NORTH DAKOTA
Farm Research
Bimonthly Bulletin

Volume 34, Number 3 January-February, 1977

Guest Column

Fred R. Taylor
Chairman, Department of Agricultural Economics

Once again the North Dakota Legislature is in biennial session and University officials are presenting projected University, Experiment Station and Extension Service budget needs for the coming biennium. I have always been surprised at the fact that the legislatures of the most urban states provide greater amounts of funds to their Land Grant Universities, Experiment Stations and Extension Services than the most rural states. This is normally true using dollar amounts of agricultural production or agricultural income as a basis of comparison.

From my vantage point as an economist, it would seem that using the most generally expected criterion, the cost-benefit ratio—that the reverse should be expected. Thus, the most agricultural states would provide the greatest financial support for agricultural research and education. This leads me to attempt to justify this view.

Over the years, much has been said and written about the benefits of agricultural research and education. Yet, there has been a continual problem of obtaining adequate funding, sometimes even to sustain, let alone increase the agricultural research and education program of our Land Grant Universities, Experiment Stations and Extension Services.

North Dakota is an agricultural state; agriculture is North Dakota's biggest industry—accounting for about four out of every five dollars of new wealth generated in the state's economy. The health of agriculture is basic to the health of North Dakota's economy.

Additional funds for agricultural research and education are needed to help offset the effects of an inflation that has increased the costs by some 6 to 12 per cent per year. Other factors contributing to the needs for additional funds include new energy, natural resource and environmental constraints, the changing state of the arts, the chang-

(Continued on page 38)

In This Issue

On The Cover: Superintendent Tom Conlon, left, and former superintendent Ray Douglas are happy to have the extra feed stored in the background for the wintering cattle at the Dickinson Branch Experiment Station. (Photo by Jim Berg).

NORTH DAKOTA
Farm Research
Bimonthly Bulletin

Vol. 34, No. 3 January-February, 1977

A BIMONTHLY progress report published by the
Agricultural Experiment Station,
North Dakota State University of Agriculture and Applied Science
Fargo, North Dakota 58102

Arlon G. Hazen
Dean of Agriculture, and Director of Agricultural Experiment Station

EDITORIAL ADVISOR
H. Roald Lund

EDITORS
Robert A. Jarnagin
J. J. Feight *Gary Moran* *Dorothea McCullough*

of aflatoxin contamination of corn silage. Silage samples were collected this fall from 19 farms in a three-county area and are being checked for aflatoxin. The data from this work will indicate whether or not aflatoxins in corn silage are a potential animal and human health problem.

BLACKLEG AND IBR VACCINATION

Researchers in the Department of Veterinary Science are working under a contract with the North Dakota Beef Commission to investigate immunological responses of calves from cows that have substantial immunity to blackleg and infectious bovine rhinotracheitis (IBR) at calving.

The primary objective of the research is to determine if the passive immunity the calf receives from its dam will interfere with vaccination responses to either blackleg or IBR. Efforts are also being made to determine the optimum age at which to vaccinate with these two vaccines.

Preliminary results have shown that a single chemical blood test can be used to determine the quantity and quality of passive immunity in the day-old calf resulting from consumption of colostrum milk.

COPPER LEVELS IN CATTLE

Copper was first shown to be a dietary essential in 1928, and is known to function in many growth processes. Copper deficiency may occur when there is insufficient dietary copper or the copper is tied up by molybdenum. In cases of copper deficiency, bone disorders, nervous system problems, poor growth and scours are often observed.

Based primarily on data acquired from diagnostic specimens, it was evident that the copper nutrition of North Dakota cattle should be investigated. A project was developed in the Department of Veterinary Science and is now underway to measure copper levels in cattle. In this investigation, liver and serum samples from North Dakota cattle will be assayed for copper and molybdenum. The data from this investigation will be used in feeding recommendations and in establishing livestock nutrition standards.

VETERINARY DIAGNOSTIC LABORATORY

The Veterinary Diagnostic Laboratory at NDSU is involved in day-to-day evaluation of animal disease, providing diagnostic and laboratory support to practicing veterinarians.

The demand for diagnostic service runs high, as the lab handled over 3,800 cases in 1976. This compares to only 1,631 cases in 1969. The new modern diagnostic facility in the recently constructed Van Es Laboratories building has greatly increased the efficiency of the diagnostic laboratory to accommodate the growing case load.

The NDSU laboratory uses a variety of procedures, including gross and microscopic pathology, bacteriology, serology and toxicology. Procedures used are determined by the pathologist in charge, in consultation with the practicing veterinarian submitting the case.

North Dakota's 90 practicing veterinarians serve the largest area per veterinarian in the United States, so the availability of a modern diagnostic laboratory is an important part of the disease prevention effort in the state's livestock herds.

(Taylor . . . from page 3)

ing status of the work ethic, the changing sophistication of the inputs and such items as health and safety regulations, pollution controls, and the increasingly complex food and fiber system involving about 17 million people (one U.S. worker in five).

Historically, the aim of the Land Grant Universities' research and education arms has been to ensure that expenditures of public funds on food and agricultural research are one of the soundest investments in the future welfare of mankind that can be made. Given the opportunity, the dedicated workers in these institutions are ready and able to continue to supply the knowledge that North Dakota and the U.S. will need for a bountiful supply of food and agricultural products for the future.

The U.S. population is expected to double within the next 50 years. This increasing population will have to be fed and clothed using cropland acreage not much greater than the amount that has been cultivated since 1930.

Private investments in agricultural research are limited since they cannot capture enough of the benefits created by such investments. Thus, the public sectors must finance and do a large part of the agricultural research, including the dissemination of the results. Among the key institutions in this public research capacity are the Agricultural Experiment Stations and Extension Services of the Land Grant Universities.

With growing competition for both federal and state budget funds, Land Grant Universities

(Continued on page 48)

Agricultural Experiment Station
NORTH DAKOTA STATE UNIVERSITY
of Agriculture and Applied Science
University Station
Fargo, North Dakota 58102
Publication

DIRECTOR

to

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE
AGR 101

U.S.MAIL

THIRD-CLASS

(Taylor . . . from page 38)

have been called upon to provide projected rates of return or benefit-cost analysis of their research and extension budget requests. Numerous studies (T. W. Schultz, Griliches, Tweeten and Hines, and Bredahl and Peterson—to include a few) have all shown that agricultural research and extension expenditures have high rates of return.

The next 100 years will be a challenge to our agriculture. The United States, as the major exporter of grains to the deficit areas of the world, has a crucial role in feeding the world's growing population. Research and the development of appropriate technologies are a major key to a future with enough food. In the future, U.S. agriculture must do with less in almost every aspect of life, except possibly knowledge. With proper funding of agricultural research, one expanding resource will be knowledge and it will enable us, if properly used, to keep abreast of growing needs and expectations.

If the United States is to achieve the required increases in agricultural productivity, more resources will have to be devoted to agricultural research. Resources are not given or fixed in any absolute sense. They are fixed with respect to a given state of knowledge. Over time, resources are created through scientific research and technology development. A considerable time lag occurs between scientific discoveries and actual adoption of the technology. Thus, productivity of the year 2000 and beyond will be based on the research of the next decade or so.

Successful research in the biological, physical and engineering departments may require new production, distribution and consumption patterns, new property relations, modified financial and other institutions, in fact, new conceptions of the economic, social, and political worlds. Thus, economic and other social science research is strategic to such a transformation process.

I believe that given proper funding, agricultural research could help develop and make available technological developments that are only dreamed of in the dark recesses of a few people's minds today. Then if given proper farm prices and costs and adequate supplies of inputs, the United States farmers could literally double their agricultural production.

There is a great **need for** more support for **research and education to reduce the uncertainty** and provide the inputs needed to keep North Dakota agriculture healthy, wealthy and wise!