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RESEARCH PROJECT TITLE

The Actual Cost of Food Systems on Roadway Infrastructure

SPONSOR

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The Actual Cost of Food Systems on Roadway Infrastructure

tech transfer summary

Between 12 and 18 percent is saved on the external cost per vehicle when light-duty trucks are used.

Objectives

This project was designed to provide more insight into the infrastructure challenges of agricultural enterprises in Iowa and to also facilitate the understanding needed to implement broader energy-related policy and planning. This work also provides farmers and farmer networks with the necessary resources to justify increased local and state investments in the local and regional food systems.

Problem Statement

The impact on the transportation infrastructure is very much dependent on the type of vehicle used to move goods. While heavier vehicles are employed on cross-country distances, for local and regional, mid- to light-trucks are used to move shorter distances.

To help demonstrate the value of the project to farmers, this project sought to develop a systematic methodology for estimating the actual cost of moving food produce from farm to market, including these costs:

- Environment (carbon emissions and air quality)
- Infrastructure
- Energy (fuel)
- Congestion (travel time)
- Safety (crashes)
- User (taxpayer) costs

Research Description

This study investigated the impacts of the conventional, regional, and local food systems on the roadway infrastructure. Researchers analyzed data on vehicle miles traveled (VMT) in moving food from farm to table, types of vehicles used, and the weight of food moved.

To estimate the impact of local, regional, and conventional food systems, this study used three different types of data to estimate food freight:

- Food freight data from the Commodity Flow Survey (CFS)
- Local consumption data from the U.S. Food Market Estimator
- Local county consumption data from fresh fruit and vegetable survey

The U.S. Department of Transportation's CFS is designed to provide data on the flow of goods and materials by mode of transport and is the primary data source on domestic freight movements. Its limitation for this project is not distinguishing between food and non-food freight. The CFS also doesn't track what is sold at farmers' markets around the country. And, the origin and destination of commodities are aggregated as states, which make it impossible to track local food system distribution.

The researchers used the Leopold Center's U.S. Food Market Estimator to address the CFS data limitations. To compare the regional with the local food system, the team focused on consumption data for the amount of fresh fruits and vegetables received by retailer by county in Iowa. Limiting the sample study to only fresh fruits and vegetables provided a consistent way to compare among the food systems.

The U.S. Food Market Estimator data reflects an ideal situation of consumption rate per capita, based on the national average. It doesn't consider accessibility to food or grocery stores, or income, among other factors.

To account for this limitation, this study included a survey in three counties—to compare the impact of location, demographics, and access to a major highway on the local food system. The survey captured the amount of fresh fruits and vegetables received by retailers or restaurants weekly.

The limitation with this data was the poor response rate for the urban county. Also, information was missing on the amount of fresh produce locally grown and sold.

However, the research was able to estimate the external costs of moving food in the local, regional, and conventional food systems and its impact on roadway infrastructure. The "external costs" or "true cost" of the freight of food included emissions, crashes, travel time, and pavement deterioration. These costs were computed using the Federal Highway Administration (FHWA)'s Highway Economic Requirements System-State Version (HERS-ST).

Key Findings

Food freight increased five percent between 2002 and 2008 and is expected to increase more than 80 percent by 2035. Likewise, the external costs are expected to increase proportionate to the freight increase. The external costs of moving food on the conventional and regional food systems far surpasses the total revenue the state brings in for transportation-related programs, so much that, at the current levels, it cannot even support pavement maintenance.

From the available data, the regional food system moves more freight weight wise than the conventional, due to the data not tracking the freight that passes *through* the state. In any case, encouraging the development of a regional food system won't do much to change the food freight trend. Currently, the cost for moving fresh fruits and vegetables within Iowa comes to a staggering \$76 per pound.

The case for a local food system is all about reducing the distance food travels, which makes it feasible to move the food with a lighter-weight vehicle that has negligible impact on the pavement, compared to the semi-trailers that dominate the state's highways.

The study of local food systems for the three counties demonstrates that remote areas are more likely to develop local food systems to supply demand. In the local food system in rural Adams and Taylor Counties, the Farmers' Markets and roadside pick-up truck vendors are important to meet the fresh fruit and vegetable demand. In contrast, Story County has the benefit of being close to a major highway and the Interstate system for supplying their demand for fresh produce. Therefore, in more urban counties, making a case for local food depends on making a case given the external costs of transportation.

With local food systems, the external costs of transportation are very low compared to the regional and conventional food systems. In addition, dependence on the conventional food system has a stark disadvantage for the urban areas, as it tends to create food deserts when one group is cut off, disadvantaged by income or access to public transportation. On the other hand, developing a local food system close to the urban counties does have huge economic benefits for the state, as more and more people are beginning to question where their food comes from, and other studies have shown that consumers are willing to pay more for locally-grown fruits and vegetables.

Implementation Readiness

The project presents the unsustainability of the conventional and regional food systems and provides adequate information and background to begin a serious policy discussion on road-use costs in the state.

This is information that can be used by the farmers and farmers' networks, consumers, media, policymakers, and the food industry, including producer associations, processors, and food services companies, as well as academia, to provide constructive feedback as the policy discussion unfolds.

Implementation Benefits

The findings of this project benefits agriculture in the state as it places Iowa farmers in the spotlight, not just for its grains, this time, which is powering the bio-economy in the nation, but for the benefits that the state would accrue if Iowa agriculture was diversified with a view toward creating and sustaining the local food system across Iowa.

The project found strong reasons why Iowa should invest more in the local food system, as it has the least impact on roadway infrastructure. The total revenue for transportation-related programs in the state is not enough to even keep up with the damage to pavements from the conventional and regional food systems, much less the environmental impacts of these long distance hauls. In addition, a niche for local food systems exists in the urban counties that is sustainable and can expand the economic base of the state if pursued vigorously.