



IAI VISION 2020

1st International Symposium on Future of Indian **Dairy** Industry

1-2 December 2011, NDRI, Karnal, Haryana

Draft Document on Vision 2020 for Indian dairy industry

Dec,01,2011

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Acknowledgement

At the outset I would like to express my sincere gratitude to each and everyone from dairy world , who has helped me clarify my concepts of dairying.

I express my sincere gratitude to my supporting team of Dr CN Sant, Mr Ravinder Mathur, Mr Kaushlesh Varshney, Mr AV Gupte who have helped me to shape and draft this document on Vision 2020.

I am also thankful to Ms Amrita Patel Chairperson NDDB who has always been an inspiration behind this vision 2020 through her deliberations since the turn of the century as well as through the exemplary work of National Dairy Plan 2022.

I am thankful to Dr Ak Srivastava, Director NDRI Karnal, who has been an inspiration for converting vast data of Indian dairy industry into a brief package of dairy intelligence .

I am thankful to Late Dr C K Prahalad and his coveted campaign of India@75 which has taught me on how to develop an actionable plan for a chosen future.

I am thankful to Mr Subodh kumar who is a true cow worshipper and a staunch believer in A2 type of milk for his continuous support to shape my thoughts for peeping inside the future of dairying.

I am thankful to large numbers of senior dairy experts who have been involved in our program of The second innings for contributing their ideas towards envisioning the future of dairy industry with me.

I would once again like to extend a special thanks to Dr C N Sant for guiding me and providing valuable insights for developing this vision 2020 document.

I am thankful to Dr CB Singh principal advisor IAI and Mr Vishal Gupta Chairman PCSL to provide me a full heart support to this endeavor of writing a vision 2020 for Indian dairy industry.

At the end I would like to thank our prospective readers in advance, for they would be a source of improvement and further development of this vision 2020 document.

Kuldeep Sharma

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1. Executive summary

IAI Vision 2020 for dairy industry is an attempt to envision future of dairy industry in 2020. The document provides insights into dairy industry and outlines the opportunities and challenges being faced by this industry. IAI vision 2020 has been developed with an intent to first develop a future roadmap to achieve the ambitious targets of Indian dairy industry as laid down under various policies and plans and later to review them on regular basis at regional levels under the same theme till they are achieved. It might appear at the end that all aspects related to dairying in India are not covered in this vision document due to diversity in dairy practices across the country but we are committed to incorporate all the missed out issues in our subsequent versions of vision 2020.

India is probably the only cow worshipping country in the world. Milk and milk products are the integral part of our rituals and we have the largest liquid milk consuming population of the world. The first mention of milk trading occurred during Mahabharata times (nearly 2500 BC) when milk used to get converted into butter so as to avoid its movement from Gokul to Mathura. Sri Krishna has been considered as a true cow savior. Indian dairy industry has shown an unprecedented growth in milk production from about 51.4 million tons in 1990 to about 115 million tones in 20010-11. India has emerged as the largest milk producer in the world, but could only expected to reach about 160 million tons by 2020. The overall growth rate of the dairy industry in India is around 4%, which is almost 3 times the average growth rate of the dairy industry in the world. The milk production grew by 3 mill MT per annum from 1992 to 2007 and now we need it to grow at 5 Million Mt per annum in next fifteen so as to meet the ambitious target of around 183 million MT in 2022. Believe us it looks impossible as on now until the whole system and policies are geared for some radical changes in the areas of breeding, fodder, health and CMP.

Dairy till date has not been considered as a full time business by the farmers. Around 70 % of milk production is carried out by small and marginal farmers and organized dairy farms with more than 500 animals could still be counted on fingers. There has been huge requirement of land for fodder production and against the current levels of around 3 % land utilization for fodder, we need around 10 5 of the agriculture land to produce high quality (nutritionally) so as to meet the targets as envisioned fort 2020. Only 20 % of the total breedable animals are provided with Artificial insemination as against the requirements of 50%. The emerging issues with dairy industry are not only limited to diseases from animals but are also raising concerns over diseases from animals to the human beings.

Unlike west where the average lactation period of animal for milking purpose is 3.5 years only after which they use the same animal for meat purpose, we have a highly cost inefficient system where due to cultural reasons we have to feed and maintain animals after their productive period. This is more in case of cows than buffaloes. This financial burden of keeping the animal till it dies naturally has evolved some bad practices like starving the young calves to death. There is no clear policy on unproductive bulls also which keep on contributing to increasing population of unproductive cattle on one hand and thrive on already minimal resources of feed , fodder and water. We also have a major limitation of unorganized sector handling the raw milk. In west you can not sell raw milk and only registered agencies with capability to at least pasteurize it could sell it to the industry as well as to the consumers.

The whole eco system around dairying lacks capacity building of farmers towards better productivity, animal health, breeding practices, clean milk production and better use of animal wastes. The whole world is becoming more and more environment conscious therefore dairy emissions is an important area to be controlled through intensive knowledge sharing and dissemination. A large number of organizations from India and abroad are willing in empowering farmers through information, however it can not be done without involving committed NGOs , private players and government in a meaningful partnership in various parts of the country. It calls for private, public participation model to strengthen dairy eco system in the country.

Indian dairy farming which has always been considered as the most competitive in terms of labor and input costs is no more enjoying the same status. However the reality lies with the fact that the farmer goes for imputed costing in dairy farming and never consider the costs of labor and inputs. Even the land cost for growing the fodder is not considered as it is normally done at Gochar land. MNREGA schemes and other ambitious projects of government of India is providing a better employment opportunity for rural farmers therefore if better prices are not given then the coming generation might loose interest in dairying.

There is lack of elite knowledge amongst the farmers for better dairying practices. it is estimated that we might be requiring a total of around 300000 trained dairy workers in different cadres by 2020 so as to facilitate AI, balanced rationing, farm management, clean milk production, silage production, organic farming, mastitis and other disease control, use of IT at farm level, managing milking and chilling and other activities effectively and efficiently.

There is a huge gap in demand supply of high quality mineral mixture and concentrated feeds for animals in order to ensure health and productivity. Lack of governance in this area has led to mushroom growth of small feed manufacturers offering unknown formulations to farmers for milk yield improvement at the cost of animal health. The emerging trends of GM crops in cotton, soya and maize are also an area of concern. Though till date not much of negative impact is noticed but our researchers must forecast its impact once whole of the crop would be shifted to GM crops.

Lastly due to change in socio economic structure in our country dairy and horticulture crops are going to surpass the cereals in 2011. In 2010 the contribution of cereals, dairy and horticulture to GDP was 151000 Cr, 149000 Cr and 145000 Cr respectively. Since 1960 our food security is focusing on cereals only while dairy and horticulture are the food for tomorrow. Dairy thus requires a comprehensive warehousing and distribution mechanism along with a differential minimum support price (DMSP) based on Indigenous cows, buffaloes and hybrid cows. The major threat is from spurious or synthetic milk suppliers who attempts to fill the huge demand supply gap at both industry and consumers level. We have high hopes with the currently enacted Food safety act but time would tell about how effectively it would get implemented.

There is a need to strengthen the milk processing industry also in terms of technology, carbon foot print and water miles. The production levels could really make India the dairy basket of the world . Indian dairy industry incurs high costs of production due to lack of scale, poor product mix, high wastage, costly cold chain and lack of R&D in the sector for both products and packaging . At times it is said that India has the cheapest raw milk but the costliest dairy products. The

2. Dairy Industry in India at a glance

- Indian agriculture supports 17.5% of world population with 2.3% of global land and 4.2% of water.
- Milk production in India has come a long way over the years from a low volume of 17mn tons in 1951 to around 116 million tonnes in 2010 and is the largest producer of milk in the world.
- Livestock sector contribute 5.59% in national GDP and 36.6% of Agricultural GDP.
- In 1964-65 rice production was 39.3 MT which increased to 100 MT
- In corresponding period, milk production increased from 17 MT to 105 MT
- The livestock sector provides regular employment to 8.5% of the total workforce
- Largest livestock population: 57 % of world buffalo and 16 % of cattle
- About 70% of milk is produced by marginal farmers having 1-4 animals
- The productivity of Indian milch animal is 987 kg./ year (world average is 2200 kg.)
- Regional contribution to milk production can be seen as North (38%),South(20%), East(11%) and West(31%)
- In 2007 around 28 crores* liters of milk was produced from 9 crore milch animals on per day basis. (1 Crore = 10 million)
- The marketable surplus was around 50 % and out of the organized sector processed around 5 crore liter of milk per day with equal handling by cooperative and private dairies which is around 30 % of available surplus and which needs to be doubled up till 2020 so as to match the demands. (1 Crore = 10 million)
- India has grown by around 3 million MT per annum till 2007 and requires to grow at 5 million MT per day so as to meet the ambitious target of around 170 million MT by 2020.
- There are around 835 organized sector dairies in India being registered under MMPO with total installed capacity of around 10 crore liters of milk per day.
- There has been a negative growth of 6.5 % in indigenous cow's population in last five years.
- There has been a positive growth of 10 % and 35 % respectively in the population of in buffaloes and hybrid cows.
- The current value of milk output from livestock at current prices is around Rs 240000.00 crores and the value of dairy products market is around 400000.00 crores.
- The increase in price of milk at base (Wholesale price index WPI 1993-94 as 100) WPI as compared to other commodities may be represented as follows :

Commodity	Primary food articles	Cereals	Pulses	Milk
WPI Dec 2009	288	267	374	263

- There has been a decline in annual growth rate of milk production in last two decades. It was found to be 5.5, 4.21 and 3.5% for 1980s,1990s and from 2000-2008 respectively.

3. Key statistics of Indian dairying with projections for vision 2020

S. No.	Vision	Projected Vision 2020					* Projected
		1990	1995	2000	2005	2010	
1	Estimate of milk Prod. (M.T.)	51.4	66.2	78.3	91	110	180/160*
2	Per capita Availability (gm/Day)	173	197	217	241	261	350*
3	Live Stock Population in million Nos.	275	285				
4	Growth rate of Live Stock %	0.94		-0.01	-0.33		
5	No. of Milch Animals (000)			1,00,960	1,05,311	109849	119317*
	Cross Bred (000)			8,355	11231	15096	25490*
	Indigenous (000)			49,875	46856	44020	38691*
	Buff (000)			42,730	47224	52191	63169*
6	Value of out put from L. stock(Milk only) at current prices (crores)			129531	180231	2,40,601	700000*
	at 1999-2000 price (crores)			129531	160824	1,73,864	
7	No. of Dairy plants Regd. Under MMPO Including Coop. with capacity in (MLPD)				791	832/100	1250/200*
8	Human population in billions	0.84	0.96	1.01	1.14	1.17	1.33*
9	Value of out put of Dairy Industry in crores					4,00,000	1000000*
10	House hold milk demand (Million tons)	48.8	62	83.8	150	253	271*
	Projected demand supply gap				Proj		
11	Projected demand supply gap	2.6	4.2	-5.5	-59	-143	-91/-111

4. SWOT Analysis of Indian dairy industry

Strengths

- Largest pool of dairy cattle in the world
- Our culture makes us passionate about keeping cows
- Availability of skill for animal rearing in most parts of the country
- Indian breeds of cows represent the world's largest A2 milk producing herd.
- Keeping animal is a household practice
- India is the largest producer of milk in the world
- 70 % of milk production is done by small and marginal farmers in the country and is largest employment provider in the non farm sector
- Indigenous breeds of cows show better immunity than crossbred cows.

Weakness

- Coexistence of useless as a large portion of cattle population has low productivity
- Too much fragmented production of milk
- Farmers have a poor knowledge on costing of milk as most of the costs are imputed costs
- Land cost for growing fodder is never calculated as it is done on gochar land
- Labor is becoming costlier
- Traces of insecticides, pesticides and antibiotics are common in milk.
- Poor knowledge about nutrition and balanced ration for animal
- Poor personal hygiene of farmers and his family and ignorance to clean milk production also leads to poor quality of milk
- It is not considered as a full time employment and is being carried out by woman or elderly person at home.
- Current practices are not environment friendly
- Poor infrastructure for milk collection, chilling and transportation
- Poor infrastructure in networking of information

Opportunities

- Large demands of milk and milk products in un/organized retail.
- High purchasing power of the customer
- Large dairies are feeling the need to invest in backward integration
- Large corporates are looking for developing large herd farms
- More awareness about benefits of cows milk and panchgavya
- Large opportunities in carbon credits and development of non conventional environment friendly sources of energy through dairying

Threats

- High rate of Urbanization
- No distribution and pricing policy on milk
- No incentive on entering into this sector unlike other food processing and meat sector
- No fodder policy and it is not clear under which ministry does fodder fall.
- No firm plan on breeding/AI/Progeny testing and protection
- No control on unproductive animals growth both for bulls and cows
- No incentive on Clean Milk Production
- Very poor animal insurance policy
- Import and export policies on animals, semen, embryos and dairy products are not conducive for small and marginal farmers.

5. Focus and Challenge areas for dairy industry

Focus areas

- To improve productivity in large pool of animals so as to meet large demands of milk and milk products
- To promote indigenous animals for A2 milk as well as on chemical free and organic milk to meet future demands
- To improve capacity utilization of existing capacities by making value added products
- To develop critical mass for economies of scale both through community projects and by supporting setting up of large dairy farms

Challenge areas

- Availability of green fodder for the animals
- To keep unproductive and low quality animals away from accessing the high value natural resources as well as from reproducing more of their likes.
- Developing a mass scale extension services for dairying in a fragmented scenario as well as for developing a large pool of trainers for dairy industry.
- To develop an appropriate distribution and pricing policy for milk from Indian descript cows
- To set up common service center for milking, natural/AI, silage, hydroponics, bio gas, processing (SPV), capacity building for CMP ,health and nutrition
- To create opportunities of higher ROI

6. Insights on Indian dairy industry and Recommendations

We have categorized all the issues and challenges related to dairy industry in six categories namely

- Nutrition and Feed
- Breeding and genetics
- Animal health
- Extension services
- Research and development, and
- Miscellaneous

The whole purpose of developing these insights and recommendations is to make dairying as a remunerative option for farmers in all parts of the country. Rising urbanization has affected the input costs and feed and fodder costs have increased by three folds in the recent past. Same is true for other inputs for health and general upkeep of animal. Unlike other commodities milk is highly perishable and thus could not be stored and traded. The innovative and low cost methods for milk preservations like lacto-peroxidase have yet to get a clearance from food authorities in the country.

As stated by Ms Amrita Patel , chair person NDDB that all policy frame work and recommendations must answer the following key questions

How do we balance the interests of producers and consumers ?

How do we sustain the incentive for continued growth of milk producers ?

How do we ensure livelihoods or many more millions of milk producers?

How do we ensure that milk producers remain central to all that we plan for the future growth of dairy industry ?

Though we have made very good projections for dairy industry in India but all these projections may get influenced by various factors like subsidies for dairy farmers in the developed world , poor monsoons in India, poor performance of other sectors in the country and other economic calamities.

There have been large number of issues which exists at various levels of collection, chilling, logistics and processing. Intermediaries are normally blamed the most our research has shown that they add a lot of value to the whole value chain . Unlike other agri- products where the MRP of produce is even 10 times that of farm gate price; in dairy the farm gate price is well above 60 % in most of the milk producing states for last few decades. The only issue with intermediaries is that did not invested back in the supply chain so as to create an opportunity for farmer to get better price and the industry to get better quality.

Nutrition and Feed

This forms the major reason for the failure of the Indian farmers on many counts viz. decreased productivity as well as longer Inter-calving Period. Unfortunately this is only due to the fact that proper Nutrition has not been adhered to due to age old practices being followed by the farmers & dearth of people in this field to carry out extension services to differentiate between balanced nutrition and balanced ration.

The basics of nutrition is a combination of Green grass + Dry grass + Concentrates (Cattle Feed) & Mineral Mixture (which is to a tune of only 50 -100 gms per animal per day). Mineral Mixture is a medicine which is actually equivalent to position of salt in our food. Only 2-3 % of the breedable animals could be fed with currently produced mineral mixture. We should contribute to

making the positioning of Mineral as equivalent to salt & advocate its used by farmers daily. This will help to overcome the losses of Minerals from the body reserves in milk. (Milk contains all the minerals for e.g. One litre of milk contains 1.2 gms of calcium which means @ an average of 10 litres per day production an animal is liable to lose about 3.6 Kg. of Calcium in a lactation period of about 300 days. If this is not replenished then a day will come wherein animal stops giving milk totally. A healthy animal can give 10-12 lactations in its lifecycle if fed properly. But if mineral Mixture is not regularly supplemented then it gives on 5-6 lactations at the most.

Now a days software are also available for pocket held devices to compute balanced ration at village level. It is required to develop area specific mineral mixture .

A need for setting up a state /region specific mineral mixture plant is the need of an hour. Village resource person who is advising farmers on balanced ration could also be instrumental in promoting the need for mineral mixture.

There is a requirement for specially formulated compound cattle feed for growing and lactating bovines for different lactation stages.

By pass protein technology to improve productivity and even if a small percentage of 16 million protein meals being consumed per year is treated at solvent extraction plants (with incentives) then a kilogram of treated protein meal will add to 1 kg of extra milk production.

By pass fat technology to be used for 100 days after calving and helps in improving milk production and also reproductive efficiency.

Need for a feed regulatory authority for governance in feed manufacturing sector is the order of the day. A large number of unorganized as well as a couple of organized sector players are also selling feed with non descript ingredients and low cost fillers.

There will be need of 1000 million Mt of green fodder by 2020 but neither there is a fodder policy nor availability of data on crops and green fodder produced in various parts of the country. There would also be a need to increase the area under cultivation for fodder from around 5 % currently to around 15 % by 2020.

Green Fodder and self fed pasture practice results in the lowest cost of milk production and at the same time healthiest milk for human nutrition – low in total fats and high in EFA contents. .

The major challenge with green fodder is land availability and thus suitable amendments in land acquisition and urbanization acts should be made as well as identification and utilization of wastelands for this purpose should be promoted.

Hydroponics Fodder could also be seen as a solution to the land related problems Indian experience with hydroponics fodder with imported Fometa devices nearly twenty years ago due to inept handling, was given up as a bad dream. World over Hydroponics fodder is considered a very important Green highly nutritive, high digestibility cattle feed alternative strategy. By vertical growing it improves land use nearly 200 times and reduces irrigation water requirement to mere 5% of normal cultivation and completely immune from vagaries of weather.

We can develop our own Hydroponics Fodder device designs in India to suit various climate zones. As practiced abroad, for India it is not necessary to use

air-conditioning and artificial lighting to grow Hydroponics Fodder. It is also possible to avoid use of chlorine as sanitizing agent against fungus problems.

Combined with a Biogas plant a Hydroponics Fodder system is a completely green energy based fodder production method for Indian conditions. Just two kg/day of any coarse grain can provide a complete highly digestible & nutritious balanced cattle feed for an average Indian cow, through out the year.

It is a general belief that Greens are use in feeding however it remains to be seen that its actually the Dry fodder which helps in better digestion (owing to its less water quantum). Green contain more than 60% water at the minimum as such there is not much of chewing which forms the basics of Rumination process which is extremely vital for aiding digestion thereby improving productivity.

The Grasses are fed as such thereby there is a minimum wastage of 30% which can be curtailed by efficient use of Chaff Cutters.

The cutting of fodder at a correct length of 1-1.5 inches will be optimal for improving the Rumination. This has been shown to improve the Fat % of milk also. Fat % forms the basic parameter for Milk procurement prices.

Breeding and Genetics

It is advisable to align breeding strategies with market demands. Instead of selling what we make we must make what could be sold. Milk of only Indian breeds of Cows, (Confirmed by laboratory type testing as being free from BCM 7(Beta Case Morphine 7) from a DNA tested herd, for A2 milk should be supplied as separate Milk, not mixed with Buffalo or A1 HF milk. States such as Gujarat that produce large quantities of natural A2 Milk from its Gir cows fit excellently well to take a lead. Pure milk of Indian breeds of Cows commands very good premium prices in India.

Low fat A2 milk as the premium grade A2 milk, can command very high premium prices and cater to better informed clientele in India. EU under its Lipgene project is conducting research simultaneously in 21 laboratories in Europe to produce designer's natural milk that has low total fat and high EFA content.

Indian cows were traditionally pasture fed. (Stall feeding of cattle and concentrated prepared feed is a rather recent development from Indian point of View.)

Cows raised in Pastures as reported in Kautilya's Arth Shastra had total fat content of less than 1%. This is when Cow's Milk was truly Amrit- Nature's Nectar- a preventive and cure for all self degenerating diseases of human body. Taking guidance from our ancient cow management practices in Vedas and other Sanskrit texts, it is not difficult for us in India to produce within foreseeable future, a 'Designer's Milk' with low total fat content. By reducing fat content, the milk yield also goes up. Indians over thousands of years had enjoyed such low fat high EFA , A2 type Milk of Indian cows. The high Omega 3 content of this milk explains the secret of the well recognized highly developed capacity of Indian brains in the world.

Low in total Fat & high EFA Milk of Indian breeds of Cows will be the most highly prized A2 milk from commercial considerations.

A2 Milk Based Infant food is considered most important for baby food and milk formulae. This presents India with an excellent commercial opportunity to become a world leader in Infant milk food supplies.

AI as a tool to enhance yield ,productivity and genetic quality of bovines

The breeding practices require genetic improvement of bovine and the prime agenda for carrying it out is by making a huge shift from natural service to artificial insemination(AI).

AI also require regulation and governance from A1/A2 type of milk perspective

The current level of AI in India is at around 20 % for breedable cows which needs to be increased to around 45 % by 2020.

Farmers should be taught & shown the effective means of record keeping by virtue of which only the proper up gradation of indigenous breed is possible.

The perfect blood % would be bench marked & curtailed at that point or else it will reach almost 100% which is really not wanted as most of the cross breeding is done with animals who are comfortable in cooler climates which is not the case in India. Crossbreeding has been followed so that the progeny gets best of both the characters viz. acclimatization & Increased disease resistance (from Foreign Blood point of view) & increasing productivity (from Indian point of view).

All cross breeding in India with large number of identifiable phenotypes of Indian breeds of cows had evolved to suit the natural conditions, over the last thousands of years. Let us not consciously loose this nature's precious gift to our country. In view of the modern researches about A2 milk, it will be prudent on the part of our Government to stop cross breeding with A1 type mainly HF semen.

Production of high genetic merit bulls is also required for

a. Semen stations where currently 300 bulls are being used with only 20 % being produced under genetic improvement program. On an average around 8000 high genetic bulls will be required by 2020 of different breeds with an annual replacement rate of around 2500. The projected requirements includes bulls through progeny testing, import of exotic bulls semen and embryos and bulls from pedigree selection (for some indigenous breeds).

b. Natural service which as per a current estimation around 300000 bulls are used for natural service. They are not being produced in a scientific manner. It is required to produce minimum 100000 bulls per annum under Standard operating procedures as laid down by the scientific guidelines.

Semen production for AI delivery Services is currently required for 45 million AI per annum in about 20 % of bovine population. This needs to be raised for around 130 millions AI by 2020 in around 50 % of breedable bovines. Only 20 million of the 45 mill AIs are being carried out at the door steps of the milk producer. Remaining 25 million AI also needs to reach to farmers door steps and for this an additional 60000 mobile AI technicians would required to be added to provide AI services alone. It could be done through train the trainer program also. There is a need to charge at cost with some profit also for delivering Ai services. The subsidized services should be available to people at BPL level.

AI should be excluded from the list of minor veterinary services. Minor veterinary services otherwise restrict delivery of these services in a couple of states by government technicians only. This way the opportunities to include private organizations to build a structure around this vast opportunity gets eliminated.

As against 80 % success rate of AI in USA, we could hardly achieve around 25 % in last over sixty years of independence. Regular failure of AI leads to infertility of cow over a period of time. Fibroids caused by lack of professional expertise of the AI provider staff, after a few calving renders good fertile cows incapable of future conception. Loss of good milk yielding cows due to infertility has also never been assessed in the Indian Animal Husbandry practice. By poor AI delivery apart from tremendous burden on farmers in feeding cows for the extended dry period, excellent milk cattle is being turned infertile. In this way AI is helping the cow slaughter industry.

All precautions must be taken to avoid spread of IBR (Infectious Bovine Rhinotracheitis) which has been known to be an uncontrollable Zoonotic disease during AI. Indian veterinary experts have the data of 20000 animals from Military Farms, Gaushala, Two Coordinated projects and 50 PG studies on this disease from India in support of this observation. It is reaching human population in the form of Swine Flu, Dengue fever, H1N1 infection, Common Cold and Cough spreading like epidemics in colder seasons.

A combination of breeding program which leads to animals with higher a higher feed conversion efficiency and a balanced ration will lead to a lower methane emissions and thus more efficient dairying. The poultry model of feed conversion must also be benchmarked in dairy industry in terms of milk production and not for meat.

For better governance in semen production, AI delivery, registration of semen centers, protocol of AI delivery to animals with log keeping, promoting semen production to produce A2 type milk as against A1 type milk, there is a need for Draft bovine breeding bill.

Animal health

Central act of prevention and control of infectious Diseases 2009 needs to be further strengthened and implemented at a nation wide level with participation of states to identify free zones for potential milk and meat production activities.

Mastitis control & management, and prophylactic vaccination for clean milk production.

Many milk producers don't even bother about their own hygiene and expectation from them about the clean milk production is too much. Therefore, incentive (in cash or kind) may motivate them for clean milk. Without motivation, things will continue as such.

To begin with if the farmer increases the water feed to animal just by one time in a day; a guaranteed increase of minimum 5 % of milk yield is possible.

It is important to stress to the farmers that an animal which is not falling sick will only give better productivity as well as reproduction.

It is important to keep the inter-calving period to the least thereby only the business will be lucrative.

The dependence on Doctors (actually Veterinarians) should be minimal. It should be understood that Prevention is investment & treatment is Expense.

In India it is seen that most of the problems (more than 90%) faced by the Dairy Farmers are linked to poor management (in both nutrition as well as that of Metabolic Disorders), which is mainly due to lack of Nutritional (basic) knowledge leading to heavy losses. The various problems faced by the farmers are:

- | | |
|--------------------------------------|--------------------------------------|
| 1. Repeat Breeding & Infertility | 2. Anoestrous |
| 3. Delayed onset of puberty | 4. Retained Placenta |
| 5. Predisposition to Mastitis | 6. Predisposition to Metritis |
| 7. Abortions | 8. Weak Calves |
| 9. Birth of dead calves | 10. Male Infertility |
| 11. Delayed Uterine Involution | 12. Reduced disease resistance |
| 13. Reduced growth | 14. Goitre |
| 15. Anemia | 16. Bone diseases |
| 16. Poor growth & diarrhea | 18. Susceptibility to parasites |
| 19. Increased time for wound healing | 20. Calf Pneumonia |
| 21. Hypocalcaemia | 22. Downer Cow Syndrome |
| 23. Ketosis | 24. Displaced abomasum |

Genetic potential of the animals is very low which has to be improved. The animal holding capacity (presently it's less than 2 per farmer) is also low. The farmer is trying to increase the number of animals to get more milk , rather than getting more milk from less no. of animals (which is very much possible) by following good Management & feeding practices.

Management & Nutrition covers more than 90% of the animal Rearing Costs. This is being totally neglected, for a farmer is still of the opinion that Injections & Treatment (which contributes less than 2% of the total Rearing costs) is better for improving productivity & is being given utmost importance.

Low cost medication through Homeopathy and Ayurvedic must be supported and promoted in the rural areas. A large talent pool must be developed for treatment of common diseases through these conventional means of treatment.

Extension Services

Extension can be described as an activity basically targeted to impart knowledge to the end users (farmers) with a view to enhance their knowledge (w.r.t Dairy Farming; Management & Nutrition thereof) scientifically & to improve their bottom line. At the same time it is ensured that farmers are made aware as well as convinced about the specific needs & wants of their animals (which they have to fulfill) to get the better returns.

We might be requiring over 300000 dairy workers by 2020 to provide knowledge to farmers in balanced rationing, mineral mixture, clean milk production, costing and farm management, mastitis controls, chilling center management etc. National Skill Development corporation should be involved in supporting this campaign through Train the trainer program and a PPP model around this activity should be created.

Initially it could be for Intensive/Compulsory Training the Farmers in the areas of Clean Milk Production (HACCP issues in particular; Food Safety Quality issues in addition to Quantity & other related issues feed, Mineral Mixtures, GREEN FODDER, Silage preparation) etc.

Animal Health Camps coordinated with State A.H Depts, Veterinary Drugs/Feeds Suppliers, Mineral Mixture manufacturer suppliers for Deworming and Infertility Check up, P.T, A.I etc inclusive of Private and Co-operative.

To provide Clean Milk Production Calendars and literature with pictures in local languages to all Milk Vendors/DCS/Suppliers.

The main focus in extension services has always been Treatment which does not exceed more than 1.5% of the total farming costs.

The farmers believe that Doctor will help them improve productivity by use of medications as well as Feed supplements.

There is a shortage of Dairy training Institutions which could provide practical training to the farmers on various aspects of good dairying practices along with economics and commercial aspect of it. This results into the Trainings being too theoretical. Thus Extension & formation of Training Schools/Colleges would be the most ideal method to disseminate the required & essential knowledge to all the corners of the country over a period of time.

Try to impart (basic) Knowledge of the farming, which is need of the hour to the farmer by targeting his productivity & thereby profitability. If the farmer PROSPERS then only the Country can meet its demand of milk.

Try to bring the Paradigm shift in the farmer's viewpoint i.e. from Treatment to Prevention. This will ensure better quality as well as quantity of milk automatically. It has to be borne in mind that a healthy animal will always produce best quality of milk with least Somatic Cells Count as well as bacterial load since it does not suffer from any infections. E.g. Mastitis is seen in more than 35% of the animals by virtue of which all the products related to this will get a upper hand.

Try to reduce dependency on the Old methods & convert into scientific methods to ensure optimization of milk as well as Reproduction.

The largest base for livestock population lies with the Dairy Cooperatives. It is seen that more & more Dairy Companies as well as Cooperatives are coming up. Farmers are taking up to dairying ; a fact also due to the variations in the seasons, mainly Rainfall, which has become totally unpredictable thereby rendering the returns from agriculture totally unpredictable. Politicians depend upon Coops (mainly Sugar) for keeping in constant touch with the marginal farmers, which form their potential vote bank. Sugarcane as such requires heavy rainfall, which of late has become less & less thereby eroding the base of sugarcane farming in total. Thus it is seen that the politicians have turned to Dairy Farming; mainly thro forming Coops which are becoming their strong footholds.

It is also a well known that Milk production is not affected much by rainfall & is surefire business paying money to the Farmers within 15 days. It is also seen that the areas, which have low rainfall, tend to have a better Dairy business.

Most of these Dairy Coops focus more on Milk & Milk Products rather than the Milk Production itself. Thus the Dairy Coops tend to employ less manpower (viz. Veterinarians or Extension Officers) to give required attention to Extension.

It could be done by establishing a Training Institute targeting one in each state on 3 different scales / parameters viz. a simple one (which the marginal farmer

is presently doing), second one with little mechanizations & third with total mechanization so that the farmers understand the efficacy of each & every model & can adopt the same. This will also influence the farmers not in Dairy farming to opt for one.

Lately it requires a tie up with various Cooperatives (small or big) who do not have much strength of Veterinarians/Extension Workers working with them which can get hands on Training as well as experience as well as expertise which can later be disseminated at the farmers level.

Research and development

There should be a strategic intent to research and development in dairy sector at both industry and academia level. The research requires a collaborative approach wherein the Institution should work on industry funded projects/problems). Even if the Institute has got its mandate for conducting basic research then it should also be approved by a joint body of Institute and industry .

There should be a national body approach and the whole research requirement should be divided amongst various research bodies at Institutional as well as industrial levels. A time target for solving problems related to animal breeding and improvement of breeds should be set up and achieved.

One of the most effective ways of achieving your goals on understanding the real time issues with farming related to costs, yield, health or impact of some feed ingredients it would be desirable to set up a local research farm at say an agricultural school/college or university in various parts of the country. The Farm should be fitted out with a milk recording, measuring and data collection via a PC. Because your climate, crops soil and animal genetics differ from Europe or the American Continent, you will need to test & Analyze the various suggestions of adjusting the feed/nutrition compounds, water temperature, pest controls etc.

The research farm will be able to identify the most profitable suggestions from other countries and recommend the local farmers adopt those first. In order to put such research projects together, companies like ourselves and governments such as Canada will provide subsidies to make it happen.

Special research should be dedicated to conserving our local indigenous cows and buffaloes. The genetic potential of our animal and particularly buffalo should be done so as to make India a buffalo exporting nation in the world.

New frontiers of research are to be identified in the first line areas using biotechnology, ICT, nanotechnology , solar engines and other challenging techniques. Embryo transfer a great potential in our country and a large population of low/non productive cows with healthy uterus may act as surrogate mothers to ready embryos from developed world or our own cows for A2 descript milk.

Research is required in the areas of converting the production processes for indigenous milk products (sweets) continuous and achieve economies of scale and thus rule the export markets as well as domestic markets.

Packaging technology for extended and longer shelf life of products need to be developed in our own country. It is still very difficult to procure three layer carbon blackened extruded HDPE bottles for sterilized flavored milk as well as square or rectangular transparent retort able trays for long shelf life paneer in India.

Research should also be conducted to develop some dairy products which are patentable in the area of health and nutraceuticals.

Research on feed and feed supplement to control nature of protein, fat and carbohydrates in milk should be the order of the day. This research must also manifest better feed conversion ratio for milk in dairy cattle.

Research should be conducted to develop injectable sterilization drugs for making unproductive bulls sterilized instead of painful process of castration.

Miscellaneous

Government Policy frameworks :There should be national level policy and advocacy body in the following areas for making dairy industry more productive and capable for becoming dairy basket of the world.

- a. National milk production policy
- b. National Milk pricing policy
- c. National milk powder storage and distribution policy for food security
- d. National Fodder Policy
- e. National AI and animal breeding policy
- f. National unproductive animals elimination policy
- g. National cattle insurance policy
- h. National cattle feed quality and safety policy
- i. National animal health policy
- j. National Organic milk production policy
- k. National dairy cold chain policy
- l. National milk supply chain policy
- m. National training policy for dairy workers
- n. National wasteland management for fodder policy
- o. National silage production and management policy
- p. National oil cake and oil meal export policy
- q. National policy on imports and exports of milk and milk products
- r. National policy on imports and exports of dairy cattle , semen and embryos

Information system : There should be a national level Information center with complete information about milk production, milk collected and chilled ,milk pricing, feed and fodder pricing, AI and breeding status and calves produced. This data should be collected from all the villages and later to be integrated at district levels for a state and for state level for the country. The ICT tools with mobile technology could be utilized for this. Each and every dairy farmer should be issued a smart card and complete data related to his dairy farming business need to be updated on a weekly, monthly basis at the village/block level.

Role of Private Public partnerships in dairy development : The versatile model of PPP could very well be conceived, promoted and implemented in building the following

- Common service centers for community milking, bio gas, AI , milk chilling, transportation and milk processing for making value added products like Khoa, panir, dahi etc.
- Developing Integrated dairy parks
- Developing Cold chain for milk and milk products in a particular area
- Developing common processing plants by federating large number of dairy farmers in a particular area through SHG movement or otherwise under a producer company format.

- Developing complete value chain for organic or chemical free milk and milk products for modern trade or exports market.

Government support is solicited for dairy development in India : The industry requires special package from the government a couple of them have been announced but not implemented like tax holidays for setting up a milk processing plant. Even a couple of states do not consider milk or dairy products to be a type of food and thus dairy processing machine manufacturer can not charge lower rates of VAT which are applicable for food processing machineries.

There should be a special permission for importing animals, semen or embryos with A2 typing milk.

Tax holidays should be provided for companies setting up cattle feed plants and mineral mixture plants.

There should be soft loans and duty free imports for equipment for making and packing long shelf life milk and milk products . Such plants would help dairy farmers to extend their reach to far off markets without cold chain with the help of existing cooperatives and federations.

Food safety and labeling : The process for getting an amendment made for milk products with healthy additives like Dahi and panir with fiber should be made single window and much simpler with the appropriate authority.

Effective systems like Lacto peroxidase should be allowed in the country with proper labeling so as to save on the huge cost of energy and investment on DG set etc in the power grey areas of the country.

7. Bibliography

- Draft 12th Five years plan : Planning commission
- Draft National Dairy plan 2007-2021-22 by NDDB
- Indian dairyman issues of Jan 2006, Dec 2006, March 2010 and September 2011
- <http://www.indiastat.com>
- Mckinsey FAIDA report on Indian food processing sector 2004
- Technopack report on PPP in dairy industry
- Proceedings of CII dairy conference at NDRI Karnal 2008
- Blogs of Dr.Chandrakiran N. Sant an eminent dairy advisor
- Blogs of Er. Subodh Kumar an eminent cow worshipper
- TIFAC vision 2020 report
- Article by Mr V P Gandhi in Dairy Planner