

Systems thinking embedded in a futures study of Honeybees

Summary of Learnings

**2026 Houston
Foresight Award**

Systems Thinking Final Assignment
Leah Fischer
email: lsfische@CougarNet.UH.EDU
April 30, 2025



History and Current Conditions

“The sheer value of honeybees as engines of agriculture is preventing complete collapse even as they are assailed on all sides.”

- Oliver Milman

The pollination of **California's 1.56 million acres of almonds** = the largest annual managed-pollination event in the world.



Honeybee System + Disruption = Chaos

2024-2025
Record-level
US Honeybee
die off event

What if system collapse?

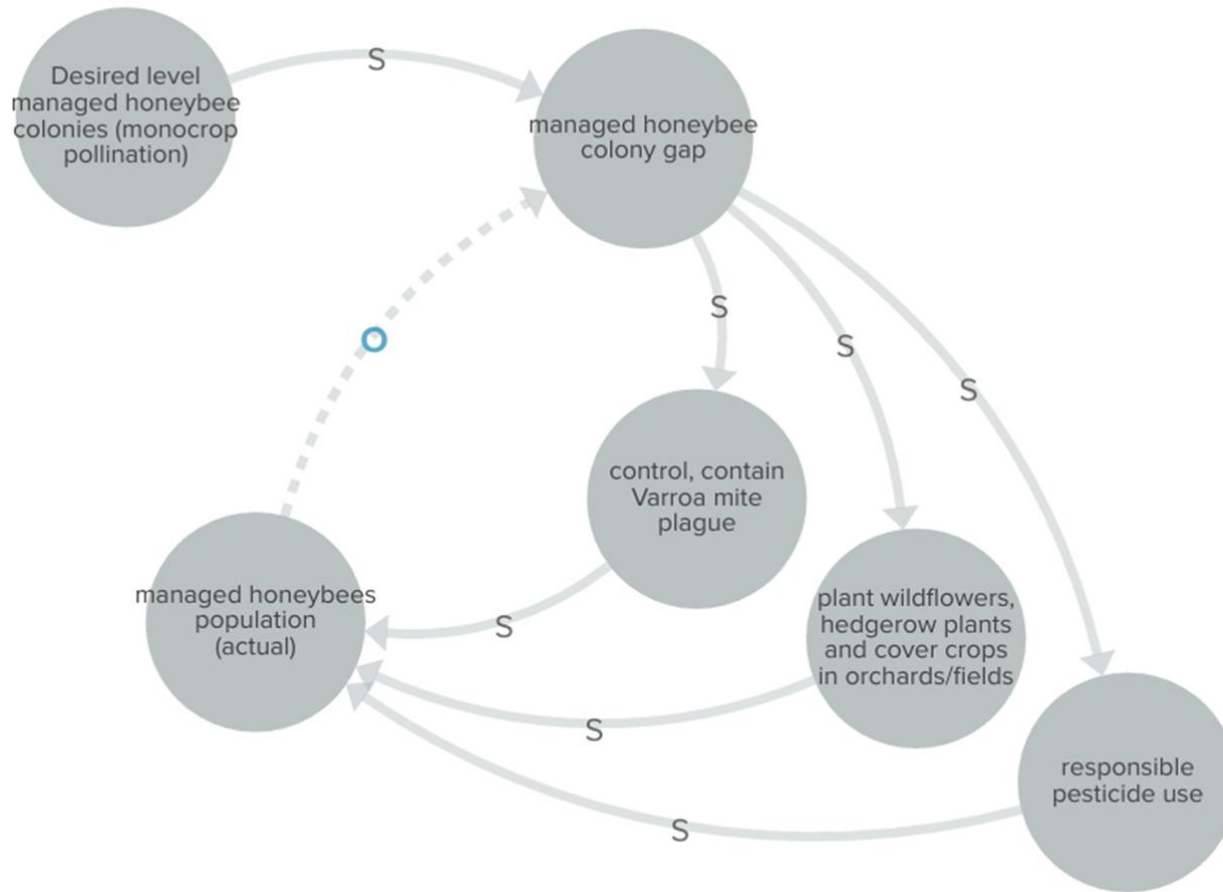
- Increased agriculture and food industry costs
- Loss of variety of food in diet
- Loss of U.S. economic security
- Global food security issues



Who's in the Honeybee System?

Honeybee system actors	Other players*
• Managed honeybees • Commercial migratory and hobbyist beekeepers manage honeybee colonies for pollination services and honey production • Commercial farmers rent honeybee colonies for pollination services • Wild/native bees pollinate forage habitat and agricultural land	• Agriculture land • Agricultural pesticides • Forage habitat • Bee diseases, pests, and pathogens • Climate change *Managed honeybees interact with or are acted upon by each of these other players.

Sustaining managed honeybee colonies for monocrop pollination



Thousands of almond trees bloom at an orchard in Vernalis, San Joaquin County, California, March 1, 2025. Stephen Lam, San Francisco Chronicle Via Getty Images

Honeybee System + Reorganization

How might System repair/reorganize?

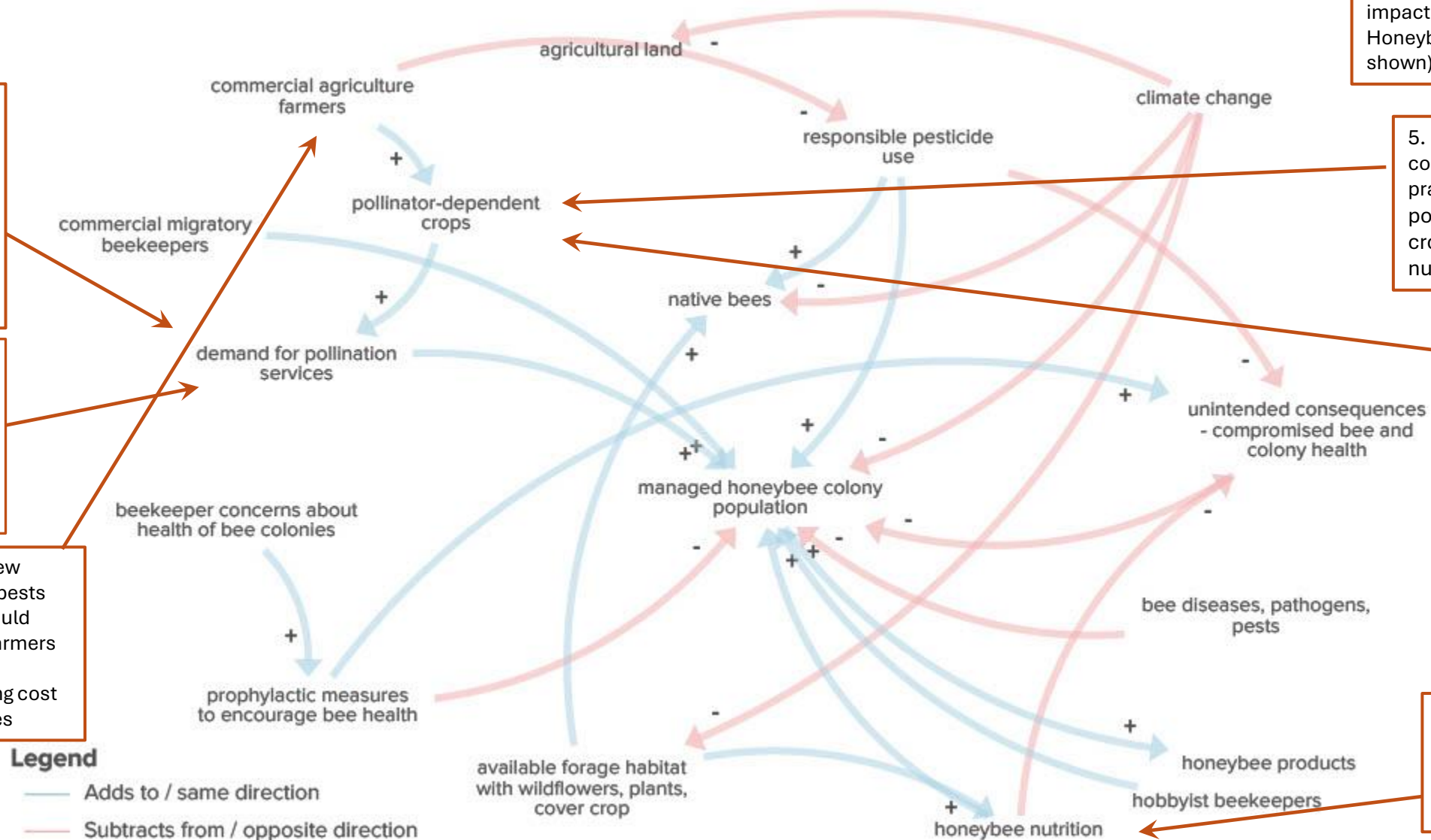
- Wild/Native bees
- Prioritize habitat
- Regulate agricultural pesticide
- Change management practices
- Change the balance of what we eat/ return land to nature



Thank you!



5b. Emerging Change: Where it will hit the system



7. Increasing temperatures and unpredictable weather associated with climate change impact everything in the Honeybee system (arrows not shown)

5. Changes/Advances in bee colony management practices would impact pollinator-dependent crops by increasing colony numbers

6. Expansion of available forage land would affect pollinator-dependent crops by improving health/nutrition of managed bees and wild bees

1. Expansion of monocrop agriculture would affect honeybee nutrition by reducing ecosystem diversity

4. Increasing acreage planted with self-fertilizing varieties of almonds would impact commercial beekeepers by demand for pollination services

3. Identification of emerging agricultural pests would impact pollination services by limiting colony travel

2. Identification of new invasive pathogens/pests that prey on bees would affect commercial farmers by reducing availability/increasing cost of pollination services