

# Establishing a benchmark for comparing relative cost-effectiveness of an alternative policy instrument for controlling non-point source pollution

**B Grové\* and LK Oosthuizen**

*Department of Agricultural Economics, PO Box 339, University of the Free State, Bloemfontein 9301, South Africa*

## **Abstract**

Knowledge about economic environmental tradeoffs is a prerequisite to evaluate the relative cost-effectiveness of alternative policy instruments to control non-point source pollution (NPS). Failure to explicitly account for the impact of the spatial combination of alternative management practices on pollution contribution rates while quantifying these tradeoffs may cause relative comparisons between alternative policy instruments to control NPS pollution inappropriate. The main objective of this research is to develop a spatial decision support system able to quantify cost-effective economic environmental tradeoffs of maintaining alternative pollution standards taking the interrelated linkages between various agricultural management practices into account. The system is used to establish a benchmark tradeoff curve by means of which alternative policy instruments to control NPS pollution can be compared to determine their relative cost-effectiveness. Tradeoff analyses indicated that the pollution contribution factor plays a cardinal role in determining pollution abatement cost and therefore the benchmark. The importance of the contribution factor highlights the necessity of taking the interdependencies between management units into account when modelling economic environmental tradeoffs. Catchment level tradeoffs showed that the nitrate water quality indicator can be improved with little cost due to both positive and negative tradeoffs at the sub-catchment level. Significant variability exists at the sub-catchment level when nitrate pollution abatement and abatement cost are concerned. The conclusion is that care should be taken not to compare the relative cost-effectiveness of alternative policy instruments to control NPS pollution based on catchment level tradeoffs alone.

**Keywords:** spatial programming, environment, tradeoffs, irrigation, pollution, contribution factors