The Business option is intended to prepare students for careers in agricultural business or industry, the Production and Farm and Ranch Operation and Management options for careers in farming and ranching, and the Science option for graduate work or careers in teaching and research.

Elective courses are available in Cereal Technology, General Agriculture and Veterinary Science. A two-year Veterinary Science curriculum is offered at NDSU for students planning to enter one of the 18 accredited colleges of veterinary medicine in this country.

Graduate Study

Graduate study is available to students who wish to continue beyond the bachelor degree. Study leading to the Master of Science degree in agriculture is offered by all of the departments which offer the B.S. degree, plus the Department of Cereal Chemistry and Technology and by special arrangement in General Agriculture.

Qualified students can continue their studies and earn a Doctor of Philosophy degree in the following departments: Agronomy, Animal Science, Botany, Cereal Chemistry and Technology, Entomology, Plant Pathology, or Soils.

Facilities

Comfortable modern residence halls with lounges and study areas are provided for men and women. Arrangements for room and board should be made with the Director of Housing. Housing for married students is available.

The North Dakota Agricultural Experiment Station and the Cooperative Extension Service are located at NDSU. Over 2,400 acres of land and many modern facilities are devoted to research on a great variety of agricultural problems.

Buildings on campus devoted to teaching, research and extension in agriculture include Morrill Hall, Walster Hall, Agricultural Engineering, Dairy Science, Sheppard Livestock Arena, Waldron Laboratory, Harris Laboratory, Van Es Hall and the greenhouses.

Located a mile northwest of the campus is the farm unit with additional educational facilities in the Animal and Poultry Research Centers; Dairy, Sheep, Swine and Beef Barns; and the Farm Shop.

Financial Information

The cost of attending NDSU is an individual matter. However, in-state residents should plan for a minimum of approximately $420 to $450 per quarter, or $1,260 to $1,350 per academic year. Out-of-state residents should plan for an additional minimum of $729 per year.

Students who need financial help should contact the NDSU Financial Aids Office for information regarding part-time employment, scholarships and loans. A placement service also is maintained on campus to assist students who seek part-time employment during the school year.

THE RESEARCH FUNCTION of the AGRICULTURAL EXPERIMENT STATION

H. R. Lund
Assistant Director

Location

Agricultural research at NDSU is conducted on the main station at Fargo, and on seven branch experiment stations located at Carrington, Casselton, Dickinson, Hettinger, Langdon, Minot and Williston. Administratively the research is coordinated from Fargo. The Agricultural Experiment Station is closely integrated with the College of Agriculture, and many staff members of the Agricultural Experiment Station also have assignments and responsibilities in the College of Agriculture.

Approximately 1,800 acres of NDSU’s 2,400 total acres are devoted to plots, fields, pastures, barn areas and other similar uses for the teaching and research programs. The rest of the land is occupied by campus buildings, housing, athletic facilities, etc. The branch experiment stations total approximately 6,200 acres, for a total of 8,000 acres in use by the College of Agriculture and Agricultural Experiment Station in North Dakota.

The main station, branch stations and discipline organization are summarized as follows:

Main Station departments and chairmen

Agricultural Economics Dr. Fred Taylor
Agricultural Education Dr. Donald Prieb
Agricultural Engineering Mr. W. J. Promersberger
Agronomy Dr. Jack Carter
Animal Science Mr. M. L. Buchanan
Bacteriology Dr. Kenneth McMahon
Biochemistry Dr. Harold Klosterman
Botany Dr. Warren Whitman
Cereal Chemistry and Technology Mr. Orville Banasik
Entomology Dr. John Callenbach
Horticulture and Forestry Dr. E. P. Lana
Plant Pathology Dr. R. L. Kiesling
Soils Dr. E. B. Norum
Veterinary Science Dr. Myron Andrews

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**Branch Stations and superintendents**

<table>
<thead>
<tr>
<th>Branch</th>
<th>Superintendent</th>
</tr>
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<tbody>
<tr>
<td>Carrington</td>
<td>Mr. Howard Olson</td>
</tr>
<tr>
<td>Casselton</td>
<td>Mr. LeRoy Spilde</td>
</tr>
<tr>
<td>Dickinson</td>
<td>Mr. Thomas Conlon</td>
</tr>
<tr>
<td>Hettinger</td>
<td>Mr. Timothy Faller</td>
</tr>
<tr>
<td>Langdon</td>
<td>Mr. Robert Nowatzki</td>
</tr>
<tr>
<td>Minot</td>
<td>Mr. Ben Hoag</td>
</tr>
<tr>
<td>Williston</td>
<td>Mr. Ernest French</td>
</tr>
</tbody>
</table>

**Personnel**

The complexity of the Agricultural Experiment Station organization and operation is partly illustrated by a brief description of the personnel involved in the program. The 1971-73 budgeted payrolls list a total of 372 authorized positions on a 12-month annual employment basis.

<table>
<thead>
<tr>
<th>Authorized Positions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fargo, Main Campus</td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>138</td>
</tr>
<tr>
<td>Nonprofessional</td>
<td>109</td>
</tr>
<tr>
<td>Graduate Research Assistants</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>345</td>
</tr>
<tr>
<td>Branch Experiment Stations</td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>14</td>
</tr>
<tr>
<td>Nonprofessional</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Grand Totals</td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>152</td>
</tr>
<tr>
<td>Nonprofessional</td>
<td>122</td>
</tr>
<tr>
<td>Graduate Research Assistants</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>372</td>
</tr>
</tbody>
</table>

These figures do not show the 15 full-time research professional people and their allied nonprofessional help who are stationed in the University facilities and financed by USDA, and the professional and nonprofessional personnel in the Department of Agricultural Information who are listed in the Cooperative Extension Service payroll but are partially financed by the Station.

Also not shown is the complement of professional scientists with the USDA Metabolism and Radiation Research Laboratory located on the campus. This competence in the midst of the campus has beneficial impacts upon both the teaching and research programs of the University.

**Financial Support**

Agricultural research activities at the Main Station and Branch Stations are supported from state appropriations, federal appropriations, and institutional collections. The present annual operating budget totals about $4.6 million. This sum is composed of approximately 60 per cent state appropriations, 20 per cent federal appropriations (which is administered through the USDA), and 20 per cent from gifts, grants and sales of research by-products.

The state appropriations which comprise about 60 per cent of the $4.6 million annual operation funds, can be compared with the annual cash farm income in North Dakota from farm marketings and government payments 1968 through 1971 which averaged about $875,000,000. Relating only this income to the expenditure for agricultural research as contained in the current annual operating budget shows these relationships:

1968-1971 average annual cash farm income, North Dakota $875,000,000

Current annual budget, all sources of funds, Agricultural Experiment Station (one-half of the 1971-73 total), including buildings 4,561,993

Percentage Station budget is of farm income 0.521 per cent

Current annual budget, State General Fund only, Agricultural Experiment Station (one-half of the 1971-73 total)

Operating 2,753,344
Buildings and land 14,163
Total $ 2,767,507

Percentage state appropriations is of farm income 0.316 per cent

Thus, the present total research investment compared to the average North Dakota cash farm income over a four-year period is indeed very small — about one-half of one per cent. From the General Treasury it is just over three-tenths of one per cent. Other similar comparisons could also be made.

**Research Objectives in Agriculture**

Research in any field consists of asking carefully structured questions looking for answers to those questions by careful methods of science. Agricultural research is a systematic way to gain and apply knowledge efficiently to the biological, physical and economic phases of producing, processing and distributing farm, ranch and forest products. It also includes consumer health and nutrition, and the social and economic aspects of rural living in its search for knowledge.

Use of public funds in agricultural research includes a broad base of fundamental science that is not normally part of industrial research. The millions of farmers could scarcely organize to conduct a program of effective research for their needs.
without public assistance. Public interest demands a thorough and systematic program, since many research projects show no promise of immediate profit. The public-supported system helps avoid the duplication of effort which is bound to occur in highly competitive private research. The public shares in the benefits of this research since discoveries do not create a monopoly.

A long-range study started in 1965 by a joint Department of Agriculture (USDA) State Agricultural Experiment Stations (SAES) task force was completed in 1966. The study was to define the goals, purposes and scope of national agricultural research. To appraise the character and effectiveness of the current program, a research classification was developed to project the future needs of people as they relate to agriculture and to specify resources required.

This system contained nine goal statements for research which would enable agriculture to fulfill its role in meeting the nation's needs.

1. Insure a stable and productive agriculture for the future through wise management of the nation's natural resources.
2. Protect forests, crops and livestock from insects, diseases and other hazards.
3. Produce an adequate supply of agricultural products.
4. Expand the demand for agricultural products by developing new and improved products with better quality.
5. Improve efficiency in the marketing system.
7. Improve the health, nutrition and well-being of the American consumer.
8. Assist rural Americans to improve their level of living.
9. Promote community improvement, including development of beauty, recreation, environment, economic opportunity and public services.

The agricultural research classification system uses a measure of research activity known as a scientist-man-year (SMY) which indicates the output of a professional research scientist during a 12-month period. The ability of the agricultural research system to change priorities is demonstrated in the following table. Fiscal year 1966 is used as a base year and is compared with fiscal year 1971 by using SMY as a measureable component. These changes do not substantiate the popular current allegation that agricultural research is outmoded and directed to the wrong segments of the American society. Also summarized in the following table is the SMY effort in the respective goals by SAES agricultural researchers in the North Dakota Agricultural Experiment Station.

### SUMMARY OF SOME MAJOR RESEARCH PROJECTS IN THE AGRICULTURAL EXPERIMENT STATION

**Insect Studies**

Entomology is a conservation science designed to aid in food and fiber production and help maintain the health of animals and man.

Since insect species outnumber all other plant and animal species combined, one or more insect species will be associated to some degree with every biological situation that may be encountered. Commonly, the layman's reaction to insects is that all are harmful, loathsome things and should be exterminated. This is fallacious, since many insects are beneficial pollinators, scavengers, parasites and predators of other noxious insects, food for birds and fish, and the like. Thus, with both destructive and beneficial insects in the environment, when a pest insect species becomes so numerous as to threaten agricultural production or public health, control can be extremely complex. That pest species must be controlled, but care must be taken that non-target species (this includes the beneficial insects, plus birds, fish, domestic animals and man, himself) are not adversely affected.