

# Agricultural Sources of Contaminants in Groundwater and Surface Water

In agriculture, pesticides and plant nutrients can enter groundwater and surface water and contaminate it. These products may reach large enough levels to become harmful to animals and people, so we must understand how contamination may occur and how it can be avoided. With good management practices, we can keep groundwater and surface water from becoming contaminated by pesticides and nutrients.

## Agricultural sources of contamination

The following substances used on the farm have the potential to contaminate groundwater:

- Livestock manure — a major source of plant nutrients such as nitrogen and phosphorous
- Fuels and solvents for operating machinery
- Pesticides, a general term that includes:
  - Herbicides — used to control weeds
  - Insecticides — used to control insects
  - Fungicides — used to control plant diseases
- Chemical fertilizers:
  - Nitrogen
  - Phosphorus

## How do these agricultural sources become water contaminants?

Animal manure from confinement areas can potentially be a serious contaminant to well water. The contaminants are in the forms of microscopic pathogens (bacteria) and plant nutrients. Nutrient contaminants are predominantly nitrates and, to a lesser degree, phosphates. Animal manure contaminants can enter groundwater through

poorly constructed wells, or by percolating through soil layers.

Spills or leaks of fuels, solvents and pesticides can enter water supplies and are often the most reasonable explanations of well water contamination. A common source of well contamination is inadequate well construction and maintenance. These factors combine to pour contaminants down the well into the groundwater.

Plant nutrients from fertilizers and animal manure are identical. Fertilizer spills near a water source or well pose a contamination threat. Percolation of nitrates through soil layers to the groundwater can stem from land application of animal manure or fertilizers.

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### Note

Nitrogen does occur naturally. Commonly grown legume plants, such as soybeans and alfalfa, produce nitrogen. This nitrogen also changes into nitrate. One cannot distinguish between these naturally occurring sources of nitrates and those added by fertilizers or animal manure.

Nitrates can contaminate groundwater if more nitrate is applied to the soil than the plants and soil can use.

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This publication — previously named WQ21 *Agricultural Sources of Contaminants in Groundwater and Surface Water* — was written by Karen DeFelice, former associate extension agronomist; Nyle Wollenhaupt, former state extension agronomist; and Daryl Buchholz, former state extension agronomist. This material is based upon work supported by the United States Department of Agriculture, Extension Service, under special project number 89-EWQI-1-9203.

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