Economic Aspects of Livestock-Big Game Relationships

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Use and management of range-land has undergone some far-reaching changes in the last twenty years. Probably our notion of good range management will change still further in the next twenty. All of us are concerned with these changes. All of us are anxious that the changes which do occur will increase the wealth and enjoyment to be had from our range resources.

Within the last two decades we have seen livestock numbers in the West fluctuate from a low of about 15 million animal units in 1940 to more than 19 million animal units in 1953. We have seen a significant shift from sheep to cattle throughout much of the range country. We have seen a decline in grazing use of National Forests from 13 million animal unit months in 1933 to less than 8 million animal unit months in 1953. We have seen an increasing use of supplemental feeds and improved pastures for our livestock.

Within this same two decades an amazing increase in big game numbers has occurred throughout most of the West. Probably we have more deer now than ever before. Elk and antelope are numerous in places, but their range is more restricted now than originally. Hunting licenses issued in the United States have increased from about 6 million in the mid-1930’s to nearly 15 million now.

Within the last two decades we also have seen a great amount of work done on our rangelands. Figures on miles of fencing, numbers of wells and tanks, acres of reseeding and on other improvements run into the thousands and hundreds of thousands. Much remains to be done, but looking back twenty years, one realizes how much has been done.

Perhaps the most significant change that has occurred with respect to our range resources during the last twenty years is the growing realization that rangeland can be managed. This Society is founded on the idea that range can be managed and is dedicated to the task of learning how to do it. If we are to spend our money efficiently for range production, we must know something of the relative values of the things produced. It is here that economics can play a part in range management.

Our purpose is not to solve any specific range problem involving livestock and game relationships. Rather it is to show how economics might be used to help make management decisions for the production of livestock and game from our range resources. Economics of game-livestock production was not a factor until there was competition for resources. With competition, relative values of inputs and outputs of range production assume great importance. A broader understanding of the economic relationships between game and livestock should contribute toward wise management.

Livestock and game use the same range and their uses overlap and conflict to a greater or lesser degree especially on spring-fall-winter range. Total quantity and kind of feed available from the range and the proportions of game and livestock produced from that feed can be varied over time. As a result of these relationships, we have two fundamental problems. First (in economic terms) is the allocation of our limited range resource between two products, game and livestock. Second is the allocation of the resource between the present and the future. Resource allocation between products is reasonably complicated, even when the products compete directly and the management decision lies within an individual business. In the case of game and livestock, in which the products compete only imperfectly and under specific circumstances, and in which public and social values are involved, the task becomes formidable. Resource allocation between the present and the future is difficult enough without the complication of psychic values and complex relationships between resources. Despite these complications, careful scrutiny of the facts can lead us to workable answers.

Let us begin our look at these problems with two assumptions, (1) We want to maximize current net income from our range resources, but conditioned by (2) use in such a way and at such a level that will give us the greatest net income over time. We must think of net income in this case as the margin between

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Knowing the Kinds and Numbers of Animals That Can be Produced

We must know the carrying capacity of the range. We must know the degree of competition between game and livestock for feed. Determining what animals eat what plants, and to what extent under a variety of conditions, is not easy, as all you ranchers and range technicians know. Even so, some notable studies of range feed utilization have been made. Most of these studies were made in limited areas and under limited conditions. They are valuable as far as they go, but we need more information covering wider areas and a greater variety of conditions.

Range feed usually is a combination of many different kinds of plants. Different animals have preferences which change with the seasons and with the degree of use. As a result we usually find that the total carrying capacity of a range is greater when used by combinations of animals rather than by one kind only. We must know how much game or livestock, or both, can be produced in terms of numbers, pounds or other relevant units. This is not a job for economists, but it is a necessary first job in any economic analysis of range-game-livestock relationships.

Knowing the Costs of Producing Game and Livestock

Costs of producing livestock are very real to ranchers. Taxes must be paid. Feed and salt must be bought. Fences, windmills, wages and gasoline all cost money. The rancher's time and the interest on his money are worth something also. Both the out-of-pocket expenses and other costs of producing livestock can be counted by the ordinary methods of business analysis.

Costs of producing game present a different kind of accounting problem. Some may say that game is not "produced" in an economic sense and therefore no economic costs are involved. Perhaps this was true in the early days when game herds roamed the country without competition from livestock and without the aid of State game departments. But today costs are incurred in producing game, even though production and marketing methods differ somewhat from those for livestock.

First, game eats feed, some of which could be eaten by livestock. The value of this feed in its alternative use sets at least its minimum value when consumed by game. This is true whether the feed grows on public or private land. Feed consumed by game which has no other use probably cannot be counted in the cost. But we must be careful in deciding what is alternative use. Even the forage that is inaccessible to livestock may have another valuable use, such as for watershed protection. The value of the feed consumed by game in its next best alternative use can be considered as the first cost of producing game.

Second, production of game requires management and labor. State game departments and other State agencies, Federal agencies, sportsmen's organizations and others spend many millions of dollars annually in managing game. Game laws must be enforced, hunting supervised, preserves managed, predators controlled, feed supplies checked, and occasionally the game itself artificially fed. All these items are part of the costs of producing game.

Third, livestock must be gathered and marketed, important items of cost to ranchers. Game too must be gathered and marketed, although in a different way. There should be no question that the salaries and other expenses required to supervise hunting are part of the costs of producing game. There is some question as to whether the money spent by hunters for guns and gasoline, ammunition and automobiles, food, lodging and hundreds of other things is a cost or an income. Actually it is both. The amount required to make these things available is part of the cost of producing game. In the same way, money that ranchers spend for trucks, gasoline, saddles, groceries, barbed wire and many other goods and services is a cost of livestock production and marketing but it is an income to the merchants of the community.

For the moment, let us consider as costs to livestock production all the money spent by a rancher to carry on his business, interest on his capital investment, wages for himself and his family and the value of range forage used. Let us consider as costs to game production all the money spent by public agencies in game administration plus an allowance for the value of range forage used by game and the amount required to supply hunters with goods and services used in pursuit of game.

Knowing the Incomes from Game and Livestock

Both game and livestock are things people want badly enough to forgo something else in order to
have them. The degree of want is reflected in price. Price is the amount the consumer must give to get the item, and it is the amount the producer gets for producing it. Income is the aggregate of the prices received. People are willing to spend money to eat beefsteak. They are also willing to spend money to hunt game and eat venison occasionally. Money so spent constitutes the income to the game and livestock industries.

The income to the livestock industry for any particular area or state is rather readily ascertained. Livestock have a market and a price, a price which we can accept as the measure of value which livestock contributes to society.

Game, too, has value, but rarely does it have a price, at least not in modern times. Herein lies much of the difficulty in comparing relative incomes from game and livestock. Most of the economic studies of game have attempted to measure income by adding up the amount of money spent by sportsmen for licenses, equipment, supplies, and services. This approach is misleading, especially when such figures are compared to farm income from livestock to show relative importance of the game and livestock industries.

Other economic studies of game attempt to measure incomes by assigning a price to the meat obtained by hunting. This approach is misleading for it fails to recognize the recreational value of hunting and seeing game on the range and the value of trophies and hides. It is misleading as a comparison with income from livestock when a retail price is assigned to game and a farm price is used for livestock.

What then is a sound method? Occasionally we have opportunity to observe the value of game in an economic setting comparable to other industries and particularly to the livestock industry. This occurs when hunting privileges are sold or leased by ranchers or other landowners, or where individuals or groups own land, pay taxes on it and incur other expenses solely or primarily for the hunting provided. In a few places we find that the demand for a place to hunt is great enough that buyers can bid successfully for land against livestock producers. When buyers have the opportunity to bid against each other for land to be used for livestock production or for hunting, the price that each is willing to pay gives us a clue to the relative values of the two uses. However, most of the big game hunting in the West is on public land where “buyers of game” and “buyers of livestock” have no chance to bid against each other. Obviously, game has no market price under such conditions.

One measure of income is the amount of money people are willing to spend to obtain the product. This is simply an assumption that a thing is worth at least what it costs. Many economic studies of game have sampled hunters to determine the amounts spent for the goods and services used in hunting. Rarely do such studies include the amount spent to bring the game into existence in the first place or to maintain it. If all these expenditures could be totaled, an approximation of the gross income attributable to game could be obtained.

If this measure is used, then for comparative purposes, a truly gross income for livestock also must be used. For example, we cannot conceive of consumers coming to the ranch in pursuit of a beefsteak. If they did, they would buy gasoline, lodging, meals and perhaps guns, ammunition and special clothing. Realistically, the process of getting livestock from the range to the consumer is performed by middle-

men who provide transportation, feed, slaughter facilities, refrigeration, sales and distribution and many other things. As consumers, we are willing to pay for these additional services. Therefore, the comparable gross income of livestock is reflected in retail prices of the products rather than on-farm prices of the animals.

**Determining Maximum Net Income from Range**

If we know the number and kind of animals produced under different circumstances, the costs of production and the resulting incomes or values, then we should be able to determine, at least theoretically, the level of use and the combination of uses that will result in the greatest net income to society. There are several techniques for doing this, one of which is by using alternative budgets. A budget is simply a statement of expected production, costs and incomes. Alternative budgets can be made for different combinations of game and livestock until the one that shows the highest net income is determined.

A word of caution is needed at this point. In calculating costs of production at different levels and in different combinations of product, one must be alert to the fact that some costs are fixed while others are variable. For example, fencing costs may be just as great when an area is used by 5,000 head of livestock as when used by 10,000 head. Game administration may be just as costly when deer are thinly scattered as when they are plentiful. These and other fixed items of cost may influence considerably the net incomes from different levels and combinations of production.

**Allocating Resources Between the Present and the Future**

By the process outlined, the most profitable allocation of current range resources between game and livestock can be approximated. We still
have the problem of allocating resources between the present and the future. Range is a renewable resource under normal conditions and as such it is subject to depreciation or appreciation. The level of future production and the rate of appreciation or depreciation depend on the type of range, its initial condition, soil, climate, weather, and on our management of these and other factors. Again we need to know more about the physical relationships between animals, plants and soils. Knowing this, we can estimate future production at different levels of use and under different management systems.

Range managers have some economic choices to make in allocating resources between the present and the future. They may take all the production they can get now with the expectation that production and incomes will decrease in the future. They may take reasonable production now with the expectation that it will continue. They may take conservative production now with the expectation that it will be greater in the future. Or they may invest in improvements now with the expectation of increased production in the future. Rational economic choices can be made if we know the physical responses to the different courses of action and can estimate the future demand for the products produced.

Future demand will come from people and will vary with their numbers and incomes. We are all aware of our increasing population and of the increasing pressure on our land resources. Pertinent to our problem here is whether this increasing population will want relatively more livestock products or more big game.

Every State in the West has had large increases in numbers of big game hunters. But the proportion of the population in urban areas who hunt big game probably is decreasing. Perhaps as we become more of an urbanized nation, relatively fewer people will find enjoyment in this rugged sport, or will be willing to pay the price for it. Certainly in recent years our total consumption of livestock products, especially the red meats, has increased and there is every indication that this increase will continue. How much this demand for livestock will be reflected in greater pressure on our range resource will depend upon how well range producers can compete with other livestock producers.

As a result of these pressures some rangeland may become so valuable for recreational purposes that we cannot afford to use it for livestock. On the other hand, meat may become sufficiently scarce and high priced that we cannot afford to use range feed for production of big game. Actually both of these things could happen at the same time but in different localities. The pressure for recreational use and big game production in our national forests already is acute. In many areas on national forests livestock grazing has been discontinued in favor of recreation. In many others reduced grazing pressure by livestock has permitted game to increase, sometimes to the extent of heavy overstocking by game. Given some knowledge of future production and demand, again we can make rational choices to attain highest net income over time.

Control of Resources

So far, livestock and game have been viewed as industries. This implies a planned enterprise at least to a degree that some control is exercised over resources and production in response to economic and other stimulation.

Livestock production is an industry. It is made up of many thousands of individual businesses. The product of the industry is exchanged in markets where economic forces operate. These forces influence production in a way similar to that in other competitive industries.

On the other hand, control over the resources used to get production by the range livestock industry differs from that of other competitive businesses. Farmers, for example, control their land and other factors used in production to a high degree. They can plow their land, irrigate, plant different crops; and if one fails, they can plant another. They can thresh their crops, bale them, graze them off or plow them under, depending on what seems best to them at the time. In contrast, stock ranchers have considerably less control over rangeland. Forage grows if it rains, and it can be harvested only by grazing animals. Adjustments in production between seasons, between years and between products, are much more limited for ranchers than for farmers. Further, game has access to their land and eats their feed. Brush, poison weeds or wild fires may encroach on their feed supply and, if they have control at all, it is at great expense. The low degree of control over resources in response to economic forces in the industry, is a unique feature of ranching.

Is game production an industry? We have assumed here that it is, although admittedly it has unique features. The English kings of the Middle Ages liked to hunt, and exercising the power they had at the time, declared that all game was their personal property. Ownership of game by the Crown was firmly established in English law when we started political housekeeping for ourselves. The States in this country inherited the power of the Crown and along with it, ownership of the game. The States are the entrepreneurs of the game industry. In one sense then, the people are the stockholders in this business, the legislature is the board of directors, the game commissions and departments make up the
management staff. The State is not in the business of producing game for a profit that will show up on a business profit and loss statement. But profits do accrue to the stockholders of the business, the people of the State. Some take their dividend in the form of the enjoyment of big game, others take theirs in the form of business provided by those in pursuit of game.

The State, as the manager of the game business, does exercise control over game production in response to directions from the stockholders. For example, about 30 years ago we found ourselves almost out of game. People became alarmed. More rigid laws were passed and enforced; game preserves were established; and other things were done to protect the supply and increase numbers of game. Now in many places we have more game than the range can support. Malnutrition and even starvation of game on the one hand and range deterioration on the other are causing grave concern. State game departments, with the help of Federal land agencies, are making vigorous attempts to effect wise management within the limits of their budgets and authority.

The game industry has a unique position with respect to the land it uses. Most of the land used by game is owned by the Federal Government and by individuals while the game itself is owned by the State. Federal land policy gives the States a sort of free use permit for its game in indefinite numbers. Private landowners generally permit the States' game virtually free access.

Conclusion

In view of this land, livestock and game ownership situation, collaboration between the parties concerned is a basic requirement for good management. The State which owns and controls the game, the rancher who owns the livestock and part of the land and the Federal agency which owns most of the land on which both game and livestock graze all have a voice in range management decisions.

Perhaps some sound economics will help to reduce conflicts in these decisions; and will help to attain the goal of highest net incomes to society. Sound management must be based on the best information we can get concerning range plants, soils and animals and the relationships between them. We must get better information on the costs and incomes from game and livestock production and we must sharpen our conception of the economics of resource allocation as applied to this unique situation. Even with all the information and tools needed for rational decisions, we still will have some conflicts because different people are involved. Rational decisions for the public good cannot please all individuals, but such decisions should minimize the areas of conflict. Range technicians, both public and private, have an important role to help develop rational management through research and experience. Economists can lend a hand by helping to evaluate results.

Let me be the first to criticize this attempt to put big game in the strait jacket of dollars and cents accounting. There is no way to evaluate the thrill of looking over a 30-30 at a buck bouncing down a hillside. Nevertheless, that buck costs you something in terms of reduced beef production, lowered range condition or out-of-pocket expenses for game administration. So we must take a careful look at what products we want most, how much we are willing to spend for them and how to divide our limited resources between them.

COMING EVENTS

Nov. 8–12. Amer. Soc. of Agronomy & Soil Science Society of America, St. Paul Hotel, Minn.


