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“Farmers and Fresh Water: Voluntary Conservation to Protect Our Land And Waters”

Chairwoman Stabenow, Ranking Member Cochran, Senator Boozman, and members of the Committee, thank you for this opportunity to testify at today’s hearing, and to discuss an important issue for US agricultural producers.

I have spent the past 25 years investigating agricultural impacts on water quality, including stream ecosystem function and structure. I have worked with USEPA, USDA-ARS, USDA-NRCS, various state, county and local organizations, and farmers to improve water quality at watershed scales using a variety of best management practices (BMPs). I have also worked with municipal and industrial facilities that have regulated water quality criteria under the Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit program. I have seen the benefits and challenges associated with both strategies for protecting water quality.

Regulatory approaches such as the NPDES permit program are very effective at implementing thresholds and enforcing limits where there are clear and unambiguous sources of pollution. Municipal and industrial wastewater treatment facilities and concentrated animal feeding operations (CAFOs) have discrete discharge points (usually pipes) that can be monitored, managed, and regulated. Non-point sources of impacts (those that are not from a pipe or other conveyance) are more difficult to regulate because there is no point of discharge.

Water quality in a river, stream, reservoir or estuary is the product of the cumulative activities upstream in the watershed. Human activities throughout the watershed impact water quality. Existing and changing land uses, including urbanization, residential development, agricultural production, and forestry, change the way water interacts with and moves across the landscape. Paving, plowing, grading, and other landform modifications increase runoff volume, water flow velocity, and the contaminants carried into water bodies.

The mechanisms of impacts of agricultural activities on water quality are well known. Crop tillage practices can result in soil erosion, ultimately increasing sediment pollution. Nutrients, particularly nitrogen and phosphorus, are transported to streams either in solution or attached to soil particles. In some cases pesticides can be transported to streams via the same mechanism, or through overspray into waterways. Animal production grazing systems can result in field and stream bank erosion. Bacteria from animal manure can also reach waterways, either as a result of land application of the manure for fertilizer or direct runoff from production units.

Best management practices (BMPs) have been developed over the past 100 years for each of these categories of water quality impact across the agricultural landscape. Recently many of

these BMPs have been translated to urban systems, referred to as Low Impact Development (LID) practices or green infrastructure design. In agricultural landscapes BMPs are part of integrated National Resource Conservation Service (NRCS) conservation strategies and include elements such as conservation tillage practices to reduce erosion and increase soil health, nutrient management planning to reduce N and P loss, vegetative filter strips to capture soil and nutrients, and riparian zone conservation areas to provide. Implementation of these BMPs is often called “voluntary”, when a more accurate term would be “incentivized”. Agricultural producers who participate in any USDA program (EQIP, crop insurance, etc.) must also implement conservation plans. The specific criteria for these practices vary by region but water quality protection is a common criterion for conservation plans.

The incentivized adoption strategy employed by USDA NRCS has resulted in dramatic improvements across the US agricultural landscape. In the nearly 80 years since the formation of the US Soil Conservation Service the US landscape has been transformed from an ecological wasteland to the most efficient, effective, and productive agricultural landscapes on Earth. The SCS has evolved to become the Natural Resource Conservation Service; conservation districts have been established with local farmer governance and expertise in every county in every state in the Nation, and the US Extension Service has become the world’s most effective instrument for agricultural innovation and stewardship. In 2014 the United States is projected to produce almost 37 percent of the world’s corn on 20 percent of global planted acres, and 31 percent of the world’s soybeans on 27 percent of global planted acres (USDA, 2014). US production and efficiency for corn and soybeans are the highest in the world.

The US agricultural community recognizes this is not enough to insure sustained prosperity across the heartland. In 2007 representatives from the US agricultural supply chain met to develop a strategy for insuring the sustainability of US agriculture, focusing on agronomic crops (corn, soybeans, cotton and wheat). This organization became *The Field to Market Alliance for Sustainable Agriculture*, a multi-stakeholder collaboration of representatives from the entire US agricultural supply chain. I serve on the Executive Committee for Field to Market, and have worked with this group over the past seven years to develop first-tier key performance indicators (KPIs) for row crop agriculture.

Across the entire agriculture supply chain – from the farm gate to the restaurant counter – the challenge of meeting demand for a rapidly growing population, while conserving natural resources, has become increasingly complex. With the world population estimated to exceed 9.5 billion by 2050, the entire food chain must work together to efficiently and responsibly lay the groundwork for the future. Field to Market defines sustainability as meeting the needs of the present while improving the ability of future generations to meet their own needs. This means that US farmers must work across the agricultural and food value chain in order to:

1. Increase productivity to meet future food, fuel and fiber demands;
2. Improve the environment;
3. Improve human health
4. Improve the social and economic well-being of agricultural communities

Field to Market is composed of a diverse group of grower organizations; agribusinesses; food, fiber, restaurant and retail companies; conservation groups; universities and federal agency

partners who focus on promoting, defining and measuring the sustainability of food, fiber and fuel production. We defined as criteria for adoption of any KPI that they must be:

- 1) Science driven,
- 2) Outcomes based,
- 3) Technology neutral, and
- 4) Transparent.

Field to Market is in the process of developing and benchmarking KPIs across all three domains of sustainability: environmental, social, and economic. The five first-tier environmental KPIs developed by Field to Market were:

- a. Soil Erosion
- b. Energy Use
- c. Greenhouse Gas Emissions
- d. Water Use
- e. Land Use

Next tier KPIs include biodiversity, nutrient use efficiency and water quality. KPIs for social and economic domains are also being developed for 2015.

The Field to Market team analyzed metrics over the past 30 years (1980-2011) for each environmental KPI at the US national level for the major US crops: corn, soybeans, cotton, wheat, potatoes and rice (Field to Market, 2012). During that period yield per planted acre increased for all crops. The most dramatic increases were with corn (+64%), potatoes (+58%), soybeans (+55%), and rice (+53%); moderate increases were achieved with cotton (+43%), and wheat (+25%) (Field to Market, 2011). This report is included as an annex to this testimony.

Soil erosion reduction has been a major sustainability success in US agriculture. On a unit of production basis (tons of soil lost per ton of crops produced) soil erosion decreased over the past 30 years for all six crops: corn (-67%), cotton (-68%), soybeans (-66%), potatoes (-60%), rice (-34%), and wheat (-47%). Similar efficiency improvements were achieved across the other four KPIs. These improvements have been the product of research and innovation in plant genetics, tillage practices, smart implements, and constant and incredible effort by producers.

In spite of the incredible improvements US agricultural producers have made across first tier environmental KPIs we still have a number of challenges ahead. Soil loss across US agricultural lands decreased in total mass by 41 percent in the past 30 years, but the amount of soil eroding each year is still too high (USDA, 2013). However, we are not done yet; erosion in 2010 was essentially unimproved from 2007. Soil erosion is not an inevitable cost of agricultural production. We can do better.

The process of continuous improvement is the essence of sustainability. The Field to Market initiative provides a framework for continuous improvement for outcomes-based KPIs for agricultural producers. Producer organizations like Cotton Incorporated and the United Soybean Board define sustainability goals for KPIs like soil erosion and water quality. Improvements across each KPI will be measured and reported using transparent and scientifically appropriate methods in order to accelerate improvements in outcomes.

The Fertilizer Institute, one of Field to Market's members, initiated the 4R program to enhance nutrient stewardship by farmers (<http://www.nutrientstewardship.com>). This program provides nutrient management guidance for applying the Right fertilizer source at the Right rate, the Right time and on the Right place. The 4R program has been implemented nationally with targeted implementation in high nutrient sensitive areas such as the Great Lakes region. This is one example of the many Examples of instructional materials are included as an annex to this testimony.

In conclusion, it is my assessment that US agricultural producers are more engaged than ever before in programs and practices that will continue to improve efficiency and reduce impacts from production. These non-regulatory programs provide a platform for innovation based on the freedom to explore new technologies and try new practices. Regulations tend to disincentivize innovation because compliance is the outcome, not continuous improvement for a metric. The sustainability initiatives led by Field to Market will revolutionize targeted implementation of practices across the agricultural landscape, resulting in measurable improvements in KPIs. This process is occurring now, without regulation.

### *References*

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