Macroeconomic Consequences of Lost Pollination Services

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Introduction

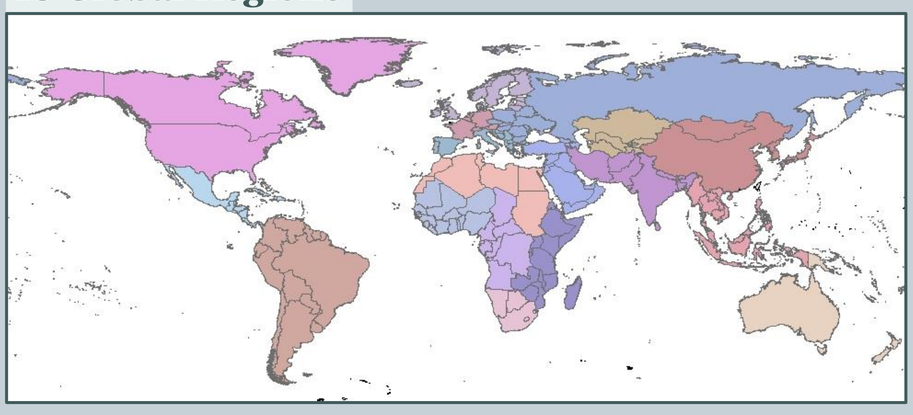
Pollination is a valuable ecosystem service which provides a variety of benefits including food and fiber. Mounting evidence of long run declines in both managed and wild insect pollinators has raised concerns over potential risks to global food security and economic development.



Methods

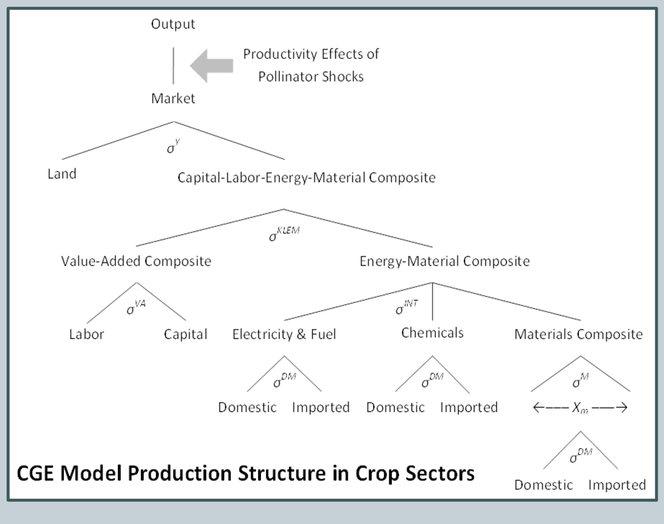
- Computable general equilibrium (GE) model
- Pollinator declines implemented as shocks to pollinator-dependent crop sectors
- Prices and quantities adjust in all sectors and regions
- Examine global and regional shocks
- Measure changes in social welfare and value added in direct crop and indirect non-crop sectors
- Compare results to partial equilibrium (PE) approach

18 Global Regions



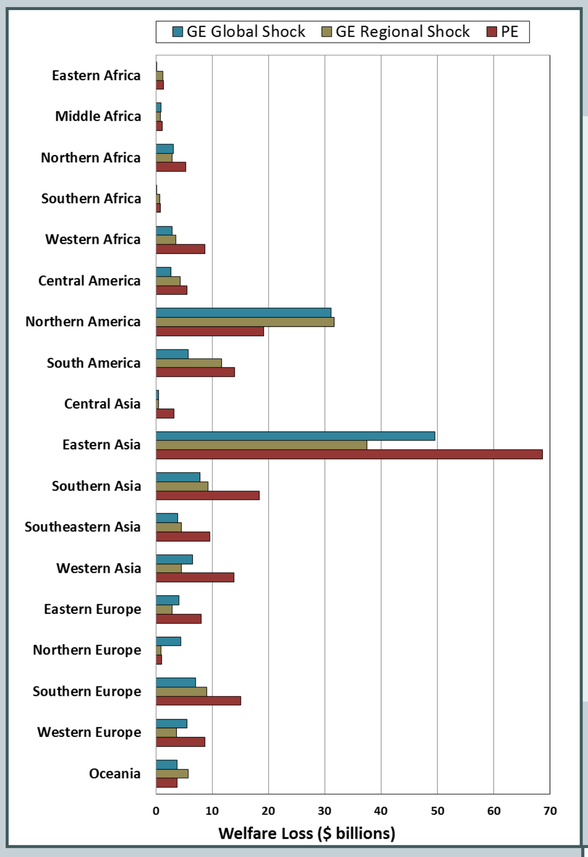
13 Production Sectors

- Rice, wheat, and other grains
- Vegetables, fruits, and nuts
- Oil seeds
- Sugar cane, beet, and other crops
- Livestock
- Forestry
- Other agricultural sectors
- Processed food
- Fuels and electricity
- Chemicals, rubber, and plastics
- Manufactures
- Services
- Rest of economy



CGE Model Production Structure in Crop Sectors

Results

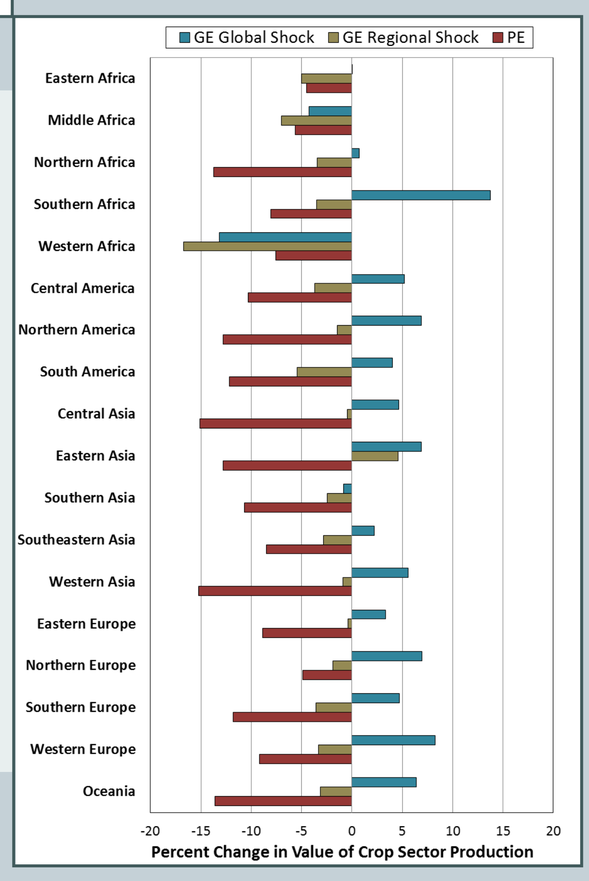


Loss in Social Welfare

- $127-152 billion, globally
- PE approach overestimates ($206-279 billion)
- Mean loss for regional shock is $7.5 billion
- Regional variations exist for both global and regional shocks
- Rest-of-world gains from many regional shocks

Change in Production Value

- GE model predicts net gain to crop sectors in all but three regions
- GE model predicts large indirect sector losses (e.g., processed food, chemicals)
- Regional variations exist for both global and regional shocks
- PE approach predicts large crop sector losses



Next Steps

Examination of input substitutions

- bee colony rental as a formal livestock section
- conservation investment in wildlife habitat