NDSU | NORTH DAKOTA STATE UNIVERSITY

STATE BOARD OF AGRICULTURAL RESEARCH AND EXTENSION
Agribusiness and Applied Economics
Dr. William Nganje, Chair, November 2, 2021

I. Background and Accomplishments

1) Student placement at 98% or higher.
2) Premier Commodity Trading Room (CTR) contributes significantly to faculty and undergraduate research.
3) NAMA and Bison Fund students continue to conduct excellent undergraduate research in the areas of marketing and financial investment.
4) Top ranked program, in the top 40 of all applied economics department globally.
5) Constant interaction with stakeholders on advisory of our five research centers (CAPTS, CTR, PCPE, QBCC, BioEpic)
6) Highly productive faculty – publish 1.5x national average, with four journal editors.
7) All faculty with 30% research appointment or higher have Hatch Projects.
7) Department has 27 graduate students; leveraging 3.5 SBARE/Herbison funded positions annually. **Need for more Grad Students with recently approved PhD program.**
8) The department houses the ND Tax Model.
9) Provide three extension conferences on Crop Outlook, Insurance, and Ag Lenders Conference.
11) Active fund raising for three endowments (CTR and Burdick Center for Cooperatives).

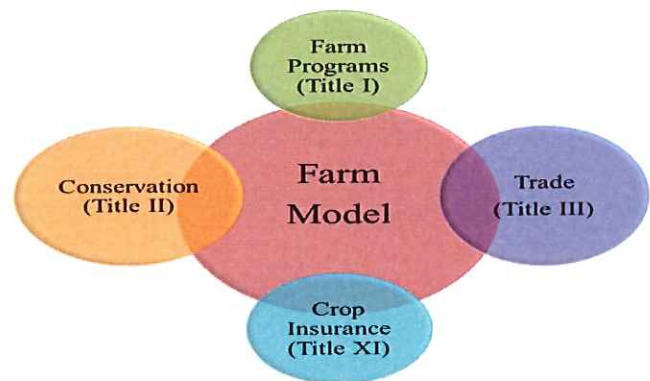## II. Research Need for Food Security and Trade

North Dakota is a global leader for producing major commodities and minor crops to meet global food security challenges.
Importance: Demand side issues play a major role in addressing food security challenges. Major opportunities exist in the Agribusiness and Applied Economics department to position ND as a leader in demand side market issues and trade. The department has developed farm models for four major crops (soybeans, wheat, corn, and sugar beets). The models are currently being used to analyze some of the Titles of the Farm Bill (Fig 1). A challenging aspect of these models are their tremendous appetite for accurate data

and data collection (see Appendix with sample research currently conducted).
Currently the data work is done by graduate students with no institutional knowledge. There is a need for a technician to assist CAPTS' researchers and preserve institutional knowledge on demand and trade data. Historically, this position was helped by Richard Taylor who retired several years ago and was funded by Earmarked funding. Such funding is no longer available.

Figure 1: Farm Model

III. Research Need for Food and Energy Security Contribution Studies

Agriculture is one of the key cornerstones of the state's economy in conjuncture with energy. Renewable energy can provide a well diversified energy portfolio for ND in the long-run. Little is known about the true impact of the renewable industry in ND.
Importance: Oil and gas from fossil fuel could be depleted in 60 or 70 years. Other middle eastern nations are investing hundreds of millions of dollars on renewable energy to ensure food and energy security. The impacts of the agriculture and renewable energy sector could be updated every two years to inform policy in ND. **Need for one FTE for a**

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regional economist in the state to sustain work in the impact and contribution areas for ND industries, including agritourism.

IV. Research and Extension Need for Big Data Analytics

Position in data analytics using big data and focus on farm production decisions, marketing, etc. The Specialist would develop research and extension programs. Most modern technology innovations involve varying forms of big data being analyzed to make microeconomics farm management decisions. This includes variable rate fertilizer, seeding, pesticide use, etc. In all cases, data is generated intra-field using satellite imagery, sensors and others. This data is then analyzed to determine optimum agronomic decisions, presumably this should be **profit maximization and sustainable returns on investment (ROI).** Similar procedures could be developed for marketing decisions, among others. **Need for one FTE position**

Scope: Production economics, marketing, among others. Work closely with big data person on bioinformatics and breeding programs; complement efforts in Farm management, Agbiosystems Engineering, Center of Risk and Trading, Data analytics program in the CBA, Grand Farm and AgTech development in ND and the regional (e.g., Sentara and others).

Importance: See link for University of Illinois creating a Digital Ag Center and companies highlighting the importance of this. (e.g., Land o Lakes; John Deere; Cargill, etc.).

https://www.feedstuffs.com/news/university-illinois-creating-digital-ag-center?NL=FP-006&Issue=FP-006_20191010_FP-06_456&sfvc4enews=42&cl=article_2_2&utm_rid=CPG02000000845716&utm_campaign=43037&utm_medium=email&elq2=4d3841c7625f4453a68577d810ad9a5c

Appendix: Ongoing Work on Farm Models

Month	Activity	Degree of Completion (%)	Comment
June 2021	Submit Report on Prediction of Crop Yields in the Presence of Random Shocks	100%	The final version of this draft has been submitted and is expected to be published as a departmental report before the close of the calendar year 2021.
July 2021	Development of Survey Instrument for Relevant Variables. Literature Review (Yield, Price Analysis and State level Trade Efficiency Prediction)	90%	The section on the farm survey has been delayed to upon advice. The proposal for this farm survey on agriculture, climate change and carbon sequestration will be submitted as an independent project in the 'Call for FY 2023 Research Funding Requests'.
August 2021	Pretest of Survey Instrument and Literature Review. Literature Review (Yield, Price Analysis and State level Trade Efficiency Prediction)		
September 2021	Pretest of Survey Instrument and Literature Review. Literature Review (Yield, Price Analysis and State level Trade Efficiency Prediction)		The section on forecasting state level soybean export is 90% complete contingent on feedback from the NDSC and comments from peer review.
October 2021	Data Collection and Curation for Yield Analysis. Data Collection and Curation for Price Analysis	25%	Currently curating the data. Data being curated includes historical payment information on farm program payments and crop yields.
November 2021	Data Analysis and Presentation of Results for Yield Analysis. Data Analysis and Presentation of Results for Price Analysis		This section will evaluate the impact of farm programs on yield and income risk mitigation.
December 2021	Data Analysis and Presentation of Results for Yield Analysis. Data Analysis and Presentation of Results for Price Analysis		
January 2022	Analysis of the determinants of State Level Trade Efficiency	0%	
February 2022	Analysis of the determinants of State Level Trade Efficiency	0%	

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