

## Enhancing the Agricultural Economy with Efficient 12-Month Pasture-Forage Management Systems

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Traditional livestock feed management systems are biologically inefficient and capture only a small portion of the value potentially available from the grasslands, haylands, and croplands in the Northern Plains. The amount of potential value produced on the land but not currently captured as economic wealth during the preweaning stages of calf production is greater than the potential amount of wealth available for capture from the value added to a calf postweaning. Modern 12-month pasture-forage management systems with improved efficiency have the ability to increase production on the land and to capture this vast potential value, so they could be even more significant than value-added beef enterprises in enhancing the region's agricultural economy.

The potential amount of new wealth generated from agricultural use of land resources is limited by the biological capacity of the plants to produce herbage and nutrients from soil, sunlight, water, and carbon dioxide and by the effectiveness of management practices in capturing value from plant production. Sustaining high levels of productivity from pastures and haylands requires the use of management strategies that place priority on plant health and growth and meet the biological requirements of plants and ecosystem processes.

The traditional livestock forage management practices used in the Northern Plains were developed during the era of low-performance livestock. Traditional grazing and haying management places priorities on animal husbandry practices and harvesting greater amounts of dry matter. These emphases result in high livestock pasture-forage costs, high herbage reductions during growing seasons with water stress, and low profit margins.

Twelve-month pasture-forage management systems enhance the quality of natural resources and increase value capture and profit margins by improving biological effectiveness, nutrient capture efficiency, and nutrient conversion efficiency over those of traditional practices. The management concepts for the 12-month pasture-forage systems are based on three scientific premises:

- Coordinating livestock grazing with specific plant growth stages and seasons of the year beneficially manipulates plant biological processes, stimulates soil organism activity, and enhances the biogeochemical cycles responsible for the flow of nitrogen, carbon, and water through ecosystems. This coordination of defoliation and plant growth stages increases the biological effectiveness of management strategies and results in improved plant health and increased herbage production and nutrient flow in grassland ecosystems.
- Harvesting by grazing or mechanical haying of forage plants at their optimum growth stage yields the greatest quantity of nutrients—nitrogen as crude protein and carbon as energy—per acre rather than the greatest quantity of dry matter per acre. Determining the nutrient-weight-per-acre curves from herbage-production curves and nutritional-quality curves identifies the optimum growth stage for a forage type. Harvesting a forage at this stage improves the efficiency of nutrient capture and results in a reduced cost per pound of nutrient and in turn a reduced cost for that forage type as livestock feed.
- Meeting the daily nutritional requirements of modern high-performance livestock all year maintains animal production levels at genetic potentials. This practice improves the efficiency of nutrient conversion into saleable commodities like calf weight and results in stronger animal performance and lower annual pasture-forage costs than practices that overfeed or underfeed nutrients.

Northern Plains beef producers who replace their traditional grazing and haying practices with efficient 12-month pasture-forage management strategies have the ability to double the cow herd size, reduce annual pasture-forage costs per cow by 30 to 50 percent, and increase net income 3 to 10 times on their current land resources.

North Dakota State University Extension Service and NDSU Dickinson Research Extension Center sponsored 17 workshops, 14 grazing schools, and 10 adult range camps from 1998 through 2002 to inform beef producers about the principles and concepts of

12-month pasture-forage management strategies. Educational text containing course material and complementary information was developed. The one-day workshops, which covered key concepts and general information about the management strategies, had 938 participants. The two- and three-day grazing schools and the two- and three-day adult range camps, which covered the principles and concepts necessary for producers to implement and operate management plans designed specifically for the individual ranches, had 395 participants and resulted in the development of 320 management plans.

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