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How-To Financial Feasibility Tool: Agrivoltaics Solar Sheep Cooperative

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1. Tool Relevance and Background

1.1 Tool Background

Solar energy production uses land with optimal characteristics for agricultural operations. Therefore, agrivoltaics, the dual use of land for both solar arrays and agricultural use, remediates many concerns associated with the loss of farmland to solar. Therefore, a team of researchers from the Cooperative Enterprise Program in Cornell University's Charles H. Dyson School of Applied Economics & Management, developed a user-driven tool to assess financial feasibility for a member-owned solar sheep grazing cooperative. This guide utilizes a “walk through” example of the tool to explain its various features.

This model was developed under the direction of Dr. Todd M. Schmit, a Professor in the Dyson School. The Dyson School is a unit within two colleges: the College of Agriculture and Life Sciences (CALS) and the SC Johnson College of Business (SCJCB). Please contact Dr. Schmit for any additional information, questions, or concerns (tms1@cornell.edu, +1-607-255-3015).

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1.2 Overview of Financial Feasibility

Financial evaluation is a critical component of the process of cooperative development as it informs potential investors and users of the business of the expected profitability of the venture. In assessing the feasibility of a new solar grazing cooperative, this financial feasibility tool estimates 10-year pro forma financial projections assuming a base set of input parameters based on credible sources, along with user-provided information. The base inputs can be changed by the user according to their specifications. The outputs of the financial modeling include standard financial statements: an income statement, balance sheet, cash flow statement, statement of member equities, return on investment sheet, and owners return sheet.

The financial model summarizes financial performance, by year, based on a comprehensive set of revenue, expense, and equity calculations. Each financial statement provides different, yet complementary, insights into the financial performance of a business. The income statement (IS) presents revenues and operating expenses of the cooperative by year. In the tool, the operational revenues are derived solely from lease payments solar array operators make to the cooperative for

vegetative management services.¹ There are several operating and capital expenses related to the costs of services, management expenses, capital investment, and depreciation. Revenues and costs are a function of the growth of the business over time. Revenue less costs represent earnings before interests and taxes (EBIT) and subtracting EBIT by interest expenses related to loans generates profit before patronage.

1.3 Financial Aspects of a Cooperative

Unlike traditional corporations, profits generated by cooperatives do not all go to dividends and/or unallocated equity (i.e., retained earnings). The distributions of profits by cooperatives, as approved by the board of directors each year, can be paid out as dividends (generally uncommon), retained as unallocated equity, and/or distributed to members in cash and/or equity as patronage refunds based on member use of the business.² In this case, patronage is determined by the number of sheep provided for grazing services. Since cooperatives follow IRS Subchapter T single taxation principles, not all earnings are included in the calculation of income taxes for the cooperative. In general, taxable income for the cooperative is computed as profit before patronage less cash patronage refunds, qualified stock patronage refunds, and nonqualified stock redemptions. In this way, net income is defined as profit before patronage less income taxes in each year. The specifics of each financial statement and various financial indicators can be found in section 4.

¹ The companion farmer survey as part of this project also included components for cooperative input supply and collective marketing services. The financial feasibility of these business components, subject to farmer interest, is left for future research; however, starting with cooperative services limited to solar grazing is appropriate as a first step.

² Stock patronage refunds can be distributed in either qualified or nonqualified forms. The allocation affects to whom (the cooperative or the member) and when income taxes are paid. For ease of exposition, we assume all stock patronage refunds are qualified distributions, requiring a minimum cash distribution of 20% and for which members pay the income taxes in the year of distribution on both the cash and equity portions.

2. Financial Feasibility Tool Overview

2.1 Excel Tool Breakdown

The tool is set up through Microsoft Excel. Its breakdown, including the sheet order and brief descriptions, are below. Users will only make direct changes to sheets 1 and 2. All others are automatically calculated.

Sheet	Index	Type	Description
1	For Viewers (inputs)	PRODUCER INPUT	Primary input sheet for users to input fundamental model assumptions and preview the co-op's financial feasibility and needed assets.
2	Additional Inputs	PRODUCER INPUT	Secondary input sheet for users to change additional assumptions that determine the model specifications. Note that the initial settings for this section are based on research and data from the USDA and various solar grazing sources.
3	Return on Investment	AUTO CALCULATE	ROI: summarizes the feasibility of the project. It provides net present value, benefit cost ratio, and internal rate of return.
4	Owners Return	AUTO CALCULATE	Owners Return summarizes members' return. It provides net present value and internal rate of return to members.
5	Arrays, Farms, Workforce	AUTO CALCULATE	Number of solar arrays and acres, sheep, farms/co-op members, and co-op workforce, including the administration team, shepherds, and drivers for mobilization.
6	Income Statement	AUTO CALCULATE	Income Statement: revenue, profit, income, & financial efficiency measures.
7	Balance Sheet	AUTO CALCULATE	Balance Sheet: assets, liabilities, equity.
8	Cash Flow Statement	AUTO CALCULATE	Cash Flow Statement: operating, investing, and financing cash flow.
9	Expense Analysis	AUTO CALCULATE	Expense Analysis: contains all estimated costs of the cooperative
10	Loan	AUTO CALCULATE	10-year breakdown of the estimated loan needed to finance the cooperative
11	Owners' Equity	AUTO CALCULATE	Statement of Owner Equity: the co-op's financial obligations to members (unallocated equity, qualified/non-qualified stocks).
12	Depreciation	AUTO CALCULATE	Outlook on estimated depreciation costs of mobility (trucks and trailers) and fencing
13	Mobilization	AUTO CALCULATE	Number and costs of trucks, trailers, drivers, and shepherds needed for cooperatives
14	Fencing	AUTO CALCULATE	Fencing costs

3. User-Driven Interfaces

To generate reliable and informative results from the financial forecasting model, defining and defending numerous operational parameters are necessary. This section outlines the various input parameters that users can customize to match their specifications. As noted in the previous section, the tool separates user-input sheets into sheets 1 and 2, with the major inputs contained on sheet 1. For explanatory purposes, this guide uses baseline specifications which will be outlined in subsection 3.3. These parameters are based upon prior research of the solar sheep agrivoltaics market in the northeastern U.S. by the research team.

The model includes a base year (year 0) where member recruitment is completed, the business is established, financial resources are obtained, a core management team and board of directors are functioning, and capital investments are completed prior to the first year of grazing services (year 1); i.e., there is no operating income in the base year. We assume that all costs incurred in the base year (operational and capital) are satisfied by upfront member investments, loans, and grant funding.³ We allow for customization of the interest rate for the initial long-term loan associated with the capital investment and a 10-year loan term.

3.1 For Viewers (inputs)

The initial sheet of the financial feasibility tool, “For Viewers (inputs)” is setup in a way that allows for direct customization of major input parameters, while simultaneously seeing the direct impact to important financial measures of the cooperative. The sheet is split into four sections, Solar Farms, Sheep (year 0), Cooperative Financial Inputs, and Preview of Business Outputs (images 1-3 below). The green cells are those that can be customized. Gray cells are static and cannot be changed. Subsection 3.3 will specify which parameters are customized using this sheet and will explain each parameter in more detail.

3.2 Additional Inputs

To simplify the master input sheet and allow for a preview of business outputs on sheet 1, additional inputs were placed on sheet 2 of the tool. Similarly to sheet 1, the cells noted in green are customizable by the user, while non-green cells cannot be edited. Each of the inputs noted on this sheet are used to calculate the financial outputs of the cooperative. The financial tool was created to allow for as much user-driven specification as possible, with no inputs “assumed” in the model that cannot be changed. This sheet includes inputs such as grazing season length, workforce size and wage, contract costs, vehicle/asset costs and capacity, general driving logistics, fencing costs, and mechanical trimming inputs. Subsection 3.3 below will specifically outline the inputs which are customized on this sheet, sheet 2: Additional Inputs.

³ In our application, the grant is a one-time payment in the base year (year 0). Following financial accounting principles, it is classified as “other income” in the financial statements and amortized over the length of time for which it is used for; i.e., it follows the same (8-year) depreciation schedule of the capital equipment. Therefore, it shows up in the income statement amortized over the first eight years of operation. It also shows up in the balance sheet as “deferred revenue”, which offsets the income amount in the income statement. Since the grant is received as cash in the base year, there is a cash inflow in financing activities by the full amount. The amortized amount of “other income” is subtracted from the net income in cash flow statement in the section of operating activities.

Image 1: Solar Array and Sheep Farm Inputs

OVERALL INPUT SHEET AND SENSITIVITY ANALYSIS		LEGEND:	YOUR INPUT	AUTO CALCULATE				
This sheet consists of the main producer inputs, shown in green, as well as an initial view of the business outputs calculated using the assumptions that were used.								
INPUTS:								
Solar Arrays								
Projected Annual Growth Rate in Acres for Solar Grazing, Percentage	Average acres per array by size:	SMALL SOLAR	MEDIUM SOLAR	LARGE SOLAR	TOTAL ACRES/ARRAYS			acres
5%	Beginning number of arrays by size:	25	80	500	605			
	Acreeage	1	1	1	3			arrays
Average Grazing Price per Acre:		4%	13%	83%	100%			
\$	750							
Sheep (year 0)								
# Sheep Needed:	# Sheep Farms		SMALL FARMS	MEDIUM FARMS	LARGE FARMS	VERY LARGE FARMS	TOTAL	
1815	6	Average number of sheep per farm by size category:	100	250	1000	0	1948	Number of sheep
		Sheep distribution:	10%	35%	55%	0%	100%	CHECK EQUALS 100%
Mobilization Period (days to get sheep to arrays at beginning of season and returned to farms at end of season)	14	Number of Farms:	2.000	3.000	0.998	0.0	6	Number of farms
Average Distance between farms and arrays	50 miles							

Image 2: Co-Op Financial Inputs

COOPERATIVE FINANCIAL INPUTS:	
Investment & Equity	
Grant	20%
Loan	40%
Farmer Investment	40%
CHECK ROW (grant + loan + investment = 100%)	100%
Long Term Interest Rate	8%
Loan Term	10
Base Year Investment + Startup Cost	\$ 350,139
Loan Amount	\$ 140,055
Working Capital	\$ 250,000
Short Term Interest Rate	7.00%
Equity Information	
Membership Common Stock	\$ 140,055
Tradeable common stock (1=yes)	0
Revolving period (years)	5
Dividend rate on common	0.0%
Total members/Sheep Farms (year 0)	6
Grant	\$ 70,028
Average Investment per Member	\$ 23,343
Member Investment per Sheep	\$ 77
Profit Allocation	
(all percentages relate to before tax income)	
Percentage to Unallocated Reserve	10%
Percentage to Cash Patronage Refund	70%
Percentage to Qualified Stock Patronage Refund	20%
Percentage to Non-Qualified Stock Patronage Refund	0%
Check ADD to 100%	100%

Image 3: Preview of Business Outputs

PREVIEW OF BUSINESS OUTPUTS					
COSTS:					
	Startup (Year 0)	Year 1	Year 5	Year 10	
Capital Expense	\$ 183,510	\$ 24,591	\$ 25,488	\$ 27,784	
Service Costs	\$ -	\$ 113,359	\$ 135,227	\$ 169,769	
Total Direct Costs	\$ 183,510	\$ 137,950	\$ 160,714	\$ 197,553	
Management Expense	\$ 166,629	\$ 274,206	\$ 295,982	\$ 381,818	
Legal Cost (i.e. contracts)	\$ -	\$ 31,000	\$ 37,769	\$ 48,428	
Total Management Expense	\$ 166,629	\$ 305,206	\$ 333,751	\$ 430,245	
Total Cost	\$ 350,139	\$ 443,156	\$ 494,466	\$ 627,798	
Co-op Level:			Member Level:		
Net Present Value (NPV):	\$752,084.42		Net Present Value (NPV):	\$739,680.04	
Internal Rate of Return (IRR):	32.54%		Internal Rate of Return (IRR):	41.98%	
PROFITABILITY:					
	Startup (Year 0)	Year 1	Year 5	Year 6	
Revenue	\$ -	\$ 490,731	\$ 671,350	\$ 993,303	
Net Income	\$ (190,567)	\$ 24,282	\$ 141,770	\$ 312,397	
Co-op Profit Margin	0%	5%	21%	31%	
Total Assets	\$ 409,571	\$ 404,821	\$ 460,595	\$ 660,202	
Assets Needed:					
Medium Trailers and Half Ton Trucks (e.g. F150):	2				
Shepherds:	2		Sheep:	1815	
Assets Outsourced for Mobilization:					
Custom Haul Package: 1 Ton Truck + Large Trailer + Driver:	1				
Locations:					
	Total Nodes (locations):	10			
Cooperative:	1		Sheep Farms/Farmers:	6	
			Solar Arrays:	3	

3.3 Baseline Input Parameters

This section highlights a set of parameters which were used by the research team to assess the model. The inputs used are reflected in all following sections to help explain the auto-calculated financial sheets. It is important to note that each of these inputs can be changed by the user. Those that are automatically included are based upon prior research of the solar sheep agrivoltaics market. They are included as a starting point for those who may use and change the model as they see fit. It is assumed that all costs incurred in the base year (operational and capital) are satisfied by upfront member investments (40%), loans (40%), and grant funding (20%). An 8% interest rate is assumed for the initial long-term loan associated with capital investment and a 10-year loan term. The interest rate on the \$250,000 annual working capital loan is 7%. Below, in table 5, the baseline parameters are outlined, as well as the sheet they can be customized in (sheet 1 or 2).

Table 1 denotes baseline inputs for both solar arrays and sheep farm sizes and numbers. These parameters are customized using sheet 1. Those in red are not directly input, rather they are a direct result of the inputs in black. For example, the user cannot directly input the number of sheep farms by size. Instead, the user must input the sheep distribution (i.e., what percentage of the total number of sheep will be sourced from small farms, medium farms, large farms, and very large farms, and the average number of sheep per farm size. The two parameters, sheep distribution and average sheep per farm by size, imply the number of farms needed of each size to service the array acres. In contrast, the number of solar arrays and average acreage per solar array are direct inputs. The proportion of array acreage and total acreage serviced follows.

Table 1 – Sheet 1: Baseline input parameters of array and member size (red = indirectly input)

Solar Arrays	<i>Range & Average Acreage</i>	<i>Amount in Year 0</i>	<i>% of arrays</i>	<i>% of acreage</i>
Small array	25	1	33.3	4
Medium array	80	1	33.3	13
Large array	500	1	33.3	83
Sheep Farms	<i>Average number of sheep</i>	<i>Amount in Year 0</i>	<i>% of Farms</i>	<i>% of Co-op Sheep</i>
Small farm	100	2	33.3	10
Medium Farm	250	3	50.0	35
Large Farm	1000	1	16.67	55
Very Large Farm	--	--	--	--
Total Acreage: 605	Total Arrays: 3	Total Sheep: 1,815	Total Farms (members): 6	

The list of parameters in table 2, below, are customized using either sheet 1 or sheet 2, as noted in the second column. The inputs are categorized into general, core management team, investment and equity, contract negotiation, mobilization, shepherding, and fence installation.

Table 2 – Baseline input parameters for financial feasibility projections.

Parameters	Sheet	Default Value
Average grazing price (revenue) per acre (dollars)	1	750
Solar grazing land anticipated in year 0 (acres)	1	605
Annual growth rate of solar grazing acres (percent)	1	5
Stocking rate (sheep/acre)	2	3
Length of grazing season (weeks)	2	27
Fuel price (\$/gallon)	2	4.00
Average driving speed, mobilization/shepherding (miles/hour)	2	45
Average distance between farms and arrays (miles)	2	50

Table 2 – Baseline input parameters for financial feasibility projections.

Parameters	Sheet	Default Value
Annual inflationary cost rate (%)	2	2
Annual inflationary lease rate (%)	2	3
Annual discount rate (%)	2	8
Supplemental mechanical mowing cost (\$/hour)	2	60
Average time spent mechanical mowing (hours/acre)	2	0.5
Useful life of trucks & trailers (years)	2	8
Useful life of ATVs (years)	2	10
Annual truck maintenance cost (\$/truck)	2	1,000
Annual trailer maintenance cost (\$/trailer)	2	500
Annual ATV maintenance cost (\$/ATV)	2	200
Core Management Team		
Chief Executive Officer (\$/year)	2	75,000
Logistics Supervisor (\$/year)	2	55,000
Contract Specialist (\$/year)	2	55,000
Member Relations & Marketing (\$/year)	2	55,000
Accountant, Contract (\$/year)	2	55,000
Member Directors (number)	2	5
Director compensation (\$/year)	2	5,000
Employee benefits rate (%)	2	30
Investment & Equity		
Investment allocation, Grant/Loan/Member common stock (%)	1	20/40/40
Capital investment loan interest rate (%)	1	8
Loan amortizations term (years)	1	10
Working capital loan (\$)	1	250,000
Working capital loan rate (%)	1	7
Allocated equity patronage refund revolving period (years)	1	5
Tradeable common stock (1 = yes)	1	0
Dividend Rate on Common Stock	1	0
Contract Negotiation		
Farmer legal fees (\$/contract)	2	250
Farmer liability insurance cost (\$/acre)	2	50
Mobilization		
Contract custom hauler (drivers + equipment) for mobilization (\$/mile)	2	4.5
Large trailer capacity for mobilization (sheep)	2	75
Loading/Unloading time on site, farm/array (hours)	2	1
Labor hours available per day (hours/day)	2	24
Mobilization period: Time to move sheep to/from arrays (days)	2	14
Mobilization periods per season	2	2
Shepherding		
Wage rate, shepherding services (\$/hour)	2	40
Half ton truck price for cooperative purchase (\$)	2	75,000
Medium trailer price for cooperative purchase (\$)	2	15,000
Medium trailer capacity for shepherding (sheep)	2	25
Fuel mileage of half ton truck (miles/gallon)	2	20
Average shepherding visits (visits/week)	2	2
Time to shepherd (hours/sheep)	2	0.05
Days per week shepherding (days/week)	2	7
Labor hours available per day (hours/day)	2	8

Table 2 – Baseline input parameters for financial feasibility projections.

Parameters	Sheet	Default Value
Fence installation		
Wage rate, fence installation (\$/hour)	2	40
New fencing installation set up time (hours/acre)	2	1
Existing fencing repair and adjustment time (hours/acre)	2	0.5
Installation time – small array (hours)	2	5
Installation time – medium array (hours)	2	10
Installation time – large array (hours)	2	20
Cost for single spike netting, 164' x 35" (\$)	2	135

4. Understanding the Auto-Calculated Spreadsheet Tables

4.1 Return on Investment

The third sheet of the tool summarizes the cooperative's return on investment. This sheet utilizes the discount rate, which was entered on the additional inputs sheet, to calculate the cooperative's total present value of income, total present value of expenses, net present value, and internal rate of return. The sheet also includes various financial ratios such as the Present Value Benefit / Present Value Cost ratio, Return on Assets across the 10-year outlook, and the average Return on Assets. The final piece of information the sheet provides is the estimated number of payback periods (years).

4.2 Owners Return

The fourth sheet of the tool summarizes the returns to owners (members). The sheet uses the income tax rate and the capital gains rate from the additional inputs sheet to project the value of member returns. Overall, the sheet calculates member return on investment, net present value, and internal rate of return.

4.3 Arrays, Farms, Workforce

The fifth sheet of the tool calculates the 10-year estimates for the solar arrays, sheep farms, revenue, and workforce based upon the inputs from sheets 1 and 2. On this sheet, the user will be able to see the estimated growth in the number of solar arrays. In turn, the growth in the number of sheep needed to service the arrays, and thus the number of sheep farms. The 10-year revenue, calculated from the lease rate times the total array acreage is shown. The size of the workforce is determined as a ratio of the workload capacity of each position. For example, with the baseline parameters assumed, it would take a full-time CEO, and only part-time employees to handle the other position responsibilities in year 0. Labor costs are determined proportionately to the size of the workforce. The number of drivers employed by the cooperative and their labor hours are determined from the calculations of what is required to move and monitor the sheep within the timelines given.

4.4 Income Statement

The sixth sheet of the tool is the consolidated income statement. The income statement combines the revenues, expenses, and profits into a single report. For a cooperative specifically, it also includes patronage allocations. Patronage allocations can be classified as cash, qualified, and non-

qualified. Important financial indicators on the income statement include the net income including non-controlling interests, the co-op Profit Margin (PM), Return on Investments (ROI), and Return on Equity (ROE). Profit margin (PM) and return on investment (ROI) are computed annually. PM represents net income divided by total revenue and ROI is net income divided by total investment (assets). Cumulative ROI and ROE use the cumulative net income.

4.5 Balance Sheet

The seventh sheet of the tool is the balance sheet. The balance sheet (BS) reports the cooperative's financial position in assets, liabilities, and member equities each year. In this case, assets include cash on hand, other short-term assets, land, buildings, and equipment. Total assets represent the sum of assets less accumulated depreciation. Liabilities include a working capital loan, a long-term loan (portion of initial capital investment), and deferred revenues from grant funding (portion of the initial capital investment). Member equities include upfront membership stock/investment (with voting rights), qualified stock from retained patronage refunds, and unallocated equity (retained earnings). As usual, the amount of the cooperative's assets is equal to its liabilities and member equity.

4.6 Cash Flow Statement

The eighth sheet of tool is the cash flow statement. The cash flow statement (CFS) is especially significant in assessing financial feasibility. The CFS reports net cash inflows and outflows each year, the net change in cash, and cash at the end of the year. Cash flows are reported separately for operating activities, investing activities, and financing activities. Operational cash flows include net income from operations, other income (e.g., grants), and changes in depreciation. Investment cash flows in our case are limited to the cash outflows from capital investment in equipment.⁴ Financing cash flows relate to liabilities and member equity; namely, the change in long-term debt, cash patronage refunds, qualified stock patronage refunds redeemed, new member stock investments, and direct investments via grant funding in the base year. The net change in cash is computed as a sum of all changes in cash in the three sections. Cash at the end of the year is simply the net change in cash in that year plus the cash at the beginning of the year (or the end of the prior year). As the financial distribution of profits is unique in a cooperative setting, end-of-year cash flows represent a particularly salient factor in evaluating the financial status of the business. Cash flows should be sufficient to distribute patronage refunds to members and redeem member equities as scheduled.⁵

4.7 Expense Analysis

The ninth sheet of the tool is the expense analysis. This sheet is important as it calculates all annual expenses of the cooperative. The expenses are split into direct costs of capital expenses and service costs, and management and legal expenses. The investment and reinvestment of new equipment is based on its useful life. The contracted labor and fuel expenses are calculated from resources needed for shepherding and mobilization.

4.8 Loan, Owner's Equity, and Depreciation

The tenth sheet of the tool calculates the loan information, including principal payments and total interest expenses. The owner's equity statement, the eleventh sheet, calculates the qualified and

⁴ We assume fully depreciated assets generate no residual cash flow from their disposition (sale).

⁵ We assume that retained patronage refunds are redeemed on a five-year revolving fund; i.e., first in, first out.

non-qualified stock issued and redeemed to get the total members equity. The depreciation statement, the twelfth sheet, shows the total annual depreciation and cumulative depreciation for the trucks, trailers, ATV, and fencing materials.

4.9 Mobilization and Fencing

The thirteenth sheet, mobilization, calculates and gives an overview of the number of trucks, trailers, and ATVs needed for the cooperative's use. The sheet also includes the reinvestment expense, maintenance expense, and depreciation expense for the equipment. The sheet also shows the labor and fuel costs of shepherding and mobilization using the cooperative owned trucks and trailers. The outsourced haulers for the mobilization period are not included in these calculations as the cooperative does not retain any expenses for those other than the per mile cost. The fencing sheet, the fourteenth and final sheet of the tool, calculates the costs and depreciation expenses of the fencing materials as the cooperative grows throughout the ten-year period.

5. Key Financial Insights and Tool Takeaways

The financial model is designed to allow for easy customization across alternative input parameters such as capital investment endowments, labor rates, fuel costs, and the size of the core management team. Accordingly, the financial model can serve as an updateable tool throughout the process of cooperative development with interested farmers and provide useful information to stakeholders for potential financial support.

As an example, let's look at financial feasibility using the baseline parameters. The output sheets are shown below, or you can follow along with the Excel tool sheets directly. Starting with the income statement, the cooperative is profitable starting in year 1, with a 5% profit margin and \$24,508 of net income. Total revenue from the lease payments is noted on the first line of the table. The ROI and ROE, as well as the cumulative ROI and ROE, remain positive after year 2. The co-op and member returns are highly positive across the ten years, with an average co-op return on assets of 32.5% and average member return on investment of 84.9%. Co-op IRR is 32.5% and member IRR is 42% showing the positive feasibility of the co-op.

The balance sheet shows the total assets are equal to liabilities plus equities. In addition, the balance sheet allows viewers to see that the long-term loan ends in year 10 and liabilities are less than equity which is a benefit for the cooperative's stability. The cash flow statement is of particular importance as it shows the net change in cash throughout the year as well as the cooperative's total cash. Using the baseline parameters, the cooperative begins seeing positive cash at the beginning of year 2. However, it should be noted that the negative net change in cash in years 6 and 9 is to be expected. These drops are largely due to the need for more trucks and trailers to accommodate the cooperative's growth. Given that the trailers have fixed capacity, the need for the cooperative to acquire more is incremental based on when the total number of sheep can no longer be handled with what the cooperative owns, which can take a few years to get to that point. Importantly, the model assumes these additional capital purchases are made with internal cash available from the business, rather than taking on additional debt.

The expense analysis is helpful to understand as it allows for a breakdown of the total costs the cooperative must cover. As mentioned in the previous paragraph, the incremental nature of truck and trailer growth can specifically be seen on this sheet in the Capital Expenses section. As a reminder, the administrative expenses also increase as the cooperative increases as the model assumes the administrative team is hired on an as needed basis. For example, the logistics supervisor is assumed to be able to handle up to 100 nodes (count of farms, arrays, and co-op locations) in a full-time status. Since there are only 10 nodes in year 1, the logistics supervisor only needs to be hired and paid 10% of full-time status (i.e., if 40 hr/week = full time, they will need to work 4 hr/week and 10% of the total allocated annual salary is \$7,857 per year.

The loan document outlines the assumed 8% annual interest rate and its impact on the 10-year principal and interest payment projections. As can be seen, the loan will be fully paid off in year 10. The interest on the working capital is also calculated for the 10-year time frame. As was noted on the balance sheet, the debt to assets ratio is positive and decreases throughout the planning horizon. This shows the cooperative's dependence on debt financing decreases throughout the years, and the cooperative maintains more assets than debt.

The owner's equity statement is critical for understanding the financial workings of a cooperative model. This sheet calculates the membership stock, stocks issued and redeemed (qualified and non-qualified), and unallocated equity. Using the baseline parameters, the qualified stocks are redeemed on a 5-year revolving period which can be seen from the second chart on the statement and the line for qualified stock redeemed. The baseline parameters do not include any non-qualified stocks. Overall, the total member's equity is small in year 0 but quickly begins to increase on an annual basis. The unallocated equity becomes positive in year 10. Unallocated equity is calculated by subtracting cash and qualified patronage refunds from the net income and adding the previous year's unallocated equity. This shows that at the end of year 10, if the cooperative were to sell all of its assets it would be able to use the proceeds to pay off all debts and not owe any money, leaving positive profits to distribute to the member-owners.

The depreciation statement simply calculates the annual depreciation of the owned resources (the trucks, trailers, ATVs, and fencing materials) based upon their useful life. Given the baseline useful life of eight years for the trucks and trailers, the sheet shows a decrease in depreciation expenses in year 8. The mobilization sheet shows the number of trucks, trailers, and ATV's that the cooperative needs to own to maintain its business. It also shows how many trucks and trailers are needed to handle the mobilization of the sheep, in addition to using the cooperative owned equipment.

This mobilization sheet also calculates the necessary investment, reinvestment, maintenance, depreciation (i.e., summarized on the previous sheet), and fuel expenses for the equipment. The model assumes one driver (cooperative employed) and ATV are needed for each cooperative owned truck/trailer. All of cooperative employed drivers are used for both the shepherding and mobilization of the sheep. The additional labor needed to complete mobilization based on the baseline mobilization period (i.e., 14 days) is employed through custom haulers on a per mile cost basis. For example, in year 1 the cooperative needs to own 2 half-ton trucks with 2 trailers (25 sheep capacity). Then, they would need to hire 2 full-time drivers employed hourly. To move all

of the sheep pre-season and post-season, they would need approximately one additional custom hauler.

Finally, fencing calculates the amount of fencing materials needed. Assuming the cooperative will use rolls of single spike netting that is 164' x 35", it would take 6 rolls for a 1-acre paddock, 8 rolls for a 2-acre paddock, and 12 rolls for a 5-acre paddock. The paddocks are moved around by the shepherds to facilitate good grazing patterns by the sheep within the arrays. The time for fencing setup depends on the size of the array. To set up the fencing for year 1 of the cooperative, it would take approximately 35 hours. The setup time becomes more efficient throughout the years as it doesn't need to be set up twice but instead it just needs moving and repairs of previous installs. The model assumes that the cooperative needs materials to set up a 1, 2, and 5-acre paddock at each array and also calculates the reinvestment and depreciation of the fence materials.

"Co-op of One" (non-cooperative) Use:

It is useful to also note that this tool could be used to represent a "co-op of 1". In other words, a non-coop, individual farmer. To do this, simply input 1 farm with X number of sheep and 1 array with Y number of acres. Where X = number of sheep that the farm is able to use for solar grazing and Y = the estimated number of solar array acreage that farm plans to service.

The examples discussed in this section will hopefully serve as a useful guide to understanding the financial statements within the tool. While they may be helpful, it's important to remember that each of the parameters discussed can be changed to fit the user's needs.

If there are any questions or concerns, please contact the research team lead, Dr. Todd Schmit: tms1@cornell.edu, +1-607-255-3015.

Return on Investment

This sheet summarizes the feasibility of the project. It provides net present value, benefit cost ratio, and internal rate of return. The only input is the discount rate, which is entered on the Additional Inputs sheet, cell B19

Discount Rate from Additional Inputs Sheet:

8.00%

Year	0	1	2	3	4	5	6	7	8	9	10
Service Revenue	\$ -	\$ 490,731	\$ 530,725	\$ 573,979	\$ 620,759	\$ 671,350	\$ 726,065	\$ 785,240	\$ 849,237	\$ 918,450	\$ 993,303
Discount Factor	1.000	0.926	0.857	0.794	0.735	0.681	0.630	0.583	0.540	0.500	0.463
PV of Income	\$ -	\$ 454,380	\$ 455,011	\$ 455,643	\$ 456,276	\$ 456,910	\$ 457,544	\$ 458,180	\$ 458,816	\$ 459,453	\$ 460,092
Total Expenses	\$ 350,139	\$ 443,156	\$ 448,726	\$ 459,214	\$ 483,356	\$ 494,466	\$ 590,452	\$ 543,208	\$ 556,225	\$ 676,371	\$ 627,798
Discount Factor	1.000	0.926	0.857	0.794	0.735	0.681	0.630	0.583	0.540	0.500	0.463
PV of Expenses	\$ 350,139	\$ 410,329	\$ 384,710	\$ 364,539	\$ 355,281	\$ 336,525	\$ 372,085	\$ 316,957	\$ 300,511	\$ 338,354	\$ 290,792
Benefits Less Costs	\$ (350,139)	\$ 47,575	\$ 81,999	\$ 114,765	\$ 137,403	\$ 176,885	\$ 135,614	\$ 242,031	\$ 293,012	\$ 242,079	\$ 365,505
PV Benefits Less PV Costs	\$ (350,139)	\$ 44,051	\$ 70,301	\$ 91,104	\$ 100,995	\$ 120,385	\$ 85,460	\$ 141,223	\$ 158,305	\$ 121,100	\$ 169,300

Co-op Level

Total PV of Income	\$ 4,572,306										
Total PV of Expenses	\$ 3,820,222										
Net Present Value	\$ 752,084										
Internal Rate of Return	32.54%										
PV Benefit/PV Cost Ratio	1.20										
Return on Assets	0.00%	12.89%	23.56%	31.94%	35.20%	43.35%	37.81%	36.69%	50.92%	41.54%	43.89%
(after tax income/total capital investment)											
Average Return on Assets	32.53%										
Payback Period (years)	4										

(payback period only displayed if less than or equal to 10 years)

Analysis of Member Returns

This sheet summarizes the member's return. The only input is the members' average marginal income tax rate and capital gains rate from the Additional Inputs sheet, cells C23 and C24. The projected value of the cooperative in year 10 is based on 5 times the average Earnings Before Interest, Taxes and Amortization which is an accepted accounting convention for valuing a privately held firm.

Member Income tax rate:	30%
Capital Gains Tax Rate:	25%

Year	1	2	3	4	5	6	7	8	9	10	
Member Investment (CS)	\$ 147,058	\$ 154,411	\$ 162,132	\$ 170,238	\$ 178,750	\$ 187,688	\$ 197,072	\$ 206,926	\$ 217,272	\$ 228,136	
Cash Patronage Refunds	\$ 17,614	\$ 39,761	\$ 61,528	\$ 76,259	\$ 102,838	\$ 135,675	\$ 146,315	\$ 196,054	\$ 206,567	\$ 226,609	
Stock Dividends	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Qualified Stock Received	\$ 5,032	\$ 11,360	\$ 17,579	\$ 21,788	\$ 29,382	\$ 38,764	\$ 41,804	\$ 56,015	\$ 59,019	\$ 64,746	
Qualified Stock Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,032	\$ 11,360	\$ 17,579	\$ 21,788	\$ 29,382	
Non-Qualified Stock Received	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Non-Qualified Stock Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
"Sale" of Stock										\$ 985,563	Average EBIT \$ 197,113
Taxable Income	\$ 22,646	\$ 51,121	\$ 79,107	\$ 98,047	\$ 132,221	\$ 174,439	\$ 188,120	\$ 252,069	\$ 265,586	\$ 291,355	
Taxable Gain on Stock										\$ -	
Members Income Tax	\$ 6,794	\$ 15,336	\$ 23,732	\$ 29,414	\$ 39,666	\$ 52,332	\$ 56,436	\$ 75,621	\$ 79,676	\$ 87,406	
After Tax Cash Income	\$ 10,820	\$ 24,425	\$ 37,796	\$ 46,845	\$ 63,172	\$ 88,376	\$ 101,240	\$ 138,012	\$ 148,679	\$ 1,154,148	
Return on Investment	7.36%	15.82%	23.31%	27.52%	35.34%	47.09%	51.37%	66.70%	68.43%	505.90%	
Average Return on Investment	84.88%										
Cash flows	\$ (147,058)	\$ 17,072	\$ 30,075	\$ 38,738	\$ 54,660	\$ 79,438	\$ 91,855	\$ 128,159	\$ 138,333	\$ 1,143,285	
Net Present Value	\$ 739,680	of after tax flows.									
IRR	41.98%										

Consolidated Income Statement

This sheet contains the cooperative's income statement. The income statement calculates the profit and income of the cooperative, while taking into account the patronage. The second table is used to calculate the income, excluding the grant income, for usage on the Owner's equity sheet. It should not be used to estimate the total cooperative income.

Year		0	1	2	3	4	5	6	7	8	9	10
Lease payment Revenue	\$	-	\$ 490,730.63	\$ 530,725.17	\$ 573,979.27	\$ 620,758.58	\$ 671,350.41	\$ 726,065.47	\$ 785,239.80	\$ 849,236.85	\$ 918,449.65	\$ 993,303.29
Service cost	\$	-	\$ (113,358.98)	\$ (115,947.48)	\$ (118,746.82)	\$ (121,505.87)	\$ (124,231.22)	\$ (109,882.30)	\$ (138,005.04)	\$ (141,335.33)	\$ (152,296.58)	\$ (158,770.52)
Gross profit	\$	-	\$ 377,371.65	\$ 414,777.69	\$ 455,232.45	\$ 499,252.71	\$ 547,119.19	\$ 616,183.16	\$ 647,234.77	\$ 707,901.51	\$ 766,153.07	\$ 834,532.78
Labor expense	\$	(166,628.57)	\$ (274,205.85)	\$ (275,998.25)	\$ (281,618.91)	\$ (287,528.67)	\$ (293,741.00)	\$ (300,270.36)	\$ (324,383.36)	\$ (331,095.92)	\$ (354,407.05)	\$ (379,231.75)
Legal expense	\$	-	\$ (31,000.00)	\$ (32,762.50)	\$ (34,350.63)	\$ (36,018.16)	\$ (37,769.06)	\$ (39,607.52)	\$ (41,537.89)	\$ (43,564.79)	\$ (45,693.03)	\$ (48,427.68)
Depreciation and amortization	\$	(23,938.75)	\$ (27,052.34)	\$ (30,037.97)	\$ (33,023.59)	\$ (36,009.22)	\$ (38,994.84)	\$ (53,730.47)	\$ (58,172.34)	\$ (40,114.22)	\$ (50,480.00)	\$ (50,515.47)
Other income (Grant), net	\$	-	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46	\$ 8,753.46
Operating income (EBIT)	\$	(190,567.32)	\$ 53,866.92	\$ 84,732.44	\$ 114,992.79	\$ 148,450.13	\$ 185,367.75	\$ 231,328.28	\$ 231,894.64	\$ 301,880.05	\$ 315,573.00	\$ 356,357.88
Interest expense	\$	-	\$ (28,704.43)	\$ (27,931.00)	\$ (27,095.69)	\$ (26,193.55)	\$ (25,219.24)	\$ (24,166.99)	\$ (23,030.56)	\$ (21,803.21)	\$ (20,477.68)	\$ (19,046.10)
Profit before Patronage	\$	(190,567.32)	\$ 25,162.48	\$ 56,801.44	\$ 87,897.10	\$ 122,256.58	\$ 160,148.50	\$ 207,161.29	\$ 208,864.08	\$ 280,076.83	\$ 295,095.32	\$ 337,311.78
Cash Patronage Refund	\$	-	\$ 17,613.74	\$ 39,761.01	\$ 61,527.97	\$ 85,579.61	\$ 112,103.95	\$ 145,012.91	\$ 146,204.85	\$ 196,053.78	\$ 206,566.72	\$ 236,118.24
Qualified Patronage Refund	\$	-	\$ 5,032.50	\$ 11,360.29	\$ 17,579.42	\$ 24,451.32	\$ 32,029.70	\$ 41,432.26	\$ 41,772.82	\$ 56,015.37	\$ 59,019.06	\$ 67,462.36
Qualified Redeemed	\$	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,032.50	\$ 11,360.29	\$ 17,579.42	\$ 24,451.32	\$ 32,029.70
Non-qualified Patronage Refund	\$	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Redeemed	\$	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Income before taxes	\$	(190,567.32)	\$ 25,162.48	\$ 56,801.44	\$ 87,897.10	\$ 122,256.58	\$ 160,148.50	\$ 207,161.29	\$ 208,864.08	\$ 280,076.83	\$ 295,095.32	\$ 337,311.78
Taxable income	\$	(190,567.32)	\$ 2,516.25	\$ 5,680.14	\$ 8,789.71	\$ 12,225.66	\$ 16,014.85	\$ 20,716.13	\$ 20,886.41	\$ 28,007.68	\$ 29,509.53	\$ 33,731.18
Tax expense	\$	-	\$ 654.22	\$ 1,476.84	\$ 2,285.32	\$ 3,178.67	\$ 4,163.86	\$ 5,386.19	\$ 5,430.47	\$ 7,282.00	\$ 7,672.48	\$ 8,770.11
Net income including non-controlling interest:	\$	(190,567.32)	\$ 24,508.26	\$ 55,324.60	\$ 85,611.78	\$ 119,077.91	\$ 155,984.64	\$ 201,775.10	\$ 203,433.61	\$ 272,794.84	\$ 287,422.84	\$ 328,541.67
Co-op Profit Margin			5%	10%	15%	19%	23%	28%	26%	32%	31%	33%
ROI			12%	26%	38%	50%	63%	77%	74%	95%	95%	103%
ROE			-67%	-404%	473%	199%	139%	117%	89%	92%	79%	76%
Cumulative ROI			6%	14%	20%	27%	33%	40%	38%	47%	45%	48%
Cumulative ROE			-67%	-404%	473%	199%	139%	117%	89%	92%	79%	76%

Balance Sheet

This sheet contains the cooperative's balance sheet. The balance sheet determines the cooperatives assets, liabilities, and equities.

Year	0	1	2	3	4	5	6	7	8	9	10
ASSETS											
Short-term assets	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000
Cash from Operations	\$ -	\$ (2,063)	\$ 7,679	\$ 27,979	\$ 59,673	\$ 103,666	\$ 67,753	\$ 117,643	\$ 161,220	\$ 136,582	\$ 211,245
Land Buildings and Equipment	\$ 183,510	\$ 208,101	\$ 232,119	\$ 256,617	\$ 281,604	\$ 307,092	\$ 434,444	\$ 473,884	\$ 514,113	\$ 638,088	\$ 665,872
Less Accumulated Depreciation	\$ (23,939)	\$ (50,991)	\$ (81,029)	\$ (114,053)	\$ (150,062)	\$ (189,057)	\$ (242,787)	\$ (300,960)	\$ (341,074)	\$ (391,554)	\$ (442,069)
TOTAL ASSETS	\$ 409,571	\$ 405,047	\$ 408,769	\$ 420,543	\$ 441,216	\$ 471,702	\$ 509,410	\$ 540,567	\$ 584,260	\$ 633,116	\$ 685,047
LIABILITIES											
Working capital loan	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000	\$ 250,000
Long-term loan	\$ 140,055	\$ 130,387	\$ 119,946	\$ 108,669	\$ 96,491	\$ 83,337	\$ 69,132	\$ 53,790	\$ 37,221	\$ 19,326	\$ 0
Deferred Revenue	\$ 70,028	\$ 61,274	\$ 52,521	\$ 43,767	\$ 35,014	\$ 26,260	\$ 17,507	\$ 8,753	\$ (0)	\$ (0)	\$ (0)
TOTAL LIABILITIES	\$ 460,083	\$ 441,662	\$ 422,467	\$ 402,437	\$ 381,504	\$ 359,598	\$ 336,639	\$ 312,544	\$ 287,221	\$ 269,326	\$ 250,000
MEMBER EQUITY											
Membership stock	\$ 140,055	\$ 147,058	\$ 154,411	\$ 162,132	\$ 170,238	\$ 178,750	\$ 187,688	\$ 197,072	\$ 206,926	\$ 217,272	\$ 228,136
Qualified stock	\$ -	\$ 5,032	\$ 16,393	\$ 33,972	\$ 58,424	\$ 90,453	\$ 126,853	\$ 157,266	\$ 195,701	\$ 230,269	\$ 265,702
Non-qualified stock	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unallocated equity	\$ (190,567)	\$ (188,705)	\$ (184,502)	\$ (177,998)	\$ (168,951)	\$ (157,100)	\$ (141,770)	\$ (126,314)	\$ (105,588)	\$ (83,751)	\$ (58,790)
TOTAL MEMBER EQUITY	\$ (50,512)	\$ (36,615)	\$ (13,698)	\$ 18,106	\$ 59,711	\$ 112,104	\$ 172,771	\$ 228,024	\$ 297,039	\$ 363,790	\$ 435,047
TOTAL LIABILITIES AND EQUITY	\$ 409,571	\$ 405,047	\$ 408,769	\$ 420,543	\$ 441,216	\$ 471,702	\$ 509,410	\$ 540,567	\$ 584,260	\$ 633,116	\$ 685,047
<i>Check</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>

Cash Flow Statement

This sheet contains the cooperative's cash flow statement. This statement includes the movement of cash for the cooperative over the course of 10 years.

Year	0	1	2	3	4	5	6	7	8	9	10
Cash Flow from Operating Activities											
Net Income	\$ (190,567.32)	\$ 24,508.26	\$ 55,324.60	\$ 85,611.78	\$ 119,077.91	\$ 155,984.64	\$ 201,775.10	\$ 203,433.61	\$ 272,794.84	\$ 287,422.84	\$ 328,541.67
Depreciation and Amortization	\$ 23,938.75	\$ 27,052.34	\$ 30,037.97	\$ 33,023.59	\$ 36,009.22	\$ 38,994.84	\$ 53,730.47	\$ 58,172.34	\$ 40,114.22	\$ 50,480.00	\$ 50,515.47
Other income (Grant), net	\$ -	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ (8,753.46)	\$ -	\$ -
Total	\$ (166,628.57)	\$ 42,807.14	\$ 76,609.11	\$ 109,881.91	\$ 146,333.66	\$ 186,226.02	\$ 246,752.10	\$ 252,852.49	\$ 304,155.59	\$ 337,902.84	\$ 379,057.14
Cash Flow from Investing											
CAPEX	\$ (183,510.00)	\$ (24,590.93)	\$ (24,017.63)	\$ (24,497.99)	\$ (24,987.95)	\$ (25,487.71)	\$ (127,352.08)	\$ (39,440.12)	\$ (40,228.92)	\$ (123,974.42)	\$ (27,783.93)
Total	\$ (183,510.00)	\$ (24,590.93)	\$ (24,017.63)	\$ (24,497.99)	\$ (24,987.95)	\$ (25,487.71)	\$ (127,352.08)	\$ (39,440.12)	\$ (40,228.92)	\$ (123,974.42)	\$ (27,783.93)
Cash Flow from Financing											
Long Term Debt Increases (Decreases)	\$ 140,055.43	\$ (9,667.95)	\$ (10,441.39)	\$ (11,276.70)	\$ (12,178.84)	\$ (13,153.15)	\$ (14,205.40)	\$ (15,341.83)	\$ (16,569.18)	\$ (17,894.71)	\$ (19,326.29)
Cash patronage refunds Increase (Decrease)	\$ -	\$ (17,613.74)	\$ (39,761.01)	\$ (61,527.97)	\$ (85,579.61)	\$ (112,103.95)	\$ (145,012.91)	\$ (146,204.85)	\$ (196,053.78)	\$ (206,566.72)	\$ (236,118.24)
Qualified Patronage Refund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (5,032.50)	\$ (11,360.29)	\$ (17,579.42)	\$ (24,451.32)	\$ (32,029.70)
Non-qualified Patronage Refund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Member Stock	\$ 140,055.43	\$ 7,002.77	\$ 7,352.91	\$ 7,720.56	\$ 8,106.58	\$ 8,511.91	\$ 8,937.51	\$ 9,384.38	\$ 9,853.60	\$ 10,346.28	\$ 10,863.60
Other direct investment - Grant	\$ 70,027.71										
Total	\$ 350,138.57	\$ (20,278.92)	\$ (42,849.49)	\$ (65,084.12)	\$ (89,651.86)	\$ (116,745.18)	\$ (155,313.29)	\$ (163,522.59)	\$ (220,348.78)	\$ (238,566.46)	\$ (276,610.63)
Net Change in cash	\$ -	\$ (2,062.71)	\$ 9,741.98	\$ 20,299.80	\$ 31,693.86	\$ 43,993.13	\$ (35,913.26)	\$ 49,889.78	\$ 43,577.89	\$ (24,638.05)	\$ 74,662.58
Cash at Beginning of Year	\$ -	\$ -	\$ (2,062.71)	\$ 7,679.28	\$ 27,979.08	\$ 59,672.93	\$ 103,666.06	\$ 67,752.80	\$ 117,642.58	\$ 161,220.47	\$ 136,582.42
Cash at End of Year	\$ -	\$ (2,062.71)	\$ 7,679.28	\$ 27,979.08	\$ 59,672.93	\$ 103,666.06	\$ 67,752.80	\$ 117,642.58	\$ 161,220.47	\$ 136,582.42	\$ 211,245.00

Expense Analysis

This sheet contains an expense analysis for the cooperative. The expenses are broken down into capital expenses, service costs, management expenses, and legal cost.

Year	0	1	2	3	4	5	6	7	8	9	10
Capital expenses											
Investment of new trucks	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75,000	\$ -	\$ -	\$ 75,000	\$ -
Reinvestment of new trucks	\$ -	\$ 18,750	\$ 18,750	\$ 18,750	\$ 18,750	\$ 18,750	\$ 18,750	\$ 28,125	\$ 28,125	\$ 9,375	\$ 18,750
Investment of new trailers	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,000	\$ -	\$ -	\$ 15,000	\$ -
Reinvestment of new trailers	\$ -	\$ 3,750	\$ 3,750	\$ 3,750	\$ 3,750	\$ 3,750	\$ 3,750	\$ 5,625	\$ 5,625	\$ 1,875	\$ 3,750
Paddock fencing	\$ 3,510	\$ 1,609	\$ 585	\$ 585	\$ 585	\$ 585	\$ 585	\$ 585	\$ 585	\$ 2,486	\$ 293
Total Capital Expense	\$ 183,510.00	\$ 24,590.93	\$ 24,017.63	\$ 24,497.99	\$ 24,987.95	\$ 25,487.71	\$ 127,352.08	\$ 39,440.12	\$ 40,228.92	\$ 123,974.42	\$ 27,783.93
Service Costs											
Contracted Labor (trucks + trailers + drivers)	\$ -	\$ 83,338	\$ 85,592	\$ 87,739	\$ 89,784	\$ 91,731	\$ 75,039	\$ 99,778	\$ 102,286	\$ 110,805	\$ 113,826
Fuel expense - Mobilization	\$ -	\$ 6,683	\$ 6,312	\$ 6,012	\$ 5,725	\$ 5,453	\$ 5,193	\$ 7,419	\$ 7,024	\$ 6,690	\$ 8,458
Fuel expense - Shepherding	\$ -	\$ 2,149	\$ 2,686	\$ 2,686	\$ 2,686	\$ 2,686	\$ 2,686	\$ 2,686	\$ 2,686	\$ 2,686	\$ 3,760
Fuel expense - Fencing	\$ -	\$ 40	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 50	\$ 70
Truck, trailer, and ATV maintenance	\$ -	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 4,500	\$ 4,500	\$ 4,500	\$ 6,000	\$ 6,000
Mowing expense – outsourced landscaping	\$ -	\$ 18,150	\$ 18,308	\$ 19,260	\$ 20,261	\$ 21,311	\$ 22,415	\$ 23,573	\$ 24,789	\$ 26,066	\$ 26,657
Total Service Cost	\$ -	\$ 113,359	\$ 115,947	\$ 118,747	\$ 121,506	\$ 124,231	\$ 109,882	\$ 138,005	\$ 141,335	\$ 152,297	\$ 158,771
Total Direct Cost	\$ 183,510.00	\$ 137,950	\$ 139,965.11	\$ 143,244.81	\$ 146,493.82	\$ 149,718.92	\$ 237,234.38	\$ 177,445.16	\$ 181,564.26	\$ 276,271.00	\$ 186,554.45
Labor											
Administration											
Chief Officers	\$ 107,143	\$ 109,286	\$ 111,471	\$ 113,701	\$ 115,975	\$ 118,294	\$ 120,660	\$ 123,073	\$ 125,535	\$ 128,046	\$ 130,607
Logistics Supervisors	\$ 7,857	\$ 9,617	\$ 9,809	\$ 10,006	\$ 10,206	\$ 10,410	\$ 10,618	\$ 12,636	\$ 12,888	\$ 15,024	\$ 15,325
Contract Specialists	\$ 15,714	\$ 21,371	\$ 21,799	\$ 22,235	\$ 22,680	\$ 23,133	\$ 23,596	\$ 24,068	\$ 24,549	\$ 37,560	\$ 38,311
Member Relations and Marketing	\$ 4,714	\$ 5,610	\$ 5,722	\$ 5,837	\$ 5,953	\$ 6,072	\$ 6,194	\$ 8,123	\$ 8,285	\$ 8,451	\$ 8,620
Accountant	\$ 5,500	\$ 6,732	\$ 6,867	\$ 7,004	\$ 7,144	\$ 7,287	\$ 7,433	\$ 8,845	\$ 9,022	\$ 10,517	\$ 10,727
Board Members Retainer	\$ 25,000	\$ 25,500	\$ 26,010	\$ 26,530	\$ 27,061	\$ 27,602	\$ 28,154	\$ 28,717	\$ 29,291	\$ 29,877	\$ 30,475
Transportation											
Labor for mobilization	\$ -	\$ 36,385	\$ 35,054	\$ 34,053	\$ 33,080	\$ 32,135	\$ 31,217	\$ 42,702	\$ 41,240	\$ 40,062	\$ 49,979
Labor for paddock fence installation	\$ 700	\$ 739	\$ 780	\$ 824	\$ 871	\$ 920	\$ 974	\$ 1,030	\$ 1,091	\$ 1,414	\$ 1,488
Labor for shepherding (inspecting sheep)	\$ -	\$ 58,966	\$ 58,485	\$ 61,430	\$ 64,560	\$ 67,887	\$ 71,425	\$ 75,189	\$ 79,194	\$ 83,457	\$ 93,701
Management Expense	\$ 166,628.57	\$ 274,206	\$ 275,998.25	\$ 281,618.91	\$ 287,528.67	\$ 293,741.00	\$ 300,270.36	\$ 324,383.36	\$ 331,095.92	\$ 354,407.05	\$ 379,231.75
Legal											
Liability Insurance	\$ -	\$ 30,250	\$ 31,763	\$ 33,351	\$ 35,018	\$ 36,769	\$ 38,608	\$ 40,538	\$ 42,565	\$ 44,693	\$ 46,928
Legal Fees	\$ -	\$ 750	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,500
Total Legal Cost	\$ -	\$ 31,000.00	\$ 32,762.50	\$ 34,350.63	\$ 36,018.16	\$ 37,769.06	\$ 39,607.52	\$ 41,537.89	\$ 43,564.79	\$ 45,693.03	\$ 48,427.68
Total Management & Legal Expense	\$ 166,628.57	\$ 305,205.85	\$ 308,760.75	\$ 315,969.53	\$ 323,546.82	\$ 331,510.07	\$ 339,877.87	\$ 365,921.25	\$ 374,660.71	\$ 400,100.08	\$ 427,659.43
Total cost	\$ 350,138.57	\$ 443,155.75	\$ 448,725.86	\$ 459,214.34	\$ 470,040.64	\$ 481,228.99	\$ 577,112.25	\$ 543,366.41	\$ 556,224.97	\$ 676,371.07	\$ 614,213.88

Owner's Equity

This sheet calculates the various equities of the cooperative, including qualified and non-qualified stock, preferred stock, and unallocated equity.

Year	0	1	2	3	4	5	6	7	8	9	10
Membership Stock	\$ 140,055	\$ 147,058	\$ 154,411	\$ 162,132	\$ 170,238	\$ 178,750	\$ 187,688	\$ 197,072	\$ 206,926	\$ 217,272	\$ 228,136
Qualified Stock Issued	\$ -	\$ 5,032	\$ 11,360	\$ 17,579	\$ 24,451	\$ 32,030	\$ 41,432	\$ 41,773	\$ 56,015	\$ 59,019	\$ 67,462
Qualified Stock Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,032	\$ 11,360	\$ 17,579	\$ 24,451	\$ 32,030
Qualified Stock Balance	\$ -	\$ 5,032	\$ 16,393	\$ 33,972	\$ 58,424	\$ 90,453	\$ 126,853	\$ 157,266	\$ 195,701	\$ 230,269	\$ 265,702
Non Qualified Stock Issued	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non Qualified Stock Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non Qualified Stock Balance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unallocated Equity	\$ (190,567)	\$ (188,705)	\$ (184,502)	\$ (177,998)	\$ (168,951)	\$ (157,100)	\$ (141,770)	\$ (126,314)	\$ (105,588)	\$ (83,751)	\$ (58,790)
Total Members Equity	\$ (50,512)	\$ (36,615)	\$ (13,698)	\$ 18,106	\$ 59,711	\$ 112,104	\$ 172,771	\$ 228,024	\$ 297,039	\$ 363,790	\$ 435,047

The Calculations Below Are Used to Determine the Equity Revolved Each Year Based on the Inputed Revolving Period

Qualified Stock Credits Issued	\$ 5,032	\$ 11,360	\$ 17,579	\$ 24,451	\$ 32,030	\$ 41,432	\$ 41,773	\$ 56,015	\$ 59,019	\$ 67,462
Qualified Stock Credits Redeemed 1 yr rev		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 2 yr rev			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 3 yr rev				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 4 yr rev					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 5 yr rev						\$ 5,032	\$ 11,360	\$ 17,579	\$ 24,451	\$ 32,030
Qualified Stock Credits Redeemed 6 yr rev							\$ -	\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 7 yr rev								\$ -	\$ -	\$ -
Qualified Stock Credits Redeemed 8 yr rev									\$ -	\$ -
Qualified Stock Credits Redeemed 9 yr rev										\$ -
Qualified Stock Credits Redeemed 10 yr rev										
Total Qualified Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,032	\$ 11,360	\$ 17,579	\$ 24,451	\$ 32,030
Total Qualified Stock Credits	\$ 5,032	\$ 16,393	\$ 33,972	\$ 58,424	\$ 90,453	\$ 126,853	\$ 157,266	\$ 195,701	\$ 230,269	\$ 265,702
Non-Qualified Stock Credits Issued	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 1 yr rev		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 2 yr rev			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 3 yr rev				\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 4 yr rev					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 5 yr rev						\$ -	\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 6 yr rev							\$ -	\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 7 yr rev								\$ -	\$ -	\$ -
Non-Qualified Stock Credits Redeemed 8 yr rev									\$ -	\$ -
Non-Qualified Stock Credits Redeemed 9 yr rev										\$ -
Non-Qualified Stock Credits Redeemed 10 yr rev										
Total Non-Qualified Redeemed	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Non-Qualified Stock Credits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Depreciation

This sheet shows the depreciation for the cooperatives vehicles and fencing.

Year	0	1	2	3	4	5	6	7	8	9	10
Trucks, Trailers, and ATV	\$ 23,500.00	\$ 26,412.50	\$ 29,325.00	\$ 32,237.50	\$ 35,150.00	\$ 38,062.50	\$ 52,725.00	\$ 57,093.75	\$ 38,962.50	\$ 49,456.25	\$ 49,656.25
Fencing	\$ 438.75	\$ 639.84	\$ 712.97	\$ 786.09	\$ 859.22	\$ 932.34	\$ 1,005.47	\$ 1,078.59	\$ 1,151.72	\$ 1,023.75	\$ 859.22
Total Depreciation	\$ 23,938.75	\$ 27,052.34	\$ 30,037.97	\$ 33,023.59	\$ 36,009.22	\$ 38,994.84	\$ 53,730.47	\$ 58,172.34	\$ 40,114.22	\$ 50,480.00	\$ 50,515.47

Mobilization

This sheet estimates the number and costs of the vehicles the cooperative will need over the initial 10-years.

Sheep	# Sheep		# Sheep farms		# Small farms		# Medium farms		# Large farms		# Extra Large farms	
Year 0	1,815	6	2	3	3	4	5	6	7	8	9	10
Pro-Farms capital investments and outsourcing hauling projection												
Year	0	1	2	3	4	5	6	7	8	9	10	
Trucks/Trailers needed for mobilization												
Outsourced (driver + truck + trailer combo):	1	1	1	1	1	1	1	2	2	2	2	3
Owned:	2	2	2	2	2	2	3	3	3	4	4	4
Trucks/Trailers for Cooperative to Own (for Shepherding)												
Trucks/Trailers needed for shepherding	2	2	2	2	2	2	3	3	3	4	4	4
Option 3: Purchase trailers & trucks (Year 0 baseline)												
Capital expense												
Half Ton Truck (medium)	\$	75,000.00										
Medium-Sized Sheep/Livestock Trailer	\$	15,000.00										
ATV	\$	5,000.00										
ADDITIONAL VEHICLES/LABOR FOR MOBILIZATION SEASON - TO OUTSOURCE												
Per Mile Cost of contracted driver (driver + 1 ton truck + large trailer)	\$	4.50										
Useful life of truck		8 years										
Useful life of ATV		10 years										
Useful life of trailer		8 years										
Quantities needed to Own												
Trucks												
Total Half-Ton Trucks Owned		2	2	2	2	2	2	3	3	3	4	4
ATVs												
ATVs owned		2	2	2	2	2	2	3	3	3	4	4
Trailers												
Total Trailers (medium) Owned		2	2	2	2	2	2	3	3	3	4	4
Investment costs (per year)												
Trucks	\$	150,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75,000	\$ -	\$ -	\$ 75,000	\$ -
Reinvestment based on useful years	\$		\$ 18,750.00	\$ 18,750.00	\$ 18,750.00	\$ 18,750.00	\$ 18,750.00	\$ 18,750.00	\$ 28,125.00	\$ 28,125.00	\$ 3,375.00	\$ 18,750.00
ATVs	\$	10,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,000.00	\$ -	\$ -	\$ 5,000.00	\$ -
Reinvestment based on useful years	\$		\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00	\$ 2,000.00
Trailers	\$	30,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,000	\$ -	\$ -	\$ 15,000	\$ -
Reinvestment based on useful years	\$		\$ 3,750.00	\$ 3,750.00	\$ 3,750.00	\$ 3,750.00	\$ 3,750.00	\$ 3,750.00	\$ 5,625.00	\$ 5,625.00	\$ 1,875.00	\$ 3,750.00
Total new trucks, trailers, and ATVs	\$	190,000	\$ 23,500	\$ 23,500	\$ 23,500	\$ 23,500	\$ 23,500	\$ 118,500	\$ 35,250	\$ 35,250	\$ 107,750	\$ 24,500
Maintenance (oil changes, routine inspections, tires, etc.)												
Trucks	\$	2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 4,000.00	\$ 4,000.00
Maintenance cost per truck, per year	\$	1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00
ATV	\$	400.00	\$ 400.00	\$ 400.00	\$ 400.00	\$ 400.00	\$ 400.00	\$ 600.00	\$ 600.00	\$ 600.00	\$ 800.00	\$ 800.00
Maintenance cost per ATV, per year	\$	200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00
Trailers	\$	1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,000.00	\$ 1,500.00	\$ 1,500.00	\$ 1,500.00	\$ 2,000.00	\$ 2,000.00
Maintenance cost per trailer, per year	\$	500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00
Total	\$	3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 6,000.00	\$ 6,000.00
Driver labor cost												
Shepherds Needed		2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	4.0	4.0
Seasonal Mobilization Drivers Needed		0.8	1.2	1.3	1.4	1.5	1.6	1.3	1.9	2.0	2.3	2.5
Shepherding Labor Cost	\$	58,366.35	\$ 58,485.28	\$ 61,430.01	\$ 64,559.66	\$ 67,886.88	\$ 71,425.21	\$ 75,189.12	\$ 79,194.12	\$ 83,456.82	\$ 93,701.05	\$ 98,647.77
Mobilization Labor Cost (employees)	\$	36,384.5	\$ 35,054.5	\$ 34,052.9	\$ 33,080.0	\$ 32,134.8	\$ 31,216.7	\$ 42,702.2	\$ 41,240.1	\$ 40,061.8	\$ 43,378.7	\$ 48,550.8
Total	\$	95,350.85	\$ 93,539.74	\$ 95,482.92	\$ 97,639.63	\$ 100,021.71	\$ 102,641.90	\$ 117,891.37	\$ 120,434.19	\$ 123,518.60	\$ 143,679.76	\$ 147,198.53
Depreciation expense												
Trucks	\$	18,750.00	\$ 21,093.75	\$ 23,437.50	\$ 25,781.25	\$ 28,125.00	\$ 30,468.75	\$ 42,187.50	\$ 45,703.13	\$ 30,468.75	\$ 38,671.88	\$ 38,671.88
Reinvestment based on useful years	\$	1,000.00	\$ 1,100.00	\$ 1,200.00	\$ 1,300.00	\$ 1,400.00	\$ 1,500.00	\$ 2,100.00	\$ 2,250.00	\$ 2,400.00	\$ 3,050.00	\$ 3,250.00
Trailers	\$	3,750.00	\$ 4,218.75	\$ 4,687.50	\$ 5,156.25	\$ 5,625.00	\$ 6,093.75	\$ 8,437.50	\$ 9,140.63	\$ 6,093.75	\$ 7,734.38	\$ 7,734.38
Total	\$	23,500.00	\$ 26,412.50	\$ 29,325.00	\$ 32,237.50	\$ 35,150.00	\$ 38,062.50	\$ 52,725.00	\$ 57,093.75	\$ 38,962.50	\$ 49,456.25	\$ 49,456.25
Gas expense												
Gas expense shepherding	\$	2,148.57	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 2,685.71	\$ 3,760.00
Gas expense mobilization (cooperative owned assets)	\$	6,662.87	\$ 6,312.33	\$ 6,011.74	\$ 5,725.47	\$ 5,452.83	\$ 5,193.17	\$ 7,418.81	\$ 7,024.30	\$ 6,689.81	\$ 6,457.37	\$ 8,457.37
Total Gas Expense	\$	8,811.44	\$ 8,998.04	\$ 8,697.45	\$ 8,411.18	\$ 8,138.54	\$ 7,878.88	\$ 10,104.52	\$ 9,709.91	\$ 9,375.52	\$ 9,143.08	\$ 12,217.37

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