Stakeholder presentations for the USDA-OCS March 2, 2017 public listening session “Visioning of United States Agricultural Systems for Sustainable Production”

# 10

20min Break and Networking

reminder: stop and restart WebEx Recording to reduce file size

# 11

Sara Scherr, Ph.D.

President, EcoAgriculture Partners
Chair, Landscapes for People, Food and Nature Initiative

Seth Murray, Ph.D. (USDA-OCS) moderating

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Agricultural Production Landscapes:
Long-term research priorities in the U.S. to sustain productivity, ecosystem health and prosperous communities

Sara J. Scherr, President, EcoAgriculture Partners
Washington, D.C.
February 3, 2017

Agricultural lands—central to healthy ecosystems & biodiversity

Annual crops as % land area

> 60%  40-60%  30-40%

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Healthy ecosystems—central to ag’l productivity, profits, resilience

Long-term goal: Re-shape the relation of farming & ecosystems

- From a leading threat to biodiversity, to a key pillar of our biodiversity conservation strategy
- From a leading consumer and polluter of water, to a key contributor to healthy watersheds and reliable clean water supplies
- From a leading consumer of fossil fuels, to a producer of renewable energy
- From a leading source of greenhouse gases, to one of the most important carbon sinks
- From a marginal role, to a key solution for nutrition, employment, social inclusion, and rural renaissance

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Integrated landscape management

www.ecoagriculture.org

Agri-landscape partnerships

<table>
<thead>
<tr>
<th>2013-15</th>
<th>Africa</th>
<th>Latin America &amp; Caribbean</th>
<th>S &amp; SE Asia</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape partnerships surveyed</td>
<td>87</td>
<td>104</td>
<td>174</td>
<td>71</td>
</tr>
<tr>
<td>Principal motivations</td>
<td>Reduce degradation, sustainable land management, conserve biodiversity, improve food security, increase productivity, improve water security, sustain cultural values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average # objectives</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Average # stakeholder groups</td>
<td>9</td>
<td>11</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Most common participants</td>
<td>Local govts, farmer associations, local NGOs, nat’l-int’l NGOs, agribusiness, national govts, regional agencies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Australia – Landcare, China – Incipient, USA - ???

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Clark Fork River Coalition, Montana

Science-based, community-focused, stakeholder-Informed, and fueled and sustained by diverse partnerships

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Scientific research priorities

1) Collaborative research/info framework across sectors and scales
2) Agri-socio-ecological dynamics in agricultural landscapes
3) Landscape-scale ecosystem management to increase productivity and resilience
4) Technologies and tools to increase synergies and reduce tradeoffs among landscape values
5) Long-term, public-private-local research to support multi-stakeholder partnerships


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ALEXIS BADEN-MAYER
Political Director
RegenerationInternational.org

"Human vanity can best be served by a reminder that, whatever his accomplishments, his sophistication, his artistic pretension, man owes his very existence to a six-inch layer of top soil—and the fact that it rains."

– The Cockle Bur, sometime between 1930 and 1968

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Climate change isn’t just an issue. It is the entire context in which we have to make all our public policy decisions.”
  –Congressman Jamie Raskin
Human agricultural activities have removed roughly 660 GtCO2 from terrestrial ecosystems.

Shifting to agricultural practices that can draw that carbon back down to the soil would:

- Reduce atmospheric CO2 by 40-70 ppm by 2100,
- Build soil instead of losing it, and
- Improve resilience to drought and floods, while
- Producing more food that’s more nutritious, and
- Generating higher farm incomes.

Kathleen Delate, Ph.D.

Professor-Orgnic Agriculture
Depts. of Agronomy and Horticulture
Iowa State University

Oral / no slides

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# 15

**Ann Bybee-Finley**

Doctoral student in Agronomy

Soil and Crop Science Section

School of Integrated Plant Sciences

Cornell University

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**Comell University**

Sustainable Cropping Systems Lab

https://scslabcu.wordpress.com/

Ann Bybee-Finley

kab436@cornell.edu

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Building Resilient Cropping Systems
Focus: Dairy producers in the Northeast

Restorative Capacity
(Crop Insurance)

Resilience Capacity

Absorptive Capacity
(Intercropping)

Adaptive Capacity
(Double Cropping)

Matthew Ryan, Richard Smith, Heather Darby

Ecological Insurance
Uses practices that draw on ecology to reduce risk

Intercropping

Intercrops had greater stability in yields across environments.

Double Cropping

83% surveyed NY farmers (n = 30) planned to continue to double crop.

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Global cropland (% of total area)

These are all annual crops

- Cereals, oil seeds, legumes: 68%
- Tree crops: 2%
- Roots & tubers: 4%
- Fruits & vegetables: 7%
- Fiber: 3%
- Other: 3%
- Forages: 11%

From Monfreda et al., 2008

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**Perennial grain crops**
- Wheat
- Maize
- Sorghum
- Rice
- Oil seed crops
- Legumes

*Global perennial grain programs*

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**Perennial wheat: Long-term crop breeding**

Dr. Dhruba Thapa  
Nepal Agricultural Research Council  
Khumaltar Laitpur, Nepal  
High altitude perennial wheat

“...will increase food & forage security significantly in the region.”

“...will help to minimize the workload of farmers, especially of women in the remote areas.”

“...some of the 25 lines...appear highly resistant to yellow rust.”

Deeper roots: “...more stable grain and biomass yields;...higher uptake of selenium, zinc, iron and other minerals.”

**Kernza: Med-term opportunities but needs reliable sourcing**

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Pigeon pea: Immediate use but needs improved traits

Perennial grain benefits

1. Human well-being: Diversifies humanity’s key energy sources (grains, legumes, oil seeds)
2. Environment: better protects soil and water, ‘feeds’ the soil, and provides greater support to ecosystem services
3. Improved resource utilization: Increased nutrient use efficiency; greater reliance on and support for on-farm natural biological cycles; more photosynthesis
4. Climate change: Additional tools for farmers to respond to increased rainfall intensity and prolonged drought

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Perennial grain opportunities
1. Advances in genomics, phenotyping, and bioinformatics potentially reduce by half the breeding times needed
2. Perennial breeding programs add value to annual breeding programs—‘parallel complementary breeding strategies’ for improved nutrient use, pest resistance, drought tolerance
3. Advances in food processing lower adoption barriers & broaden commercial potential
4. Recognition that farms must perform multiple functions—produce food, support environment, manage water, support wildlife, etc

Perennial grain challenges
1. Sustained medium- to long-term support is needed for significant impact & will likely depend on public support for initial stages
2. High ‘procrastination penalty’—food crises elicit short-term solutions. Investments need to happen before crises occur.
3. Questions remain about seed systems, pests and disease, input requirements—difficult to answer until developed. [These don’t pose insurmountable problems].

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Investing in perennial grains:

1. Low-risk, high-potential impact
   • Beyond proof-of-concept
   • Large environmental & economic impact potential
2. Transformative game-changer for agriculture (2010 Nat’l Acad. Sciences report on sustainable agriculture)
3. Addresses national and international agriculture priorities and needs

# 18 Seth Murray, Ph.D. (USDA-OCS)
Moderated Questions and Discussion Time

Sara Scherr
Diana Jerkins
Alexis Baden-Mayer, Esq.
Kathleen Delate, Ph.D.
Ann Bybee-Finley
Bruce Goldstein
Jerry Glover

reminder: if no live comments, go to WebEx chat
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# 19

**Lunch and Breakout**

*Group number is on badges*

*reminder: stop and restart WebEx Recording to reduce file size*

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**# 19**

**Choose three to address, be specific**

- What are the major strengths of current agricultural systems that are important to maintain in future systems?
- What are the major weaknesses of current agricultural systems that could be improved on in future systems?
- What are the major opportunities for agricultural systems of the future? How can technology and scientific findings facilitate these?
- What are the major threats for agricultural systems of the future?
- What research will be needed and how can this be accelerated?
- What infrastructure will be needed?
- What changes will be needed for new systems to succeed?
- How can we educate the next generation to solve these challenges?

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