The State of Dairy Cattle in India

This report is part of a Humane Society International sponsored project by the Federation of Indian Animal Protection Organisations and hosted by the Blue Cross of India.

CONTENTS

I. INTRODUCTION

This report deals with the situation of cows in the dairy sector in India and various factors that influence the condition of such animals. The situation with respect to cattle (specifically cows) used in the dairy industry has to be viewed with a somewhat different lens (compared to other animals that are raised for human consumption, either directly or indirectly) owing to the dynamics associated with the cultural and religious significance of cows within Hindu mythology and tradition. In a large majority of Indian states, especially those that have large cow populations, cow slaughter is banned. However, the often repeated statement about cow slaughter being banned in India is technically incorrect, since a number of states have no legislation towards this end. In such states there are no cultural or religious taboos associated with cow meat, which is a routine part of people's diet.

Buffalos though enjoy no such protection and are slaughtered once they are no longer of use in the milk production cycle. Buffalos are also a significant contributor to the overall supply of milk that the country produces. The absolute number of buffalos in the country is growing as is the rate of growth of their population.

The Government, Social Development agencies, the dairy sector highlight the fact that India holds the world's second largest cattle population and is the world's largest milk-producing country. The dairy sector is characterized by a smallholder production system of village-based production units often consisting of one to three milking animals. The majority of milk produced is consumed on the farms where it is produced or distributed through informal channels. Formal markets receive milk deliveries from millions of smallholders coordinated through an extensive cooperative structure (Babcock Institute 2006:Introduction). Government policies and budgetary allocations promote a model where dairy is one of the constituents of the farmer's livelihood basket and most often complements crop production. Government schemes related to dairy have thus focussed on improving livelihoods rather than maximising milk production per se. Milk production though has certainly gone up, though that is more because of the sheer size of the Indian dairy herd (including buffalos) than productivity enhancement. This structure of the dairy sector has welfare implications that are discussed in the report.

The early 1990s saw deregulation of the dairy sector making it possible for private players to set up dairy units fairly easily. Subsequently, the regulatory climate has been further relaxed creating the potential for the private organised sector to participate actively in the dairy arena. This development, viewed in combination with rapidly changing consumption patterns and increases in disposable incomes, particularly in urban areas, implies that there is a huge spurt in demand for dairy products that the existing dairy model may not be able to meet. Projections made by dairy industry watchers predict that the Indian dairy pie may be large enough to allow the cooperative as well as the corporate players to operate in tandem. The projected rise of dairies organised on industrial lines again has significant welfare implications that are discussed in the report.

II. POPULATIONS AND BREEDS

II.1. Context

The entire cattle production of the country is for milk and draught purposes only. While the females are used for milk the bullocks are the mainstay of agricultural operations, especially among small land holders. Male calves are also often abandoned or sent for slaughter.The following table[1] provides a context to the dairy sector of the country relative to India's production of various agricultural products. Cow meat does not feature in this table as its export (as well as import) is restricted as part of India's Export Import Policy. As the table below shows that India accounts for about two-thirds of the world's buffalo milk and nearly half of the world's buffalo meat output. Cow milk production is less than buffalo milk production, and India's share of world cow milk output is less than one-half its population share. Combining milk from all species, India produces about 15 % of the world supply. India produces 10.5 percent of the world's cereal (food) grains, mostly wheat and rice. India is also a major producer of cotton and sugarcane, and accounts for two-thirds of world jute output.

[1] http://faostat.fao.org/

TABLE 3. India Crop and Livestock Production, 2005

	India	World	India as % of World
	Million MT		
Livestock Products			
Beef and Veal	1.5	60.2	2.5%
Buffalo Meat	1.5	3.2	47.1%
Poultry Meat	2.0	81.0	2.4%
Sheep and Goat Meat	0.7	13.0	5.5%
Eggs (Fresh)	2.5	64.4	3.9%
Cow Milk	38.5	529.8	7.3%
Buffalo Milk	50.7	77.1	65.8%
Goat Milk	2.7	12.4	21.7%
Milk, Total	91.9	629.2	14.6%
Crops			
Wheat	72.0	628.1	11.5%
Rice, Paddy	129.0	618.5	20.9%
Barley	1.5	137.3	1.1%
Maize	14.5	694.6	2.1%
Millet	9.0	27.4	32.9%
Sorghum	8.0	58.6	13.6%
All Cereal Crops	234.0	2,228.0	10.5%
Seed Cotton	7.5	67.3	11.1%
Cotton Lint	2.5	23.5	10.5%
Jute	1.9	2.9	66.4%
Sugarcane	232.3	1,289.8	18.0%
Fruit excl Melons, Total	47.0	509.1	9.2%
Oil crops Primary	9.0	137.6	6.6%
Pulses, Total	14.6	61.7	23.7%
Roots and Tubers, Total	32.6	711.7	4.6%
Tree nuts, Total	0.5	8.7	5.6%
Vegetables & Melons, Total	80.5	883.1	9.1%

Source: FAO [33].

(Source: FAO statistical databases http://faostat.fao.org/)

II.2. National Figures and Trends

According to the recent most livestock census undertaken in 2003, the country has about 185.18 million cattle and almost 98 million buffaloes. Interestingly, a decline in the total cattle population has been observed over the last three livestock censuses as depicted in the table below. This is mainly due to the reduction in population of indigenous cattle. Crossbred cattle on the other hand have increased by about 62% over the last 11 years. Over 1997-2003, the population of crossbred cattle increased by 22.82%, compared to a decrease in the population of indigenous cattle by 10.23% during the same period. Buffalo numbers too have continued to rise during this period.

Census	Cross bred	Indigenous cattle	Total	Buffaloes	Total cattle + buffaloes
1992	15.215	189.369	204.584	84.206	288.790

1997	20.099	178.782	198.882	89.918	288.800
2003	24.686	160.495	185.181	97.922	283.109

(Figures in millions) (Source: DAHDF 2006)

The percentage change in the composition of the country's dairy animal population in presented in the table below.

Change in Livestock Population by Species Annual Growth rate (%)

Species	1951-56	1956-61	1961-66	1966-72	1972-77	1977-82	1982-87	1987-92	1993-97	1997-03
Cattle	0.43	2.04	0.07	0.24	0.19	1.35	0.74	0.49	-0.56	-1.18
Adult Female Cattle	-2.76	1.52	0.31	0.61	0.45	1.63	0.95	0.73	0.02	0.02
Buffalo	0.68	2.66	0.69	1.61	1.55	2.39	1.71	2.08	1.32	1.43
Adult Female Buffalo	0.66	2.29	0.89	2.4	1.82	0.76	3.78	2.29	1.32	1.44
Total Bovines	0.49	2.18	0.21	0.56	0.53	1.62	1	0.93	0	-0.33

(Source: http://www.nddb.org/statistics/livestock_population_species5.html)

This clearly shows the growing preference for buffalos as milch animals. Between buffalos and cows, the Indian buffalo herd is expanding by 1.2% per annum, while the dairy cow herd is decreasing by an average of 1% per year. This is principally due to the fact that as far as milch animals are concerned, buffalos are preferred to cows – Indian buffaloes produce more milk than cows and their milk has a higher fat content and a richer taste. At a national level, 57% of the milk production consists of buffalo milk and 43% of cow's milk. Each year buffalo milk production rises by 4% and just cow's milk by just 1.2%. (Brouwers 2006: pp 2).
The population of buffaloes increased from 43.2 million in 1951 to 93 million in 2003, although growth in the buffalo population decelerated from around 2% per year during the 1970s and 1980s to around 1.2% thereafter. This is on account of faster deceleration in the growth of male buffalo population, which fell to 0.3% during the latter period from 0.7%. The proportion of females among the buffalo population has been increasing consistently and in 2003 accounted for about 55% (Stall et al. 2008)

Apart from total animal numbers, the Animal Husbandry Department of the Government of India also records figures on the following disaggregate parameters:

- Number of **female cows** that were capable of producing milk – 58.085 million.
- The number of **breedable cattle** according to the 2003 census was 63.012 million. This figure does not include buffalos.
- The number of **bulls** was recorded as 4.801 million. As far as bulls are concerned, there has been a net decline in the number of animals – both indigenous as well as cross breeds.
- The population of **working animals** has been recorded as 54.319 million. This is a 0.43 % decline from the 1997 figure.

Across all these categories, there has been a decline of varying proportion in the number of indigenous animals while the number of cross bred ones has gone up.

Indian cattle population trends can be summarised as follows[2]:
The cattle population increased until 1992, when it started declining. The turning point in the composition of the draft animal population was 1977 to 1982: at this time the male cattle population declined by over 12 million and the male buffalo population declined by some 2 million. Between 1992 and 2003 the cattle population declined by 9%, with the decline confined to indigenous stock that comprised 87% of the total cattle population in 2003. The number of indigenous cattle declined by 15%, while that of cross-breds increased by 62 %. Within the indigenous stock, the decline was particularly drastic for males (22%).

These figures are reflective of the policy adopted by development agencies – governmental as well as non governmental – of crossing indigenous cattle with foreign breeds through artificial insemination. The decline

[2] See Stall et al 2008: pp 39

in local breeds can be also be correlated with the reduced demand and need for working animals, especially in farms as a result of increased mechanisation. Since the focus has progressively shifted to the utility of cattle as milk producers rather than as working animals, breeds that are high milk producers are being promoted. (HED 2002, pp183)

II.3. State Trends

Madhya Pradesh and West Bengal have the largest number of cattle (18.913 million each) followed by Uttar Pradesh (18.551 million) and Maharashtra (16.303 million). Amongst states Kerala, Maharashtra, Tamil Nadu, Punjab, Uttar Pradesh and West Bengal accounted for nearly 70% of total crossbred in the country, with Kerala having the highest crossbred population. The declining trend among indigenous cattle however, is not uniform across states: agriculturally advanced and more mechanized states, such as Punjab, Haryana, Andhra Pradesh, Kerala and Tamil Nadu, witnessed a sharper decline in working male population, while the less progressive and hilly states, such as Assam, Bihar, Madhya Pradesh, Orissa and West Bengal, showed increasing dependence on work animals.

To provide a perspective, the population of buffalo also increased by 8.90% during the intervening period between last two livestock censuses (1997 and 2003). While buffaloes are now reared in almost all states, Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh account for bulk of the buffalo population.

(Planning Commission 2007: pp16)

II.4. Breeds

India possesses 27 acknowledged indigenous breeds of cattle and seven breeds of buffaloes. The Government supported Indian dairy establishment has focussed its energies on the cross breeding of existing cattle with foreign breeds. The foreign breeds introduced are the Holstein Friesian, Jersey, Red Dane and Brown Swiss. The National Dairy Research Institute (NDRI) has succeeded in developing two new breeds, the Karan Swiss and the Karan Fries. The Karan Swiss is a cross between Brown Swiss bulls from Switzerland and the Sahiwal and Red Sindhi Zebu (humped) breeds. The Karan Swiss breed produces an average of 3,350 kg milk per year, while the record production for this breed stands at 7,096 kg. To develop the Karan Fries, the NDRI used the Tharparkar buffalo. They were artificially inseminated by Holstein Friesian bulls. The cows of this new breed are able to produce an average of 3,400 to 3,600 kg milk per year. (Brouwers, 2006: pp18-19)

The welfare implications of such cross breeding and the progressive displacement of indigenous breeds by cross breeds are unclear. However, the unsuitability of cross breeds to cope with extreme weather conditions and other environmental stressors, particularly as prevalent in north India are well recorded (HED 2002: pp182- 183). There are certainly implications as far as conservation of domestic biodiversity is concerned. However, those are beyond the scope of this report.

There are seven Central Cattle Breeding Farms at Suratgarh (Rajasthan), Chiplima and Sunabeda (Orissa), Dhamrod (Gujarat), Hessarghatta (Karnataka), Alamadi (Tamil Nadu) and Andeshnagar (Uttar Pradesh). These are engaged in “scientific” breeding programmes of cattle and buffaloes and production of high pedigreed bulls for the National Project for Cattle and Buffalo Breeding. During 2004-05, these farms produced 313 bull calves and supplied 252 high pedigreed bull calves for use under Artificial Insemination Programme in various parts of the country[3].

It is also likely that there are welfare issues associated with the breeding process. However, it has not been possible to locate secondary information on this subject.

III. PRODUCTION AND CONSUMTION TRENDS

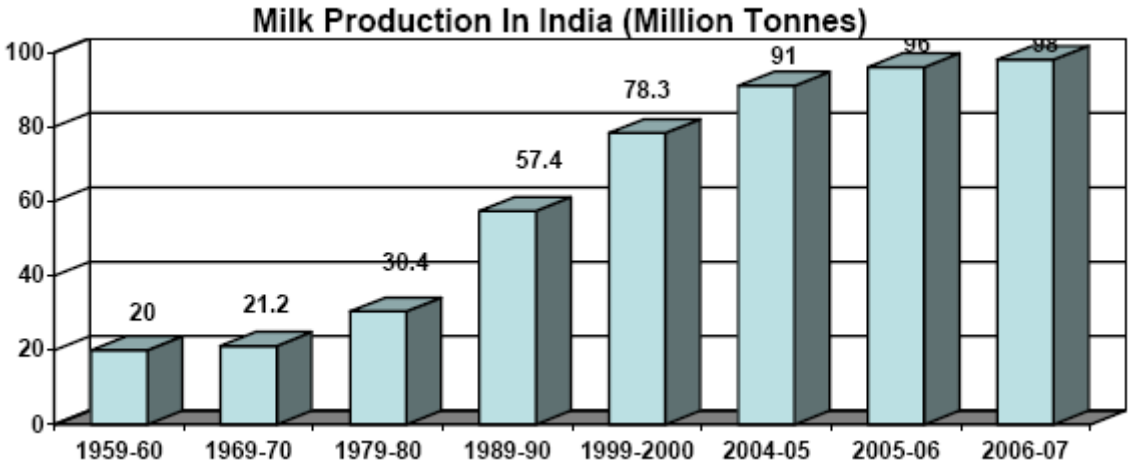
In this section we examine the trends of milk production nationally as well as across states. Various predictions about possible future trends are examined to predict possible welfare implications on dairy cattle. Since the figures used here are consolidated for both cows as well as buffalos, the welfare implications apply as much to buffalos as they do to cattle.

III.1. Production

India is the largest producer of milk producing more than 100 million tons of milk per annum. The table below shows the consistent rise in the milk production in the country. India's milk production increased from 21.2 million tonnes in 1968-69 to 97.1 million tonnes in 2005-06 and to 100 million tonnes in 2006-07. Per capita availability of milk was 245 grams per day in 2006-07, increased from 241grams per day in 2005-06, up from 112 grams per day in 1968-69[4].

[3] See http://india.gov.in/sectors/agriculture/cattle_buffalo.php

[4] See. http://www.nddb.org



(Source: Banerjee 2007)

Across the country, dairy is concentrated in the north-western states where the climate is more temperate. The top five states – UP, Punjab, Rajasthan, Andhra Pradesh, Gujarat - account for more than half of current production (Brouwers 2006: pp 15). The table below shows the growth in milk production across states. In reading this table, the fact that off the total milk produced in the country approximately 42 % is cow milk must be remembered.

Estimates of Milk Production - Statewise

(000 tonnes)

State	1987-88	1988-89	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2006-06	2006-07
All India	72128	75424	78286	80607	84406	86159	88082	92484	97066	100869
Andhra Pradesh	4473	4842	5122	5521	5814	6584	6959	7257	7624	7939
Arunachal Pradesh	43	45	46	42	42	46	46	48	48	49
Assam	719	725	667	683	682	705	727	739	747	751
Bihar	3420	3440	3464	2489	2664	2869	3180	4743	5060	5450
Chhattisgarh	-	-	-	777	795	804	812	831	839	849
Goa	38	41	44	45	45	46	48	57	56	57
Gujarat	4913	5059	5269	5312	5862	6089	6421	6745	6960	7533
Haryana	4373	4527	4679	4850	4978	5124	5221	5222	5299	5367
Himachal Pradesh	714	724	742	761	756	773	786	870	869	872
J & K	1167	1232	1286	1321	1360	1389	1414	1422	1400	1400
Jharkhand	-	-	-	910	940	952	954	1330	1335	1401
Karnataka	3970	4231	4471	4599	4797	4539	3857	3917	4022	4124
Kerala	2343	2420	2532	2605	2718	2419	2111	2025	2063	2119
Madhya Pradesh	5377	5442	5519	4761	5283	5343	5388	5506	6283	6375
Maharashtra	5193	5609	5707	5849	6094	6238	6379	6567	6769	6978
Manipur	62	65	68	66	68	69	71	75	77	77
Meghalaya	59	61	62	64	66	68	69	71	73	75
Mizoram	17	20	18	14	14	15	15	16	15	16
Nagaland	46	48	48	51	57	58	63	69	74	67
Orissa	672	733	850	876	929	941	997	1283	1342	1431
Punjab	7165	7394	7706	7777	7932	8173	8391	8554	8909	9168
Rajasthan	6487	6923	7280	7455	7758	7789	8054	8310	8713	9375
Sikkim	35	35	35	35	37	45	48	46	48	49
Tamil Nadu	4061	4273	4586	4910	4988	4622	4752	4784	5474	5560
Tripura	57	76	77	77	90	79	84	86	87	89
Uttar Pradesh	12934	13618	14152	13857	14648	15288	15943	16512	17356	18095
Uttarakhand	-	-	-	1025	1066	1079	1188	1195	1206	1213
West Bengal	3415	3441	3465	3471	3515	3600	3686	3790	3891	3982
A&N Islands	22	22	23	22	23	26	25	24	20	23
Chandigarh	43	43	42	43	43	43	44	43	46	46

D&N Haveli	4	8	8	8	8	8	8	4	5	5
Daman & Diu	1	1	1	1	1	1	1	1	1	1
Delhi	267	290	290	291	294	296	299	303	310	289
Lakshadweep	1	2	1	2	2	2	1	1	2	2
Puduoherry	36	36	37	37	37	37	40	41	43	45
Source: Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, GoI										

(Source : http://www.nddb.org/statistics/milkproduction_states.html)

The FAO's statistics division has produced disaggregated statistics for the production of cow milk in the country between 1996 and 2006.

(tonnes)

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
27916000	29128000	30454000	32636000	32967000	34516000	34612000	34973000	37344000	39759000	39775000

(Source http://faostat.fao.org/site/569/DesktopDefault.aspx?PageID=569)

Thus while a clear rising trend in production of cow milk can be see, the more important statistic that these figures point towards is the rising importance of buffalo milk and therefore of buffalos as animals within the Indian dairy sector.

III.2. Consumption

Historically, the Indian society has been a significant consumer of dairy products. Apart from liquid milk, butter, ghee, and other such products have had a central place in Indian society. The per capita milk consumption is around 250 g per day. During the 1980s, consumption of both animal and vegetable products increased very substantially. Among the animal products, the largest proportional increase was in the consumption of milk (Pingali and Khwaja 2004). The table below clearly shows the rising trend in the consumption of milk products (as well as other foods of animal origin):

Table 4. Food consumption in India

(the unit used is cal/cap/day)

Product	Averages		
	79-81	89-91	99-01
Grand Total	2083	2365	2492
Total Animal Product	120	163	196
Animal Fats	23	28	47
Aquatic Products, Other	0	0	0
Eggs	3	5	6
Fish, Seafood	5	7	8
Meat	16	20	22
Milk- Excluding Butter	71	102	111
Offals, Edible	2	2	2

(Source : www.faostat.fao.org)

A useful mechanism to predict the possible changes in demand for dairy products in the future is to look at the temporal change in the expenditure on milk and milk products across the country. This data disaggregated on a rural-urban basis gives us further clues to the source of changing demand for milk and milk products.

Per Capita Monthly Consumption Expenditure (in Rs.)	
National Sample Survey Round	Milk and Milk Products
25th (1970 - 1971)	
Rural	3.03
Urban	5.01
27th (1972 - 1973)	
Rural	3.22
Urban	5.91
32nd (1977 - 1978)	
Rural	5.29
Urban	9.16
38th (1982)	
Rural	8.45
Urban	15.15
42nd(1986 - 1987)	
Rural	13.48
Urban	23.32
43rd(1987 - 1988)	
Rural	13.63
Urban	23.83
44th(1988 - 1989)	
Rural	15.65
Urban	26.74
45th(1989 - 1990)	
Rural	18.35
Urban	29.53
46th (1990 - 1991)	
Rural	19.04
Urban	32.37
47th (July - Dec. 1991)	
Rural	21.9

Urban	37.21
48th (Jan. - Dec. 1992)	
Rural	23
Urban	42
49th(Jan. - June 1993)	
Rural	23
Urban	41
50th(July 1993 - June 1994)	
Rural	27
Urban	45
51st (July 1994 - June 1995)	
Rural	27
Urban	49
52nd (July 1995 - June 1996)	
Rural	32.38
Urban	56.45
53rd (Jan-Dec 1997)	
Rural	39.31
Urban	62.75
54th (Jan-- June 1998)	
Rural	36.54
Urban	64.63
55th (July 1999 - June 2000)	
Rural	42.56
Urban	74.18
56th (July 2000-June2001)	
Rural	42.97
Urban	75.9
57th (July 2001-June2002)	
Rural	41.91
Urban	75.82
58th (July 2002-Dec.2002)	
Rural	45.34
Urban	78.19
59th (Jan. 2003-Dec.2003)	
Rural	44.69

Urban	80.03
60th (Jan. 2004-June2004)	
Rural	47.6
Urban	82.98
61st (July 2004-June 2005)	
Rural	47.31
Urban	83.3
Source of NSS data: Level & Pattern of consumer expenditure, Various issues, National Sample Survey Organisation, Ministry of Statistics & Programme Implementation, GoI. Table sourced from http://www.nddb.org/statistics/expenditure_milk.html	

This dataset shows us a clear trend of increasing expenditure on milk and milk products. This rise is particularly pronounced in urban areas and takes to the next section – predicting welfare implications of a growing demand for dairy products.

III.3 Future Scenario

Though there are significant welfare issues with transport of cattle and slaughter, there has been relatively less attention paid to welfare issues associated with the rearing of cattle and their husbandry during their lifespan. Partly, this is reflective of gaps in research attention to issues of welfare among dairy cattle as well as the relatively low attention devoted to the welfare of dairy cattle by the Indian animal welfare sector. However, this is also on account of the fact that the welfare implications of a decentralised, small-holding dairy model are relatively "benign" compared to a model focussed on maximising production. It should also be remembered that in the current situation, milk production is a complementary activity for farmers that is undertaken in conjunction with other agricultural activities and that the Indian government too views the sector more as a rural development / poverty alleviation tool rather than as a contributor to GNP through production maximisation.

The Indian dairy sector is however likely to witness rapid changes in the near future fuelled by the following factors:

(i) Milk Production growing at 3 % and consumption of milk and products derived from it growing at more than double that rate.

(ii) The table presented in the preceding section (Food Consumption in India) clearly shows a sustained rise in per capita income fuelling a rapid growth in demand for animal food products. The rapid rise in per capita expenditure on milk and milk products can also be seen clearly through the last table. Though urbanization would continue to be the main driver of demand growth, rural areas are also expected to contribute to future surges in demand growth.

(iii) Changes in consumption patterns with an increased proportion of processed foods, especially dairy products, in the diet of Indians. Growth in demand is likely to be widespread cutting across class and regional distinctions. The Planning Commission working group on Animal Husbandry has stated that the demand for animal food products is income elastic and the low-income households with rise in their income will spend more on them (Planning Commission 2007).

(iv) Finally, the world demand for dairy products continues to grow (Brouwers 2006). Industry will want to tap the export market, particularly with policy climate likely to be liberalised as a result of various free trade agreements that India is negotiating.

(v) There are even predictions of increased imports of dairy products. Consider the following analysis presented in (Babcock Institute 2006: pp 42):

> "…while India is likely to pursue policies that limit imports of dairy products for the foreseeable future, scenarios can be constructed that would change this result. A NDDB Road Map Group developed a plan under which India's domestic milk production would rise from 91 million metric tons per year to about 170 million metric tons per year by 2021 or 2022. The approximately 5 percent per year increase in milk production embodied in this plan would be achieved by increasing the productivity of the existing number of dairy animals. If milk production increases as specified in the plan and demand for dairy products exhibits recent trends in the future, then most of India's domestic requirements for dairy products under this scenario could be met by domestic producers. However, different scenarios are possible. For example, a Nestle official described for the (this) study team a high economic growth scenario under which an additional 200 million people in India would enter markets to purchase at least two meals per day. He said that under this scenario India would import more of almost everything, including dairy products. It is beyond the scope of this study to assess whether the latter scenario is likely to materialize. However, it would be imprudent to entirely rule out the possibility of a high economic growth scenario that would carry with it substantially greater dairy imports by India."

In this context, let us look at some of the specific developments taking places within the dairy sector (IndiaFood 2007-2008):

- Himmatnagar (Gujarat) based Sabarkantha District Co-operative Milk Producers' Union Ltd, popularly known as Sabar Dairy, is planning to increase its milk processing capacity by setting up another plant. The dairy, which is a member of the Gujarat Co-operative Milk Marketing Federation (GCMMF), plans to invest Rs. 1.50 billion for the expansion.
- Punjab-based Macro Dairy Ventures Private Ltd has proposed to invest Rs. 1 billion to set up a dairy project in Ludhiana, for producing premium quality milk and mozzarella for domestic and export purposes over 2008-09.
- Kolkata-based Thacker Dairy, which sells 'Farm Fresh' milk and 'Cold Rush' ice creams, is looking at a 20 per cent year on year growth on the back of direct milk procurement from farmers thus doing away with middlemen. It also plans a launch of various dairy products and a foray into the retail business to stock its products.
- With a view to cash in on the estimated Rs. 5 billion ready-to-drink flavoured milk category, Gujarat cooperative milk marketing federation (GCMMF), better known as Amul, has firmed up it plans to widen its portfolio in its flavored milk category and will launch a new flavour across the country very soon.
- Wal-Mart, which has been partnering Bharti Retail, is the newest entrant in the dairy procurement and retail business in Punjab. Wal-Mart has been buying milk directly from cooperatives rather than from farmers.
- National Dairy Development Board (NDDB) will now be managing the affairs of cooperative dairying in Assam for the next five years.
- Mother Dairy is expanding its probiotic portfolio with the launch of Nutrifit, a fermented probiotic milk.
- Yakult-Danone Pvt. Ltd has launched probiotic fermented milk drink, becoming the fourth player to foray into the country's probiotic dairy products market. The same company has said it will invest Rs. 1 billion in the next three years to increase the capacity of its probiotic milk plant in Haryana and expand business.
- Dabur India plans to foray into the milk segment to tap the Rs. 1 billion milk-based beverages market.
- India's largest food brand Amul is set to launch 24/7 ATM (Any Time Milk) outlets.
- Skimmed milk powder (SMP) producers, who had put their expansion plans on hold last year following a ban on exports, are now set to add 200 tons a day capacity.

III.4. Impacts of Changing Demand

The increasing gap between demand and supply (milk production is growing at about 3% per annum while the demand for dairy products is growing at over 5% each year) is predicted to have various implications. While some analysts predict that this will create opportunities for international dairy companies[5], the domestic sector, particularly the NDDB is gearing up to catalyse a 5% growth in the production of milk. As quoted from the Babcock Institute's report above, the NDDB road map for the Indian (cooperative) dairy sector aims to raise milk production from 91 million metric tons per year to about 170 million metric tons per year by 2021 or 2022. The approximately 5 percent per year increase in milk production embodied in this plan would be achieved by increasing the productivity of the existing number of dairy animals. This implies that there is likely to be an intensification of existing husbandry practices and a move towards industrialised dairy systems.

Sharma et al (2003) have made a similar point and also identify some of the consequences of surging demand, "…the demand for milk and milk products in India is expected to rise exponentially due to population growth, urbanization, increase in income levels and changes in food habits and is likely to reach at 181 million tonnes in 2011-12 and per capita consumption is expected to rise to about 152 kg per year. This increase in demand for dairy products will put increasing pressure on dairy production systems; traditional breeds and feeding practices are likely to give way to higher-yielding breeds, associated intensification of production systems, increased disease risks, pollution and animal health issues, and a greater reliance on concentrates. Currently, Indian dairy farming is dependent on crop residues, natural resources, and open grazing as sources of feed. Expansion of these traditional sources of feeds and fodder to support a large increase in dairy production is unlikely, as available grazing areas and other common property resources are shrinking and are already degraded. Additional milk output will surely have to come from intensified systems based on stall-feeding, and increasingly using feed concentrates."

It is difficult to outline the precise impacts of such intensification in the absence of India specific studies. However, based on experiences in other countries, certain animal welfare and environmental impacts can

[5] See http://www.globalknowledgeresearch.com/reportdetails.asp?id=31009

be predicted. In fact the Planning Commission's working group on Animal Husbandry for the XI Plan specifically mentions that while industrial systems permit reduction of costs of production due to economies of scale, their social, environmental and public health costs may prove extremely expensive in the long run. It goes on to state that "…industrial systems require conversion of good agricultural land that can feed humans to fodder plots to feed animals. They accelerate the conversion of natural forests and grasslands to pasture. They concentrate large numbers of animals in a small area, leading to accumulation of animal waste, which in turn contaminates air, soil and water, while increasing the risk of communicable diseases. Since current trends indicate that increasing share of the supply will be met by industrialised production given economies of scale, increasing labour and declining capital costs, there is a need to introduce favourable policy changes so that *small producers are able to benefit from this demand and compete with organized industries* (emphasis added). These policy changes include vertical integration of small producers with livestock food processors through contract farming, improving the efficiency of their operations and the productivity of their animals, which largely depends upon improved research and availability of service." (Planning commission 2007:pp 13). The recent publication 'Livestock's long shadow' (Steinfeld et al. 2006) brought into sharp focus the environmental issues surrounding livestock production. The growing intensification of pig, poultry and other livestock systems in Asia, largely by raising animals in Western-style large-scale production units, is reducing the costs of production but often at high environmental costs. Inappropriate disposal of animal wastes is polluting air, water and soils in many areas. Growing livestock sectors also exacerbate climate change (e.g. globally the sector already accounts for 35–40% of anthropogenic methane emissions) and biodiversity losses through the felling of forests to create grazing lands and the degradation of pastures through overgrazing. It is not only large-scale intensive livestock production that can cause environmental damage. Intensification of small-scale production such as that seen in pig systems in some parts of South-East Asia with inappropriate disposal of waste into water courses can cause not only environmental problems but also concerns about human health.

IV. STRUCTURE OF THE DAIRY SECTOR

India is rich in agro-ecological diversity, and concurrently one finds a range of unique livestock production systems that have evolved in each region in tune with the naturally available resources and needs of the people. This diversity begins with the choice of species reared, breeds that have evolved, management and feeding practices, healthcare systems that are closely linked to the natural flora and fauna, and local marketing systems. Mixed crop-livestock farming and pastoralism are the two common production systems found across rain fed agriculture zones. In the former, farmers derive their livelihood somewhat equally from agriculture and livestock; in the latter, people's livelihoods depend primarily upon their livestock, which are exclusively maintained on grazing. Dryland regions also traditionally harbour the 'grasslands' of India, providing pasture/grass for some parts of the year. In these harsh climates with minimal precipitation, sustained agriculture through the year is extremely difficult and it is livestock, which has historically played an important role in people's livelihoods.

IV.1. History of the Dairy Sector[6]

A brief glimpse into the history of the dairy sector in the country will help us understand how the current structure evolved. The history of the dairy development can be broadly classified into two distinct phases: pre- and post-Operation Flood. On examining the developments made during both phases, it can be concluded that the difference lies in the basic objectives and the approach to solving the problems facing the dairy sector.

The earliest attempts at dairy development can be traced back to British rule, when the Defence Department established military dairy farms to ensure the supply of milk and butter to the colonial army. The first of these farms was set up in Allahabad in 1913; subsequent facilities were established at Bangalore, Ootacamund and Karnal. These farms, even in the early stages, used improved milch animals. As animals were reared under farm conditions, some herd improvement was made using artificial insemination. This approach did not have any impact on the supply of milk to urban consumers, which was of major concern to civilian authorities but less important to the military.

With the growth of the population in urban areas, consumers had to depend on milk vendors who kept cattle in these areas and sold their milk, often door-to-door. As a result, several cattle sheds came into existence in different cities. This was not an environmentally sound approach and as the main objective of the milk vendors was to maximize profit, they started using practices that caused sterility problems in their animals and reduced the number of calvings. Once the cattle became unproductive, they were sold to slaughterhouses. This practice systematically drained the country of its genetically superior breeds.

To some extent, the Second World War gave impetus to private dairies with modestly modernized processing facilities. In the cities of Bombay, Calcutta, Madras and Delhi, and even in some large townships, processed milk, table butter and ice-cream were available, though not on a large scale. Polsons, Keventers and the Express Dairy were some of the pioneer urban processing dairies. These dairies would source milk supplies through middlemen or their own staff. Milk producers were thus deprived of appropriate prices for

[6] This section has been adopted from Banerjee (1994)

their produce. According to dairy industry literature, these early modern systems did not bring about significant shifts in milk production, nor did they develop quality milch animals. To a large extent, despite modernized processing facilities, dairying remained unorganized.

With the initiation of India's first Five-Year Plan in 1951, modernization of the dairy industry became a priority for the government. The goal was to provide hygienic milk to the country's growing urban population. Initial government action in this regard consisted of organizing "milk schemes" in large cities. To stimulate milk production, the government implemented the Integrated Cattle Development Project (ICDP) and the Key Village Scheme (KVS), among other similar programmes. In the absence of a stable and remunerative market for milk producers, however, milk production remained more or less stagnant. During the two decades between 1951 and 1970, the growth rate in milk production was barely 1 percent per annum, while per capita milk consumption declined by an equivalent amount.

During the 1960s, various state governments tried out different strategies to develop dairying, including establishing dairies run by their own departments, setting up cattle colonies in urban areas and organizing milk schemes. Almost invariably, dairy processing plants were built in cities rather than in the milksheds where milk was produced. This urban orientation to milk production led to the establishment of cattle colonies in Bombay, Calcutta and Madras. These government projects had extreme difficulties in organizing rural milk procurement and running milk schemes economically, yet none concentrated on creating an organized system for procurement of milk, which was left to contractors and middlemen. Milk's perishable nature and relative scarcity gave the milk vendors leverage, which they used to considerable advantage.

This left government-run dairy plants to use large quantities of relatively cheap, commercially imported milk powder. The daily per capita availability of milk was about 107 g during this time.

High-fat buffalo milk was mixed with imported milk powder to bring down the milk price, which resulted in a decline in domestic milk production. As the government dairies were meeting barely one-third of the urban demand, the queues of consumers became longer while the rural milk producer was left in the clutches of the trader and the moneylender.

All these factors combined left Indian dairying in a dormant situation. The establishment and prevalence of cattle colonies resulted in a major genetic drain on the rural milch animal population. City dairy colonies also contributed to environmental degradation, while the rural producer saw little reason to increase production.

Milk procurement from the rural areas and its marketing in the urban areas was the major problem in Indian dairying at the time India gained independence.

The Birth of Amul

In one of the earliest urban milk supply schemes, Polsons - a private dairy at Anand in the western Indian state of Gujarat- procured milk from milk producers through middlemen from the surrounding Kaira district, processed it and then sent the milk to Bombay (now known as Mumbai), some 425 km away. Bombay was a good market for milk and Polsons profited immensely. In the mid-1940s, when the milk producers in Kaira asked for a proportionate share of the trade margins, they were denied even a modest increase. The milk producers went on strike, refusing to supply milk to Polsons. On the advice of Sardar Vallabhbhai Patel, a leader in India's independence movement, the milk producers registered the Kaira District Cooperative Milk Producers' Union in 1946. The Kaira union subsequently became the Gujarat Cooperative Milk Marketing Federation that owns the Amul brand. The Kaira union procured milk from affiliated village-level milk societies. This was the genesis of organized milk marketing in India. Between 1946 and 1952, AMUL's policy was directed towards obtaining monopoly rights for the sale of milk to the Bombay milk scheme. In 1952, it succeeded in achieving its purpose after the Government of Bombay cancelled the contract with Polsons and handed over the entire business of supplying milk to Amul. However, as the Bombay milk scheme was committed to purchasing all the milk produced by the Aarey Milk Colony (a local milk supply scheme) in Bombay, it would not take Amul's milk during the peak winter months. The disposal of this surplus milk posed difficulties for Amul, forcing it to cut down on purchases from its member societies, which affected members' confidence. The answer was the production of milk products: in 1955, a new dairy plant was set up at Anand to produce butter, ghee and milk powder. A second dairy was built in 1965, and a product manufacturing unit was established in 1971 to cope with increasing milk procurement. In 1993, a fully automatic modern dairy was constructed adjacent to the original Amul dairy plant at Anand. Amul formed the basis for the Anand Model of dairying.

The success of Amul attracted attention from decision makers and the presence of charismatic leaders within Amul meant that its success was scaled up through an initiative known as Operation Flood.

Operation Flood[7]

In 1964 India’s Prime Minister, Lal Bahadur Shastri, visited Amul in Anand to inaugurate an animal feed

[7] This section has been taken from Brouwers 2006

factory. He spent the night in a village in order to see for himself the value of the co-operative model. The following day in a discussion with Dr V Kurien, the prime minister expressed the wish to see the Anand model introduced throughout India. Kurien was keen to oblige but felt that the government must found an institution to facilitate this, and that the institution should be established not in bureaucratic New Delhi. And so, towards the end of the 1960s, Dr Kurien became the director of the National Dairy Development Board (NDDB) in Anand. NDDB extended dairy farming and the dairy industry across the whole of India, using the Operation Flood programme as the vehicle. The dissemination started in the early 1970s with unorthodox methods. Milk powder, supplies of which were being donated to India as food aid, was regularly converted into drinking milk and then sold to consumers in the major cities at normal prices. The funds that this generated were then used by the NDDB to improve the dairy herd and to organise the production, collection and processing of milk in other parts of India.

Operation Flood is a programme designed to develop dairying by replicating the Anand Model for dairy development. The first phase of Operation Flood was launched in 1970 following an agreement with the World Food Programme, which undertook to provide as aid 126000 tonnes of skim milk powder and 42000 tonnes of butter oil to finance the programme.
The programme involved organizing dairy cooperatives at the village level; creating the physical and institutional infrastructure for milk procurement, processing, marketing and production enhancement services at the union level; and establishing dairies in India's major metropolitan centres. The main thrust was to set up dairy cooperatives in India's best milksheds, linking them with the four main cities of Bombay, Calcutta, Delhi and Madras, in which a commanding share of the milk market was to be captured. In achieving that goal, the first phase of Operation Flood laid the foundation for India's modern dairy industry.
The second phase of the programme was implemented between 1981 and 1985. Designed to build on the foundation laid in the first phase, it integrated the Indian Dairy Association-assisted dairy development projects being implemented in some Indian states into the overall programme. About US$150 million was provided by the World Bank, with the balance of project financing obtained in the form of commodity assistance from the EEC.
The third phase of Operation Flood aims at ensuring that the cooperative institutions become self-sustaining. With an investment of US$360 million from the World Bank, commodity and cash assistance from the EEC and NDDB's own internal resources, the programme envisages substantial expansion of the dairy processing and marketing facilities; an extended milk procurement infrastructure; increased outreach of production enhancement activities; and professionalization of management in the dairy institutions.

Some key features of Operation Flood have been:

- The introduction of modern technology, both at the village level and in the processing of milk and products
- Establishment of an urban market has provided the stability necessary to encourage farmers to invest in increased milk production.
- The induction of professional managers to serve farmers has reversed the usual pattern of farmers as supplicants and officials as "benefactors".
- The cooperative structure, by giving farmers command over the resources they create, has ensured that they receive the maximum return from each rupee spent by consumers on milk and milk products, and it is this that has provided the incentive on which the growth of the dairy industry has been based.
- The unique cooperative infrastructure with which NDDB works makes the adoption of technologies and the dissemination of knowledge relatively easy, and this has enabled Operation Flood to facilitate the application of modern technologies to enhance milk production.

It is also educative to look at the constraints that Operation Flood was confronted with and which it overcame:

- It has had to deal with a stagnant dairy industry in which cheap, subsidized imports were a disincentive to the farmers.
- It has had to overcome the negative effects of consumer-oriented programmer that managed to keep prices low for the urban elite while depressing the price of milk in rural milksheds.
- It has had to deal with the lethargy and bureaucratic orientation of state enterprise in dairying.

IV.2. Structure of the Dairy Sector
Having understood the history of dairy development in the country, let us now look at the current situation of the dairy sector in the country, the players involved and their relative importance. An understanding of the relative importance of various players in terms of the share of milk they handle would be useful to contextualise the structure of the dairy sector.

Most of the milk in India is produced in villages, with about 56% available for marketing to urban areas[8]. This implies that nearly 44 % is consumed at source, not necessarily by producers themselves, but through local village level markets. Off the percentage that is marketed to urban areas, the share of the organized sector is small – about 24% (private-11-12% + government/cooperative sector - 11-12%). The bulk is handled by the unorganised sector through a variety of permutations of middlemen, milkmen, *halwais* rest is In the Government/cooperative sector, almost 80% milk is marketed as liquid milk and only 20% as milk products. While it is reverse in the private sector - only 30% is marketed as liquid milk and 70% as milk products with value addition[9]. The discussion about the cooperative sector in India, therefore is relevant to only a small proportion of total milk produced. From a welfare point of view it limits the degree to which the cooperative structure can be leveraged to improve welfare conditions. The cooperatives however, remain the only organised mechanism through which rearing practices can be made animal friendly .

a. The Organised and Unorganised Sectors

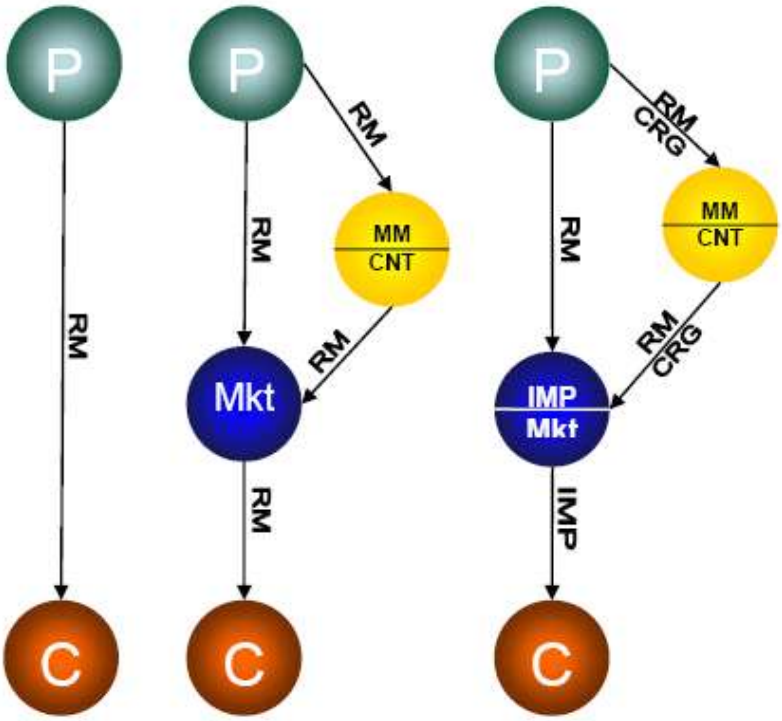
Two graphics below depict the supply chain of milk in case of the unorganised and the organised sectors, respectively. Both graphics have been adopted from Banerjee 2007.

[8] Here it is not possible to separate buffalo and cow milk. However, it must be remembered that nearly 55% of milk in India is from buffalos and hence this proportion would apply here as well.

[9] From Sathe, BS. Livestock investment opportunities in India accessed at http://www.fao.org/docrep/article/agrippa/657_en00.htm .

Milk Supply Chain Traditional Unorganised Dairying System

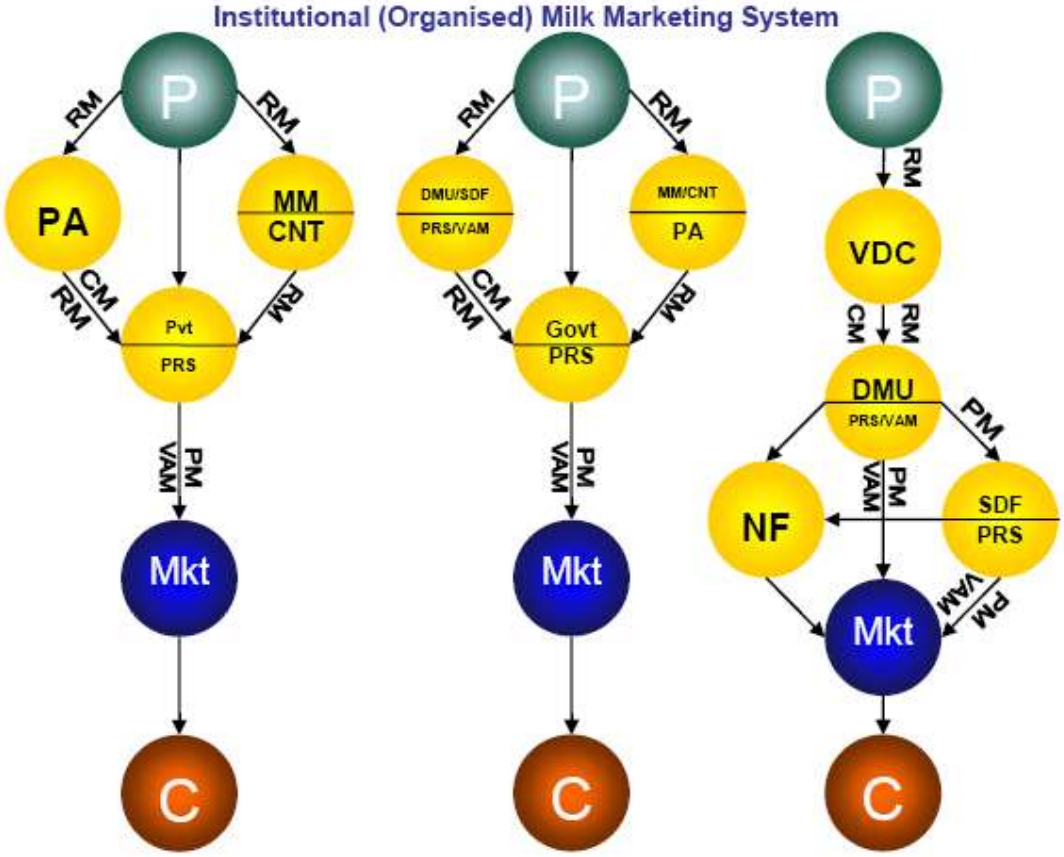
Tradition or Non-Institution (Unorganised)



P: Producers
RM: Raw Milk
CRG: Cream / Coagulates
IMP: Idigenous Milk Products
MM: Milk Man
CNT: Contractor
Mkt: Market
C: Consumers

I. Milk producers supply milk to the consumers directly through the traditional marketing channel or through milkman/contractors.
II. Milk producers supply milk to the consumers through intermediaries like milkman and/or milk contractors via the traditional marketing channel or directly through indigenous milk product manufacturers.

Milk Supply Chain Model – Organised Dairying System



P: Producers	**DMU:** Distt. Milk Union
RM: Raw Milk	**SDF:** State Dairy Feden.
CM: Chilled Milk	**NF:** National Federation
PRS: Processing	**Pvt:** Private Dairy
PM: Processed Milk	
VAM: Value Added Milk	
PA: Producers Association	
VDC: Village Dairy Coop.	

I. Producers' milk reaches private processors either directly and/or through milkman/milk contractors or through the producers' association. After processing and/or value addition, milk reaches consumers through marketing channel.

II. Producers' milk reaches government/private processors directly and/or through milkman/contractors or producers' association and also through district milk union/state dairy federation. After processing and/or value addition, it reaches consumers through the marketing channel.

III. Milk producers supply their milk to village dairy cooperative, which inter alia supplies to district milk union. The milk, after processing and/or value addition in the district milk union, reaches consumers either directly via marketing channel and/or through state dairy federation or national federation via marketing channel. The state dairy federation, for bulk marketing, sometimes operates through the national federation of cooperatives.

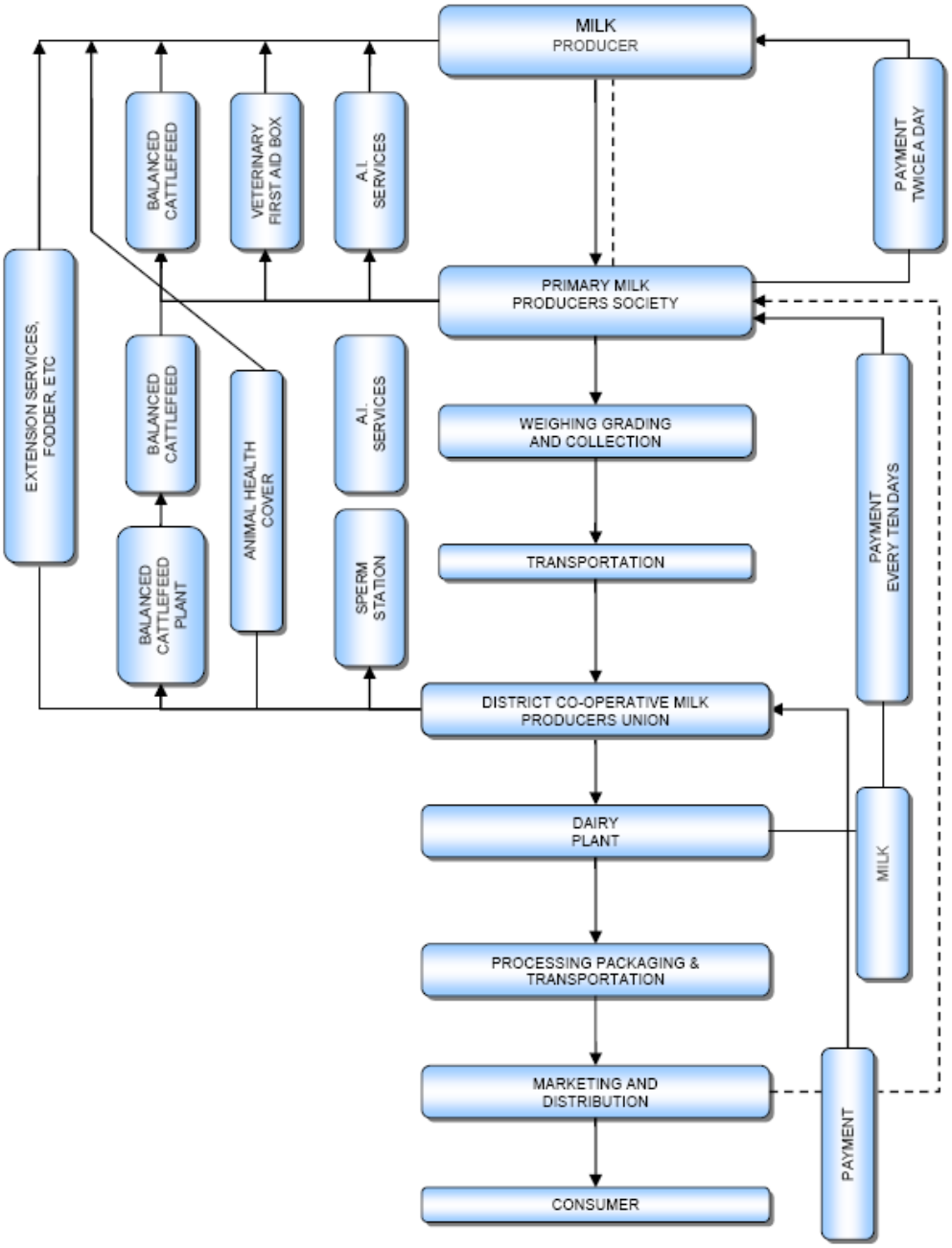
b. The Cooperatives

The cooperative set up, because of its uniqueness, deserves a closer look. The cooperative model, popularly known as the Anand model is based on the experience of the country's oldest and most successful dairy cooperative – Amul. Banerjee[10] has described the Amul model in the following terms. The basic unit in this model is the milk producers' cooperative society at the village level. These cooperatives are organizations of milk producers who wish to market their milk collectively.

[10] See Banerjee, A. Dairying systems in India http://www.fao.org/ag/againfo/resources/documents/gender/war/warall

Membership is open to all who need the cooperative's services and who are willing to accept the responsibilities of being a member. Decisions are taken on the basis of one member exercising one vote. No privilege accrues to capital, and the economic returns, whether profit or loss, are divided among the members in proportion to patronage. Each cooperative is expected to carry out the continuing education of its members, elected leaders and employees. All the milk cooperatives in a district form a union that, ideally, has its own processing facilities. All the unions in a state are normally members of a federation whose prime responsibility is the marketing of milk and milk products outside the state. There is also a fourth tier, the National Cooperative Dairy Federation of India (NCDFI), which is a national-level body that formulates policies and programmes designed to safeguard the interests of all milk producers. Each tier of the Anand organizational structure performs a unique function: procurement and services by the cooperative; processing by the union; marketing by the state federation; and advancing the interests of the cooperative dairy industry by the national federation. Thus, the Anand Model has evolved into an integrated approach to systematic dairy development.
The graphic below (adopted from Banerjee 2007) shows how a typical dairy cooperative is organised.

Co-Operative Milk Producers' Organisation On Anand Pattern



The Dairy Cooperative Network (as on March 2007) includes 170 milk unions operates in over 346 districts covers around 1,22,534 village level societies is owned by around 12.96 million farmer members of which

3.4 millions were women[11]. There are 15 apex state level milk marketing federations under which these cooperatives are organised. Some of these federations have created brands (such as Amul, which is the brand name under which the Gujarat Cooperative Milk Marketing Federation markets its products) that have significant presence within the Indian market[12].

Consequent to the opening up of the Indian Dairy Sector in 1992[13], the number of processing facilities has taken a quantum jump. At present, there are 678 dairy processing units registered, in India which process around 12-15 per cent the milk produced in India totaling to 26.63 MT/year. Out of the total number of dairy processing units registered under MMPO[14], 403 are private dairies, processing around 11.83 MT/year, whereas cooperative dairies numbering 212 process 10.36 MT/year. The remaining 63 government plants have the balance-processing capacity of 4.44 MT/year. These dairy plants are registered in the different states of India.

Thus, four types of supply chains have evolved in India; out of which three are institutional, consisting of government, cooperative and private/multinational, termed as the organised dairy sector. The fourth type is known as the 'traditional or unorganized (informal)' sector.

V. DAIRY AND KEY SOCIAL INDICATORS (LIVELIHOODS, GENDER, EQUITY)

The following indicators help us contextualise the role of cattle as well as other milch animals in the national economy, particularly among rural areas:

- Livestock contributes about 27 per cent to the GDP from agriculture. The annual value of India's anticipated milk production amounts to about Rs. 1,050 billion in 2006-07. Dairy cooperatives generate employment opportunities for around 12.96 million farm families[15].
- Milk production is primarily a supplementary occupation for small landholders or landless labourers. There are no official counts of dairy farms and estimates vary widely among sources. Best estimates indicate that approximately 70 million rural households (primarily small and marginal farmers and landless labourers) are engaged in milk production. The average herd size is about two milking animals, and average daily milk production per herd is about four litres (Babcock Institute 2006: pp13).

V.1. Income and Employment Generation in the Indian Dairy Sector[16]

Development and Livelihood experts underline the key role of dairy enterprises in terms of improving the socio-economic status of the rural poor by reducing the longstanding problems of unemployment and underemployment. Since distribution of livestock is more equitable than is land, growth in the livestock sector is deemed to be antipoverty and equity-oriented. In 1999-2000 dairying, including processing and selling of products, engaged about 18 million people in India i.e. 5.5% of total workers. Of the total workforce engaged in dairying activities, 92% are concentrated in rural areas.

In this section, we look at key trends in income and employment generation in the dairy sector. Figures in the two tables below are subsequently summarised.

[11] See http://www.nddb.org/achievement/ataglance.html
[12] See www.nddb.org/partners
[13] Please refer to the section on policy for a description of the liberalization of the Indian dairy sector.
[14] Please refer to end note 1 for details about MMPO
[15] See http://www.nddb.org/achievement/ataglance.html
[16] From Staal et al 2008 : pp54-55

Table 18: Employment in dairying in major states of India (in 1,000s) and its distribution in rural and urban areas.

State	Rural	Urban	All	Rural (%)	Urban (%)
Andhra Pradesh	1986	158	2143	92.6	7.4
Assam	35	27	62	57.0	43.0
Bihar	664	64	727	91.3	8.7
Gujarat	1709	142	1851	92.3	7.7
Haryana	783	65	848	92.3	7.7
Himachal Pradesh	234	3	237	98.9	1.1
Jammu & Kashmir	28	5	34	83.7	16.3
Karnataka	470	76	546	86.1	13.9
Kerala	459	71	530	86.6	13.4
Madhya Pradesh	305	57	362	84.4	15.6
Maharashtra	842	169	1011	83.3	16.7
Orissa	178	30	208	85.6	14.4
Punjab	1559	84	1643	94.9	5.1
Rajasthan	2585	92	2677	96.6	3.4
Tamilnadu	844	135	979	86.3	13.7
Uttar Pradesh	3350	241	3592	93.3	6.7
West Bengal	182	58	240	75.8	24.2
India	16,267	1,520	17,787	91.5	8.5

Source: Computed from unit level NSSO database (55th round)

Table 19: Percentage distribution of employment in dairying across social groups in major states of India (1999-2000).

State	Scheduled Castes	Scheduled Tribes	Other Backward Castes	Others
Andhra Pradesh	11.6	20.8	51.1	16.5
Assam	8.9	9.2	26.6	55.3
Bihar	2.6	14.0	72.9	10.4
Gujarat	11.7	8.6	46.7	33.0
Haryana	0.2	23.4	29.5	46.8
Himachal Pradesh	1.5	17.4	5.2	75.9
Jammu & Kashmir	5.5	17.5	6.2	70.7
Karnataka	7.5	22.5	38.7	31.3
Kerala	0.7	10.5	48.7	40.1
Madhya Pradesh	13.7	17.9	57.7	10.8
Maharashtra	10.1	8.1	21.7	60.0
Orissa	19.1	10.5	48.2	22.3
Punjab	0.2	36.7	13.1	50.0
Rajasthan	23.5	13.5	35.6	27.3
Tamilnadu	1.5	23.5	72.4	2.6
Uttar Pradesh	1.9	25.4	43.2	29.6
West Bengal	-	31.6	14.5	53.9
India	8.2	19.6	40.9	31.2

Source: Computed from unit level NSSO database (55th round).

The distribution of workers among rural and urban areas differs considerably across states; the share of urban workers in dairying is very high in Assam (43%) and West Bengal (24%). The share of persons engaged in urban areas in dairying is also higher than the national average in Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Rajasthan.

At a national level, processing, including manufacturing of different dairy products, such as butter, ghee, milk powder, ice-cream, *kulfi, khoya* and cheese, engages only 1.2% of dairy workers in both the formal and traditional informal sectors. A little over 6% of workers in the dairy sub-sector are engaged in selling of milk and milk products, including both wholesaling as well as retailing. As expected, a higher proportion of workers in the
dairy sector in rural areas are engaged in production-related activities (95 %) and less than 1% in processing. In urban areas about 31% of the dairy workers are engaged in selling of milk and milk products.

Staal et al (2008: pp56) have estimated that the level of employment generated per unit of milk production decreases dramatically as herd size increases. This gives us a clue to the reluctance of the dairy sector, particularly the NDDB to increase herd sizes. We must also remember, as has been mentioned elsewhere in the report, that dairy is viewed more as a poverty alleviation tool than as a contributor to GNP.
For every 1000 litres of milk produced on a daily basis on small farms, some 230 jobs are created, mostly family labour (194 jobs). The rate of employment per unit declines to 17.6 jobs in the largest commercial operations, with most of that in the form of hired labour (10.6). The data also reveals that less labour is used per unit milk production in Punjab than in Haryana; this is consistent with the perception of the higher level of development of Punjab dairy farms, which are likely to employ more labour-substituting strategies (Staal et at 2008: pp56).

Table 20: Income and employment in milk production on average in Haryana and Punjab, under different scales of production.

		Small	Medium	Large	Commercial
Total milk production (litres/farm/day)		4.5	19.6	60.6	140.8
Rate of employment generated (jobs/1000L produced on daily basis)	Self employment	193.6	58.6	17.0	7.0
	Hired labour	36.5	38.2	8.4	10.6
	Total employment	230.1	96.8	25.4	17.6

(Source: Staal et al 2008: pp56)

V.3. Gender and social equity

The Working Group on Animal Husbandry set up by the Planning Commission for the XI five year plan states that gender equity is more pronounced in livestock sector, as women's participation is 71% of the labour force while it is only 33% in crop farming. As many as 75 million women are engaged in the livestock sector as against 15 million men. This represents about 58% of the total workers engaged in the dairying sub-sector, although in urban areas it is only 37%. Women play a major role in livestock production and most of them have good knowledge about livestock behaviour and local feeds. Viewed from an economic dimension, the day-to-day activities performed by women are crucial inputs for economic returns/benefits that a household earns through livestock production either directly through sale of livestock and livestock products or the use of livestock in various livelihood activities. (Planning Commission 2007: pp11-12)
The annual report of the DAHDF[17] highlights the initiatives of the government of India in the promotion of women in dairies. The National Dairy Development Board (NDDB) is implementing a Woman Dairy Cooperative Leadership Programme in 50 district unions across the country. This has resulted in increasing the participation of women dairy farmers in dairy cooperatives. Till March 2007, 143 women thrift cooperatives with a membership of 9064 have been organised. It needs to be noted that there are around 16000 Dairy Cooperatives, which are all-women in membership.

Further, the majority of dairy workers belong to socially and economically disadvantaged communities: Scheduled Tribes (STs), Scheduled Castes (SCs) and Other Backward Castes (OBCs) together constitute about 69% of the persons employed in dairy sector. Further, about 92% of workers in the dairy industry are engaged in farming and allied activities pertaining to primary production, including cattle rearing, goat rearing for milk production, breeding, ranching and grazing. (Staal et al 2008: pp 56)

VI. LAWS AND POLICIES (INCLUDING INTERNATIONAL TRADE RELATED ISSUES)

[17] See DAHDF (2008). Annual Report 2007-08. Department of Animal Husbandry, Dairying and Fisheries. Ministry of Agriculture, Government of India. New Delhi.

VI.1. Legal Frameworks

a. Cow Slaughter and Transport

With regard to cattle, there has historically been a very strong emphasis on providing legal backing to prohibiting cow slaughter as it is considered to be in consonance with Hindu sentiments. There is also the popular perception that cow slaughter is banned in India and that as a consequence of the religious reverence for cattle, these animals enjoy a better quality of life relative to other animals. This section examines the implication of various laws that are in vogue with regard to their impact on cow slaughter. We also examine laws and legal provisions that govern the rearing and transport of cattle.

By virtue of the fact that the subject of Agriculture, including Animal Husbandry, is covered by the State List in the Constitution, the central government has on fact not legislated on the matter of cow slaughter. Several states though have passed various laws (as listed below) on this subject. This implies that at least technically cow slaughter is not banned in India. It is only banned in certain states and as we will see subsequently in this section, loopholes have been devised to circumvent these bans.

The table below presents the salient features of the cow slaughter legislations of states that have enacted such legislation:

S.No.	State / Title of Legislation	Gist of Provisions
1.	Andhra Pradesh The Andhra Pradesh Prohibition Of Cow Slaughter And Animal Preservation Act, 1977	Definitions: “Cow” includes heifer, or a calf, whether male or female of a cow. “Calf”- age not defined. Ban on slaughter: Slaughter of “Cow” prohibited Slaughter of bull, bullock allowed on ‘fit-for-slaughter’ certificate, to be given only if the animal is not economical or is not likely to become economical for the purpose of breeding or draught / agricultural operations. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs. 1,000 or both. Offences: Cognisable
2.	Assam The Assam Cattle Preservation Act, 1950	Definitions: “Cattle” means `Bulls, bullocks, cows, calves, male and female buffaloes and buffalo calves. “Calf” not defined. Ban on slaughter: Slaughter of all cattle allowed on ‘fit-for-slaughter’ certificate, to be given if cattle is over 14 years of age or has become permanently incapacitated for work or breeding due to injury, deformity or any incurable disease. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs. 1,000 or both. Offence: Cognisable only
3.	Bihar The Bihar Preservation And Iimprovement Of Animals Act, 1955	Definitions: Bull – uncastrated male of above 3 years. Bullock - castrated male of above 3 years. Calf - male or female below 3 years. Cow - female above 3 years. Ban on Slaughter: Slaughter of cow and calf totally prohibited

		Slaughter of bull or bullock is allowed if over 15 years of age or has become permanently incapacitated for work or breeding due to injury, deformity or any incurable disease. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs. 1,000 or both. Offence: Cognisable only Ban on Export : Export of cows calves, bulls and bullocks from Bihar is not allowed for any purpose.
4.	Daman & Diu The Goa , Daman & Diu Prevention Of Cow Slaughter Act, 1978	Details as for Goa .
5.	Delhi The Delhi Agricultural Cattle Preservation Act, 1994	Definitions: Agricultural Cattle- cows of all ages, calves of cows of all ages, bulls and bullocks. Ban on Slaughter: Slaughter of all agricultural cattle is totally prohibited. Ban on Transport or Export for slaughter is also prohibited. Export for other purposes permitted on declaration that cattle will not be slaughtered. Export to a State where slaughter is not banned by law will not be permitted. Penal provisions : Imprisonment upto five years and fine upto Rs. 10,000, provided that normally imprisonment should not be less than 6 months and fine not less than Rs. 1,000. Burden of proof is on the accused. Offences: Both cognisable and non-bailable.
6.	Goa The Goa , Daman & Diu Prevention Of Cow Slaughter Act, 1978. The Goa Animal Preservation Act, 1995	Definitions : Cow includes cow, heifer or calf. Age of calf not defined. Ban on Slaughter : Total ban on slaughter of cow except when cow is suffering pain or contagious disease or for medical research. Prohibition of sale of beef or beef products in any form. Penalty Provisions : Imprisonment up to 2 years or fine up to Rs.1,000 or both. Offences : Both cognisable and non-bailable. Definitions: Applicable to bulls, bullocks, male calves and buffaloes of all ages. Ban on Slaughter: All the animals can be slaughtered on 'fit-for-slaughter' certificate which is not given if the animal is likely to become economical for draught, breeding or milk (for she/buffaloes)

		purposes Prohibition of sale of beef obtained in contravention of above provisions, except beef imported from other States. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs. 1,000 or both. Offences: Cognisable only.
7.	Gujarat The Bombay Animal Preservation Act, 1954 (Applied To Gujarat)	Definitions: Applicable to bulls, bullocks, cows, calves and male/female buffalo calves. Ban on Slaughter: Slaughter of cow, calf, bull or bullock totally prohibited. Slaughter of buffaloes permitted on certain conditions. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs. 1,000 or both. Offences: Cognisable only.
8.	Haryana The Punjab Prohibition Of Cow Slaughter Act, 1955 (Applicable To Haryana)	Provisions same as for Punjab except penal provisions Penal provisions : Rigorous• imprisonment up to 5 years or fine up to Rs.5,000 or both.
9.	Himachal Pradesh The Punjab Prohibition Of Cow Slaughter Act, 1955 (Applicable To The State Of Himachal Pradesh)	All provisions same as for Punjab .
10.	Jammu & Kashmir The Ranbir Penal Code, 1932	Voluntary slaughter of any bovine animal such as ox, bull, cow or calf shall be punished with imprisonment of either description which may extend to 10 years and shall also be liable to fine. Fine may extend to five times the price of the animals slaughtered as determined by the Court. Possession of flesh of killed or slaughtered animals is also an offence punishable with imprisonment up to 1 year and fine up to Rs.500.
11.	Karnataka The Karnataka Prevention Of Cow Slaughter And Cattle Preservation Act, 1964	Definitions: Animal - means bull, bullock, and all buffaloes. Cow – includes calf of a cow, male or female. Ban on Slaughter: Slaughter of cow, calf of a cow or calf of a she-buffalo totally prohibited. Slaughter of bulls, bullocks and adult buffaloes permitted on 'fit-for-slaughter' certificate provided cattle is over 12 years of age or is permanently incapacitated for breeding, draught or milk due to injury, deformity or any other cause. Transport for slaughter to a place outside a state not permitted. Sale purchase or disposal of cow or calf for slaughter not permitted. Penal provisions: Imprisonment up to maximum of 6 months or fine of up to Rs.1,000 or both.

		Offences: Cognisable only.
12.	Kerala No state legislation - only Panchayat Act / Rules Kerala Panchayat (Slaughter Houses and Meat Stalls) Rules, 1964	Panchayat laws provide for prohibition of slaughter of useful animals in Panchayat (non-municipal) areas in the State. Under the Kerala Panchayat (Slaughter Houses and Meat Stalls) Rules, 1964, no certificate shall be granted under Rule 8 in respect of a bull, bullock, cow calf, he-buffalo or she-buffalo or buffalo calf unless the animal is over 10 years of age and is unfit for work or breeding or the animal has become permanently incapacitated for work or breeding due to injury or deformity. In 1976, the Kerala Government issued an executive order banning the slaughter of useful animals in the Municipal areas as well.
13.	Madhya Pradesh The Madhya Pradesh Agricultural Cattle Preservation Act, 1959.	Definitions: Agricultural cattle means cows of all ages, calves of cows, bull, bullocks and all buffaloes. Ban on Slaughter: Slaughter of cow, calf of cow, bull, bullock and buffalo calf prohibited. However, bulls and bullocks are being slaughtered in the light of Supreme Court judgement, provided the animal is over 15 years or has become unfit for work or breeding. Transport or export for slaughter not permitted. Export for any purpose to another State where cow slaughter is not banned by law is not permitted. Sale, purchase, disposal of cow and its progeny and possession of flesh of cattle is prohibited. Penal provisions: Imprisonment up to 3 years and fine of Rs.5,000. Normally imprisonment shall not be less than 6 months and fine not less than Rs.1,000. Burden of proof is on the accused. Offences : Cognisable only.
14.	Maharashtra The Maharashtra Animal Preservation Act, 1976	Definitions: 'Cow' includes a heifer or male or female calf of a cow. Ban on Slaughter: Slaughter of cow totally prohibited. Slaughter of bulls, bullocks and buffaloes allowed on fit-for-slaughter certificate, if it is not likely to become economical for draught, breeding or milk (in the case of she-buffaloes) purposes. Penal provisions: Imprisonment up to maximum of 6 months and fine of up to Rs.1, 000. Burden of proof is on the accused. Offences: Cognisable only.
15.	Orissa The Orissa Prevention Of Cow Slaughter Act, 1960	Definitions: 'Cow' includes heifer or calf. Ban on Slaughter: Slaughter of cow totally prohibited. Slaughter of bull, bullock on fit-for-slaughter certificate if cattle is over 14 years of age or has become permanently unfit for breeding, draught. Penal provisions: Imprisonment up to maximum of 2 years or fine up to Rs. 1,000 or both. Offences: Cognisable only.

16.	Pondicherry The Pondicherry Prevention Of Cow Slaughter Act, 1968	Definitions: Cow' includes heifer or calf. Ban on Slaughter: Slaughter of cow totally prohibited. Slaughter of bull or bullock permitted on 'fit-for-slaughter' certificate provided it is over age of 15 years or has become permanently unfit for breeding or draught. Prohibition on sale, transport of beef. Penal provisions: Imprisonment up to maximum of 2 years or fine up to Rs. 1,000 or both. Offences: Cognisable and non-bailable.
17.	Punjab The Punjab Prohibition Of Cow Slaughter Act, 1955	Definitions: "Cow" includes bull, bullock, ox, heifer or calf. Ban on Slaughter: Slaughter of cow (and its progeny) totally prohibited. Export for slaughter not permitted. Sale of beef prohibited. Penal provisions : Imprisonment up to maximum of 2 years or fine up to Rs.1,000 or both. Burden of proof is on the accused. Offences : Cognisable and non-bailable.
18.	Rajasthan The Rajasthan Bovine Animal (Prohibition Of Slaughter And Regulation Of Temporary Migration Or Export) Act, 1995	Definitions: "Bovine' - means and includes cow, calf, heifer, bull or bullocks. 'Bull' - means uncastrated male above 3 years 'Bullock' - means castrated male above 3 years 'Calf' - means castrated or uncastrated male of 3 years and below. 'Cow' - means female above 3 years; 'Heifer' is female of 3 years or below. Ban on Slaughter: Slaughter of all bovine animals prohibited. Possession sale, transport of beef and beef products is prohibited. Export of bovine animal for slaughter is prohibited. Custody of seized animals to be given to any recognised voluntary animal welfare agency failing which to any Goshala, Gosadan or a suitable person who volunteers to maintain the animal. Penal provisions: Rigorous imprisonment of not less than 1 year and up to maximum of 2 years and fine up to Rs.10,000. Burden of proof is on the accused.
19.	Tamil Nadu The Tamil Nadu Animal Preservation Act, 1958 Government orders banning cow	Definitions: 'Animal' means bulls, bullocks, cows, calves; also, buffaloes of all ages. Ban on Slaughter: All Animals can be slaughtered on 'fit-for-slaughter' certificate Certificate given if animal is over 10 years of age and is unfit for work and breeding or has become permanently incapacitated for work and breeding due to injury deformity or any incurable disease. Penal Provisions: Imprisonment of up to 3 years or fine up to Rs. 1,000 or both. Slaughter of cows and heifers (cow) is banned in all

	slaughter dt. 30th August, 1976 .	slaughterhouses in Tamil Nadu.
20.	Uttar Pradesh The Uttar Pradesh Prevention Of Cow Slaughter Act, 1955	Definitions: 'Beef' means flesh of cow and of such bull or bullock whose slaughter is prohibited under the Act, but does not include such flesh contained in sealed containers and imported into U.P. 'Cow' includes a heifer and calf. Ban on Slaughter: Slaughter of cow totally prohibited. Slaughter of bull or bullock permitted on 'fit-for-slaughter' certificate provided it is over the age of 15 years or has become permanently unfit for breeding, draught and any agricultural operations. Transport of cow outside the State not permitted for slaughter. Prohibition on sale of beef. Penalty provisions: Rigorous imprisonment up to 2 years or fine up to Rs. 1,000 or both. Offences : Cognisable and non-bailable.
21.	West Bengal The West Bengal Animal Slaughter Act, 1950	Definitions : Scheduled animals – bulls, bullocks, cows calves and buffaloes of all types / ages. Ban on Slaughter : Slaughter of all animals permitted on 'fit-for-slaughter' certificate Certificate given if animal is over 14 years of age and unfit for work or breeding or has become permanently incapacitated for work and breeding due to age, injury, deformity, or any incurable disease. Penal provisions: Imprisonment up to maximum of 6 months or fine up to Rs. 1,000 or both. Offences: Cognisable only.

(Source: http://dahd.nic.in/ch3/annex3.1.htm)

The fact that 21 states have legislation that either prohibits or regulates cow slaughter in the country needs to be read with the rider that there is no consistency in the state laws. By and large, most of the laws prohibit the slaughter of cows of all ages. However, Assam, Tamil Nadu and West Bengal permit the slaughter of even cows of over 14, 10 and 14 years of age, respectively. Most States prohibit the slaughter of calves, whether male or female. However, except for Bihar and Rajasthan, where age of a calf is given as below 3 years, the other Acts have not defined the age of a calf. In Maharashtra, the definition of calf being followed by some executive instructions was 'below the age of 1 year'. Delhi, Gujarat, Madhya Pradesh, Punjab and Rajasthan have banned totally the slaughter of cow and its progeny, including bulls and bullocks of all ages. The Uttar Pradesh Act permits the slaughter of bulls and bullocks of over 15 years or who have become permanently incapacitated. However, by an Ordinance issued in 2001, the Uttar Pradesh Government prohibited the slaughter of cow and its progeny. While Kerala has no state legislation on cow slaughter, there are several local government notifications that can be interpreted in a way that restricts cow slaughter. With the exception of Assam, none of the north eastern states have banned cow slaughter.

As a result of these issues, bulls and bullocks are routinely slaughtered, as are buffalos, which enjoy no protection according to these laws. The above analysis clearly shows the political will to impose bans on cow slaughter are dictated by the cultural and religious persuasion of a majority population of the state in question.

Closely linked to slaughter is the issue of large scale transport of cattle to states (principally West Bengal, Kerala and the north eastern states) and abroad (Bangladesh) where there is a demand for cow meat. There are 2 sets of rules framed under the Prevention of Cruelty to Animals Act that regulate transport of animals in India

- According to the Transport of Animals Rules, 1978, cattle transported by rail or road must be accompanied by a veterinary certificate that they are fit to travel, and by first-aid equipment. Average

space per animal should not be less than 2 square metres, and ropes and platforms should be used for loading. They should be properly fed and given water first. Other provisions of the Transport of Animal Rules are:

- Water and food should be made available for the whole journey.
- When cattle are transported by rail, there is a maximum number allowed in each wagon, and each wagon should have at least one attendant. There should be padding on the floor and adequate ventilation.
- When cattle are transported by road, specially fitted goods vehicles should be used, or ordinary vehicles should be provided with anti-slipping material, and there should be an attendant. No more than six cattle can be carried in one vehicle.

- The Transport of Animals (Amendment) Rules, 2001 state that a valid certificate issued by an officer or any person or Animal Welfare Organisation authorised by the AWBI or Central Government needs to be obtained before transporting an animal to ensure that all relevant requirements have been met. If these conditions are not met, any permit will be cancelled and the police must stop further transport. The animals will be given to the authorised Animal Welfare Organisation if available until further decisions are made by the authorities.
- The Prevention of Cruelty to Animals (Transport of Animals on Foot) Rules, 2001 apply to transport of animals on foot when the distance from the boundary of village or town or city of the origin of such transport to the last destination is 5 km or more than 5 km. The rules state that every animal must be healthy and in good condition, and a veterinary certificate is needed for each animal. Veterinary first aid equipment must also be provided for the journey. New born animals, diseased, blind, emaciated, lame, fatigued animals, and animals who have given birth during the preceding seventy two hours or likely to give birth during transport should not be transported on foot.
    - Arrangements should be made for watering and feeding the animals during transport. Nobody is allowed to use whips, sticks, etc. or apply any substance on their bodies to make the animals walk faster. If an animal has to be tied, a cushioned rope should be used. If two animals are tied together (more than two animals cannot be tied together) the space between them should be at least two feet.
    - Animals cannot be transported before sunrise or after sunset. Limits have been set for transport on foot.
    - Animals should not be made to walk in adverse weather conditions such as heavy rain, thunderstorms, and extremely dry or sultry conditions.

The Prevention of Cruelty to Animals (Slaughter House) Rules, 2001 regulates the slaughter of animals (including cattle, in states where cow slaughter is not banned). Key provisions of slaughter house rules are:
Definitions -
b) "Slaughter" means the killing or destruction of any animal for the purpose of food and includes all the processes and operations performed on all such animals in order to prepare it for being slaughtered.
c) "Slaughter house" means a slaughter house wherein 10 or more than 10 animals slaughtered per day and is duly licensed or recognised under a Central, State or Provincial Act or any rules or regulations made thereunder.

- Animals within a municipal area can only be slaughtered in licensed/recognised slaughter houses. Animals cannot be slaughtered if they are pregnant, under 3 months of age, have offspring less than 3 months old, or not certified by a vet as fit to be slaughtered.
- Slaughter houses must have a reception area of adequate size for animals, with adequate shelter, where a vet must examine a maximum of 12 animals an hour, and a maximum of 96 animals a day.
- This area should have proper ramps for unloading, and facilities for feeding and watering animals. Isolation pens for sick and restless animals should be provided.
- There should be a lairage of sufficient size where animals can rest for 24 hours before slaughter. Animals should be protected from adverse weather, separated where necessary, and water should be provided.
- Animals should not be slaughtered where other animals can see them, and there should be separate sections for slaughter of individual animals to ensure this condition.
- A separate space for stunning should be provided as soon as possible.
- Only people with a valid authorisation from the local authority will be allowed to slaughter animals.
- The AWBI or any person or organisation authorised by it can inspect a slaughter house at any time without notice and report to the AWBI and local authority to take action if needed.

In addition, the Prevention of Cruelty to Draught and Pack Animals Rules, 1965 (as amended up to 9th December, 1968) has provisions to ensure welfare of working animals. Though details of this are beyond the scope of this report, it would be useful to remember that in rural India there is a strong overlap between milch and working animals.

Needless to say, the practical implementation of these laws remains extremely weak. These laws are also circumvented to transport cattle to states and even countries where there is a demand for cow meat. There

is large scale transport of cattle to the North Eastern States, Kerala and West Bengal for slaughter. There is also well documented smuggling of cattle to Bangladesh, primarily through West Bengal and also through other states that share a border with Bangladesh. Thus economics is seen to dictate the fate of cattle more than any extant legislation. Rahman (2007) has documented the transport of animals (including cattle) across the country and its export to Bangladesh.
As far as dairy cattle are concerned, note should be taken of the fact that beef is on the on the negative list of exports under the Export Import Policy of the Government of India. Therefore formal export of beef does not exist, though there are anecdotal reports of beef being clandestinely exported, stamped as buffalo meat (DAHDF 2002).

b. Rearing

Curiously, the preoccupation with cow slaughter has been to the virtual exclusion of extending legal protection to cattle during their lifespan. Though, there provisions in particular Central Laws (such as Section 429 of the Indian Penal Code; The Prevention of Cruelty to Animals Act, 1960) pertaining to husbandry of cattle, these are seldom pursued with the energy that cow slaughter prohibition attracts. The following provisions in existing legislation extend protection to cattle as part of rearing:

- The Prevention of Cruelty to Animals Act, 1960, states that if any owner does not provide its animal with sufficient food, drink or shelter, or abandons the animal with a reasonable likelihood that it may starve, the punishment is a fine of Rs 10 to Rs 50 for a first offence, and Rs 25-Rs 100 and/or imprisonment for up to 3 months.
- The Prevention of Cruelty to Animals (Registration of Cattle Premises) Rules, 1978, states that in cities or towns with a population exceeding one lakh, every person owing or in charge of premises with five or more cattle kept for profit must register such premises. The application should include the provision made or to be made as respect to floor space, flooring, ventilation, supply of food and water, disinfection, drainage, and disposal of dung or unwanted matter.
    - Under these Rules, a certificate is given for 3 years, once the registering authority is satisfied that the welfare is adequate and that the animals are unlikely to undergo any unnecessary suffering.
    - If milch cattle are kept, the owner must display a copy in the local language of Section 12 of the Prevention of Cruelty to Animals Act, prohibiting the use of phooka or doom dev. ("phooka" or "dhoom dev" includes any process of introducing air or any substance into the female organ of a milch animal with the object of drawing off from the animal any secretion of milk).

c. Government Notifications Impacting Dairy Cattle

The Milk and Milk Products Order 1992 (MMPO) is an instrument through which the Government of India regulates the dairy industry (please refer to end note 2 for details of the MMPO). Though the MMPO does not have any explicit animal welfare or even husbandry provisions, by virtue of the fact that it regulates sanitary, hygiene, quality and food safety conditions in dairies, it can inter alia, be interpreted to regulate rearing practices as well. This corollary follows from the fact that for sanitary, hygiene, quality and food safety provisions specified in the MMPO, attention to rearing practices is essential.

Similar to the MMPO, processing of meat products is licensed under Meat Food Products Order, 1973 (MFPO) which is being implemented by Ministry of Food Processing industries with effect from March 2004. The main objectives of the MFPO, 1973 are:

- To regulate production and sale of meat food products through licensing of manufacturers, enforce sanitary and hygienic conditions prescribed for production of wholesome meat food products;
- Exercise strict quality control at all stages of production of meat food products, fish products including chilled poultry etc.
- To develop necessary infrastructure for processing of meat and meat food products for domestic market as well as for Export market.

The impact of the MFPO and the potential to leverage this for improved welfare will be discussed in the report on dairy buffalos, since legally the slaughter of cows is prohibited in a large part of the country. The effect of the MPFO will therefore trigger in case of buffalos, which are routinely slaughtered throughout the country.

VI.2. Policy Environment and its Application through Government Schemes

Banerjee 2007 mentions that state and central governments do not provide any institutional support, funding or specific policy support to corporate dairy players or to the unorganised (informal) sector. However, both the corporate and the unorganised (informal) sector do derive lateral benefits of the government policies aimed at the overall growth of the country's dairy sector.

State and central government policies that impact cattle should be read in light of the fact that cattle are principally seen as a means improving people's livelihoods. The chronological evolution of the dairy sector presented in section IV.1. makes this policy direction quite clear

The central government formulates policies (through the Planning Commission of India), which are being implemented by the States since constitutionally, agriculture along with dairy and animal husbandry is a State subject.
There are principally two ministries that influence dairy cattle in the country. The Ministry of Food Processing Industries (MFPI) and the Ministry of Agriculture through the Department of Animal Husbandry, Dairying and Fisheries (DAHDF). The MFPI deals with policies concerning milk products such as value addition and meat whereas the DAHDF deals with milk production. There are also multi-institutional players under the domain of centre and state governments. These institutions are either part of the government or financially supported by them. Such institutions deal with dairy education and research, dairy development; milk products export promotion, inspection, quality testing, certifications, etc.
Besides, there are apex level organizations like the National Dairy Development Board, National Cooperative Dairy Federation of India, National Cooperative Dairy Corporation, State Dairy Cooperative Federations. These organisations also formulate policies concerning dairy development as well as coordinate with the State and Central governments, to translate the various policies into action. However, the remit of these institutions is limited to dairy cooperatives only.

Activities of the Ministry of Food Processing Industries (MFPI) that impact dairy cattle are principally via the Agriculture and Processed Food Products Export Development Authority (APEDA). The APEDA gives capital assistance and also helps Indian meat exporters in marketing their products abroad. Over the X Plan period (2001 – 2006) 15 export oriented integrated mechanized abattoirs cum meat processing plants have been set up. The export of meat, especially buffalo meat accounts for an important source of foreign exchange. During the last one-decade, in the private sector 12 modern abattoirs have been set up and another 15 are in pipeline. In addition there are about 35 meat processing and packaging units (including 12 registered with APEDA), which receive, dressed carcasses from the approved municipal slaughterhouses for export of meat. (Planning Commission 2007: pp 36).

The activities of the Dairy Development division within the DAHDF are concentrated on promotion of dairy in non Operation flood areas with an emphasis on building cooperative infrastructure, revitalisation of sick dairy cooperative federations, and creation of infrastructure in the states for production of quality milk and milk products. For pursuing these objectives, the department implements four schemes in the dairy sector. The National Dairy Development Board (NDDB), also functioning under the aegis of the DAHDF, continues its activities for the overall development of dairy sector in Operation Flood areas through a variety of activities.

A brief look at the activities of the Dairy Development Division and the NDDB provides an insight into government policy and its likely impact on cattle (and buffalos):

The 4 schemes of the Dairy Development Division are:
i. Intensive Dairy Development Programme – this focuses on hilly and non operation flood areas with the following objectives:

- Development of milch cattle;
- Increasing milk production by providing technical input services;
- Procurement, processing and marketing of milk in a cost effective manner;
- Ensure remunerative prices to the milk producers;
- Generate additional employment opportunities;
- Improve social, nutritional and economic status of residents of comparatively more disadvantaged areas.

ii. Strengthening Infrastructure for Quality & Clean Milk Production – the main objective is to improve the quality of raw milk produced at the village level through training of farmers on good milking practices, procurement of equipment and so on.

iii. Assistance to Cooperatives – is aimed at revitalizing the sick dairy cooperative unions at the district level and cooperative federations at the state level.

iv. Dairy/Poultry Venture Capital Fund – through bankable projects to rural/urban entrepreneurs, farmers, cooperatives, NGOs, this scheme is intended to bring about structural changes in the unorganized sector. Measures like milk processing at village level, marketing of pasteurized milk in a cost effective manner, quality up-gradation and up-gradation of traditional technology to handle commercial scale using modern equipment are encouraged.

The NDDB promotes, plans and organizes programmes for the development of dairy and other agriculture based and allied industries along cooperative lines and also provides assistance in the implementation of

such programmes. The NDDB provides technical and financial support to dairy cooperatives in the areas of strengthening cooperative business infrastructure, productivity enhancement,
quality assurance and the creation of a national information network. Specific activities of the NDDB include:

- Enhancing Women's Involvement in Cooperatives to raise women's awareness about their rights and responsibilities as cooperative members
- Development of Indigenous Breeds for conservation and development of select breeds in their native tracts.
- Animal nutrition and feed technology;
- Animal health
- Managing quality of milk in village and district level cooperatives through capacity building of farmers on health and hygiene, house keeping, society management, village-level bulk milk chilling, rapid transportation of raw milk to dairy plant.
- Promotion of New Generation Cooperatives or Producer Companies – Such companies retain the character of cooperatives, both in spirit and practice, while operating within the same business and regulatory framework enjoyed by companies.
- Development of new products on behalf of state milk marketing federations.

The Animal Husbandry Division of the DAHDF operates a Centrally Sponsored Scheme called the National Project for Livestock Development. As part of this, a project for establishment and modernisation of rural slaughter houses and utilisation of carcasses is being operated. However, over the X Plan period, there was only marginal utilisation of the funds allocated to this project.

As can be gathered from the description of the above mentioned schemes, the thrust of the central government is on **promotion of dairy among small and farmers** as a means of enhancing livelihoods. Government policies (backed by budgetary allocations) are geared towards this end. There are very few explicit provisions, either in policy prescriptions or in budgetary allocations for the promotion of private players in the dairy sector.

From an animal welfare perspective the existing policy climate can be considered favourable for the welfare of cattle, at least as far as husbandry of dairy cattle is concerned. This is because inherently the sort of small holder dairy production systems that are prevalent, involve little or no confinement and relatively low stocking densities.

This however is likely to change in the near future for the following reasons:

1. 1992 onwards, the government has liberalized the dairy sector in a manner that has significantly eased the establishment of private dairy units. Currently there are 678 dairy processing units registered under the MMPO. Out of these, 403 are private dairies, and 212 cooperative dairies. The remaining 63 are government plants operated by different state governments.
2. There is a spurt in domestic demand for liquid milk as well as processed milk products with changing consumption habits and an increase in disposable income. This is likely to encourage private players, who may follow the same integration model that has been seen in the poultry industry.
3. Simultaneously international demand for processed products too is changing, though economically, Indian dairy products are still not competitive with Australian and New Zealand dairy industry.

With such changes, it is likely that more intensive confinement systems may come in vogue, specially in case of urban and peri-urban dairy units.

VI.3. International Trade and Dairy

As far as international trade frameworks are concerned, Sharma et al (2003) have the following comment on animal welfare concerns in the rapidly changing dairy sector:
"… animal welfare, which includes establishing norms for animal protection on the farm, during transport, and at the time of slaughter, is a growing source of concern among animal protection organizations, consumers, and decision makers. Although animal welfare is not currently covered under the WTO Sanitary and Phytosanitary Agreement, these issues are coming under increasing public scrutiny. Two main types of policies relate to animal welfare: (i) to support production methods that promote animal welfare and (ii) to impose requirements on imports so that acceptable standards of animal welfare are applied during production and transportation. National authorities must seek to reduce the negative effects of commercialization of livestock farming and trade on animal welfare. The WTO recognizes the Office International des Epizooties (OIE) as the international organization responsible for the development and promotion of international animal health standards, guidelines, and recommendations affecting trade in live animals and livestock products." Rahman 2007 has however pointed out that despite India being a member

of the OIE, OIE Guidelines on Animal Welfare, specially with reference to land transport and slaughter of animals for human consumption are yet to be followed.

At a more practical level however, since international trade plays a negligible role in the Indian dairy sector, much of the discussion with regard to international trade norms remains academic. India's share in world trade of dairy products is negligible (0.2%). Apart from the fact that India does not have the marketable surplus, the direct and indirect subsidies provided by EU, USA, and Canada to their dairy industry means that Indian exports are unable to compete in the international market. Indian products also do not compete economically with the world leaders in dairy – Australia and New Zealand. Incidentally, Australia and New Zealand claim that their dairy industries operate without subsidies. (Brouwers 2006: pp 20) The WTO was expected to put some discipline on protectionist policies followed by countries, but still distortions in the world market are very large. As a result India is far from being a player in the world dairy market. (Planning Commission 2007: pp 99)

From an animal welfare point of view, since there is hardly any export of Indian dairy products taking place, the leverage that compliance with international standards may provide (as in the case of poultry) does not exist in the dairy sector, at least at the present juncture. Further, as has been pointed out in other places in the report, domestic demand is itself so high and rapidly growing that it appears unlikely that the Indian dairy sector may be a significant international player in the near future. Having said this, as Free Trade Agreements (FTAs) are currently being negotiated between India and various countries, the animal welfare community needs to ensure that pro welfare measures are incorporated into the FTAs. This would ensure that any export of dairy products that does take place, however small in scale it may be, is from animals that have been raised in accordance with welfare guidelines.

ENDNOTES

1. The Govt. of India had promulgated the Milk and Milk Products Order (MMPO) 1992 on 9.06.1992 under the provisions of Essential Commodities Act, 1955 consequent to de-licencing of the Dairy sector in 1991. According to this order, any dairy plant handling more than 10000 liters per day of milk or 500 MT of milk solids per annum needs to be registered with the registering authority appointed by the Central Government. The main objective of the order is to maintain and increase in supply of liquid milk of desired quality in the interests of the general public and also for regulating the production, processing and distribution of milk and milk Products.
Recognizing the necessity for suitable amendments in Milk and Milk Product Order 1992 for faster pace of growth in the dairy sector, the Government of India amended Milk and Milk Products Order 1992 from time to time in order to make it more liberal and oriented to facilitate dairy entrepreneurs. The Government of India has notified the amendments in the official gazette on 26/03/2002. Now there is no restriction on setting up of new capacity. The requirement of registration is for enforcing the prescribed standards of quality and food safety. The salient features of the new amendments are as follows:

- The provision of assigning milkshed has been done away with.
- The registrations under MMPO-92 will now cover sanitary, hygienic condition, quality and food safety.
- The provision of inspection of dairy plants has been made flexible.
- The provision to grant registration in 90 days has been reduced to 45 days.
- The power of registration of State registering Authority has been raised from 1.00 LLPD to 2.00 LLPD.
- Altogether the Central and the State Registering Authorities have registered 688 units with combined capacity of 803.74 LLPD in Cooperative, Private and Government Sector as on 31.3.2003.

The Government of India has notified National Productivity Council and Export Inspection Council of India as Quality Auditors to conduct the periodic inspection of units registered under MMPO to ascertain the sanitary, hygienic conditions and food safety measures as specified in the MMPO. Under this provision, the dairy establishments are required to get their plants inspected once in a year by the notified inspection agencies (Source: http://dahd.nic.in/milkorder.htm)

REFERENCES

Babcock Institute (2006) The Dairy Sector of India: A Country Study. Babcock Institute Discussion Paper No. 2006 -2. The Babcock Institute for International Dairy Research and Development. University of Wisconsin-Madison, College of Agricultural and Life Sciences

Banerjee, A (2007). Lessons Learned Studies: India. Improved market access and smallholder participation for sustainable dairy development (CFC/FIGMDP/16FT). Animal Production & Health Commission for Asia & the Pacific - Food and Agricultural Organization of the United Nations/The Common Fund for Commodities. 2007.

Banerjee, A (1994). Dairying Systems in India. *World Animal Review*, vol. 79, no. 2 (1994). Food and Agricultural Organization of the United Nations. 1994

Brouwers, T. (2006) India: Dairy Giant Walking Barefoot. ZuivelZicht magazine (www.zuivelzicht.nl), an edition of Koninklijke BDU Uitgeverij BV (the Netherlands). February 2006.

CLFMA (2005). Dairy Industry. Livestock Industry Report 2005. Compound Livestock Feed Manufacturers' Association of India. 2005

DAHD (2002). Report of the National Commission on Cattle. Department of Animal Husbandry and Dairying. Ministry of Agriculture, Government of India. New Delhi. July 2002

DAHDF (2006). Basic Animal Husbandry Statistics. Department of Animal Husbandry, Dairying and Fisheries. Ministry of Agriculture, Government of India. Krishi Bhawan, New Delhi. 2006

DAHDF (2008). Annual Report 2007-08. Department of Animal Husbandry, Dairying and Fisheries. Ministry of Agriculture, Government of India. New Delhi.

FAO Statistical Database www.faostat.fao.org

Garcés, Leah D (2002). The Detrimental Impacts of Industrial Animal Agriculture: A case for humane and sustainable agriculture. Compassion in World Farming Trust. 2002.

HED (2002). Haryana State Biodiversity Strategy and Action Plan. Prepared by Haryana Environment Department under National Biodiversity Strategy and Action Plan, executed by Ministry of Environment and Forests (Government of India); Technical implementation by Technical and Policy Core Group (TPCG); Coordinated by Kalpavriksh and; Administrative coordination by Biotech Consortium India Ltd.; Funded by Global Environment Facility through United Nations Development Programme; 212 pp.

Hindu Date:14/12/2007
URL:http://www.thehindu.com/thehindu/yw/2007/12/14/stories/2007121450020200.htm

IndiaFood December 2007 / January 2008, April / May 2008. Hindustan Studies & Services Ltd, DNP Information & Analytics Pvt. Ltd.

Jodha, N. S. (1986). 'Common Property Resources and the Rural Poor', Economic and Political Weekly, 25.

Jodha, N.S. (2003). *Life on the Edge: Sustaining Agriculture and CommunityResources in Fragile Environments.* New Delhi: Oxford University Press.

Mehta, R. and J. George (2003) Institutional and Legal Framework of Food Safety Regulations in India. Country Paper of the Research Project "International Food Safety Regulations and Processed Food Exports from Developing Countries: A Comparative Study of India and Thailand"

Pingali, Prahbu and Yasmeen Khwaja (2004) Globalisation of Indian Diets and the Transformation of Food Supply Systems. ESA Working Paper No. 04-05 February 2004. Indian Society of Agricultural Marketing Hyderabad, 5-7 February, 2004

Planning Commission (2007) Report of the Working Group on Animal Husbandry and Dairying for the Eleventh Five Year Plan (2007-12). Planning Commission, Government of India, New Delhi.

Rahman, Abdul (2007) Status Report on India, Pakistan and Bangladesh. Global Campaign Coalition Against The Long Distance Transport Of Animals For Slaughter – Asia Status Report

Sathe, BS. Livestock investment opportunities in India. Food and Agricultural Organization of the United Nations. Accessed at http://www.fao.org/docrep/article/agrippa/657_en00.htm .

Sharma, Vijay Paul; Delgado, Christopher L; Staal, Steven; Singh, Raj Vir (2003). Policy, Technical, and Environmental Determinants and Implications of the Scaling-Up of Milk Production in India. Project on Livestock Industrialization, Trade and Social-Health-Environment Impacts in Developing Countries. Food and Agricultural Organization of the United Nations. July 2003

Staal, Steven J., Alejandro Nin Pratt, and Mohammad Jabbar (2008). Dairy Development for the Resource Poor. Part 3: Pakistan and India Dairy Development Case Studies PPLPI Working Paper No. 44-3

Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M and de Haan CD. 2006. Livestock's long shadow: Environmental issues and options. Food and Agriculture Organisation of the United Nations, Rome, Italy.

GLOSSARY

Cattle- For the purpose of this report, cattle refers to cows and bulls and excludes buffalo.

Cow – Female cattle have been refereed to as cows.

Bull / Bullock – different sources referred to for the purpose of this report have used the terms bull and bullock interchangeably. Essentially, these terms refer to male cattle.