Combining Policies to Reduce Agricultural Runoff in Delaware

Colin Brownlee
Union College - Schenectady, NY, brownleecolin@gmail.com

Follow this and additional works at: https://digitalworks.union.edu/eco228_2019

Recommended Citation
hits://digitalworks.union.edu/eco228_2019/1
Combining Policies to Reduce Agricultural Runoff in Delaware

Noxontown Pond is a small part of Delaware’s rich history. In 1730, Thomas Noxon damned the head of the Appoquinimink to form Noxontown and build his mill. The small village of Noxontown was once used as the headquarters for Caesar Rodney, a signer of the Declaration of Independence. Yet, in recent decades Noxontown pond has struggled. An EPA study from the 1970’s quotes the pond’s trouble with high nutrient levels. Large algae blooms have become regular in the summers and have diminished fish populations. As the First State, Delaware has been a leader since the founding of this country and should now take on a responsibility as a new type of leader.

The entirety of Delaware is in the Delaware Bay watershed. Home to delicate marshlands with strong biodiversity that feed into the ocean, the state has a responsibility to manage its runoff. It is also a highly agricultural state. To support the crops, fields are fertilized with nitrogen and phosphorous rich products. Yet, there is often excess nutrients that washes into our bodies of water as nonpoint source pollution. With continued development, especially in the area surrounding Noxontown Pond, the impervious surfaces lead to increased runoff as less land is able to absorb and filter water. In fact, Middletown is expected to double in the next 20 years. Sources of runoff mainly consist of agriculture and storm water. Reducing runoff can often be categorized by reducing storm water or agricultural runoff; a study that evaluated the this for every state in the Chesapeake Bay watershed showed that while most states are depending heavily on storm water runoff reduction, Delaware is expecting the agricultural industry to carry this load. Runoff reduction is necessary as the same nutrients that support agricultural growth also promote algae growth. In the hot months, this leads to large algae blooms in ponds all over Delaware, including Noxontown, which deoxygenate the water and damage the pond’s ability to support other life. This type of damage has long reaching effects; it hurts the fishing and recreation industry. In 2006, a crew regatta on Noxontown was outright cancelled due to an overgrowth of waterweed. In addition to those industries, because these
dammed ponds are at the heads of rivers, the biological effects are felt downstream all the way to the ocean. The challenge is effectively addressing these issues through policies.

Best Practice Management (BPM) are methods of reducing runoff that include using buffer zones, cover crops, and fertilizer reduction. Buffer zones are areas of land that lay fallow between agricultural fields and bodies of water; these additional grasses and trees act as a filter for the water that escapes the fields. Cover crops are typically grasses and wheats that are grown in fields when not in use. Although additional work to plant, they prevent soil erosion and promote soil fertility. Which practices should we use? How do we implement them?

One method is to implement flat subsidies. The Delaware government can pay farmers to implement any of the strategies listed above. Yet, a 2015 study on the Chesapeake Watershed from Ecological Economics showed that a pay-for-performance system achieved the same runoff reduction at half the cost to the farmers. In this type of system, consistent monitoring allows actual data from bodies of water to determine how effective a farmer’s practice is at reducing runoff. This type of system would have required extensive man hours and lab time decades ago. However, as our ability to collect, analyze, and relay data in the field using automated devices becomes cheaper, this is a feasible option.

Another method recommends both a subsidy on buffer zones and a tax on fertilizers. The subsidy helps cover the costs of the loss of farmable land when buffer zones are implemented. The tax creates an incentive to reduce the amount of fertilizer being used on fields, which is often in excess anyways.
A 2017 study on the Chesapeake Watershed from the American Journal of Agricultural Economics evaluated how effective cost sharing programs were in implement BPM. It found that when used on a per-acre basis, there was a significant decrease in the amount of runoff while also reducing the cost of abatement. This double effect highlights this as a promising method.

Finally, a Finnish-based study from the International Association of Agricultural Economist Conference evaluated how combinations of such policies can be mutually reinforcing and lead to more effective results at lower costs to farmers. The exact combination of policies was case-dependent and effected by the effectiveness of each method in that area and the cost of implementing each method.

All of the BPMs listed are not free; in implementing them we are asking farmers to carry the financial weight of these programs. If the government helps support these programs, that is a burden on the taxpayer. Yet, as these bodies of water and the ecosystems they support effect all people of Delaware today and of future generations, we have an obligation to protect them. We must do so in a method that is effective in reducing runoff while minimizing the burden on both farmers and taxpayers. A study by Delaware Department of Agriculture should be done to determine what optimal combination of the BPMs, taxes, and subsidies will best support Delaware. With this information in hand, the people and legislature of Delaware must work to implement these programs.