

Proposal
Texas AgriLife Research Air Quality Research Program
FY2014-2015

Economic Impacts of the Environmental Protection Agency's Regulation of Greenhouse Gas Emissions on the Livestock Industry of the Texas High Plains Region

Principal Investigator:

Dr. Seong C. Park, Assistant Professor, Texas A&M AgriLife Research, Vernon, TX

Co-Principal Investigator:

Dr. Steve Amosson, Regents Fellow, Professor and Extension Economist, Texas A&M AgriLife Extension Service, Amarillo, TX

Collaborator:

Dr. Bridget Guerrero, Postdoctoral Research Associate, Texas A&M AgriLife Extension Service, Lubbock, TX

Dr. Tong Wang, Postdoctoral Research Associate, Texas A&M AgriLife Research, Vernon, TX

Amount Requested per year: \$10,500 FY2014; \$10,500 FY2015

A. Executive Summary:

Problem and background: The recent Environmental Protection Agency (EPA) consideration of adopting greenhouse gas (GHG) regulations is expected to impose potentially costly and burdensome requirements on animal agriculture, which could be detrimental to the Texas economy. The Texas High Plains would be the area of the state that could be impacted the most. This area is well known for established cattle feeding and hog operations and is home to a rapidly growing dairy industry. Therefore, the economic impacts of EPA regulation of GHG emissions on the Texas High Plains' livestock industry would be substantial and have an even more significant impact on the region's economy. To date, no study has been conducted to identify the impact on the Texas High Plains' livestock industry and the regional economy due to imposing GHG regulations.

Approach: The socioeconomic input-output IMPLAN (IMPact analysis for PLANning) model is used to understand the linkages between sectors of an economy and estimate the impacts of changes in the economy. An advantage of the IMPLAN model is that it allows the incorporation of user-supplied data throughout the model building process. This aspect makes the model flexible and enhances the accuracy of impact results. The initial study area is the Texas Panhandle region that consists of the top 26 counties in Texas.

Expected deliverables: The economic impacts of EPA policies on the Texas High Plains livestock industry include direct, indirect, and induced effects on industry output, employment, and value added for the study area.

B. Proposal Narrative:

1. Introduction

The recent EPA's consideration of the GHG regulation to cover emitters of carbon dioxide, methane and nitrous oxides stems from a Supreme Court's decision in 2007 that GHG emissions could be regulated by EPA under the Clean Air Act if it determined that they endanger public health or welfare. However, once the GHG emission regulations are finalized under the Clean Air Act, certain provisions are expected to impose potentially costly and burdensome requirements on agriculture, small business, and the economy in general. Moreover, a significant number of agricultural operations, which were not previously regulated under the Clean Air Act, would come under permit requirement such as Title V and New Source Review (NSR)/Prevention of Significant Deterioration (PSD) Building based on the USDA publication (USDA, 2009).

Regulating GHG emissions, therefore, can cause an increase in prices of commodities produced by agricultural sectors, which leads to an increase in production costs of processing companies that use such commodities as input factors. Processing companies then may reduce their production or raise the prices of consumer products. The livestock industry is a good example that is greatly influenced by regulation of GHG emission because an increase in production cost of the livestock industry would lead to an increase in the prices of livestock products and also lead to a decrease in profit margin of the industry (Kim and Koo, 2010). The Texas High Plains is known as the "Cattle Feeding Capitol of the World" producing more than 25% of the countries' fed beef. In addition, hog production in the region has increased from less than 10% of the state's total to almost 94% in the last 20 years (Amosson et. al., 2009). The same factors that attracted fed beef and swine operations are known to lead to a rapidly expanding dairy industry in the region. It is expected that the economic impact of EPA GHG regulations on the Texas High Plains' livestock industry would be substantial and the impacts on the regional economy could be catastrophic. Currently, no study on regional economic impacts in terms of implementing potential GHG regulations in the Texas High Plains has been conducted.

2. Goal and objectives

The overall goal of this project is to estimate the economic impacts of EPA regulations on GHG emissions on the Texas High Plains' livestock industry and the resultant impacts on the region's economy. Specific objectives are 1) to evaluate the economic implications of implementing the various EPA's policies being considered and 2) to give policy makers insight with respect to the impacts on the regional economy from potentially adopting EPA regulations for GHG emissions.

3. Methodology

Input-output modeling is a method used to understand the linkages between sectors of an economy and estimate the impacts of changes in the economy. Many studies have quantified the economic impacts of policies or alternative scenarios on a region with the input-output IMPLAN (Impact analysis for PLANning) model. This computer-based system was originally developed

by the United States Department of Agriculture’s Forest Service to assist in land and resource management planning. The Minnesota IMPLAN Group later privatized the development of the computer software. Data is updated annually while the software was recently updated to IMPLAN Version 3.0 (Minnesota IMPLAN Group, 2009). The model provides access to comprehensive and detailed data coverage of the entire U.S. by county. IMPLAN datasets are compiled from a wide variety of sources including the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor, and the U.S. Census Bureau. An advantage of the IMPLAN model is that it allows the incorporation of user-supplied data throughout the model building process. This aspect makes the model flexible and enhances the accuracy of impact results (Minnesota IMPLAN Group, 2004).

The estimated direct impact to the Texas livestock industry from EPA’s GHG policies will serve as the input for the socioeconomic IMPLAN model to estimate the effects on overall economic activity in the study area. This model captures the “spillover effects” on other economic sectors linked directly and indirectly to the livestock industry. These impacts are referred to as direct, indirect, and induced effects. Direct effects represent the impacts for the livestock industry specified as direct final demand changes. Indirect effects represent the impacts caused by other agricultural sectors when supplying more (or fewer) inputs for livestock production. Induced effects represent the responses of all local industries caused by the change in household income/spending generated by the direct and indirect effects of final demand changes.

Multipliers are produced from the IMPLAN model to estimate the total economic impact of a “shock” within an economy. In the process of constructing the regional economic model, a social accounting matrix is generated which includes detailed information about the flow of dollars and local economic interactions. The social accounting matrix is then used to create region-specific multipliers that generate the economic impacts. The impacts generated will include direct, indirect, and induced effects for industry output, employment, and value added for the study area (Minnesota IMPLAN Group, 2004).

The initial study area is the Texas Panhandle region that consists of the top 26 counties in Texas. First, a baseline model will be developed for every county in which the livestock industry runs in an unregulated profit maximizing matter (current status). Then, IMPLAN models with several alternative policy scenarios will be constructed to estimate the economic impact of various EPA regulations of GHG emission on the livestock industry.

4. Deliverables with a time line

Activity	FY14				FY15				Responsibility
	1	2	3	4	1	2	3	4	
Project preparation and planning									Park, Amosson, and Guerrero, Wang
Data collection and data analysis									Park, Wang, and Guerrero
IMPLAN model development									Park, Wang, and Guerrero
Results and sensitivity analysis									Park, Wang, and Guerrero
Publication of results and presentation at national and regional conferences									Park, Wang, Amosson, and Guerrero

. 2004. *IMPLAN Professional Version 2.0; User's Guide; Analysis Guide; Data Guide*. 3rd ed: MIG, Inc.
 USDA, NASS, 2009. Farms, Land in Farms, and Livestock Operations 2008 Summary. Available at <http://usda.mannlib.cornell.edu/usda/nass/FarmLandIn//2000s/2009/FarmLandIn-02-12-2009.pdf>

E. Budget

	FY14			FY15		
	Dr. Park	Dr. Amosson	Total	Dr. Park	Dr. Amosson	Total
Salary	\$8,000		\$8,000	\$8,000		\$8,000
Travel	\$1,000	\$1,000	\$2,000	\$1,000	\$1,000	\$2,000
IMPLAN Workshop	\$500		\$500	\$500		\$500
Total	\$9,500	\$1,000	\$10,500	\$9,500	\$1,000	\$10,500

The total budget request for this project is \$21,000. The primary expense associated with this project is partial support for two postdoctoral research associates who will collect and analyze data and run IMPLAN models. Support includes salary for 2 months effort for each year. Two research associates will work in close collaboration with Drs. Park and Amosson. Travel fund for Drs. Park and Amosson to various locations (Lubbock, College Station, and Amarillo) for initial and regular meetings of the project team is included. Support has also been budgeted for Dr. Park or Dr. Wang to attend the IMPLAN workshops (introductory and advanced levels) and a professional meeting to present results and obtain feedback.

F. Attachments: CV for Drs. Park, Wang, Amosson and Guerrero