Farms and the Environment

Agriculture serves a unique role in the environmental discussion because of its contributions to climate change and biodiversity loss, but also the negative effects the industry is facing because of the issue. On the one hand, tension exists between the need for profitable operations that provide global food security and efforts to reduce environmental impact of intensive food production (Robertson and Swinton 2005).

- Agriculture sector accounts for 11.3% of global GHG emissions (Schaeffer and Dillion 2013)
- Farm runoff (fertilizers, livestock waste, sediment) decreases aquatic habitat suitability (Matson et al. 1997, Verchot et al. 2007)
- Monocultures decrease diversity of plants and associated species (Matson et al. 1997, USDA NAC 2012)

On the other hand, agriculture depends on environmental factors like water availability, growing season conditions, and interactions among species, so climate change and biodiversity loss threaten the perpetuation of the industry.

- Warming temperatures cause geographic range shifts of beneficial pollinators, soil microbes and invertebrates (Mation et al. 1997, Verchot et al. 2008)
- Range shifts also introduce novel pests and invasive species to farms (Verchot et al. 2007)
- Increased need for pesticides, herbicides, fungicides, etc. (Nair and Garrity 2012)
- Socioeconomic effects: crop damage, decrease in food output, loss of profits for farmers (Mation et al. 1997)

In order to mitigate for climate change and biodiversity loss, Virginia should implement a program that requires farms larger than fifty acres to implement at least one of the five agroforestry practices (Figure 2).

1. Alley cropping that integrates annual crops with high-value trees and shrubs
2. Forest farming where food, herbal, and decorative products are grown under the protection of a managed forest canopy.
3. Riparian forest buffers along waterways
4. Silvopasture systems with trees, livestock, and forages growing together
5. Field, farmstead, and livestock windbreaks

Figure 2. The five types of agroforestry practices, as outlined in the USDA’s Agroforestry Strategic Framework (2011).

Virginia’s Agroforestry Program

Funding
- Agriculture and Forestry Industries Development Fund (AID)
- USDA Agriculture and Food Research Initiative: Agriculture and Natural Resources Science for Climate Variability and Change Challenge Area
- National Fish and Wildlife Foundation (NFWF) Conservation partners Program

Support
- Riparian buffers do not require pesticides, allowing foravian predators to inhabit land while maintaining profitable crop production; Figure 3.
- Trees decrease the distance between hospitable habitat patches, allowing species to move freely throughout an area

A Voluntary Alternative

Firm regulations tend to face opposition and obstacles in the policymaking process. As an alternative to this agroforestry requirement, a certification program could be established in Virginia that awards farms a type of biodiversity conservation designation based on the extent to which they use agroforestry on their land. In order to cater to the smaller statewide scale and unique needs of each individual farmer, this program would be modeled after initiatives such as the grassroots Certified Naturally Grown program or South Carolina’s Certified SC Grown program (CNG 2015, South Carolina Department of Agriculture). This program would be more incentive-based in the sense that farmers would not only gain direct environmental and economic benefits from agroforestry practices, but they may see greater market access to increase profitability and public relations with consumers and citizens. Federal and state tax incentives would still be available as in the regulatory option, and farmers participating in the certification program would be required to attend at least one workshop every other year.

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Puckett et al. 2009. “Soil quality and unique needs of each individual farmer, this program would be modeled after initiatives such as the grassroots Certified Naturally Grown program or South Carolina’s Certified SC Grown program (CNG 2015, South Carolina Department of Agriculture). This program would be more incentive-based in the sense that farmers would not only gain direct environmental and economic benefits from agroforestry practices, but they may see greater market access to increase profitability and public relations with consumers and citizens. Federal and state tax incentives would still be available as in the regulatory option, and farmers participating in the certification program would be required to attend at least one workshop every other year.

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