

Financial Aspects of Cattle Production in the Chihuahuan Desert

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In recent years, livestock grazing on both public and private lands in desert areas of the United States has been strongly challenged by various environmentally concerned groups. The primary economic argument against grazing in desert areas centers on the relatively high amount of infrastructure (fences, watering points, roads) and land required per animal unit compared to the more humid areas in the Great Plains and eastern United States (Wuerther 1990). A secondary part of the argument is that cattle productivity in desert areas due to a lower nutrition plane and greater environmental stress is inferior to that in the more humid Great Plains and eastern ranges. However, Holechek (1991) reported Chihuahuan desert cattle productivity can equal that on the best humid ranges when appropriate range management and animal husbandry technologies are applied.

Government regulation has not been a significant factor affecting the cattle industry on private lands in the Great Plains but on public lands in the West grazing fee increases have reduced economic returns (Torell and

Doll 1989). These impacts have been much less important than those resulting from changing financial conditions. Declining property (Torell and Doll 1989) values and high interest rates (9 to 13%) have been the two most negative factors affecting western range livestock operators. The positive aspect of cattle ranching on western rangelands in recent years has been high cattle prices. In the early 1980's prices for steer calves averaged around 60 to 65 dollars per hundred weight compared to 85 to 100 dollars per hundred weight for the last five years (1987 to 1991).

The major question I will address is how this economic scenario is influencing the profitability of the average cattle ranch in the Chihuahuan desert of New Mexico. The basis for my analysis comes from a series of reports by agricultural economists at New Mexico State University and analyses I've performed using a computer model developed by Allen Torell, agricultural economist, NMSU. This model permits comparison of financial outcomes from various management interventions through altering cattle prices, ranching costs and ranch financial structure. The financial structure of the average Chihuahuan desert ranch given in Tables 1 and 2 is based on rancher

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Table 1. Financial structure of the average medium sized (250 animal unit) cow-calf ranch in the Chihuahuan desert of southern New Mexico in the 1986 to 1991 period.

Item identification	Unit	Quantity	Value/Unit (\$)	Value (\$)
Land:				
Owned rangeland	Acres	8,400	25.77	216,468
State lease rangeland	Acres	8,000	6.44	51,520
Federal lease rangeland	Acres	23,600	—	—
Federal lease rangeland	AUM's	1,780	42.96	76,468
Subtotal		40,000		344,456
Dwellings:	—	—	—	55,000
Other buildings:	—	—	—	36,000
Watering facilities:				
Wells	Number	4	10,000	40,000
Pipelines	Miles	2	2,100	4,200
Tanks & Reservoirs	Number	3	2,500	7,500
Subtotal				51,500
Barbed wire fence	Miles	38	1,500	57,000
Other range facilities	—	—	—	4,000
Machinery	—	—	—	39,300
Cattle:				
Cows	Number	190	600	114,000
Heifers 1-2	Number	25	600	15,000
Heifer calves	Number	25	374	9,345
Bulls	Number	13	688	8,944
Horses	Number	4	1,000	4,000
Subtotal				\$151,289
Total Value				\$738,545

Table 2. Budgeted costs and returns for the average medium sized (250 AU) cow-calf ranch in the Chihuahuan Desert of southern New Mexico (1986 to 1991).

Livestock type	Gross returns				Guideline value
	\$/CWT	Sale weight (CWT)*		Total (\$)	
137 calves	89.00	4.2		51,217	204.84
2 cull bulls	55.00	12.5		1,375	5.50
23 cull cows	42.00	8.0		7,728	30.91
Total (\$)				60,320	241.25

Cost type	Production costs				Guideline value
	Unit	\$/Unit	Tax deduction	Total (\$)	
A. Variable costs					(\$/AU)
1. Grazing fees					
State lease	Acre (8,000)	0.59	x	4,720	18.88
BLM	AUM (1780)	1.86	x	3,311	13.24
2. Supplemental feed			x	7,500	30.00
3. Livestock expenses					
2 purchased bulls	Head	1,300	x	2,600	10.40
Fuel & repairs			x	4,500	18.00
Veterinary & medicine			x	1,200	4.80
Property taxes (livestock)			x	1,024	4.10
Maintenance			x	2,700	10.80
Other			x	1,756	7.02
4. Hired labor			x	0	0
Total variable costs			x	29,311	117.24
B. Fixed costs					
Electricity			x	1,700	6.80
Telephone			x	720	2.88
Butane & Heating			x	1,030	4.12
Insurance			x	4,200	16.80
Depreciation			x	9,346	37.38
Property taxes			x	1,010	4.04
Total fixed costs			x	18,006	72.02
Total cash costs			x	47,317	189.27
C. Net ranch income** (\$)				\$13,003	51.99

*Sale weights include 3% shrink.

**No value is subtracted for operator labor and management.

interviews and range surveys directed by Allen Torell and the author (Torell et al. 1990, Torell and Word 1991). Special thanks is given to Dr. Torell for his help in the development of this paper.

Comparative Financial Position

Total ranch value of the average medium sized cow-calf operation in the Chihuahuan desert in 1991 was approximately \$740,000 compared to \$920,000 in the early 1980's (Torell and Doll 1989). The 20% decrease in value has been due to a general decline in real estate across the USA, increased grazing fees on state lands, changes in the nation's tax system and an increased perception by buyers that ranches are poor investments (Torell and Doll 1991).

Net returns unadjusted for operator labor and management are about \$13,000 under present conditions (Table 2). This gives a return per animal unit of \$51.99, a return per acre of \$0.33, and an overall return on investment of \$1.76%. When present returns are compared to those for the 1978 to 1984 period adjusted for a 5% inflation rate, real income has increased about \$4,900 (Table

3). A return of 1 to 3% on investment has historically characterized this type of cattle operation (Fowler and Torell 1985).

From an investment standpoint Chihuahuan desert cattle ranching would be considered unprofitable and risky by any Wall Street analyst. Bank passbook savings accounts are yielding 3% while money market yields are 3% to 4%. The present return on long-term (30-year) insured government and corporate bonds ranges between 7.5% to 9.5%. On the average, corporations in the USA get 12% return on invested capital. Investors who chose blue chip stocks in the 1980's have averaged 11%, while those in the best mutual stock funds such as the Fidelity Magellan Fund have received 20 to 25%. As a matter of interest, investors involved in cattle feeding operations in the Central and Southern Plains have annually averaged a 14% return over the last six years.

In the shortgrass prairie country of northeastern New Mexico, cattle ranching is primarily on private land. Here medium sized cow-calf operations (250 AU) have received about twice the return of the same size operation (250 AU) in the Chihuahuan desert (Torell et al. 1990, Torell and

Table 3. Production and efficiency characteristics for average medium sized-Chihuahuan desert ranches in southern New Mexico in the 1978 to 1984 period and the 1986 to 1991 period and for the NMSU College Experimental Ranch using all the best available technology.

Characteristic	Average ranch (1978 to 1984)	Average ranch (1986 to 1991)	College Ranch (best technology) ²
Ranch size (Acre)	40,000	40,000	40,000
Number of AUJ	235	250	333
Number of mature cows	179	190	253
Replacement rate (%)	13	13	13
Bull to cow ratio	1:15	1:15	1:15
Calf crop %	74	75	87
Calf death loss	4.0	4.0	<0.5
Steer calf weight (lb)	425.0	420.0	490
Beef product/Ac (lb)	1.35	1.44	3.53
Supplement feed cost/AUJ (\$)	26.95	30.00	10.63
Health care/AUJ (\$)	2.66	4.85	9.50
Replace heifer mgmt cost/AUJ (\$)	—	—	10.05
Total variable cost/AUJ (\$)	—	117.24	116.85
Total fixed cost/AUJ (\$)	—	72.02	54.02
Total cost/AUJ (\$)	165.88	189.26	170.87
Total return (\$)	8,084	13,003	49,487
Return/AUJ (\$)	34.40	51.99	148.61
Return/Ac (\$)	0.21	0.33	1.24
Stocking rate (Ac/AUJ)	170	160	120
Forage product (lbs/ac)	125	150	250
Forage use (%)	45–50	45–50	30–35
Range condition ¹	Mid-Fair	High-Fair	High-Good

¹Soil Conservation Service approach is the basis for range condition ratings.

²Standardized to 40,000 acres.

Word 1991). This difference is explained by a combination of lower fixed and variable costs and higher cattle productivity in the shortgrass prairie.

Economic Benefits to Society

Data from the Las Cruces Resource District (BLM) were used to evaluate total range management costs and grazing fee returns. In the 1988 to 1991 period the Las Cruces Resource District (BLM) received about \$1,180,000 per year to cover all administrative and managerial costs of the grazing program on 6.5 million acres of rangeland. A total of \$1,255,000 per year in grazing fees was collected from these lands. On this basis the BLM netted about one cent per acre and the rancher netted 0.33 cents per acre for a total net return of 0.34 cents per acre per year. From an economist's viewpoint, cattle grazing in the Chihuahuan desert is a legitimate use as long as total monetary returns equal or exceed total monetary costs. However, the real issue regarding profitability centers on the environmental conditions under which desert grazing occurs and the management practices that are applied.

Range condition has a major influence on financial returns in the Chihuahuan desert. This is because forage production drops drastically as these ranges are degraded from good to poor condition (Tembo 1990, Frost and Smith 1991). When forage production drops below 100 lbs/acre, it is highly probable that grazing will result in financial loss because the fixed costs per animal unit (fences, roads, watering points, property taxes, insurance, etc.) become excessive (around \$150/AU). Another problem is the depressed cattle performance that results from forage scarcity. Cattle performance declines under forage scarcity are due to reduced diet quality, lower forage intake, increased death loss to poison plants, and

greater energy expenditure in foraging activity. (See reviews by Holechek et al. 1989, Vallentine 1990).

In contrast to the above situation, my studies from the College Ranch, operated by NMSU, indicate net incomes of \$20,000 to \$40,000 are possible for most medium sized Chihuahuan desert ranches if appropriate range and cattle management practices are applied. Profitability of cattle ranching tends to increase geometrically rather than linearly as range condition (Soil Conservation Service method) changes from poor to excellent. Net incomes of \$40,000 to \$50,000 are possible for the best medium sized (250 AU) Chihuahuan desert ranches that are characterized by higher rainfall (11 to 12 versus 9 to 10 inches average annual precipitation), deep loamy soils, and a long history of conservative stocking. Lower fixed costs and improved cattle productivity explain the higher potential incomes for these ranches compared to those with a less favorable environment and in lower range condition. Presently around 15 to 18% of the Chihuahuan desert in New Mexico is in poor condition (0 to 70 lbs forage/acre), 45% is in fair condition (71 to 180 lbs forage/acre), 35% in good condition (181 to 280 lbs forage/acre) and 5 to 10% is in excellent condition (281 to 400 lbs forage/acre) (USDI 1984 and Figure 1). Modest improvements have been made in Chihuahuan desert range condition over the last 10 years (Figure 1).

The traditional argument supporting livestock grazing on arid public lands focuses on the benefits to society from the taxes, local expenditures, employment, water developments, road maintenance, and meat production (also wool) that result from ranching activities (Holechek 1981, Quigley and Bartlett 1990). On well-managed Chi-

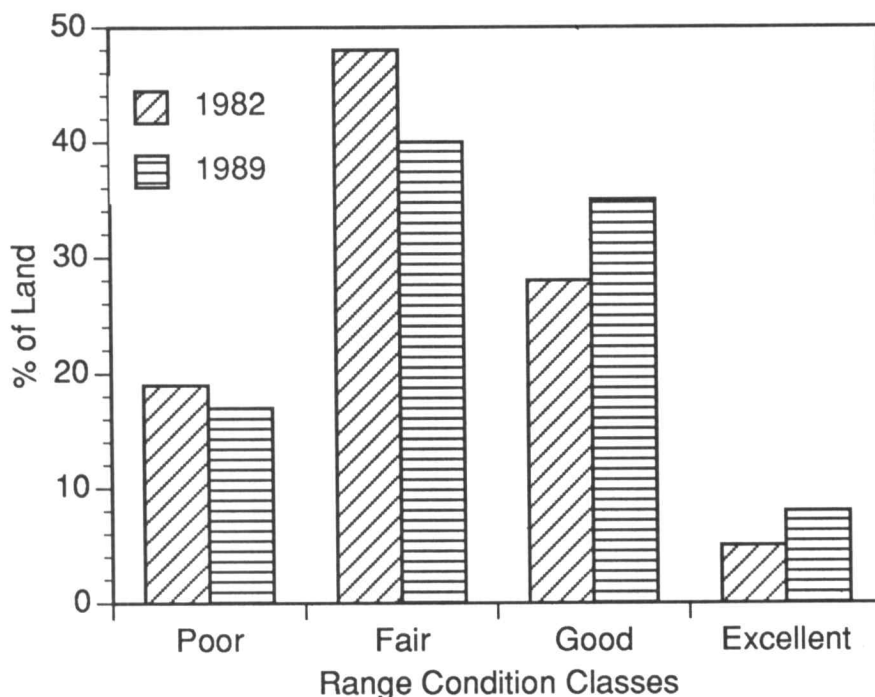


Fig. 1. Range condition changes on southwestern New Mexico rangelands in the 1980's (USDA Soil Conservation Service 1991).

Chihuahuan desert ranges in good condition (over 200 lbs forage/acre), all these arguments appear valid. However on those ranges in poor and low fair condition (less than 100 lbs forage/acre), the benefits of grazing on public lands to society become questionable. In addition to probable economic losses by the rancher, tax payers sustain high costs for administering grazing on these lands relative to what they receive in return. Important externalities of cattle grazing, particularly around towns and cities, are the damages to human health (particulate matter in air) and property that result from wind and water erosion on denuded lands. There's also the argument that federal agencies such as the Bureau of Land Management with limited funds could better manage their other ranges if they didn't have to dedicate part of their efforts to those in poor condition.

Presently, the main argument for continuing grazing on poor condition public ranges is that little if any recovery will occur after livestock are removed. On creosotebush areas in the Chihuahuan desert this is generally true. However, natural revegetation does have potential to improve soil stability and forage productivity on many of the sandy mesquite sites (Valentine 1970, Beck et al. 1987).

Government Policy

Recently, grazing fees on federal lands have been increased from \$1.86/AUM to \$1.97/AUM. This increase will reduce total income for the ranch described in Tables 1 and 2 by about \$200. Some environmental groups are advocating grazing fees be increased up to \$8.00/AUM or more. However, studies by agricultural economists at New Mexico State University indicate fees of \$2.50 to

\$4.00 per AUM are more in line with fair market value (Torell et al. 1988).

From my point of view, the best approach on public lands is adjustable grazing fees that vary with livestock prices and grazing intensity. Low fees would be assigned to ranchers using conservative stocking rates (30 to 40% use) and high fees to those that graze heavily on BLM lands. Under the present cost/price structure, a fee of \$1.80/AUM might be reasonable for a rancher using a conservative stocking rate while those grazing more heavily could be assigned fees of \$4 to \$8/AUM. As grazing capacity increased on the conservatively stocked ranges, additional AUM's at low fees could be granted as further incentive for judicious management. Government revenue over time might actually increase under this system as the increases in grazing capacity offset monetary losses from the lower fees.

I consider the federal government program of providing payments to ranchers during droughts for supplemental feed to be counter-productive. This encourages ranchers to retain livestock rather than partially destock during periods when forage is scarce and the range is easily damaged. A better approach might provide ranchers with direct payments for partial destocking under drought. In order to make this kind of program work, provisions that disqualify ranchers using destructive grazing practices would be necessary.

Increasingly, more pressure is being applied to de-emphasize livestock production on federally owned Chihuahuan desert rangelands and place more emphasis on recreation and wildlife. Certain organizations such as "The Nature Conservancy" have been interested in buying the grazing privileges from ranchers on some BLM

lands and then removing the livestock. Under present BLM policy, if a permittee does not exercise his right to graze within two years that right will be transferred to qualifying applicants who will graze the allotment. I think it would be progressive for the BLM to change this policy so private conservation organizations could temporarily or permanently reduce or retire livestock grazing on areas with extraordinary wildlife or recreational values if a purchase of the grazing rights was negotiated with the permit holder and the fees associated with grazing are paid to the BLM.

In the early 1980's the BLM developed a policy that resulted in placement of their rangelands into three categories based on condition. The M (maintenance) category is given to allotments judged to be in acceptable condition, and the basic goal is to sustain present management. Allotments in a deteriorating condition judged to have potential for recovery are given the I (improve) category, and management is geared towards improvement through better grazing management, water development, brush control, etc. Ranges in poor condition thought to have low potential for recovery are given the C (custodial) category, and management on these allotments is at the discretion of the permittee. Much of the destructive grazing that is now occurring in Chihuahuan desert BLM lands is on the custodial allotments. Consistently these allotments produce under 100 lbs of forage per acre, which makes grazing economically unsound.

Part of the rationale behind the custodial category was to minimize the difficulties of managing the smaller, more scattered parcels of BLM land and those parcels that are heavily integrated with state and private lands. However, in actuality a number of allotments with 3 or more sections (in some cases over 50 sections) have been given the custodial category.

My analysis of permittees on these allotments shows in most cases they are held by hobby ranchers whose income from ranching is a minor part (less than 20%) of their total income. It is my view that livestock grazing should be eliminated from the custodial allotments until production of perennial forages reaches 100 lbs per acre per year. In years of exceptional annual forage growth, there could be a provision to allow temporary stocking of the custodial allotments at a conservative rate.

Presently BLM lands exist in both southern New Mexico and Arizona where potential revenues from camping, hunting and other forms of recreation greatly exceed those realized from livestock grazing. On some of these areas both their fragility and the high level of human

activity make multiple use impractical. Here I think it would be a wise policy change to allow the BLM to purchase the grazing rights from the permittee at fair market value and then charge reasonable recreational fees. If BLM policy was modified to accommodate this shift in land use, the tax payer, recreationist and rancher all would receive more equitable treatment.

Perhaps the "Conservation Reserve Program" administered under the U.S. Dept. Agr. Soil Conservation Service will ultimately indirectly affect Chihuahuan desert ranchers more than any direct program involving grazing fees or supplemental feed payments. Starting in 1996, contracts on around 35 million acres of farmland temporarily retired to grassland will start to expire. If major increases in beef production result from expiration of CRP contracts, beef prices could be seriously depressed.

Supporting Literature

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