

Crop and Livestock Enterprise Budgets: How do Producers Use Them?

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In the previous two series, we covered what enterprise budgets are and how they can be understood from the New Mexico State University Cooperative Extension Service website. In this third part of our Enterprise Budget series, we will focus on how producers use these budgets to make management decisions. Producers can consider four (4) key elements when using enterprise budgets: farm planning, evaluating farm performances, forecasting producers' income, and examining key financial measures. The following sections address the indicators in detail using 2022 enterprise budgets for Doña Ana, Sierra, and Roosevelt counties.

1. FARM PLANNING

For beginning producer

Suppose a resident in Doña Ana County wants to start farming and is interested in determining which crops to grow and how much income they could generate, considering factors such as soil type, weather, and a marketing plan. The beginner producer does not own equipment or land but can provide their own labor. To find an appropriate enterprise budget, the beginner may visit the NMSU website to use as a guide (costsandreturns.nmsu.edu).

Among the 12 crops listed on the budget sheet, the producer considers cotton to be a viable option due to the arid conditions in the county. Figure 1 (from the 2022 Doña Ana and Sierra budget sheet (<https://costsandreturns.nmsu.edu/documents/2022-Dona-Ana-and-Sierra.pdf>)) shows that the total operating expenses for upland cotton are \$1,237.63 per acre and net operating loss is of \$105.63 per acre. These results suggest that cotton may not be a viable choice for this beginning producer (Figure 1).

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However, Pima cotton (on the next page of the budget sheets) shows a total operating expense of \$1,190 and a net operation profit of \$805. Since Pima cotton offers a good (positive) net income, the beginner would likely consider selecting the production of Pima cotton over upland cotton.

TABLE 9. Upland cotton (picker), flood-irrigated, budgeted per acre costs and returns for a farm with above average management, Doña and Sierra Counties. Projected 2022 Planting Dates: April 15- April 30 Harvest Dates: November 15 - November 30							
ITEM	PRICE	YIELD	BASE				TOTAL
GROSS RETURNS							
LINT	\$0.93	1,000 LBS					\$932.00
SEED	\$0.13	1,600 LBS					\$200.00
PROGRAM PAYMENT	\$0.00	1,000 LBS	0.85				\$0.00
PLC PAYMENT	\$0.00	1,230 LBS	0.85				\$0.00
TOTAL							\$1,132.00
TOTAL OPERATING EXPENSES		9.83 HR	\$806.16	\$99.21	\$28.07	\$112.21	\$1,237.63
NET OPERATING PROFIT							-\$105.63

Figure 1. Table 9 from the 2022 Doña Ana and Sierra Projected Crop CARE.

For experienced producers

An experienced producer in Doña Ana County may consider peanuts as a beneficial crop to rotate with cotton, as peanuts can improve soil fertility. This decision comes after cotton has suffered from a persistent leaf disease. To inform this decision, the producer consults the 2022 cost and return data for peanuts from Roosevelt County. Since the producer owns both equipment and land, their primary focus is on determining the cash costs required to grow peanuts and how much income is generated from that activity. According to the Roosevelt County Portales Valley Food budget (Figure 2), the cash costs (variable operating expenses) for peanuts are \$648 per acre, and the income generated is of \$10 per acre. Given that both the income and the benefits of improving soil fertility are positive, the producer may choose to incorporate peanuts into their farming operation.

For both beginner and experienced producers – providing required work operations and types of machines and necessary quantities of inputs.

Crop enterprise budgets detail the costs and returns associated with growing crops, including quantities and costs of equipment and machinery (viewed as required inputs). For example, beginning producers considering Pima cotton production will want to know the quantities of required inputs, such as seed, fertilizers, herbicides, crop insurance, and water, along with their prices (Table 8, under “Purchased Inputs” column).

The budget also outlines the machinery used for preharvest operations (Figure 3, under “Preharvest Operations”); this list includes: plowing (disc, chisel, plow, disc and spray with tractor), fertilizing (fertilizers), preparing soil beds (lister, pre-irrigate, harrow, rolling cult), planting (planter), weeding (harrow, rolling cultivation) and herbicide spraying (rope wick), and flood irrigation (roto buck, irrigate with canal water). Harvest operation includes harvesting (cotton picker), loading cotton (cotton trailer), and arranging for ginning cotton (custom). Postharvest operations include shredding of the residues (shredder).

Experienced producers wanting to introduce peanuts or other crops can make use of these budgets to adapt operations and machinery according to their specific needs. While this example focuses on cotton, producers can adjust the operations and equipment for different crops as necessary.

TABLE 11. Summary of per acre costs and returns for a 320 acre farm with above average management, Roosevelt County, New Mexico Projected 2022					
	WHEAT	CORN	GRAIN SORGHUM	STRIPPER COTTON	PEANUTS
	BU	CWT	CWT	LBS	LBS
PRIMARY YIELD	50.00	65.00	55.00	500.00	2,600.00
PRIMARY PRICE	\$7.62	\$6.77	\$10.60	\$0.93	\$0.25
GOVERNMENT PAYMENTS	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
SECOND INCOME	\$40.00	\$20.00	\$20.00	\$100.00	\$0.00
GROSS RETURN	\$421.00	\$460.05	\$603.00	\$721.98	\$657.80
TOTAL CASH EXPENSE	\$418.49	\$653.20	\$460.31	\$759.63	\$647.90
RETURN OVER CASH EXPENSES	\$2.51	(\$193.15)	\$142.69	(\$37.66)	\$9.90

Figure 2. Table 11 from the 2022 Roosevelt, Portales, Valley Flood Budget.

2. EVALUATING FARMING PERFORMANCE

Return over cash expenses

The final section of the county budget sheet lists the summary of per acre costs and returns (Figure 4). This is the information the producer can use to evaluate which enterprise performs best for their farming situation. For example, the farm in the budget sheets planted twelve crops in 2022. Green chile generated the highest income per acre \$7,878, while fall lettuce generated the lowest, \$0.22 per acre. The return over cash expenses approach focuses on returns and actual payment of expenses and can affect farms' survival in the short term. If these returns were negative, the farm may not survive beyond a 2–3-year period.

Evaluating operating expenses

Using the same budget sheet, producers can compare input costs to assess the contribution of each input to the total costs. For example, in Figure 5, custom charges are the largest input cost: 68% of fall lettuce (\$2,022), 70% of spring lettuce (\$2,126), and 71% of fall onion (\$5,306) custom charges. Reviewing the individual cost and return analysis in the previous page(s), it is evident that all fall lettuce harvest operations rely on custom labor. To decrease custom work costs, producers could consider identifying less costly operators or performing some of the operations themselves.

Performing Partial Budgeting to choose better production methods

Experienced producers may prepare a partial budget to evaluate a potentially better farming method. For example, a producer may wonder if planting onion seedlings could be a better method for shortening the growing season compared to using direct seedling, and if so, how much it would reduce costs and increase returns. Partial budgeting is useful in this scenario since it considers only the items that change, while keeping other factors constant. This approach effectively compares the costs and returns of different seeding methods.

Table 8. Pima cotton, flood-irrigated, budgeted per acre costs and returns for a farm with above average management, Doña Ana and Sierra counties. Projected 2022 Planting Dates: April 15 - April 30 Harvest Dates: November 15 - November 30		
PURCHASED INPUTS	PRICE	QUANTITY
SEED	\$7.00	25 LBS
NITROGEN (N)	\$0.00	120 LBS
PHOSPHATE (P ₂ O ₅)	\$0.00	50 LBS
HERBICIDE	\$33.37	1 X/ACRE
CROP INSURANCE	\$2.94	
PUMP WATER*		0 AC. IN.
CANAL WATER		33 AC. IN.

PREHARVEST OPERATIONS	POWER UNIT	ACCOMPLISHMENT RATE
DISC	140 HP	0.14 HR
CHISEL	140 HP	0.20 HR
PLOW	140 HP	0.38 HR
DISC	140 HP	0.14 HR
DISC & SPRAY	140 HP	0.15 HR
FERTILIZE	140 HP	0.05 HR
LISTER	140 HP	0.18 HR
PRE-IRRIGATE		0.75 HR
HARROW	40 HP	0.32 HR
ROLLING CULT	40 HP	0.21 HR
PLANTER	140 HP	0.26 HR
HARROW	40 HP	0.32 HR
ROLLING CULT (3X)	140 HP	0.36 HR
ROTO BUCK (2X)	40 HP	0.03 HR
ROPEWICK	40 HP	0.10 HR
IRRIGATE (4X)		2.00 HR

Figure 3. Table 8 from the 2022 Doña Ana and Sierra Counties Projected Crop CARE.

TABLE 19 Summary of per acre costs and returns for a 500 acre farm with above average management, Doña Ana and Sierra Counties, Projected 2022.												
ALFALFA ESTABLISHMENT	AL-FALFA HAY	PIMA COTTON	PICKER COTTON	GRAIN SORGHUM	SPRING LETTUCE	FALL LETTUCE	CORN SILAGE	FALL ONIONS	MIDSEASON YELLOW ONIONS	SWEET SPANISH ONIONS	GREEN CHILE	RED CHILE
RETURN OVER CASH EXPENSES												
(\$325.51)	\$1,084.22	\$1,154.85	\$189.11	\$107.61	\$2,421.72	(\$0.22)	\$1,894.05	\$2,736.13	\$1,085.12	\$389.66	\$7,877.99	\$2,477.27

Figure 4. Table 19 of the Doña Ana and Sierra Counties Projected Crop CARE.

TABLE 19. Summary of per acre costs and returns for a 500 acre farm with above average management, Doña Ana and Sierra Counties. Projected 2022													
	ALFALFA ESTABLISHMENT	ALFALFA HAY	PIMA COTTON	PICKER COTTON	GRAIN SORGHUM	SPRING LETTUCE	FALL LETTUCE	CORN SILAGE	FALL ONIONS	MIDSEASON YELLOW ONIONS	SWEET SPANISH ONIONS	GREEN CHILE	RED CHILE
SEED	\$76.25		\$175.00	\$202.50	\$20.50	\$7.92	7.92	\$67.38	\$600.00	\$600.00	\$716.00	\$90.00	\$144.00
FERTILIZER	\$112.05	\$150.20	\$193.05	\$193.05		\$490.38	\$459.25	\$327.00	\$965.25	\$714.60	\$714.60	\$414.15	\$347.20
CHEMICALS	\$0.00	\$14.40	\$33.37	\$98.09	\$55.60	\$111.09	\$250.28	\$30.00	\$196.12	\$140.58	\$140.51	\$165.80	\$165.80
CROP INSURANCE			\$2.94	\$0.34	\$2.94			\$2.94				\$40.00	\$40.00
OTHER PURCHASED INPUTS		\$79.19											
CANAL WATER		\$133.00	\$97.00	\$97.00	\$85.00	\$85.00	\$46.67	\$93.00	\$119.67	\$109.00	\$119.67	\$126.33	\$133.00
FUEL, OIL & LUBRICANTS EQUIPMENT	\$44.28	\$35.56	\$98.57	\$99.21	\$31.64	\$61.50	\$67.07	\$19.16	\$88.19	\$80.22	\$80.22	\$102.82	\$84.34
FUEL IRRIGATION	\$5.85	\$0.00	\$0.00	\$0.00	\$0.00	\$15.59	\$0.00	\$5.85	\$5.85	\$5.85	\$5.85	\$0.00	\$0.00
REPAIRS	\$13.19	\$6.21	\$27.87	\$28.07	\$8.45	\$18.66	\$20.55	\$5.36	\$26.03	\$23.71	\$23.71	\$24.85	\$23.18
CUSTOM CHARGES	\$73.33	\$53.20	\$116.03	\$128.30	\$16.80	\$2,125.98	\$2,022.23	\$10.00	\$5,305.93	\$3,091.04	\$3,611.72	\$1,770.83	\$1,038.33
LAND TAXES		\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44	\$9.44
OTHER EXPENSES	\$0.56	\$86.58	\$86.88	\$86.89	\$86.00	\$86.73	\$86.82	\$85.83	\$87.39	\$87.19	\$87.38	\$87.79	\$87.44

Figure 5. Table 19 from the 2022 Doña Ana and Sierra Counties Projected Crop CARE.

3. FORECASTING PRODUCERS' INCOME

For experienced producers

Producers can project future incomes using budget sheets. For example, as shown in Figure 4, a producer plans to reduce the area of fall lettuce due to low income, but increase the area of green chile. Considering the producer's field situation, they plan to grow 10 acres of fall lettuce and 25 acres of green chile if labor is available option. According to the budget sheet information, Table 1 demonstrates that these changes would result in an income increase of \$28,311 for the farm.

The producer in Doña Ana County also would project the break-even yield and price for each enterprise. For example, to determine the break-even yield and price of green chile, Table 2 shows that the break-even yield is 3.97 pounds and the break-even price is \$189. This is the price needed to cover the cash investment without incurring a loss.

Table 1. Income projection by changing crops and their growing area.		
Previous Year	Projected Year	
Fall Lettuce		
Income $\$(0.22) * 50 \text{ acres} = \(11.00)	Income $\$(0.22) * 10 \text{ acres} = \(0.44)	
Chilli Pepper		
Income $\$2,382 * 15 \text{ acres} = 42,480$	Income $\$2,832 * 25 \text{ acres} = 70,800$	
Total \$42,469	\$70,780	Δ \$28,311

Table 2. Projecting green chile break-even yield and price based on cash expenses.	
Green Chile Enterprise	
Data from the budget sheet	Yield 15 lbs. price \$714/lbs. Cash cost \$2,833
Break-even yield	Cash cost \$2,833 / price \$714 = 3.97 lbs.
Break-even price	Cash cost \$2,833 / 15 lbs = 189.00

The advantage of creating producer's own enterprise budgets

To generate accurate budgets, producers should create their own by keeping detailed records of inputs and machine uses. These records are also useful for filing farm tax returns. As mentioned in the previous series, enterprise budgets reflect both economic costs based on actual paid and unpaid costs. Because of this, enterprise budgets are different than filing farm taxes.

Farm taxes are based on the actual whole farm costs incurred and paid during the previous year. In contrast, enterprise budgets for individual crops and livestock include actual and projected opportunity costs and returns.

In addition to maintaining records for farm tax returns, enterprise budgeting requires detailed tracking of input costs and machine usage for each enterprise. For example, Figure 6 illustrates record-keeping for an alfalfa hay budget. Similarly, each of the other 11 crop enterprises would require a similar table for accurate budgeting.

4. INDICATORS OF FINANCIAL MEASURES

Figure 7 (the bottom half of Table 20 from 2022 Doña Ana and Sierra Counties Projected Crop CARE) shows two financial indicators: return to risk and return on investment. These indicators show that as the land value increases from \$3,000 per acre to \$11,000, the return to risk declines from \$285,730 to \$199,730. This results in a decrease of return to risk from 20.91% to 6.22%. It also means that if a producer invests in all necessary inputs, hires all required labor, and rents 1,600 acres to grow the twelve different crops in Doña Ana County, the estimated earnings will be \$285,730, representing a 20.91% return on investment when the land value is \$3,000 per acre.

5. CONCLUSION

Enterprise budgets are most effectively used at the planning stage for the following year, ideally after all current farming activities have been completed. Early January is an optimal time for this. While the examples provided illustrate some uses of the budgets, they are not limited to only these. Budgets can also be used for various purposes, such as comparing annual performance and assessing overall efficiency.

ALFALFA HAY			ACRES: 160	PUMP WATER: 0.0			
					ACCOMPLISHMENT		
MACHINE			POWER UNIT	TIMES OVER	RATE	TOTAL	CUSTOM
SPRAYER			140 HP	1.00	0.11	0.11	
FERTILIZE			140 HP	1.00	0.05	0.05	
IRRIGATE (10X)				10.00	0.30	0.00	

Figure 6. An example of machine use in Alfalfa hay in Doña Ana and Sierra counties.

LAND VALUE	RETURN TO RISK*	RETURN ON INVESTMENT
3000/ACRE	285730	20.91%
5000/ACRE	264230	13.15%
7000/ACRE	242730	9.59%
9000/ACRE	221230	7.55%
11000/ACRE	199730	6.22%

Figure 7. Image of a portion of Table 20 from the 2022 Doña Ana and Sierra Counties Projected Crop CARE, showing two financial indicators: return to risk and return on investment

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