

Brief historical perspective

In the 1940's through the 1970's, the "green revolution" occurred thanks to the development and worldwide distribution of technologies associated with crops, improved genetic resources, irrigation, and synthetic fertilizers, pesticides, and fungicides. There was also a shift to large-scale agricultural production and improved farm management techniques, that dramatically increased crop yields and world food supplies (Evenson and Golin, 2003; Paarlberg, 2010).



Agricultural outputs increased greatly during the "green revolution".

These shifts, however, perpetuated agricultural practices that use significant amounts of water and energy, and



Increased agricultural intensity also impacted soil and water through chemical application and water and nutrient runoff.

involved applications of fertilizers and chemicals that have significant adverse environmental impacts (Pingali, 2012). While the green revolution increased food production and generated significant positive economic returns to land owners, farmers, and agribusinesses, there was also environmental degradation of soil and waterways, which generated problems that continue to persist today.

Making agriculture more sustainable is typically more difficult to implement through best management practices or other means, since this usually involves costs that are not offset by expected increases in revenues (Behe et al., 2012). Recent

research involving sensor networks might be an exception to this rule. We have found significant cost savings associated with sensor network adoption under a variety of production conditions. These savings have led to increases in profits, which have led to payback periods of several months to a few years. It is this increase in profitability that suggests that sensor networks will be more widely adopted by growers. As these systems become more widely adopted, the public benefits associated with their use increases.

In this module, we will discuss the public benefits of sensor network adoption, and take a look at some of the potential public benefits of these systems. The numbers that are presented here are based on information that we have gathered as part of this project. We attempted to be realistic in our estimates based on results seen at the grower partners that have been involved in this project. A follow-up study will be necessary to determine the actual public impacts of sensor networks.