Property and Environment Research Center
2048 Analysis Dr, Ste A • Bozeman MT 59718
(406) 587-9591 • fax (406) 586-7555
perc@perc.org • www.perc.org.

Bee Pollinators – An Environmental Market Story

Profits earned from bee pollination markets help prevent bee populations from declining as a result of Colony Collapse Disorder.

Environmental Concern

Is our food supply at risk due to rising honeybee mortality rates? Honeybees are pollinators that assist in the production of an estimated one-third of the food that we eat in the U.S. In the winter of 2006/2007 bee colonies across the nation began to collapse from a phenomenon called Colony Collapse Disorder (CCD). CCD caused winter honeybee mortality rates of 30 to 40 percent; that is about twice the normal rate of annual loss. While the causes of CCD remain unclear, there is concern about future honeybee populations.

Market Solution

CCD is a real problem but well-functioning markets have prevented it from impacting food supply. Privately owned honeybees are used to pollinate most commercial crops. Crop owners pay beekeepers to temporarily relocate hives to enhance pollination, and thus crop production. If honeybee production declined as a result of CCD, the price of pollination services would be expected to rise. Beekeepers, however, prepare for potential CCD losses by raising more bees. In fact, there has been little economic impact from CCD losses. The numbers of honeybees and hives have remained fairly constant since CCD hit. Furthermore, honey production has not declined and the price of pollination services has remained stable for most crops.

Pollination is an active market where beekeepers and crop growers negotiate and both parties gain from trade. Every February about 70 percent of the privately-owned beehives in the U.S. are trucked to California to pollinate almonds. After almond pollination, the bees are transported to other regions to pollinate cherries, cranberries, melons, squash, and other crops. Beekeeping is not an easy business but the potential profits from pollination services motivate beekeepers to maintain supply.

Environmental Market Learning Principles

1. Environmental problems are the result of conflicting demands on scarce resources.
Resources are limited; therefore people must choose among various uses. A choice to do one thing is also a choice to not do something else.

- **What are the competing demands for the resource?**
  Sometimes nature competes with human desires. CCD, for example, threatens honeybee populations. The market response by beekeepers is to increase hives to ensure a sufficient number of bees to meet the demand for pollination and honey.

2. **People respond to incentives.**
Incentives are the rewards and punishments defined by laws, cultural norms, regulations, property rights and other formal and informal rules of society.

- **What are the incentives driving resource use and management?**
  Beekeepers can make money by raising bees for both honey production and to provide pollination services. It is the market for both that motivates beekeepers to continue to raise bees and invest in splitting colonies to repopulate low numbers when loses from CCD are expected.

3. **Markets encourage mutual gains from trade.**
   If property rights are secure markets function well to allocate scarce resources directing them toward their highest valued use. Property rights are secure when they are well defined and enforced in a manner that allows exclusive but tradable rights and ensures accountability for impact on others.
- **What are the contractual or institutional arrangements? How do they facilitate or hinder trade? What are the potential gains from trade?**
  Though property rights on bees are imperfect, they are sufficient to motivate efficient markets. Beekeepers own the hive but there is no guarantee the bees will return. However, it is the nature of bees to return. Secure rights to the hives allow beekeepers to transport their property, negotiate with crop owners, and provide pollination services.

<u>Classroom Questions</u>

- What is the expected impact of CCD on honeybee populations?
  - *CCD reduces the number of honeybees that live through winter.*
- Why did total honeybee populations not fall as a result of CCD?
  - *Beekeepers responded to the bee losses by repopulating their private hives.*
- What motivates beekeepers to maintain a stable population of honeybees?
  - *Beekeepers respond to expected price and profit of pollination services. A reduction in the number of hives owned by an individual beekeeper will result in a reduction in profit potential.*
- While there are many wild pollinators, crop growers pay for pollination services. Why?
  - *Though there are many wild pollinators, crop growers gain certainty and increased yield by paying for pollination services. The additional benefit they gain in crop yield outweighs the additional cost for the pollination services.*
- How do markets and secure property rights motivate stable honeybee populations?
  - *Markets encourage cooperation between beekeepers and crop growers because there are mutual gains from trade. Secure property rights clearly delineate what is owned to help lower the cost of contract creation and the negotiation process.*

<u>Supplemental Reading</u>

- Cheung, Steven, 1973. "The Fable of the Bees: An Economic Investigation*." Journal of Law and Economics.* April, 11-33. (Dispels the myth that honeybee pollination is an externality).
- Hayek, Friedrick A. 1945. "The Use of Knowledge in Society." American Economic Review. September, 519-30. (Markets draw on the "knowledge of the particular circumstances of time and place." That type of knowledge is not understood by any one person.)
- Rucker, Randal R. and Walter N. Thurman. 2011 "Blessed are the Beekeepers." *Wall Street Journal*. June 22*.* (Beekeepers respond to market price to ensure a good supply of pollinators.)
- Rucker, Randal R. and Walter N. Thurman. 2012. "Colony Collapse Disorder: The Market Response to Bee Disease." *PERC Policy Series*, PS50. Bozeman, MT. January. (A demonstration of how markets are able to resolve the problem of large bee die-offs and ensure a stable food supply.)