Pre-Feasibility Study

Dairy Farm (75 cows)

Environmentally Controlled Housing (ECH) System

Small and Medium Enterprises Development Authority

Ministry of Industries & Production

Government of Pakistan

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September 2017

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Document Control

Document No.	PREF-107
Prepared by	SMEDA-Punjab
Revision Date	September, 2017
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2 EXECUTIVE SUMMARY

This pre-feasibility study is based upon the business analysis of setting up a dairy farm where cows with proven pedigree and high genetic worth are kept primarily for milk production in an Environmentally Controlled Housing (ECH) system. The animals are fed Total Mixed Ration (TMR), which is a high energy and protein rich nutritionally balanced formulated feed.

Dairy production is basically an all-inclusive activity, related to dairy animal care, reproduction, feeding and management. It encompasses all aspects and activities related to raising dairy animals during various phases of life to get maximum productivity in terms of hygienic milk.

The proposed dairy farm with 75 cows needs a total investment of approximately Rs. 65.63 million out of which, capital cost of the project is Rs. 64.02 million with working capital of 1.61 million. The project is assumed to be working on a 50:50 debt and equity ratio. It is assumed that starting from 75 animals in year 1, the herd of animals will increase to approximately 301 animals, out of which, 173 would be lactating cows in 10th year of the project. The culling rate is assumed to be 15% per annum.

The Internal Rate of Return (IRR), Payback Period and Net Present Value (NPV) of the project, based upon stated assumptions, are 33%, 3.75 years and Rs. 52.60 million respectively. The farm will provide employment opportunity to 8 individuals. The legal status of the project is proposed to be a sole proprietorship.

The project is proposed to be located in peri-urban & rural areas around metropolitan cities. Most critical considerations or factors for success of the project are background knowledge and related experience for application of Good Animal Husbandry Practices (GAHP), market / demand of milk, understanding of ECH dairy system and efficient farm management.

3 INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out ‘sectoral research’ to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need based capacity building programs of different types in addition to business guidance through help desk services.

4 PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors in setting up **Dairy Farm (75 cows)** with Environmentally Controlled Housing (ECH) system on commercial basis by providing them a general understanding of the business with the intention of supporting potential investors in crucial investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business set-up and it's successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form basis of any Investment Decision.

5 BRIEF DESCRIPTION OF PROJECT & PRODUCT

The proposed dairy farm will be established on purchased land with purpose built shed constructed on Environmentally Controlled Housing (ECH) system. The farm will begin operations with 75 cows to achieve sellable milk production of 810,095 litres in first year of the project. The initial capacity utilization of milk production for sales revenue is 95% by year 10. Female calves will be raised on milk replacer for first three months of age. Upon weaning at 4th month of age, calves will be offered Total Mixed Ration (TMR) for the rest of their productive life. Breeding of animals will be planned through 'Artificial Insemination' method. Female calves will be given special attention and raised as 'Heifers' whereas male calves are to be sold in the

market around the age of one month. The milk will be primarily sold to bulk buyers at the rate of Rs. 60 with 5% annual growth rate in selling price.

The subject business can be set-up at any appropriate location that ensures easy availability of feed, water and other related services. The development of urban or peri-urban commercial dairy farms is a relatively new concept in dairy production.

5.1 Dairy Farm Production Process

Selection of dairy cattle breed such as Holstein Friesian with proven pedigree and high genetic worth from elite/ superior and renowned sires. Holstein cows are recognized by their distinctive color markings and outstanding milk production, having large body stature with typical color patterns of black & white or red & white. Holstein heifers can be bred at around 15 months of age as they gain 65% of their adult body weight (approx. 550 kgs live body weight). Gestation period of the animal is nine months with normal productive life of 4-5 years.

Figure 1: A typical Holstein Cow

The pedigree and genetic worth of cows must be considered on top priority, i.e. proper pedigree paper and documentation containing all identifications and registrations of dairy cows by Holstein Aassociation from USA or EU. Pedigree is a document showing an animal's lineage, a record of their ancestry; a typical Holstein pedigree shows three generations - the animal itself, its sire and dam, along with their sires and dams. May also list genetic and performance records for each animal, when applicable.

Figure 2: A typical Pedigree

The pedigree is very important as it can be useful to farmers and breeders in providing information about the cow's ancestors and thereby helping to predict how well that animal may perform later in life e.g. how much milk might be produced or how they will look in their body stature and conformation etc., based on the performance of their ancestors. Aside from providing owners and breeders with detailed information about their animals, Official Holstein Pedigrees also serve as a verified source of ancestry, performance

and genetic information when selling animals, giving the buyer trusted documentation ensuring that information presented on the animal is accurate.

Selection of animals with excellent body condition and udder health: average daily milk production of 32 litres or above for cows in first lactation, essentially with no disease history.

Housing: Good housing leads to good management practices and ultimately optimum production. Generally, housing should be;

I. Pre-engineered building
II. Tunnel-type, ventilated, comfortable and dry with hygienic environment
III. Designed with the probability of future expansion when required

The housing should facilitate;

- Easy drainage and removal of dung, urine and waste material
- Apparent (or feels like) temperature not exceeding 27 °C
- Minimum sun exposure: axis of length to be east to west
- Availability of feed and water round the clock

The Environmental Controlled Housing (ECH) Dairy Farm is a new and remarkable revolution in Pakistan's dairy sector by creating a self-sufficient temperature in dairy house. Following are some of the features of this system which are quite different from traditional dairy housing;

Figure 3: A typical ventilation

- ✓ Concrete structure is preferred over steel with low roof height for easy maintenance and access.
- ✓ Proper insulation to prevent heat from all sides. Optimum temperature of 26°C should be maintained inside the shed area. Temperature may be reduced up to 20°C at certain places if required.
- ✓ Proper Heating, Ventilation & Air Conditioning Control (HVAC) designed and planned as per engineering principles as such type of structure is designed to utilize minimum possible electricity. Electricity cost is much less than traditional fans barns as only 4 fans of 1.5 HP are used. Negative pressure fans utilize 18~20 fans of same capacity in the same size.
- ✓ No gases, odor or smell inside the barn due to proper ventilation system, hence, animals are comfortable in cool breeze passing through them from all sides. In

this way, the production efficiency of pedigreed Holstein cows does not suffer in hot weather resulting in optimum productivity utilization in summers.

- ✓ Self-sufficient to produce coal free electricity from manure of cows.
- ✓ The structure of the farm is designed in a way to allow natural flow of water resulting in minimum human efforts for cleanliness.
- ✓ There is limited need for extra lighting sources at the farm house in day light due to semi closed nature of the housing system.
- ✓ Electricity cost is markedly less than traditional fan barns.
- ✓ The animals should be dehorned, as they are easier to handle in barns, causing less accidental injuries to other animals and attendants.

- ***Feeding:*** The lactating Holstein cows are fed 1 kg of Dry Matter (DM) feed per 1.75 litres of milk produced. The ration allows nutritionally balanced feed in 24 hours. It includes dry matter with 60% concentrate and 40% roughages containing 16% Crude Protein (CP) and energy to increase animal productivity. It is better to use Total Mixed Ration (TMR) wagon for feeding the cows.

Figure 4: A Typical TMR wagon

- ***Watering:*** Supply of clean drinking water in clean troughs i.e. 50 to 80 litres of water consumption per adult animal per day, round the clock, maintains milk production capacity of the animal.
- ***Breeding:*** Efficient and timely Artificial Insemination (AI) of good genetic worth is a key to success in good breeding programs of herd.
- ***Calving:*** Pregnant animals should be given special attention in third trimester of pregnancy and should be separated in pregnancy pens. Veterinary assistance should be sought out in case of emergency. Calf care and heifer management is very important in maintaining dairy farm production. The proposed farmer will raise female calves as future breeding heifers which will replace culled dairy animals. The first generation (F1) will be capable of breeding at age of 14 months; hence producing milk at about 23-24 months of age.
- ***Lactation Period:*** lactation period is the period during which animals yield milk after calving. The animals producing milk are called 'Wet Animals'. Generally standard lactation period is taken as 305± 5 days. This pre-feasibility study has taken 50-65% of the total number of animals as wet cows. The calving interval (interval between two calving) in Holstein cows is 12-14 months. The average daily milk yield of a cow is 35 litres.

- ***Udder health:*** Hygienic and clean milking three times a day (morning/afternoon/ evening) lowers chances of mastitis as udder health and hygiene is most important in dairy animals.
- ***Proper storage of milk*** should be done preferably at temperature of 4 ^{0}c.
- ***Disease management:*** Vaccination & medicine is required to prevent any disease outbreak in the dairy herd. Each animal will be vaccinated before entering the farm. Procurement of vaccines from reliable sources should be sought. Following is a tentative vaccination schedule;

Table 1: Tentative Vaccination Schedule

Disease	Vaccine	Time for vaccination	Dose/ Administration
Foot & Mouth Disease	FMD	February/March & September/October	5 ml sub cut.
Black Quarter	BQ	March/April	5 ml sub cut.
Haemorrhagic Septicemia	HS	May/June & November/December	5 ml / 300 kg body wt. sub cut.
Anthrax	Anthrax	August	1 ml sub cut.
Brucella Abortus	BA	Once in life for heifers (4-12 months of age)	1ml sub cut.

- ***Record keeping:*** The animals should be ear-tagged with information of animal such as breed, age, date of birth/ purchase, number of lactations, vaccination etc. The records for daily milk yields, weight, Artificial Inseminations (AI), calving, vaccination and medication etc. are also important.
- ***Culling:*** Good productive animals should be selected and uneconomical animals should be culled. Low yielding culled animals may be sold in the regular livestock market. On an average, cows are productive for 7 to 8 years. The culling rate of 15% per annum in the total herd is desirable for a successful dairy farm.
- ***Regular technical assistance*** from dairy and livestock professionals, experts and technical consultants is advised.

Returns on the proposed business and its profitability are highly dependent on the efficiency of above mentioned factors. In case a dairy farm is not able to attain its target milk production or implement effective husbandry practices, it will not be able to cover the potential market and recover payments; hence, cost of operating the business will increase.

5.2 Installed and Operational Capacities

In the proposed study, initially, 75 cows are recommended to obtain optimum milk production in first year of project. It is assumed that on average, 60-65 % of total animals present at farm would be in lactation on farm. The female calves born at farm will be added to the milking herd through heifer management; hence total number of animals to be 301, among which, 173 animals will be in lactation in 10th year of project. The male calves will be sold in open market. Average milk production of cows during one lactation period is estimated to be 10,500 litres. The dairy farm will have the capacity to generate revenues at total sellable milk produced at farm i.e. 810,095 liters in its first year of operation.

The annual mortality rate is assumed to be 5% for newborn calves, 1% for heifers and 2% for adult cows. The project will operate at 95% of its installed capacity from the first year of operations.

6 CRITICAL FACTORS

The most critical considerations or factors for success of the project are:

- Background knowledge and related experience of the entrepreneur in dairy farm operations.
- Application of good husbandry practices such as timely feeding, watering and vaccination to ensure animal's health and disease-free environment.
- Awareness about supply and demand of milk in the market as demand of milk is relatively higher in summer as compared to winter season.
- Efficient marketing of the project and bulk supply to wholesalers.
- Dairy farming is highly complex due to breeding, management, feeding, housing, disease control and hygienic production of milk on farm.
- Culling of low yield animals as early and efficiently as possible.
- Overall genetic improvement of all dairy animals for improved milk production by noting milking records at equal intervals, selection of semen from progeny-tested bulls from high producing dams (mothers) and making its extensive use in well-organized Artificial Insemination (AI) program.
- Other farm management practices include feeding for growth, lactation, pregnancy or maintenance, hygienic milk production, comfortable and ventilated barns, spraying of animals in summer, timely detection of heat and AI service. Timely breeding of animals within the 60-90 days of calving to improve overall performance of herd.

- Timely vaccination against mentioned diseases such as Rinderpest, Black Quarter, Foot and Mouth Disease and Brucellosis.

7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Commercial dairy farming is a viable business proposition for peri-urban areas of Pakistan. There is higher demand for milk in peri urban areas around the major cities such as Karachi, Hyderabad, Sakkar Lahore, Faisalabad, Sheikhupura, Bahawalpur, Multan, Jhang, Sahiwal, Pakpattan, Okara, Jehlum, Peshawar, Charsadda, D.I. Khan, Quetta, etc. across the country. Hence, the proposed project offers good investment opportunities for potential investment in all provinces of country. The peri-urban areas around major cities with abundant water and availability of fodder make a better choice for farming; provided there is ready access to livestock related marketing and veterinary services.

8 POTENTIAL TARGET CUSTOMERS / MARKETS

This pre-feasibility study suggests that milk will be sold at the farm gate directly to the consumers or milk contractors. It can also be sold directly to milk centers in the urban market or may be pasteurized at farm by the farmer and delivered to the nearest city, however it involves extra investment which is not included in this prefeasibility study. Milk contractors collect milk from farmers and deliver it to the consumer's doorstep. Milk collection networks of different processing companies also collect milk directly from the farm and transport it to the processing facilities.

Apart from Lahore, Sialkot, Kasur, Gujranwala, Bahawalpur, Okara, Quetta, D.I. Khan etc., commercial dairy farming in peri-urban locations takes place around all major cities. Metropolitan cities are considered major markets for the sale of milk. Following are some of the target clients for a dairy farmer;

- Domestic consumers
- Milk contractors and suppliers
- Milk collection and processing companies
- Dairy products manufacturing companies
- On-farm Processing by farmer (however, it requires minimum viable capacity of 40,000 liters of milk daily)

The cost of production per litre of raw milk should be lower than its sale price so that the farmer finds it economical. The daily milk intake of Lahore & Karachi is 3 million litres and 5 million litres respectively. The demand for milk increases during summers as consumption of whey (lassi) increases due to hot weather. Yogurt or curd is another popular product. These are high value products however with relatively short shelf life.

Milk processing companies use milk as a raw material to formulate different types of milk i.e. pasteurized milk, UHT treated milk, condensed milk, skim milk & milk powder, etc. Different value added products like ghee, khoya, yogurt, ice cream, butter and cheese are also prepared from raw milk. Processed milk market has increased its share in quality conscious consumers. Processed milk has achieved 4% share in Lahore milk market during the last two decades. Milk supply is increasing at the rate of 4% annually, however demand is increasing at 15% annually.

9 PROJECT COST SUMMARY

9.1 Project Economics

The financial model for this pre-feasibility study indicates estimated revenue of Rs. 50.07 million in first year of the project. The capacity utilization during year one is 95%, which will remain the same throughout the life of the project. The following table shows Internal Rate of Return, payback period and Net Present Value of the proposed venture.

Table 2: Project Economics

Description	Details
Internal Rate of Return (IRR)	33%
Payback Period (Yrs.)	3.75
Net Present value (Rs.)	52,606,132

9.2 Project Financing

Following table provides details of equity required and variables related to bank loan;

Table 3: Project Financing

Description	Details
Total Equity (50%)	Rs. 32,816,986
Bank Loan (50%)	Rs. 32,816,986
Markup to the Borrower (%age / annum)	12%
Tenure of the Project (Years)	5

9.3 Project Cost

Following fixed and working capital requirements have been identified for operations of the proposed business.

Table 4: Project Cost

Description	Cost (Rs.)
Capital Cost	
Land	4,607,763
Building and infrastructure	24,739,313
Machinery and Equipment	3,709,900
Purchase of Cows	30,000,000
Furniture & Fixture	230,000
Office Equipment	68,000
Office Vehicles	73,500
Pre-operating Cost	592,000
Total Capital Cost	**64,020,476**
Working Capital	
Raw Material Inventory	829,906
Upfront Insurance Payment	189,170
Cash	594,420
Total Working Capital	**1,613,496**
Total Project Cost	**65,633,972**

The proposed pre-feasibility is based on the assumption of 50% debt and 50% equity, however this composition can be changed as per requirements of the investor.

9.4 Space Requirement

Space requirement for the proposed dairy farm is calculated considering requirements for management office, sheds for cows, calves and dry animals, milk chiller rooms, storage, open paddocks etc. Details of space requirement and cost related to land & building are given below;

Table 5: Space Requirement

Description	Estimated Area (sq. ft.)	Unit Cost (Rs.)	Total Cost (Rs.)
Shed for Wet Cows	16,000	1,000	16,000,000
Open Paddock for Wet Cows	32,000	10	320,000
Shed for Dry Cows	6,000	500	3,000,000
Open Paddock for Dry Cows	12,000	10	120,000
Shed for Calves	3,000	500	1,500,000
Open Paddock for Calves	6,000	10	60,000
Stores (fodder, concentrate & machines)	400	750	300,000

Room (chillers, utensils & milk storage)	144	1,000	144,000
Silage / Hailage Bunker (sft.)	6,844	350	2,395,313
Residence (Manager)	120	2,000	240,000
Admin / Accounts Room	120	2,000	240,000
Washroom (Executives)	24	2,000	48,000
Rooms (Workers)	240	1,250	300,000
Washrooms (Workers)	48	1,500	72,000
Total Infrastructure	**82,940**		**24,739,313**

Total investment in building and infrastructure is approximately Rs. 24,739,313. Shed will increase if there is any increase in number of animals in the herd. The housing of labor & management staff and room for chiller utensils and milk storage would be constructed on the first floor.

Land is to be purchased as per maximum space requirements of the farm for 10 years. Total land requirement is approximately 18.43 kanals at an average price of Rs. 0.25 million per kanal.

9.5 Machinery & Equipment Requirement

Following farm machinery and equipment are needed to run daily farm operations;

Table 6: Machinery & Equipment

Description	Quantity (No.)	Unit Cost (Rs.)	Total Cost (Rs.)
Calf Feeder (New born calves)	7	1,200	8,400
Calf Cages	10	12,000	120,000
Cooling System	1	1,000,000	1,000,000
Water Turbine	1	100,000	100,000
Milking Line	6	150,000	900,000
Generator (50 KVA)	2	300,000	600,000
Milk Chiller (2,300 litres)	1	700,000	700,000
Milk Testing Machines	1	20,000	20,000
Velocity Meter	1	1,500	1,500
Surgery Kit	1	10,000	10,000
AI Equipment	2	50,000	100,000
Dystocia Kit	1	20,000	20,000
Energy Savers-Farm	75	400	30,000
Miscellaneous			100,000

Total Machinery & Equipment			**3,709,900**

It is assumed that electricity infrastructure and installations along with a transformer are already available, hence calculations do not include these costs.

9.6 Office Vehicle

Following office vehicle is needed for the farm;

Table 7: Office Vehicle

Description	No.	Cost / Unit (Rs.)	Total Cost (Rs.)
Motor Cycle	1	70,000	70,000
Registration fee			3,500
Total cost			**73,500**

It is assumed that Rs. 10,000 per month will be required to cover travelling expenses in order to carry out essential operations of the farm, translating to an expense of Rs. 120,000 per annum.

9.7 Furniture & Fixtures Requirement

Details of furniture and fixtures required for the project are given below;

Table 8: Furniture & Fixture

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Tables	2	15,000	30,000
Chairs	4	5,000	20,000
Fans	4	4,000	16,000
Energy Savers	10	400	4,000
Misc. Furniture for Workers			100,000
Air Conditioner	1	60,000	60,000
Total Furniture & Fixtures			**230,000**

9.8 Office Equipment Requirement

Following office equipment will be required for the dairy farm;

Table 9: Office Equipment

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Computer	1	40,000	40,000
Computer printer	1	15,000	15,000
Misc. equipment	1	10,000	10,000
Cell phones	1	3,000	3,000
Total			**68,000**

9.9 Human Resource Requirement

In order to run operations of the farm smoothly, following human resources along with number of employees and monthly salary are recommended;

Table 10: Human Resource Requirment

Description	No. of Employees	Monthly Salary (Rs.)	Total Salary Year 1 (Rs.)
Owner / Farm Manager	1	100,000	1,200,000
Farm Supervisor	1	30,000	360,000
Workers: Cows	4	15,000	720,000
Workers: Calves	1	15,000	180,000
Security Guard	1	16,000	192,000
Total	**8**		**2,652,000**

9.10 Raw material Requirement

Following tables show raw material requirement to run the proposed dairy farm in first year of production;

Table 11: Feeding Requirements for one Cow* in Year 1

Description	Daily Feed Allowance (Kgs)	Rate Rs./ Kg.	Daily Feed Cost (Rs.)	Total Cost in Year 1 (Rs./ Cow)
Total Mixed Ration (TMR)	22.75 (@ 3.5 % of Live BW)	30	683	249,113

**Average adult Live Body Weight (BW) of cow is assumed to be 700 kg with 35 liters of daily milk production for one lactation. For the calculation purpose, the total milk production of 9,750 litres in one lactation period is distributed in 365 days. One lactation period of Holstein Friesian cow is estimated to be 305 +_ 5 days.*

Table 12: Feeding Requirements of One Female Calf (from birth till one year of age) in year 1**

Description	Daily Feed Allowance (Kgs)	Rate Rs./ Kg	Daily Feed Cost (Rs.)	Total Cost in Year 1 (Rs./ Calf)
Milk Replacer (First 3 months of age per calf)	6 liters	40	240	21,600
TMR (from 4th to 12th months of age)	8.3 (@ 3 % of live BW)	30	249	68,063
Total				**89,663**

***Average birth weight of the new born calf is 35-40 kgs. At the time of weaning at three months of age, it is 150 kgs which increases up to 400 kgs at the age of one year.*

Table 13: Feeding Requirements of One Heifer (1 year older)* in year 2**

Description	Daily Feed Allowance (Kgs)	Rate (Rs./ Kg)	Daily Feed Cost (Rs.)	Total Cost in Year 1 (Rs./ Heifer)
TMR	13.5 (@3% of Live BW)	30	405	155,216

****Average Live body weight (BW) of heifer, older than one year is assumed to be 550 kgs.*

Table 14: Total Cost of Feeding in Year 1 and 2

Description	Total Cost (Rs.)****			
	No. of Animals	Year 1	No. of Animals	Year 2
Lactating Cows	67	16,628,259	59	15,364,512
Female Calves (younger than one year)	36	3,194,227	28	3,189,366
Heifers (Female calves older than one year)	-	-	29	4,423,663
Total	**103**	**19,822,486**	**116**	**22,977,541**

*****Prices are rounded off to near decimal point for 365 days of feeding. The number of animals are calculated after mortality count which is 7% in new born, 3 % in female calves older than one year and 2% in adult cows.*

Table 15: Total Cost of Vaccination, Medication and AI in Year 1

Description	Rs./ Animal	Total Cost in year 1 (Rs.)
Vaccination and Medication	1,000	95,250
Artificial Insemination (AI)	5,000	333,750
Total	**6,000**	**429,000**

9.11 Utilities and other costs

An essential cost to be borne by the project is the cost of electricity. Direct electricity expenses of the dairy farm are estimated to be approximately Rs. 115,363 per month i.e. Rs. 1,384,350 annually. The type of electricity connection is Industrial B-1 Category and one time connection charges are Rs. 35,000. It is further assumed that within the cooling system, the cone exhaust fans with water motor will operate for 12 hours per day. The milk chiller and energy savers will operate for 12 hours per day (average) throughout the year. The water turbine will operate for 2 hours daily (average). The milking line will operate for 7 hours daily (average) to carry out three milking sessions daily for a herd of 75 cows.

The indirect or regular electricity expense for management building and staff residence is assumed to be approximately Rs. 7,500 per month or Rs. 90,000 in year one of the project.

The fuel cost (diesel) for running generator set in case of absence of electricity is assumed at an average 4 hours daily; for a monthly expense of Rs. 78,240 or Rs. 938,880 annually in first year of operations.

Machinery maintenance expense is assumed to be Rs. 10,000 per month or Rs 120,000 in year one.

Monthly expenses related to travelling, communication and office vehicle running are Rs. 120,000, 96,000 and 60,000 respectively.

Professional fees related to any legal, audit or technical consultation is assumed to be Rs. 50,069 per year.

Insurance of equipment, machinery and office vehicle is assumed to be 5% of total cost, which is Rs. 189,170 in first year of operations.

9.12 Revenue Generation

Based on capacity utilization of 95% for revenues from milk production from 75 cows, sales revenue during the first year of operations are shown in the following table. However, capacity has been increased at 5% for a maximum utilization of 95%.

Table 16: Revenue Generation – Year 1

Description	Unit	Annual Production	Price (Rs./Unit)	Total Revenue in Year 1 (Rs.)
Sale of Milk	No. of Liters	810,095	60	48,605,681
Sale of male calves	No.	34	10,000	338,438
Sale of culled cows	No.	7.5	150,000	1,125,000
Total				**50,069,119**
The annual culling rate is 15% applicable to all animals in the herd.				

10 CONTACT DETAILS

In order to facilitate potential investors, contact details of private sector Service Providers relevant to the proposed project are given hereunder.

10.1 Machinery Suppliers

Profarm Pakistan Pvt. Ltd.
Plot No. 52, Block R-1,
M. A. Johar Town, Lahore, Pakistan.
T: +92 (0)42 35291992-4 (3 lines), F: +92 (0)42 35291995
E: info@profarm.com.pk, Customer Service (24/7): +92 323 8888 211

Dairy Solution Pvt. Ltd.
177/B- Johar Town, Lahore
Ph: +92-42-35169450 +92-42-35169451
Fax +92-042-35169449

Cattle Kit Pvt. Ltd. Pakistan
104-A, Punjab Government Servants Housing Society Near Mohlan Waal, Lahore
Ph: +92 (042) 35978500-3
Email: Info@cattlekit.com.pk
Web: www.cattlekit.com.pk

10.2 Raw Material Suppliers

Feed Suppliers
Hi-Tech Feeds Pvt. Ltd. 1-A, Shadman Chowk, Jail Road, Lahore. Ph: 042-37564503
Shareef Feeds Pvt. Ltd. 7-A, New Muslim Town, Lahore. Ph: 04235758233-5
National Feeds Pvt. Ltd. 171- Shadman – II Lahore. Ph: 042 37551405-8
Anmol Vanda c/o Livestock and Dairy Development Department, Govt. of Punjab, 16-Cooper Road, Lahore Free Landline: 0800-78685, 0800-78686
Big Feed Pvt. Ltd. 2-A, Ahmad Block, New Garden Town, Lahore. Ph: 042-35835374-35835373
AI / Semen Suppliers
Ghazi Brothers B-35 KDA Scheme No 1, Mian Muhammad Shah Road, Karachi. Ph: 021-4543579
World Wire Sires by Maxim International Pvt. Ltd. 69-A, Sector-XX, Khayaban-e-Iqbal, DHA, Lahore. Ph: 042-35693993
Altaf & Co., Altaf & Co Plaza, 16/1, Out Fall Road, Lahore. Ph: 042-35763411-4
Milk Contractors/ Processors
Engro Foods Pvt. Limited 5th, 6th Floor, Harbor Front Building Marine Drive, Block 4, Clifton, Karachi. Ph: +92 21 3529-6000 (10 lines)
Nestle Pakistan 308, Upper Mall, Lahore, Ph: 042-35757082-95, UAN +92-42-111637853
Holstein Cow Suppliers

The pedigreed Holstein breed cows with average daily milk production capacity of 35 liters of EU and USA origin may be found from following sources;

1. Holstein Association USA (www.holsteinusa.com)
2. United States Livestock Exporters Association (USLEA) *(www.livestockexportersusadotcom.wordpress.com)*
3. Veepro Netherland (www.veepro.nl)
4. Mr. Berg, Berg Exports, Netherlands (info@bergexport.nl)
5. Mrs. Karin, Ugerup Cattle Exports Sweden (Karin@ugerup.mu)
6. Mr. Johan, Hun land Exports from Holland (www.hunland.com)
7. Mrs. Renee, Strickland Global, USA (www.stricklandglobal.com)

10.3 Technical Experts / Consultants

Dr. Sami Ullah. Farm Manger Infinite Dairy Farm, Sargodha. Cell: 0323-4360006
Dr. Rami Hamad Farm Manager, Nishat Dairy Farm, Sukheki, Cell: 0302-8556301
Dr. Nasir Javed Consultant Lead Foundation, West wood Colony, Lahore Cell: 0300-8432595
Dr. Zafar Ullah Khan Manager, Livestock Altech Pvt. Ltd. Cell: 0302-8543005

11 USEFUL WEB LINKS

Links of Federal & Provincial Government, Semi Government and other (sector & Cluster based) Development organizations are given under to get benefit from the services offered.

Table 17: Useful Web Links

Small & Medium Enterprises Development Authority (SMEDA)	www.smeda.org.pk
Government of Pakistan	www.pakistan.gov.pk
Ministry of Industries & Production	www.moip.gov.pk
Ministry of National Food Security & Research	www.mnfsr.gov.pk

Government of Punjab	www.punjab.gov.pk
Government of Sindh	www.sindh.gov.pk
Government of Khyber Pakhtunkhwa	www.khyberpakhtunkhwa.gov.pk
Government of Balochistan	www.balochistan.gov.pk
Government of Gilgit Baltistan	www.gilgitbaltistan.gov.pk
Government of Azad Jamu Kashmir	www.ajk.gov.pk
Trade Development Authority of Pakistan (TDAP)	www.tdap.gov.pk
Security Commission of Pakistan (SECP)	www.secp.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
State Bank of Pakistan (SBP)	www.sbp.org.pk
Punjab Small Industries Corporation	www.psic.gop.pk
Sindh Small Industries Corporation	www.ssic.gos.pk
Punjab Board of Investment & Trade (PBIT)	www.pbit.gop.pk
Sindh Board of Investment (SBI)	www.sbi.gos.pk
Pakistan Agricultural Research Council (PARC)	www.parc.gov.pk
Balochistan Agricultural Research Centre (BARC)	www.parc.gov.pk
Southern-zone Agricultural Research Centre (SARC)	www.parc.gov.pk
Arid Zone Research Institute (AZRI)	www.parc.gov.pk
Punjab Livestock & Dairy Development Board	www.plddb.pk
University of Agriculture, Faisalabad,	www.uaf.edu.pk
Lasbela University of Agriculture, Water & Marine Sciences, Lasbela	www.luawms.edu.pk
Sindh Agriculture University, Tondojam	www.sau.edu.pk
Gomal College of Veterinary Sciences, Dera Ismail Khan	www.gu.edu.pk
KPK Agricultural University, Peshawar	www.aup.edu.pk
Pir Mehr Ali Shah Arid Agricultural University, Rawalpindi	www.uaar.edu.pk
University College of Veterinary & Animal Sciences, Islamia University Bahawalpur (IUB),	www.iub.edu.pk
University of Veterinary & Animal Sciences (UVAS), Lahore	www.uvas.edu.pk
Bahauddin Zakariya University (BZU), Multan	www.bzu.edu.pk
Animal Husbandry In-Service Training Institute (AHITI), Peshawar	
Veterinary Research Institute (VRI), Punjab	
Agribusiness Support Fund (ASF), Lahore,	www.asf.org.pk

Livestock and Dairy Development Department, Punjab	www.livestockpunjab.gov.pk
Livestock & Fisheries Department, Sindh	www.sindh.gov.pk
Agriculture & Livestock Department, KPK	www.khyberpakhtunkhwa.gov.pk
Livestock & Dairy Development, Balochistan	www.balochistan.gov.pk

12 ANNEXURES

12.1 Income Statement

Calculations **SMEDA**

Income Statement

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	50,069,119	46,694,815	61,571,981	72,755,292	87,353,835	104,199,842	124,341,509	148,368,275	167,896,092	203,725,061
Cost of sales										
Cost of feed	19,822,486	22,977,541	27,580,699	32,808,679	38,802,078	45,922,550	53,980,038	62,052,002	73,250,505	89,602,407
Cost of vaccination / medication	95,250	112,140	136,513	162,783	194,566	232,392	261,580	317,912	394,215	466,492
Cost of artificial insemination	333,750	441,551	519,338	623,834	744,073	889,286	1,062,200	1,198,179	1,452,315	1,799,487
Direct labor cost	1,260,000	1,185,150	1,517,295	2,140,741	2,349,166	2,864,316	3,457,509	3,794,137	4,920,546	5,814,973
Machinery maintenance cost	120,000	132,000	145,200	159,720	175,692	193,261	212,587	233,846	257,231	282,954
Direct electricity cost	1,384,350	1,522,785	1,675,064	1,842,570	2,026,827	2,229,510	2,452,461	2,697,707	2,967,477	3,264,225
Diesel cost	938,880	1,032,768	1,136,045	1,249,649	1,374,614	1,512,076	1,663,283	1,829,612	2,012,573	2,213,830
Total cost of sales	23,954,716	27,403,936	32,710,153	38,987,976	45,667,017	53,843,391	63,089,658	72,123,394	85,254,863	103,444,367
Gross Profit	26,114,403	19,290,880	28,861,828	33,767,316	41,686,818	50,356,451	61,251,851	76,244,881	82,641,230	100,280,694
General administration & selling expenses										
Administration expense	1,392,000	1,527,527	1,676,249	1,839,451	2,018,543	2,215,071	2,430,733	2,667,393	2,927,094	3,212,080
Electricity expense	90,000	99,000	108,900	119,790	131,769	144,946	159,440	175,385	192,923	212,215
Travelling expense	120,000	132,000	145,200	159,720	175,692	193,261	212,587	233,846	257,231	282,954
Communications expense (phone, fax, mail, internet, etc.	96,000	105,600	116,160	127,776	140,554	154,609	170,070	187,077	205,785	226,363
Office vehicles running expense	60,000	66,000	72,600	79,860	87,846	96,631	106,294	116,923	128,615	141,477
Office expenses (stationary, entertainment, janitorial serv	97,440	106,927	117,337	128,762	141,298	155,055	170,151	186,718	204,897	224,846
Promotional expense	1,001,382	901,244	811,120	730,008	657,007	591,306	532,176	478,958	431,062	387,956
Insurance expense	189,170	170,253	151,336	132,419	113,502	94,585	75,668	56,751	37,834	18,917
Professional fees (legal, audit, consultants, etc.)	50,069	46,695	61,572	72,755	87,354	104,200	124,342	148,368	167,896	203,725
Depreciation expense	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106
Amortization of pre-operating costs	118,400	118,400	118,400	118,400	118,400	-	-	-	-	-
Subtotal	4,859,567	4,918,752	5,023,980	5,154,047	5,317,070	5,394,769	5,626,567	5,896,524	6,198,442	6,555,639
Operating Income	21,254,836	14,372,128	23,837,848	28,613,270	36,369,749	44,961,682	55,625,284	70,348,357	76,442,787	93,725,055
Gain / (loss) on sale of machinery & equipment	-	-	-	-	-	-	-	-	-	370,990
Gain / (loss) on sale of office equipment	-	-	-	-	-	-	-	-	-	6,800
Gain / (loss) on sale of office vehicles	-	-	-	-	-	-	-	-	-	7,350
Earnings Before Interest & Taxes	21,254,836	14,372,128	23,837,848	28,613,270	36,369,749	44,961,682	55,625,284	70,348,357	76,442,787	94,110,195
Interest expense on long term debt (Project Loan)	3,573,723	2,943,291	2,232,905	1,432,424	530,422	-	-	-	-	-
Interest expense on long term debt (Working Capital Loan)	57,930	-	-	-	-	-	-	-	-	-
Subtotal	3,631,653	2,943,291	2,232,905	1,432,424	530,422	-	-	-	-	-
Earnings Before Tax	17,623,182	11,428,837	21,604,943	27,180,846	35,839,326	44,961,682	55,625,284	70,348,357	76,442,787	94,110,195
Tax	5,387,613	3,219,592	6,781,229	8,732,795	11,763,264	14,956,088	18,688,349	23,841,424	25,974,475	32,158,068
NET PROFIT/(LOSS) AFTER TAX	**12,235,569**	**8,209,245**	**14,823,714**	**18,448,050**	**24,076,063**	**30,005,594**	**36,936,935**	**46,506,933**	**50,468,312**	**61,952,128**
Balance brought forward		12,235,569	20,444,814	35,268,527	53,716,578	77,792,641	107,798,235	144,735,170	191,242,103	241,710,415
Total profit available for appropriation	12,235,569	20,444,814	35,268,527	53,716,578	77,792,641	107,798,235	144,735,170	191,242,103	241,710,415	303,662,543
Dividend	-	-	-	-	-	-	-	-	-	-
Balance carried forward	12,235,569	20,444,814	35,268,527	53,716,578	77,792,641	107,798,235	144,735,170	191,242,103	241,710,415	303,662,543

12.2 Balance Sheet

Calculations **SMEDA**

Balance Sheet

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
Current assets											
Cash & Bank	594,420	9,303,497	13,684,886	23,648,329	36,445,161	53,794,148	84,832,065	122,660,153	169,534,868	219,965,296	293,118,654
Accounts receivable (for milk only)		932,164	861,319	1,139,525	1,340,272	1,609,949	1,920,254	2,295,009	2,741,254	3,092,179	3,748,036
Raw material inventory	829,906	1,058,277	1,397,409	1,828,542	2,378,958	3,097,208	4,003,847	5,064,222	6,577,667	8,849,073	-
Pre-paid insurance	189,170	170,253	151,336	132,419	113,502	94,585	75,668	56,751	37,834	18,917	-
Total Current Assets	1,613,496	11,464,190	16,094,951	26,748,816	40,277,892	58,595,891	90,831,834	130,076,135	178,891,622	231,925,465	296,866,690
Fixed assets											
Land	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763	4,607,763
Building/Infrastructure	24,739,313	23,502,347	22,265,381	21,028,416	19,791,450	18,554,484	17,317,519	16,080,553	14,843,588	13,606,622	12,369,656
Animals	30,000,000	28,125,000	29,857,275	37,612,071	44,609,236	53,430,897	63,781,532	75,408,007	88,932,824	104,112,931	126,411,300
Machinery & equipment	3,709,900	3,338,910	2,967,920	2,596,930	2,225,940	1,854,950	1,483,960	1,112,970	741,980	370,990	-
Furniture & fixtures	230,000	207,000	184,000	161,000	138,000	115,000	92,000	69,000	46,000	23,000	-
Office vehicles	73,500	66,150	58,800	51,450	44,100	36,750	29,400	22,050	14,700	7,350	-
Office equipment	68,000	61,200	54,400	47,600	40,800	34,000	27,200	20,400	13,600	6,800	-
Total Fixed Assets	63,428,476	59,908,370	59,995,540	66,105,230	71,457,290	78,633,845	87,339,374	97,320,744	109,200,454	122,735,456	143,388,720
Intangible assets											
Pre-operation costs	592,000	473,600	355,200	236,800	118,400	-	-	-	-	-	-
Total Intangible Assets	592,000	473,600	355,200	236,800	118,400	-	-	-	-	-	-
TOTAL ASSETS	**65,633,972**	**71,846,161**	**76,445,690**	**93,090,847**	**111,853,582**	**137,229,736**	**178,171,208**	**227,396,879**	**288,092,077**	**354,660,922**	**440,255,410**
Liabilities & Shareholders' Equity											
Current liabilities											
Accounts payable (feed only)		1,629,245	1,888,565	2,266,907	2,696,604	3,189,212	3,774,456	4,436,715	5,100,165	6,020,589	7,364,581
Total Current Liabilities	-	1,629,245	1,888,565	2,266,907	2,696,604	3,189,212	3,774,456	4,436,715	5,100,165	6,020,589	7,364,581
Other liabilities											
Long term debt (Project Loan)	32,010,238	27,039,360	21,438,051	15,126,355	8,014,179	-	-	-	-	-	-
Long term debt (Working Capital Loan)	806,748	-	-	-	-	-	-	-	-	-	-
Total Long Term Liabilities	32,816,986	27,039,360	21,438,051	15,126,355	8,014,179	-	-	-	-	-	-
Shareholders' equity											
Paid-up capital	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986	32,816,986
Gain / Loss on Net value of Animals		(1,875,000)	(142,725)	7,612,071	14,609,236	23,430,897	33,781,532	45,408,007	58,932,824	74,112,931	96,411,300
Retained earnings		12,235,569	20,444,814	35,268,527	53,716,578	77,792,641	107,798,235	144,735,170	191,242,103	241,710,415	303,662,543
Total Equity	32,816,986	43,177,555	53,119,075	75,697,584	101,142,800	134,040,524	174,396,752	222,960,163	282,991,912	348,640,332	432,890,829
TOTAL CAPITAL AND LIABILITIES	**65,633,972**	**71,846,161**	**76,445,690**	**93,090,847**	**111,853,582**	**137,229,736**	**178,171,208**	**227,396,879**	**288,092,077**	**354,660,922**	**440,255,410**
	-	-	-	-	-	-	-	-	-	-	-

12.3 Cash Flow Statement

Calculations SMEDA

Cash Flow Statement

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating activities											
Net profit		12,235,569	8,209,245	14,823,714	18,448,050	24,076,063	30,005,594	36,936,935	46,506,933	50,468,312	61,952,128
Add: depreciation expense		1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106	1,645,106
amortization of pre-operating costs		118,400	118,400	118,400	118,400	118,400	-	-	-	-	-
Accounts receivable		(932,164)	70,844	(278,206)	(200,746)	(269,677)	(310,305)	(374,755)	(446,245)	(350,925)	(655,857)
Raw material inventory	(829,906)	(228,371)	(339,132)	(431,133)	(550,415)	(718,250)	(906,639)	(1,060,374)	(1,513,445)	(2,271,406)	8,849,073
Advance insurance premium	(189,170)	18,917	18,917	18,917	18,917	18,917	18,917	18,917	18,917	18,917	18,917
Accounts payable		1,629,245	259,320	378,342	429,697	492,608	585,244	662,259	663,449	920,425	1,343,992
Cash provided by operations	(1,019,076)	14,486,702	9,982,699	16,275,139	19,909,008	25,363,166	31,037,916	37,828,088	46,874,715	50,430,429	73,153,358
Financing activities											
Project Loan - principal repayment		(4,970,878)	(5,601,309)	(6,311,696)	(7,112,177)	(8,014,179)	-	-	-	-	-
Working Capital Loan - principal repayment		(806,748)	-	-	-	-	-	-	-	-	-
Additions to Project Loan	32,010,238	-	-	-	-	-	-	-	-	-	-
Additions to Working Capital Loan	806,748	-	-	-	-	-	-	-	-	-	-
Issuance of shares	32,816,986	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financing acti	65,633,972	(5,777,626)	(5,601,309)	(6,311,696)	(7,112,177)	(8,014,179)	-	-	-	-	-
Investing activities											
Capital expenditure	(64,020,476)	-	-	-	-	-	-	-	-	-	-
Cash (used for) / provided by investing acti	(64,020,476)	-	-	-	-	-	-	-	-	-	-
NET CASH	**594,420**	**8,709,076**	**4,381,389**	**9,963,443**	**12,796,832**	**17,348,988**	**31,037,916**	**37,828,088**	**46,874,715**	**50,430,429**	**73,153,358**
Cash balance brought forward		594,420	9,303,497	13,684,886	23,648,329	36,445,161	53,794,148	84,832,065	122,660,153	169,534,868	219,965,296
Cash available for appropriation	594,420	9,303,497	13,684,886	23,648,329	36,445,161	53,794,148	84,832,065	122,660,153	169,534,868	219,965,296	293,118,654
Dividend		-	-	-	-	-	-	-	-	-	-
Cash balance	594,420	9,303,497	13,684,886	23,648,329	36,445,161	53,794,148	84,832,065	122,660,153	169,534,868	219,965,296	293,118,654
Cash carried forward	594,420	9,303,497	13,684,886	23,648,329	36,445,161	53,794,148	84,832,065	122,660,153	169,534,868	219,965,296	293,118,654

13 KEY ASSUMPTIONS

13.1 Operating Cost Assumptions

Description	Unit	Details
Machinery Maintenance	Rs./ Month	10,000
Direct Electricity	Rs./ Month	115,363
Office vehicle running expenses	Rs./ Month	5,000
Office Expenses (entertainment, janitorial, stationery etc.)	Rs./ Month	8,120
Communication Expenses	Rs./Month	8,000
Promotional Expenses	Rs./ Month	83,449

13.2 Production Cost Assumptions

Description	Unit	Details
Annual installed capacity	No. of cows	75
Milk production starting capacity Utilization	%	95
Maximum production capacity utilization	%	95
Total milk production	Liters/ cow/ lactation cycle	10,500
Number of female calves in year 1	No.	29
Average number of days in Lactation	No. of days	305+_5
Purchase price of pregnant cow	Rs. per cow	400,000
Cost of Artificial Insemination (AI)	Rs/ animal/ year	5,000
Cost of vaccination and medication	Rs./animal/year	1,000
Mortality in new born calves	% of total animals/ year	5
Mortality in adult cows	% of total animals/ year	2
Mortality in heifers (females calves older than one year)	% of total animals/ year	1
Shed space per cow	Sq. Ft. per animal	80
Open paddock space per cow	Sq. Ft. per animal	160

13.3 Revenue Assumptions

Description	Unit	Details
Initial Herd Size: No. of Cows	No.	75
Maximum Herd Size: No. of Cows	No.	301
Production capacity (ltrs / cow / day)	Ltrs	35
Milk sale price in year 1	Rs. / Litre	60
Culling price male calves in year 1	Rs. / Animal	10,000
Culling price female cows in year 1	Rs. / Animal	150,000
Sale price growth rate		5%
Asset base calculations		
Lactating animals	Rs.	400,000
New born female calves	Rs.	50,000
1 year plus female calves	Rs.	150,000

13.4 Financial Assumptions

Description	Unit	Details
Debt: Equity Ratio	Ratio	50:50
Interest Rate	% per annum	12
Debt Tenure	Years	5