NC STATE UNIVERSITY

DEPARTMENT of SOIL SCIENCE

Conservation Practices and Water Quality: The NIFA-CEAP Experience

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National Institute of Food and Agriculture (NIFA) Conservation Effects Assessment Project (CEAP)

Thirteen watershed projects were funded by NIFA and NRCS as part of the overall CEAP initiative to focus on relating water quality change to conservation practice implementation on crop and pasture lands. The studies were retrospective in that watershed projects had greater than 5 years of water quality and land treatment data. As the 13 projects ended, the lessons learned from these projects were synthesized and have been transmitted to key policy personnel. The most important 15 lessons are presented.

Locations of the 13 NIFA CEAP Watersheds

Cannonsville Reservoir, NY CEAP

Water Quality Results

Six of the 13 projects demonstrated water quality changes but none met their water quality targets. All six projects had significant conservation practice implementation and appropriate monitoring, as did other less successful watershed studies.

- Three employed long-term (> 20 years) monitoring (ID, NE & OH)
- Three used paired-watershed water quality monitoring designs (IA, NY & PA).Two projects were part of the US EPA 319 National Nonpoint Source Monitoring Program (IA & NY)

Farmer participants, KS and NY CEAP watersheds respectively

NIFA-CEAP Watershed Study Synthesis Materials

- **Book:** Osmond, D., D. Meals, D. Hoag, and M. Arabi. 2012. How to Build Better Agricultural Conservation Programs to Protect Water Quality: The NIFA-CEAP Experience. Soil & Water Conserv. Society: http://www.swcs.org/en/publications/building_better_agricultural_conservation_programs/
- **Fact Sheets:** www.soil.ncsu.edu/publications/ NIFACEAP/
- **USDA NIFA National Water Quality Conference Proceedings:** http://www.usawaterquality.org/conferences/default.html
- **USDA NRCS Synthesis Report:** http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?&cid=stelprdb1047821
- **USEPA Webinar:** http://mp118885.cdn.mediaplatform.com/118885/ml/mp/4000/5345/5417/14720/Archive/default.htm

Bioswale, IN CEAP;

Sampler, OH CEAP;

Prairie conversion, IA, CEAP

Fifteen Top Lessons Learned from the NIFA-CEAP Watershed Study Synthesis

1. Programs funded primarily by the federal government since 1978 with the goal of understanding conservation practice effects at the watershed scale. Many of the lessons learned in the NIFA-CEAP were observed in these earlier programs and projects; some are new due to more holistic NIFA-CEAP study objectives. With dwindling resources and mounting environmental degradation, it is essential that many of the lessons from NIFA-CEAP be integrated into policy and agency protocols if water resources are to be protected.

2. Conservation planning must be done at a watershed scale with sufficient water quality information, and potentially modeling.

3. Correctly identify pollutant(s) of concern and source(s) of pollutant(s) before implementing conservation practices.

4. Identify critical source areas to prioritize conservation practices within the watershed.

5. Understand and consider farmers' attitudes toward agriculture and conservation practices to promote adoption.

6. After conservation practices have been adopted, continue to work with farmers on maintenance and sustained use of practices.

7. Economic incentives were often required for adoption of conservation practices not obviously profitable or compatible with current farming systems.

8. Technical assistance to farmers is most effective when delivered by a trusted local contact and is very person intensive. Reduced funding is eroding the ability of NRCS, Extension, and Soil and Water Conservation Districts to deliver effective programming.

9. Conservation practice adoption is a multivariate choice and although economics are exceptionally important, many other factors affect decision-making.

10. Projects that conduct water quality monitoring must establish monitoring systems that are designed to specifically evaluate response to conservation practice implementation and ensure that projects include the necessary long-term resources and expertise.

11. To link water quality response to land treatment changes, conservation practice activities must be tracked as intensively as water quality monitoring, and at the same temporal and spatial scales.

12. Unless adequate (multi-year with pre-BMP) water quality and land treatment/use monitoring is planned, conservation implementation projects should NOT conduct water quality monitoring due to expense and unlikelihood of detecting changes in water quality.

13. Data for land use, management, and conservation practices is absolutely essential to understand effectiveness of conservation programs. Such data are often incomplete or unavailable due to confidentiality.

14. Watershed models are very complex. Correct model(s) must be selected and modified if necessary. Sufficiently trained personnel, well calibrated and validated models, and adequate water quality and land treatment data are essential.

15. Most models grossly overestimated pollutant reduction; model results must be used with care as models are still evolving.

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