Hallberg, George R. 1986. "From Hoes to Herbicides—Agriculture and Groundwater Quality," Journal of Soil and Water Conservation, 41:6, Nov.-Dec.

Many agricultural water quality problems are the result of inefficiencies in chemical use. Agricultural chemical contaminants in groundwater of foremost concern are nitrates and pesticides.

Re: nitrates, the focus of attention with respect to groundwater must be nitrogen fertilizer since it is the greatest nitrogen input, the most controllable input, and the one farmers pay for. Estimates that only about 20% of the nitrogen needed could be supplied naturally even under BMPs.

Compared with nitrogen, pesticide losses in groundwater and surface waters are quite low, usually less than 5% (about the same amount of active ingredient that actually reaches target pests), i.e. there is no clear economic incentive to reduce inputs.

There is legitimate concern about the effects of conservation tillage. In reducing run-off many studies show that infiltration and leaching of chemicals into groundwater may increase.

Harmon, W.L., et al. 1985. "No-Till Technology: Impacts on Farm Income, Energy Use and Groundwater Depletion in the Plains," Western Journal of Agricultural Economics, vol. 10 (1), July.

Abstract: Rapidly rising fuel costs for irrigation and tillage, combined with groundwater depletion, confront producers in the Great Plains. Maintaining profits while production costs escalate and water levels decline emphasizes the need to increase water and energy use efficiency. A linear programming analysis for a ten-year period comparing conventional tillage practices with no-till practices based on an irrigated wheat/no-till feedgrain/fallow crop rotation indicates no-till increases both water and energy use efficiency. Returns to land, management, and risks are substantially higher using no-till practices.

Weed control with no-till is accomplished through application of twice the amount of herbicides applied under conventional tillage.

Harwood, Richard R. 1984. "Organic Farming Research at the Rodale Research Center," Organic Farming: Current Technology and Its Role in a Sustainable Agriculture, ASA, CSSA, SSSA, Madison, Wisconsin.

Notes the decline in yields during the process of conversion from conventional to organic practices -- it takes 3-5 years to obtain yield potential with organic culture commensurate with that of conventional practice.

Gives the cost comparison between an organic operation and the average costs for Pennsylvania using the same market price for corn.