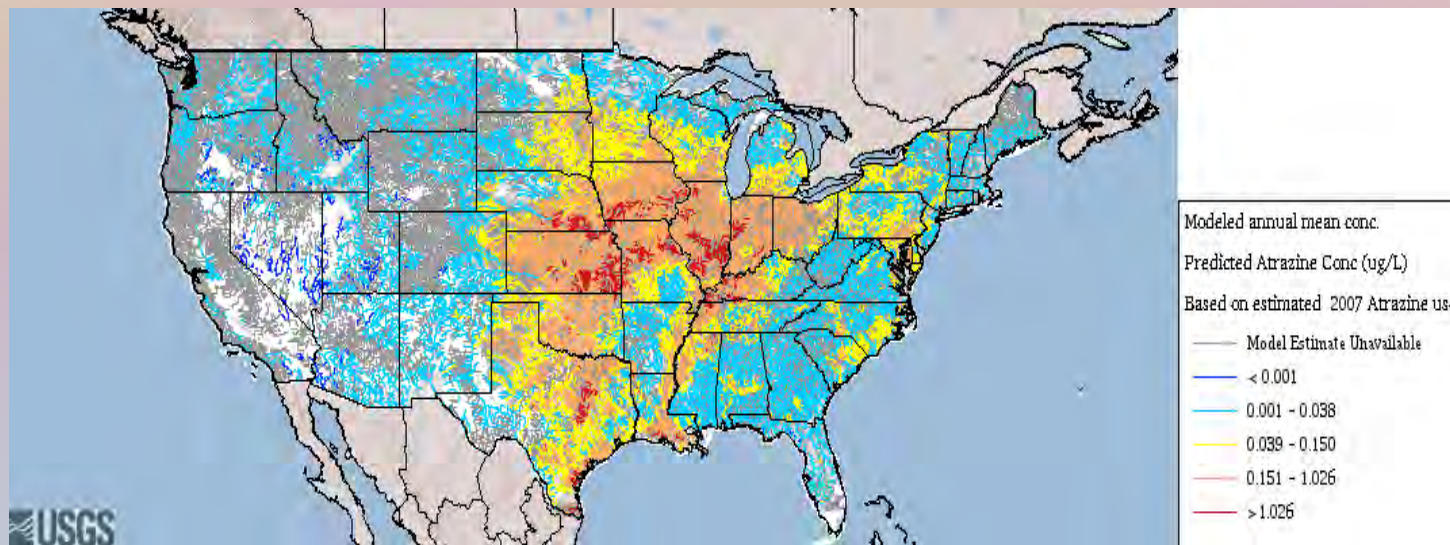


How to reduce water pollution from herbicides: A
case study of the outcomes of atrazine restrictions in
Italy



Joanna Ory
PhD Student
Environmental Studies, UCSC

- Problem: pollution of water with agricultural chemicals creates a critical problem for public health and wildlife
- Atrazine, one of the most common water contaminants, is found at high concentrations in much of the US



- The US EPA is currently reviewing atrazine
- Main research question:
 - **What are countries that have banned atrazine doing instead?**
 - **What are the social, economic, and environmental outcomes of different atrazine management policies?**

Case Study: Research in Italy

- Veneto, Italy

First country to ban atrazine 20 years ago

Major corn growing region



Social issues of atrazine management

Goal: To understand the ways farmers respond to atrazine restrictions and the factors that affect their decisions



Main research questions

- *How have corn farmers complied with restrictions on atrazine?*
- *What are the reasons for adopting certain practices (IPM, organic, conventional)?*
- *What is the importance of information from government, extension, peers, and personal experience?*

Methods

- Survey with corn growers (n=10)

- Focused on what type of information is most important to their decisions of what products/ practices to use, info on what products they currently use, how incentives might influence their choices, how the ban on atrazine affected farms economically, and what the obstacles are in adopting more sustainable techniques

- Semi-structured interviews

- 6 professors (agriculture, environmental policy)
- 9 chemical company representatives
- 2 farm consultants
- 9 corn growers

Findings

- Most common response to the atrazine ban was switching to terbuthylazine, a very similar herbicide (59%)
- Some farmers started using only post emergence herbicides and IPM management (40%)
 - Herbicide use is reduced by 50%
- Some farmers started using and organic techniques (1%)

Switching to terbutylazine

- Did this really improve water quality?
 - Water became less contaminated, but there are still problems
 - “The lessons from the atrazine crisis taught us how to use terbutylazine better. Terbutylazine's use is strictly regulated – the application rate is less than 1/3 of what was used with atrazine. Improper (timing, amount) use, not the specific substance, is the key factor of groundwater protection.” - Weed Scientist, Padova
 - Atrazine in US=2.5 lbs/acre
 - Terb. In IT= 0.6 lbs/acre

What influences adoption of IPM and organic?

- Incentives from government

- “I use organic farming and I have a six meter buffer strip between the crop and the water. The buffer has trees and attracts birds. I'm paid 1300 Euro/hectare by the region. I would have less acreage organic and smaller buffers without this contribution.” -Farmer, Rovigo

- Training from extension

- “Education is the best solution to the problem. Creating an educational program that focuses on the economic benefits of IPM and assessment of input costs will encourage decreased use of herbicides.” - Weed scientist

- Stewardship ethic

- “The cost is more to grow organic, but I want the land to be good for the long term.” - Farmer, San Dona

Future work

- Continuing research on IPM and organic corn in Italy – 9 months next year
- Comparative work with US atrazine management policies
- Develop set of recommendations for US policy



Water quality outcomes after atrazine restrictions

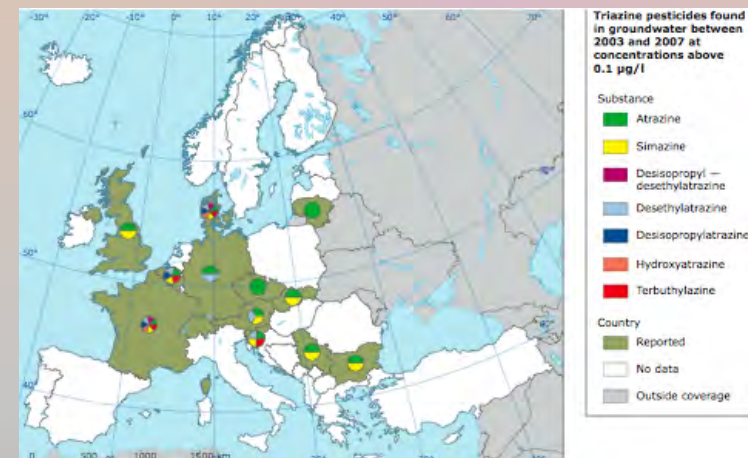
Questions

- *How have herbicide concentrations in groundwater changed since the atrazine restrictions?*



Methods

Measure: Change in atrazine concentration and other herbicide concentration over time



Findings

Integrations and policy recommendations

- Alternatives analysis examines the pros and cons of many alternatives (O'Brien, 2000).
- Possible alternatives to current herbicide management: 1) ban atrazine, 2) restrict atrazine where levels are too high, 3) reduce overall herbicide use (IPM) and organic production
- My analysis will allow for an evaluation of the pros and cons considering social, environmental, and economic issues
- I will integrate the alternatives analysis with policy recommendations for reducing atrazine pollution. I will recommend policy tools for educating and incentivizing more sustainable agricultural practices.

“If more sustainable options are offered in a win-win situation, there is no reason to think farmers are stuck in such a high-input system.”

- C. Giupponi