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Environmentally Controlled Dairy Farm (100 Holstein Cows - American)



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Summary

Livestock plays an important role in the economy of the country by contributing approximately 51.8 percent of the agriculture value added and 11.3 percent to national GDP (2008-09). Gross value addition of livestock at current cost factor has increased from Rs. 1,052 billion (2007-08) to Rs. 1,287 billion (2008-09) showing an increase of 22.3 %. The value of livestock is 6.1% more than the combined value of major and minor crops.

Buffaloes cannot be as productive as is required to meet the ever increasing demand of milk and can't provide the profitability that cows can. Buffaloes become fully matured at the age of 24 – 30 months, relative to cows becoming mature at 15-18 months of age. This results in cows becoming productive milkers much earlier in their lives as compared with buffaloes. Cows have larger lactation period cycles which can reduce their dry period to 60 days; buffaloes have dry period of 4 month.

The Controlled Shed Dairy Farm with population of 100 American Holstein Cows needs a capital investment estimated at Rs. 57 million for purchasing of cows, construction of building, purchasing machinery and equipment. In addition to this, a sum of Rs. 3 million is required as working capital. The total project cost is estimated at Rs. 60 million.

The estimated income varies from 2.8 million to 77 million per annum from first to tenth year of the project. In dairy farming golden earning period starts after six years due to multiplication of animals. This is a profitable business enterprise due to continuous increasing demand of the milk in the market and export prospects.

1. Introduction

Pakistan is the fifth largest producer of milk in the world with 34 billion liters of milk produced annually based on 50 million animals according to various estimates in year 2009. The potential is huge but the sector operates mostly in the informal economy and needs a consistent effort to formalize and be able to contribute better to the national economy. Out of the total milk produced, 97% is in the informal sector (i.e. loose milk consumed in the villages and or sold in the cities through "Gawallas" in unhygienic conditions and without any quality standards). There are 8 Million farming households in Pakistan with a total herd size of 50 million animals. About 97% of these farmers are not linked to formal markets and hence are not progressing in economic terms. Moreover, the overall animal herd of Pakistan is thinly spread across thousands of square kilometers with an average of 2 to 5 animals per household. It is an untapped market, expected to grow an additional 3 billion liters in the next few years at a growth rate faster than most sectors, and 30% by 2015.

Being a highly perishable commodity and produced primarily in the heart of the rural environment, milk reaches the consumer only with much difficulty and increased cost. Urban usage of milk is only 30% with the formal milk processing industry handling only 2 to 3 % (around 1 billion liters) of total milk production of the country. For the other 97%, a multi-layered distribution system of middlemen has evolved for milk supply. An estimated 20% of current milk production is lost from income generation due to fragile infrastructure facilities required for a highly perishable commodity like milk. As a result of these factors, Pakistan is a net importer of milk and milk products. An important goal for the dairy industry of Pakistan is to meet the needs of the people of Pakistan, such that while imports are welcome they are not necessary.

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It is a remarkable revolution in dairy sector by creating a self sufficient temperature and environmental controlled dairy farm house. Following are some of the features which are quite different from the other traditional farm houses.

- Temperature of the shed is controlled by the use of mist spraying on animals and fans.
- Consumption of electricity is reduced due to standardized design of farm.
- Less human efforts are required for cleanliness because of structure of the shed.
- Concrete structure is more durable than the steel one.
- Coal free electricity can be produced from manure of the cows.
- Efficiency of imported cows does not suffer in hot weather.

2. Basic Information on Livestock

Table 1: Traits of Cows

Parameters	Cattle
Dry period	2-3 months
Calving interval	13 months
Service period	2-3 months
Age at first calving	2 to 2.5 yr.
Gestation length	300 days
Estrous cycle length	21 days
Estrous duration	17 hrs
Age at puberty	15-18 months
Rectal Temperature	101.5 degrees F (38.5 degree C)
Heart Rate	60-70 beats/minute
Respiratory Rate	30 breaths/minute

3. Contribution of Livestock in National Economy

Livestock plays an important role in the economy of the country. Livestock sector contributed approximately 51.8 percent of the agriculture value added and 11.3 percent to national GDP during 2008-09. Gross value addition of livestock at current cost factor has increased from Rs. 1,052 billion (2007-08) to Rs. 1,287 billion (2008-09) showing an increase of 22.3 %. The value of livestock is 6.1% more than the combined value of major and minor crops. Government gives high priority to its development and is focused on private sector led development of livestock. Underpinning the importance of livestock, the government has placed livestock on national development agenda. It has formulated “Livestock Development Policy” and “Poultry Development Policy”. Both policies are aimed at private sector led development of livestock with Government providing enabling environment. The policies would provide a frame work for accelerated development of livestock (Source: Economic Survey of Pakistan 2008-09).

To spearhead the development efforts through private sector, fully autonomous private sector-led, “Livestock and Dairy Development Board” and “Pakistan Dairy Development Company” have been established. These companies are serving as platform for investment in livestock sector. Apart from provincial Government programs, the federal government has substantially increased public sector investment in livestock sector and has initiated mega projects to the tune of Rs. 7.1 billion for strengthening livestock services for improved disease diagnosis & control; milk and meat production; breed improvement; animal husbandry and management practices in the country. The livestock population for the last five years is given below: (Source: Economic Survey of Pakistan 2008-09)

Table 2: Livestock Population (Million Numbers)

Year	Cattle	Buffaloes	Sheep	Goat	Camels	Asses	Horses	Mules
2004-05	24.2	26.3	24.9	56.7	0.7	4.2	0.3	0.3
2005-06	29.6	27.3	26.5	53.8	0.9	4.3	0.3	0.2
2006-07	30.7	28.2	26.8	55.2	0.9	4.3	0.3	0.2
2007-08	31.8	29.0	27.1	56.7	1.0	4.4	0.3	0.2
2008-09	33.0	29.9	27.4	58.3	1.0	4.5	0.4	0.2

Table 3: Annual Growth Rate of Livestock Population (Million Numbers)

Species	1996 Census	2006 Census	Increase 1996-2006	Annual Growth Rate(1996 to 2006)
Cattle	20.42	29.56	45%	4.50%
Buffalo	20.27	27.34	35%	3.50%
Sheep	23.54	26.48	13%	1.30%
Goat	41.17	53.79	31%	3.10%
Camels	0.82	0.92	13%	1.30%
Asses	3.56	4.27	20%	2.00%
Horses	0.33	0.34	3%	0.30%
Mules	0.1	0.16	18%	1.80%

In view of the importance of livestock in the economy as well as in the life of a common man, the Government is trying by all means to fix priorities to increase production of milk, meat and poultry to meet rising domestic demand of ever increasing population and produce exportable surplus as well. The major products of livestock are milk and meat, the production of which for last three years is given below: (Source: Economic Survey of Pakistan 2008-09)

Table 4: Livestock Production (Million tons)

Sr. No.	Milk type	2006-07	2007-08	2008-09
1	Milk (Gross Prod.)	40.87	42.19	43.56
i)	Cows	13.91	14.44	14.98
ii)	Buffalo	25.47	26.23	27.03
iii)	Sheep	0.04	0.04	0.04
iv)	Goat	0.68	0.70	0.72
2	Milk (Available for Human consumption)	33.00	34.06	35.16
i)	Cows	11.13	11.55	11.99
ii)	Buffalo	20.37	20.99	21.62
iii)	Sheep	0.04	0.04	0.04
iv)	Goat	0.68	0.70	0.72
3	Meat	2.62	2.73	2.52
i)	Beef	1.50	1.55	1.60
ii)	Mutton	0.57	0.57	0.59
iii)	Poultry Meat	0.55	0.60	0.65

The dairy sector operates mostly in the informal economy and needs a consistent effort to formalize and be able to contribute better to the national economy. The annual milk production of 34 billion liters in Pakistan is shared between a 71 percent share for the rural economy and a much smaller urban share of 29 percent. Only 3 percent of the milk production is processed and marketed through packing.

Presently 97 percent of raw milk produced in the rural economy is not linked to the market mechanism because of a number of reasons. This is mainly due to problems in collection of good quality milk as well as storage and delivery.

4. Productivity of Animals in Pakistan Compared with other Countries

Pakistan's huge animal population of 50 million suffers from low productivity compared to global players although it is quite reasonable in comparison to the rest of Asia. It is estimated that Pakistan has three times the animals that Germany has, but yields are one fifth of Germany's and one third of New Zealand's and USA produces 94.5 billion liters of milk annually through an animal base of a mere 3.4 million animals representing a significant loss in potential economic and social value.

This low productivity has several causes:

The main cause is imbalanced feeding; Pakistan faces shortages of fodder and water two-three times a year. In addition to shortages, feeding of animals is practiced according to the farmers experience and tradition, without any training or knowledge of ration formulation based on production levels. The buffalo in this sense is an easy animal and has relatively modest nutritional requirements. However, cattle require a balanced fodder containing appropriate amounts of concentrate and forage. This is important for efficient rumen digestion and metabolic balance. Technology driven fodder preservation systems (silage) are needed to ensure availability of feed despite seasonality issues. Unhygienic animal care is an additional issue. Smallholding farmers generally tie their animals within the house premises or in premises where animals cannot move freely. Sustainable agriculture training should be encouraged for a long-term rural vision.

Lack of drinking water for animals is a big problem. It is said that if only water was readily available to the animals, productivity could increase by as much as 7%. This demonstrates that even simple infrastructure and management solutions could lead to improved productivity.

Table 5: Milk Production per Animal (Kg)/ Lactation

Country	Cattle	Buffalo
Bangladesh	207	407
Bhutan	257	400
India	987	1,450
Nepal	415	850
Pakistan	1,195	1,909
Sri Lanka	627	496
Australia	4,926	
New Zealand	3,947	

Mr. Collin's Report February 2005

Comparisons show that the role played by indigenous breeds such as Sahiwal, Red Sindhi, Neeli and other breeds native to Pakistan is useful and indeed important. These native breeds are resistant to heat, diseases and need further improvement.

5. Organized Sector

The processed milk sector of Pakistan contributes 0.43% to the GDP, and this is likely to grow in the coming years. Growing urbanization and globalization are changing lifestyles in Pakistan. Dairy as a sector has the ability to influence this change, and indeed the industry must change with changes in society, or it will stagnate. The processing sector can play a critical role in creating a consumer pool for itself in the new urbanized Pakistan.

Table 6: Processor Capacity of Different Organizations

Processors	Capacity	Capacity Utilization		Average Monthly
	(Million liters)	Flush	Lean	
Nestle	1.30	1.30	0.78	1.04
HFL	0.90	0.90	0.54	0.72
Millac	0.30	0.30	0.18	0.24
Vita	0.05	0.03	0.02	0.03
Halla	0.15	0.15	0.09	0.12
Prime	0.10	0.10	0.06	0.08
Nurpur	0.15	0.15	0.09	0.12
Nirala	1.00	0.10	0.06	0.08
Dairy Crest	0.15	0.15	0.09	0.12
Engro	0.35	000	000	000
K& K	0.40	000	000	000
Butt Dairies	0.06	0.06	0.04	0.05
Munno Dairies	0.02	0.02	0.01	0.02
Khi Dairies	0.10	000	000	000
Military	0.18	0.18	0.11	0.14
Total	5.30	3.44	2.06	2.75

Source: Dairy SWOG, Strategic paper on Pakistan's Dairy sector 2006

6. SWOT Analysis for Dairy Industry

Strengths, Weaknesses, Opportunities and Threats analysis can be helpful in decision making for investment in dairy industry.

Strengths

- Important sector for national economy by providing raw material for food & leather industry.
- Major source of milk & meat for food requirements of increasing population
- Export prospects for foreign exchanges earning.
- Business expansion scope of Milk Production due to demand and supply gap.
- Big sector for human resource employment.
- Secures sector for financing for banks.
- Huge scope for milk and meat processing industry.
- Source of Farm Yard Manure to increase the soils fertility and biogas energy.

Weaknesses

- At national level, lack of dairy knowledge, research and extension facilities.
- Lack of commercially viable local breeds of animal to compete with the international breeds.
- High cost of American Holstein cows due to high transport cost.
- Weak institutional support to farmers for establishment of dairy sector.
- Sector is unorganized and unaware of basic farm management practices.
- Problem in marketing of products due to production in remote areas.
- Unavailability of services organizations to provide technical services to the farmers.
- Lack of marketing information and infrastructures.
- Lack of proper planning keeping in mind the future multiplication of off-springs.
- Unavailable of high quality feed and concentrate and lack in silage preservation knowledge.
- Unavailability of national support to endemic diseases that cause losses every year.

Opportunities

- Govt. of Pakistan & Sate Bank of Pakistan has realized the importance of this sector and is supportive.
- Better alternate for industrial groups for diversification in the business.
- Increasing population in cities is demanding more by-products i.e. 30% higher than supply.
- Commercially viable sector with great credit potential and absorption capacity.
- High scope of development due to vast range of aligned areas of business.
- High scope of value addition in dairy products.
- Village's dairy businesses can provide the employment to labor that will ultimately reduce the population load on cities.
- Corporate financing in dairy sector can set an example for other agri. corporate financing.

Threats

- Lack of institutional support can cause a setback in the growth of this sector
- Low farm yields and inferior quality farm future breeds
- Irregular payment to banks against loans or defaults can cause banks for loaning.
- Unorganized marketing systems.
- Delayed establishment of processing industry can flush the milk in market.
- Imbalance between prices of inputs & outputs.
- High rate of interests with rising trend in cost of production.
- Lack of implementation of the latest farm management techniques.
- Lack of high quality semen and embryos and embryos transplant facilities.
- Lack of awareness about economics, demand & supply in market.
- Low saving, low holding capacity.
- Non-availability of subsidy, tax holidays.

7. Project Cost

American Holstein cows with herd size of 100 are suggested in this feasibility study with a scope to extend the farm size to approximately 500 cows within 10 years time. For progressive farmers a herd of 100 cows is considered feasible to get the milk production and multiplication of animals.

The Controlled Shed Dairy Farm with population of 100 American Cows needs a capital investment estimated at Rs. 57 million for construction of building, purchasing machinery and equipment. In addition to this, a sum of Rs. 3 million is required as working capital. The total project cost is estimated at Rs. 60 million.

Table 7: Project Costs (Rs)

Account Head	Total Cost (Rs)
Capital Cost	
Land (8 acres)	8,000,000
Building/Infrastructure	5,958,332
Animals	40,000,000
Machinery & equipment	2,436,000
Pre-operating costs	750,000
Total Capital Cost	57,144,332
Working capital	
Land lease for fodder (33 acres)	495,000
Raw material Inventory	2,200,000
Cash in hand	250,000
Total Working Capital	2,945,000
Total Project Cost	60,089,332

8. Farm Management

Fans and sprinklers system should be installed in the animal barns to control the temperature during summer through soaking technique. Separate division in open coral should be created for various age categories of animals requiring special attention. Animals must be properly tagged to keep all the record like vaccination and insemination etc. Farm should be kept clean and good manure management that is integral part of dairy farming business as it has direct relation with productivity and health of animals. Farm yard manure and slurry is used for improvement of farm soil fertility. Farm should have the availability of 24 hrs electricity. Before entering into the farm, all vehicles must go through a chemical filled low depth pond to disinfect the vehicles coming into the farm. Herd management could be done through IT support that would help in managing the herd in the best possible manner regarding the individual milk records, vaccinations, inseminations feeding and breeding etc.



Hygienic milk can be produced by the clean and healthy animals through milking parlor. Parlor has facility to keep milk production records of each animal and is automatically attached with milk chilling tank. Parlor is feasible when farm consists of at least 500 milking animals, due to its high cost. In this feasibility milking machine is suggested.

9. Land Requirement

For building a dairy farm project of animals starting from 100 animals and at a target herd size of 500 animals in a period of 10 years about 8 acres of land should be purchased. Majority of this land would be used for building sheds for the animals to protect them from severity of the weather. The area for fodder production can be acquired on lease. Agriculture land for fodder production can be acquired with an annual rent of Rs. 15,000 per acre. Around 0.33 acres of land would be required per animal for fodder production per annum.

Table 8: Projected Land Requirements (for target size of around 500 animals)

Description	Area (Acres)
Shed along with free stalls for Cows	0.996
Open paddock for cows	0.996
Calves shed (15 days – 6 months)	0.274
Open Paddock for calves (15 days – 6 months)	0.274
Stores for fodder, concentrate & machine room	0.004
Utensils & milk storage	0.004
Servant Room, Wash room	0.424
Bunker silage	4.252
Total Land Requirement	7.224

10. *Shed Space Requirements for Animals*

Requirements of shed space can vary due to different dairy farm designs.

Table 9: Space Requirement per Animal

Description	Sq. Ft.
Shed along with free stalls for Cows	80
Open Paddock for cows	80
Calves shed	20
Open paddock for calves	20
Stores for fodder, concentrate & machine room	100
Utensils & milk storage	100
Servant Room, Wash room	20
Silage bunker (C ft.)	122



Table 10: Total Infrastructure Cost

Description	Sq.ft	Rate/Sq.ft Rs.	Total Cost Rs.
Shed along with free stalls for Cows	8,000	450	3,600,000
Open paddock for cows	8,000	13	104,000
Calves shed	1680	250	420,000
Open paddock for calves	1680	13	21,840
Stores for fodder, concentrate & machine room	200	550	110,000
Utensils & milk storage	200	550	110,000
Servant Room, Wash room	2,000	550	1,100,000
Silage bunker (C ft.)	22,386	22	492,492
Total Infrastructure Cost			5,958,332

11. Human Resource Requirement

Labor is required for carrying out different functions at farm e.g. feeding, watering, and milking and care of animals etc. One skilled person can handle 15 milk animals easily. Eight farm workers are recommended for handling 100-animals.

Table 11: Labor Requirements

Description	No.	Salary/month/Person	Annual Salary (Rs)
Farm Manager	1	25,000	300,000
Workers	8	8,000	768,000
Total Labor Cost	9	89,000	1,068,000

12. Equipment and Machinery Requirement

Following equipment and machinery is required.

Table 12: Equipment and Machinery Cost

Description	Unit Cost Rs.	Animals per equipment	Total Cost Rs.
Calf feeder	1,200	5	24,000
Milking machine	200,000	50	400,000
Chiller -	400,000	50	800,000
Generator (15 KVA)	150,000	50	300,000
water pump	20,000	50	40,000
Fan pads	66,000	50	132,000
Heavy Duty Ventilation Fans	250,000	50	500,000
Calf cages	12,000	5	240,000
Total Cost (Rs.)			2,436,000

13. Cows Availability

The ideal herd should consist of 100% cows for the viability of a farm. The cows are comparatively high yielder as compared to buffaloes. Animal markets, Government and private livestock farms are the main sources for purchasing milk animals. There are different contractors available in the markets that help locating the proper animals. These contractors work on commission basis and the commission rate charged may vary from 1-2% of the animal price. Preferably, the Australia and U.S.A are the best international markets for the purchase of cows.

14. Feed of Cows

Animals required dry matter and concentrate to increase productivity. Wheat straw is also used as dry roughage along with green fodder. It is observed that about 1 kg of total mix ration on dry matter is required for the production of 2 liters of milk. Feed formula will provide adequate energy according to energy and protein requirements of animal in production. Mineral Mixture is used as a feed supplement (magnesium, iron, sodium and salts). Mineral mixtures are good source of energy and increase the animal productivity to give milk. Fodders which are required as feed to animals are multi-cut oats, berseem, lucerne, Sorghum- Sudan grass hybrids, mott grass, sorghum, maize and millet have been developed.



Silage bunkers should be developed to prepare and store the feed especially for the period when there is shortage of green fodder.

Table 13: Types of Dry & Green roughage

Dry Roughage	Green Roughage	
	Summer Fodder	Winter Fodder
Wheat Straw	Maize	Barseem
Rice Straw	Sorghum	Alfalfa (Lucerne)
Oat Straw	Millet	Oats
Maize/Sorghum Stubble	Mott Grass	Rye Grass
Sugarcane Baggass	Sadabahar	Sugarcane tops
Cotton Seed Hulls	Guar	
Corn Cobs		

(Reference: Livestock & Dairy Development Department, Lahore) (Reference: FAO Statistical Databases)

Table 14: Daily Feed Requirement of Cow & Calf

Animal	Daily Requirement (kg)	Cost/kg Rs.	Amount Rs.
Cow			
Dry	14	6	84
Concentrate	7	22	154
Total			238
Calf younger than 1 year			
Dry	5	6	30
Concentrate	2	22	44
Total			74

15. Vaccination of Cows

Animal will be vaccinated before entering the farm. It will cost Rs. 1,200 for each cow per year. The vaccines are provided to the Government Farms and Hospitals on payments that are produced at Veterinary Research Institute, Ghazi Road, Lahore.

Table 15: Vaccination of Cows

Name of Disease	Name of Vaccine	Qty administered (ml)	Time for Vaccination	Duration of Immunity	Preventive Measures
Anthrax	Anthrax spore vaccine	0.5 ml	March-June	One year	Vaccination every year.
Foot & Mouth Disease (FMD)	Foot & Mouth Vaccine	5 ml	March	4 months	Four months before the expected symptoms of disease.
Hemorrhagic Septicemia (HS)	HS vaccine	5-10 ml	March	4 months	Four months before the expected symptoms of disease.
Rabies (Bowla Pun)	Anti rabies vaccine	10 ml	According to need	One year	Vaccine should be used right after preparation.

16. Artificial Insemination through Sexed Semen

Imported semen is available in Pakistan which is of high quality breeds. Sexed semen is also available in the country to produce 90% heifer calves which offers better control over internal herd growth, reduced disease risk and increased rate of genetic improvement. Artificial

Insemination charges will be Rs 6,000 per cow per year. Price varies with quality of semen. On an average each cow will be requiring approximately 2.5 dozes of insemination.

17. Characteristics of Cow Milk

During lactation period the animals are called wet animals, that is 300 days in case of cows. In the feasibility 100% of the total number of cows is considered as wet cows. The calving interval in cow has 13 months. The average milk yield of cow is estimated at $20 \times 300 = 6,000$ liters per lactation.

Cow milk contains more water, less total solids, less fat, slightly less lactose, and less protein than buffalo's milk. Cow's milk contains 12-14% total solids and the butter fat content is usually between 3% and 5%. Cholesterol, saturated fatty acids and phospholipids are lower in cow's milk. The quantity of casein, albumin and globulin is less in cow's milk. The mineral content of cow's milk is nearly the same as that of buffalo milk except for phosphorus, which occurs in roughly twice the amount in buffalo milk. Cow's milk enriches the yellow pigment carotene, precursor for vitamin A, and its yellowness is frequently used to differentiate it from buffalo's milk in the market. Despite the absence of carotene, the vitamin A content in buffalo milk is almost as high as that of cow's milk. Apparently the buffalo converts the carotene in its diet directly to vitamin A. The two milks are similar in B complex vitamins and vitamin C, but buffalo milk tends to be lower in riboflavin.



18. Projected Income Statement based on 100 American Holstein Cows

	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Revenue from sale of milk	19,968,000	21,772,800	25,194,240	32,893,600	43,100,290	57,409,587	77,084,007	104,639,255	145,349,848	202,651,093
Other Income	1,050,000	1,080,000	3,032,960	3,869,510	5,024,571	6,486,610	8,547,136	11,152,905	14,358,801	19,348,528
Total Revenue	21,018,000	22,852,800	28,227,200	36,763,110	48,124,862	63,896,196	85,631,143	115,792,160	159,708,648	221,999,621
Cost of Sales										
Cost of Feed	9,154,880	9,608,476	11,924,520	15,413,843	20,056,769	26,535,220	35,466,779	47,731,840	64,693,337	89,273,149
Vaccination Charges	120,000	120,000	134,400	163,200	199,200	247,200	309,600	391,200	501,600	650,400
Insemination Charges	600,000	600,000	672,000	816,000	996,000	1,236,000	1,548,000	1,956,000	2,508,000	3,252,000
Direct Electricity & Fuel Charges for Generator	1,800,000	1,890,000	1,984,500	2,083,725	2,187,911	2,297,307	2,412,172	2,532,781	2,659,420	2,792,391
Total cost of sales	11,674,880	12,218,476	14,715,420	18,476,768	23,439,881	30,315,727	39,736,552	52,611,821	70,362,357	95,967,940
Gross Profit	9,343,120	9,554,324	10,478,820	14,416,832	19,660,410	27,093,860	37,347,456	52,027,433	74,987,491	106,683,153
General Administration & Selling Expenses										
Payroll (Admin)	1,068,000	1,174,800	1,233,540	1,295,217	1,359,978	1,427,977	1,499,376	1,574,344	1,653,062	1,735,715
Office expenses	32,040	35,244	37,006	38,857	40,799	42,839	44,981	47,230	49,592	52,071
professional Fee	53,400	58,740	61,677	64,761	67,999	71,399	74,969	78,717	82,653	86,786
Depreciation	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517	1,016,517
Subtotal	2,169,957	2,285,301	2,348,740	2,415,351	2,485,293	2,558,732	2,635,843	2,716,809	2,801,824	2,891,089
Operating Profit	7,173,163	7,269,023	8,130,080	12,001,480	17,175,116	24,535,128	34,711,613	49,310,624	72,185,667	103,792,064
Non-Operating Expense										
Interest expense on long term debt	2,979,150	2,759,150	2,259,150	1,859,150	1,659,150					
Land Lease	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000
Subtotal	3,474,150	3,254,150	2,754,150	2,354,150	2,154,150	495,000	495,000	495,000	495,000	495,000
Earnings Before Tax	3,699,013	4,014,873	5,375,930	9,647,330	15,020,966	24,040,128	34,216,613	48,815,624	71,690,667	103,297,064
Tax	924,753	1,003,718	1,343,983	2,411,833	3,755,242	6,010,032	8,554,153	12,203,906	17,922,667	25,824,266
NET PROFIT AFTER TAX	2,774,260	3,011,155	4,031,948	7,235,498	11,265,725	18,030,096	25,662,460	36,611,718	53,768,000	77,472,798

19. Selling Assumptions

Milk/Cow/Day (lit)	20
Wet Cows of Total No. of Cows (%)	100
No. of Days in Year (days)	300
Purchased Price of developed progeny cow (Rs)	400,000
Female calf (cow) older than one year	100
Sale price /Culled cow (Rs)	100,000
Sale Price/ Low yield cow (Rs)	100,000
Sale Price/ Male calf (Rs)	25,000

Animals	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Average No. of Cows	100	100	112	136	166	206	258	326	418	542
No. of lactating Cows	100	100	112	136	166	206	258	326	418	542
No. of Calves	84	80	110	136	170	216	278	358	454	598
Calve older than one year (cows)/Heifer	0	42	40	54	68	84	102	128	166	214
Total animals older than one year	100	142	152	190	234	290	360	454	584	756
Total Animals	184	222	262	326	404	506	638	812	1038	1354
Animals sold during the year										
No. of Cow Progeny sold	0	0	0	0	0	0	0	0	0	112
No. of culled cows sold	0	0	14	16	18	20	22	24	24	26
No. of Male Calve sold	42	40	56	68	86	108	140	178	228	298
Total Animals Sold	42	40	70	84	104	128	162	202	252	436

20. Production Assumptions

Cow's Milk 20 ltr per day per animal
Milk for calve 4 ltr per day per calve

Production of Milk	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cow's milk per day	2,000	2,000	2,240	2,720	3,320	4,120	5,160	6,520	8,360	10,840
Milk for Calve per day	336	320	440	544	680	864	1,112	1,432	1,816	2,392
Net daily milk	1,664	1,680	1,800	2,176	2,640	3,256	4,048	5,088	6,544	8,448
Net annual milk	507,520	512,400	549,000	663,680	805,200	993,080	1,234,640	1,551,840	1,995,920	2,576,640
Revenue from Sale of Milk Rs.										
Daily	66,560	72,576	83,981	109,645	143,668	191,365	256,947	348,798	484,499	675,504
Annual	19,968,000	21,772,800	25,194,240	32,893,600	43,100,290	57,409,587	77,084,007	104,639,255	145,349,848	202,651,093
Other Revenue Rs.										
Sale of developed progeny	-	-	-	-	-	-	-	-	-	16,800,000
Sale of culled cows	-	-	1,400,000	1,728,000	2,099,520	2,519,424	2,993,076	3,526,387	3,808,498	4,455,943
Sale of low yielder cow	-	-	-	-	-	-	-	-	-	-
Sale of calves	1,050,000	1,080,000	1,632,960	2,141,510	2,925,051	3,967,186	5,554,060	7,626,518	10,550,302	14,892,584
Total Annual Revenue	21,018,000	22,852,800	28,227,200	36,763,110	48,124,862	63,896,196	85,631,143	115,792,160	159,708,648	221,999,621

21. Key Assumptions

Equity	50%
Debt (In case of loss S.T Loan will be taken)	50%
Interest rate Short Term	15.5%
Total No of Employees	9
Loan Repayment Period (yrs)	5
Payments in a year	12
Cows Mortality	1%
Calf Mortality	3%
Starting Herd Size	100
Target Herd Size	500
Milk sale price (Rs)	40
Purchase Price of Cow (Rs)	400000
Price of Low yield Cow (Rs)	100,000
Milk yield of Cow per day (liter)	20
Sale Price of 6 month old calf (Rs)	25,000
Sales Price growth rate	8%
Cost of Goods Sold growth rate	6%
Salaries Growth Rate (%)	8%
Lactation Period (no. of milking days per year)	300
Artificial insemination charges per cow per year (Rs)	6,000
Vaccination & medication charges per cow per year (Rs)	1,200
Electricity Cost & Diesel charges for generator (Rs. per month)	150,000

22. Disclaimer

The content of the information memorandum does not bind NBP in any legal or other form as the purpose of this report is to provide a general idea and information to NBP staff to assist them evaluate the feasibility reports submitted by the clients, and for the farmers and organizations interested to establish environmentally controlled dairy farm. The data and info reported in this document is gathered from various sources and is based on certain assumptions. In spite of taking due diligence in compiling this report, the contained information may vary due to any change in any of the relevant factors e.g. mortality, diseases, feed quality, production and market sale price etc. and the actual results may differ substantially from the presented information. NBP does not assume any liability for any financial or other loss resulting from this document in consequence of undertaking this Project.