

Beef Producers Can Generate Greater Economic Wealth from the Land Resource

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Pasture and forage management strategies that meet the biological requirements of grass plants could generate greater economic wealth for the Northern Plains than traditional management practices currently used in the region, says a North Dakota State University range scientist.

“Traditional management practices focus on the use of grasslands for livestock forage and wildlife habitat rather than on management of the grassland resource. The common forage management practices place priorities on animal husbandry activities and on harvesting the greatest weight of dry matter per acre to produce livestock weight. Livestock weight is the commodity sold at the marketplace, but not the source of new wealth,” says Lee Manske, a range scientist at NDSU’s Dickinson Research Extension Center.

“The source of new wealth and the basic unit of economic value is the nutrients produced by plants on the land resource and transferred as food by the meat animal to the human consumer. Grazing management practices that focus on meeting plant biological requirements increase the quantity of nutrients produced on and captured from the land, thereby increasing the amount of wealth generated from the land resource,” he explains.

Humans place caring properly for animals higher than meeting the biological requirements of plants. This hierarchy need not be changed, but the activities that provide proper care and handling of livestock should be conducted so that plant biological needs are met, not sacrificed, Manske says.

The performance level of the plant component in the ecosystem determines the performance level of the livestock. Management designed to enhance grassland resources manipulates processes that meet the requirements of the grass plants and promote the vegetative growth of secondary tillers from axillary buds, stimulate beneficial activity of soil rhizosphere organisms, and facilitate the functioning of ecological processes at higher levels. These changes result in the perpetuation of healthy, productive grasslands with denser plant cover, increased quantities of herbage and nutrients, improved animal performance, higher quality habitat for wildlife, and greater economic return per acre.

The wealth agricultural production generates from grassland 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 treatments in capturing value from plant production. Generating greater wealth from land resources requires increasing the rate of nutrient production through enhanced photosynthesis in plants and stimulated activity of soil organisms and increasing the rate of nutrient transfer to the grazing animal through improved efficiency of nutrient capture.

Manske says these increases can be achieved through moderate grazing of grass plants between the third-leaf and flowering stages. Defoliation of grasses at this time triggers biological processes that result in increased herbage production and enhanced nutrient cycling within the ecosystem. In addition, grazing vegetative lead tillers and stimulated secondary tillers of grasses gathers greater quantities of nutrients per acre than traditional harvest of the grasses when the forage dry matter is mature.

Forage dry matter is not the economically valuable product from the land, and the quantity of forage dry matter produced or the market value of that product is not an accurate indicator of the wealth generated from the land, Manske notes. “The amount of dry matter needed to feed a cow varies with the quantity of nutrients contained in the forage dry matter, so the cost of livestock feed is determined primarily by the cost per unit of nutrient weight rather than by the cost per unit of forage dry matter weight. The nutrient cost per unit of weight is determined by the weight of the nutrients grazed or mechanically harvested per acre prorated against the land costs, production costs, equipment costs, and labor costs per acre.”

Land area per animal unit is related to the quantity of nutrients captured per acre and the quantity of nutrients a cow-calf pair requires. As greater quantities of produced nutrients are captured per acre, each animal unit requires less land area, feed costs decrease, and economic wealth generated from the land increases.

A typical traditional management treatment in the Northern Plains captures nutrients inefficiently and requires about 23.93 acres to produce the feed for one 1200-pound cow for a year. Manske's research indicates that changing the priority of management practices from capturing the greatest quantity of dry matter per acre to capturing the greatest quantity of nutrients per acre reduces to 11.68 acres the land area required to produce the forage for a cow, reduces the pasture and forage costs from \$246 to \$171 per cow, and increases the economic return after pasture and forage costs from \$5.47 per acre to \$21.54 per acre for the calf weight sold at weaning for 70 cents per pound.

“When the biological requirements of the forage plants are met and the produced nutrients are efficiently captured and transferred to the meat animal, the land resources of the Northern Plains can generate greater economic wealth through livestock agriculture,” Manske says.