

Crop and Livestock Enterprise Budgets: How do producers use them? – Enterprise Budgets Series 3/3

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The New Mexico State University Cooperative Extension Service provides the definition of the crops and livestock enterprise budgets, and the reading instruction in its website(costsandreturns.nmsu.edu) In this third series, we discuss how producers use them to make management decisions. Producers consider four (4) key elements of the budgets: farm planning, evaluating farm performances, forecasting producers’ income, and examining key financial indicators. 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 person in Doña Ana County wants to start farming. The resident wants to know what crops to grow and how much income could be generated after considering soil type, weather, and marketing plan. The beginning producer does not have equipment or land but can provide his or her own labor. The producer may also visit the NMSU website (Costsandreturns.nmsu.edu) to find an appropriate enterprise budget to use as a guide. Among twelve crops on the budget sheet, suppose they consider cotton to be the best crop given the arid conditions in the county. Table 9 below (from the budget sheet) shows total operating expenses of \$1,238 and net operating losses of \$106 per acre (red and blue lines below) for cotton. The results clearly show the beginner would not likely choose (upland) cotton in terms of generating income.

TABLE 9. Upland cotton (picker), flood-irrigated, budgeted per acre costs and returns for a farm with above average management, Dona Ana 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	\$0.0000		1,000 LBS	0.85						\$0.00
PLC PAYMENT	\$0.0000		1,230 LBS	0.85						\$0.00
TOTAL										\$1,132.00
TOTAL OPERATING EXPENSES			9.83 HR	\$806.16	\$191.97	\$99.21	\$28.07	\$112.21		\$1,237.63
NET OPERATING PROFIT										-\$105.63

However, Pima cotton (on the next page of the budget sheets) shows total operating expenses 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.

For experienced producers

An experienced producer in Doña Ana County may think peanuts are a good crop for rotating with cotton since it contributes to increasing soil fertility. The producer might introduce peanuts as a rotation crop, following cotton, which is prone to leaf disease¹s for a long time. The producer refers to Roosevelt² County peanut crop costs and returns in 2022 for information. Since the producer owns equipment and land, the producers' needs are limited to determining the cash costs required to grow peanuts and how much income is generated from that enterprise. The budget sheet below shows cash costs (variable operating expenses) of \$648 per acre and an income after expenses of \$10 per acre (Roosevelt County Portales Valley flood budget from Table 11). Since both income and the value of rotation increasing soil fertility are positive, the producer might select peanuts for a rotation.

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 EXPENSES	\$418.49	\$653.20	\$460.31	\$759.63	\$647.90
RETURN OVER CASH EXPENSES	\$2.51	(\$193.15)	\$142.69	(\$37.66)	\$9.90

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

The crop enterprise budgets provide information about the costs and returns of the crops grown, and they also show quantities and costs of equipment and machinery (viewed as required inputs). For example, beginning producers considering Pima cotton production will likely want to know the quantities of required inputs for growing Pima cotton, such as seed, fertilizers, herbicides, crop insurance, Water and their prices (see Table 8 below starting from blue circle). In the preharvest operations, the budget details machines used to perform the work operations (see Table below in red circle): Various plowings (disc, chisel, plow, disc & spray with tractor), fertilizing (fertilizers), preparing soil beds (lister, pre-irrigate, harrow, rolling cult), planting (planter), weeding (harrow, rolling cultivation) and herbicide spraying (ropewick), and flood irrigation (roto buck, irrigate) with canal water. Harvest operation includes harvesting (cotton

¹ Total operating expenses represents the total cost for the producer who does not have equipment and land. ² If a producer has equipment and land, their income cover cash costs enough to survive in the short term.

picker), loading cotton (cotton trailer), and requesting ginning cotton (custom). After harvesting, shredding of the residues (shredder) is included as a postharvest operation. Experienced producers wanting to introduce peanuts can make use of budgets. This example is for growing cotton, but producers of other crops could change the operation and machine usage for whatever crop is being considered.

TABLE 8. Pima cotton, flood-irrigated, budgeted per acre costs and returns for a farm with above average management, Dona 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)	\$1.09	120 LBS
PHOSPHATE (P2O5)	\$1.25	50 LBS
HERBICIDE	\$33.37	1 X/ACRE
CROP INSURANCE	\$2.94	
PUMP WATER*		0 AC. IN.
CANAL WATER		33 AC. IN.
SUBTOTAL		

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	0.63 HR
ROTO BUCK (2X)	40 HP	0.03 HR
ROPEWICK	40 HP	0.10 HR
IRRIGATE (4X)		2.00 HR
SUBTOTAL		5.86 HR

2. Evaluation farming performance

Return over cash expenses

The final section of the county budget sheet (see Table 19 below) lists the summary of per acre costs and returns (see Table 19 below). This is the information the producer can use to evaluate which enterprise performs best for the farming situation. For example, the farm in the budget sheets planted twelve crops in 2022 (see Table 19 below). Green chilé generated the highest income per acre \$7,878, while fall lettuce generated the lowest income, \$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.

Table 19. Summary of per acre costs and returns for a 500 acre farm with above average management, Dona 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	
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	

Evaluating operating expenses

Using the same budget sheet, producers can compare input costs to assess the contribution of each input to total costs. For example, in Table 19 below, 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. When examining again at the individual cost and return analysis in the previous page(s), all the fall lettuce harvest operations rely on custom labor. To decrease custom labor costs, operators could consider reducing costs by identifying less costly operators or performing some of the operations themselves.

	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
CASH OPERATING EXP													
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 PURCHASES		\$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 & LUBRIC	\$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
TOTAL CASH	\$325.51	\$567.78	\$840.15	\$942.89	\$316.39	\$3,012.28	\$2,970.22	\$655.95	\$7,403.87	\$4,861.63	\$5,509.09	\$2,832.01	\$2,072.73

Performing Partial Budgeting to choose better production methods

Experienced producers may prepare a partial budget to choose a potentially better farming method. A producer may wonder if planting onion seedlings could be a better method for shortening the growing season than using direct seedling, and, if so, how much would costs be reduced and to increase. Partial budgeting could be used to analyze this scenario since it considers only items that change while other items remain the same. Hence, partial budgeting provides a good approach for comparing the returns and costs of the approaches for seeding.³

3. Forecasting producers' income

For experienced producers

³ Partial budgeting will be addressed in the next factsheet.

Producers could predict their incomes for future years based on budget sheets. For example, based on Table A1 summary of per acre costs and returns, the producer plans to reduce the area of fall lettuce due to low income, but increase area of green chilé at the same time. Considering the producer's field situation, the producer plans to grow 10 acres of fall lettuce and 25 acres of green chilé. Based on the budget sheet information, Table A1 below shows that changing the two growing areas increases income by \$28,311 for this farm.

Table A1. Income projection by changing crop growing area.

Previous year	projected year	
Fall lettuce		
Income \$(0.22) * 50 acres = \$ (11.00)	Income \$(0.22) * 10 acres = \$(0.44)	
Chilé pepper		
Income \$2,832* 15 acres = \$42,480	Income \$2,832* 25 acres = 70,800	
Total	\$42,469	\$70,780 Δ \$28,311

The producer in Doña Ana County also would project his or her break-even yield and price of each enterprise. For example, if the producer wants to know the break-even yield and price of green chilé, the table below shows that the break-even yield is 3.97 lbs. and the break-even price is \$189 per lb. for not losing his or her cash investment (Table A2).

Table A2. Projecting Green chilé break-even yield and price based on cash expenses.

Data from the budget sheet	Yield 15 lb.	Price \$714	Cash cost \$2,833
Break-even yield	\$3.97 lbs.	(= cash cost /price =\$2,833/ \$714)	
Break-even price	\$189	(= cash cost /yield =\$2,833/15 lbs.)	

The advantage of creating producer's own enterprise budgets

In order to generate accurate budgets, producers should build their own data. To do so, this requires keeping good records of input and machine use. Fortunately, these records are also used for filing farm tax returns so they can be easily repurposed for budgets. As mentioned in the previous series, enterprise budgets are economic costs that are based on actual paid and unpaid costs. Because of this, enterprise budgets are often required including additional benefits and expenses compared to income tax returns.

Farm taxes depend on whole farm costs that occurred actually and were paid during the previous year. Enterprise budgets of individual crops and livestock returns and costs - including whole farm costs and returns may be based on actual or projected values.

To obtain enterprise budgets, in addition to keeping the record for preparing farm tax returns, enterprise budgeting requires input and machine uses and costs for each enterprise. Table A3

below is an example of record keeping for an alfalfa hay budget. In a similar way, the other eleven crop enterprises in the example require Table A3 for each crop.

Table A3. An example of machine use in Alfalfa hay

ALFALFA HAY		ACRES:	160	PUMP WATER:		0.00
				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	

4. Indicators of financial measures

Table A4 (the bottom of Table 20) shows two financial indicators: return to risk and return on investment. These indicators show that when land value changes from \$3,000 per acre to \$11,000, return to risk declines from \$285,730 to \$199,730, resulting in rates of return to risk declining from 20.91 % to 6.22%. It also means that if a producer invests all the inputs, hires all the labor, and rents 1,600-acre land to grow the twelve crops in Doña Ana County, the estimated earnings will be \$285,730, corresponding to 20.91% of the return when the land value is \$3000.

Table A4. Two financial indicators: return to risk and return on investment

LAND VALUE		RETURN TO RISK*	RETURN ON INVESTMENT**
\$3,000 /ACRE		\$285,730	20.91%
\$5,000 /ACRE		\$264,230	13.15%
\$7,000 /ACRE		\$242,730	9.59%
\$9,000 /ACRE		\$221,230	7.55%
\$11,000 /ACRE		\$199,730	6.22%

5. Conclusion

Enterprise budgets may be used at the planning stage for the following year after all current farming activities have been completed. The early part of January will be the best time for most New Mexico farms and ranches. The uses of the budgets are not limited to only the above examples but can also be used in many ways such as for comparison of historical performance.

Reference

Budgets, New Mexico for crops and livestock, <http://Costsandreturns.nmsu.edu>, 2011-2022.

Crop and Livestock Enterprise Budgets: What are They and Why do Producers Need Them? – Enterprise Budgets Series 1/3, Cooperative Extension Service New Mexico State University, 2024

Understanding NMSU’s Crop Cost and Return Budgets Enterprise Budgets Series 2/3,
Cooperative Extension Service New Mexico State University, 2024