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Who does pesticide regulation protect?

Protection, Production, and Persuasion: Factors Influencing Pesticide Regulatory Decisions Under the Food Quality and Protection Act

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Introduction

The use of modern pesticides has made great contributions to agricultural productivity, but these benefits have been accompanied by significant risks to humans and wildlife. The regulatory stakes are high: overly protective regulation may result in significant productivity losses; under-regulation may result in the unnecessary endangerment of human and animal life. In the past two decades, the EPA assessed the registrations of individual uses of older pesticide active ingredients, most of which were first introduced to the market when efficacy, not safety, was the primary concern of the registration process. Reregistration requires balancing the interests of consumers, growers, applicators, registrants (manufacturers), and the environment: do the reregistration outcomes reflect the dietary and occupational risks of pesticides and the toxicity to non-target species? Is the likelihood of reregistration different for crops planted on a relatively small number of acres? Do some pesticide manufacturers appear to be better able to influence pesticide regulations?

Data

I examine the toxicity profile and crop characteristics of a group of food-use pesticides subject to reregistration between 1991 and 2008. Regulatory outcomes for active ingredient/use pairs come from the Reregistration Eligibility Decisions published by the EPA. The data consists of over 120 food-use fungicides, insecticides, and herbicides registered for use on agricultural crops. Reference doses, carcinogenicity categories, and inhalation, eye, dermal, bee, bird, and fish toxicity ratings come primarily from EPA sources. Data on crops, such as acreage and value per acre, are from USDA.

Approved pesticides have lower chronic toxicity but are not less carcinogenic

Dietary exposure is the main route of concern for the food-uses studied. Though many pesticides degrade rapidly after application, there is concern about the cumulative dietary effects of pesticides for consumers, particularly for sensitive groups such as infants and children.

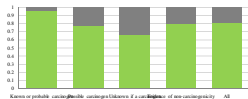


Figure 1. Nearly all uses of pesticides classified as probable carcinogens were reregistered, whereas the proportion of non-carcinogenic uses cancelled tracks the cancellation rate of the population.

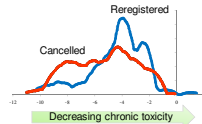


Figure 2. A greater density of reregistered uses is concentrated at lower toxicity values of reference dose, a measure of chronic toxicity. The distribution for cancelled uses has relatively more toxic values.

Occupational hazards mitigated

Occupational exposure is more intensive than dietary exposure, and affects pesticide mixers, loaders, applicators, and workers reentering the field after application.

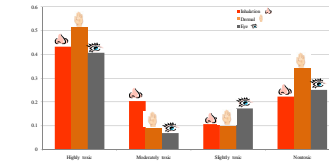


Figure 3. A high percentage of uses that were highly toxic by inhalation, dermal, and eye routes of exposure were cancelled.

Conclusions

Probable carcinogens were more likely to be continued for food uses under the reregistration program, though regulatory decisions appear more protective along the dimensions of chronic and occupational toxicity. Many pesticide uses with high levels of occupational toxicity and toxicity to non-target species were cancelled under the reregistration process. A higher proportion of minor crop uses were cancelled for fungicides than for insecticides.

Cropper et al. (1992) examined factors influencing regulatory decisions for a select group of pesticides of special concern. My research represents a more comprehensive look at regulation, as all older pesticides still on the market in the 1990s were subject to review.

Percentage of minor uses reregistered varies by type of pesticide

Crop production may suffer when active ingredients are cancelled. This is of particular concern to minor crops, which are planted on fewer than 300,000 acres and may not provide enough revenue for registrants to pay for the regulatory process. Minor crops include many high value per acre fruits and vegetables important to healthy diets.

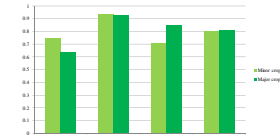


Figure 4. Overall rates of reregistration are similar for both major and minor crops, but more insecticides and fewer fungicides were reregistered for minor crops.

Regulatory success varies by registrant

A few firms dominate the pesticide market, and must invest significant resources in the regulatory process.

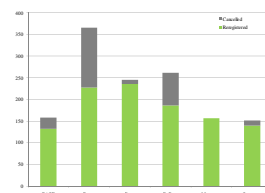


Figure 5. The major firms' success in reregistering their pesticides varied substantially, with Bayer having a large number of uses cancelled and Monsanto reregistering all uses in the dataset.

Decisions protective of non-target species

Honeybees are an important part of the production of many crops, and scientists have questioned whether there is a link between pesticide use and Colony Collapse Disorder, which threatens honeybee populations. Birds and fish are other organisms affected by pesticide applications.

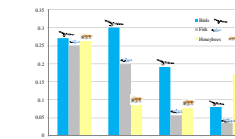
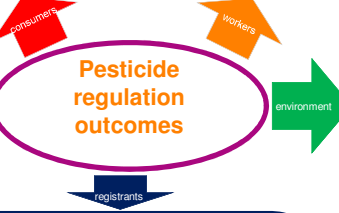


Figure 6. A large proportion of pesticide uses most toxic to non-target species were cancelled.

Pesticide regulation outcomes



Literature cited

Cropper, M.; Evans, W.; Berardi, S.; Duch-Souares, M. & Potney, P. (1992). "The determinants of pesticide regulation: A statistical analysis of EPA decision making". *Journal of Political Economy* 100, 175-197.
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Further information

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