Diagnostic Study of Livestock Practices & Scope for Livelihood Intervention.

Kachchh

COHESION

Contents:

Background:

Bhachau and Rapar block of Kachchh are highly susceptible to frequent drought and disasters. Livestock raring and dryland agriculture are the two main sources of livelihood and recurrence of disasters created long-term impact on their lives. Though Kachchh is known for its livestock density, the productivity has always remained low. Farmers cultivable lands are often lay abandon due to uncertainties in rainfall. Increased land salinity and neglect of water bodies further complicated the life supporting systems.
Nonetheless families still drive their bred and butter from livestock raring. COHESION an NGO working in disaster mitigation, felt that long-term sustainable alternatives could be explored in reviving livestock practices. AWAM an outsourcing service organization was assigned to carry out a study with the support of COHESION.

COHESION is working in 53 villages/vandh of Rapar and Bhachau administrative blocks of Kachchh region. The project area divided in 5 clusters covering Rapar and Bhachau. Each cluster has covered 10 villages. One of the clusters (Ramvav) is having irrigation facility from a minor dam. 8 villages out of 10 are partially covered. In rest of the clusters the irrigation is restricted to 1or 2 villages per cluster. Similarly milk production is visible in almost all villages. Maldhari communities often rare sheep and goats who are either sedentary Pastoralist or trashumant agro-Pastoralist. About 80% of families still draw their income/livelihood from livestock related activates.

Rationale:

The diagnostic study 'livestock raring practices and livelihood intervention' aimed at understanding the livestock scenario. Frequent disasters, degenerating natural resources and institutional failure adversely affected livelihoods of people. In past, exogenous alternatives either ignored local knowledge and practices or failed at breaking strong lobby of trade political interests.

Prior to any initiative in dry land resource systems through diagnosis should be carried. The focus of the study will be on existing livestock practices, impediments and scope for change.

Objectives of the study:

As mentioned above, the study focus on understanding local livestock practices and looks for alternatives to strengthen livelihood of local population.

- To take account of existing livestock and raring practices.

- To study local resource systems and productivity
- To understand institutional support and technology
- To study scope for value addition and village level enterprise.

Methodology:

The study carried out in five clusters of Rapar and Bachau blocks where COHESION is actively involved. Totally 55 settlements (some revenue villages and some non-revenue villages) were covered. Stratified random sampling covered 10% of the settlements considered to carry household survey. Structurised interview schedule was administered while survey was carried in each settlement among livestock owners. Families were selected at random. Another 5 villages were covered to gain further understanding at primary level. Participatory Rural Appraisal tool were adopted in the process. Secondary level information obtained from associated institutions and earlier studies. COHESION team members also shared their insights. Household data was triangulated in PRAs and group discussions.

Limitations:

The study is restricted to Rapar and Bhachau block of Kachchh arid region. Hence it does not represent entire district.
Representation of *Maldhari* community is limited in the study as most of them already migrated with their stock.

Chapter-1.

Executive Summary:

Diagnostic study of livestock practices and scope for livelihood interventions essentially focused on Rapar and Bhacahu blocks of Kachchh. Attempt was made to understand the scope and changing practices of livestock raring in Kachchh. Though 50% of families depend both on livestock and agriculture a significant 37% exclusively survive on livestock. The livestock size is higher at 11(average) with families completely dependent on livestock. The average livestock size of family is however, 4 animals where milk production at household level is 12.4 lts/day. The stock retention period is limited due to inherent complexities in livestock raring. Families below poverty line often abandon the stock due to drought, seasonal migration and high retention costs.

Classification of livestock keepers[1]

Mobility	No home base Year round movement of animals	Home base Seasonal movement of animals	Home base Local movement of animals/Confinement
Fulltime livestock raring	Nomadic Pastoralist	Transhumant Pastoralist	Sedentary Pastoralist **(35%)**
Livestock raring with subsidiary cropping	-	Transhumant agro-Pastoralist **(20%)**	Sedentary agro-Pastoralist
Cropping with subsidiary livestock raring	-	-	Livestock raring farmers **(80%)**
Livestock raring subsidiary to non-cropping activities	-	-	Landless livestock keepers **(12%)**

Livestock raring is a significant aspect of livelihood in Kachchh. Though Pastoralist is predominantly from Kachchh, other livestock keepers also significantly increased[2]. Livestock raring in semi-arid and arid regions is highly complex activity balancing human and livestock needs on limited natural resource base. Pastoralist of Kachchh is stooping away from the traditional occupation. While it maintains a reputation as the most complex and formidable of all agricultural resource development tasks, Pastoralist tend to be among the least educated and least empowered of rural populations.

Pastoralism is at odds with rural, agricultural and urban development priorities[3]. Though their contribution to various sectors of economy is significant, their livelihood is on down slide. A *Maldhari* women questioned, 'why we should rare sheep, when there is no market for the wool for last two years'? They find *'Australian wool'* better and cheaper'! Similar is the case of milk production. Though the percapita milk production is higher, no organized effort sustained in these years in these years. Half of the milk produced is consumed locally and remaining half is turned into processed cream (Ghee).

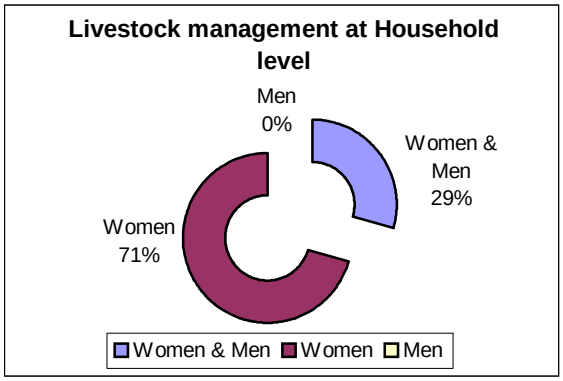
Early technical interventions in pastoral systems focused on regulating trade, improving veterinary services, formalizing livestock/livestock produce marketing, and organizing

[1] Nomadic People, The role of livestock in rural economy; Waters-Bayer & Bayer 1992.
[2] ICAR & GUIDE 1996, 2000
[3] Pastoralism in India:some perspectives; Ganesh Pangare & Richard Cincotta 1996.

grazing land rights. 'Panjrapol's (Cattle rescue centers) were established to provide fodder and water to livestock during drought years. Local traders manage these centers on charitable and religious grounds.

Though such inputs appreciated, development objectives often were not achieved because political, economic and technological reasons. The technology was applied out of context with out sufficient attention to how pastoral systems operate. For example the *Maldharis* refused to use wool cutting machine as they found high mortality rate among herds after its application. Similarly the soft-loans and other schemes were not effective due to migration-oriented lifestyle of Pastoralist. *Panjrapols* in the hands of traders (not Pastoralist) acted more as trade centers of livestock.

Over the years traditional livestock keeping practices are changing and traditional institutions are getting implacable. For example, '*Panjrapol*'s created perpetual dependency among poor and livestock owners. Families' buy livestock for 3 to 4 months a year and abandon them with *Panjrapols*. They repurchase in the following year during monsoon. A *Rajput* women said 'how can we retain the stock when retention costs are higher! To retain stock during 4 months of summer, it costs around Rs3000 per stock. The crisis mounts up specially if it is drought year. When the fodder grass prices shoots up. Traditionally women manage the livestock.



In a study on pastoral communities in Mali, T. Vedeld argued that the internal interests are diverse and wealthier political elites often capture the benefits of social change raises particular problems if policies are geared towards support of traditional structures and leaders[4]. Here in Kachchh traditional pastoral leadership completely eroded and even local agriculturists are struggling hard to survive disasters. Most of the younger generations opting for seasonal labor in privately operated salt-pans along the coast. Lack of political will reflects attitudinal problems among political and ruling elites in different countries and is manifested in very low investments in the drylands and among pastoral groups[5] Perhaps they are not politically attractive for their thin population density and migratory lifestyle.

Traditionally Kachchh exported milk and milk products to middle east. Closing of India/Pakistan boarder cut off access to the water, traditional dry season pasture and trade rich Sind province. Though some communities still migrate greater distance in a continuous search of resources, conflicts, insecurity and hardships marsh their living. On the other hand, fodder shortage whirled up disproportionately in the years of drought. Neglected common property resources such as grazing lands and water bodies mounted pressure on livestock keepers.

Despite the hostile conditions, productivity of Kachchh livestock is positive. Milk yields are higher, draft animals sustain long hours of work and abundance of land generates hope for change in the condition. Change in traditional institutional arrangements, stock

[4] Village Politics. Heterogeneity, leadership and collective action among Fulani of Mali. Vedeld T. 1997.
[5] Custodians of Commons: Pastoral land tenure in East and West Africa; Lane, Charles 1998.

raring practices, market access could generate tremendous growth in livestock raring in Kachchh. Livestock keepers have the key to reverse the trend of soil degradation with organic manure. Farmers and Pastoralist often develop relationships centered on each other's needs: the Pastoralist provides manure and in turn get fodder. The nutrient and energy trade between these farmers and Pastoralist not only underlines agricultural sustainability, but also may actually be increasing due to increasing dependency over croplands and demand for organic fertilizer.

The terms of trade between products that the livestock owners sell and he goods they buy worsen and the real income of livestock producers decline. If local price variability can be reduced by making markets more open….. then this might reduce the social consequences of drought. Risk and uncertainty at household level must be met by variety of measures and institutions

Small scale enterprises could be evolved around manure trade (Organic Fertilizer) and Diary industry. Strange enough, Kachchh does not have strong milk cooperative movement. Earlier initiatives did not succeed for political reason. However village level milk cooperatives should be initiated while collaborating with existing processing units in adjoining districts.

Per capita milk production of stock is at 8 liters per day. About 6000 liters of milk regularly supplied to Rapar town alone by private vendors. Only 40% of the market is shared by branded and packaged milk. This too outsourced from far of places like Gandhinagar and Ahmedabad (400kms)

Enterprises could be initiated around the following areas:

- It is found that there is enormous scope for milk collection, processing and marketing.
- There is high potential for Fodder supply and pasture development to meet the requirement of existing stock.
- Organic Fertilizer is another most viable enterprise and has large potential with increasing awareness among farmers

Village institutions/enterprises could be initiated around these areas. Though there is considerable awareness among livestock keepers on existing markets, seed money and working capital could make a good beginning. Initial investment should be made in community mobilization and capacity building in the above areas. Action in this director would result in reducing the poor communities vulnerability to frequent drought and disasters. Women being major players in livestock raring, enterprises could be initiated among women groups. This would result in equitable and sustainable intervention. The study recommends following steps in this direction.

Recommendations:

- There is high potential for livestock based activities. Reforms are inevitable in traditional ('*Panjrapol*') institutions centered livestock management practices. This practice involved high costs to state and donors and at the same time exploitative and unsustainable.

- Strong livestock based associations/groups should come up to cope with disasters to retain stock on sustainable basis at household level. Pilot projects that place emphasis on local level fodder management should be tried.

- Alternative institutional arrangement (enterprises) should come up in each village to improve resilience of grazing lands and pastures to manage fodder in crisis and block market exploitation.

- New institutional arrangements should be explored, to establish linkages between agriculturists and livestock keepers to balance fodder supply and demand. A cross-linkage trade could be established between organic fertilizer supply and fodder supply.

- Milk producer cooperatives should come up to manage milk collection; trade and processing at cluster level (group of 10 to 20 villages).

- Processing, chilling, storage units along with carriers (Transportation) should be established to transport milk with low transaction costs and avoid transition losses.

- Pressure should be created for prioritising animal husbandry in district plans. Advocacy, lobbing should be carried with the help of premier institutions in livestock management like NDDB, Diary Industry and other Trade & industry partners in wool, leather etc.

- At least 10 Veterinary centers should be allocated (5 each in Rapar and Bhachau) to cater to livestock needs in far-fetched villages. District administration should take keen interest in this sector and divert funds for such activities.

- Credit facilities should be made available to livestock owners for livestock based enterprises or stock improvement activities. Local cooperative banks, lead banks should make funds available. NABARD or other national level /state level corporations should mobilize NGOs to facilitate the process.

- Village livestock plans should be developed to avoid panic sale of stock or purchase of fodder during disasters. Livestock centered micro level planning should be initiated.

- Livestock promotion centers (like Agro-Centers) should come up to provide market information, input supply and to guide other financial services to livestock raring communities. Educated youngsters could run these as micro enterprises. Loans could be made available to them to start such ‘Livestock Centers’.

- Allocation of financial and professional resources, bottom-up institutional arrangement could only create enabling environment for sustainable livelihood of Kachchh communities.

- The stock composition is rapidly changing. Agriculturists no longer prefer oxen due to mechanization (cost effectiveness). Alternatives should be evolved to avert crisis in this segment.

Chapter-2.

Introduction to Kachchh livestock and livelihoods:

Animal husbandry has a predominant role in rural Kachchh. Not merely as subsidiary to agriculture but as one of the main occupation. Kachchh *Maldharis* who survive on seep and goat stock often migrate in search of fodder and water. Recurrence of drought and increased crisis for drinking water has pushed out most of the livestock owners shift from the traditional occupation. *Rabari* community rare cattle for breeding purpose and cattle breeds from this region were in high demand in other parts of Gujarat and neighboring states. Of late stock preference has shifted to stall-fed buffalos for their milk yields and local market for 'processed cream'.

Livestock composition and changing scenario:

In Bhachau and Rapar, the proportion of browsing animals (Sheep and Goat) is more. However, these stocks spend most of its time outside Kachchh in search of fodder and water. Only 4 months the stock remains at village and about 8 months shepherds stay away from village.

Though it has become a tradition, Maldharis do prefer to stay put if there is availability of fodder and water. Following chapters deal with the reasons for raring sheep and goat and increasing difficulties in retaining the stock. Sheep and goat population dominated 75 to 80 percent of stock.

Block wise Livestock composition in 1997

	Cattle	Percent	Buffalo	Percent	Sheep & Goat	Percent	Others	Total
Bhachau	36746	12.14	20989	6.93	239328	79.07	5612	302675
Rapar	39092	14.51	22311	8.28	203504	75.53	4545	269452
District total stock details	374831	22.69	164928	9.98	1082746	65.55	29331	1651836

Source: Livestock Census, 1997

Though livestock trend in last few decades is increasing, per family herd size was reported downward swing. Of late attention is more on higher value stock. This however does not deter the demand for open grazing, as small ruminants still occupy significant proportion. This changing composition has created greater demand for fodder and water resource.

Factors affecting livestock productivity:

Land resources: Invasion of Prosopis on open lands.
Grazing lands are in a degraded state, due to overgrazing, recurrent draughts, increased salinity levels and invasion of Prosopis Juliflora. This has spread as weed in entire kachchh. It fulfills fuel needs of rural communities and also generates employment (charcoal making in 6 months of dry season) for poorer households. But spread of Prosopis Juliflora was considered counter productive to Kachchh ecology. As such the forestlands are dismal and invaded by Prosopis, very little left as productive forestland. Forestlands in Rapar and Bhachau blocks are severely eroded due to torrential rains

and sparse vegetative cover. Poor vegetation could not be blamed on sheep and goat population of the region, as they out migrate for more than 8 months a year.

Salinity ingress and impact on forage and fodder:
Agriculture lands are productive in central Rapar and Bhachau blocks. Coastal areas villages bordering desert are poor soils. Hence the productivity also remains low for most of the years. Salinity ingress is another reason for low productivity. In water rich regions, over extraction resulted in brackish water not fit for consumption or agriculture purpose.

Salinity Ingress in Kachchh District during 1985 - 95

Tehsil	Total area	Area above 4000 TDS		Increase %	Proportion of total area
		Year 1985	Year 1995		
Bhachau	1985	613.37	805.61	31.34	40.58
Rapar	3024	1128.78	1727.40	53.03	57.12
Kachchh	19400	4320.00	6656.49	54.09	34.31

Increasing land salinity is another major threat to vegetation and forage development. Coastal salinity and in land salinity is increasing. Coastal salinity is evident in several studies conducted in past 3 decades. Recent trends in excess ground water extraction contributed to inland salinity. Increased salinity has direct implication on crop yield and forage availability.

Change in cropping pattern and impact on forage availability:
Significant change in cropping pattern is observed in past 15 years. Significant reduction up to 30% observed in cereals and food crops. Cash cropped area has increased. Though forage availability increased by 7% due to irrigation in main lands of Rapar and Bhachau, the demand and supply gap it still higher.

Kachchh district	1960 - 61	1999 - 00
Area under food crops	327000	104027
Area under non-food crops	235200	241917
Total area under crops	562200	345944
Area under food crops %	58.16	30.07
Area under non-food crops %	41.84	69.93

Fodder grass Demand and supply[6]:	**Kgs.**
Existing stock fodder requirements:	801600
Supply level in 2002 from crop lands:	18200
Gap in demand and supply:	783400
Productivity of wastelands in good year:	303000
Crop residues availability in good year:	480400
Production demand per acre Kgs.	3121
Need for increase in crop residues/acre	1914

Neglect of commons and impact on livestock:
Common lands, forest lands and village pasturelands were increasingly neglected due to increased dependency on migration and wage labor. There is strong linkage between salinity ingress-land productivity-migration. Neglect of community based fodder management practices (traditional) resulted in increased dependency over crop residues and sponsored fodder supply.

[6] In 10 study villages.

Chapter-3.

Study Findings

1. Livestock: Changing scenario

The livestock scenario in Rapar and Bhachau is complex and ever changing. Complex, diverse and risk prone nature of the livelihoods resulted in such phenomenon. The study findings suggest that about 35% of families draw their major livelihoods from livestock. And about 12% of families survive completely on livestock. It was also observed that about 80% of families' rare animals and also involved in agriculture for their livelihoods. Again, about 20% families still migrate seasonally 4 to 6 months as wage labors in saltpans and charcoal units[7].

This complexity has emerged out of frequent disasters such as drought, cyclone and earthquake. Apart, major shift in trade, disaster related policies and industrialization has its share in this complexity. Koli community is highest among migrant workers, followed by livestock raring community in search of fodder and water.

The stock composition is still favorable towards two broad segments that are sheep and draft animals. No significant impact of drought was visible on livestock population. In fact, the population has increased slightly 2.5% over last year. This increase is in 'Sheep's, followed by buffalos and cows.

Livestock and Livelihoods:

80% Having agriculture and livestock as source of income

35% Having livestock as major source of income

12% Have no agriculture but survive on livestock

27% Have no livestock but survive on agriculture

20% have agriculture and livestock and still migrate

Land less families are more in Koli community than others.

Average family size is 7

Children are highest among migrants

37% of families migrate 4-6 months a year for employment.

However there is not a single family that completely depends on migration.

Among agriculturists the livestock per family is 5 and among livestock dependant families it is around 11. Big ruminants are greater among agriculturists. Out of 5 animals 4 are big ruminants and 1 is goat. This is also reflected in the population of draft animals maintained by agriculturists. Among livestock raring community sheep population is higher. However, other communities like Patels also started raring buffalos. This has contributed to increase in milk animals.

Livestock Distribution:

Livestock per Family	Avg. no. Families per village	Average Population size	Avg. livestock size per village	Big ruminants	Small ruminants
5	243	1143	1258	382	876

Livestock raring communities keep small ruminants ranging from 100 to 400. This number is however small among agriculturists. Poor families rear often 2 goats for household

[7] Please refer to table for details in appendix 'Income source'.

Livestock Composition

Cluster name	Village name	No.of Families	Population	Livestock Total	Bovine species	Browsing species	Previous year stock
Adesar-1	Lakhagadh	650	2815	2890	290	2600	2656
Adesar-2	Fulpura	85	600	165	145	20	230
Ramvav	Saranvandh	80	450	300	290	10	300
Balasar	Versar	150	610	1560	360	1200	1560
Rapar	Kherai	250	1240	1375	825	550	1375
Total		1215	5715	6290	1910	4380	6121
Average		**243**	**1143**	**1258**	**382**	**876**	**1224**

Stock distribution/Village

Year 2002 Winter

Village name	Cows	Buffalos	Bullocks	Sheep	Goat	Calf	Others
Lakhagadh	77	78	95	2000	600	40	0
Fulpura	30	50	40	0	20	25	0
Saranvandh	40	60	160	0	10	30	0
Versar	100	150	80	1000	200	30	0
Kherai	25	200	400	400	150	200	0
Total	272	538	775	3400	980	325	0
Percentage	**4**	**9**	**12**	**54**	**16**	**5**	**0**

Previous year stock

Village Name	Cows	Buffalos	Bullocks	Sheep	Goat	Calf	Others
Lakhagadh	70	76	90	1800	600	20	0
Fulpura	50	70	50	0	30	30	0
Saranvandh	40	60	160	0	10	30	0
Versar	100	150	80	1000	200	30	0
Kherai	25	200	400	400	150	200	0
Total	285	556	780	3200	990	310	0
Percentage	**5**	**9**	**12**	**51**	**16**	**5**	**0**

Maldharis (sheep raring community) has however found it difficult to sustain the activity in absence of services and exploitative trade and markets in wool. The chapter on trade will discuss this in detail.

Among agriculturists draft animals are predominant. Each family owned about 2 animals. Similarly the cows and buffalo population is around 50% of the stock among big ruminants. Sheep's do form significant percentage out of total livestock of Bhachau and Rapar. They count for 70% of the total population yet having negligible services and productivity. Following chapters would deal with the details on productivity. Population of buffalos is increasing over the years due to its milk yield.

It is also observed that draft animals are neglected even in agriculture, as people find it expensive to maintain during drought and disasters. Though the population of bullocks has not decreased, machines in agriculture increasingly replacing them.

2. Resource distribution and management

Fodder management:

Most of the livestock owners keep stock during monsoon. Fodder is managed from crop residues, crop weeds. In monsoon, stock is not left for open grazing. In early winters, if monsoon is good (about 5 inch) stock is left for open grazing. If monsoon fails, the stock retained with the help of available forage with the family.

For example, 2002 monsoon failed in many parts of Rapar and Bhachau. Animals from Balasar, Adesar-1 and 2 clusters are shifted to 'Panjrapol's. Except one cow or buffalo all other animals are abandoned. Generally goats are kept in drought years. Those who retain buffalos buy fodder and survive on sale of processed milk cream. Draft animals are the first one to dispose after monsoon.

All the animals disposed during winter, are purchased back in monsoon. Families when dispose get no value to the stock but when they buy back pay a price for the stock. The major reason for abandoning the stock is lack of fodder and water.

Villages located on saline coastal lands do manage fodder from open tracks and forestland. But production there would also depend on good monsoon. Farmers said 'if monsoon is good then fodder availability increases on these coastal open lands. But then we also have plenty of crop residues and hence we do not collect from there'.

Resource availability and supply:

Forage availability in year 2002 from crop lands[8]

Cluster	Livestock	Land Sown/Ac in 2002	Total Cultivable Area Ac	Waste Acres	Grazing Land Acres	Produce of Grain Kgs.	Forage Produce Kgs	Forage Produce/ Family	Available Months
Adesar-1	2890	2000	2000	3000	50	200000	133333	205	1
Adesar-2	165	650	650	80	170	65000	43333	510	2
Ramvav	300	1000	1000	500	200	100000	66667	833	3
Balasar	1560	3000	3000	225	150	150000	100000	667	2
Rapar	1375	800	800	100	100	80000	53333	213	1
Avg.	**1258**	**1490**	**1490**	**781**	**134**	**119000**	**79333**	**486**	**2**

Crop land available per livestock:	1.2 Acres
Common land available per livestock:	0.7 acres
Average production potential from common lands per livestock:	2800kgs.
Forage availability from common lands is negligible, as they are not maintained.	

[8] Year 2002 is considered unfavorable monsoon and crop production is very low

Forage availability from crops in good year[9]

Cluster	Production Good year	Forage Good year	Forage Average/ Family/Kg	Forage Availability/ Unit Kg.	Available Months
Adesar-1	4400000	2933333	4513	1015	3
Adesar-2	1430000	953333	11216	5778	19
Ramvav	2200000	1466667	18333	4889	16
Balasar	6600000	4400000	29333	2821	9
Rapar	1760000	1173333	4693	853	3
Avg.	**3278000**	**2185333**	**13618**	**3071**	**10**

Pasture/Range land development:

Local resource availability has drastically reduced over the years. As discussed earlier, common pool resources were increasingly neglected. As a result their maintenance was not carried periodically as it was done earlier. With this their output was reduced. Some of the resources like pasturelands virtually invaded by Prosopis (Khodasar village common land and village tank in Bhachau). In other cases (Balasar and Bela village clusters) these lands virtually turned saline. No vegetation observed on these lands.

Land resource availability:

Livestock/ village	Percapita cultivable area	Percapita wasteland	Percapita pasture land	Per capita area for forage	Production This year (Only cultivable areas) Kg.	Potential production (total available land)
1258	1 acre	0.5 acre	0.2 acre	1.7 acres	53 kg	2494 kg.

Similarly, the water bodies are either silted or invaded by Prosopis and function far below their capacity. Each village has at least 2 water bodies existing. Some villages located in ground water rich areas, have open wells and bore wells like in Ramvav cluster villages. However the TDS levels of this water is increasing.

Water availability

Cluster	Village Tanks	Private Wells	Tanker Lts/year	Pipeline Network[10]	Months Available
Adesar-1	3	300	0	Not available	4
Adesar-2	1	0	1800000	Not available	4
Ramvav	3	1	0	Defunct	6
Balasar	3	0	1920000	Defunct	5
Rapar	1	350	0	Defunct	6
Avg.	**2**	**326**	**1860000**		

Tanker supply reported highly uncertain and just enough for human consumption. Pipeline water supply that laid defunct after earthquake left only hopes. Villagers were optimistic about Narmada water (major canal in Gujarat) reaching through these pipelines.

9 Good year is where monsoon pattern is favorable with 10 inch rainfall at 5 intervals. For more details refer to text. Fodder availability could be surplus in Adesar-2 and Ramvav clusters during normal years of monsoon

10. Pipeline network lay defunct after earthquake. Measures were not yet mooted.

Crop residues:
Even in the existing water bodies, water availability drastically reduced to few months in monsoon. COHESION teams shared that the community based resource management initiatives were almost vanished. Villagers are increasingly looking forward to relief measures and external aid at the place of community management.

Veterinary services in the region are highly dis-proportionate. Veterinary services are highly disproportionate and inaccessible. Villagers travel as far as 50 kilometers to access veterinary services and pay to the tune of Rs.1500 per stock for treatment. Recently, in post earthquake response measures, NGOs and donor agencies provided assistance to organize camps in villages.

Crisis management:

Families adopt 'fleet' mechanism to cope with fodder and water shortage. Over a period of time, this mechanism as incorporated 'trading' face that has high exploitative overtones. As mentioned above, families abandon stock in winter and buy back in next monsoon. All the so-called relief centers virtually turned into 'trade' centers. When the stock shifted to these centers individual have to pay nominal fees to leave his/her stock at *'Panjrapol'*. This varies from Rs.10 to Rs.100 per animal. The stock is provided minimum requirement of fodder and water during the retention period. This period is generally 6 months.

Once monsoon occurs, people visit the centers and buy stock at a price in open auction. Animals fetch good price in open auction. That means people have to pay optimum price when they buy back. This vicious cycle of abandoning the stock and buying back perpetuates poverty and pushes the family in to crisis.

Agriculturists generally abandon the draft animals and unproductive cows and buffalos. Goats are kept for contingency and household milk needs. The cost of raring goats is virtually nil, except cases of bad health. Shepherds generally move out and travel about 400 to 800 kilometers in search of fodder and water. Though they face enormous difficulties like hostility from villagers, road accidents, poor shelter and non-availability of medical and other services.

Livestock Productivity

Livestock productivity is found higher in Rapar and Bhachau blocks. It is higher in big ruminants compared to sheep and goat populations. Traditionally *Maldharis* do not sell the stock for 'meet', and Gujarat is considered politically sensitive in this matter. With this sheep and goat are generally kept for wool, milk and organic matter. Cows and Buffalos are for milk and bullocks are for agriculture purpose.

In summers, most of the stock found at *'Panjrapol's* (relief camps) at various centers in Kachchh. These *'Panjrapols'* are run by business community and known to be functioning for 'Charity' purpose. However, entire operation of *Panjrapols* reveal that they are profit generating exploitative entities that survives on apathy of livestock in Kachchh. See box for further details.

Bovine species:

Milk Productivity:

Cluster name	Per family L.stock	Milk yield Lts/day	Milk yeild/ Lts/year
Adesar-1	4.4	1009	181620
Adesar-2	1.9	750	135000
Ramvav	3.8	800	144000
Balasar	10.4	2000	360000
Rapar	5.5	2600	468000
Average yields	5.2	7159	257724

Cows and buffalos average milk yield: 9 lits./day
Averege milk yeild of village per day: 1432 lts/day
The milk yield reported to rise to 11lts/day in good years.

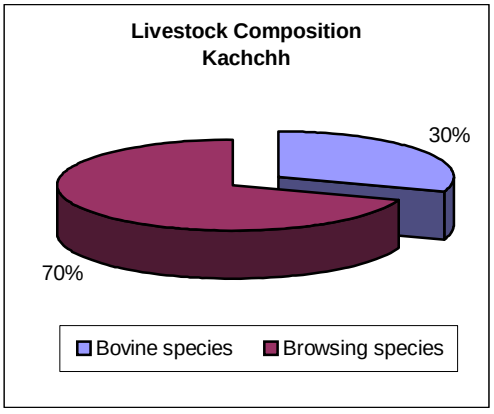
Per capita milk yield of cows ranges from 5 liters to 8 liters. Where as buffalo ranges from 8 to 17 liters in general. Maximum yield per day rises as high as 20 liters and drops as low as 2 liters per day. The average milk yield by cows and buffalos among agriculturists is about 5 lts per day. Among livestock raring community it is around 12 liters per day.

Agriculture operations:

Use of cattle in agriculture operations though predominant, increased mechanization probably affect the population of cattle. It is found that farmers prefer hiring tractors to plough their lands. The cost of plough per acre work out is equal in both cases (tractor or pair of Bullocks) at the rate of Rs. 250 to 300 per acre. However, the maintenance cost of bullocks found to be much higher.

Few years back, bullock played important role in agrarian economy. They were used as means of transportation, used in ploughing, weeding, thrashing etc. Now with increased transportation facilities and mechanization of agriculture their role is getting dismal.

Farmers abandon bullocks and retain milk animals in critical periods like drought. Only those households having more than 10 acres of land retain bullocks. Small landholders generally hire bullocks for plough or retain them only in monsoon season.
Transportation:



Browsing species:

The condition of families dependant on these species reportedly getting deteriorated. ‘Maldhari’ families said that the institutional support and other services are not available. Recurrence of drought and deteriorated common pool resources made life difficult.

Wool production:

Wool produce in last couple of years was not sold due to poor returns. The value of wool produced domestically has reduced with imports from Australia. The wool imported has reduced the market value of local wool and buyers offering further low rates.

Generally the wool is purchased from businessmen from Rajasthan who run wool-processing units. They used to visit regularly and collect wool. However for last 4 years

i.e., from 1998 on wards the situation has changed to worst. Rate of wool per kilo has fallen from Rs.48 to Rs.25.

Returns form Browsing species:

Browsing Species.	Production and livelihood				
Description Per stock	Milk Lts	Dung Kg.	Wool Kg	Sale value Rs.	Annual Rs.
Annual production / stock	100	36	4	1500	
E. Value of production	800	200	100	1500	
Actual income Rs.	0	200	100*	0	300
Feed Source	Open Graze	Feed			
Fodder Kg	360	360			
Months	12	12			
Value Rs.	0	400			
Actual cost Rs.	0	400			400
Additional[i] gains Rs.	800	200	100	1500	1100

* Cost of wool has reduced from Rs.50/kg to 25/kg over a period of 4 years. Hence retention of browsing stock is getting unviable.

Each sheep produces about 4 kg of wool per year. That fetches them about Rs.100. and against the maintenance; the returns are just at subsistence level. Though experiments conducted on improved herds, they did not survive due to extreme climates. Similarly the experimentation of wool cutting tools did not succeed, as herds suffered chronic ailments after application of machinery for wool cutting.

Milk production

Milk production from small herds is almost negligible. However, *Maldharis* sell the milk when they are stationed at a place for long. However the milk fetches low rates when compared to cow or buffalo milk. It is reported that about Rs.5 per liter is the current rate. Goats are largely kept for domestic milk consumption needs.

Meat

Similarly, the goats value Rs.400 to Rs.1200 in and around Kachchh. The community prohibits meat production on religious grounds. With this the market value of sheep and goats are low in Kachchh. Middlemen often sell them in other markets outside Kachchh. The plight of goats and difficulties are narrated in case study on *Maldhari* community.

Institutional support

Although the livestock keepers did not always cite them as problems, the absence of low level of literacy, management skills, and revenue-generating abilities were major obstacles to capacity building and viable institutions. Though state owned Corporations facilitated some services like loans, conflict resolution and technological innovations in production of wool, *Maldharis* said its outreach is limited. The primary interests with regard to food/fodder security, resource security, defense of territory, negotiation of

access and resolution of conflicts, water, veterinary services, credit, access to markets and improvement in pricing and trade policies is still a dream.

Veterinary services:

Unfortunately no institutional support is available to communities in livestock raring. As mentioned earlier, health services are available but at a premium that is often out of reach for the poor communities. Adesar-1 cluster reported the visit of veterinary doctor once in 3 months. All other study villages pointed absence of doctors visit and any kind of veterinary services. The available services were also reported highly inadequate. The veterinary hospital at Rapar is understaffed and also lack advanced (for that matter minimum) equipments to treat stock. With poor infrastructure and spatial distribution of services, people pay high price for treatment.

Villagers from Balasar cluster reported that they have to travel to Rapar for any kind of veterinary services (50 kilometers).

Feed management:

No trade support systems or mechanisms exist in both the blocks of Rapar and Bhachau. Milk sold is largely to hotels on state and national high ways. The price is arbitrary and reflect differential demand-supply ratio. Production is higher than demand. Local diaries exist run by private operators. They could trade about 200 to 500 liters per day. With out proper support and guidance these diaries were closed operations in past.

As mentioned earlier, traditional fodder management practices were completely ignored and damaged. Existing 'Panjrapol' system of crisis management is highly exploitative. Fodder is purchased from far of places and grants were mobilized to maintain the stock. The entire system is un sustainable. Improved feed is sold at local markets and people reflected less know how in feed management.

Some interesting observations: Livestock raring communities	
No. of big ruminants per family is	**5 to 6**
Average livestock per family is	**11**
No.of small ruminants per family is	**2**
Maldhari communities rare small ruminants	**100 to 400**
Average milk production/family:	**12.5 liters**
Average (mim)milk production/livestock:	**4.5 liters**
Percentage cropland plough by Bullocks:	**44**
Percentage population depend on migration:	**24**
Percentage population of children in migrants:	**46**
Percentage families migrate for subsistence:	**32**
Average income earned: Rs./ year.	**12300**
Percentage families not having big ruminants:	**20**
Percentage of forage available year 2002.	**3**

Stock improvement:

Technological innovations are grossly missing in the region. Improved breed, milk processing, storing, health services, fodder management are some of the areas were there is greater need for technological innovations. Though the stock quality is comparatively better and has market value in Gujarat, there is scope for further improvement.

Less than 5% of livestock owners provide improved feed to the stock. Almost all the stock found in the study villages carry local varieties and no improved breed traced. It is evident that initiatives were completely missing in improving the stock quality. Similarly the existing small diary units are also poorly equipped with infrastructure.

Institutional lending:

Lack of initiatives and investments in this sector is reportedly for two main reasons. One is transaction cost of milk collection and processing and second is uncertainty in fodder availability due to poor rainfall and recurrence of drought. Both the reasons found to be imaginary and hypothetical.

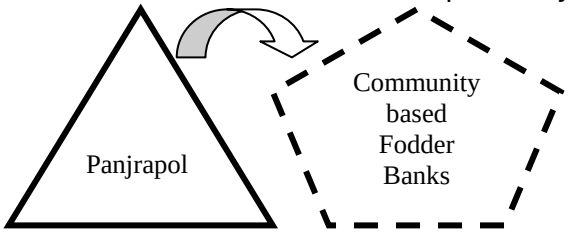
The breed is local but milk yields are sufficient enough to reduce the transaction cost of collection and supply. Absence of organized or institutionalized efforts in fodder management is not a 'cause' but pure failure of traditional mechanism and lack of public sector initiative on the part of state or apex bodies.

For example the Corporation established to support 'shepherd' community introduced machine cutters to collect wool from sheep. Applying this resulted in large-scale mortality among herds. Further initiatives were not taken to find alternatives or improving the tools. Similarly Australian herds were imported and breed locally. But it did not succeed due to high temperature variations and other reasons. Such unsuccessful trials pushed back the entire activity.

Value addition to livestock raring

New Institutional Arrangements:

Scope exists for innovations and improvement in livestock raring practices. The first initiative could be to eliminate dependency over highly un-sustainable 'Panjrapols'.



Panjrapols have become a regular feature in Kachchh lifestyle inducing highly exploitative practices.

Secondly there should be an institutional mechanism that ensures forage collection from agriculturists and makes it available to livestock raring communities. This should be across caste barriers considering those dependants on livestock as major source of livelihood. Such institutional mechanisms do not exist of now. Forage is sold in open market that is generally out of reach to poor.

Revival of traditional practices:

There is scope and need to revive traditional fodder management practices and introduce **community based fodder banks**. Pasturelands and open lands should be revived for fodder production and managed by local institution to manage it on regular basis irrespective of drought or disaster.

Milk processing:

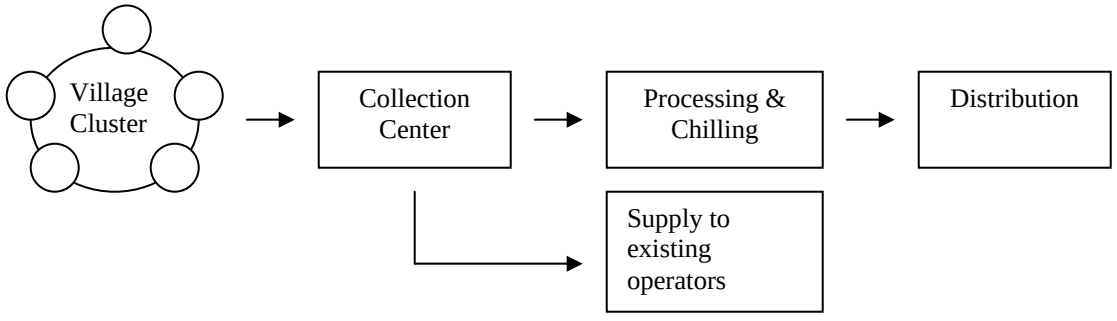
Similarly, milk could be sold to diaries in adjacent districts in co-operative framework. This ensures better services and consistency in rate. Milk producer cooperatives should be established and milk should be sold in far off markets. As of now the milk is imported (Branded) to small towns and cities in Kachchh from other diaries and local milk producers are not able to fetch suitable price.

On an average, each village earns about Rs.176000 worth processed cream (Ghee) per year. About Rs.25 77 240 work milk produced by each village. The net productivity per stock (cows and buffalos) is Rs.4553/year/stock. Each family is generating revenue (in terms of produce) about Rs.10273 from livestock raring. This however being done in most unorganized environment. The results could be overwhelming if the sector is organized and supported by specialized institutions at local and regional level.

Collection and Trading:

Hence proper packaging, branding and if need be processing also has good market potential. As milk production is in significant proposition (per capita livestock production among cows and buffalos is 5liters and 12 liters/day) proper collection, chilling and supply could make good business proposition. Every day about 6000 liters of milk is sold in Rapar through 8 private diaries. Out of which 3000 lts is branded. Individual milk producers sell another 4000 liters directly to households. Though there is gap between demand and supply, markets are not fully explored and developed. This is possible by established diaries in market. Significantly about 6 diary parlors opened in one year in Rapar. They sell milk and milk products. All of them reported good retailing.

Simple models could be evolved in the beginning in milk trade. With external support by institutions collection, processing and distribution could be carried out. Even collection and supply to existing diaries could be explored. Adjoining district milk marketing cooperatives could play important role here. If the cooperatives are in legal tangles or administrative loggerheads, it could well be supplied to private operators in near by cities or towns. It is volume of milk that is produced in Kachchh that makes all the difference.



Linkages:

After ensuring sufficient milk collection, and supplying to major diaries, village institutions could think of developing brand linkages to sell in local markets. In such initiatives, the producer cooperatives could have better margins and also establish presence in local markets. Instead of establishing separate brands, the prouder groups could establish brand linkages. This process could be facilitated by NGOs of support agencies.

Impact of natural calamities on the economics of these activities

Against the general notion that per capita livestock is decreasing, no major downward trend witness in livestock composition in last two years. In fact slight increase in sheep and buffalo population observed. It is evident that the main reason behind increase in buffalos is for its milk yield. Families' raring buffalos often stall feed, unlike cows and bullocks that survive on open grazing.

Increase of herd size in sheep is much of a natural phenomenon rather attributing any trend. Most of the stock that moved out of Kachchh (2001 winter) for fodder and water needs did not return 2002 winter due to unfavorable monsoon. Only those who owned relatively larger cropped lands returned for short duration.

The retention cost of stock is higher in drought and other disasters as the input cost rises. Similarly the stock productivity also reduces due to insufficient fodder and water availability. Stocks are either abandoned or sold during natural calamities.

Loans were made available to Pastoralist communities through Sheep and Wool Development Corporation, but the process was reported as cumbersome. Herd owners said that they often migrate in search of fodder and water and are generally not aware about any schemes to support them. Some other families reported that the schemes are not flexible to suit their pattern of migration and livelihood.

Scope for Change:

Communities should revive traditional livestock practices. New institutional mechanism should be introduced to strengthen and support livestock raring. Small ruminants by and large were ignored in institutional services. Though state sponsored Corporation to take care of small ruminant productivity and sustenance, its functioning was not favorably reported. On the other hand the returns in big ruminants found encouraging. Share of Buffalos is steadily increasing with in household livestock composition.
Returns from Livestock:

The contribution of livestock to household economy is significant, as 37% of households survive on livestock raring. Though 80% own both agriculture and livestock, the returns are interwoven. In monsoon the stock is provided green fodder and in winter and summer dry. Most of the fodder is from agriculture and agriculture depends on timely and 'proper' monsoon. If agriculture fails, livestock also largely abandoned.

Increasing trends observed that milk yielding stocks are retained for their commercial value and fodder is purchased and supplied. Cost of input is recovered from sale of milk and processed cream. Processed cream fetches some where between Rs.6000 to

Rs.12000 per family having at least 2 milk animals. Family consumes buttermilk, yogurt and other products.

Financial Returns: (Under favorable conditions in Kachchh)[11]

Bovine spe.	Production and livelihood									Branded/import	
Produce	Milk Lts	Cow dung Kg.	Process Cream Kgs.	Butter Milk	Yogurt Kg	Cream Kg	Plough Acres	Meat Kg	Wool Kg	Ice cream & Yogurt	Total returns Rs.
Annual turnover / stock	1800*	500	24	3600	900	90	5	0	4		
E. Value of production	18000	500	4800	7200	18000	5400	2000	1200	100	0	Above 18000
Actual income Rs.	0	500	4800	0	0	5400	0	0	100	0	**5400 – 15000**
Feed Source	Crop. resid.	G.F.	D.F.	O.G.	Weeds	Feed	**Total**	Gap	Available	Other costs	
Fodder Kg	900	2400	4800	0	450	720	9270	1530	953		
Months	3	8	8	0	3	12	Normal Year	Open grazing	2002		
Value Rs.	1320	3600	24000	0	440	7500	**38390**	1530	1430		
Actual cost Rs.	0	0	6000	0	0	3200	9200		0	750	9950□
Additional ▪ gains Rs.	9000	500	2400	7200	0	0	2000**	0	0	0	**19100**

Sheep and Goat:

No. of months	Stock moved	Cash earnings on return Rs.	Avg. stock sold/ trip.	Avg. milk yield/ day	Sold Lts/day/ Rs.	Daily expenses of herd owner Rs.	Stock addition per Year
8 to 12	Browsing species	Rs.100 per stock	10% to meet Contingency	0.5lts/ animal	Rs.8/lt market is uncertain	Rs.20	20%

Need for reforms in trade policies and practices:

While attributing reasons for raring sheep and goat communities reportedly continued the practice as traditional occupation. *Maldharis* said that they continued their occupation irrespective of hardships. However the recent imports of 'Australian' wool has severely affected their livelihood. The wool imported is of finer quality and invading markets. The local wool is found to be less smooth and its market value is drastically reduced from Rs.50 to Rs.25 over a period of 4 years.

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* Annual milk yield is calculated on average basis at 10 liters per day per stock for 180 days in a year.
** Gains from draft animal is excluded from total additional gains
▪ Additional gains: Benefits gained by family in addition to cash earnings from milk or milk products.
□ Cash purchase of fodder and services to retain stock through out the year.

Changing Scenario (Study villages)	Bovine	Browsing
Stock representation	111	164
Value of stock in Rs.	555000	164000
Total stock value in Rs.		719000
Stock value in percentage	77	23
Stock representation in percentage	40	60

Pastoral community expressed their concern over this trend and found lack of initiatives in Corporation that is formed to develop the community. Shepherds said that even technological innovations are also half hearted and seldom reach the people in remote areas. Most of the wool stocked as there is no market for past 2 years. Women expressed concern over further deterioration of wool quality.

Wool is generally sold to businessmen at 'Bikaner' in western Rajasthan (600 kilometers away). Threading and weaving processes are carried here. However the businessmen reportedly quoting lower prices for the wool. Pastoral community found it highly un-profitable to sell at low price.

It was recommended that wool-processing units should be encouraged in Kachchh. The community also demanded breed improvement measures and advanced feed management practices. Lack of involvement of community in programs and schemes resulted in isolation of the entire sector. Women felt that sheep and goat raring community is highly neglected and most of the animal husbandry programs are targeted to agriculturists and bovine stockowners.

Among hardships, the community said that stock management is the most difficult aspect of sheep raring. The stock is highly susceptible for theft, accidents and loss. They also said that the stock is highly sensitive to climate changes and hence this community needs to be prioritized in reforms.

Crisis management:

The existing crisis management approach is unsustainable and un economical. Fodder banks and feed banks should replace the existing fodder management /crisis management mechanisms. A drought-proofing model of fodder banking could avert such crisis in fodder supply. When such mechanism exists in each village, crisis could be avoided and poor families could benefit along with others.

Once a drought situation develops, people resort to various strategies. This include changes in food consumption (type and number of meals per day), sale of animals, labor, migration for even low wages, sale of fuel-wood, and remittances from relatives living outside the village.

The terms of trade between products that the livestock owners sell and he goods they buy worsen and the real income of livestock producers decline. If local price variability can be reduced by making markets more open….. then this might reduce the social consequences of drought. Risk and uncertainty at household level must be met by variety of measures and institutions[12]. Interventions through fodder banks, grain banks, market information, pricing management could make a difference in the situation.

[12] Drought Preparedness and risk Mitigation Ragnar Oygard etl 1999 NLH.

Average Crisis period/ Months	Kg. Of grass supplied by Panjrapol / livestock	Average livestock rescued / year	Tons of fodder supplied	Annual cost Rs.	Management cost Rs.
6	900 kg	15000/ Center	13500	5400000	8100000

* Based on discussion with Panjrapols at Rapar.

Service Infrastructure:
Communities reported that the veterinary services are grossly missing due to poor infrastructure and spread. Similarly the livestock camps are organized only when NGOs take initiative. Most of the camps reported were organized in post earthquake scenario. Village groups said that 'prior to earthquake no such camps were witness'. As Rapar and Bhachau are the only centers for health care visits, people find it expensive to meet health related contingencies. COHESION organized such camps in study villages as reported and they wanted to continue it on regular basis.

Milk supply in towns:

No service infrastructure is available for small producers. Milk supply done by small producers in Rapar market with out getting competitive prices. On the other hand 3 new brands are introduced in markets in a span of 10 months. 'Amul' brand that was recently entered in Rapar town (September 2002) sells 540 liters per day and the volume is increasing. Households prefer branded milk. Other customers are tea stall owners and small 8 diary parlors spread in Rapar. They prefer un-branded for making yogurt, buttermilk, sweets.

Sourcing Agency	Region	Quantity of supply	Market rate Rs./Lt	Consumer's perception	Scope for switch over to local supply
Private Diary owners	Rapar town	10000 lts/day	Rs.14 to Rs.16 for Branded Rs.10 to Rs.13 for open sale	Branded is preferred over open sale	Local supply should also be branded and marketed.

About 4000 liters of un-branded milk is consumed in Rapar. Remaining 6000 liters is supplied by brands. Ice creams are the major product sold by private diary units. Ice creams are branded and come from Ahmedabad. About 270 kg of Ice cream is sold every day in Rapar during August 2002. The demand for Ice cream is also increasing.

Existing Market services:

There is less demand for market of milk with in the district. Conscious and strategic initiatives were missing in identifying and generating markets for milk in Kachchh. Though some initiatives were launched in past they hit the ground due to poor management practices.

Scope for Milk Trade:

Rapar and Bhachau (5 to 50 km.) are good markets for milk and milk products. Apart entire Kachchh should not be ignored when looking at potential markets. Currently

Banas and Rajkot diary are supplying milk and milk products. Ice creams for example transported all the way from Ahmedabad and Gandhinagar (400 km away) and sold. Potential of new towns across Kachchh could be identified and markets should be generated. Nearest chilling unit is 90 kilometers away from Rapar in Banaskatha district.

Nonetheless, institutional tie-ups benefit at the initial stage. Milk collection and supply should be focused. To avoid transaction losses, chilling units and carriers should be in place. Milk producer cooperatives are the most viable and accepted mode of trade. If needed NDDB and other private milk based industries explored for collaboration.

Existing Technology:
Existing technologies for breed improvement, production, feed management etc need to be applied if not further innovated. Here the application of technologies itself needs greater prioritization. Such potential district is unfortunately neglected and slogging under administrative apathy. Continuous lobbying, advocacy and research could be used as tools to put forth the sector on priority.

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Appendix:

1. Summary Profile of study villages in Rapar and Bhachau

1.1 Family Size

R.no	Clustername	Village name	Community	Family members	Men	Women	Children
AD101	Adesar-1	Mandavyavandh	Koli	9	3	3	3
AD102	Adesar-1	Mandavyavandh	Koli	9	3	3	3
AD103	Adesar-1	Mandavyavandh	Koli	11	2	2	7
AD104	Adesar-1	Mandavyavandh	Koli	10	3	3	4
AD105	Adesar-1	Mandavyavandh	Koli	11	2	2	7
				50	13	13	24
AD146	Adesar-1	Lakhagadh	Aahir	8	2	1	5
AD147	Adesar-2	Lakhagadh	Shepherd	8	2	3	3
AD148	Adesar-3	Lakhagadh	Aahir	7	2	1	4
AD149	Adesar-4	Lakhagadh	Meghval	10	4	3	3
AD150	Adesar-5	Lakhagadh	Aahir	5	2	2	1
				38	12	10	16
AD236	Adesar-2	Varanu	Brahmin / Maharaj	5	1	2	2
AD237	Adesar-3	Varanu	Brahmin / Maharaj	6	3	2	1
AD238	Adesar-4	Varanu	Brahmin / Maharaj	6	2	2	2
AD239	Adesar-5	Varanu	Brahmin / Maharaj	9	3	4	2
AD240	Adesar-6	Varanu	Brahmin / Maharaj	6	2	4	0
				32	11	14	7
AD206	Adesar-2	Nagtar	Koli	7	1	1	5
AD207	Adesar-2	Nagtar	Koli	3	2	1	0
AD208	Adesar-2	Nagtar	Koli	10	4	3	3
AD209	Adesar-2	Nagtar	Koli				
AD210	Adesar-2	Nagtar	Koli	5	3	2	0
				25	10	7	8
RV11	Ramvav	Karuvandh	Koli	8	1	2	5
RV12	Ramvav	Karuvandh	Koli	7	3	2	2
RV13	Ramvav	Karuvandh	Koli	7	2	2	3
RV14	Ramvav	Karuvandh	Koli	6	3	2	1
RV15	Ramvav	Karuvandh	Koli	11	1	3	7
				39	10	11	18
RV41	Ramvav	Khengarpar	Koli	6	1	2	3
RV42	Ramvav	Khengarpar	Koli	4	1	1	2
RV43	Ramvav	Khengarpar	Koli	5	1	1	3
RV44	Ramvav	Khengarpar	Koli	4	1	1	2
RV45	Ramvav	Khengarpar	Koli	12	4	4	4
				31	8	9	14
RP16	Rapar	Khodasar	Koli	5	1	1	3
RP17	Rapar	Khodasar	Bharvad	8	1	2	5
RP18	Rapar	Khodasar	Harijan	7	1	1	5
RP19	Rapar	Khodasar	Koli	9	2	1	6
RP20	Rapar	Khodasar	Harijan	5	3	2	0
				34	8	7	19

R.no	Clustername	Village name	Community	Family members	Men	Women	Children
RP26	Rapar	Khirai	Patel	8	0	2	6
RP27	Rapar	Khirai	Patel	7	4	3	0
RP28	Rapar	Khirai	Patel	8	1	3	4
RP29	Rapar	Khirai	Patel	8	3	3	2
RP30	Rapar	Khirai	Patel	6	2	1	3
				37	10	12	15
BL21	Balasar	Desalpara	Mahraj	8	3	4	1
BL22	Balasar	Desalpara	Vanand	6	2	1	3
BL23	Balasar	Desalpara	Chowdhri	7	1	2	4
BL24	Balasar	Desalpara	Patel	4	1	2	1
BL25	Balasar	Desalpara	Patel	8	2	2	4
				33	9	11	13
BL31	Balasar	Balasar	Maldhari	7	5	2	0
BL32	Balasar	Balasar	Chaudhari	6	3	3	0
BL33	Balasar	Balasar	Rajput	7	3	1	3
BL34	Balasar	Balasar	Koli	8	3	3	2
BL35	Balasar	Balasar	Rajput	3	1	1	1
				31	15	10	6
	5 Clusters	5 villages	Livestock	169	56	55	58
	5 Clusters	5 villages	Agriculture	181	50	49	82
	5 Clusters	**10 villages**	**Total**	**350**	**106**	**104**	**140**

Average Family size is 7. Children (59%) are higher among agriculturists than in pastoral communities.

1.2 Livelihood:

Clustername	Village name	Community	Source of income				
			Agriculture	Livestock	Migration	Business	Local labor
Adesar-1	Mandavyavandh	Koli	1	1	1	0	0
Adesar-1	Mandavyavandh	Koli	1	1	1		
Adesar-1	Mandavyavandh	Koli	1	1	1	0	0
Adesar-1	Mandavyavandh	Koli	1	1	1		
Adesar-1	Mandavyavandh	Koli	1	1	1		
			5	5	5	0	0
Adesar-1	Lakhagadh	Aahir	1	1	1	1	1
Adesar-2	Lakhagadh	Shepherd	1	1	1	1	1
Adesar-3	Lakhagadh	Aahir	1	1	1	1	1
Adesar-4	Lakhagadh	Meghval	1	1	0	1	1
Adesar-5	Lakhagadh	Aahir	1	1	1	1	1
			5	5	4	5	5
Adesar-2	Varanu	Brahmin / Maharaj	1	1	0	0	0
Adesar-3	Varanu	Brahmin / Maharaj	1	1	0	0	0
Adesar-4	Varanu	Brahmin / Maharaj	1	1	0	0	0
Adesar-5	Varanu	Brahmin / Maharaj	1	1	0	0	0
Adesar-6	Varanu	Brahmin / Maharaj	1	1	0	0	0
			5	5	0	0	0
Adesar-2	Nagtar	Koli	1	0	1	0	0
Adesar-2	Nagtar	Koli	1	0	0	0	0
Adesar-2	Nagtar	Koli	0	0	0	1	0
Adesar-2	Nagtar	Koli	1	1	0	0	0
Adesar-2	Nagtar	Koli	1	1	0	0	0
			4	2	1	1	0
Ramvav	Karuvandh	Koli	1	1	1	0	1
Ramvav	Karuvandh	Koli	1	0	1	0	0
Ramvav	Karuvandh	Koli	1	1	1	0	0
Ramvav	Karuvandh	Koli	1	1			1
Ramvav	Karuvandh	Koli	1	1	0	0	0
			5	4	3	0	2
Ramvav	Khengarpar	Koli	0	1	0	1	1
Ramvav	Khengarpar	Koli	0	1	0	1	1
Ramvav	Khengarpar	Koli	1	1	0	1	0
Ramvav	Khengarpar	Koli	0	1	0	1	1
Ramvav	Khengarpar	Koli	1	1	0	1	0
			2	5	0	5	3
Rapar	Khodasar	Koli	0	0	1	0	0
Rapar	Khodasar	Bharvad	1	1	1	0	0
Rapar	Khodasar	Harijan	1	0	1	0	0
Rapar	Khodasar	Koli	1	0	0	0	0
Rapar	Khodasar	Harijan	1	0	1	0	0

Source of income							
Clustername	Village name	Community	Agriculture	Livestock	Migration	Business	Local labor
			4	1	4	0	0
Rapar	Khirai	Patel	0	1	0	0	1
Rapar	Khirai	Patel	0	0	0	1	0
Rapar	Khirai	Patel	1	1	0	0	0
Rapar	Khirai	Patel	1	0	0	0	0
Rapar	Khirai	Patel	1	0	0	0	0
			3	2	0	1	1
Balasar	Desalpara	Mahraj	1	0	0	0	1
Balasar	Desalpara	Vanand	1	0	0	1	1
Balasar	Desalpara	Chowdhri	1	0	0	0	1
Balasar	Desalpara	Patel	1	0	0	1	0
Balasar	Desalpara	Patel	1	0	0	0	0
			5	0	0	2	3
Balasar	Balasar	Maldhari	0	1	0	0	0
Balasar	Balasar	Chaudhari	0	0	0	0	0
Balasar	Balasar	Rajput	0	1	1	1	0
Balasar	Balasar	Koli	1	1	0	1	1
Balasar	Balasar	Rajput	1	1	0	1	1
			2	4	1	3	2

Livelihood source and livestock

Having agriculture as major source of income	80
Having livestock as major source of income	35
Have no agriculture but survive on livestock	12
Have no livestock but survive on agriculture	27
There is however no family that completely depends on migration	0
37% of HH having either agriculture or livestock tend to migrate for 4 to 6 months a year.	37
20% have agriculture and livestock and still migrate	20
Land less families are more in *Koli* community than others.	

3. Veterinary Services

Reference Code	Doctor's Visit	Vaccinated Stock	Improved Stock	Local Stock	No.of Health Camps	Type of Treatment	Major Diseases (Local names)
RP26	0	0	0	3	0	0	Kharva Mova, Damko, Rahadi
RP27	0	0	1	4	1	Vaccination	Kharva Mova, Vallo, Hajako
RP28	0	0	0	7	0		Kharva Mova, Kalio Tav
RP29	0	0	0	7	0	0	Kharva, Damko, Kalio Tav
RP30	0	0	1	5	1	Vaccination	Kharva, Damko, Kalio Tav
	0	0	2	26	1		
BL31	0	0	0	28	1	Vaccination	Kharva Mova, Vallo, Va
BL32	0	0	0	6	1	Vaccination	Kharva Mova, Vallo, Va
BL33	0	0	0	5	1	Vaccination	Kharva Mova, Vallo, Va
BL34	0	0	0	6	1	Vaccination	Kharva Mova, Vallo, Va
BL35	0	0	0	7	1	Vaccination	Kharva Mova, Vallo, Va
	0	0	0	52	1		
AD236	0	0	0	5	0	0	0
AD237	3	2	0	3	2	Vaccination	Kalio Tav
AD238	3	0	0	5	0		Kharva Mova, Aadaro
AD239	3	0	0	6	2	Vaccination	Aadaro, Kalio Tav
AD240	3	0	0	5	0	0	Kharva Mova, Aadaro
	3	2	0	24	2		
RV41	0	0	1	2	0	0	Aadaro
RV42	0	0	1	1	0	0	0
RV43	0	0	1	2	0	0	Kharva Mova, Aadaro
RV44	0	0	0	3	0	0	0
RV45	0	0	1	7	0	0	Kharva Mova, Aadaro, Pain in legs
	0	0	4	15	0		
AD146	0	0	0	5	1	Vaccination, primary treatment	Kalio tav, Kharva Mova
AD147	0	11		125	1	Vaccination, primary treatment	Cold, Zada, Ori Mata
AD148	0	0	0	11	1	Vaccination, primary treatment	Kharva Mova, Untatiyo, Kariyo, Kubhva
AD149	0	0	0	3	0	0	Kharva Mova, Afaro
AD150	0	0	4	4			
	0	11	4	148	1		
Total	**3**	**13**	**10**	265	**5**		

4. Fodder management at household level

Reference No.	Who manages the stock				Feed availability in an year			Feeding pattern	
	Management		Grazing	Bovine	Dry fodder	Imporved	Total	Green fodder	Dry fodder
	Male	Female	Months	Species	Kgs/day	Feed/day	Months	Months	Months
RP26	0	1	4	3	60	2	12	3	4
RP27	0	1	4	5	100	2	10	4	8
RP28	0	1	3	7	140	10	12	4	8
RP29	0	1	4	7	140	10	12	3	4
RP30	1	1	12	6	120	4	7	4	8
	1	5	27	28	560	28	53	18	32
BL31	1	1	4	3	60	0	12	4	12
BL32	1	1	4	4	80	0	12	4	12
BL33	1	1	4	3	60	0	3	4	12
BL34	1	1	3	4	80	0	12	4	12
BL35	1	1	4	5	100	0	12	4	12
	5	5	19	19	380	0	51	20	60
AD236	0	0	0	5	100	0	0	0	0
AD237	1	1	12	3	60	2	0	3	5
AD238	0	1	12	5	100	2	0	0	0
AD239	0	1	12	6	120	2	10	4	8
AD240	1	1	12	5	100	0	0	0	0
	2	4	48	24	480	6	10	7	13
RV41	0	1	0	3	60	2	7	6	4
RV42	0	1	0	1	20	4	8	4	4
RV43	0	1	0	3	60	4	6	12	12
RV44	0	1	0	3	60	4	8	4	4
RV45	1	1	0	6	120	3	12	4	8
	1	5	0	16	320	17	41	30	32
AD146	1	1	12	5	100	0	0	0	0
AD147	0	1	12	0	0	0	0	3	9
AD148	0	1	12	7	140	5		4	8
AD149	0	1	12	3	60	6		4	8
AD150	0	1	12	9	180	3		4	8
	1	5	60	24	480	14	0	15	33
Total	**10**	**24**	**154**	**111**	**20**	**2.6**	**6.2**	**3.6**	**6.8**

5. Livestock distribution and production

R.no	Livestock							Total	Bovine	Stock	Previous	Milk	Wool
	Cow	Buff	Bulk	Calf	Sheep	Goat	Cam		Species	Value Rs.	year stock	Yield Lts	Kgs
RP26	0	1	0	2	0	0	0	**3**	3	16000	4	8	
RP27	0	1	2	2	0	0	0	**5**	5	21400	4	8	0
RP28	0	2	2	3	0	0	0	**7**	7	20,000	2	20	0
RP29	0	2	2	3	0	0	0	**7**	7	55,000	6	15	0
RP30	2	2	2	0	0	0	0	**6**	6	26,400	12	24	0
	2	8	8	10	0	0	0	**28**	28	138800	28	75	0
BL31	3	0	0	0	25	0	0	**28**	3	52,500	32	20	100
BL32	0	1	2	1	0	2	0	**6**	4	28,900	5	15	0
BL33	0	1	2	0	0	2	0	**5**	3	26,000	3	11	0
BL34	0	2	2	0	2	0	0	**6**	4	22,000	9	12	0
BL35	0	2	2	1	0	2	0	**7**	5	39,000	7	18	0
	3	6	8	2	27	6	0	**52**	19	168400	56	76	100
AD236	1	1	2	1	0	0	0	**5**	5	15,300	4	8	0
AD237	2	0	0	1	0	0	0	**3**	3	3,700	2	10	0
AD238	1	0	2	2	0	0	0	**5**	5	13,300	5	0	0
AD239	1	2	2	1	0	0	0	**6**	6	17,700	6	10	0
AD240	0	1	2	2	0	0	0	**5**	5	26,800	4	10	0
	5	4	8	7	0	0	0	**24**	24	76800	21	38	0
RV41	0	3	0	0	0	0	0	**3**	3	36,000	5	20	0
RV42	0	1	0	0	0	0	0	**1**	1	11,000	3	10	0
RV43	0	3	0	0	0	0	0	**3**	3	45,000	2	30	0
RV44	1	1	0	1	0	0	0	**3**	3	11,200	1	6	0
RV45	0	6	0	0	1	1	0	**8**	6	85,300	10	42	0
	1	14	0	1	1	1	0	**18**	16	188500	21	108	0
AD146	0	4	0	1	0	0	0	**5**	5	56000	4	32	0
AD147	0	0	0	0	113	12	0	**125**	0	125,000	85	40	452
AD148	0	3	2	2	0	4	0	**11**	7	55,000	14	30	0
AD149	0	1	2	0	0	0	0	**3**	3	28,000	4	14	0
AD150	1	4	2	2	0	0	0	**9**	9	56,500	6	30	0
	1	12	6	5	113	16	0	**153**	24	320500	113	146	452
Total	**12**	**44**	**30**	**25**	**141**	**23**	**0**	**275**	**111**	**893000**	**239**	**443**	**552**
Families	8	21	15	15	4	6	0	11	Avrgs.	35720	9.56	17.72	

6. By-products and sale

R.no	Fodder Source	Cost of Fodder Rs.	Other costs Rs.	By-product income	Income from Sale Rs.	Earnings Rs.
RP26	From Vagado & Purchase	4000	170	7000	6000	8830
RP27	From Vagado & Purchase	4,800	0	6000	0	1200
RP28	From Vagado & Purchase	9,600	0	6000	12000	8400
RP29	From Vagado & Purchase	4,000	500	10000	12,000	17500
RP30	From Vagado & Purchase	2,500	2,000	13,200	25,000	33700
		24900	2670	42200	55000	69630
BL31	Vagdo and Grazzing Land	0	2,700	8000	16000	21300
BL32	Feed & Fodder	4,800	2000	17200	21,200	31600
BL33		9,600	3,000	15950	26,000	29350
BL34	From Vagado & Purchase	9,600	0	13700	15,000	19100
BL35	Vagdo	0	0	5000	12,000	17000
		24000	7700	59850	90200	118350
AD236	Agriculture & Grazzing Land	0	0	0	0	0
AD237	Agriculture & Forest	0	0	0	0	0
AD238	Agriculture	0	0	0	0	0
AD239	Agriculture	0	0	0	10,000	10000
AD240	Agriculture	0	3,000	0	0	-3000
		0	3000	0	10000	7000
RV41	Juvar, Lachko & Mahudi	0	4,800	3000	3,000	1200
RV42	Juvar, Lachko & Mahudi	0	0	2000	4,000	6000
RV43	Juvar, Lachko & Mahudi	0	4,800	6000	15,000	16200
RV44	Juvar, Lachko & Mahudi	0	0	2000	2,000	4000
RV45		40	4,800	20000	15,000	30160
		40	14400	33000	39000	57560
AD146	Juvar, Lachko & Mahudi	0	0	6000	10000	16000
AD147	Grazzing Land	0	0	14300	10,000	24300
AD148	Juvar, Bajari, Feed, Grazzing	0	4800	4000	36,000	35200
AD149	Juvar, Bajari, Feed, Grazzing	24,000	4800	5000	13,000	-10800
AD150	Vadi	24,000	4800	10000	12,000	-6800
		48000	14400	39300	81000	57900
Total	**Total**	**96940**	**42170**	**174350**	**275200**	**310440**

7. Livestock productivity & returns

Cluster name	Total livestock	Feed Source	Feed cost 4 months Rs.	Green feed Available months	Dry Feed Available months	Veterinary Costs Rs.
Adesar-1	2890	Agri-residues	1050000	3	5	87000
Adesar-2	165	Agri-residues	555000	4	5	43500
Ramvav	300	Open grazing	0	3	5	87000
Balasar	1560	Agri-residues	1590000	4	5	270000
Rapar	1375	Agri-residues	1950000	4	5	288750
Avg.	**1258**	**0**	**1286250**	**3.6**	**5**	**155250**
Unit Cost	1		**1022**			**123**

Net returns on annual basis*

Income/Year Processed Cream Rs.	**Milk Production/ Year/ Rs.**	**Income from Wool Rs.**	**Income by sale of stock/Rs.**	**Net Productivity Rs.**	**Net Productivity/ Family/ Rs.**	**Unit Production Bovine Species Rs.**
520000	1816200	65000	0	1199200	1845	4135
68000	1350000	500	24000	819500	9641	5652
32000	1440000	250	12000	1385000	17313	4776
60000	3600000	30000	240000	1800000	12000	5000
200000	4680000	13750	180000	2641250	10565	3202
176000	**2577240**	**21900**	**91200**	**1311740**	**10273**	**4553**

Annual feed cost per stock (average) Rs.1022
Annual expances on veterinary services (average) Rs.123
Net income per family on livestock is Rs.10273
Net returns per unit stock (Bovine species) per year Rs.4553
Unit productivity is higher in Adesar2 and Balasar clusters.
Annual returns per family on livestock raring reported higher in Ramvav cluster.