 8) was selected as the quantum of milk sold through TMS was in the mid range (i.e. 200,930[5] tonne per annum which is 61 per cent of the total production and 91 per cent of the total milk marketed in the district), and the cow-buffalo ratio was almost equal. The estimated milk production too was in the middle range (329,650[5] tonne per annum) as compared to the other districts in the state. The local consumption in

Box II

Objectives of the Action Research

1. To test an Action Research Methodology to understand the dynamics of TMS and experiment field actions for improving the sector.
2. To facilitate community-identified spontaneous decisions and actions.
3. To identify additional information needs to clearly understand TMS and its constraints and opportunities.
4. To test the relevance of the methodology to identify and address the constraints and opportunities.
5. Through these, contribute to sustainable livelihood options for poor producers and supply of assured quality of milk to the consumers.

3 Derived from : URL ftp:// ftp.scu.edu.au/www/arr/aandr.txt; http://www.scu.edu.au/schools/gcm/ar/arp/aandr.html

4 The process followed for sample selection are explained in the main report and the process documentation.

5 Derived from data of A.H.Dept., SMILDA, APDDCF and the house hold survey of milk producers under the AR.

the producing households amounted to a third of the milk produced - see section 1.6.2. (Page-20)

Three mandals (Khammam, Konijerla and Dammapeta) in the district and two villages[6] (covering five habitations) were selected based on the sampling methodology suggested in the RRG (using secondary data on dairy animal population, milk production, and cow-buffalo proportion, proportion of traditional and organised sector milk procurement etc.). The preliminary study in these habitations showed that in most of them, the communities were not into dairying as a livelihood option, even though the livestock population was high. The RRG clarified that the scope of the AR was limited mainly to working with market players and issues related to the traditional milk market and to some extent with the organised

Box III

Research Reference Group

The Action Research was guided, steered and supported by a Research Reference Group (RRG) comprising:

	Name	Designation and Organisation
1	Mr P M Kuriakose / Mr Neerab Kumar Prasad, Chairperson of the RRG	Dairy Development Commissioner & Managing Director, APDDCF
2	Dr Piedy Sreeramulu / Dr K. Ravikumar	Additional Director, Dept. of AH, AP / Joint Director AH, Khammam dist
3	Dr B. Anantham / Dr K. Sreenivasa Rao	Joint Director, SMILDA / Vet. Asst. Surgeon, SMILDA
4	Prof. Vinod Ahuja	Professor, IIM, Ahmedabad
5	Prof. Vijay Paul Sharma	Professor, IIM, Ahmedabad
6	Dr Steeven J. Staal	Agricultural Economist, Market Oriented Smallholder Dairy, ILRI, Nairobi
7	Ms Lucy Maarse / Ms Rupa Mukerji	Delegate, Intercooperation
8	Ms. Rebecca Katticcaren	Senior Programme Coordinator, NRMPA, Hyderabad
9	Dr Satish Kulkarni	Principal Scientist and Head, Dairy Technology, NDRI, Bangalore
10	Mr N. Shiv Kumar / Mr N. Raghunathan	Director, Catalyst Management Services, Bangalore
11	Mr L. Narendranath	Consultant, CMS
12	Dr A. K. Joseph	Sr Programme Coordinator, CALPI

Role of Research Reference Group

- Planning the research (fine tuning objectives, methods, tools, protocol, etc)
- Planning the actions - developing models
- Steering and monitoring the process and the progress
- Advising on research sites and potential collaborators
- Bringing in different sectoral, country and international experiences and perspectives
- Providing known and tested methodologies and expertise
- Collaborating, sharing, networking and advocating
- Analysing, learning, documenting and disseminating
- Critically reflecting at various points to understand what works well, when, where, how and why

[6] 'Village' here refers to Revenue Village and 'Habitations' include all localities in a particular hamlet and comes under the revenue village boundaries.

Box IV

Samples for the Action Research

Four markets with varying profiles were covered - rural (villages; eight habitations), semi-urban (town market - Satupalli), urban (district market - Khammam) and well evolved market (corporation - Vijayawada). A total of 949 producer house holds, 819 household consumers, 179 institutional consumers, 75 market intermediaries (65 vendors, 2 creameries, one ghee-maker and 7 dairies) were covered through semi-structured questionnaires, focus group discussions and observations.

Eight habitations were covered in the production side. Two profiles of habitations were selected - one set with an exclusive traditional market chain and the other with a combination of organised (coop and private) and traditional market chains. Four habitations in each profile were covered. Besides, five habitations where the study was originally initiated were later dropped as the focus of the study was clarified by RRG as being habitations where a reasonable quantum of milk flows through the traditional milk market, and not one of bringing farmers into milk market.

sector for the purpose of understanding the comparison. Therefore, issues such as 'productivity of animals' in these habitations, 'bringing farmers into the dairy market' etc were assigned low priority under the AR. The final sample was drawn based on field findings of the pilot study and clarification/guidance by RRG.

The preliminary study in these habitations also threw up another factor - market competition profile - that seemed to play an important role in deciding the dynamics in the sector. Two profiles emerged from the pilot study - one, the pockets where all three players (cooperative, private dairy and vendors) operate and two, the pockets where only vendors operate. During the same period, the pilot study in the Vijayawada market provided a field methodology to identify habitations with different competition profiles, working backward from the market. Based on these, it was decided by RRG to modify the methodology used to identify habitations that have these two competition profiles (on the production side). At the same time, it was also decided to cover four different kinds of markets. (For the final samples, see Box IV.)

The study also had a number of interactions with the state DoAH, DRDA, municipal authorities and the cooperative and the private dairies. Scientific sample collection and quality tests[7] by NDRI were conducted. These tests were used to determine the practices and dynamics of TMS and the quality of products being sold mainly

Box V

Tools and Approaches Used in the Action Research

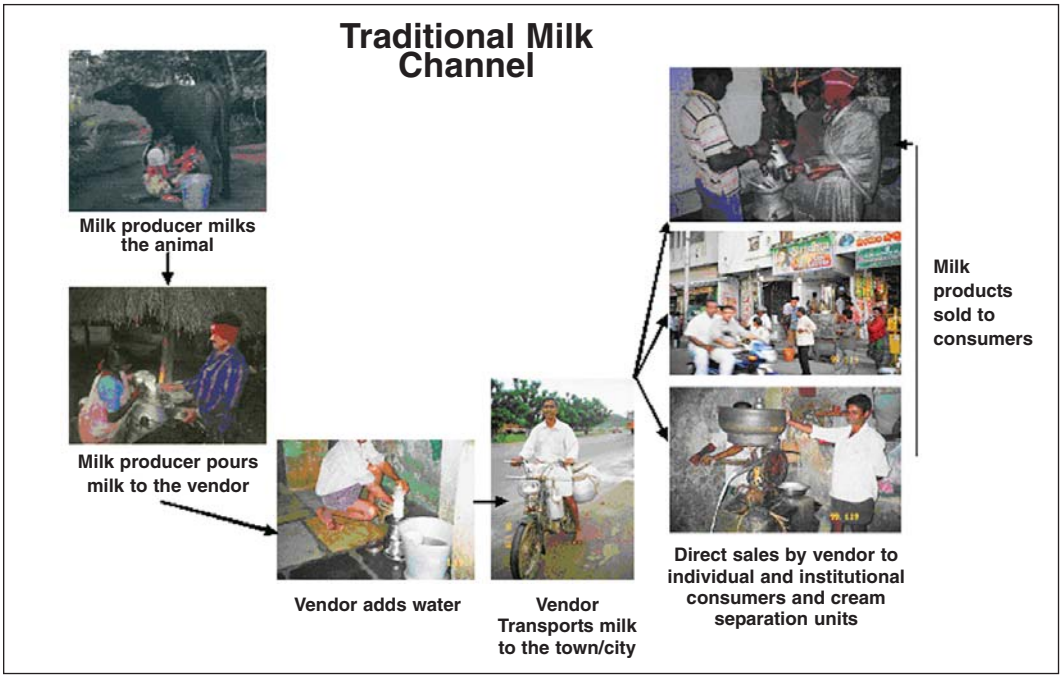
At the habitations:

- Social mapping, using transect walk and participatory exercises
- Seasonality analysis, particular reference to dairy sector
- Dairy timeline, milestones
- Dairy livelihood analysis - identifying problems, actions
- Individual interviews with producers - 30 per habitation
- Vendors interviews - all vendors in the habitation
- Habitation level individual interviews with consumers - 30 per habitation
- Case studies
- Formal and informal discussions
- Veterinary camps
- Producer-vendor meetings
- Observations of entire dairy day cycle with vendors, producers
- Interviews with key informants in the habitations

At the Market:

- Mapping of vendor points using key informants, observations
- Interviews with household consumers - total of about 1,000; and institutions such as hotels, hostels
- Interviews with vendors and private dairies
- Observations in creameries, transit points
- Scientific tests for quality through samples
- Interviews with key informants from government and communities
- A number of reflection meetings within the team

Figure I



under the traditional milk chain. For facilitating actions, a number of meetings/ interactions were held with a variety of stakeholders - about 20 interactions in each of the habitations studied. These include PRA exercises, meetings with SHG/producer groups, vendor groups, local leaders and meetings together with the AHD staff. At the vendor association level too, at least two meetings per month were conducted during the project period apart from other small group interactions.

The methodology adopted for the study covered both flush and lean seasons and were spread over one year (August '05 to June '06). The study involved extensive data collection using tools and techniques developed, tested and vetted through the RRG mechanism (Box V). The data collected was both quantitative and qualitative, using structured questionnaires, PRA tools, observations on the field relating to both within the habitations and markets, enquiries leading from these observations, informal interactions, meetings and workshops. Raw milk samples were also collected from various points in the chain for laboratory assessments. The study followed principles of AR wherein the problems related to traditional milk markets were participatively identified, analysed and spontaneous solutions developed and facilitated with stakeholders. Five meetings of the RRG were conducted during the course of the AR process. Groups of RRG members made extensive visits to the field, both to the habitations and the markets, on three different occasions and had wide ranging interactions with the producers, vendors and their associations, consumers, creameries, private dairies, cooperatives and the field research teams. The findings emerging from the research were shared with RRG members periodically and suggestions were incorporated in the research process and used for midcourse corrections. A detailed documentation of all the processes that were followed has been done by the study team (refer Process Documentation). A desktop interactive information system that brings together all the documents (proposals, tool kits, databases, analysis, reports), photographs and video documentation of the entire AR is under development.

1.2 Characteristics of TMS

As the first step, the study focused on the main characteristics of the traditional market. Although traditional products like ghee, sweetmeats, paneer etc., form part of TMS, they were not covered under the AR. Based on consensus within RRG, for the

7 Tests for fat, solid non-fat, adulterants in milk and bacterial load to determine the shelf life.

purpose of this AR, TMS was characterised as the channels of supplies, either by producers directly or by vendors, selling unprocessed[8], unbranded milk in loose form or filled in plastic packets or bottles[9] in flexible quantities and prices[10]. The market operates through informal agreements both at the producer and consumer levels. The processing, if undertaken, uses traditional methods (mainly creameries[11], ghee-making). The geographical boundaries of operation by TMS are limited to an area[12] in which the cycle of procurement and sale can be completed in about five hours.

1.3 Channels of TMS

For the purpose of this AR, two main routes for TMS were identified: (i) producer-to-consumer (including neighbourhood sales) and (ii) producer-to-vendor-to-consumer. Two categories of vendors were identified from the research - vendors who are also primary milk producers and vendors as pure market agents. The producer-vendors were found more open and willing as they have a stake in every level of the value chain starting from production to marketing. Any improvement made in the value chain improves their incomes. Compared to other vendors, the producer-vendors were more involved in the study, willing to learn, attend training, try out innovations and proactive in suggesting actions. Their interests also appear to be different as compared to the other categories of vendors. Other players in the channel were creameries[13] and product-making units and the consumers (both households and institutions). The details of the traditional milk channel and the vending cycle and key players are depicted in figures - I and II respectively.

In search of scarce fodder

Vendors cater to different kinds of consumers at the market level - households, institutions, dairies, bulk coolers and milk product manufacturers. Vendors have milk with varying quality to cater to the different needs of the consumers. At the procurement level, sometimes vendors collect milk from the agents, or from cooperative and private dairies to handle any shortages (in all-three operators' habitations). Usually, any left-over milk from the market (due to consumers not available, lesser quantum purchased, etc), is sold to dairies or bulk coolers at a substantially lower rate (without checks on quality).

In Vijayawada, among the large-scale vendors, the cream separation process was observed. These creameries are situated at the main transit points (such as bus stand, railway station) where milk from the villages is brought into the town, the cream is separated, and the milk is taken for supply to consumers. This practice was not observed in a major way in either the Khammam[14] or Satupalli markets.

Milk vendors then supply the milk left over after distribution to the dairies or bulk

[8] 100% of milk supplied by operators covered in the research in all three markets; very few centres in Satupalli and Khammam sell refrigerated loose milk through retail outlets and refrigeration facilities.

[9] 52% of the milk is sold in loose form, 28% in PVC bottles, 12% in plastic bags, 8% other

[10] 100 ml onwards; even measures such as one-glass, half-glass, or even 'for Rs 6', etc.

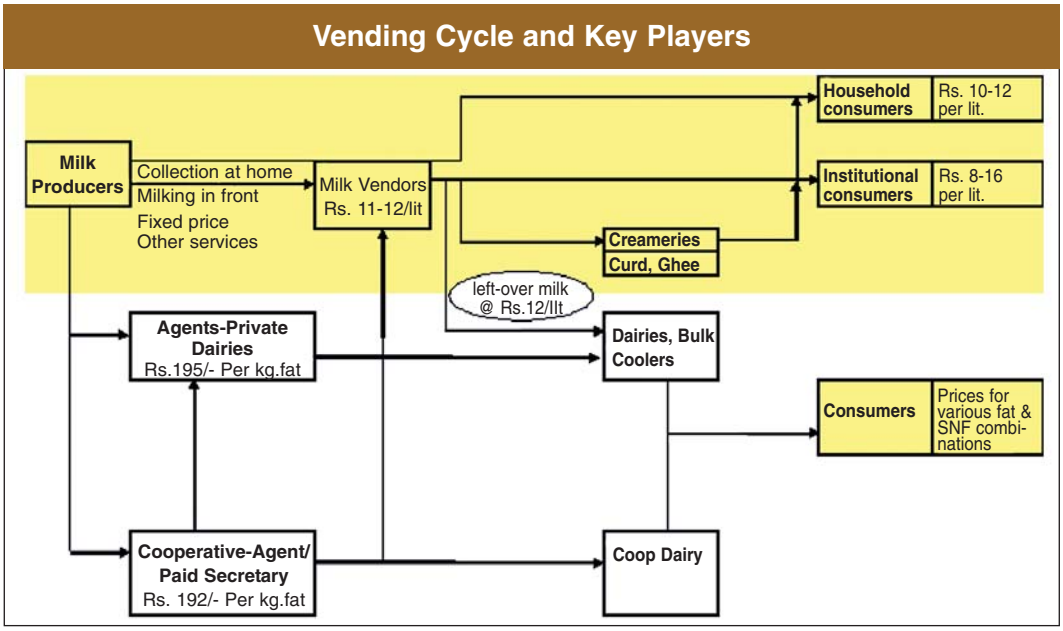
[11] Mostly in Vijayawada market, used mainly by large-scale vendors (operating at 70 litre and above per day)

[12] In terms of distance, this could go up to 70 km in places where train/bus services are available and the market is large (e.g. Vijayawada).

[13] In Vijayawada about 30-odd creameries are operational. In Khammam, there are four creameries, but are used very sparingly as most large-scale vendors supply to institutions where quality check for fat is conducted.

[14] Four creameries in Khammam and one in Satupalli

Figure II



coolers. In a few cases in the Satupalli and Khammam markets, the vendors sell the excess milk to retail milk outlets, which have refrigeration facilities.

1.4 Size of TMS

The results of the study show that TMS has enormous size[15] , spread, reach and impact potential. In the study area, TMS is present in large proportions even in places where there are a large number of players from the organised sector. With increasing urbanisation, the proportion of milk handled by TMS in the market seems to be diminishing. For e.g. Vijayawada has 42 per cent of the market under TMS compared to Satupalli (98 per cent) and Khammam (88 per cent), but still substantial quantities are handled by TMS in these markets and will continue to do so for long.

In Khammam town, an estimated 1,700 vendors operate. In the production and market channels, TMS provides an important livelihood option for large numbers of smallholder dairy farmers and milk vendors. At production points where there is no presence of the organised sector due to difficulty in access and unviable quantities for operation, TMS provides the most important market linkages for rural producers (e.g. habitations such as Kondavanamala and Chinnagollagudem, which are about 8 km away from the main road). Moreover, in habitations which are close to an urban market, the producers have an incentive to sell directly to the urban consumers. Even in habitations where all three operators have a presence, more than 50 per cent of the quantum of milk is sold through TMS. This is indicative of the fact that the sector provides an effective livelihood option for the smallholder dairy farmers, vendors and also caters to the needs of consumers.

Based on the market share of TMS in the towns covered under the AR and the rate of growth of each of the channels as derived from the secondary data sources (table - I), it can be reasonably assumed that TMS is likely to stay for many decades to come and that it is important to focus on this segment, both at the policy and operational levels. In spite of its size, coverage and impact potential, the sector does not receive the kind of attention required for its improvement from any agency (government or other development organisations). Planned investments focused on dairy development are not made in these low potential areas, served mainly by the traditional milk system.

[15] According to secondary sources (APDDCF, 2003-04 list of private dairies/competitors in the federation milk-shed; and statement showing procurement and sales in APDDCF Ltd, year-wise/unit-wise) about 91% of the milk produced in the district is handled through TMS, i.e... approximately 301,000 tonne of milk per year.

1.5 Milk Producers - Profile and Operations

1.5.1 Milk Production

The habitations studied were mainly buffalo tracks, with very limited number of cows being reared. In these, 42 per cent of the households were primary milk producers (proportion similar in all-three operator and vendor-only habitations).

Milking - the most rewarding task of the day

The average animal holding per milk producer household was 2.8 overall and slightly higher at 3.1 in all-three operator habitations. About a third of the milk producers owned only one or two buffaloes. About three-fourths of the milk producing households did not report dairying among the top two sources of income for their households. In terms of social categories, about half of the households were from backward castes (such as Yadavas and Kuruvas), who are traditionally known for livestock rearing and milk production. Some development programmes by the government and other agencies focus on dairying as an important supplementary livelihood option and provide credit for buying animals. These have resulted in a marginal increase in the number of milk producers and animals over the years especially in habitations that have irrigation facilities (such as Ananth Nagar and R. C. Puram). In the habitations studied, dairying is a supplementary source of income for most milk producers, with limited animal holding and milk production.

The average milk production per animal was 2.38 litre per day (lpd) for the flush season and 1.77 lpd for the lean season. At these levels, milk production is considered an unviable option if investment is considered[16]. Overall, 60 per cent of milk producing households handled quantities less than 5 lpd. In terms of breed, less than a fifth of the animals in the habitation were graded buffaloes, and the rest were of local breeds.

In terms of animal management practices, 60 per cent of producers kept the animals outside their houses without proper shelter. Dry grass was the most used fodder (70 per cent of producers), with only a tenth of producers reporting green fodder for feeding the animals. Use of rice bran for feeding was observed in all the three operator habitations, which is also linked to availability of irrigation facilities. The hygiene and sanitation levels at the milking points and in places where animals are kept were extremely poor. The normal hygienic practices to be followed while milking (cleaning of udder, place of milking, etc.) were rarely observed across different habitations and profiles of producers. Stainless steel or aluminium vessels were used by producers while milking.

The vendor's day begins early

[16] According to calculations, at least 4 lpd per animal is required for commercial viability for the producer. Detailed calculations of profitability and cash flow for small-holder dairy farmers included in the main report.

Incidences of cattle diseases were reported[17] to be high as a result of poor animal management and lack of preventive and treatment services in habitations. The main health observed included foot-and-mouth disease, Haemorrhagic Septicemia, Mastitis, Anoestrus Ovary, mosquito bites (during paddy harvest seasons) and death of calves due to worm infestation. Treatment services at the habitation level were generally poor particularly for habitations that were away from veterinary institutions (such as Kondavanamala, R. C. Puram, Basavapuram). The services by DoAH were usually limited to conducting occasional veterinary health camps at a central location, about two to three km away from these habitations.

The use of Artificial Insemination (AI) services was found to be limited, with 23 per cent of milk producers not having accessed these services in the last two years. Forty-three per cent reported accessing this service only once during this period. The usage of these services was found higher in all-three operator habitations due to better accessibility. The utilisation of services of Gopalmitras[18] was reported only by 17 per cent of the producers (only 4 per cent in vendor-only habitations). In terms of satisfaction levels with AI services, about 40 per cent of the producers reported either average levels of satisfaction or dissatisfaction. There were no breeding bulls available even in habitations which were far from veterinary institutions. The inter-calving period was around 18-24 months, much higher than the generally preferred 13-15 months.

The milk production in the research sites was characterised by a holding rate of 2.8 to 3.1 animals per holding household, low productivity (flush 2.38, lean 1.77 lpd) and poor animal management practices leading to inefficient and commercially unviable dairy operations. Lack of commercial orientation to dairying by producers, their lack of understanding of scientific animal management practices, combined with poor veterinary services and accessibility issues have led to the current situation in milk production in the research sites. These issues related to production have in turn affected the quality of milk and the price that it can command in the market. Improvements in these areas are a must for improving small-holder incomes from dairying.

1.5.2 Post Production

On an average, about a third of the milk produced in the habitations was consumed within the milk producing households, with the quantum of milk consumption remaining the same between lean and flush seasons. With the lean season production going down by about 30 per cent, the quantum of marketable surplus milk was reduced to that extent.

The journey with milk begins

Sales to neighbourhood, milk vendors, cooperative and private dairies were the main channels used by producers. Eighty-five per cent of the milk produced in the morning and 45 per cent of the milk produced in the evenings were sold. Most vendors did not procure in the evenings, as the demand for the milk in the evenings is much less compared to mornings and the time taken for completing a cycle would extend their work to more than 16 hours. Therefore, procurement by

[17] Through veterinary camps conducted as a part of entry-point activities and as a part of collaborative actions with DoAH and community organisations.

[18] A cadre of para-veterinarians engaged in AP under the National Project for Cattle and Buffalo Breeding, generally chosen from the community where they are to work and are supported by the Andhra Pradesh Livestock Development Agency and the state animal husbandry department

vendors in the evening was limited in all habitations studied. In all-three operator habitations, producers sold milk mainly to the organised sector (cooperative or private) in the evenings. In fact, producers who sold milk to vendors in the morning also sold evening milk to the organised sector. However, in vendor-only habitations, evening milk was either stored and mixed with morning milk or used for household consumption. Effective storage of milk using locally appropriate methods was one of the areas identified by vendors to improve market access.

In all-three operator habitations, during flush season, about 50 per cent (23 percent through vendors and 27 percent to household and institutional consumers) of the milk is sold through TMS. This proportion increased to 57 per cent of the marketed milk in lean season, wherein the share of organised sector came down. In vendor-only habitations, 76 per cent was sold to vendors and 24 per cent was sold directly to consumers in the lean season.

The reasons for milk producers choosing a particular channel for sale are varied. In case of vendors and private dairies, producers prefer them for regularity of payment and reliability of the person collecting milk. It is to be noted that the operation of private dairies is similar to that of vendor operations, wherein these dairies appoint local level agents to procure milk. In most cases, the producers select the private dairy based on the agent. In a few cases, ex-vendors have taken up such agencies in their own habitations. In case of cooperative societies, the reasons for preference were mainly reputation (well-known government dairy) and correct or higher price, which is quality-based. In habitations where cooperatives operate through agents, the reliability of the person and the confidence that the producer has on the agent have been reported as reasons for preferring the channel. The cooperatives collect milk from fixed centres. The private dairies also have their fixed centres. The vendors with doorstep collection, personal relations, flexible methods and other non-price incentives fulfill some of the basic needs of the producers. In the case of consumers as well, most of these non-price incentives prevail.

With regard to the price received by the producers, the average price reported from vendors ranged between Rs 11 and 12 per litre. Producers selling directly to the consumers got higher prices depending on the market accessed and the level of adulteration with water. For producers selling to private and cooperative dairies, the price ranged between Rs 14 and 15 per litre (worked out on the basis of the announced price of Rs 19.20 per litre for 10 per cent fat in case of cooperative and Rs 19.50 in case of private dairies). During the lean season, cooperative and private dairies increased the price by Rs 1 per litre, which was not practiced by vendors. The price offered by vendors was similar through the seasons, ranging between Rs 11 and 12 per litre, irrespective of all-three or vendor-only habitations.

Prima facie, the price paid by TMS to producers seems lower than that paid by the private and the cooperative channels. Only 51-59 per cent of the consumer rupee reaches the producers through TMS. However, producers value many non-price incentives such as acceptance of froth in the milk sold, no separate sample milk for fat test, door-step collection/delivery of milk, personal contact with the farmers, morning wake-up call, help in milking, limited grocery supplies, milk price realisation

Skimming the profit

on a monthly basis etc., the value of which is not reflected in the 51-59 per cent shown above. Different profiles of producers attach different values on these non-price incentives. For example, to a poor milk producer in an inaccessible habitation, supply of groceries and supply of milk during the dry period were more important, whereas for a large producer, the convenience of door-step procurement and help in milking were given priority.

Even in villages where many vendors or milk channels operate, the price paid by vendors to producers, irrespective of the quality of milk, is the same. There seems to be an understanding among the vendors on the common price that should be offered to the producers in the habitations. Occasional deviations from this unwritten rule were reported (e.g. Kondavanamala), but only for a very short time. Price was not considered the most important factor while deciding on the vendors (rather the relationship, regularity of payment and the non price incentives among others, were considered important).

1.6 Milk Vendors - Profile and Operations

1.6.1 Profile of Vendors

Most of the vendors in all the three markets were mainly men (close to 95 per cent). Women vendors operated in markets that were proximate and within walking distance from their habitations (e.g. Peddagollagudem) or in markets that were accessible by train or bus from their habitations (e.g. Khammam and Vijayawada market, where women vendors from habitations in the periphery of the towns operated).

In terms of social categories, similar to producers, about two-thirds of the vendors were from the backward caste category (traditionally in the dairy business). Only about 10 per cent of vendors were from scheduled castes (SC) or scheduled tribes (ST). Close to half of all vendors were either large or medium farmers (with land holdings of more than 5 acre[19]). Field observations revealed that about two-third of the vendors were also milk producers.

Getting ready for the market

Three-fourths of the vendors studied had been in the milk vending business for over five years, with only 5 per cent of them being new entrants to the business in the last two years. Most vendors reported that milk vending was a business that demanded untiring efforts, the ability to take risks and required maintaining an ongoing effective relationship with both producers and consumers. As such, new entrants to the milk vending business in the last couple of years seemed very low. Moreover, most of the new entrants in the last two years were either relatives or friends of the existing vendors, who provided them with some minimal contacts to start the business. The demands of this business, as cited above, have been reported as barriers that prevent many new faces from entering this business.

About 75 per cent of vendors reported 'milk vending' as their main occupation. For a fourth of vendors, agriculture was the main occupation, with milk vending being the supplementary income source. In most vendor families, milk vending had been the main family occupation over the years, with their relationship with producers and consumers passed down through the generations. As has been discussed earlier, most producers reported 'relationship' as an important factor for choosing to supply to a vendor. The relationship goes beyond just the milk business to their participation in family and other social occasions. This 'bonding' between

[19] Average land holding 3.9 acre

Trains carry milk over long distances

the producer and vendor is valued very highly while deciding on the TMS for supply by producers.

An analysis of the vendor profile indicates that most vendors were from families that had been in the business of milk vending for a long time and it was their main source of income. A large proportion (about two-thirds) of these families could be classified as being economically better off, given their land holding and caste profile.

1.6.2 Scale of Operations

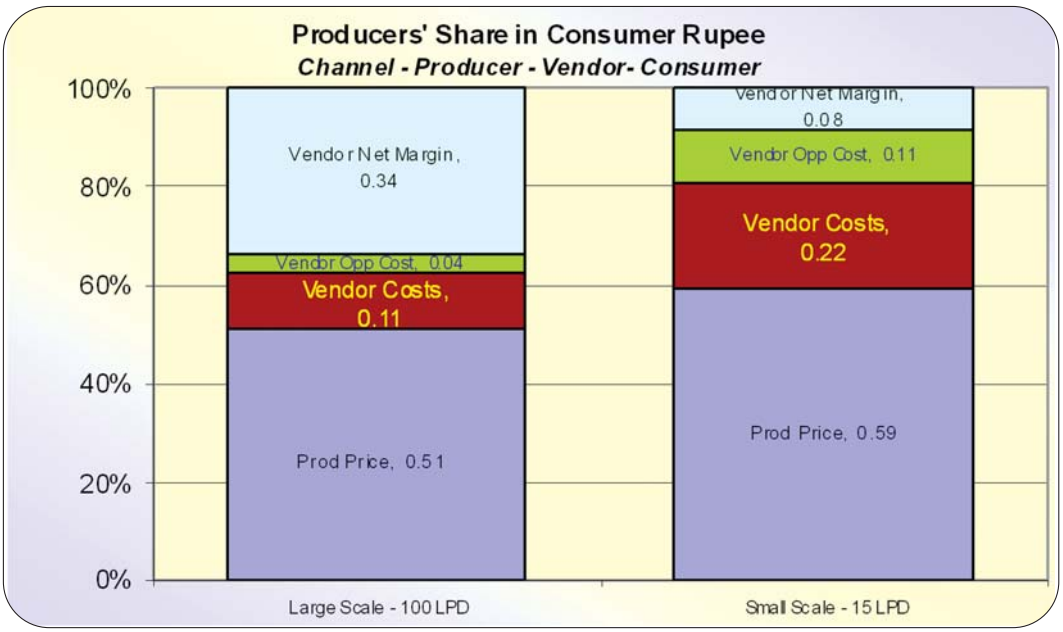
Forty-five per cent of the vendors handled milk quantities below 20 lpd, and about 31 per cent between 20 and 50 lpd. The minimum quantity handled was 6 lpd, with more than three-fourth handling below 50 lpd. The average quantity of milk handled per vendor was about 38 lpd. There was no fluctuation in the quantum of milk handled by vendors between lean and flush seasons. During lean season, vendors looked for more producers and, at the same time, some of the organised sector operators did not operate in habitations that had lower outputs.

Most vendors (61 per cent) reported using packed milk or milk powder to compensate for any supply shortage. About 10 percent vendors reported purchasing milk from other vendors and, either adding or dropping, a few producers or consumers. Similarly, about 10 percent vendors providing higher rates during the lean season to the agents of private and cooperative dairies to procure additional quantities were observed. In case of milk left over after sales, most vendors supplied the excess produce to private dairies and bulk coolers at very low rates, some times even at Rs 2 per litre (in case of Satupalli). However, the quantum of milk and the frequency of this situation were very limited (very few vendors reported this happening in the three months prior to the survey period).

1.6.3 Selection of Habitations and Producers

It was observed that vendors selected habitations based on the consistency and relia-

Figure III



bility of the supply of milk available to them from these habitations. The total quantum from the locality and quality of milk were other factors that decided the selection of habitations. Within these habitations, the selection of producers were based on the 'quality of milk', followed by quantum. The frequency of selection of habitations and producers for most vendors was once in six months (46 per cent of vendors reporting). The main challenge for vendors was to retain the producer, ensuring consistent supply and maintenance of quality. The most common strategy adopted by vendors to this effect was to ensure regular payments to producers. One of the learnings from this study is that vendors also operate on monthly payment terms, both with their consumers and their producers.

1.6.4 Milk procurement and Ensuring Quality

In all the cases, the place of procurement by vendors was the door-step of the producer. Vendors ensured quality of milk supply by being personally present (or a family member being present) while milking. This demands a large amount of time and effort from the vendors. In a few cases, milking is done in the absence of the vendor, when the price paid was usually Re 1 less than the regular rate offered. Case studies of vendors' day-cycle show that the time spent on procurement was between two and four hours depending on the number of producers covered by them. Most vendors started their working day as early as 4.30 am.

1.6.5 Price and other Non-price Incentives

The average price paid to producers (as reported by vendors) was Rs 10.75 per litre. The average price was Rs 11.20 per litre in case of small-scale vendors compared to Rs 10.60 in the case of large-scale operators. Apart from the price, vendors provided other non-price incentives such as loans/advances (31 per cent vendors) and information on animal management (concentrate feed, fodder, Vet. services -20 per cent). Vendors supplying grocery items, helping in milking operations, supplying milk during dry periods etc. were also observed during field interactions. A higher proportion of large vendors provided non-price incentives such as loans/ advances. Very little variation was found in the rates offered by vendors between all-three operators and vendor-only habitations.

1.6.6 Handling Practices

Irrespective of the scale of operations or type of habitations or profile of vendors, all vendors are reported to adulterate milk with water before it was sold (reported in the interviews and during observations). The data based on the test results by the National Dairy Research Institute (NDRI), Bangalore shows that 67 per cent of the consumer samples in Khammam, 88 per cent in Satupalli and 55 per cent in Vijayawada were diluted. There are differ-

Handling milk, the vendor's way

ent levels of adulteration with water by the vendor based on the price offered by the consumer[20]. The lowest quality milk (sold at around Rs 10 per litre[21]) was adulterated with water to the extent of 75 per cent to 100 per cent. The highest quality milk (sold at around Rs 18-20 per litre) was adulterated with water to an extent of 10 to 20 per cent. The scientific test carried out by NDRI confirms a degree of correlation, though weak, between milk price and milk solids. The perceptions of the consumer with respect to the propor-

[20] In some locations, vendors usually keep three to four cans, of which one is invariably water, but looks white as a small quantity of milk is added to make it look like milk. When the consumer asks for milk, the vendor usually asks what price and based on the price, a combination of thick milk and water is added in quick time to make the milk for that price.

[21] General understanding among vendors is that it is 50:50 milk, i.e. 50% water and 50% milk for Rs 10 per litre.

Vendors serve a variety of consumers

tion of water added in the milk purchased by them are consistent with the findings of the scientific tests.

Many small-scale vendors sell milk in PVC bottles and some medium and large-scale vendors use plastic cans which are not made of food-grade plastics. These cans are not easy to clean properly thereby increasing the microbial load in repeat uses adversly affecting the milk quality.

Most vendors do rudimentary tests to check the thickness of milk by dipping fingers into the milk. In creameries too, all the operations involve contact with milk and its products with bare hands. The water used for adulteration is not filtered. The hygiene and sanitary conditions in creameries are areas of concern.

1.6.7 Vendor operations - overall

Case studies of vendors show that the gross margin from milk vending operations ranged from 41 per cent for small scale operators to 49 per cent for large-scale vendors. The details are presented in figure III. i.e. about Rs 75 per day for small-scale operators and Rs 700 per day for large scale vendors. If one considers opportunity costs and other direct costs, then the net margin for a small-scale vendor works out to only Rs 10 per day (6 per cent of the sale amount realised). For the large-scale vendor (100 lpd), the net margin works out to Rs 500 per day (37 per cent of sales realisation).

The scale of operations by most vendors is generally very low given the time and effort spent on operational activities. Each vendor balances the quantity of milk handled at his/her level - 'collects only what s/he can sell and sells only what s/he can collect'. This restricts the quantity of milk handled by each vendor, making it unfavourable to the vendors. The process of collection (including milking in presence), transport and distribution of milk at the doorsteps of consumers requires over six hours of the vendor's time every day. Thus, the cost of labour (based on opportunity cost) on a per litre basis remains exceptionally high.

Poor handling practices and adulteration of milk with water and neutralisers by vendors affect the quality of milk supplied to consumers. The scientific tests conducted by NDRI show that the deterioration of milk quality in terms of milk solids and microbial load is highest at the vendor level.

1.7 Consumers - Profile, references

Of the total 819 urban consumers covered in the study, 94 per cent purchased milk. Of this, 60 per cent purchased milk from TMS, with 98 per cent in Satupalli, 86 per cent in Khammam and 39 per cent

in Vijayawada. In terms of quantum of purchase, 64 per cent of milk purchases were from TMS (98 per cent at Satupalli, 88 per cent at Khammam and 42 per cent in Vijayawada).

Per capita milk purchase was the highest in Vijayawada at 227 ml per day, followed by Satupalli at 222 ml and Khammam at 217 ml. Per capita consumption was the highest for higher income categories (at 348 ml per day in Vijayawada) and gradually reducing (with the low-income category at 161 ml per day).

Access to the traditional milk market was the highest among the high-income group (52 per cent of households reporting purchase from TMS), followed by the upper-middle income group (48 per cent). In the low-income categories, access to the organised sector was the highest with 59 per cent reporting preference for this channel.

The main reasons of preference for TMS were the 'quality of milk (thickness and taste)' followed by 'availability at right time' and 'home delivery'. In case of the organised sector too the 'quality of milk (thickness and taste)' was the main reason for preference, followed by 'availability at the right time'.

About 65 per cent of the consumers purchasing from TMS reported that the milk was diluted with water. This proportion was the lowest at 58 per cent in Vijayawada (where price and competition is high, and there is a practice of cream separation), compared to the highest at Satupalli at 88 per cent. In Khammam, 67 per cent of consumers reported that the milk was diluted.

In terms of usage pattern, 40 per cent of the milk purchased was for tea and coffee, 32 per cent for curd and 21 per cent for consumption by children. The usage pattern is different for each town, with the highest proportion of milk used for tea/coffee in Vijayawada (43 per cent), compared to the highest proportion of milk being used for making curd in Satupalli (43 per cent). Milk is not consumed in its raw form by any of the consumers. When handling practices and quality issues with respect to TMS were discussed, most consumers felt that these did not affect them as they boiled the milk before use. Given this strong rooted perception on milk quality, it is important to develop and disseminate scientific evidence on the quality of milk and the effect of using low quality milk, to change the behaviour of the consumers.

1.8 Quality of Milk in the TMS

The scientific tests conducted by NDRI across the channel show that most of the producer samples consistently conformed to total solids figures. Less than half of vendors' samples conformed to legal quality standards with respect to total solids. However, at the point of sale the dilution takes place depending on the price realised from each consumer. As a result of this, more than three-fourths of consumer samples did not conform to legal standards with respect to total solids, although almost all samples were diluted to some extent. The details are in figure IV.

Institutional consumer samples (from hotels, tea shops, etc.) had the poorest conformation rate.

The smaller-scale vendors had a higher proportion of samples meeting the requisite standards vis-à-vis larger vendors.

Figure IV

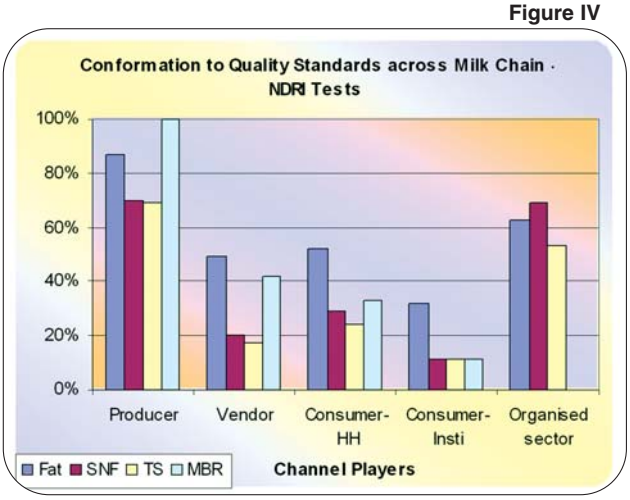
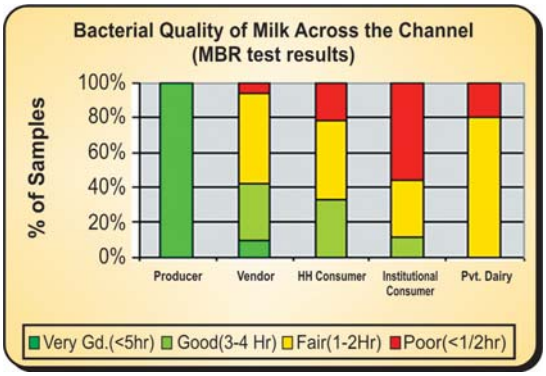


Figure V



The average total solids in milk sold during the lean season was marginally higher than that during the flush season, with producer samples showing the highest level and the institutional consumers showing the lowest level of solids.

The correlation between price paid (as reported by the consumers) and milk solids from these tests is moderate (correlation coefficient 0.501[22] for total solids and 0.441 for fat). It supports the perceptions of the consumer with respect to water mixing.

No chemicals or thickeners were found in milk sold at any level during the flush season. However, during the lean season, about 50 per cent of the vendor samples were found to carry neutralisers (sodium carbonate).

Milk quality assessment carried out on the basis of Methylene Blue Reduction (MBR) test is reflected in figure V. While at the producer level the quality of milk was consistently good, at the vendor and consumer level about two-thirds of the samples were of 'fair' or 'poor' quality (with MBR time ranging from five minutes to one hour). The samples from institutional consumers (such as hotels) showed very poor quality in terms of MBRT.

Though most of the milk through vendor route is diluted, the criticality of this quality is not felt at the consumer level, as diluted milk less often clots on boiling.

1.9 Summary of Findings and Actions Identified/ Facilitated

1.9.1 Summary of Findings

- TMS has enormous size, spread, reach and impact potential. With increasing urbanisation, the proportion of milk handled by TMS in the market is diminishing, but at a very slow rate. Still substantial quantities are handled by TMS in these markets. An analysis of the macro data at the national level indicates that at the present rate of displacement, TMS would take six to seven decades to reduce to ten percent share of the market. It is therefore important to address the gaps (Annexure-I) in TMS and also build on the strengths of this sector to contribute to overall milk production in the country.
- At the production and market points, TMS provides an important livelihood option for large numbers of smallholder dairy farmers and milk vendors. At the production points where there is no presence of the organised sector due to difficulty in access and unviable quantities for operation, TMS provides important market linkages. Even at the research sites, where all three operators have a presence, more than 50 per cent of the quantum of milk (57 per cent in lean season) is sold through TMS.
- In spite of its size, coverage and impact potential, the sector is not focused on by any agency (government or other development organisations) for its improvement. Planned investments focused on dairy development are not made in these low-potential areas served mainly by the traditional milk system.

1. The key features of TMS are:

- Provides the most important market access for milk produced in low productive and inaccessible areas.
- Provides livelihood opportunities for large numbers of producers and vendors, and addresses the consumer preferences in markets (price, flavour, taste, size, etc.).

[22] Significant at the 0.01 level - 2 tailed

- Price plus services at the producer level (advances, wake-up call, help in milking, supply of milk during dry period, supply of groceries, etc).
- Doorstep procurement and milk delivery.
- Emergency support for producers.
- Long personal relationships, going beyond generations.
- Constant prices; no quality checks; no samples for quality checks, accept froth at producer level.
- Acceptance of fluctuating quantities and qualities of milk; even small quantities (both at consumer and producer level).

2. Areas of improvement in TMS are:

- Improvements in the quality of milk handled through TMS so that issues of food safety and conformation to legal standards are ensured.
- Quality based pricing at both producer and consumer level.
- Operational inefficiencies due to low quantities handled, handling practices, methods used for procurement, etc.
- Lack of institutions and platforms that enable sharing, negotiations and working together to address common issues.
- Low productivity due to lack of incentives for higher productivity & lack of services.
- Establishment of some minimum infrastructure for quality testing, preservation, storage etc.
- Review of legal standards for unprocessed, unpacked milk being supplied by TMS

1.9.2 Actions identified/facilitated

The AR generated vast insights into the working of TMS in research sites. The channel through which milk is being sold was mapped, with variations in different types of markets. During the process, a series of actions were identified by the producers and vendors, on a wide range of topics including input supply, breed improvement, quality, price and other parameters. The actions already implemented include creation of a platform in each habitation for bringing up dairy/vendor-related issues, resolving production linked problems like supply of Travis, breeding bulls, fodder seeds, organisation of veterinary camps, training in clean milk production, sharing of quality and price issues with vendors and generating solutions, exploring quality tests, storage and preservation options, fulfillment of quality standards, sharing of information with consumer groups, exploring consumer education etc. Seeing the positive energy being generated by the AR, the district staff of DoAH, APDDCF and the Velugu programme and the Vendor Associations (VA) actively participated in the AR and pledged their support to stimulate improvements. Most of these actions were taken up through linkages with existing institutions, with only facilitative support from the study team.

The vendors after their training at NDRI, proudly exhibits their certificates

The few field strategies that emerged from the AR during consultations with various stakeholders were facilitated by the study team. The detailed actions that were tried out on the field and the support provided and expected from each stakeholder is given in Annexure I. These actions may be classified into the following areas:

- **Capacity Building:** building capacities of all players in the TMS channel in the areas of clean milk production,

handling practices, awareness on quality and legal standards, etc.

- **Institution Building:** of milk producers, vendors and consumers; and facilitating sharing platforms.
- **Exploration of Technology and Operational Solutions:** mainly to promote and facilitate quality-based pricing, better handling practices, establishment of minimum infrastructure for quality testing, preservation and storage and improving operational efficiency.
- **Productivity Enhancement:** through linkages and collaborations with government departments and local CBOs.
- **Policy-level Initiatives** (See section 1.13 on Policy Implications)

1.10 The Way Forward

The AR has opened up opportunities for planners, policy makers and senior government representatives to view this sector as an area of potential and widespread intervention for livelihood improvement and sectoral growth. It also highlights potential actions for addressing long-term threats of quality and food safety aspects not addressed hitherto.

The experience also highlights how the traditional and organised sectors work in step with each other to achieve the goals of increased production, better income and sustainable livelihoods. There are a number of strengths and good practices/principles in each of these sectors,

A mediated dialogue process between producers and vendors

which the other can learn and adapt for overall improvement. There shouldn't be a feeling of one sector replacing the other in the long run. It is important to understand areas of improvement and address them through the strengths and the base built over the years in each of the sectors. The grass-root level actions prove that a synergetic approach by a number of agencies can contribute towards effecting positive changes.

The pilot action research has opened up a number of opportunities with a variety of stakeholders in TMS in the research sites. Institutions of producers and vendors have been organised and some actions initiated. Capacity building of these institutions, facilitation of platforms of producers and vendors, linkages with government and other agencies to address production and productivity related issues, exploration of possibilities for quality-based pricing through innovative institutional models, etc. are at various levels of implementation. There is a need to logically follow this process and build capacities of institutions to sustain these so that the potential benefits of the AR facilitated so far is fully realised and pending actions with the vendors completed.

Introduction of quality testing leads to new dynamics in TMS

The presence of local facilitating agencies (NGOs) combined with the work done and rapport built with vendors and producers associations so far, provide an excellent base

for taking these actions forward. Moreover, the vendors appeared to be quite keen to learn and improve their operations. The Vendor Associations are keen to facilitate the process, given their interest in long-term benefits and sustainable livelihood options. The training of vendors at NDRI brought in improved awareness and the realisation of the need for improvements. The vendors have also come forward to facilitate formation of Producer Associations and, in the long run, Consumer Associations to facilitate better relationships with them. They perceive that the onslaught of private dairies poses a major threat to TMS and therefore, are likely to cooperate better. The category of vendors who are also primary producers appear to be more open in their approach to learning, training and reviewing their ways of working. Their interests also appear to be different as compared to those of other categories of vendors. The capacity development efforts therefore need to be tailor-made to suit both the vendor categories. Based on these opportunities, some immediate actions proposed are:

- Improving the quality of milk handled by vendors so that it conforms to legal standards.
- Improving the price spread and non-price incentives for the vendors through improving the scale of operations, productivity, marketing and financial management skills and finding solutions for reducing losses (through storage and other technologies). These are likely to result in increased price for the producers.
- Establishing and nurturing producer and consumer organisations, through capacity building of local facilitating agencies and exploring opportunities for institutionalisation of these efforts in government or other agencies.

These could be done through capacity building of the vendors, producers and consumers and their associations, providing basic infrastructural facilities for quality testing, facilitating and handholding support to address various issues collectively.

Wider dissemination of information from the AR though a number of initiatives - publications, presentations and wide circulation of outputs of the research - need to be undertaken so that other states and regions can benefit from the learning. Policy awareness exercises and sensitisation of policy-makers, regulators, development agencies and investors to the realities of the sector and potential solutions and interventions are other measures that need urgent attention.

1.11 Key Contributions of the Research

A trevis installed under the AR

The AR process has been effective in obtaining reasonably accurate and hard ground-level data on the traditional milk market players, their shares, the dynamics in operations; particularly with different market profiles. The process has broken the barrier by engaging these 'unorganised' players in a continuous dialogue and working with them. The study has also provided scientific validity to quality-related issues through laboratory tests and linked them with consumers' preferences.

The study has thrown up an important finding - that producers and consumers see inherent advantages in TMS, even in places where the organised sector is present. Each type of operator brings in additional advantages both at the consumer and producer level; in fact a combination of channels is preferred by both producers and consumers. It is therefore important to make options available, which they can choose from. At the same time, issues related to quality and price need to be addressed effectively.

Learning through the Action Research

The study has proven that with systematic and consistent effort, one can work with players in this sector and create platforms for producers and vendors to come together to their benefit. Focused efforts and facilitation at different levels can lead to coordinated efforts of various stakeholders in solving the problems of dairy farmers.

The enormous size and spread of TMS and the nature of its operations clearly point to the need to appreciate its relevance and accept and work with the players so as to improve the quality of milk supplied by them and enhance efficiency.

The study has also developed and tested a methodology, tools and analysis methodologies that can be readily used to understand and work with TMS.

1.12 Learning from the Research

The informal milk market, being one of the least studied, but sensitive areas, requires extra care and effort to obtain accurate and transparent information.

Multiple actors, some with divergent interests, call for very effective and efficient AR to ensure participation, learning and improvements simultaneously.

AR is a process-oriented approach. However, there is a need to have deadlines and specific outputs for administrative and accountability purposes. There is always a conflict between these two requirements, which needs careful balancing at various levels.

An institutional mechanism for undertaking such AR needs to bring in multi-skill teams at various levels to ensure quality, least start-up time and effective technical support. The composition of an RRG mechanism (mix of academic-research-practitioners, policy-implementers, government-non-government and communities, international-national-local, multi-disciplinary like social, market, management, gender, animal sciences), along with the rigour brought in through analysing results periodically and field visits motivated the members to contribute more than was originally planned.

The promotion of the traditional sector should not be seen as detrimental to the growth of the organised sector. These two are complementary to each other, keeping the producers and consumers at the centre of development. By having both, the consumers and producers have the option to make informed choices. There are opportunities for learning from each other.

While handling sensitive subjects such as quality issues in TMS, there could be vested interest groups using these outputs for their benefit. This can potentially spoil the relationship with the groups with whom the study teams worked closely and developed confidence. There needs to be a system of periodically identifying and assessing these risks from external factors and a strategy to address these from time to time.

1.13 Policy Changes and Approaches

The foregoing chapters demonstrate that TMS is a sleeping giant with vast potential for growth and development. About 77 percent of the milk marketed in India passes through this channel. Millions of producers, consumers and

Box VI

Reasons why the Traditional Milk Sector should be supported

1. In recent years, milk production in India has started showing erratic growth patterns. In this context, stimulating dairy production, particularly focused on TMS deserves special attention.
2. TMS covers a vast number of low-potential districts and markets. Millions of resource-poor farmers and market intermediaries earn their livelihoods through TMS. In order to realise the national goal of a *'socially inclusive and regionally balanced economic growth',* it is important that the government does not ignore these millions and the low-potential regions .
3. Growth trends in various segments of the milk value chain demonstrate that TMS is likely to exist for a long time to come - at least 6 - 7 decades to drop down to a level of 10 percent of the milk marketed in India.
4. The quality of milk served by TMS has scope for improvement. It deserves high attention from the angle of food safety, net returns to the milk producers and the value for the consumer's rupee.
5. Investments in dairy production hitherto were focused in about 250 high-potential districts of the country. In spite of its vast size, reach, spread and impact potential, the TMS or the areas served by them received no worthwhile investment or support. With small selective investments, the low-potential areas served by TMS could stimulate milk production to reach a threshold level faster so as to attract other channels also to join, compete and drive still faster growth - exploring synergies.
6. The enterprise of small-holder dairy farmers with low producing animals seems to be economically unviable. It is feared that better availability of credit for purchase of livestock under the poverty-alleviation programmes may be aiding in the creation of more such unviable enterprises. Market access through TMS and appropriate policy support to provide better animals, deserve attention.

Seeing is believing: milk producers on an exposure visit to a fodder plot

market intermediaries are dependant on this segment. If supported and nurtured effectively, it has all the ingredients to usher in another white revolution. The reasons as to why this segment deserves the attention of the policy makers, planners, development agencies, researchers and academia are summarized in Box VI.

Traditional systems of marketing, as mentioned earlier, bring in some inherent advantages, particularly for the poor and marginalised in low milk potential areas. Any improvement in this sector will directly benefit these producers. The observations and findings of the Action Research provide ample pointers for changes in the approaches and policies. There are a number of suggestions which emerged during the research process as also during the subsequent deliberations. These need further exploration. Details of some of the recommended changes in approaches and policies are indicated in Box VII. Some of these are pointers for policy actions for agencies supporting development of livelihoods of the poor. Interventions in this area could be promoted as part and parcel of livelihoods improvement programmes for the poor.

Suggested changes in approaches and policies

1. The selection of districts/areas for investments under the dairy programmes are based on the criteria of minimum production and viability levels specified by the organised sector for the high potential districts. The criteria may be made flexible, need-based, stakeholder-driven and open to include low potential areas served by TMS as well.
2. The quality standards for processed milk provide a number of options in terms of fat and solids-non fat (SNF) levels, both for suppliers and consumers. However, for raw milk sales (which is mainly from TMS) in Khammam, there is practically only one standard which is of whole buffalo milk (5 per cent fat and 9 per cent SNF). Consumers, however, prefer and avail a range of qualities and prices even from TMS. Allowing two-three standards for unprocessed milk would enable vendors also to accept and operate within a legal frame.
3. The efforts towards improving TMS and stimulating production in low producing areas should not be seen as directed at displacing any one channel by another, but at synergising and supporting each other. It should stimulate milk production in the low producing districts to reach the minimum threshold levels in a shorter time so as to attract other channels also to join the competition for the benefit of the poor.
4. Given the current growth trends in milk production, for further financial investments in high-potential districts, priority may be given to the commercial routes. Government resources may partly be diverted to stimulate production and marketing in low-potential areas as well.
5. There seems to be a large gap in the implementation of regulatory and monitoring mechanisms at the grassroot level. Provision of licenses, handholding to conform to the legal standards for milk, periodical checking of milk quality, grievance handling mechanisms, etc. seem to be lacking. It is important to address these issues, keeping in mind the flexibility, the strengths, the market access and the livelihood opportunities that TMS provides for the communities and habitations which remain un-reached by the OMS. The Govt. may promote an enbling regulatory environment for TMS.
6. Providing some minimum infrastructural support in terms of processing, preservation and transport of milk especially aimed at improving the quality, economy of scale and efficiency of operations would enable vendors to adhere to the minimum quality standards for milk and enhance the returns to the milk producers.
7. Adequate impetus needs to be provided for building 'consumer awareness' and creating platforms of consumers and traditional milk operators to dialogue for improvement in quality, price etc. Govt. support for training and capacity building of vendors need to be extended side by side with regulation.
8. Promotion of appropriate stakeholder based organizations (Vendor Associations, Producer Associations, Consumer Platforms etc) and facilitation of dialogue processes among them are of considerable importance in improving TMS.
9. The Livestock Service Delivery Systems under the government and other agencies need to be reviewed from the angle of stimulating production in the areas uncovered by the organised sector. The services should also aim at improving the quality and productivity of the animals, thereby the viability of the small-holder milk production system.
10. Fixing minimum productivity norms for the animals to be distributed under the antipoverty programmes, providing effective market linkages, ensuring continuous cash flow at the producer level through a series of credit options (rather than stopping at single credit) etc. would help the farmers enormously.
11. Introduction of quality-based pricing system under TMS is bound to improve the returns to the producers and the options to the consumers.
12. There are a number of perceptions regarding TMS, many of which are ill-founded. The government could facilitate a process of awareness building through various stakeholders, by which the right picture could be presented to producers, consumers, market agents and the public at large about TMS.

Annexure I - Summary of the Findings and the Actions Identified/ Initiated

Sl. No.	Findings	Actions identified/ Initiated	Support from Govt & others
1	**Contribution of Traditional Milk Sector (TMS)** i. TMS has enormous size, spread, reach and impact potential. In Khammam, an estimated 1,700 vendors operate. They account for about 61% of the milk produced in the district. ii. 99% of households (HH) in Satupalli, 89% in Khammam and 43% in Vijayawada purchase milk from TMS, accounting for 98%, 88% and 42 % of the marketshare respectively. The segment is likely to stay for a long time to come.	**Actions already taken up** i. Creation of an informal platform in each habitation for bringing up dairy/ vendor related issues and resolving production linked problems. ii. Some of the issues resolved include supply of Travis, breeding bulls, fodder seeds, organisation of Vet. camps, training in clean milk production, sharing of quality and price issues with vendors. iii. Training of a batch of vendors by NDRI in hygiene, sanitation, quality standards, milk testing etc. based on a course content mutually agreed with the AR team. **Actions identified** 1. Strengthen/ organise association of vendors through Self Help Organisation. Support in strengthening and institution building. 2.1. Train and build the capacity of vendors at the local level on milk composition, testing, preservation, PFA standards, hygiene, sanitation. 2.2. Handhold vendors and their associations in how to adhere to the PFA standards. 2.3. Vendors need further training to improve their economy of scale and efficiency of operations. 2.4. Training of vendors to take up quality-based transparent pricing. 2.5. Local facilitators and concerned govt staff /service providers to train vendors in input coordination. 2.6. Vendors need special coordination and facilitation skills to be an effective interphase between livestock service providers and producers. 3. Vendor associations need to enforce adherence to the PFA standards for milk by all its members This would also	1. On a number of actions as listed, Dept. of AH, Dept. of Dairy Development APDDCF, the Velugu programme etc. have helped a lot in fulfilling the needs of the producers. 2. The central and the state govts may consider working with, supporting and training and extending basic infrastructural support to TMS wherever it demonstrates its will to conform to the quality and food safety regulations. 3. The criteria for selection of districts and deployment of development funds for dairy programmes may be reviewed to set a balance between commercial routes for developed areas and development funds for low productive areas. 4. The state govts should extend support and finances for building up minimum infrastructure for weighment, bulking, preservation, storage and quality tests of milk. 5. HID support for institution building, quality, food safety aspects and use of infrastructure. 6. Mobilise govt support for quality regulation and awareness building by designated authori-
2	**Scale of Operations** i. Most vendors operate at small scale - 45% operates at less than 20 lpd and a quarter operates at more than 50 lpd. ii. The operational cycle takes about 6 hours of vendor time each day. iii. Each vendor balances the supplies at one's level- 'procures only what one can sell and sells only what one can procure'.		
3	**Quality of Milk** i. Adulteration at producer's level is close to nil. 67% of vendor supplies in Khammam, 88% in Satupalli and 55 % in Vijayawada were found water mixed. A negative correlation exists between price and dilution with exceptions. ii. No chemicals or thickeners were detected during flush season. About 50% of vendor samples carried neutralisers during lean season. iii. In some cases, a part of the evening milk gets mixed with morning milk with out preservation. iv. Consumer awareness on SNF and bacterial content is limited. Thickness and other informal assessment methods dominate quality assessment. v. Poor hygiene and handling practises at vendor level. The Methylene Blue Reduction Test time is very short showing high bacterial load. vi. Legal standards of raw milk may require a review and modification (9% SNF & 0.5 % fat in processed skimmed milk falls within standards, whereas 8.4% SNF & 7% fat in raw unprocessed milk does not).		
4	**Price** i. Price paid by TMS is generally lower than that by other channels. Even where many vendors operate, a sort of price cartel is in position and the price remains the same, irrespective of quality. ii. The level of consumer rupee reaching the		

Annexure I (Contd.) - Summary of the Findings and the Actions Identified/ Initiated

Sl. No.	Findings	Actions identified/ Initiated	Support from Govt & others
	producers is low at 51-59%. iii. There are many non price incentives which the producers/ consumers value. iv. Quality based pricing is not practised by vendors at producer level. v. A correlation (though moderate) exists between the price paid by consumers and the total solids level of milk vi. There are no strong producer organisations to negotiate the price	improve the price spread. 4. Facilitate establishment of Producer and Consumer Associations/ link groups to inter-phase production, quality, price service negotiations. 5. Facilitate producer and consumer education and capacity building in milk quality and food safety parameters. 6. Work closely with vendors and producers associations to come together and discuss issues to be facilitated. 7. Build capacity and training of local facilitators to effectively work with vendor, producer and consumer associations. 8. Facilitate establishment of minimum infrastructure for weighing, bulking, preservation, storage, quality tests etc. at the level of vendor/ stakeholder associations. 9. Build the capacity of the actors. Facilitate public quality testing facilities. 10. Share the findings of the AR with the vendors, producers and the consumers associations. 11. Presentation of findings to govt officials of DoAH, APDDCF, district officials, others with policy outreach. 12. Wider dissemination of findings to be arranged (without damaging the country's interest) through circulation of this report, e-conferences, workshops etc. 13. Work with the policy makers, planners and concerned govt officials to accept and support TMS whereever it demonstrates its determination to conform to the quality food safety standards for milk.	ty. Also, hand-hold to conform to PFA standards. 7. Support in producer and consumer education and awareness building. Existing govt and public institutions to extend support in training. Govt extension staff to support this. 8. Govt AH departments to extend training, extension and inputs delivery with special focus on public good services. 9. Legal standards of milk may require a review. e.g. 9% SNF & 0.5 % fat; (total solids 9.5%) falls within quality standards when it is processed milk, where as 8.4% SNF & 7% fat (total solids 15.4%) is not in TMS in Khammam. 10. Design support for appropriate milk containers especially for TMS. 11. Effective coordination of the activities of the concerned govt departments like AH, Health, Rural Development, Forests etc. at the district, mandal and village level.
5	**Institutional structure** i. Building strong vendor organisations/ associations is important to begin improvements in TMS. ii. Organisational development to be taken up to facilitate training, infrastructure building, self regulation of quality standards & efficiency. iii. Building producer associations and consumer platforms are important to improve the terms of trade, transactions and quality and to act as pressure groups.		
6	**Producer / consumer perceptions** i. Both producers and consumers value the vendor's services including non price incentives. In spite of high frequency of water mixing, 60% - 74% of consumers perceive TMS milk to be thick, creamy and tasty. ii. The satisfaction levels of both producers and consumers remain high.		
7	**Capacity Building/ Training** i. Vendors lack awareness on milk quality parameters, economy of scale, financial operations and marketing and facilitation skills. ii. As a result of awareness building, the vendors underwent training at NDRI in testing procedures, food quality standards, storage & preservation, hygiene & sanitation etc. They even met part of the training costs. iii. The producer - vendors are more eager than only vendors to learn and improve their operations. iv. Producers and consumers are generally unaware of milk quality parameters, terms of trade and related aspects.		
8	**Productivity Enhancement** i. Productivity levels of animals are low at 1.77-2.38 lpd. ii. Livestock service delivery is weak or absent. iii. Vendors expressed willingness to facilitate and inter-phase with service providers in preventive vaccinations, de-worming, doorstep breeding services, supplementary feeding, extension etc		

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Swiss Agency for Development and Cooperation SDC

inter cooperation

The Swiss Agency for Development and Cooperation (SDC) is the development arm of the Federal Ministry of Foreign Affairs of the Government of Switzerland engaged in international development cooperation. SDC works in India with a focus on poverty reduction in the semi-arid rural regions of the country.

Starting in 1963 with a technical collaboration in milk production, SDC's partnership with India's development agenda is spread over a diverse set of engagements covering natural resource management, rural finance and livelihoods, decentralisation, empowerment of the discriminated, environment and pollution, humanitarian assistance as well as human and institutional development. SDC partners include civil society organisations, Government departments, public sector entities, research bodies, advocacy groups, professional associations and other development agencies.

SDC India's goal is to support processes that render sustainable and equitable rural development in India. These processes are people initiated, people owned and people controlled.

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Intercooperation is a leading Swiss non-profit organisation engaged in development and international cooperation. It is registered in Switzerland as a foundation and is governed by 21 organisations representing the development community, civil society and the private sector. IC is a resource and knowledge organisation with 550 professionals working in 22 countries including India, Pakistan, Bangladesh and Nepal. IC works with a number of agencies like SDC, World Bank, IFAD, GtZ, SECO, EU, ITTO etc.

IC's early experience in India (started in 1982) was focused on providing technical expertise to livestock and dairy programmes of SDC through a series of bilateral projects with the state governments in Kerala, Rajasthan, Andhra Pradesh, Orissa and Sikkim. In 2006, IC was registered in India as an independent organisation. It now works with governments, technical and research organisations, NGOs and Community Based Organisations. IC's working domains in India comprise Livestock, livelihoods and environment, Vulnerability and adaptation to climate change and Local governance & civil society.

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CALPI

Capitalisation of Livestock Programme Experiences India

CALPI is a programme of SDC implemented by IC. It's objective is to capitalize on SDC-IC's rich experiences to significantly inspire changes in the economic, administrative, legal and policy frame conditions in the livestock sector in such a way that the priorities and challenges of the rural livelihood systems are effectively addressed and the rural poor, particularly women benefit from the emerging opportunities. The Action Research to improve the traditional milk sector is one among the seventeen activity lines supported by CALPI in the livestock- livelihood-environment domains.

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In this Action Research, the Traditional Milk Sector (TMS) refers to channels served by either producers or vendors, serving unprocessed, unbranded milk in loose form or in plastic bottles or pouches in flexible quantities and prices. The sector accounts for an estimated 1,340 lakh litre of milk per day, constituting 77 per cent of the total milk marketed (2005-'06) in India. It provides the major market access for milk to an estimated 450,000 low productive villages and some 46 million producer households (70 per cent each of the total villages and producing households) in the country. An estimated 110 million milk purchasing households (77 per cent of the total) and a few million market agents/vendors are daily contributors to this segment in India.

This document provides a short summary of an Action Research (AR) conducted in selected habitations and diverse markets of Khammam and Vijayawada districts of Andhra Pradesh. It covers the whole spectrum of activities ranging from production to consumption. The document encapsulates a summary of the findings, the actions identified and taken up, the lessons learnt, policy implications and finally, the way forward.

The aim of this publication is to focus the attention of policy makers, planners, researchers, academia and development agencies on this neglected market segment which has vast spread, reach, coverage and impact potential.

In the context of the widening imbalances in income and growth across regions and sections of society, the Government of India is orchestrating a shift in its development strategy to ensure a ***"socially inclusive and regionally balanced economic growth"***. In this respect, the action research and its recommendations are well aligned to the government's vision for creating a ***'caring India'***.

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