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Range Economics Research (The National Interest)

Richard J. Crom

Increasing interest in range economics research calls for a more tightly defined set of issues and a menu of research projects addressing these issues. This paper identifies major issues of national importance followed by a brief description of suggested research projects.

Until quite recently, range economics had become a neglected area of research despite the fact that permanent grassland and grazeable forest land constitute 40 percent of the nation's land area (Frey). The decline in range economics research actively began 17 years ago, with the disbanding of the western regional committee on the Economics of Resource Use and Development (Gray).

In 1980, the Natural Resource Economics Division of the Economic Research Service surveyed research institutions to determine the amount of range economics work underway. While they may have missed some of the relevant activity, only 18 scientist-years of research were identified as being devoted to ranch management and range resource economics research in the 12 Western States during 1980.¹

This low level of commitment may be due to one or more of a number of factors,

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¹ Based on a telephone survey of university and government offices in the Western States conducted by the Natural Resources Economics Division of ERS in 1980. Of the 18 scientist-years, 15 were expended by university-based researchers and three by employees of federal agencies.

including (1) the perceived lack of alternative uses of rangelands; (2) the perceived success of range improvement or grazing strategies, negating the need for additional knowledge; (3) excess grazing capacity given current rangeland livestock stocking rates; and (4) tight overall research budgets, or others. In addition, many of the potential researchable issues are of regional rather than national significance since the range resource is confined to the West—and many of those regional issues have a microeconomic, ranch management orientation. However, several researchable issues have national implications, and these are explored in following sections.

Interest in range economics research and extension activities is on the increase perhaps due in part to the passage of the Forest and Rangeland Renewable Resources Planning Act (RPA) in 1974 (88 Stat. 476; 16 U.S.C. 1600–1614) and the Public Rangelands Improvement Act (PRIA) in 1978 (92 Stat. 1803; 43 U.S.C. 1901–1908). Over the next several years industry and agency groups sponsored a number of workshops and conferences devoted to the economic implications of (primarily public) rangeland management and use issues. A range economics symposium was held in Salt Lake City in 1982, the proceedings of which were published by the Forest Service (Wagstaff). This provided the catalyst for the formation of WRCC-55 “Rangeland Resource Economics” which held its first formal

committee meeting in conjunction with the 1984 meetings of the Society for Range Management to discuss "felt needs for knowledge" in range economics.

A paper presented at the Salt Lake City symposium outlined range economics research from the national perspective (Crom and Cotner). These national issues and suggested research projects on the supply, demand, and pricing of range forage were subsequently discussed with researchers and extension educators attending the first meeting of WRCC-55. Since only a limited number of economists working in the West attended the WRCC-55 meeting, this paper is intended to stimulate discussion among a larger segment of the profession most likely to initiate basic and applied research projects in range economics.

Issues of National Interest

Estimates of the supply of forage available at the national and regional levels are needed by outlook analysts who forecast developments in cattle and sheep inventories. On the other side of the equation, estimates of livestock numbers imply the demand for range-based forages. These forecasts are important information for land management agency planners and administrators charged with balancing livestock numbers on public lands with the needs of other uses and user groups. Both Forest Service and Bureau of Land Management personnel, the two primary public rangeland management agencies, must make both short and long term decisions regarding the desirable and allowable number of livestock on the public rangelands; and must subsequently issue and/or revise licenses or grazing permits to rangeland livestock operators.

The land management agencies also need cost-benefit analyses of range improvement and soil conservation practices. Typically, practices recommended by researchers in the physical sciences

often are beneficial when measured in terms of technical response but will be found to be infeasible if, and when, economic analyses are conducted.

The value of range forage as a feedstuff also needs to be determined relative to that of other feed sources for use in aggregate efficiency analysis. Forage fed beef was touted as the "way to go" in the early 1970's when grain prices doubled. Then work by economists interested in the subject showed forage to be a relative expensive feedstuff; thus, a national policy to promote grass-fed beef might not be in the national interest.

Forage value enters into the determination of pasture and rangeland lease rates—both public and private. Government managers usually use some index of private land forage value in adjusting public grazing fees. Owners of private land must consider forage value when adjusting their rents. Further, the agencies administering the public lands need in-depth identification and analysis of the variables affecting public land forage pricing, including expenditures, obligations, and values accruing to both the management agency and the permit holder. The economic basis of "permit value" deserves greater scrutiny as a topic of public policy research. Public land forage pricing involves both efficiency and equity dimensions which have neither been fully appreciated nor explored by the academic community. Finally, the costs of administering public rangelands and lease agreements are substantial but complicated, and the increased emphasis on cost recovery in public administration affords intriguing analytic opportunities.

Researching the Issues

Eight research topics are identified that bear on these national issues. Development of both time series and cross-sectional data bases are germane to any or all future research activities. Currently, eco-

conomic data on the rangeland resource are sparse and fragmented among several sources. A data base project might be an excellent beginning for range economics research endeavors. The data might be developed in a fashion similar to the Economic Research Service cost-of-production studies. These studies use a probability survey to identify structural characteristics, management, and business practices of farm and ranch operations. Cost and returns budgets for homogeneous classes of production units are then constructed.

Forage Supply Research

Three projects could contribute to national needs in this area. These are briefly described below.

Estimation of national and regional supply functions. What is the aggregate supply of forage for each region and the western range overall? Are the supply curves completely inelastic with weather being the principal shifter, or are other variables involved giving the supply function a limited slope? Is the supply function responsive to livestock prices, and if so to what degree?

My hypothesis is that excluding weather effects, the forage supply function for the western range is nearly inelastic for lower values of economic variables and essentially perfectly inelastic for higher values of these variables. I would expect relatively more supply elasticity in regions where more alternative land uses exist. Regional supply functions could be estimated by multiple regression techniques; co-variance analysis might be employed particularly if one function is estimated for two or more regions.

Cost-benefit and economic efficiency analysis. What are the costs and benefits associated with cultural and management practices; and what level of investment can be justified for range improvement practices? Too often, many recommendations

are made on the basis of underlying physical efficiencies, without considering the economic efficiencies which may or may not be gained.

Here I would expect that many of the physically efficient recommendations often entail a rather high marginal cost with a limited increase in marginal revenue. Comparative costs and returns budgeting should provide a simple low-cost tool for such analyses. To the extent that adoption of such practices increase meat supplies, re-estimation of livestock prices would be necessary.

Economically justifiable levels of carrying capacity by regions. From the point of view of economic efficiency and industry stability, what is the carrying capacity of selected pastures and rangelands? Stocking rates which optimize livestock gains and forage renewal may be cost inefficient in either the short or long term. Do decreased stocking rates increase long term forage productivity? Is there a change in unit costs as stocking rates and intensity of use change? To what extent is the feasibility of integrated livestock-forage management affected by the cattle cycle and other cyclical and/or temporal phenomena? The hypotheses and possible research techniques are much the same as for the cost-benefit analyses. Physical optimums are not necessarily the same as economic optimums. Economic returns vary with the cattle cycle. Trapp at Oklahoma State has done considerable work on culling decisions and optimum herd size over the cattle cycle (Trapp and King). His work might suggest not only additional empirical techniques but alternative hypotheses as well. Nordblom's dissertation on simulation of cattle cycle demographics might also be useful (Nordblom).

Demand for Forage

Two projects could contribute to the resolution of national information needs.

The first may have the highest priority of all projects listed.

What is the comparative advantage of grazing livestock in the West versus other regions? Does the western range enjoy a comparative and/or absolute advantage over other regions for certain types of livestock operations? Regional costs and returns budgets for beef cattle calculated and maintained by the National Economics Division of the Economic Research Service indicate that a comparative advantage and, probably, an absolute advantage exist, but these should be documented. If so, the demand for rangeland forage should remain high relative to other feed sources even if the overall demand for meat decreases, over time, as may indeed prove to be the case.

Projected demand for range forage. What is the current livestock population on the western rangelands, and how many cattle and sheep are expected in the future? The answer to this question centers, first, on estimation of livestock numbers that may be grazed commencing with estimates of future red meat consumption. Once consumption has been estimated, the required aggregate supply of livestock and the portion of that aggregate supply to be produced on the western rangelands also can be estimated.

National and regional projections of livestock numbers based on profitability over the production cycle is another area of need and is one of interest to livestock and range economists. Coupled with the cyclical profitability question are information needs on costs and returns on individual pastures and ranges. While the United States Department of Agriculture prepares national and regional estimates of costs and returns from livestock production, these generally are not constructed for site-specific cow-calf rangeland livestock operations. A more useful set of ranch management information could be compiled through more localized adapta-

tions of such budget studies since the analyst on site can adjust for local range conditions and types of rangeland livestock operations.

However, if localized budgets are to be developed, preferably using primary data, consistent methodologies will need to be employed if aggregation for the purposes of national demand and supply analysis is to be accomplished. Either the regional research framework or research centered in a national agency could provide this consistency. In recent years, the Forest Service has contracted with the Economic Research Service for linear programming analyses of individual range resource situations to determine the marginal values of additional forage. Further evaluation of marginal forage value versus expected long-run cattle prices is needed as part of the estimation process for long-run needs for range forage.

Pricing Range Forage

The debate continues over pricing forages produced on public rangelands, especially when the pricing system is based on private lease rates. A host of federal grazing fee systems and formulas have been advanced over the years, but none have enjoyed wide support among economists due, in part, to both theoretical and empirical uncertainty about range forage values. Recently, several ERS and Oregon State economists completed four research reports for the Forest Service and Bureau of Land Management dealing with both the theory of pricing public range and the impacts of price changes on both ranches and the regional economic system (Brokken and McCarl; Gee; Radtke and Brokken). These reports are available through the National Technical Information Service (NTIS accession numbers are listed with the references). A journal article and research report are in publication process. These reports suggest numerous hypoth-

eses and techniques for further research. One hypothesis of particular relevance to the pricing question is that a wide distribution of marginal value products from range grazing exists among ranchers, and the shape of that distribution may not be normally distributed. Knowledge of the distribution and estimates of these marginal value products would have substantial bearing on any pricing mechanism.

Three research topics seem most appropriate in this area.

Variables affecting range values. What variables affect the value of the range for livestock grazing, wildlife habitat, or recreational use? Do these variables affect the value of range in alternative uses equally or differentially; and how should both the variables themselves and the synthesizing value equations be measured and estimated?

Value and cost of range management and improvement practices. What are the costs (both variable and fixed) incurred by public agencies responsible for the management of rangelands and their associated resources? How can these costs be allocated among uses, and to what extent are they based on "efficient" prices? What are the cash and noncash costs to both the agencies and permit holders for range improvements and management practices? What are the associated benefits and to whom do they accrue?

Permit value. It is commonly thought that the values of federal livestock grazing permits are capitalized and reflected in the value of base property. To what extent are permits valued at a premium or discount relative to privately owned lands? Some feel that permit values exist because fees are set at levels below the marginal value of rangeland livestock forage. Is this view valid in part or whole? What other factors influence permit value? Brokken and McCarl's theory paper suggests possible research in this area as does the paper presented by Obermiller and McCarl as part of the symposium on grazing fees

held at the AAEE/WAEA meetings at Logan, Utah in 1982 (Obermiller and McCarl).

The Author's Perspective

It is the author's perception that these issues and topics seem to have a high priority in the rangeland resource economics research agenda at the present time. Priorities are ever-changing; but commencing work in these areas would establish a research base for future work on evolving issues while responding to knowledge needs that currently are in the national interest.

References

- Brokken, Ray and Bruce McCarl. *A Theoretical Evaluation of the Fee Systems for Private Grazing on Federal Lands*. PB85-128-320, Economic Research Service, United States Department of Agriculture, 1984.
- Crom, Richard J. and Melvin L. Cotner. "Range Economics—A National Perspective." In *Proceedings—Range Economics Symposium and Workshop*, Fred J. Wagstaff (ed.), pp. 12-18, General Technical Report INT-149, Intermountain Forest and Range Experiment Station, Forest Service, United States Department of Agriculture, July 1983.
- Frey, H. Thomas. *Major Land Uses in the United States: 1978*. Agricultural Economic Report No. 487, Economic Research Service, United States Department of Agriculture, August 1982.
- Gee, Kerry. *The Impact of Alternative Federal Grazing Fees on Western Livestock Businesses*. PB85-128-312, Economic Research Service, United States Department of Agriculture, 1984.
- Gray, James R. "An Historic Look at Range Economics Research." In *Proceedings—Range Economics Symposium and Workshop*, Fred J. Wagstaff (ed.), pp. 1-11, General Technical Report INT-149, Intermountain Forest and Range Experiment Station, Forest Service, United States Department of Agriculture, July 1983.
- Nordblom, Thomas. "Simulation of Cattle Cycle Demography: Cohort Analysis of Recruitment and

- Culling Decisions in the National Beef Cow Herd." Unpublished Ph.D. Dissertation, Oregon State University, 1981.
- Obermiller, Frederick W. and Bruce McCarl. "In Search of Reason: Issues and Alternatives in the Federal Grazing Fee Debate." Background paper for the Symposium on Grazing Fees for Public Rangelands, 1982 meeting of the American and Western Agricultural Economics Association, Logan, Utah, August 1982.
- Radtke, Hans and Ray Brokken. *Estimated Impacts of Income and Employment in 13 Western States of Changes in the Federal Grazing Fee*. PB85-128-338, Economic Research Service, United States Department of Agriculture, 1984.
- Radtke, Hans and Ray Brokken. *Potential Impacts on Local Income and Employment of a Change in the Federal Grazing Fee (Case Studies of 13 Areas in the West)*. PB85-128-304, Economic Research Service, United States Department of Agriculture, 1984.
- Trapp, James N. and Clyde S. King. "Cow Culling and Replacement Strategies for Cyclical Price Conditions." *Oklahoma Current Farm Economics*, 52/4(1979): 1-7.
- Wagstaff, Fred J., ed. *Proceedings—Range Economics Symposium and Workshop*. General Technical Report INT-149, Intermountain Forest and Range Experiment Station, Forest Service, United States Department of Agriculture, July 1983.