

# **Kathmandu University**

**Department of Computer Science and Engineering**

**Dhulikhel, Kavre**



**A Project Idea on**

**‘Krishna Kanaiya Dairy’**

**Submitted by:**

**Aakriti Banjara(05)**

**Saugat Khatri(24)**

**Prajwol Timalisina(57)**

**Regal Adhikari (64)**

**Siris Mainali(65)**

**Submitted to:**

**Ramesh Ghimire**

**Department of Management, Informatics and Communication**

**Submission Date: 7<sup>th</sup> January 2024**

## **Abstract**

This report analyzes the budgeting and evaluation of a dairy farm in Nepal. The report provides an overview of the dairy farming industry, introduces the specific dairy farm being analyzed, and presents the results of the budgeting and evaluation analysis. This study conducts an economic feasibility analysis of establishing and operating a dairy cow farm present in Panauti, Kavre keeping the study period of 5 years. The primary objective is to assess the farm's financial viability by evaluating revenue sources, operational costs, and cash flows. The analysis considers factors such as the cost of crossbred cows, land allocation, fodder, labor expenses, and equipment investments. Various financial metrics, including payback period, net present value (NPV), internal rate of return (IRR), and benefit-cost ratio (BCR), are employed to gauge the farm's financial performance. The study's findings provide insights into the farm's economic prospects and offer recommendations for informed decision-making in the dairy farming industry.

# Table of Content

<b>Abstract.....</b>	<b>i</b>
<b>Chapter 1: Introduction.....</b>	<b>1</b>
<b>Chapter 2: Budgeting and Evaluation.....</b>	<b>2</b>
2.1 Revenue Generating Model.....	2
2.2 Assumptions.....	2
2.3 Budgeting.....	2
2.3.1 Land Cost.....	2
2.3.2 Labor Cost.....	2
2.3.3 Cost of Cows.....	3
2.3.4 Equipment Cost.....	3
2.3.5 Variable Cost of Operation for 5 years.....	3
2.3.6 Revenue for 5 years.....	4
2.4 Cash Flows.....	4
2.5 Evaluation.....	5
• 2.5.1 Payback Period.....	5
• 2.5.2 Discounted Payback period.....	6
• 2.5.3 Net Present Value (NPV).....	7
• 2.5.4 Internal Rate of Return.....	7
• 2.5.5 Modified Internal Rate of Return.....	8
• 2.5.6 Benefit-Cost ratio.....	9
<b>Chapter 3: Discussion.....</b>	<b>10</b>
3.1 Interpretation.....	10
3.2 Sensitivity analysis.....	11
<b>Chapter 4: Conclusion.....</b>	<b>13</b>
<b>References.....</b>	<b>14</b>

## **Chapter 1: Introduction**

Dairy cow farming represents a fundamental sector within the agricultural industry, contributing significantly to food production and economic growth worldwide. With the rising demand for dairy products, establishing and operating a dairy cow farm involves complex considerations, including investment in cattle, land, infrastructure, and operational expenses. This report embarks on an in-depth evaluation of the economic aspects involved in initiating and sustaining a dairy cow farm, focusing on revenue generation, cost estimation, and financial analysis. The study aims to provide insights into the financial feasibility and long-term viability of dairy cow farming operations, thereby aiding stakeholders in informed decision-making regarding investments in this agricultural endeavor.

Dairy farming is an important industry in Nepal, providing a source of income for many farmers and contributing to the country's economy. The dairy farm being analyzed in this report is located in Panauti, Kavre and has been in operation for five years. The farm has 10 crossbred cows, which are used for milk and milk product production, as well as manure. The farm has 400 sq. ft. of land, which is used for grazing and cow fodder production. The farm has a shed constructed for adult cows, as well as equipment for feeding, cleaning, veterinary aid, milking, and manure collection. The farm employs manpower for feeding, veterinary aid, milking, manure collection, etc.

## **Chapter 2: Budgeting and Evaluation**

### **2.1 Revenue Generating Model**

Dairy cow farming has significant importance in the national economy. We do not need to advertise products and marketing milk is very easy. We can sell the milk even at the farm gate. We can also use or sell cow dung to other farmers or use it in our own field for growing other crops.

#### **Revenue Sources**

- Milk and milk products
- Manure

### **2.2 Assumptions**

- Crossbreed Cows including transport cost & Insurance cost (10 Cows costing Rs.60,000 each)
- 400 sq. ft Land (taking 40 sq.ft for each cow)
- Cow fodder
- 10% rate of Interest
- Housing/Shed for adult cows
- Equipments
- Manpower costs(Feeding, veterinary aid, milking, manure collection, etc)
- No market value at the end of the period is assumed

### **2.3 Budgeting**

It is important to calculate the total costs before starting the business. The process that involves the estimation of the total cost of a project is called Budgeting.

#### **2.3.1 Land Cost**

40 sq.ft of area \* Rs. 16,070 per sq.ft. = Rs.6,42,804

#### **2.3.2 Labor Cost**

Cost of feeding cows for one month = Rs. 10,000.

Cost of feeding cows for a year = Rs. 1,20,000.

### 2.3.3 Cost of Cows

Cost of one cow, including transport and insurance: Rs. 60,000

Cost of ten cows: Rs. 6,00,000

### 2.3.4 Equipment Cost

Cost of equipment needed for milking, cleaning, brushing, etc: Rs. 40,000

### 2.3.5 Variable Cost of Operation for 5 years

Particulars	1st year	2nd year	3rd year	4th year	5th year
<b>Expenditure:</b>					
Fodder Cost	72,000	72,000	72,000	72,000	72,000
Veterinary Expenses	12,000	12,000	12,000	12,000	12,000
Utility and Maintenance	30,000	30,000	30,000	30,000	30,000
Labor Cost	1,20,000	1,20,000	1,20,000	1,20,000	1,20,000
<b>Total</b>	2,34,000	2,34,000	2,34,000	2,34,000	2,34,000

### 2.3.6 Revenue for 5 years

Particulars	1st year	2nd year	3rd year	4th year	5th year
<b>Income: (280 lactation days) (12 Liters per cow)(1kg per cow)</b>					
By sale of cow milk (Rs 30/ltr)	10,08,000	10,08,000	10,08,000	10,08,000	10,08,000
By sale of cow manure (Rs 5/kg)	18,250	18,250	18,250	18,250	18,250
<b>Total</b>	10,26,250	10,26,250	10,26,250	10,26,250	10,26,250

### 2.4 Cash Flows

Years	Revenue	Expenses	Cash-Flows
Year 0	-	(12,82,804)	(12,82,804)
Year 1	10,26,250	(2,34,000)	7,92,250
Year 2	10,26,250	(2,34,000)	7,92,250
Year 3	10,26,250	(2,34,000)	7,92,250
Year 4	10,26,250	(2,34,000)	7,92,250
Year 5	10,26,250	(2,34,000)	7,92,250

- **Cash Flow Diagram**

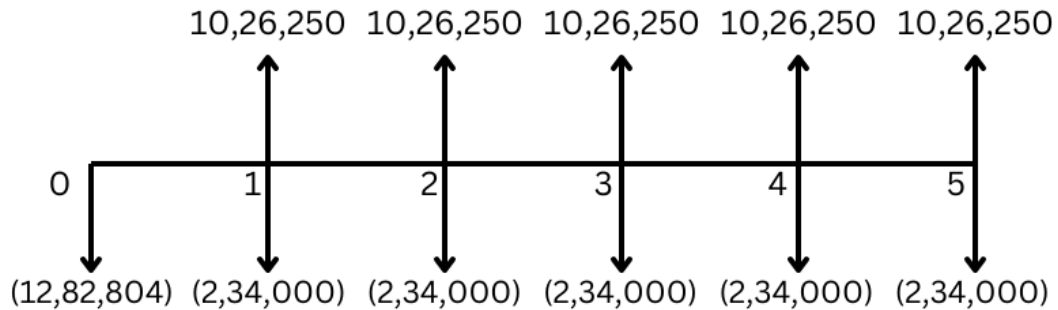


Fig: Cash Flow Diagram

## 2.5 Evaluation

- **2.5.1 Payback Period**

The payback period is the length of time it takes to recover the cost of an investment, or the length of time an investor needs to reach a breakeven point. Shorter paybacks mean more attractive investments, while longer payback periods are less desirable.

Year	Revenue - Expenses	CCF
0	-	(12,82,804)
1	792250	(490554)
2	792250	301696
3	792250	1093946
4	792250	1886196
5	792250	2678446

The formula used to calculate the Payback Period of the project is:

$$PBP = N_{F-1} + \frac{I_{F-1}}{CF_F}$$



$$= 1 + \frac{490554}{792250}$$

$$= 1.6191 \text{ years}$$

Hence, the payback period is 1.6191 years (1 Year 7 Months)

### ● 2.5.2 Discounted Payback period

The discounted payback period is a capital budgeting procedure used to determine the profitability of a project. A discounted payback period gives the number of years it takes to break even from undertaking the initial expenditure by discounting future cash flows and recognizing the time value of money. The metric is used to evaluate the feasibility and profitability of a given project.

Years	Revenue	Expenses	Cash-Flows	Cumulative PBP	Discounted Cash Flow	Cumulative DPBP
0	0	1282804	-1282804	-1282804	-1282804	-1282804
1	1026250	234000	792250	-490554	720227.2727	-562576.7273
2	1026250	234000	792250	301696	654752.0661	92175.33884
3	1026250	234000	792250	1093946	595229.151	687404.4899
4	1026250	234000	792250	1886196	541117.41	1228521.9
5	1026250	234000	792250	2678446	491924.9182	1720446.818

$$\begin{aligned}
 \text{DPBP} &= N_{F-1} + \frac{I_{F-1}}{CF_F} \\
 &= 1 + \frac{562576.72}{654752.066} \\
 &= 1.859 \text{ years}
 \end{aligned}$$

- **2.5.3 Net Present Value (NPV)**

As per our calculations, Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. NPV is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project

$$\begin{aligned}
 NPV &= -CF_0 + PMT * \left( \frac{1 - \frac{1}{(1+i)^n}}{i} \right) \\
 &= -12,82,804 + 7,92,250 * \left( \frac{1 - \frac{1}{(1.1)^5}}{0.10} \right) \\
 &= \text{Rs. } 17,20,446.818
 \end{aligned}$$

- **2.5.4 Internal Rate of Return**

The internal rate of return (IRR) is a metric used in financial analysis to estimate the profitability of potential investments. IRR is a discount rate that makes the net present value (NPV) of all cash flows equal to zero in a discounted cash flow Analysis.

In order to calculate the IRR, let us keep the interest rate to be 50%

At  $i = 50\%$ ,

$$\begin{aligned}
 NPV &= -(Investment) + \text{revenue for each year } (i=50\%) \\
 &= -1282804 + 1375841.564 \\
 &= 93037.5637
 \end{aligned}$$

At  $i = 55\%$ ,

$$\begin{aligned}
 NPV &= -(Investment) + \text{revenue for each year } (i=55\%) \\
 &= -1282804 + 1279448.914 \\
 &= -3355.086373
 \end{aligned}$$

Now, the formula to calculate IRR is:

$$IRR = LR\% + \frac{NPV(LR)}{NPV(LR) - NPV(HR)} * (HR\% - LR\%)$$

$$\begin{aligned}
 IRR &= 0.50 + \frac{93037.5637}{93037.5637 + 3355.0863} * (0.55 - 0.50) \\
 &= 0.5482
 \end{aligned}$$

Hence, the IRR is 54.82%.

- **2.5.5 Modified Internal Rate of Return**

The modified internal rate of return (MIRR) assumes that positive cash flows are reinvested at the firm's cost of capital and that the initial outlays are financed at the firm's financing cost. By contrast, the traditional internal rate of return (IRR) assumes the cash flows from a project are reinvested at the IRR itself. The MIRR, therefore, more accurately reflects the cost and profitability of a project.

$$\begin{aligned}\text{Benefit(FW): } &= FV(10\%, 5, 1026250) \\ &= 6265358.88\end{aligned}$$

$$\text{Cost(PW)} = \text{Rs } 12,82,804$$

$$\begin{aligned}\text{Maintenance (PW)} &= PV(10\%, 5, 234000) \\ &= \text{Rs } 8,87,044.10\end{aligned}$$

$$\begin{aligned}MIRR &= \sqrt[n]{\frac{FV(\text{Positive cash flows} \times \text{Cost of capital})}{PV(\text{Initial outlays} \times \text{Financing cost})}} - 1 \\ &= \sqrt[5]{\frac{6265358.88}{1282804 + 887044.10}} - 1 \\ &= 23.62\%\end{aligned}$$

Hence, the calculated MIRR is 23.62%.

- **2.5.6 Benefit-Cost ratio**

The benefit-cost ratio (BCR) is a ratio used in a cost-benefit analysis to summarize the overall relationship between the relative costs and benefits of a proposed project. BCR can be expressed in monetary or qualitative terms. If a project has a BCR greater than 1.0, the project is expected to deliver a positive net present value to a firm and its investors

Study Period: 5 years

MARR: 10%

$$\begin{aligned}\text{Benefit (PW)} &= \text{PV}(10\%, 5, 10, 26, 250) \\ &= 36,90,294.922\end{aligned}$$

$$\text{Cost(PW)} = \text{Rs } 12,82,804$$

$$\begin{aligned}\text{Maintenance (PW)} &= \text{PV}(10\%, 5, 234000) \\ &= \text{Rs } 8,87,044.10\end{aligned}$$

$$\begin{aligned}\text{BC Ratio} &= \frac{\text{Benefit}}{\text{Cost} + \text{Maintenance}} \\ &= \frac{3690294.922}{1282804 + 887044.10} \\ &= 1.70 > 1\end{aligned}$$

Hence, according to the BC ratio, this project is a profitable business.

- **2.5.7 Depreciation**

This project is based on the cow farm present in Panauti. We assumed there will be no market value of the Shed and the cows at the end of the project period. The cows will not remain as productive and hence won't sell well. While the price of land does increase, by consulting with the owners, we found that the owners are not willing to sell the land and might reside there themselves after the project period. We know that there is benefit and the land value is essential but for the sake of this project we assume that there will be no market value of the project.

## Chapter 3: Discussion

### 3.1 Interpretation

By interpreting the data calculated in the section above we can come to certain conclusions. Those conclusions are listed and described in the points listed below:

- **Payback Period**

As per our calculations, we expect the payback period to be around 1 year and 7 months . This means that within almost 2 years of business we expect to recoup the funds expended in the investment.

- **Discounted PBP**

Considering the time value of money, our payback period reaches 1 year and 10 months meaning that within almost 2 years we expect to earn back our investment plus the interest that would have been generated by the investment

- **NPV**

The Net Present Value of our project was found to be Rs. 17,20,446.818. Since, the value is more than zero, it ensures profitability of the project at the end of life.

- **IRR**

We expect the Internal Rate of Return for our project to be 54.82. Since, the value is more than the MARR, it ensures profitability of the project

- **BC Ratio**

The benefit to cost ratio of our project is expected to be 1.70. This means that the benefits outweigh the costs and hence ensures profitability.

### 3.2 Sensitivity analysis

$PW(10\%) = - \text{Investment} + \text{Annual Saving} * (P/A, 10\%, 5) - \text{Annual Expenses} * (P/A, 10\%, 5)$

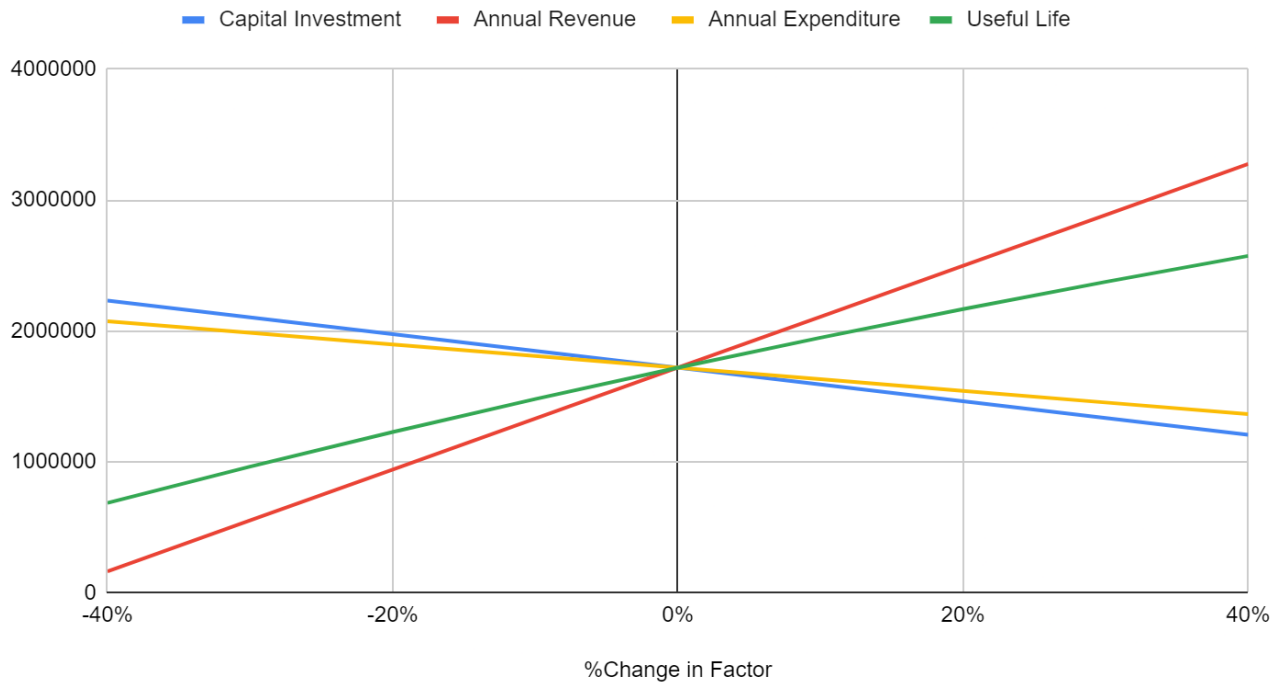
The following figures are taken for sensitivity analysis

Important Figures	Value
Capital Investment	1,282,804
Annual Saving	1,026,250
Annual maintenance	234,000
Useful Life	5
MARR	10%

The change in figures with respective change in % factors are shown in the graph below:

%Change in Factor	Capital Investment	Annual Revenue	Annual Expenditure	Useful Life
-40%	2,233,568.42	164,329	2,075,264	687,404
-30%	2,105,288.02	553,358	1,986,560	964,409
-20%	1,977,007.62	942,388	1,897,856	1,228,522
-10%	1,848,727.22	1,331,417	1,809,151	1,480,344
0%	1,720,446.82	1,720,447	1,720,447	1,720,447
10%	1,592,166.42	2,109,476	1,631,742	1,949,376
20%	1,463,886.02	2,498,506	1,543,038	2,167,651
30%	1,335,605.62	2,887,535	1,454,334	2,375,769
40%	1,207,325.22	3,276,565	1,365,629	2,574,201

## Capital Investment , Annual Revenue , Annual Expenditure and Useful Life



As we can see from the spider plot, the present worth is least sensitive with annual expenditure and capital investment but quite sensitive to changes in annual revenue, useful life.

## **Chapter 4: Conclusion**

The analysis reveals that establishing a ten-cow dairy farm offers promising financial prospects. The rapid payback period, positive NPV, high IRR, and favorable BCR all indicate strong profitability potential. While external factors like market fluctuations and operational challenges warrant consideration, this project appears to be a worthwhile venture for potential investors and farmers seeking a solid return on their investment.



## References

*customs.gov.np*. (2016, December 15). *customs.gov.np*.

<https://nddb.gov.np/en/child/Study-Report>

*Agri Farming* (2021, May 1).

<https://www.agrifarming.in/dairy-cow-farming-project-report-10-animals.html>