

THE ECONOMIC IMPORTANCE OF ATRAZINE IN THE USA

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U.S. crop producers derive substantial economic benefits from atrazine and the other triazine herbicides (simazine and propazine). These herbicides generate yield gains for U.S. crop farmers, and in many cases, also reduce total costs for herbicides. Atrazine, the most widely used triazine herbicide, is the keystone of herbicide-based weed control in corn and other regionally important crops in the U.S. Corn acreage, yields and prices have increased over time so that the 3-year average value of corn produced in the U.S. has increased more than 2.7 times, from \$18.6 billion in 1990 to 1992 to \$54.3 billion in 2008 to 2010. Over this same period, crop production practices also evolved, including the widespread adoption of transgenic crops and reduced tillage systems. Given these and other changes since previous economic assessments of the producer benefits from triazine herbicides, an updated economic assessment of the benefits of atrazine and the other triazine herbicides seemed warranted.

The primary benefit of atrazine and the other triazine herbicides to farmers is improved weed control that increases harvested yields and usually reduces costs, as alternative herbicides are less effective and/or more expensive. Based on yield loss and herbicide cost changes estimated using models, the economic value of the yield losses prevented by the triazine herbicides are estimated to range between \$3.0 billion and \$3.3 billion per year for U.S. corn, sorghum, sweet corn, and sugarcane farmers. Most of these benefits accrue to Midwestern field corn farmers using atrazine, but farmers in other regions and growing these other crops also derive substantial benefits. The annual yield benefits and net herbicide cost savings from triazine herbicides are worth an estimated \$2.36 billion to \$2.65 billion for U.S. field corn growers, \$341 million for U.S. sorghum growers, \$210 million for U.S. sweet corn growers, and between \$60 and \$120 million for U.S. sugarcane growers.

Longer term, if atrazine were not available, these yield losses and cost changes would imply price changes and crop acreage reallocations as the supply effects worked their way through the U.S. farm economy. As a result, estimated corn prices would increase between \$0.25/bu to \$0.30/bu and sorghum prices by about \$0.65/bu. These price increases imply losses to consumers estimated to range between \$3.6 billion to \$4.4 billion per year. In addition, based on model estimates, U.S. corn acres would expand by around one million acres and sorghum acres decrease by about 450,000, with small increases in total wheat and soybean acres as well. However, the largest single source for these increased acres would come from land currently enrolled in the Conservation Reserve Program (CRP) – CRP acres estimated to decrease between 620,000 to 880,000 acres, or about 2%.

Atrazine and the other triazine herbicides generate other types of benefits for farmers not accounted for in these values. Atrazine works well with other herbicides, often enhancing the value of less efficacious herbicides. Atrazine also increases the value of crop rotations by reducing weed populations and weed seed banks in crops commonly rotated with atrazine-treated crops. Atrazine also serves as an important tool for managing herbicide resistance, helping to preserve future weed control benefits for other herbicides. Finally, atrazine provides effective

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weed control that has aided adoption of conservation tillage and no-till systems in corn and other crops. Reducing or eliminating tillage reduces soil erosion and associated negative environmental impacts of agriculture, which improves water quality and further enhances the sustainability of U.S. crop production.

The longer-term adjustments in crop acreage and tillage practices that would occur if atrazine were not available to U.S farmers are estimated to increase total soil erosion from U.S. crop land between 56 million to 85 million tons per year, a 9 to 13% increase. About half of this increased erosion would occur because of the shift in crop acreage, especially conversion of CRP acres to crop production, and about half would occur because of shifting land from no-till and into conventional and conservation tillage to address problems with controlling herbicide resistant weeds. The cost of this increased soil erosion to U.S. society ranges between \$210 million and \$350 million per year.

Combining the consumer surplus estimates and the values of the soil erosion benefits, the longer-term benefits of atrazine are between \$3.8 billion and \$4.8 billion per year, with most of these benefits accruing to consumers.

Bibliography

The presentation will be based on the following two AAE Staff Papers:

Mitchell, P.D. 2011. Economic assessment of the benefits of chloro-s-triazine herbicides to U.S. corn, sorghum, and sugarcane producers. Univ. of Wisconsin Agricultural and Applied Economics Staff Paper No. 564, November, 2011, 51 p. Online: <http://www.aae.wisc.edu/pubs/sps/pdf/stpap564.pdf>.

Mitchell, P.D. 2011. Estimating soil erosion and fuel use changes and their monetary values with AGSIM: A case study for triazine herbicides. Univ. of Wisconsin Agricultural and Applied Economics Staff Paper No. 563, November 2011, 97 p. Online: <http://www.aae.wisc.edu/pubs/sps/pdf/stpap563.pdf>.