



A variety of land uses on a western North Dakota ranch.

Agricultural Land Use in North Dakota

J. F. Carter

North Dakota borders include about 42,000,000 acres of land area, of which about 30,000,000 or 75 per cent are cultivated and have been cultivated for many years. Cultivation acreage probably has about reached its maximum, as most land suitable for intensive crop culture is cultivated now and cities, roads and other encroachments on cropland continue unabated even in this most agricultural of the 50 states.

In future years, some either newly cultivated or marginal land now cultivated (250,000 to 1,000,000 acres) in North Dakota will be cultivated more intensively to crops via irrigation from aquifers or the Garrison reservoir. Each year, about 20,000,000 acres are planted to crops, 7,000,000 acres are in fallow or other noncrop, and 1,500,000 acres in plowable hay or pasture land, primarily alfalfa or alfalfa-grass mixtures. Crops usually generate about 65 per cent of the new wealth in North Dakota each year, and many crops and their value are marketed through livestock each year.

North Dakota ranks sixth in the nation in income from principal crops and is first in production of hard red spring wheat, durum wheat, barley, rye, flax and sunflowers. North Dakota also ranks high in production of sugarbeets, potatoes and dry edible beans, and doubtless will rank higher in production of these latter three crops in future years.

Use of fallow has decreased in North Dakota in recent years, especially in the eastern two-

thirds of the state, because the use of nitrogen fertilizer and chemical methods of weed control have replaced some of the benefits of fallow. Also, increasing cost of crop production inputs makes the loss of a crop year due to fallow a disadvantageous and uneconomic practice. Many new row crops have replaced fallow or have substituted for many of the functions of fallow. Such crops as corn for grain or silage, sunflowers, dry beans and soybeans, and the traditional sugarbeets and potatoes have substituted for many benefits of fallow while yielding significant crop income. However, recurring drought as serious as in 1976 will result in continued, perhaps temporary increases of fallow as a practice in North Dakota.

The environment of North Dakota is well suited to crop production, especially so-called "spring-habit" crops, or those crops which can be seeded in the spring and harvested 3-4 months later. Such crops as the spring-habit hard red spring and durum wheat and barley often grow from germinating seed to maturity and harvest in a 3-4 month period, and the soil is left idle or resting until the next seeding period. We have a short season, but we are blessed with fertile soils from

Dr. Carter is professor and chairman, Department of Agronomy.

thousands of years of previous grasslands overlying our developing soils. Now, after 100 years of use, our soils require nitrogen and phosphorus fertilization for maximum crop yields, but still relatively small amounts of fertilizer or other soil amendments compared to much of the United States and the world. Our rainfall, while limited, is very timely to spring-habit crop production. Most of our precipitation falls as rain in spring and early summer when needed by the growing and maturing crop. Then, in late summer, rain diminishes usually during the harvest period to allow quick and efficient harvest of high quality grains for commercial milling and processing to high quality foods.

We also can grow so-called warm season crops like soybeans and corn, because our long days in this northern area compensate to a great degree for the warmer temperatures of our neighbors farther south. Growing degree days or heat units usually are enough to produce relatively high yields of corn for grain and soybeans. If supplemental irrigation is supplied, especially in south central North Dakota, high yields of corn and soybeans can be produced.

The relatively flat to rolling terrain of North Dakota also is favorable to very large fields and efficient crop agriculture with large, powerful tractors and other machinery. This combination allows one farmer to farm 1,000 or more acres on the "average" farm very efficiently.

North Dakota is relatively free of major crop pests. Only black stem rust of wheat and large weed infestations threaten crop failure, or have caused nearly complete crop failure in past years. Our plant breeding team at NDSU has conquered the stem rust threat, we hope, for all the foreseeable future. We have the resistant wheats in the fields and "on the shelf" to combat any new stem rust threat, we believe. It is possible that a new damaging rust race could develop, but it is unlikely to escape our detection system which allows sufficient warning to develop new resistant wheats.

Weed control in crops of North Dakota is more efficient and effective and economical than ever in the past. Disastrous yield reductions from competitive weeds that occurred in past years are mostly relieved. The yellow fields of wild mustard are 99.9 per cent gone, but the persistent enemy wild oats remains to be finally conquered. New outbreaks of weeds like fumitory and false chamomile spring up here and there to continue challenges in weed control. Also, pesticide regulations pose a problem, but these will be solved as agricultural scientists and farmers have solved such technical problems in the past.

North Dakota is and will remain with its solid base on crop agriculture. 75 per cent of our land is now tilled, with 65 per cent of new income from crops. Our northern environment is best suited to crop agriculture. In addition are the 10 to 12 million acres of North Dakota native and seeded grassland that will be harvested and marketed through livestock as in past years. Crop roughages, hay, silage and feed grains also will be converted by livestock to salable, usable products for people.

North Dakota is a crop and food exporting state. Our domestic markets in other states and foreign consumers depend upon our production of high quality grains, potatoes, sugarbeets, flax, etc. This trend will continue or expand many years into the future. New technology will only increase or expand crop agriculture in North Dakota. We will continue to improve our techniques of pest control and improve nutrition of crop plants through more precise fertilization, and maybe the application of growth regulators to enhance plant performance. Eventually, we will make crop plants more efficient in the use of the sun's energy through photosynthesis, improve soil, water and crop residue conservation, and many other advances will be made.

BUT AN EVEN MORE SIGNIFICANT BREAKTHROUGH will be the development of small grain and other grasses or non-leguminous plants that will host other living organisms for symbiotic nitrogen-fertilization. Some tropical grasses now are being grown in association with certain bacteria and other organisms and exhibiting benefits of nitrogen nutrition not available in or supplied by original or inherent organic or inorganic nitrogen sources in the soil. While this phenomenon now is exhibited primarily in tropical or very warm soils, I believe that crop:host:nitrogen-fixing bacteria associations will be developed for many of our major food crops, wherever grown, in future years.

All of the above points to and supports the fact that continued use of 75 per cent of the agricultural land in North Dakota for cultivated crop culture will continue to supply our traditional domestic and export markets. A small amount of more intensive cultivation of submarginal land will result from new irrigation in North Dakota.

We temporarily, as at times in the past, have an apparent surplus of food and feed grains in the United States and in North Dakota. But this situation will be considered as a fortuitous "valuable food reserve" in future years as populations and demand for food expand, and increasing amounts of food grains and legumes are consumed directly as food by people.