



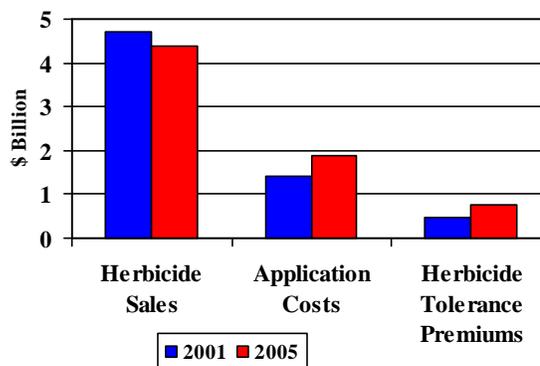
The Value of Herbicides in U.S. Crop Production: 2005 Update

Executive Summary

Herbicides are chemical pesticides that kill weeds. U.S. farmers have sprayed herbicides on nearly 90% of the nation's cropland acreage for the past 30 years.

The value of the use of herbicides in 2005 is estimated to have been \$16 billion in increased crop yields and \$10 billion in reduced weed control costs.

The use of herbicides greatly reduces the need for fuel and laborers on U.S. farms. If farmers did not use herbicides, the alternatives for weed control would be increased mechanical cultivation and increased hand labor to pull weeds. The need for fuel would be 337 million gallons higher, since twice as many cultivation trips would be needed to replace herbicide spray trips and cultivators use four times more fuel per trip than herbicide sprayers. A minimum of 1.1 billion hours of hand labor would be required at peak season for hand weeding, necessitating the employment of 7 million more agricultural workers. Even with the increased cultivation and hand weeding, crop yields would be 20% lower. Approximately 70 million workers would be needed to prevent any yield loss without herbicides.



The largest production loss would be in corn, with a reduction of 2.7 billion bushels. Corn is the main feedstock for U.S. ethanol production, a major alternative being developed to reduce dependence on oil. The corn production loss due to the non-use of herbicides is equivalent to 7.3 billion gallons of ethanol, which is equal to the entire projected capacity of U.S. ethanol production by 2010.

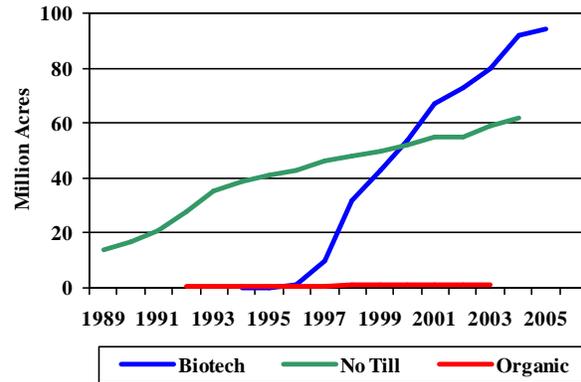
Without herbicides, U.S. growers would have to abandon no-till production practices, which are effective and popular techniques for reducing soil erosion. Without tillage, growers kill weeds with herbicides. If U.S. growers stopped using herbicides and resumed tillage on the 62 million acres that were not tilled in 2005, soil erosion would be 356 billion pounds higher than it is today. Soil erosion deposits sediments in streams and rivers resulting in downstream damages. The damage resulting from increased soil erosion due to farming without herbicides is estimated at \$1.4 billion.

Value of Herbicides in U.S. Crop Production: 2005	
Total Acres Treated with Herbicides	215 million
Current Herbicide Cost to Growers	\$7.1 billion
Herbicide Non-Use Cost Increase	\$9.7 billion
Herbicide Non-Use Yield Loss (<i>Volume</i>)	295.7 billion pounds
Herbicide Non-Use Yield Loss (<i>Value</i>)	\$16.3 billion
Herbicide Non-Use Labor	+1.1 billion hours
Herbicide Non-Use Erosion	+356 billion pounds
Herbicide Non-Use Fuel Consumption	+337 million gallons
Herbicide Non-Use Net Income Impact	-\$26.0 billion

This report for 2005 is an update of a previously issued report for 2001. The same methodology was used in both reports, which makes it possible to report on fluctuations in the herbicide market and changes in the benefits of herbicides. Due to significant price decreases, U.S. farm expenditures for herbicides declined by \$300 million between 2001 and 2005. The price decline for herbicides was outweighed by increases in the costs of applying herbicides due to higher labor and fuel costs (+\$500 million) and increases in the premium prices paid for biotech herbicide-tolerant seed (+\$312 million). Thus, the total cost of herbicides and their application increased by \$512 million between 2001 and 2005.

Increased fuel and labor costs, however, also made the costs of alternatives to herbicides higher. The aggregate cost of cultivation and hand weeding as replacements for herbicides increased from \$14.3 billion in 2001 to \$16.8 billion in 2005, resulting in a net increase in weed control costs without herbicides from \$7.7 billion in 2001 to \$10 billion in 2005.

The value of the crops also increased significantly between 2001 and 2005, which means the 20% loss in production without herbicides is worth more in 2005 (\$16 billion) than in 2001 (\$13 billion). Overall, the value of herbicides increased from \$21 billion in 2001 to \$26 billion in 2005.



Three trends that occurred in crop production and weed control between 2001 and 2005 are noteworthy, especially those relating to no-till, biotech, and organic crop production. Two of these practices are dependent on herbicides and one is not. The number of no-till acres on which herbicides substitute for tillage increased from 52 million acres to 62 million acres. The number of biotech herbicide tolerant acres where herbicides are used with crops that have been genetically-engineered for tolerance increased from 66 million acres to 94 million acres. Meanwhile, the number of cropland acres grown according to organic standards where herbicides are not used increased by 100,000 acres to 1.4 million. Organic farmers substitute labor and tillage for herbicides, which is very costly. The problem of controlling weeds without herbicides has been cited numerous times as the single largest obstacle that organic growers encounter. The following quotation from Earthbound Farms (the largest organic producer in North America) underscores the expense of doing without herbicides:

Controlling weeds without herbicides takes a lot of time and is very costly for us. We do all our weeding by tractor or by hand, which is very labor intensive. Conventional farmers spend only about \$50 an acre on herbicides that knock out every weed in sight. Organic farmers may have to spend up to \$1,000 an acre to keep weeds under control.

There is not likely to be a vast expansion in domestic organic acreage due to the high cost of labor in the U.S. in comparison to many developing countries.

The full report, *The Value of Herbicides in U.S. Crop Production: 2005 Update*, including state and crop specific data, is available on the Crop Protection Research Institute's web site at: http://www.croplifefoundation.org/cpri_benefits_herbicides.htm. For more information, please contact the authors: Leonard Gianessi at 202-872-3865 or lgianessi@croplifefoundation.org or Nathan Reigner at 202-872-3866 or nreigner@croplifefoundation.org.