MULTIFUNCTIONAL PERENNIAL CROPPING SYSTEMS

DESIGN PREFERENCES OF LANDOWNERS IN CENTRAL ILLINOIS

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Todays discussion

1. Agroforestry potential in Central Illinois
2. The design of agroforestry systems for landowners
3. Landowner preferences, motivators, and barriers
4. Improving conservation and agroforestry use
We know agroforestry...

...But what are multifunctional perennial cropping systems (MPCs)?
How can we make this a reality for landowners?
Understanding Central IL landowners

• Previous work surveyed ~100 Central Illinois landowners about MPCs

• Highest potential adopters were young, valued conservation, willing to learn.

• Biggest barrier was lack of information
Improve information for landowners

Source: Mattia *et al.* 2016, Identifying barriers and motivators for adoption of multifunctional perennial cropping systems by landowners in the Upper Sangamon River Watershed
Research questions and methods

• How can we improve design and in turn advance research?
• What is the preferred agroforestry design?
• What are the motivators and barriers to adopting agroforestry?
• What more information do landowners need?
Design for landowners, with landowners

• 15 landowners within the Upper Sangamon River Watershed

• Landowner ages between 29 to 78

• Eight are full-time farmers of some type

Legend
- Upper Sangamon River Watershed
- State Boundaries, U.S.
- Illinois County Boundaries

Land Use
- 77% agriculture (corn/soy)
- 12% developed
- 5% grassland/forest

Mattia et al. 2016
Creating MPCs from landowners goals

Initial Meeting
- Visit the land and identify areas to be used
- Understand wants and needs
- Outline goals for MPCs

Building Scenarios
- Used normative scenario design
- Plausible and reasonable situations that could and/or should exist in the future.
- Collaborative process to achieve a novel agricultural system

Source: Nassauer, J.I., Corry, R.C. 2004, Using normative scenarios in landscape ecology
Three scenarios guided design

**Production**
- High production of woody crops
- Mechanically harvestable
- Simplicity

**Conservation**
- Use of native species
- High diversity
- Eligible for conservation programs

**Cultural**
- Visually beautiful
- Recreation and experience
- Research and education
How are the designs created?
Design workflow aims to meet landowner needs
What do the designs look like?
What do the landowners think?
Narrowing in on preferences

Design materials provided

• Designs x3
• MPCs Information Book

Interview #2

• Preferences, motivators/barriers, adoption potential, building an optimal design
Results indicate production is most important

Preferred design by landowners (rank frequency)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Production</th>
<th>Conservation</th>
<th>Cultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>4</td>
<td>3</td>
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<td>2</td>
<td>3</td>
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<tr>
<td>3</td>
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<td>1</td>
<td>10</td>
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</table>

Interest score

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<th>Rank</th>
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Likert Scale Rating

1. Not at all interested, would not adopt
2. Slightly interested, would adopt very little of the design
3. Somewhat interested, would adopt some of the design
4. Moderately interested, would adopt a good amount of the design
5. Extremely interested, would adopt most or all of the design
Results show value in working face to face

<table>
<thead>
<tr>
<th>Likert-scale rating</th>
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<tbody>
<tr>
<td>1</td>
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Higher MPCs familiarity
• Before and after: 2.53 → 3.53

Higher MPCs adoption likelihood
• Before and after: 3.53 → 4.13

Usefulness of the design process
• Supplemental guide was most useful (average of 4.73)

13 out of 15 participants said they plan to adopt MPCs
**Top Motivators**

1. Growing high-value, edible crops (4.73)
2. Improving pollinator & wildlife habitat (4.46)
3. Productive use of marginal land (4.4)

Ten participants stated this become more important after the study

**Top Barriers**

1. Lack of infrastructure for post-harvest processing and packaging (4.13)
2. Time and labor requirements (3.8)
3. Three tied (3.6)
   - Lack of markets
   - Lack of harvesting equipment
   - Unfamiliarity with products/enterprises
# Continuing to move forward

## Future Work
- Field days and work with extension
- Long-term Field Trials with Select Participants
- Planning and Management Guide

## Research needed
- Building lots of Markets
  - “I would, if there was a market”
- Harvest machinery adapted to common systems (species mixing)
- Improving funding opportunities for systems
Why should the general public care about agroforestry design?
Marginal lands offer significant returns

- 7% of land was classified as marginal and suitable for MPCs
- 56% reduction in soil erosion by converting to MPCs

(Mattia et al. 2017, In review)
Rethinking how we do “conservation”

#1 practice in Illinois is CP1- Establishment of Permanent Introduced Grasses and Legumes (176,656 acres)

For this study:
• Average time spent per farmer roughly 10 hrs.
  » Each farmer costs $500

Total CRP for Illinois as of May 2017

<table>
<thead>
<tr>
<th># of contracts</th>
<th># of farms</th>
<th>Total acres</th>
<th>Total rental $</th>
<th>Avg. rental/acre</th>
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</thead>
<tbody>
<tr>
<td>78,748</td>
<td>43,678</td>
<td>895,862</td>
<td>$161,815,000</td>
<td>$181</td>
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Cost to design agroforestry on all Illinois CRP farms = $21,839,000

This is a one time investment, CRP is each year
Acknowledgments

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• United States Department of Agriculture
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• Matt Wilson
• Chloe Mattia

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• The Institute for Sustainable Energy and Environment at UIUC
• Savanna Institute