Experts' Commentary: Making Room for Agriculture

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Introduction

This year's Problem E required teams to model agriculture, starting from converting forest land to crop fields, taking the newly converted fields through maturity, and allowing the adjacent land to revert to some degree of its natural state. They expanded their model to reintroduce species to the agricultural ecosystem. The model was also expected to demonstrate the impact of human management decisions involving the use and removal of pesticides and decisions about species introduction, specifically bats. Finally, teams were asked to analyze organic farming and the impact to the ecosystem and use the results to advise farmers who are considering converting to farming organically.

This commentary is provided by a farmer who manages both conventional and organic farms and by one of the Problem E final judges who has worked with farmers for over 40 years as a soil and water conservation engineer.

In their agricultural ecosystem models, successful teams understood and modeled the cycle of planting, growth, harvest, and fallow phases and reflected this cycle in their model timeline. Data were based on a specific agricultural region, using appropriate crops, species, and agricultural management practices for the region. Judges expected teams to develop a model that would be built upon for each scenario of conversion to cropland, maturing of the cropland, re-emergence of species, addition and removal of pesticides and finally conversion to organic.

Through their research, many teams learned about the importance of soil health. Those who discussed soil health linked good soil health to the

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reduced use of chemicals and positive effects of beneficial insects. While that association is true, soil health is primarily based on organic matter, soil texture, and soil moisture, which support microbial activity in the soil. Experience shows that soil health can be best achieved through no-till or minimum-till farming and use of cover crops. However, these methods usually require the use of herbicides for weed control, and for kill-down of the cover crop before planting the commodity crop, which are practices not used in organic farming. Some teams discussed mechanical weed control in organic farming, but did not discuss the downside of tillage for soil health, including depleting soil structure and moisture.

The most successful teams recognized that converting from conventional to organic farming would be best accomplished through a phased approach. They recognized the economic challenges that could result from initial lower crop yields due to increased weeds and insects after removing pesticides from their management. It was especially good when the crop yields and economics were evaluated through their model and not solely through research.

Many teams recognized that financial incentives would aid in a farmer's decision to convert to organic and cited US Dept. of Agriculture (USDA) programs and incentives. The most convincing letters discussed an understanding of the initial costs and offered incentive opportunities to offset costs. They also provided suggestions for crop rotations, weed management methods, and marketing opportunities.

When a local conventional farmer was asked what would convince him to convert to organic, he replied that it would have to be a result of regulations or economic sanctions that would make conventional farming too difficult or unprofitable. The high level of management required for successful organic farming requires a strong desire by a farmer to do it. This desire may be based on sustainability and concern for the environment or may be based on profitability.

The premium prices that farmers receive for organic crops are a key motivator to convert to organic farming and have the farm's products certified as organic. However, currently in the United States the margin is closing between conventional and organic prices, due to products imported from the global market. Some countries may not have the same strict oversight and regulations as the U.S. does for organic farming, although some may have more.

As prices fluctuate, markets change, and the weather becomes more extreme: Whether farming organically or conventionally, *farming is a labor of love*.

About the Authors

Ann Baldwin is a graduate of the University of Delaware with a major in agricultural engineering and a minor in environmental engineering. A licensed Professional Engineer, she has worked for the US Dept. of Agriculture (USDA) in Delaware and Maryland since 1983, providing technical assistance to farmers and landowners to achieve sustainability through natural resource conservation and management.

Robert (RJ) Baldwin is a graduate of the University of Nebraska with a major in Agricultural Business. Upon graduation in 2018, he worked for a year on a harvest crew throughout the Midwest US and in Australia. He then returned to Kent County, MD to start his farming enterprise. RJ has grown his business from one tractor and a few acres to currently tilling over 500 acres. He raises corn, soybeans, sorghum, sweet corn, potted chrysanthemums, and a variety of vegetables.