



U.S. Water Quality Improvement: The Missing Link

A new approach is needed to expand adoption of conservation practices by American farmers. Despite decades of efforts to improve the Nation’s water quality, more progress is needed. Efforts to improve water quality across agricultural landscapes have traditionally focused on programs offering payments to implement conservation practices (e.g., grassed waterways) or change farming methods. Few farmers participate in these programs because they are highly bureaucratic and payments are often insufficient to cover expenses. This situation has hindered timely and meaningful improvement to the Nation’s water quality and increased government pressure to regulate agriculture.

The International Water Institute (IWI), a non-profit organization that fosters watershed stewardship through leadership in decision support, environmental monitoring and educational programming, initiated a public-private partnership in January 2019 to explore a new voluntary approach to address non-point source pollution issues.

“Nothing about our efforts to voluntarily protect and improve the water quality of our streams, rivers and lakes within rural, agricultural landscapes in the U.S makes sense, unless you understand and involve the American Farmer.”

Mark R. Deutschman, Ph.D., P.E., IWI Research Director

The “Stewardship Pilot Program” (SPP) is funded by the International Water Institute and the Mosaic Company, an international fertilizer company, with guidance provided by SB&B Foods, a family owned, large-scale agribusiness, a soil scientist, and an agronomist. The approach included the missing link for success – the shared vision and leadership of ten North Dakota and Minnesota farmers.

The SPP defines stewardship quality using fifteen criteria reflecting the amount and quality of water leaving the field and potentially impacting received waters downstream. SPP scientists combined the fifteen criteria into a “Field Stewardship Rating” (FSR) describing the stewardship quality of the farm field. The approach directly connects the FSR to net profit and allows farmers to compare and contrast different farming method options and how they affect the FSR and net profit. The SPP approach assumes the field will remain in some form of productive agriculture. Accordingly, the FSR for forage alfalfa and moldboard plowing are also calculated to enable the farmer to benchmark their operation.

SPP farmers provided 5-years of economic and yield data for two fields. To understand the relationship between stewardship quality and profit, farmers considered two alternative farming method options on each field. Option development was facilitated using the farmers’ yield maps combined with soil types, elevation, slope, water flow paths, estimates of soil and nutrient loss, the amount of water retained by the soil, possible locations for conservation practices, and potential downstream impacts (tons of sediment and pounds of nitrogen and phosphorous).

SPP data analysis indicated a positive relationship between profit and stewardship quality (i.e., profit and stewardship quality values increase concurrently). As business owners, farmers acknowledge profit is necessary to continue farming. However, many on-farm decisions rarely focus solely on profit. Every SPP farmer expressed a deep desire to improve their operation, protect the land, and preserve their agricultural legacy for their children and grandchildren. Demonstrating the positive profit – FSR relationship was a key SPP outcome that can drive large-scale adoption of conservation practices necessary to improve the Nation’s water quality.



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The SPP concentrated on providing actionable information. Farmers could easily understand how profit and FSR change if they farm differently using a dashboard comprised of a “speedometer” and a series of charts to compare the stewardship quality (FSR) and profit for their current operation and the two options.

“The Stewardship Pilot Program influenced how I think about farming and provided me with critical information that linked my farming methods to profit, the effects on water leaving my field, and my level of stewardship quality.”
A Participating North Dakota Farmer.

The partnership plans to implement the SPP approach in a pilot watershed in 2021. Additional work is needed before the SPP approach can be adapted to larger areas. The criteria used to establish stewardship quality need more investigation. For instance; although the FSR was applied to farm fields with varying soil types and physical characteristics, the criteria may require modification in other agricultural regions. SPP partners also believe the profit - stewardship quality relationship will strengthen if revenue was provided to the farmer for increasing their FSR. Corporations, conservation organizations, and others interested in supporting their sustainability claims are possible revenue sources the partnership plans to engage.

The IWl’s ultimate goal is to work with farmers in different U.S. watersheds to implement large-scale voluntary Stewardship Programs and improve our Nation’s water quality.



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