Legislative Council Staff
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Agricultural Pesticide Use in Colorado

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This issue brief discusses pesticides, including use in Colorado, detection in water, and costs.

What are Pesticides?

Pesticides are used to reduce the harm of pests and protect crops and livestock. Pests are organisms that have negative effects on crops, livestock, humans, or food. Common pests include certain insects, weeds, fungi, or disease-causing organisms. In the agricultural industry, pesticides can mitigate these effects and improve production, while reducing labor costs. The most common types of pesticides are:

- herbicides, to combat weedy plant species;
- insecticides, to combat insects; and
- fungicides, to combat problematic fungi.

Data from the United States Geological Survey (USGS) shows that herbicides are estimated to be the most commonly used pesticide in the United States. Glyphosate, atrazine, and metolacholor are commonly used herbicides.

Proper use of pesticides is important to avoid consequences. Improper pesticide use can lead to human illness, injure species not directly targeted by the pesticide (non-target species), and degrade water quality. However, proper use of pesticides can still impact non-target species, and some pesticides with groundwater advisory statements may leach into groundwater.

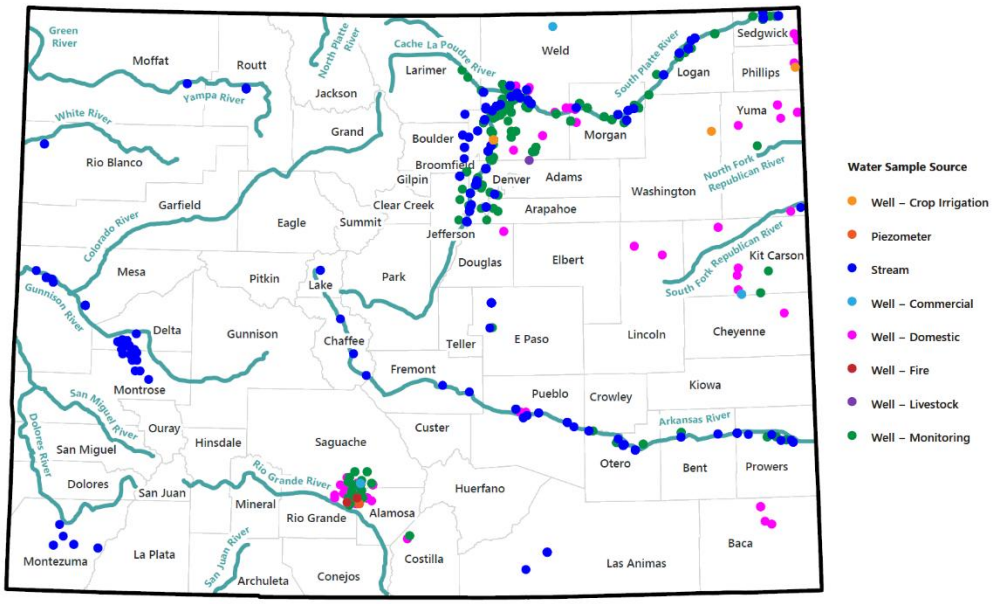
Agricultural Pesticide Use in Colorado

The USGS estimated pesticide use by crop per state through 2019. In 2019, Colorado made up about 1.7 percent of national pesticide use, consisting mostly of glyphosate and atrazine. Corn, wheat, pasture, and hay used the most pesticides in Colorado through time. Pesticide use has fluctuated year by year, but mostly remained steady over time.

Pesticide Detection in Water

The Agriculture Water Quality Program at Colorado State University measures pesticides in water sources across Colorado. From 2020 to 2024, 301 sites tested positive for pesticides, as shown in Figure 1, but none exceeded federal water quality limits. The two highest detected pesticides were metolachlor and glyphosate. The majority of sites that tested positive were streams, groundwater monitoring wells, and domestic water wells. Pesticide detections were most frequent in the South Platte River Basin, San Luis Valley, Upper Arkansas River Basin, and Front Range Urban Corridor, in that order.

Figure 1
Map of Sites That Tested Positive for Pesticides From 2020-2024



Source: Map by Legislative Council Staff. Data from Colorado State University Extension, Agricultural Water Quality Program Database

Pros and Cons of Reducing Pesticide Use

Many studies have evaluated the effects of pesticides on crop yields, with varying results. Pesticide use has generally been associated with an increase in yield. However, one study found that farms with high pesticide use could achieve the same yields with reduced pesticide use, and other studies have found that minimally reducing pesticide use may not affect yield.

Reducing pesticide use too drastically however, may decrease yield and eliminating pesticide use completely likely does reduce yield. A study found that farmers are resistant to reducing pesticide use because of uncertain yields and thus uncertain profits. The same study found that farmers with outside revenue streams are more likely to reduce pesticide use. Pesticide costs account for approximately 4.7 percent of total expenditures by farms in the United States.

Integrated Pest Management

Integrated Pest Management (IPM) is a strategy to reduce pesticide use. Federal guidance defines IPM as a sustainable approach to managing pests with biological, physical, and chemical tools to minimize economic, health, and environmental risks from pesticides. IPM principles emphasize

physical and biological pest management strategies, while reducing reliance on pesticides. An important aspect of IPM is that pest management solutions should offset costs that pests would have caused. For example, some genetically modified crops are more pest-resistant and thus use less pesticides, and netting crops aids in combatting pests. Another example of IPM is using threshold-based, rather than calendar-based, pesticide application. In calendar-based application, producers apply pesticides on a set time schedule. In threshold-based application, producers monitor pests and apply pesticides once pest damage reaches a certain level. A study showed that threshold-based application produces more pests, but the same amount of damage/yield as calendar-based application, while simultaneously reducing pesticide use.

Organic Crops

Organic crops use different types of fertilizer and pesticides than conventional crops. Non-synthetic pesticides are generally allowed except for a select few, including strychnine and arsenic. Synthetic pesticides are typically prohibited, with some exceptions. Organic crops typically have lower yields than conventional farming, though this may be mostly attributed to organic fertilizer use.

State Regulations

In Colorado, pesticides are regulated primarily in the Pesticide Act[1] and the Pesticide Applicators' Act,[2] which are administered by the Colorado Department of Agriculture (CDA). The Pesticide Act regulates pesticide and device registration, labeling, misbranding, enforcement, and penalties. The Pesticide Applicators' Act outlines licensing, certification, training, and enforcement requirements for commercial, public, and private applicators. Recent and pending legislation includes:

- Senate Bill 23-266 – designated neonicotinoid pesticides as limited-use pesticides;
- Senate Bill 24-031 – allows CDA to assess civil penalties for violations of state laws related to the prevention of noxious weeds;
- House Bill 26-1111– creates a program for the end-of-life management of pesticide products and creates the pesticide product disposal and container recycling enterprise to develop and administer the program;
- Senate Bill 26-062 – designates second-generation anticoagulant rodenticides as restricted-use pesticides for retail sales in Colorado.

Other bills have been introduced and failed.

[1] Section 35-9-101 *et seq*., C.R.S.

[2] Section 35-10-101 *et seq*., C.R.S.