

APPENDIX B

Determination of Economic Feasibility¹

The primary purpose of the economic feasibility study is to evaluate the consequences of adopting Environmentally Superior Technologies on the economic welfare of North Carolina citizens. Toward that end, the economic feasibility assessment addresses the following research objectives:

- Quantify the costs to farmers of adopting an identified set of alternatives to the current lagoon and sprayfield system.
- Identify, assess, and describe financial and other logistical factors that will affect the technology adoption decision.
- Estimate the effect of alternative technologies on the position of North Carolina hog and pork producers relative to competing producers in regional, national, and global commodity markets.
- Identify and quantify the pathways by which the adoption of new waste management technologies changes pollutant emissions to air and water and affects environmental quality.
- Estimate the monetized benefits to North Carolina households of the changes in environmental quality achieved by implementing alternative waste management technologies.

A combined team of researchers from RTI International and North Carolina State University (NCSU) Agricultural and Resource Economics (ARE) Department were competitively selected to conduct this work. They identified the following research tasks necessary to meet the objectives stated above.

- Task 1: Costing and Financing of Alternative Swine Waste Management Technologies
- Task 2: Modeling the Effects of Alternative Waste Management Technologies on the North Carolina Pork Industry
- Task 3: Modeling Environmental Quality Impacts from Alternative Technologies
- Task 4: Evaluating Farm Operator's Perspectives
- Task 5: Estimating the Monetized Benefits of Changes in Environmental Quality

Researchers from NCSU are conducting tasks 1 and 2 - those efforts are concisely summarized below. Tasks 3 through 5 were conducted by RTI International – the final report for these tasks is included as Appendix C of this document.

¹ Information in this Appendix was compiled by the Designee from progress, draft, and final reports submitted by investigators (M. Wohlgenant, B. Murray, K. Zering, M. Marra, and J. Chvosta) conducting the full economic assessments for the economic feasibility objectives described in Section 3.0 of this report.

Task 1: Costing and Financing of Alternative Swine Waste Management Technologies

The researchers conducting this tasks have: completed a spreadsheet model for the costs and returns analysis of the candidate Environmentally Superior Technologies, as well as for the baseline lagoon sprayfield system as required by the Agreements; collected cost data for each of the Phase 1 technology candidates; developed a category of farms matrix based on the type of size of all swine farms permitted in the state of North Carolina; and, compiled and discussed the various potential sources of financial support that *may be useful* for financing approved Environmentally Superior Technologies.

Task 2: Modeling the Effects of Alternative Waste Management Technologies on the North Carolina Pork Industry

The researchers conducting this task have taken the estimates of incremental costs associated with new swine technologies by individual type/size farms in North Carolina (developed by the investigators conducting the Task 1 research) and used these estimates to predict the effects on the weaned pig, feeder pig, and market hog markets in North Carolina, other states, and imports. Given the market level effects, the effects on individual farm type/sizes were computed to determine the distributional effects on the farms adopting the new technologies. In the simulations of the market model, two types of simulations were performed: one where only company-owned farms in North Carolina are required to adopt the new technologies; and one where all farms in North Carolina are required to adopt the new technologies.

The market and farm-level effects were computed using an equilibrium displacement model. The model consists of a number of equations showing how market supply and demand for weaned pigs, feeder pigs, and market hogs respond to increases in costs on production of pigs in each of these markets in North Carolina. The model used not only has supply/demand relationships for North Carolina but also supply/demand relationships in other states, and international markets. Therefore, all affected markets by introduction of the new technologies are taken into account. In development of the model, particular attention was given to the influence of vertical integration and coordination in the hog market, particularly in North Carolina. In the empirical analysis, the potential effects of market power on price relationships between spot prices and internal company prices and between spot prices and contract prices are investigated.

Current status and overview:

Detail and comprehensive draft reports for the Tasks 1 and 2 objectives have recently been submitted to the Designee and distributed to the Advisory Panel. The final reports will be available for the public domain upon finalization of the draft reports by the project investigators.