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Practitioner's Perspective

Protecting Ecosystems by Engaging Farmers in Water Quality Trading: Case Study from the Ohio River Basin

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The Ohio River Basin Water Quality Trading Project is the world's largest water quality credit trading program. Focused on environmental impacts from diverse sources, the project has facilitated nontraditional collaborations to achieve a common commitment to improving water quality, as well as broader environmental benefits. The role of soil and water conservation districts (SWCDs) has been fundamental to the success of this groundbreaking effort. Federal and state government, power companies, farmers, and environmental organizations have also been engaged to guide the structure, implementation, and verification of the effort.

Winner of the United States Water Prize (2015), the project is the most recognized domestic program creating verified and registered credits to improve water quality. In addition to the water quality improvements, there are ancillary benefits such as the protection of pollinators and rare species, farm animal health, and soil health. In this brief overview, we summarize basic project elements relevant to agriculture, and discuss key lessons learned from working with farmers, SWCDs, the US Department of Agriculture Natural Resources Conservation Service (USDA NRCS), and state agricultural agencies to implement this effort.

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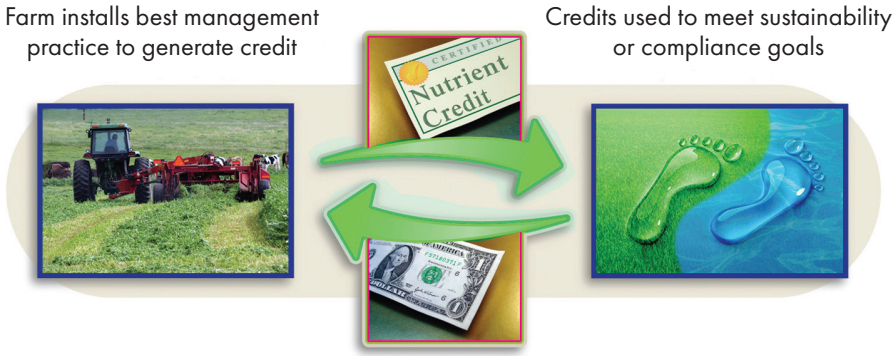
Figure 1

Graphical illustration of water quality trading.



Brief History of Water Quality Trading

Water quality trading (WQT) is an innovative, market-based approach to achieving sustainability and regulatory water quality goals in a cost-effective and ecologically effective way (figure 1). In order for credits from WQT programs to be eligible for meeting regulatory requirements, the programs must be consistent with the US Environmental Protection Agency's (EPA's) 2003 WQT Policy and 2007 WQT Toolkit for Permit Writers, which provide guidance to states, interstate agencies, and tribes on how to implement trading that is consistent with the United States Clean Water Act. Nearly two decades after EPA's original WQT Policy, the approach continues to attract interest; however, practitioners are still working to make their programs successful—particularly in the absence of regulatory drivers that incentivize active engagement from credit buyers. In recent years, there has been contemplation of the role that voluntary buyers needing to meet corporate sustainability goals (beyond compliance obligations) may play in mobilizing WQT programs. Currently, there are approximately 20 WQT programs in the United States with the credit transaction activity varying greatly between programs (USEPA 2019). Until the Ohio River Basin Water Quality Trading Project, there were no multistate WQT programs where everyone agreed to the same rules, which allows credits to be traded according to ecologically relevant watershed units crossing state lines, versus following jurisdictional or political boundaries.

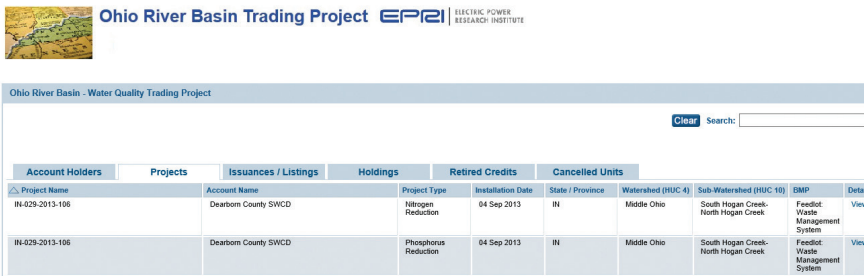
Ohio River Basin Water Quality Trading Project Overview

In the Ohio River Basin Water Quality Trading Project, water quality credits are created through the installation of best management practices (BMPs) with private landowners in Ohio, Indiana, and Kentucky (http://wqt.epri.com). Since 2012, the project has generated more than 200,000 verified water quality credits from agricultural conservation practices from approximately 50 farms in these states. The project has been covered by the *The Wall Street Journal* (Peters 2014), National Public Radio (Grant 2017), *The Economist* (Blooming Horrible 2012), in US Congressional Testimony (Fox 2014), a US Government Accountability Office report (US GAO 2017), *National Geographic* (Sacleux 2019), and in various academic publications (Keller et al. 2014; Liu and Swallow 2016; Massakkers 2016). Backed by watershed modeling, on-the-ground project verification, and rigorous credit registration, the program is the most defensible and trackable WQT program in the world.

The project has made significant investments (more than $1 million) in the modeling and credit quantification protocols (Keller et al. 2014). The project team has evolved the methods as models have been improved and calibrated over the last eight years. We currently use three models to calculate how many pounds of nitrogen and phosphorous are generated from each installed conservation project: USDA's Nutrient Tracking Tool, EPA Region V Spreadsheet Tool for Estimating Pollutant Load (STEPL), and the fully mechanistic Watershed Analysis Risk Management Framework (WARMF). Documentation and tracking are done online using the rigorous IHS Markit Environmental Registry (figure 2), enabling anyone to view nonconfidential project records to confirm the legitimacy of every conservation practice, every pound of nutrient, and every transaction.

Figure 2

IHS Markit Credit Registry projects page (partial data list showing).



Farmer Outreach

Because this project is so far-reaching and is the largest of its kind, it has been important to identify and engage a diversity of stakeholders to proactively identify and evaluate concerns. Among other activities, the project convened a series of listening sessions with farmers and SWCDs to identify potential barriers that might discourage participation, and to collect input on how to best structure the project (EPRI 2011a, 2011b). SWCDs were critical for identifying eligible farmers in their counties, advising which BMPs to fund, coordinating the timing of funding to avoid competition with or complement state and federal cost-share programs, and for executing landowner contracts. The project team also established a broader agriculture advisory committee of experts from American Farmland Trust, Ohio Farm Bureau, Kentucky Farm Bureau, Indiana Farm Bureau, National Dairy Producers, Kentucky Corn Growers Association, USDA NRCS, USDA Agricultural Research Service, Agricultural Retailers Association, Ohio Department of Agriculture, Indiana State Department of Agriculture, Kentucky Division of Conservation, individual farmers, and others. This engagement was ultimately critical to designing a novel trading program that worked for all stakeholders, including environmental groups.

After program structure concerns were addressed, SWCDs in the three states agreed to act as the contracting party in order to move funds from the Electric Power Research Institute (the project manager) to local landowners. SWCDs also supported robust outreach to announce funding opportunities and annual on-ground inspection of the practices. While funding for the conservation practices was provided by the Electric Power Research Institute, farmers contracted directly with their local SWCDs, with whom they generally already had relationships and mechanisms for submitting payment requests. Approximately $800,000 has been allocated to farmers since 2012, with funding remaining available as of this publication.

Farmers are contracted to install conservation practices meeting USDA NRCS performance standards that are known to reduce nutrient runoff. Examples of these practices include cover crops, heavy use protection areas (figure 3), cattle exclusion fencing, riparian buffers, and tree planting (NRCS practice codes 340, 561, 382, 391/393, 612, respectively). Some of the SWCDs identified interested farmers by looking at applications that were not funded—often due to lack of funds—by state and federal cost-share programs (e.g., Environmental Quality Incentives Program [EQIP], Conservation Reserve Enhancement Program [CREP], and Conservation Reserve Program [CRP]). Some of the unfunded projects met the requirements of the WQT program and could result in significant reduction of nutrient runoff to local waterways. All projects were required to be installed according to the relevant NRCS practice

Figure 3

Before and after photos of installed heavy use protection area.

standard, at a minimum. Nearly all the landowners who have applied for funding are small farmers producing corn, soy, wheat, beef, and milk.

The Farmer Viewpoint

From the farmer viewpoint, it is a relatively straightforward process to secure funds. It is entirely voluntary to participate and apply for funding, and landowners select the conservation actions that make sense for their operations. The first step is to review any active requests for proposals that outline the funding opportunity and details about the application process. Second, the farmer completes a funding application and then, if accepted by the Electric Power Research Institute, enters into a two- to three-page contract with the local SWCD. Then the farmer installs the BMP following NRCS practice standards and provides receipts to the local SWCD, which triggers an installation inspection by SWCD personnel, followed by verification by state agricultural personnel. The final step is reimbursement based on payment terms in the contract.

The conservation practices implemented may have nominal impact on operation yields, while still having huge benefits to water quality. Typical practices include the use of cover crops, riparian buffer strips, cattle exclusion fencing to prevent erosion of natural waterways, milk house waste management systems, manure wetland treatment systems, and cattle heavy use areas that allow for effective manure storage and management. More recently, we began funding tree planting to restore forests, with a focus on marginal crop land to generate significant nutrient benefits (Keller and Fox 2019). Contracts with farmers range from 5 years for seasonal practices (e.g., cover crops) to 40 years for forest planting.

While there are many details involved in credit generation, calculation, and sale, farmers are largely protected from this process. They are not subject to the uncertainty of the marketplace for the sale of the credits. All credits are "owned" by the program administrator (currently the Electric Power Research Institute), and all profits or losses from credit transactions stay with the program administrator. There is no risk to the farmer that credits will not be sold; farmers are paid after on-site confirmation of BMP installation regardless of whether or when the credits generated from those practices are, in fact, transacted. Given the uncertainty of buyers and the nascent nature of environmental markets, the fact that farmers are paid based on successful installation of the BMPs has proven very protective of the farmer. From a farmer perspective, the project offers a privately funded, cost-share opportunity using a simple contract.

Lessons

There has been significant learning since the memorialization of this multistate WQT program in 2012. We tend to categorize lessons from two perspectives: credit generation and credit sales. This chapter has been focused largely on credit generation and agriculture engagements, so we will focus on related key lessons.

One important lesson is also the most obvious: the process must work for farmers. The project supports a straightforward process with simple landowner contracts, engagement with trusted SWCD offices, and focus on practices that farmers want. The project adjusted and evolved as we heard from landowners about what worked and what didn't. Timely payments are critical, and the project has had to address a number of issues to ensure rapid payments. Producers are accustomed to business contracts that clearly state, "if you do this, then you get this." We provided a good option for cost-share funding that improved producer operations, as well as water quality and ecosystems.

An issue that was necessary to overcome was the project's pay-for-performance approach. Applications for funding were evaluated based on the cost-per-pound of nutrient reduction. The nutrient reductions were estimated using an edge-of-field model (USDA Nutrient Tracking Tool or the EPA Region 5 STEPL spreadsheet). The cost of the funding request was calculated by adding the total cost-share request from the landowner, the payment to the SWCDs for the service (capped at 10% of the total funding contracted through their office), plus the additional cost of any state agency support. Then, the dollars-per-pound of total nitrogen and total phosphorous were calculated (dollars per pound of nutrient). This is in contrast to typical state and federal cost-share programs that fund practices based on metrics such as hectares (acres) or linear meters (feet) of fence, versus kilograms (pounds) of nutrients reduced. It was

challenging to communicate that we could provide more funding for 20 ha (50 ac) of cover crops compared to 40 ha (100 ac) because the nutrient reductions were better due to site slope, soil type, and proximity to a waterway. This communication became easier as we gained experience explaining the approach.

It was important that farmers "have some skin in the game." The requirement for cost-share was an effective approach that ensured landowners were serious about the efforts and increased confidence that the practices would be implemented and maintained properly. Cost-share requests can range from approximately 50% of project costs up to the allowable limit of 75% to 80%, depending on the specific funding opportunity. On average, cost-share requests are approximately 65% of total costs, which can make it difficult to receive funding if the landowner requests the maximum allowable under the funding notice.

Working via local SWCDs to contact and enroll producers was appropriate in many cases. However, not all counties had SWCD staff with the engineering, planning, and design expertise needed to implement or contract for projects. Some SWCD offices needed support from NRCS staff or the state agriculture agency to get projects contracted and installed. It has been important to stay flexible to alternative approaches to ensure BMPs are contracted and installed efficiently, which sometimes means a neighboring SWCD office manages contracts, the Electric Power Research Institute directly contracts with landowners, or technical service providers and state agency staff oversee installation of conservation actions.

The amount of effort required to communicate a new funding source and associated requirements has been significant. This outreach effort should not be underestimated in the future, and hopefully our efforts have paved the way for future programs. There is a lag time between communicating a funding opportunity and producers expressing interest. It is prudent to maintain a very similar funding opportunity for three to five years, allowing farmers to watch how the program worked out for their neighbors before choosing to apply themselves. If the funding details change too drastically or quickly (i.e., 5-year cover crops versus 40-year forest planting), investments in communicating the prior year are lost; farmers were not allowed enough time to decide to apply for funding before the program changed focus.

Finally, it is important to understand the value of "legacy" for the landowners in these voluntary conservation programs. Many landowners we funded wanted to implement the projects and just needed a source of support. The landowners participating expressed great appreciation for the funding, and they showed true commitment to the conservation efforts, as communicated in various video interviews (figure 4).

Figure 4

Video interview of one participating landowner.

Future

Overall, the project has overcome many barriers as it formed ways to move money from large, private funders all the way to small, rural farmers through a series of thoughtful contracts. Farmers seem happy to engage in this project and have expressed appreciation for the funding. We are proud of the positive environmental benefits that the installed practices have generated, including biodiversity, carbon sequestration, soil health, farmer wellbeing, and of course, nutrients (more than 90,700 kg [200,000 lb] of nitrogen and phosphorous avoided to date).

However, going forward it will be critical to sell enough credits to continue funding conservation practices and relieve reliance on various public and private grants that are currently necessary to keep the overall project running. To this end, in 2019, we announced a collaboration with First Climate, who added the water quality credits to their broader carbon credit offering to both domestic and international corporate clients. This created a science-based option for those seeking to mitigate supply chain impacts and meet personal environmental footprint goals, as well as larger corporate targets and permit compliance obligations. We have also aligned our credits with various sustainability programs and disclosures, including the Global Reporting Initiative, CDP, United National Sustainable Development Goals, and CEO Water Mandate. With these developments and the strong interest from EPA for applying credits towards compliance obligations under the Clean Water Act, we are optimistic that we will sell credits and continue funding conservation practices with farmers. We are very grateful for the ongoing collaborations with SWCDs and other agricultural agencies, all of which will be important for the continued success of this project.

Acknowledgement

We would like to express appreciation for the farmers, local SWCDs, and state agency staff in Ohio, Indiana, and Kentucky who work on a daily basis to make this project successful.

Resource to Learn More

- Ohio River Basin Water Quality Trading Project. http://wqt.epri.com

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