

Food Security Threat: Hurts More Than a Bee Sting

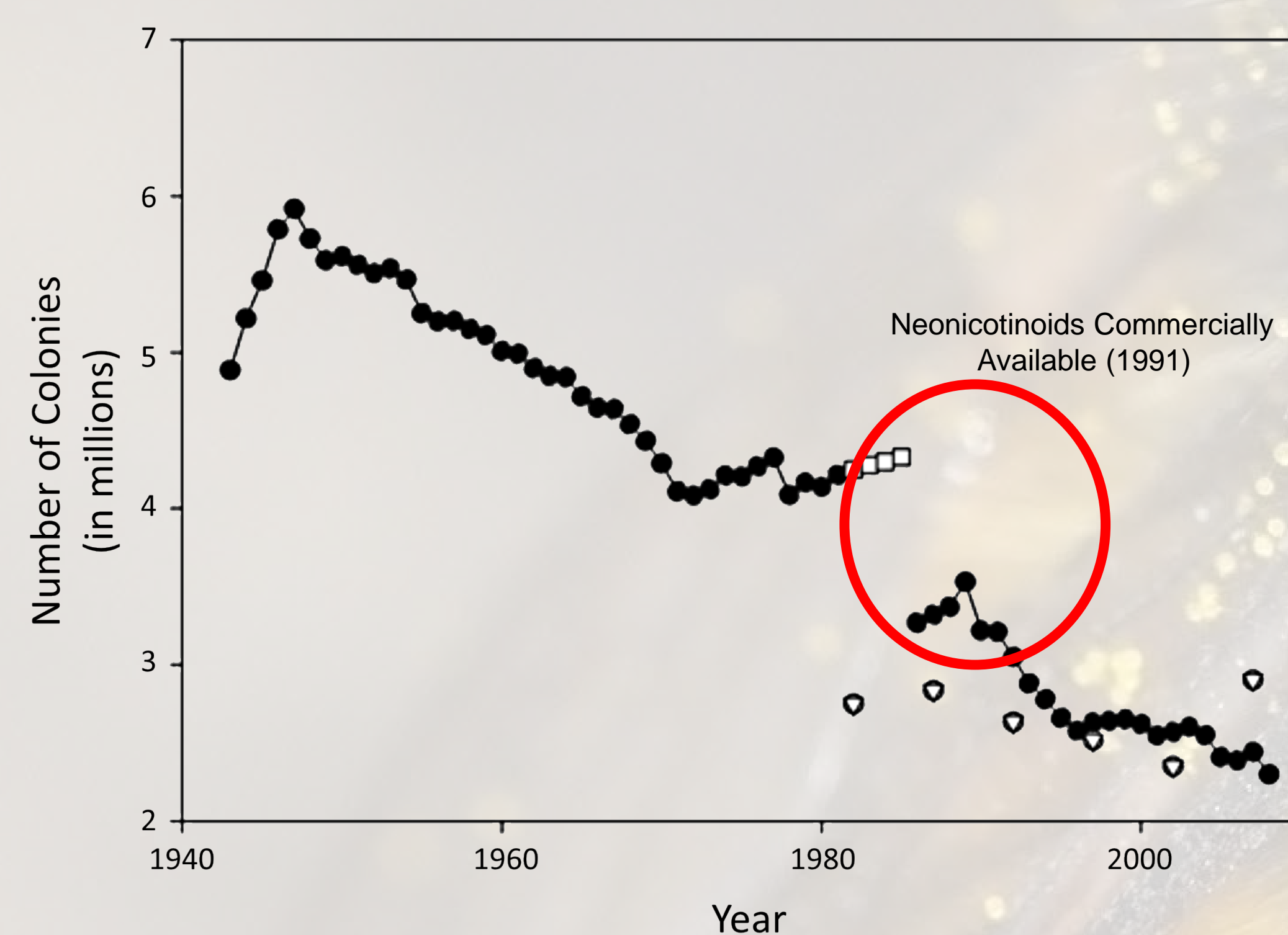
Rayyan Khan (UND) - Andre Padilla (UND)
Lars Rucker (ME) - William Rucker (ME)

Advisors: Professor Kristin Wobbe (UGS)
Professor Sharon Wulf (BUS)

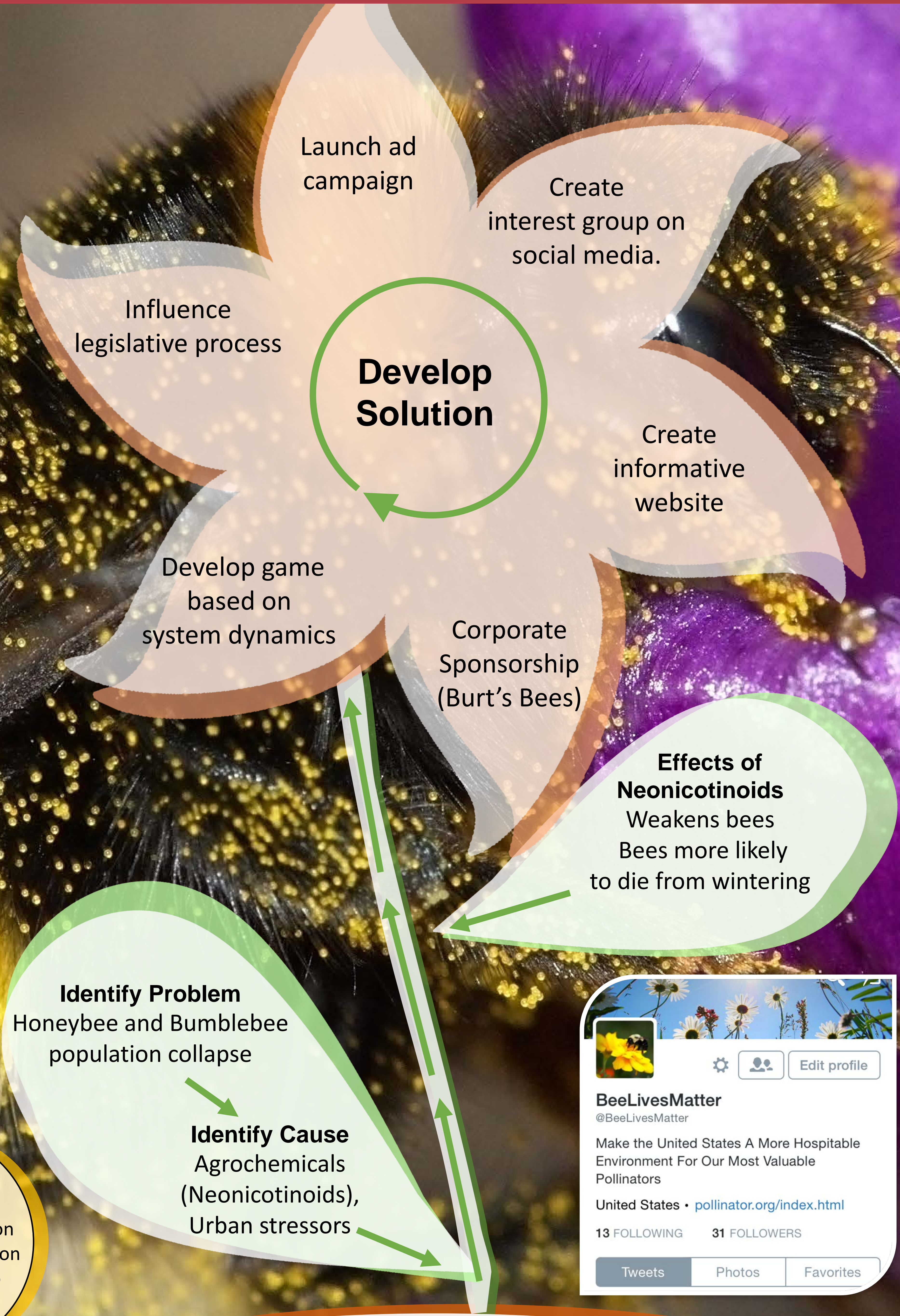
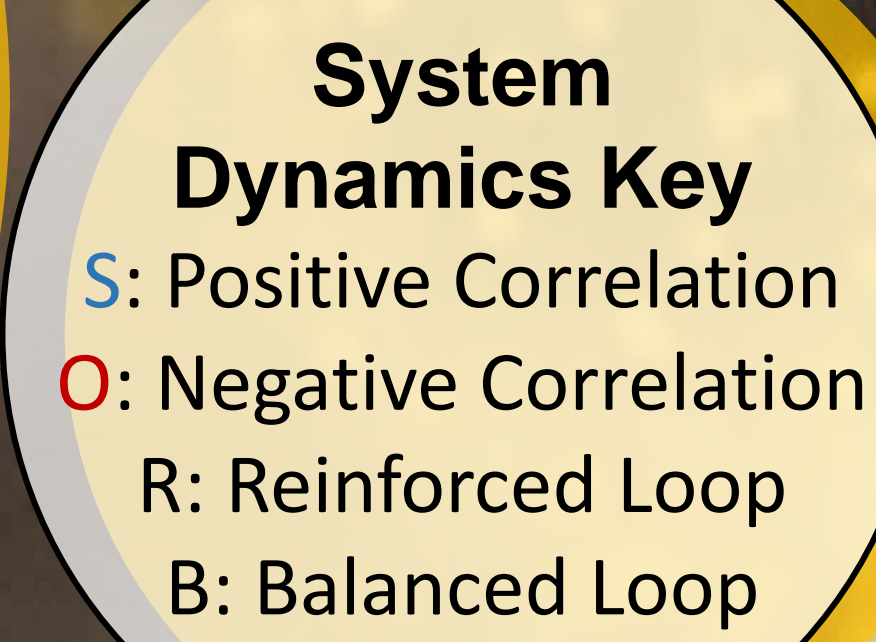
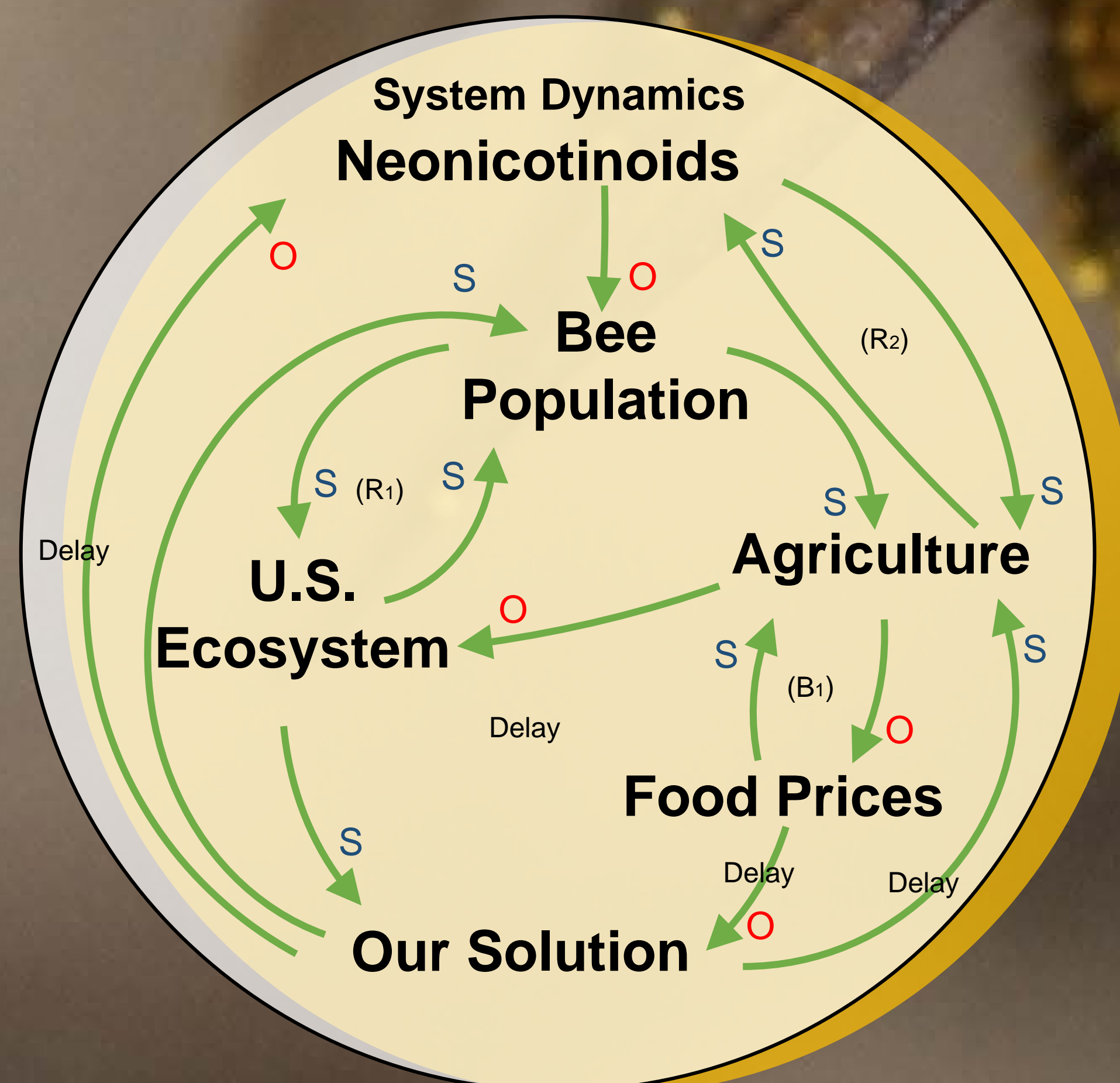
Problem & Background

- 68% of most produced monoculture crops dependent on bee pollination (Williams, 2010)
- \$15 billion sector in U.S. economy (Smith, 2013)
- Managed honeybees: 60% decline since 1940s (Vanengelsdorp, 2009)
- Notable causes of collapses: Agrochemicals (Neonicotinoids) and habitat loss (Smith, 2013)
- Lack of awareness

Numbers of Managed Honeybee Colonies in the U.S. Since 1940-2008



(USDA-BAE, 1949; USDA-AMS, 1955; USDA-NASS, 1967, 1972, 1978, 1981; Rodenberg, 1992; USDA-NASS, 1999, 2004a,b, 2009a,b)



Project Goals

- Increase awareness
- Increase research done on all species of bees native to the U.S
- Legislation pass to ban neonicotinoids by 2016
- Feed global population by 2050

Benefits

- Agriculture productivity, higher crop yield
- Sustainable Agriculture
- More hospitable and aware United States
- Notoriety
- Influences legislation proposed

Recommendations

- Short Term (First Year):**
- Have homeowners plant specific flowers
- Long term:**
- Agrochemical corporations to avoid using bee harmful pesticides
 - Influence honeybee interest groups to focus on bumblebees as well

Acknowledgements

We would like to thank Professor Robert J. Gegear, and Professor Michael Radzicki for sharing their research and insight on the topic.

References

BIOZENT, U. (2013). Pesticides under fire for risks to pollinators. *Science*, 336, 20.

Jeschke, P., & Nauen, R. (2008). Neonicotinoids—from zero to hero in insecticide chemistry. *Pest management science*, 64(11), 1084-1098.

Smith, K. M., Loh, E. H., Rostal, M. K., Zambrana-Torrel, C. M., Mendiola, L., & Daszak, P. (2013). Pathogens, pests, and economics: Drivers of honeybee colony declines and losses. *Ecohealth*, 10(4), 434-445. doi:10.1007/s10393-013-0870-2.

Vanengelsdorp, D., Chen, Y., Underwood, R., Tarpy, D. R., Pettis, J. S., Evans, J. D., . . . Cox-Foster, D. (2009). Colony collapse disorder: A descriptive study. *PLoS One*, 4(8), e6481-e6481. doi:10.1371/journal.pone.0006481

Williams, G. R., Shutler, D., Tarpy, D. R., vanEngelsdorp, D., Chauzat, M., Cox-Foster, D. L., . . . Rogers, R. E. L. (2010). Colony collapse disorder in context. *BioEssays: News and Reviews in Molecular, Cellular and Developmental Biology*, 32(10), 845-846. doi:10.1002/bies.201000075

Background Image: Retrieved December 1, 2014 from <http://en.wikipedia.org/wiki/File:Bumblebee-2009-04-19-01.jpg>. Copyright 2009. Reprinted with permission as per Creative Commons Attribution-Share Alike 3.0 Unported



Research Process