Economic Analyses

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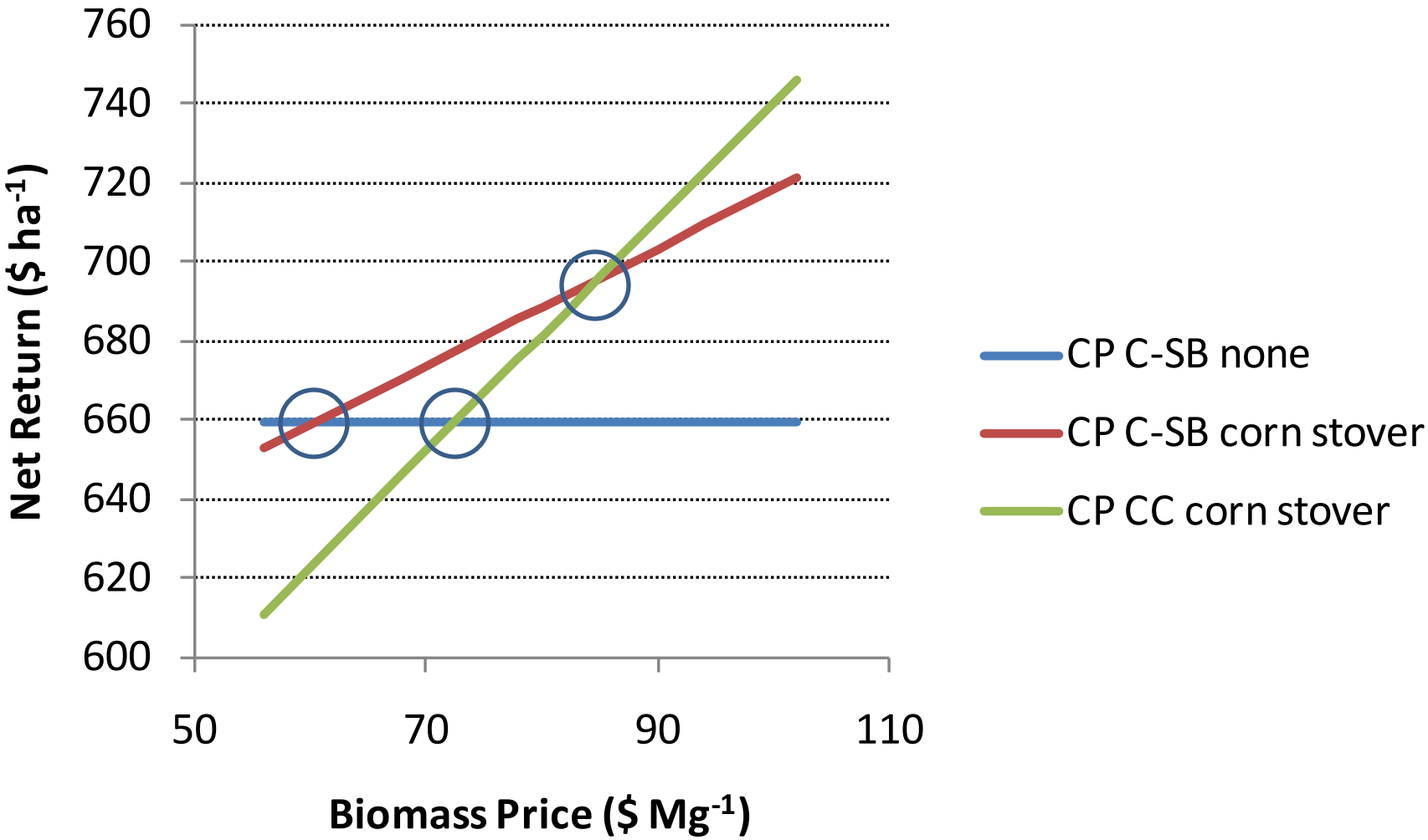
Crop Residue Example
Breakeven Analysis

- Within a tillage/rotation system:

  Breakeven Price = Harvest Cost + Nutrient Replacement
  + Transportation + Storage
  ± Impact on Future Productivity

- Tillage/rotation/other cropping system alternatives?

Higher Biomass Price Encourages Increased Biomass Harvest



Regional Analysis using EPIC

- Biomass supply for gasification plant at University of MN-Morris (UMM) within 20-mile radius of the plant
- EPIC calibrated using yield data from multiple ARS studies at the Swan Lake Research Farm
  - Will also use SOC data as it becomes available
- Treatments
  - Rotation: C-SW-SB, C-SB, CC
  - Tillage: Chisel plow (CP), Fall Strip-till (ST)
  - Residue harvest: none, corn stover, wheat straw, stover and straw

Biomass Collection, Loading, and Transportation Costs

Transportation Cost
($ Mg^{-1})

- 8.46 - 10.00
- 10.01 - 12.00
- 12.01 - 14.00
- 14.01 - 16.00
- 16.01 - 18.00
- 18.01 - 20.00

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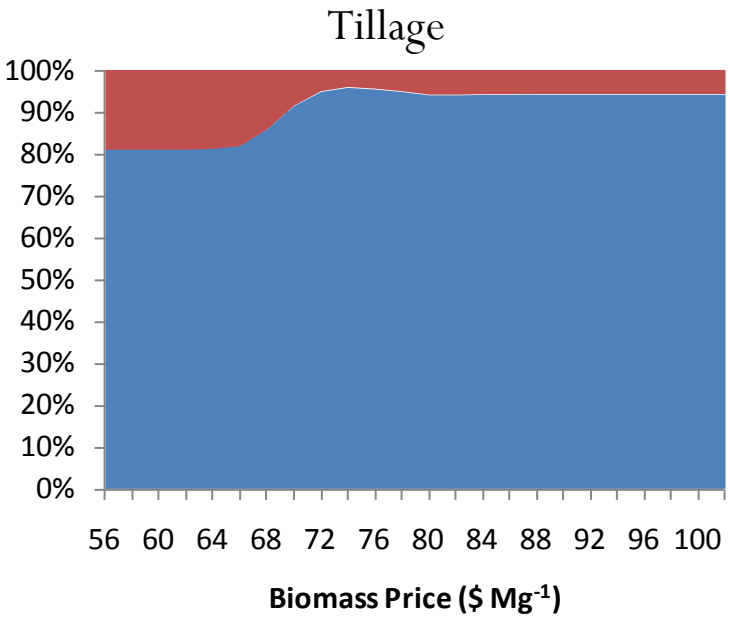
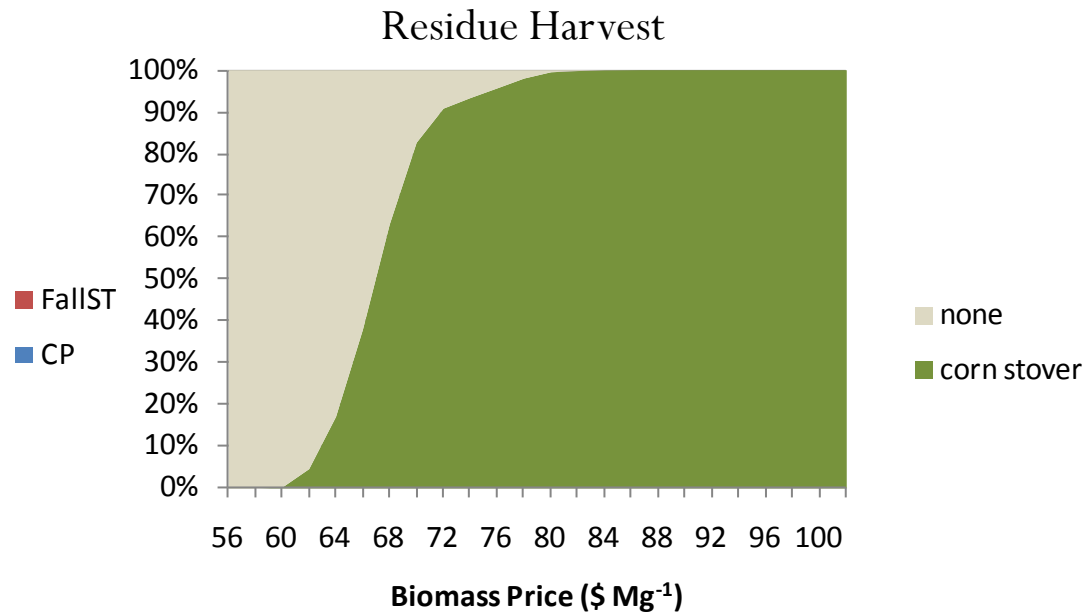
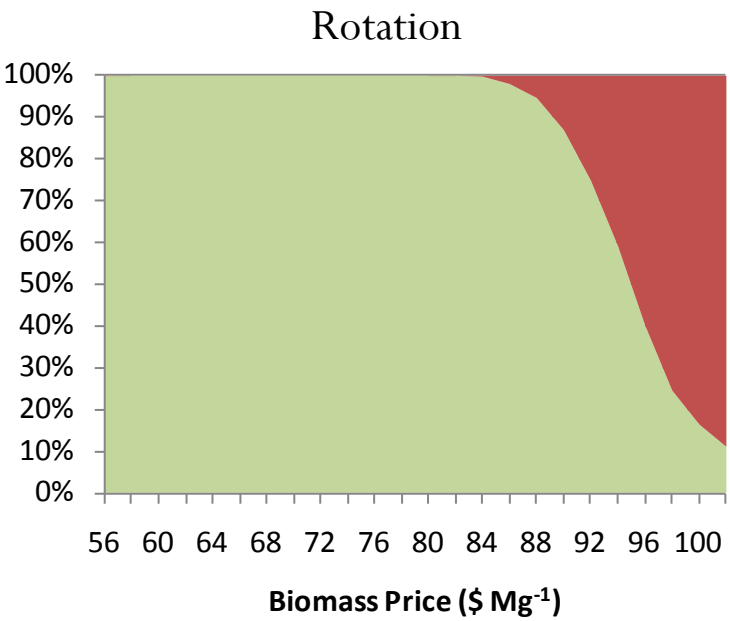
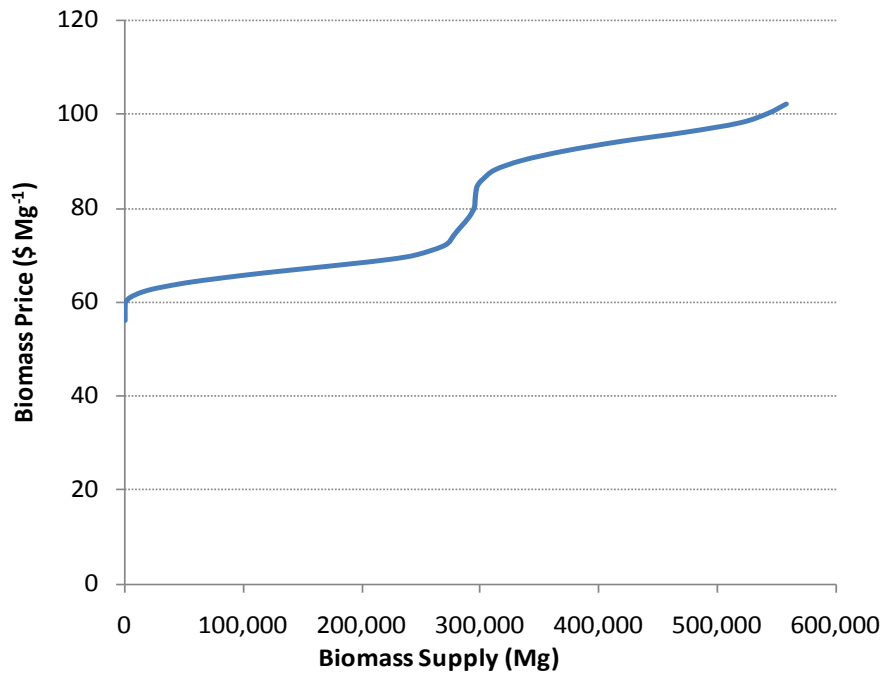
0 5 10 20 Kilometers

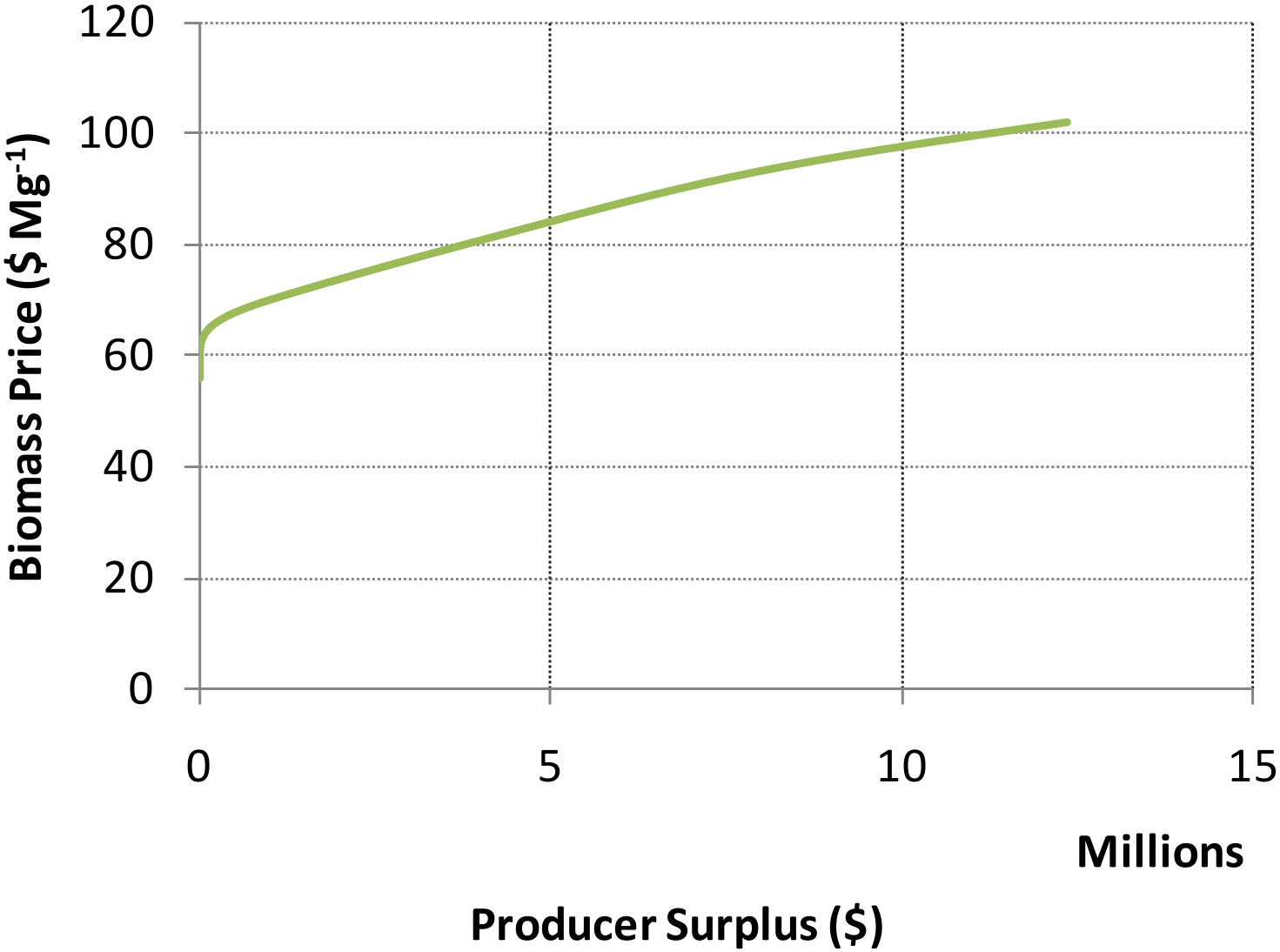

Tillage
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
56 60 64 68 72 76 80 84 88 92 96 100
Biomass Price ($ Mg-1)
FallST
CP


Residue Harvest
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
56 60 64 68 72 76 80 84 88 92 96 100
Biomass Price ($ Mg-1)
none
corn stover

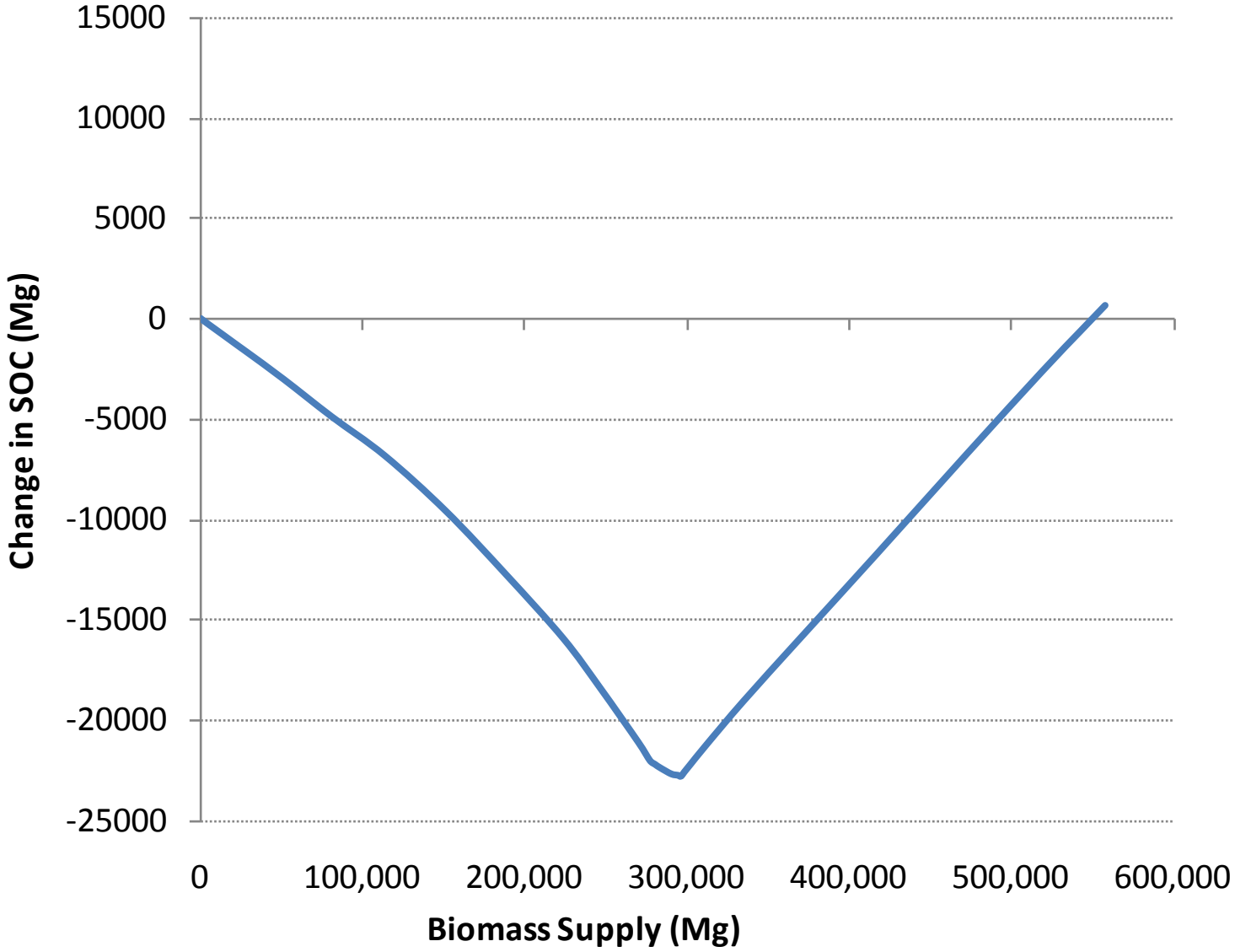

Rotation
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
56 60 64 68 72 76 80 84 88 92 96 100
Biomass Price ($ Mg-1)
CC
C-SB


120
100
80
60
40
20
0
Biomass Price ($ Mg-1)
0 100,000 200,000 300,000 400,000 500,000 600,000
Biomass Supply (Mg)

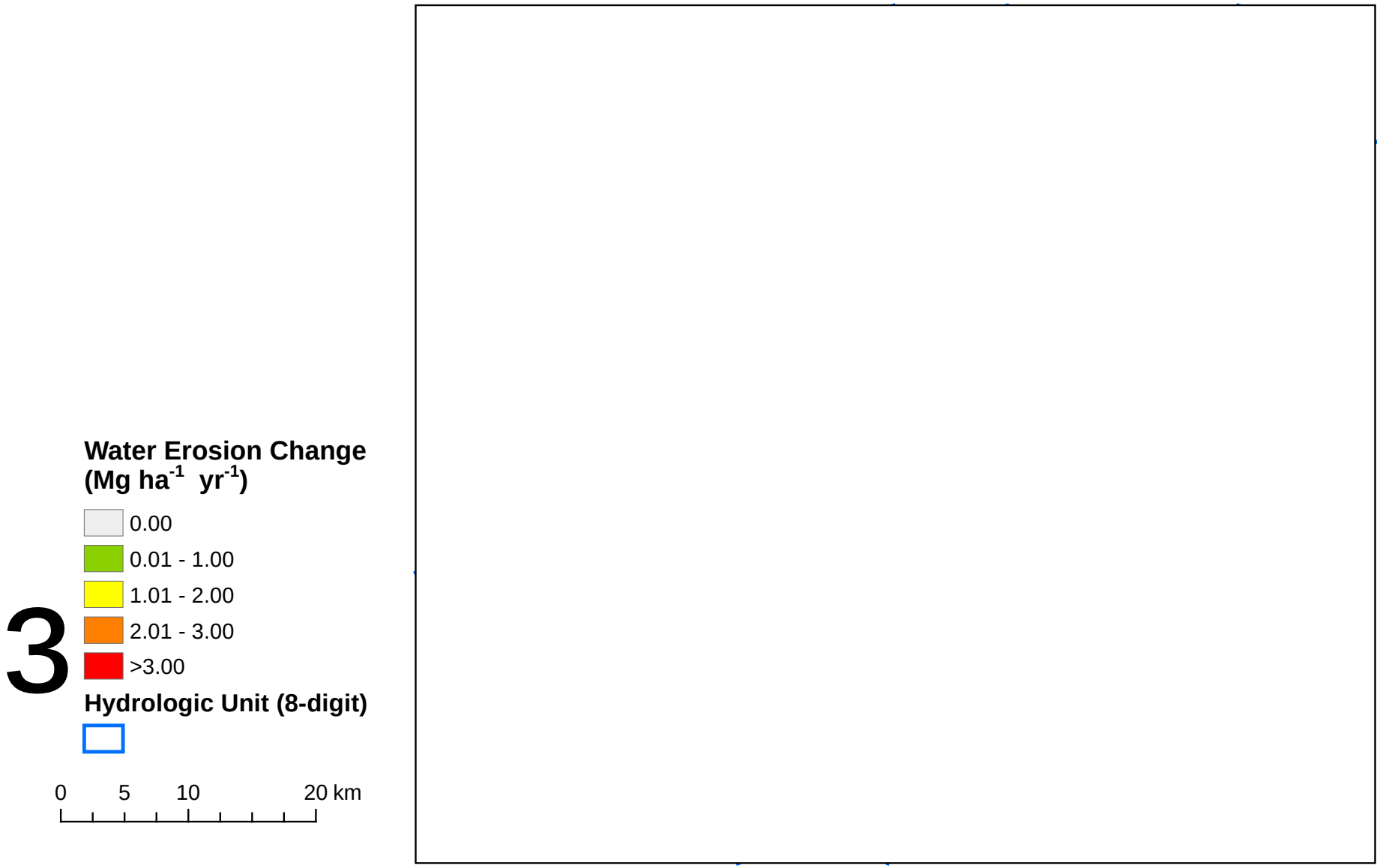
Impact on Net Returns to Farmers



Effect on SOC



Spatial Analysis of Impacts



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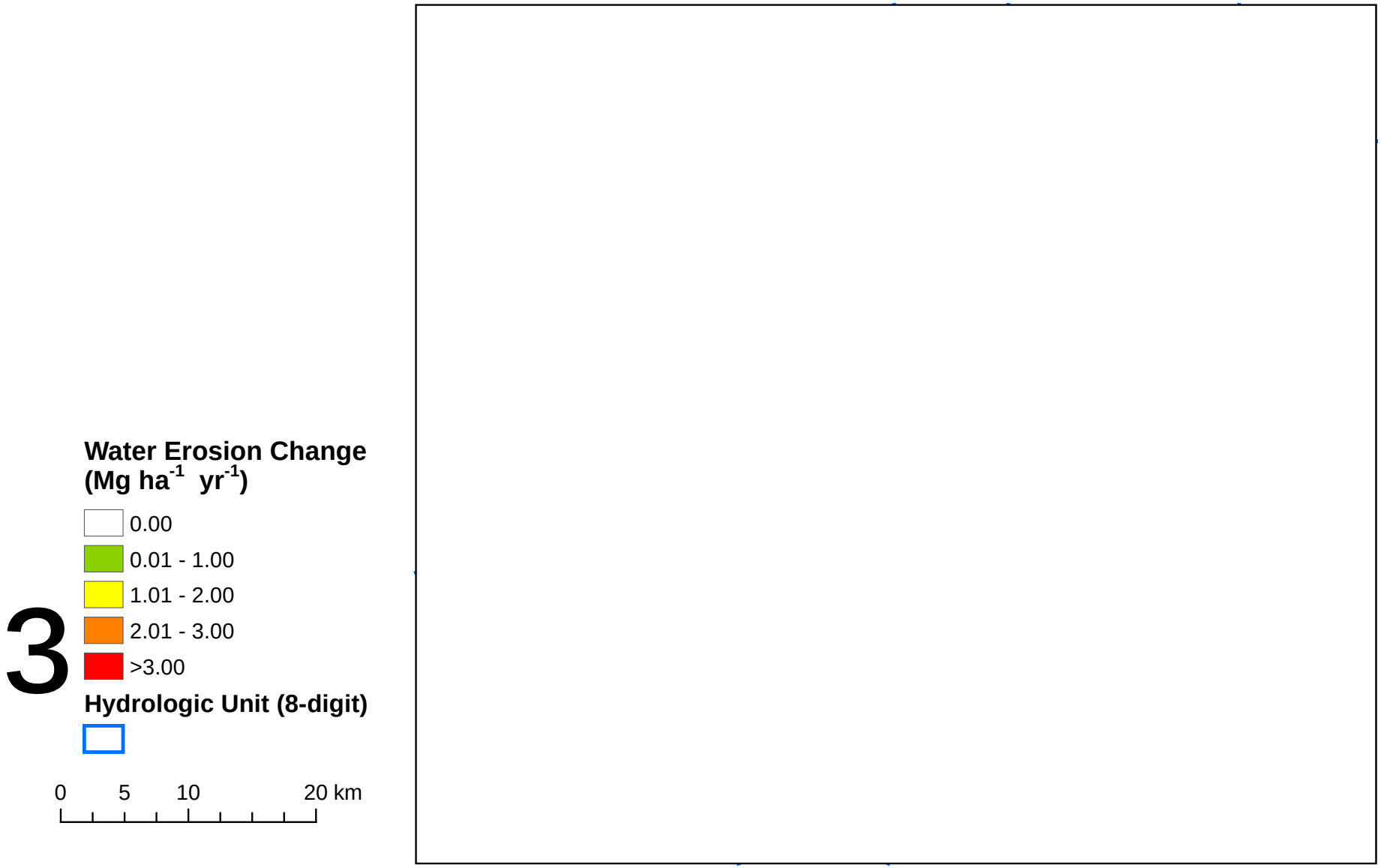
Spatial Analysis of Impacts

Effect of omitting transportation costs



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Other scale-up issues

- Factors other than profitability affecting adoption
- Market effects of production changes

Summary

- Economic analysis can add value
  - Impact – policy, adoption
  - Identify research needs
- Link to field research is critical for economic & policy analysis

Where to go?

- I will be working with some locations, can help make connections
- University economists
- Other ARS economist
  - Jerry Whittaker – Corvalis, OR; Marshall Lamb – Dawson, GA; Leah Duzy – Auburn, AL; John Halloran – Orono, ME; Phil Heilman – Tucson, AZ