

# AG ECONOMICS

## ECONOMIC IMPACT OF DELTA RESEARCH AND EXTENSION CENTER

Larry Falconer

**"DREC GENERATED AN ESTIMATED \$18.74 MILLION IN ECONOMIC ACTIVITY IN MISSISSIPPI THIS FISCAL YEAR THROUGH EXPENDITURE OF APPROPRIATED FUNDS AND GRANT FUNDING FOR PAYROLL ALONG WITH EXPENDITURE OF GRANT FUNDS FOR RESEARCH ACTIVITIES. THE FACULTY AND STAFF AT DREC CARRYOUT WORK ON ECONOMICALLY IMPORTANT PROBLEMS FACING DELTA AGRICULTURE."**

*Larry Falconer*

Delta Research and Extension Center (DREC) currently employs 111 personnel and approximately 40 additional intermittent employees during the growing season. DREC's payroll for 2016/2017 was \$6.15 million; \$2.76 million dollars in appropriated funds and \$3.39 million in grant funding, resulting in a statewide economic impact of \$9.66 million. An additional \$5.25 million of grant funds procured by faculty at DREC generated an estimated statewide economic impact output of \$9.08 million for the year. Also, the following selected research and extension programs are examples of the many programs at DREC that made significant positive contributions to the Mississippi economy.

DREC plant pathologists annually monitor for the presence of QoI-resistance within the foliar fungal disease complex. Due to the development of widespread fungicide resistance, the misuse of fungicides is an added expense for soybean farmers. Specific information regarding the efficacy of foliar fungicide products was distributed directly to growers and consultants. Mississippi soybean producers saved an estimated \$10 million by not using an ineffective fungicide in 2016.

Weed control research in corn is conducted annually at DREC. The program annually encompasses over 1,000 small plots in replicated experiments. This research project has also identified the geographic distribution of glyphosate-resistant Palmer amaranth and

Italian ryegrass across Mississippi. The average annual estimate of potential loss due to weed interference in corn production over the past five years is \$181.9 million. MSU Extension Service recommended weed control programs are estimated to cost producers \$41.6 million per year, resulting in a 4.4 to 1 benefit to cost ratio. This translates into an annual increase in direct revenue to Mississippi producers of \$140.3 million per year, with a statewide economic impact of \$247 million annually.

DREC entomologists completed work on the development of economically responsive thresholds for corn earworm infestations in soybeans. Corn earworm is one of the direct pests of soybeans in Mississippi and can cause substantial damage if not managed. This update of the treatment threshold for corn earworm was needed as the previous thresholds developed many years ago for soybean production systems that are very different from the current production system. Also, this treatment threshold for corn earworm was static and did not consider crop value or application cost. During 2016 the average cost of an insecticide application for corn earworm was \$16.50 per acre, which is a significant expenditure relative to crop value. This more refined threshold allowed growers and consultants to make more informed economic and insect management decisions.

DREC agronomists established a study of long-term multi-crop rotation combinations of cotton/corn/

soybean crops in 2004 to evaluate the agronomic and economic impact of crop rotation in the Mississippi Delta. A summary of 12 years of studies showed cotton after corn had 10-16% higher yields than cotton after cotton. Current research has shown the cotton response to rotations to be even greater and more effective when soybean is included.

DREC irrigation specialists developed the Row-Crop Irrigation Science Extension and Research Program (RISER) to address declining aquifer levels in the Delta. The primary objective of RISER is to evaluate novel Irrigation Water Management (IWM) practices at the micro-plot scale and then demonstrate at the field-scale technologies that improve crop water use efficiency and on-farm profitability. On-farm validation trials indicate that if producers adopt RISER approved IWM strategies across all furrow irrigated acres the withdrawals from the alluvial aquifer will be reduced by 433,333 acre-feet per year with reduced fuel consumption from reduced pumping estimated at \$25,400,000 per year. As of 2016, producer survey results indicate that Mississippi irrigators are adopting IWM tools at an unprecedented rate. Specifically, adoption of computerized hole selection, sensor-based irrigation scheduling, and surge irrigation have increased 1,375%, 1,125%, and 1,900% since 2011.

Catfish fingerling feeds are more expensive than adult fish feeds because it contains higher protein levels and more expensive feed ingredients. DREC scientists conducted a feeding trial to examine the growth performance of pond-raised hybrid catfish fingerlings fed diets containing various levels of protein with different protein sources. No significant differences were found in total feed fed, gross yield, final weight, or survival in fish fed various diets, but fish fed all-plant protein diets had significantly higher feed conversion. At initiation

of the trial, the control diet (35% protein with fish meal) cost \$613 per ton, while the 32% and 28% all-plant protein diets and 28% protein pork meal diet cost \$87, \$112, and \$102 per ton less than the control, respectively. Assuming hybrid fingerling producers feed about seven tons of feed per acre in a growing season, there would be \$346, \$644, and \$602 per acre annual savings, respectively, using these low protein diets, after accounting for increased feed conversion.

The most prevalent disease affecting catfish is enteric septicemia of catfish (ESC), estimated to reduce production by 25-30%, or \$30-40 million annually. DREC scientists have developed an effective management strategy for controlling ESC that includes a live attenuated vaccine and a mechanism for oral delivery. The new method of oral delivery has been shown to be safe and effective in laboratory tests and commercial scale field trials. A third generation delivery system has been constructed and validated for use in 2017. The new system increased the efficiency of vaccine application and commercialization potential of the vaccination platform. In repeated pond trials involving more than 200 million fish, vaccination resulted in improvements in survival and feed conversion ratios and increases in gross sales ranging between \$1,800 and \$3,500 dollars per acre. Implementing this technology will substantially increase the net profitability of catfish farming to help insure the economic viability of the U.S. catfish industry.

In summary, DREC generated an estimated \$18.74 million in economic activity in Mississippi this fiscal year through expenditure of appropriated funds and grant funding. As evidenced by the selected programs listed, the faculty and staff at DREC carry out work on economically important issues facing Delta agriculture.