Land O Lakes

The data-driven dairy cooperative

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Executive Summary

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Question

How can Land O' Lakes reduce turnover rate while implementing cost-per-unit data collection?

Challenges

- Increased Employee turnover rate
- Lack of cost-per-unit information

Solution

Develop a data-driven analytics system manned by dairy workers to monitor the consumption of feed

Impact

$90,000
Increase in Earnings by 2024

15%
Increase in Employee Retention

30.7%
Return on Interest

Land O Lakes is committed to finding better solutions to increase dairy farmers' productivity

Core Competencies

Land O Lake's Highlighted Offerings

3400

Members of the Cooperative Society

1700

Dairy Producers

12 billion pounds

Annual Milk Production

Land O Lake's Cost Calculation Strategy

Input

Production Costs into System

Output

Desired Sale Price to achieve profit margins

Land O Lakes Needs to maximize limited time and resources of dairy farmers

Key Issues

Limited Time & Resources

Dairy farms must be consistent with farming techniques to ensure standard quality

Constant turnover rate of 25%

7.5%

Net income ratio for current strategy

VS

13.7%

Industry average

KEY ISSUE

[**Uninspired workers** in the dairy farming industry leads to **lack of modern** profit maximization techniques]

Improving retention of dairy farm workers

Customer Analysis

Key factors workers are looking for in their jobs

5+

Transferable Job Skills

100%

Respect in Workplace

100%

Scope for growth and promotion

"Dairies don't want to compete on the basis of wage, they want to compete on training, respect, being a part of the business, upward opportunity."

Land O Lakes needs to create an efficient data system to reduce cost-per-unit

Recommendation

Modernization

Data driven system that helps farmers alter nutritional intake for each individual cow

Optimization

Job Rotation Program to empower workers to learn more about data analytics and interpretation

Organization

Grouping based on eating habits and requirements enabling close monitoring and pattern analysis

Land O Lakes will procure RFID and SaaS Cloud Technology

Recommendation

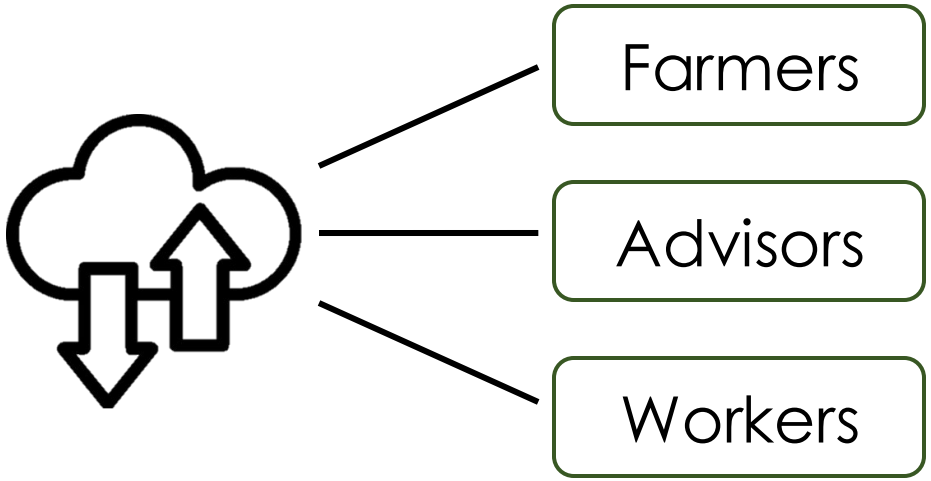
Equipment

RFID Readers

Feed Scale

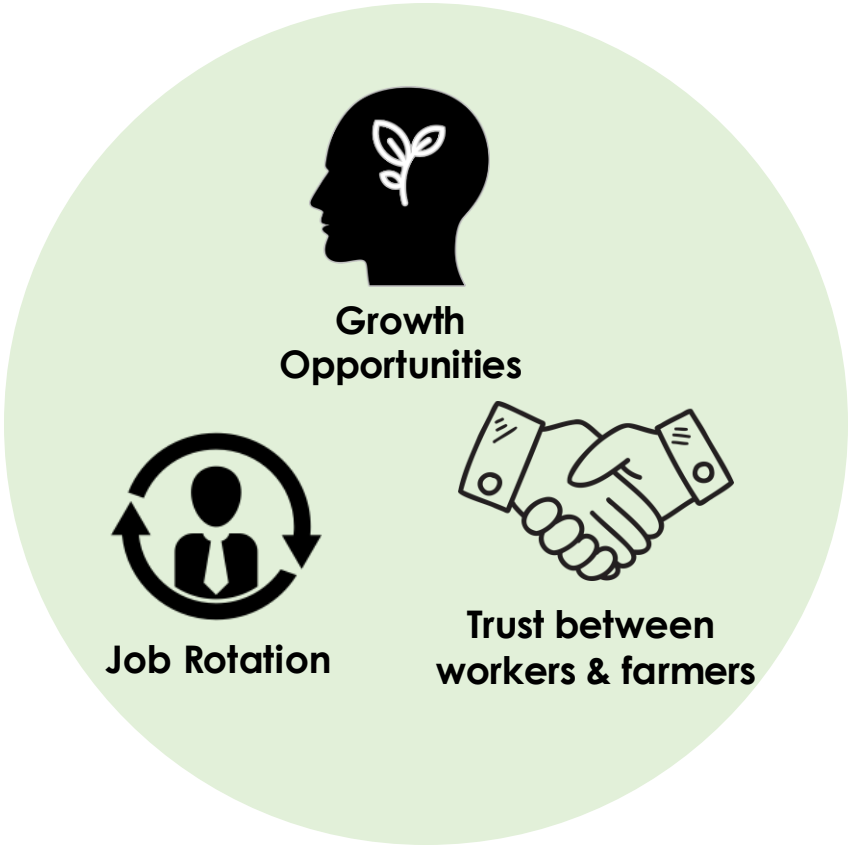
SaaS Cloud Technology

Instant Access to All Information



Modern production methods promote employee learning and provides greater job skills

Recommendation



10%

in turnover rates

Why would this decrease turnover rates?

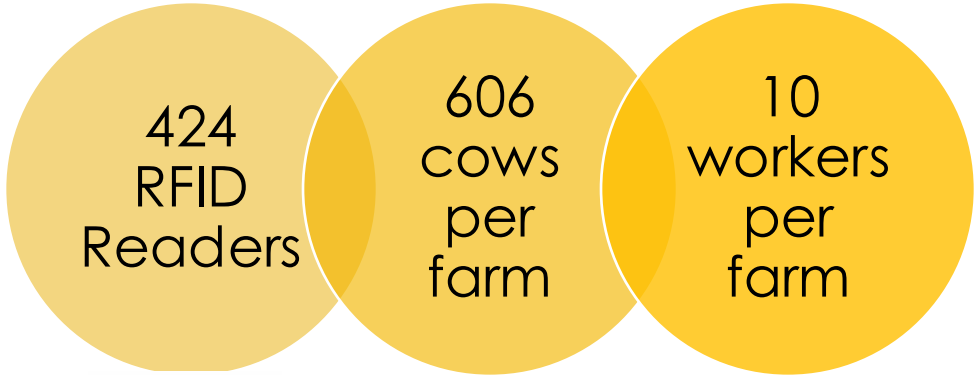
Data Collection
Training

Job Satisfaction

Recognition

A network of cattle, dairy farmers, and technology will work together to ensure minimum costs

Implementation

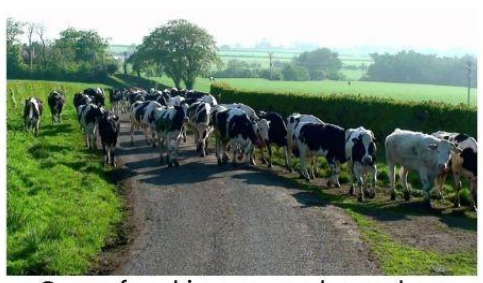


ONE

Integrated Cloud-Based System

The MOO strategy uses a combination of data analytics and technology

Implementation



Cows feed in groups based on their food intake and nutritional requirements

Hay is automatically weighed as feeding begins

Cows are constantly monitored by the RFID scanners in the station

Hay eaten is automatically tracked based on leftovers

Consumption data is uploaded to a cloud database

Data can be accessed all at once by farmers, vets, dairy advisors

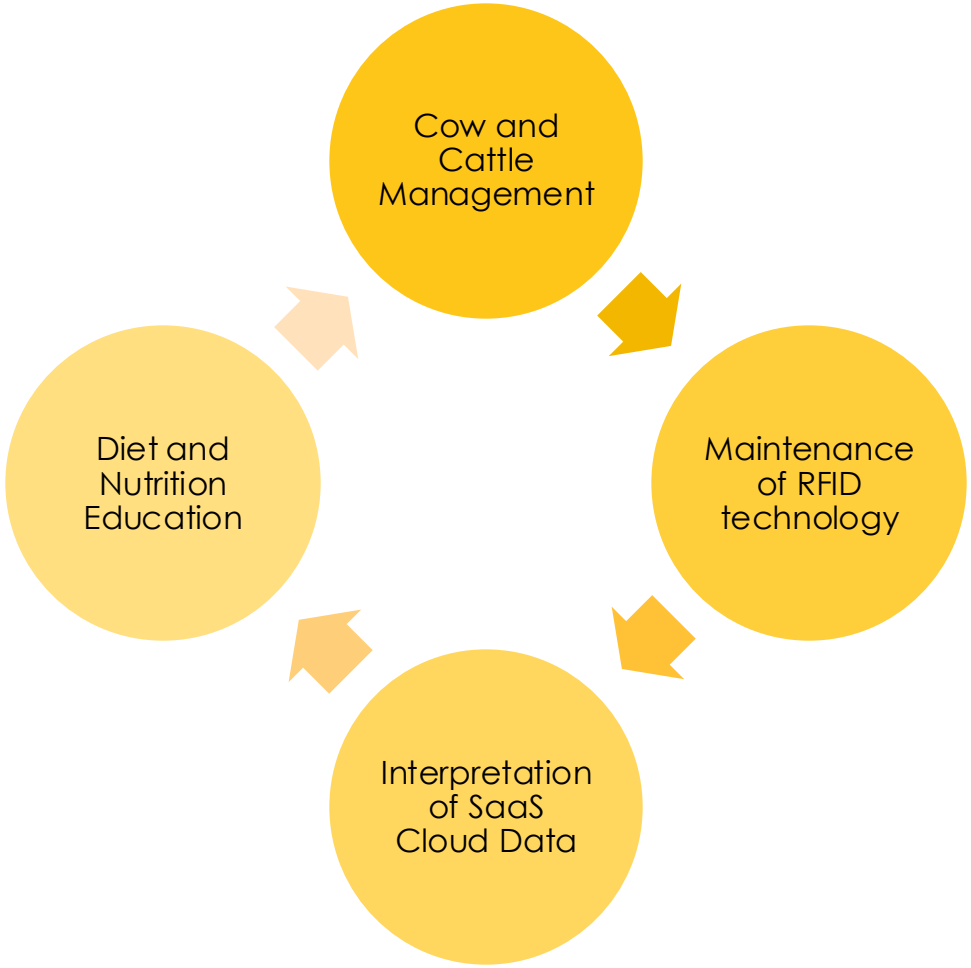
The job rotation scheme will be performed on a 3-month basis

Implementation

"Majority of dairy farmers say the job is **monotonous and physically demanding**."

"A **poorly trained workforce** causes **negative repercussions** on milk production and quality."

"The need for a higher-level workforce that can operate **complex technology and equipment.**"



The MOO Strategy has a projected increase in worker retention and cow health

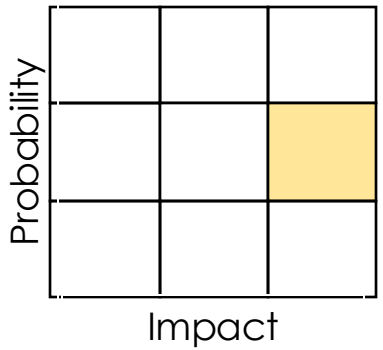
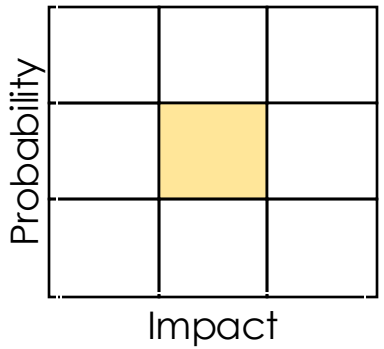
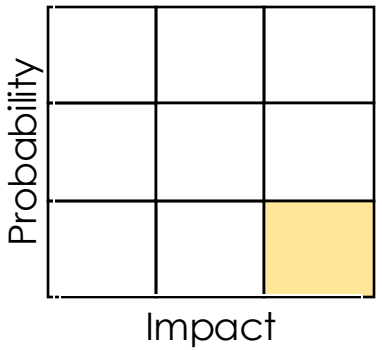
Implementation

Testing Period

	Month 1	Months 1-3	Months 3-12
Individualized Feeding System	Monitor cows eating habits on individual basis Install RFID Reader in feeding stations	Vet Visit to decide feed intake and nutritional supplements	Continue tracking cow health and lactation amounts and adjust diet if required
Employee Training	Workers install RFID Tech	Onboarding process for new technology and data analysis	Increased employee retention through varied job tasks
Cost Reduction		Reducing costs by optimizing feed for each cow	

Risks and Mitigants

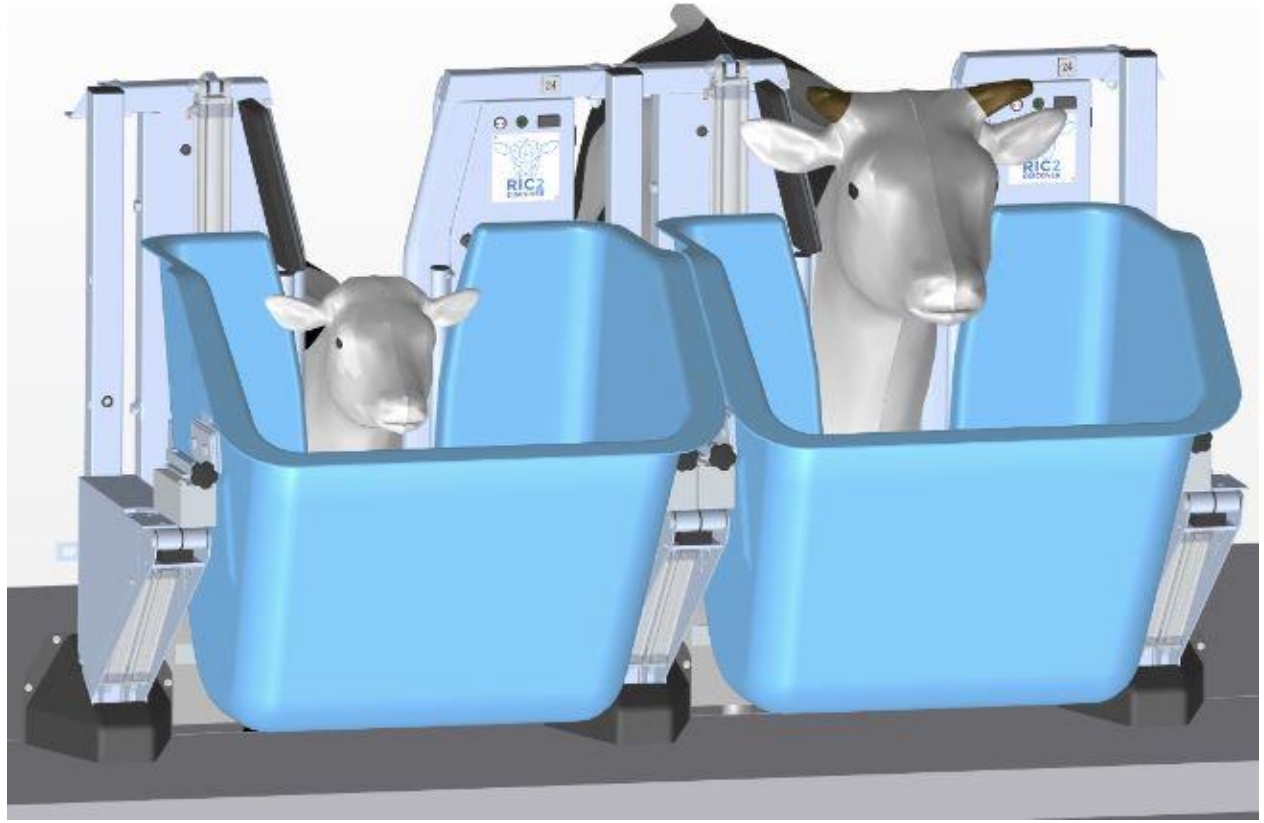
Implementation

Risks	Farmers refuse to invest in RFID system	Workers are unable to analyze data alone	Costs remain the same in the long run
Significance			
Mitigation	Testing Period with only 10 farms of 6 **months** to assure farm managers of success rates and determine cost-per-unit	Land O Lakes will appoint trainers to each farm to personally acquaint workers with the data analytics	Past case studies concluded that long-term cost-reduction was a certainty

Investment costs in Capital Expenditures

Financials

Capital Expenditures	Cost/Unit	Units	Total Cost
RFID Reader	$345	424	$83,490
Gates	$0.03	50,000	$1,500
Feeding Bins	$10	424	$4,240
Scales	$115	424	$48,760
Veterinary Evaluation	$35	606	$21,210
Labor Costs (Project Based)			$54,500
Cloud Technologies	$0.04	12000	$4800
TOTAL COST			**$218,500**



MOO leads to a positive annual growth rate and maximum profit per cow

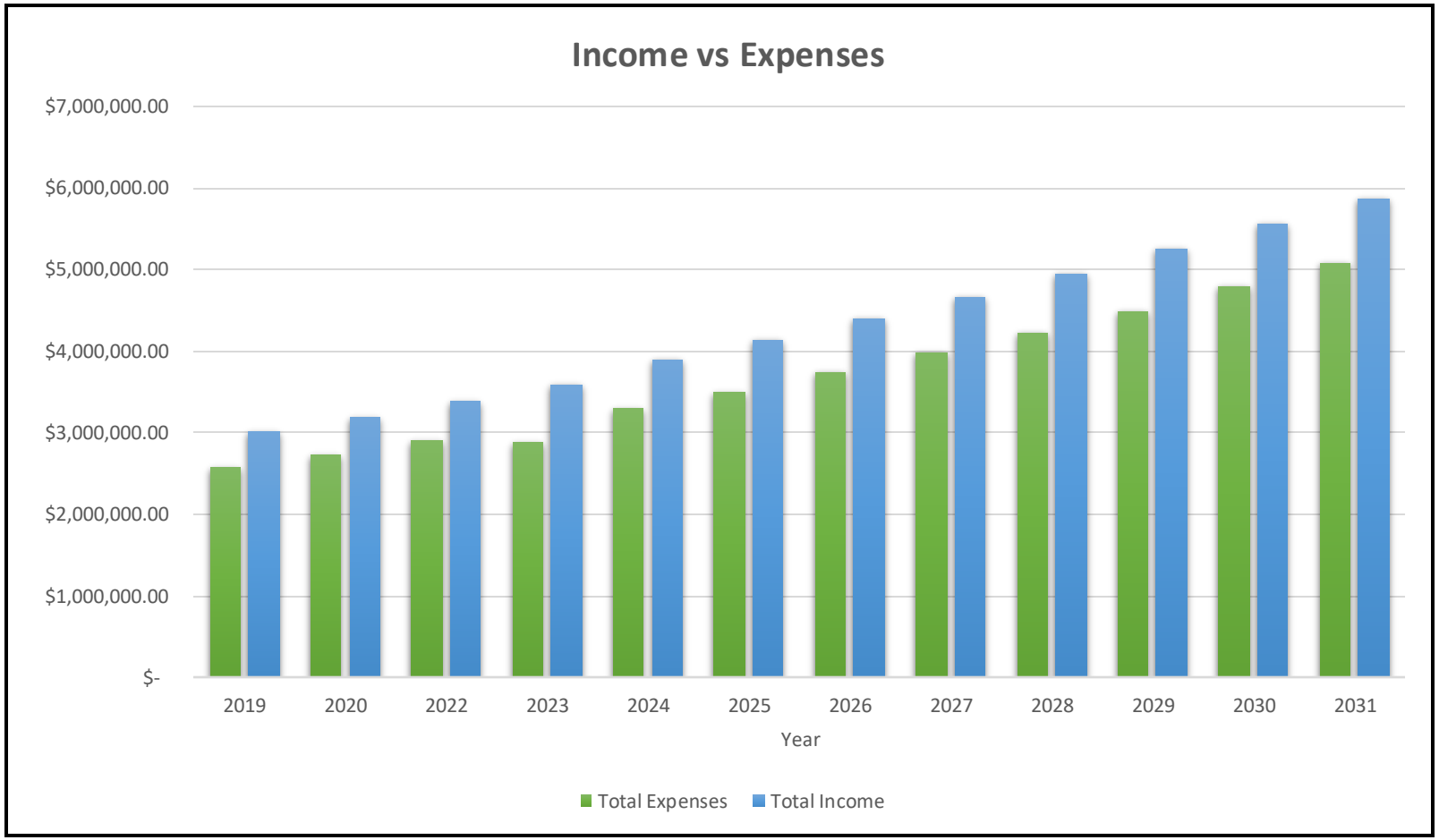
Financials

Key Assumptions:

1. **6%** Annual growth rate
2. **$0.45-$0.70** profit per cow per day after optimization

$218,500
Initial Investment

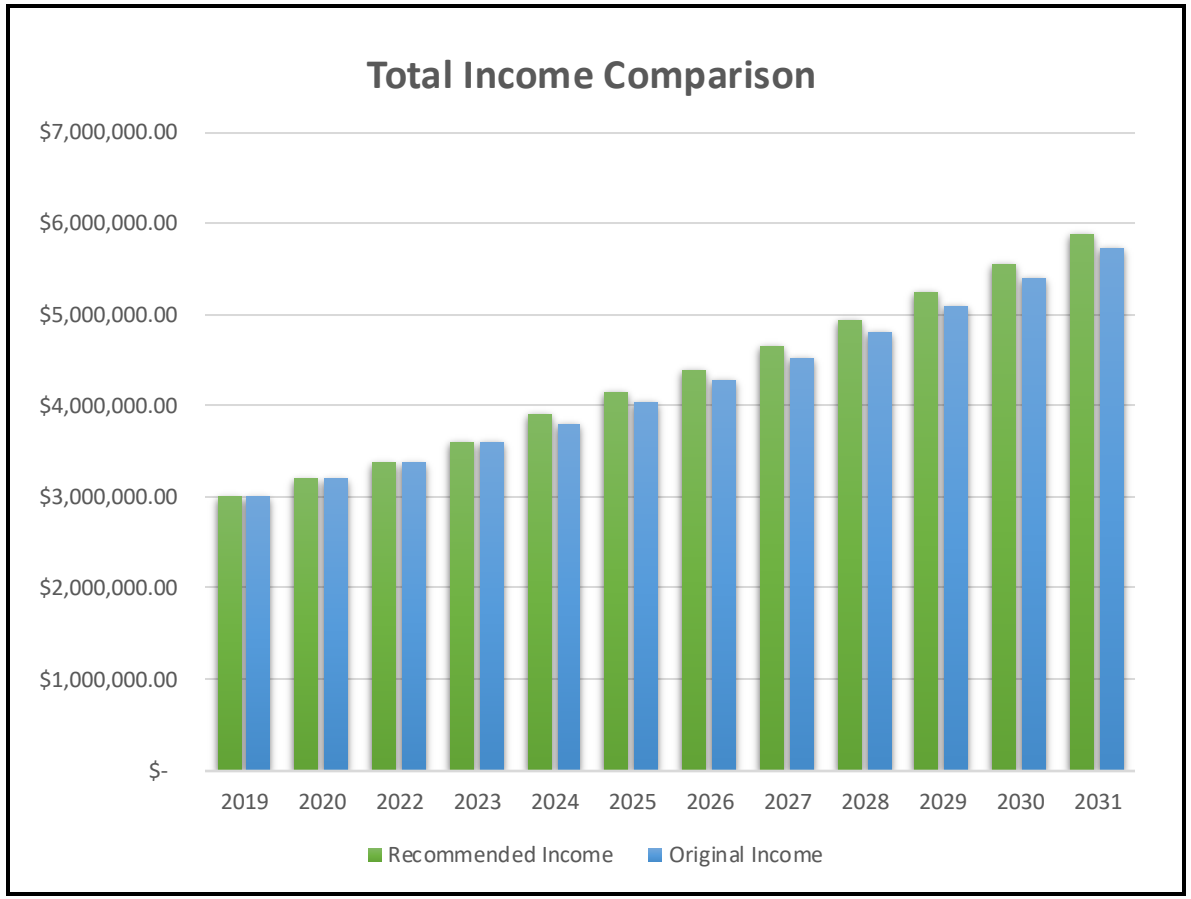
3 Years
Breakeven period



MOO generates greater income than current strategy

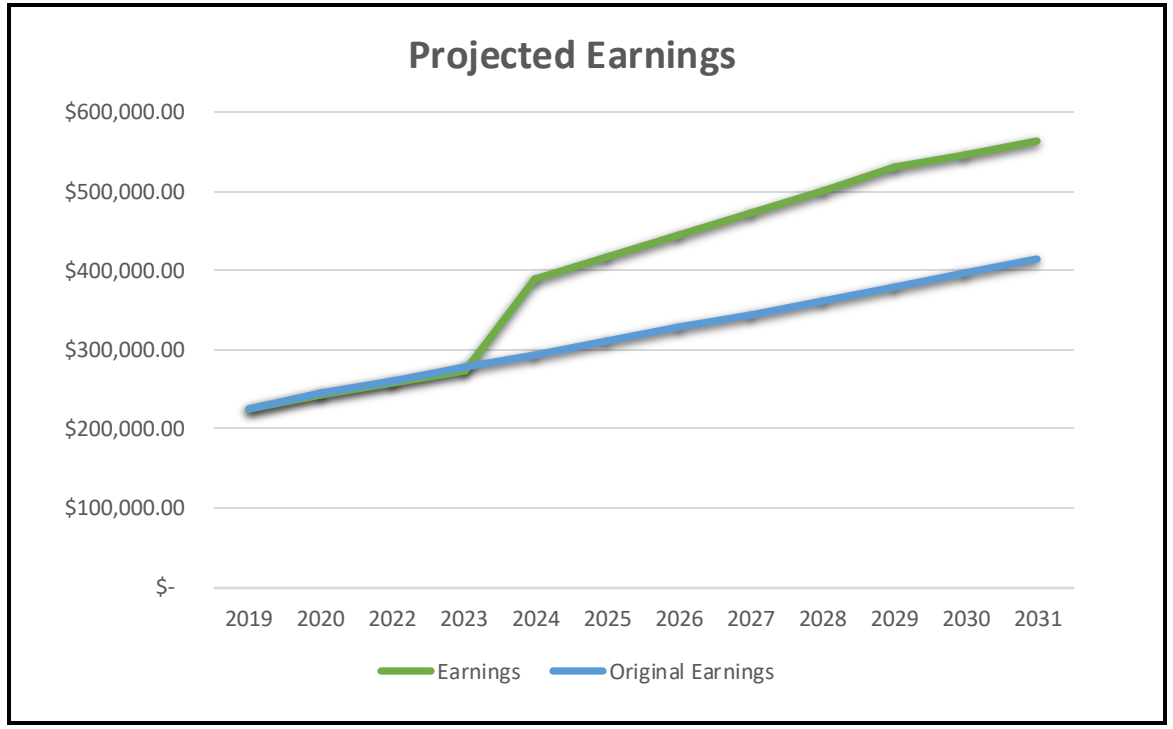
Financials

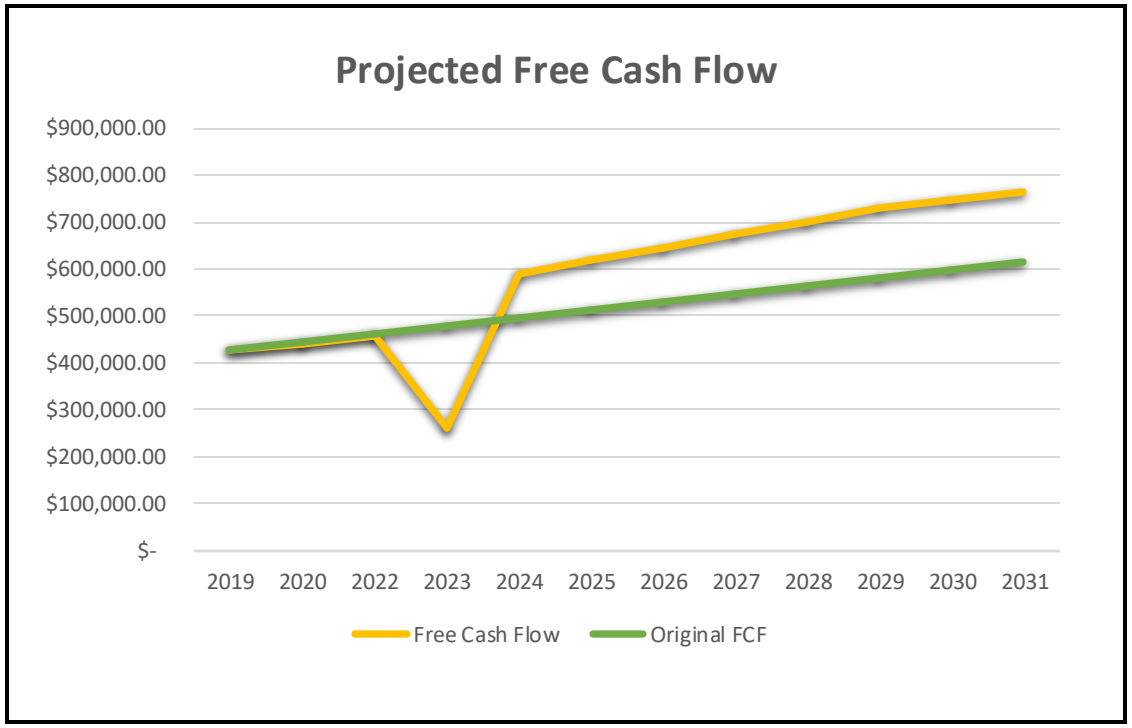
Original NPV	$6,005,839.54
NPV for Recommendation	$6,557,022.90
Difference in NPV	$551,183.36

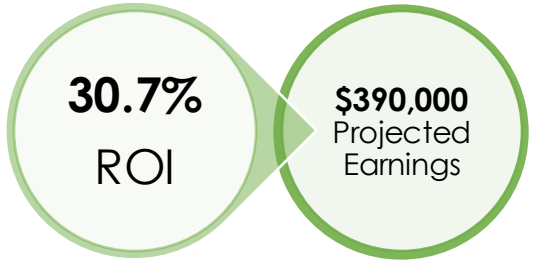


After Optimization, there is a linear growth in earnings and cash flows

Financials







Conclusion

Conclusion

KEY ISSUE [Uninspired workers in the dairy farming industry leads to lack of profit maximization techniques]

KEY QUESTION [How can Land O' Lakes reduce turnover rate while implementing cost-per-unit data collection?]

SOLUTION

Modernization

Install RFID readers and integrate cloud tech

Optimization

Train and empower workers to utilize new tech

Organization

Organize cattle on nutritional requirement

IMPACT

$90,000 Increase in earnings in 2024

15% Increase in employee retention

30.7% Return on Interest

THANK YOU

Appendix- Table of Contents

Appendix: Labor Costs

Appendix

Project	Hours	Cost/Hr	Total Increase
Fencing	-	-	$ 25,000.00
Stall Installation	2120	$ 15.00	$ 31,800.00
IT Consultation	20	$ 150.00	$ 3000.00

Appendix: High Tensile Wire Fencing

Appendix

Recommended area per cow: 1 acre
Average area per farm: 606 acres
606 acres ≈ 0.946875 square miles
1 mile = 5280 ft
High tensile wire fencing: $0.03 per ft
Labor for installation: $0.50/ft

Assumption: 10 areas going from one side of farm to the other

0.946875*10*0.03*5280 = **$1500**
Cost of Labor: **$25,000**

Appendix: Gradual Optimization by Year

Appendix

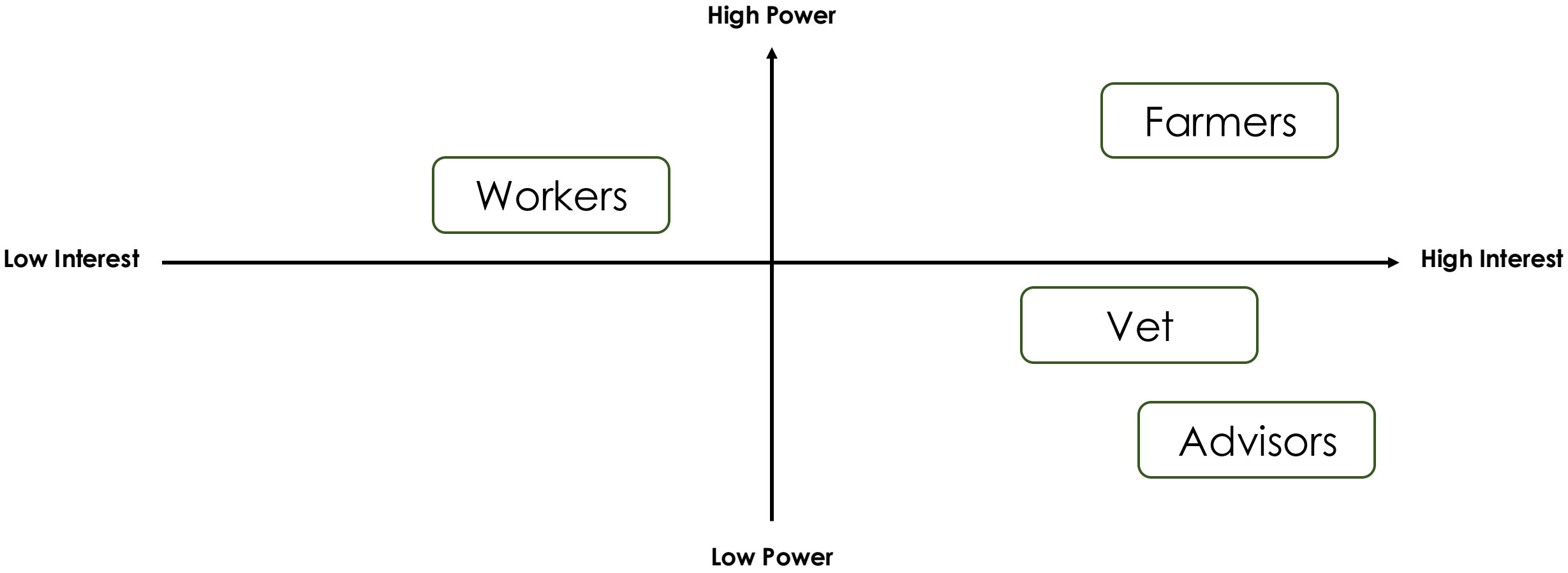
Year	$/Cow/Day	Increase/Cow/Yr	Total Increase
2024	$ 0.45	$ 164.25	$ 99,535.50
2025	$ 0.50	$ 182.50	$ 110,595.00
2026	$ 0.55	$ 200.75	$ 121,654.50
2027	$ 0.60	$ 219.00	$ 132,714.00
2028	$ 0.65	$ 237.25	$ 143,773.50
2029	$ 0.70	$ 255.50	$ 154,833.00

$0.45 - $0.70 Range of net impact of different feeding patterns different methods of specialized feeding. (During 36/35 day period)

"Algorithm development for individualized precision feeding of supplemental top dresses to influence feed efficiency of dairy cattle" (2022)

Appendix: Stakeholder Analysis

Appendix



Appendix: Issue Tree

Appendix

How can Land O Lakes reduce turnover rate while implementing cost-per-unit data collection?

- How can we increase turnover rate in dairy farms
  - Job Rotation Programs
  - Recognition and Feedback
  - 100% Promise of Growth and Promotion
- How can we maximize cow health by tracking feed intake
  - RFID scanners on feeding stations
  - Grouping cows based on overall food requirements
  - Loading data to a shared cloud system
- How to calculate per unit cost
  - **Consumption per cow / Amount of milk produced**

Cost Maximization

- Reducing overfeeding
- Personalize diet
- Reduce cost of training employees

Appendix: References to cost of materials

Appendix

RFID Tag Reader

KPR80 - Cattle RFID Tag Reader

It is an electronic ear tag reader with high capacity and durable for long-term use. It can be used with both USB and Bluetooth connection. It has the ability to read all electronic ear tag types (FDX-B, HDX) with international animal identification standards.

$450.00

Order Note

ADD TO CART | BUY NOW

Feeding Scale

Charmline Large 660 lb Shipping Scale, 21 x 17 in Platform Digital Livestock Scale Stainless Steel, Powered by Battery or AC Adapter, Suitable for Factory, Agriculture, Moving, Office, pet Weighing…

Visit the Charmline Store

47 ratings

-8% $109.99

List Price: $119.99

No Import Fees Deposit & $23.66 Shipping to Hong Kong Details

Size: Large

Large $109.99 | Small 1 option from $59.99

Brand	Charmline
Weight Limit	660 Pounds
Product Dimensions	21"L x 17"W x 1.5"H
Material	Stainless Steel
Readout Accuracy	0.2 Pounds

Feeding Bins

View larger image

Share

Ready to Ship | In Stock | Fast Dispatch

Factory outlet feed bins for cattle flatback bucket with metal durable plastic bucket with hook for feeding livestocks

100 - 299 pieces	300 - 999 pieces	>= 1000 pieces
$10.70	$9.80	$8.50

$5.00 OFF Order more than $300.00 Get Coupon

Benefits: Quick refunds on orders under US $1,000 Claim now

Quantity: 100 pieces

Samples: $19.50/piece Min. order : 1 piece Get samples

Lead time:

Quantity (pieces)	1 - 100	> 100
Lead time (days)	14	To be negotiated

Customization: Customized packaging (Min. order 1000 pieces)
Customized logo (Min. order 1000 pieces)
More

Appendix: Sample Cloud Data

Appendix

Distribution of cow body weight, size, hay eaten, and mineral defencies						
Name	Male/Female	Body Weight (in kilos)	Body Size (Small/Medium/Large)	Hay Eaten (in kilos) per day	Mineral defencies	Lactating cow
A	F	600	L	15	N/A	☑
B	F	700	L	14	Iron	☑
C	F	500	M	12	Selinium	☐
D	M	600	L	13	Phosphorus	☐
E	M	450	M	10	Undereating	☐
F	F	200	S	5	N/A	☐
G	F	600	S	10	N/A	☑
H	M	1000	L	20	Vit A	☐
I	M	350	S	9	N/A	☐
J	M	780	L	15	N/A	☐
K	F	800	L	14.5	N/A	☑

For a sample of 10 cows with no major sicknesses

Appendix: Chitale Dairy Case Study

Appendix

Chitale's 'Cow to Cloud' Program

Largest dairy in India located in Pune, Maharashtra

50,000 cows

10,000 Farmers utilizing cloud system

Centralized management, high availability, interoperability among systems, and robust security

Automation and analytics for comprehensive control of the dairy plant from the boardroom

Speedier processes through seamless flow of information to decision-makers

Roadmap for scaling business operations

Appendix: Cloud Safety Protection

Appendix

Protection and Data Supervision by Land O Lakes

Host Specifications	i3.metal Good for general purpose clusters. Provides good balance between compute and storage capabilities for most typical workload types.
Cores / host	36
Memory / host (GiB)	512
Storage	NVMe (~10.37TiB usable storage capacity)

After 10,000 GB of data is collected by each farm, Land O Lakes will sponsor cloud protection by VMWare

Average cost of $25,000 per cloud group that includes:

- Data Protection
- Encryption
- Access only by stakeholders (farmers, advisors, vets)
- Quarterly cloud safety training

Appendix: Impact/Ease Matrix

Appendix

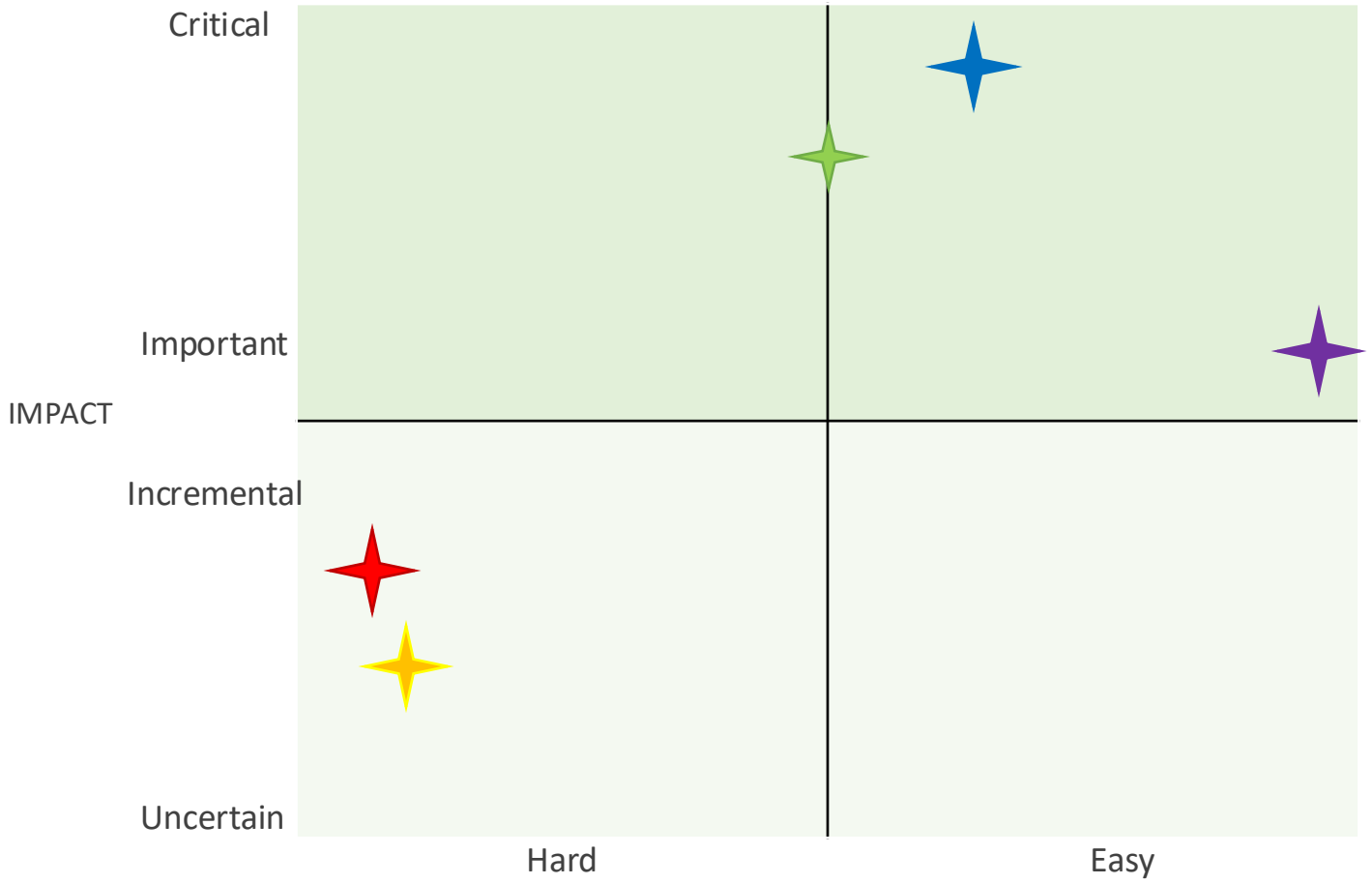
Individualized Cow Feeding

Grouping based on Requirement

RFID Tech

Cloud Based System

Manually weigh hay consumption



Appendix: GE Matrix

Appendix

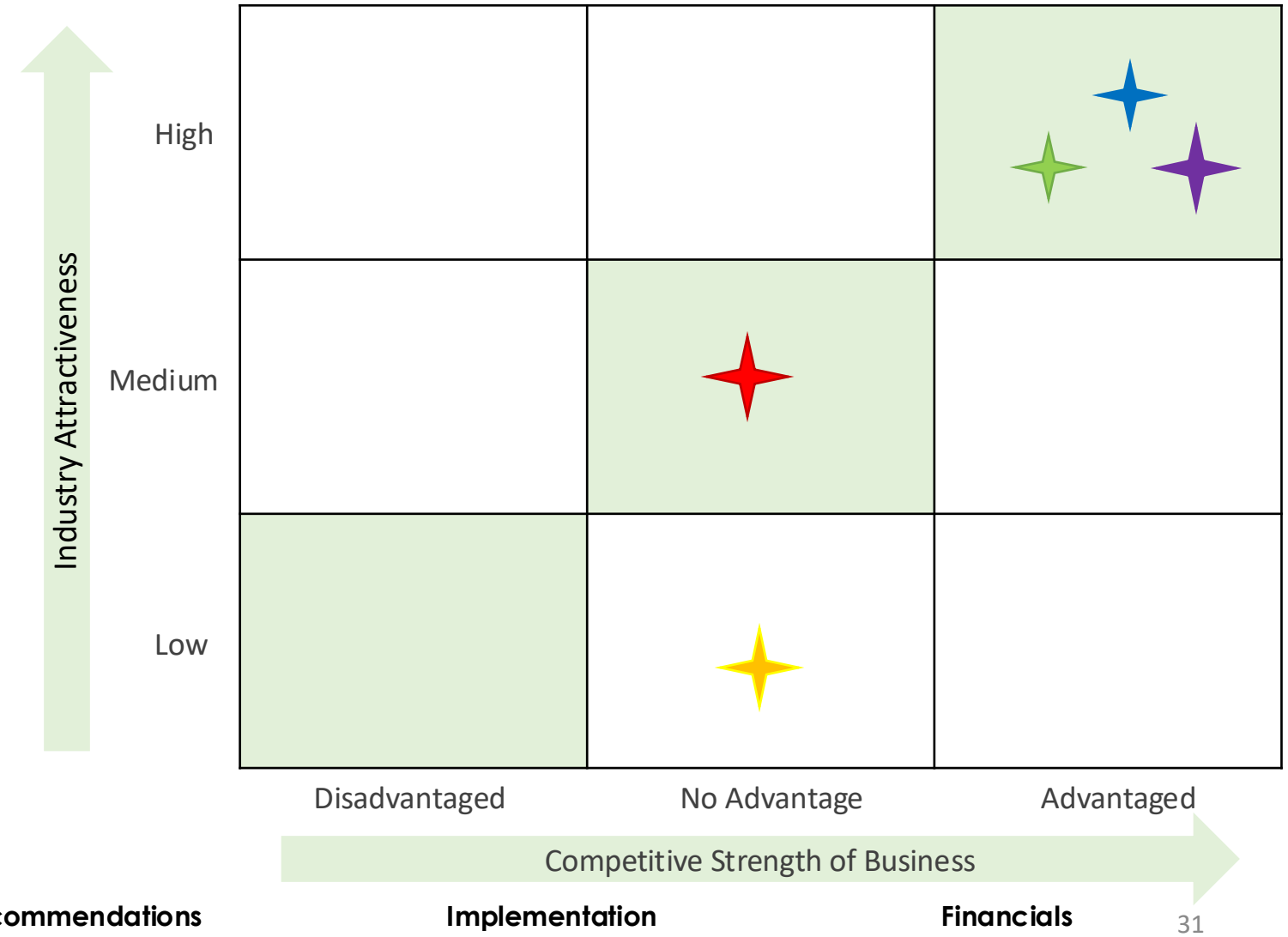
Individualized Cow Feeding

Grouping based on Requirement

RFID Tech

Cloud Based System

Manually weigh hay consumption



Appendix: WACC Assumptions

Appendix

WACC		
Debt	$	2,193,720.00
Equity	$	6,581,160.00
Interest Expense (2019)	$	65,000.00
Estimated Total Interest Expense		
Tax Rate		21%
Risk-Free Return		3.82%
Beta		1.14
Market Return		10.0%
Total Capital Value(E+D)	$	8,774,880.00
Weight of Equity Value		0.75
Weight of Debt Value		0.25
Cost of Debt		4.5%
Cost of Equity		10.9%
WACC		9.04%

TABLE 1 Northeast dairy farm debt facts

	2016
Average capital debt per cow	$3,620
Average blended debt term on farms	~8 years
Average scheduled debt principal per cow	$540
Average interest per cow	$132
Average blended interest rate	4.5%
Every additional $1,000 of debt at an 8-year term at 4.5 percent interest rate adds $135/cow of additional debt service per year.	
Profitability averaged $15 per cow but ranged from -$245 per cow in the bottom 25 percent group to $356 per cow in the top 25 percent group.	

Source: Northeast Dairy Farm Summary

Periodic Rate: (1+0.0904)^(1/12)n-1

Appendix: Financials

Appendix

Year	2019	2020	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Income	$ 3,015,000.00	$ 3,195,900.00	$ 3,387,654.00	$ 3,590,913.24	$ 3,806,368.03	$ 4,034,750.12	$ 4,276,835.12	$ 4,533,445.23	$ 4,805,451.94	$ 5,093,779.06	$ 5,399,405.81	$ 5,723,370.15
Additional Income due to optimization					$ 99,535.50	$ 110,595.00	$ 121,654.50	$ 132,714.00	$ 143,773.50	$ 154,833.00	$ 154,833.00	$ 154,833.00
Total Income	$ 3,015,000.00	$ 3,195,900.00	$ 3,387,654.00	$ 3,590,913.24	$ 3,905,903.53	$ 4,145,345.12	$ 4,398,489.62	$ 4,666,159.23	$ 4,949,225.44	$ 5,248,612.06	$ 5,554,238.81	$ 5,878,203.15
Cash Operating Expense	$ 2,490,500.00	$ 2,649,892.00	$ 2,819,485.09	$ 2,999,932.13	$ 3,191,927.79	$ 3,396,211.17	$ 3,613,568.68	$ 3,844,837.08	$ 4,090,906.65	$ 4,352,724.68	$ 4,631,299.06	$ 4,927,702.20
Total Expense	$ 2,577,100.00	$ 2,741,688.00	$ 2,916,788.85	$ 2,884,574.12	$ 3,301,258.29	$ 3,512,101.50	$ 3,736,412.44	$ 3,975,051.46	$ 4,228,933.90	$ 4,499,033.56	$ 4,786,386.47	$ 5,092,094.85
Accrual Adjustments	$ 86,600.00	$ 91,796.00	$ 97,303.76	$ 103,141.99	$ 109,330.50	$ 115,890.34	$ 122,843.76	$ 130,214.38	$ 138,027.24	$ 146,308.88	$ 155,087.41	$ 164,392.66
Gross Profit	$ 437,900.00	$ 454,212.00	$ 470,865.15	$ 487,839.12	$ 604,645.24	$ 633,243.61	$ 662,077.18	$ 691,107.77	$ 720,291.55	$ 749,578.51	$ 767,852.34	$ 786,108.30
Depreciation	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00
EBIT(and Licenses)	$ 237,900.00	$ 254,212.00	$ 270,865.15	$ 287,839.12	$ 404,645.24	$ 433,243.61	$ 462,077.18	$ 491,107.77	$ 520,291.55	$ 549,578.51	$ 567,852.34	$ 586,108.30
Taxes and Licenses	$ 12,000.00	$ 12,112.46	$ 12,839.21	$ 13,609.56	$ 14,426.13	$ 15,291.70	$ 16,209.21	$ 17,181.76	$ 18,212.66	$ 19,305.42	$ 20,463.75	$ 21,691.57
Earnings	$ 225,900.00	$ 242,099.54	$ 258,025.94	$ 274,229.56	$ 390,219.10	$ 417,951.91	$ 445,867.98	$ 473,926.01	$ 502,078.89	$ 530,273.08	$ 547,388.59	$ 564,416.73
Original Earnings	$ 225,900.00	$ 244,811.25	$ 260,848.57	$ 277,194.84	$ 293,826.79	$ 310,717.08	$ 327,833.86	$ 345,140.38	$ 362,594.42	$ 380,147.83	$ 397,745.89	$ 415,326.75
Growth rate of earnings		7%	7%	6%	42%	7%	7%	6%	6%	6%	3%	3%
Depreciation	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00	$ 200,000.00
Capital Expenditures												
RFID Reader = $345 each				$ (83,490.00)								
Gates for group separation				$ (1,500.00)								
Troughs = 10$ each				$ (4,240.00)								
Scales = $115 each				$ (48,760.00)								
Veterinary Evaluation = 35$				$ (21,210.00)								
Labor for Installation				$ (54,500.00)								
Cloud Technologies				$ (4,800.00)								
Free Cash Flow	$ 425,900.00	$ 442,099.54	$ 458,025.94	$ 260,529.56	$ 590,219.10	$ 617,951.91	$ 645,867.98	$ 673,926.01	$ 702,078.89	$ 730,273.08	$ 747,388.59	$ 764,416.73

Appendix: Sources

Appendix

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