

EXAMPLES – IMPACT STATEMENTS

Impact example #1 (Final NIFA grant report)

Issue

The C4 grass sorghum is one of the most promising and productive species for biofuel production in the US. One of the key breeding objectives for biomass crops is increased yield. Although total biomass yield is a function of growth rate and growth duration, growth rate is typically not constant throughout the growing season. Hence, the potential exists to identify distinct genetic loci that control growth rates and plant architecture traits at different times in the growing season. To be able to conduct such research a robust automated phenotyping system is needed. But to date most automated phenotyping systems have been laboratory-based or greenhouse-based.

How you addressed the issue & results

We generated genetic marker data and analysis algorithms for identifying genetic control of growth rates in sorghum and identified a couple of genetic controls that affect yield. We also developed a field-based automated phenotyping system and associated image analysis method that has been optimized and shown to be efficient and accurate.

Impact

Both researchers and breeders will benefit from our accomplishment via improved lines to generate high yielding biomass sorghum hybrids and utilizing the automated phenotyping system to obtain mass amount of phenotype data. These methods conceivably can be extended to the study and improvement of other crop species.

Impact example #2 (Final report Hatch multi-state project)

Issue

With over 230 farmers markets and 150 registered vegetable growers in Iowa, growers of fruits and vegetables are in need of new food safety intervention strategies and education to ensure the safety of their products.

How you addressed the issue & results

At Iowa State University, Drs. Mendonca and Shaw conducted studies to determine the best produce sanitizers that can be used to improve a better quality of product in melons, peppers, leafy greens, and grapes (over 10 different products). Research results were disseminated to food industry personnel through peer-reviewed journal articles, book chapters, and conference posters and oral presentations. It is estimated that over 10,000 food industry personnel have been exposed to this research.

Impact

This research has been utilized to change industry practices—to help food industry personnel ensure the safety of their products.

Impact example #3 (Final report Hatch multi-state project)

Issue

Human pathogens cannot be utilized in a food production setting to determine if a food safety intervention is effective. Therefore, the use of surrogate microorganisms that act like the human pathogens are critical for the fresh-cut industry to have an accurate model. The selection and evaluation of surrogate microorganism is an area that is under-researched in the microbiology field.

How you addressed the issue & results

At Iowa State University, Drs. Shaw and Mendonca conducted research to identify surrogate microorganisms that can be used within a produce field setting and in a fresh-cut processing setting. To date, these two labs have been able to identify 5 strains that can be utilized for microbial risk assessment that mimic the attributes of *Escherichia coli* O157:H7.

Impact

With so few of options available, these 5 strains are a major contribution to the field of food safety.

Impact example #4 (Second year progress report for a 4-year multi-state project)

Issue

Most agricultural producers focus on producing and servicing a limited portfolio of commodities. These commodities include corn, soybeans, wheat, hay, cattle, swine and chickens. There is some diversity within each group, but because down-stream purchasers require a uniform final product, the range of diversity is limited. Crops and livestock destined for these markets depend on a well-developed input infrastructure capable of providing seed, fertilizer, pesticides and other related products/services. This particular model continues to grow on a world scale, but not without production-limiting issues, including farm-gate costs greater than receipts, soil degradation, water pollution, and herbicide/antibiotic resistance. Failure to address these factors will limit the sustainability of agriculture's production capacity, duration and farm-to-consumer markets.

How you addressed the issue & results

Iowa State University (along with the University of Minnesota and the Rodale Institute) established sites, testing cattle grazing small grains within a row-crop rotation, to reach the project goal of limiting off-farm inputs (fertilizer, pesticides and antibiotics) while maintaining a production level to ensure the economic viability of an integrated crop-livestock farm operation. All institutions monitored herd health, soil quality parameters, pasture and field productivity, food safety, and economic returns, and conducted a Focus Group and Field Day, during which the project's measures of success were articulated to producers.

Impact

The broader outcome this reporting period was an increase in stakeholder knowledge of methods to ensure soil quality remains high in the absence of synthetic fertilizers or pesticides in an

integrated system. Profitability results will be released in third year of project when more data is available.

Impact example #5(Final grant report)

Issue

With climate change becoming an increasingly pressing issue and with increased demand from a growing world population, significant pressure is placed on global land resources, particularly forests. Thus, continuous improvement of models used to analyze policies is crucial in order to reflect the best science available, including measures of uncertainty that provide confidence intervals for key variables of interest in major agricultural countries.

How you addressed the issue & results

We developed a new model of global agriculture and land use, which is better able to quantify the impact on global land allocation and the environment from policy initiatives, including agricultural and biofuel policies, climate change policies, and multilateral trade agreements. The initial CARD/FAPRI agricultural modeling system was used by major policymaking bodies, government agencies, commodity groups, as well as industry and academia for market outlook projections and for policy analyses including examining world market impacts of renewable fuel policies, alternative proposals during the Uruguay Round of Agreements Act, several U.S. farm bill rounds, and the WTO Doha Round. However, the CARD/FAPRI agricultural model did not previously include land uses such as pastures and forest and did not have a stochastic component providing measures of uncertainty. The newly developed modeling system will also be used for market projections and to conduct scenario analyses related to the impact on global agricultural markets and land allocation resulting from changes in market conditions and policy initiatives. The scenario analyses will quantify the impact of these policies in terms of expected changes in land use (now including pasture and forests explicitly), greenhouse gas (GHG) emissions, and commodity supply, utilization and prices. Additionally, the newly developed stochastic model will be used to provide measures of uncertainty around changes in endogenous variables of interest.

Impact

Advances achievable due to this modeling effort will help the competitiveness of agricultural producers by providing better science-based estimates of expected land use changes and environmental impacts, and by offering policymakers better analysis on the implications of biofuel and environmental policies based on existing uncertainty. Policymakers will be in a better position to make important policy decisions when provided with the distribution around point estimates of land-use change as well as GHG emissions impacts.

Impact example #6 (Final grant report)

Issue

Bovine Respiratory Disease Complex costs the United States Beef industry nearly a billion dollars per year. Beef producers need new strategies to overcome the negative impact of this disease. Vaccines have been used for years to combat this disease. However, there are cattle that do not respond to vaccines. Is this a problem with the vaccine or the calf's ability to respond to vaccination?

How you addressed the issue & results

This project has demonstrated that genetic variation of the calf is responsible for some of the variation in response to vaccination. Approximately, half of the variation in the ability of a calf to respond to vaccination (response vs. non-response) is due to variation in the calf. Furthermore, approximately half of variation in level (high, average or low) of response to vaccination is due to the genetics of the calf. In addition, molecular markers can predict the genetic merit of the calf to respond to vaccination. Therefore, it is now possible for American Angus beef producers to select for calves that are genetically predisposed to respond to vaccination.

Impact

It is expected that this will allow the U.S. Beef industry to reduce the negative impact of bovine respiratory disease complex.

Impact example #7 (Progress report – NIFA grant)

Issue

The U.S. poultry industry, especially the egg and turkey sectors, is encountering the unprecedented **natural disaster** of highly pathogenic avian influenza (HPAI - H5N2) outbreaks. As of May 29, the impact has amounted to 44.6 million birds lost, thousands of jobs lost or at risk, and direct and ripple economic effects in billions of dollars.

How you addressed the issue & results

As the project unfolded, new information and urgent industrial concerns surfaced, enabling us to fine-tune our proposed objectives. Project scientists are conducting research to 1) determine the presence of HPAI virus in the air and on environment at infected poultry farms; 2) model airborne transmission of HPAI among farms using Hybrid Single Particle Lagrangian Integrated Trajectory [HYSPLIT] model; 3) evaluate the efficacy of an electrostatic air filtration system for reducing incoming particulate matter in a layer house.

Impact

Work under this project is expanding our knowledge on transmission mechanisms and preventative measures. Outputs of the project allow scientific community and poultry industry to better understand the role of airborne transmission in HPAI outbreak and develop HPAI prevention strategies.