Research and outreach on pesticide policy and food equity

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University of California Global Food Initiative Fellowship

Introduction

This research analyzes the successes and weaknesses of pesticide regulation in the United States and European Union using a case study of the herbicide atrazine.

Water pollution from pesticides causes health risks for humans, harm to wildlife, and disruption to ecosystem functions. Human exposure to pesticides in drinking water causes risks of both acute and chronic disorders and diseases including cancer, reproductive disorders, developmental disorders, and cardiovascular diseases (Prüss-Ustün et al., 2011).

The US used over 70 million pounds of the herbicide atrazine in 2007, making it the second most used pesticide in the country (Grube et al., 2011). According to the Natural Resource Defense Council (NRDC), drinking water in the US is being poisoned by atrazine (Wu et al., 2010). The report argues that phasing-out atrazine is needed to protect the health of the environment and drinking water safety. Farmers and industry argue that because no alternative herbicide with equal economic and agronomic attributes is available, atrazine restrictions would have negative economic impacts from decreased crop yield and costs of substitute chemicals (Ackerman, 2007). However, atrazine was banned in the European Union (EU) in 2004 and in Italy since 1990 with little apparent impact on agricultural yields.

Learning from history is an important step in designing policies to produce desired environmental outcomes. This study examines the history of atrazine regulation and its associated environmental outcomes. I use case studies in Italy and Wisconsin to analyze the environmental and economic effects of restricting atrazine and other herbicides.

Pesticide	US MCL (µg/L)	EU Standard (µg/L)	Status
Atrazine	3	0.1	Banned
Glyphosate	700	0.1	Allowed
2,4-D	70	0.1	Allowed
Acetochlor	2	0.1	Banned
TOTAL Pesticides	No limit	0.5	

Figure 1. Water quality standards in the US and EU.

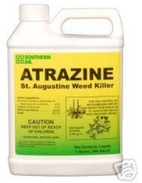


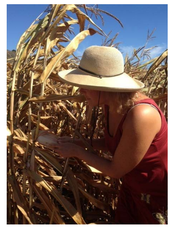
Figure 2. Atrazine bottle.

Research Questions and Methods

- Case study approach: Italy (total atrazine ban in 1991) and Wisconsin (atrazine reductions in 1991). These are the two sites with the longest history of atrazine regulations.
- The main research questions I ask in both of the case studies include:
  - What were the political, social, and environmental factors that led to atrazine policy?
  - How have atrazine policies impacted water quality?
  - What are farmers doing instead of using atrazine?
  - What are the most sustainable alternatives?
- I used methods from environmental policy, toxicology, and agroecology including: surveys, interviews, archival research, regulatory analysis, GIS analysis, and water quality analysis.

Project Goals

- Learn from past policies and understand which atrazine alternatives are most sustainable
- Collaborate internationally on an issue that is important worldwide
- Provide recommendations for the US and other countries for the best policies to manage atrazine and agricultural pollution



Figures 3. Joanna Ory doing research.

Results and Outcomes

Farmer perspectives: Both surveys in Italy and Wisconsin had growers report little impact of atrazine prohibition on yield (2.7% of surveyed farmers in Italy and 5% in WI). Many growers in both locations expressed positive views on atrazine restrictions

Water quality:

Complete ban in Italy: In 2012, atrazine was found in 134 wells and atrazine metabolites were present in 200 wells (ISPRA, 2014). 1,957 groundwater wells were sampled for atrazine, and 7.3% of samples were found to contain atrazine with 0.4 % exceeding the limit of 0.1 ug/L (ISPRA, 2014).

Restrictions in WI: For groundwater wells with known atrazine contamination, the mean atrazine concentration peaked in 1992 at 3.0 ug/L and experienced a variable yet consistent decline to 0.67 ug/L in 2013.

Atrazine alternatives have risks associated with entering water resources, persistence, and health impacts. There is not a low-risk herbicide alternative to atrazine, therefore overall reduced pesticide use is needed.

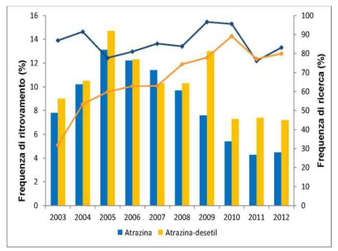


Figure 4. Atrazine concentration in Italian groundwater.

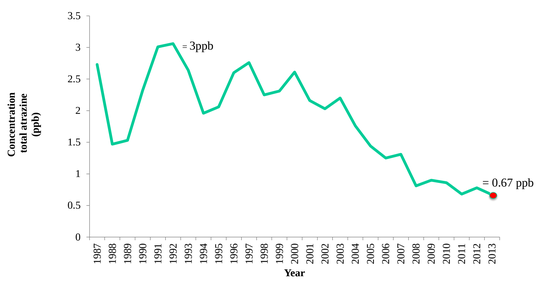


Figure 5. Atrazine mean concentration in Wisconsin groundwater.

Conclusions and Recommendations

- Atrazine is still present in groundwater in Italy and in Wisconsin and substitute herbicides that pose their own risks and are now present in water.
- A more holistic pesticide policy is needed in the US that:
  - Limits total pesticide concentrations in water.
  - Lowers water quality limits for pesticides based on precautionary standards and sensitive populations.
  - Removes the most problematic water pollutants from the market, including endocrine disruptors.
  - Mandates requirements for reduced pesticide use in agriculture.

Food Equity Research and Outreach

In addition to my pesticide policy research project, I organized several events on the topic of food equity as part of my GFI fellowship.

The first event was a partnership with the Center for Agroecology to organize a panel lecture on fair trade issues in coffee production.

The second event was a free film screening in downtown Santa Cruz of the movie Food Chains. This movie explored the working conditions, wages and justice for farm workers. The movie screening was attended by 100 people, both students and members of the public. I organized a panel discussion after the film with experts and advocates for pesticide reform, labor justice, and agroecology. I also conducted a questionnaire survey with the audience about their needs for future education on the topic of food equity.

FREE FILM SCREENING
of FOOD CHAINS
@ The Delmar Theater
1124 Pacific Avenue, Santa Cruz
APRIL 8th 2015 at 7pm

Figures 6 and 7. Images from the film screening flyer.

Literature Cited

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Acknowledgements

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