Optimizing Yields With Best Management Practices (BMPs)

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The LSU AgCenter has since the 1980s conducted cropping systems research to evaluate the yield and economic benefits of year-round diverse crop sequences that qualify as Best Management Practices (BMPs) for improving surface water quality. These studies have evaluated irrigated and dryland systems that maintain ground cover through the use of crop residues, cover crops and no-till practices. The systems include winter wheat cover crop/cotton, doublecrop wheat/cotton, wheat/soybean, wheat/grain sorghum and doublecrop wheat/cotton rotated with corn, soybean or grain sorghum. Continuous monocropping/winter fallow of each of the summer crops was included for comparison purposes, though these are not considered BMPs.

Total commodity yield of doublecrop systems was always higher than any of the monocrop systems because of the added yield of wheat grain that has averaged 66 bu/acre. Summer crop yields usually, but not always, sustained yield losses in double crop systems. For example, doublecrop cotton yield varied from a 3% yield increase to a 21% yield reduction and doublecrop soybean varied from a 12% increase to a 30% yield reduction. Sorghum yielded the same whether planted as a monocrop or doublecrop. Yields of soybean and corn were 10 to 16% higher in doublecrop rotational systems than in doublecrop systems without rotations, but cotton yields were the same with or without crop rotations. Compared with monocropping, doublecrop cotton yields lost an average 65 lb lint/ac each year and doublecrop soybean yields dropped an average of 5 bu/ac each year. Any yield reduction of the summer crop yields is a significant economic penalty because it represents a loss directly from the potential net returns.

Although BMP systems were proven in the AgCenter research to be productive, the economics of each system was reliant on the commodity prices received in a given year. In our studies, using enterprise budgets based on the yields and inputs for each system and annual prices, some of the most profitable systems were BMP systems. Across seven years, doublecrop cotton/wheat produced average annual net returns of $271.00 per acre from average yields of 65 bu wheat per acre and 1035 lb cotton lint per acre. The system of producing three crops in two years of corn-wheat-cotton averaged annual net returns of $284.00 per acre. In comparison, monocrop cotton averaged a net return of $124.00 per acre from average yields of 1108 lb lint per acre. The BMP systems of doublecrop cotton rotated with corn or grain sorghum produced annual net returns of $313.00 per acre. Continuous monocrop soybean, corn or sorghum yielded highly variable net returns that averaged $119.00 to $151.00, about the same as monocrop cotton. Negative returns occurred in some years, usually with monocrop systems and seldom with multicrop systems. Production risk was no greater with the diversity of crops in the BMP systems than with monocropping because these were irrigated studies, which prevented soil water deficient, the primary risk factor for these types of cropping systems in Louisiana.

Despite their value for environmental protection, farmers face limitations in fully implementing BMP systems because, with current inputs and variable commodity prices, not all systems will be economically preferable to monocropping practices. Conservation programs that subsidize effective BMPs with public funding sources are needed for practices such as grass winter cover crops to promote implementation and attain their valuable environmental benefits, especially in combination with conservation tillage. Legume cover crops, however, have increased cotton yield 300 to 400 pounds per acre and are therefore an economic alternative for a winter cover crop. These studies were conducted with conservation tillage, a viable economic practice because of the associated savings in fuel, equipment and labor costs.

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