United States Department of Agriculture
Research, Education, and Economics

Considerations for the Future of Animal Science

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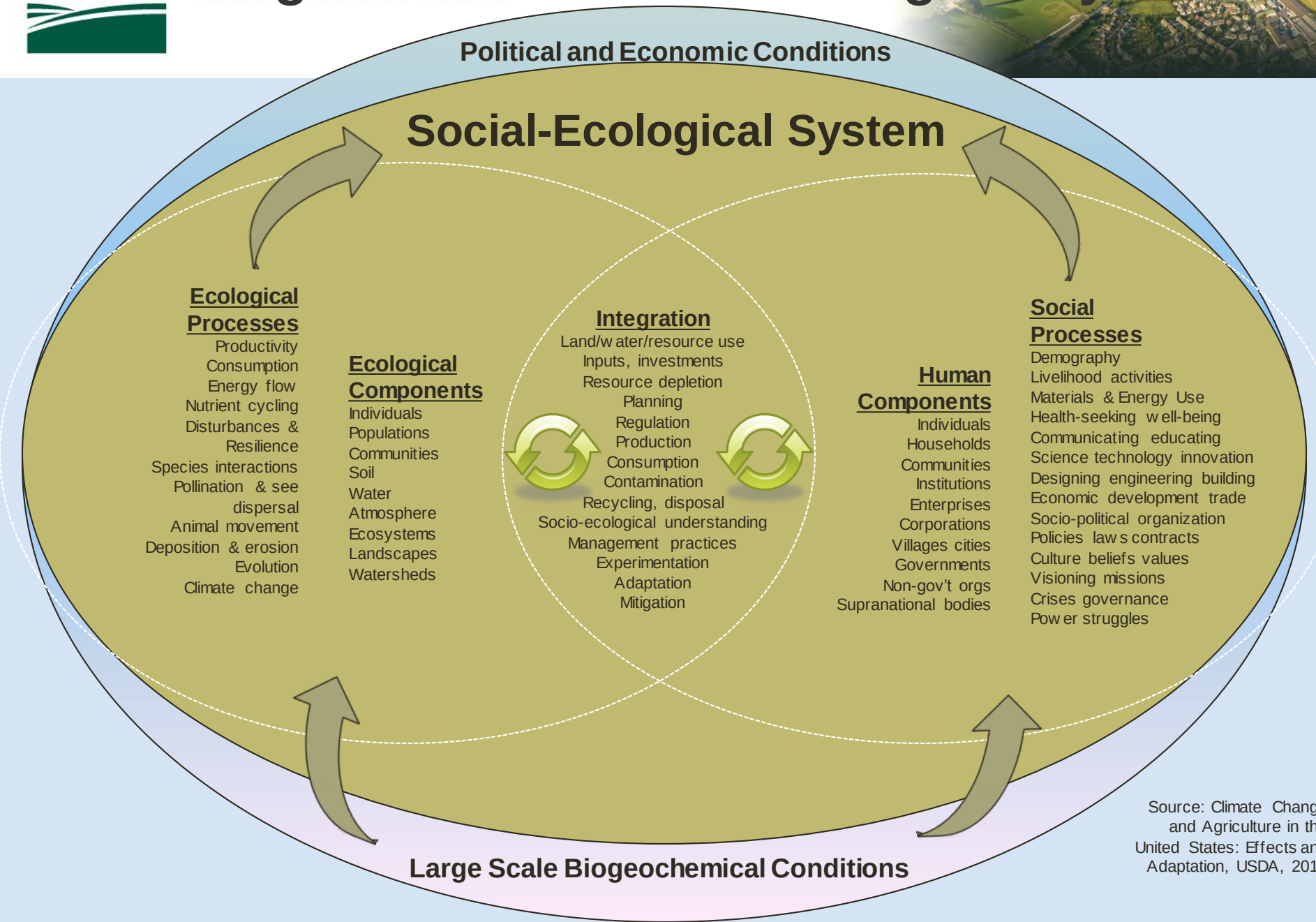
Presentation Agenda

1. Livestock in Food Security – 2050
2. Benefits of Public Agriculture Research
3. Critical Research Needs – 2050
4. Opportunities
5. Summary

U.S. Agricultural Social-Ecological System



Source: Climate Change and Agriculture in the United States: Effects and Adaptation, USDA, 2013

Food Animal Production
Sustainable Food Security - 2050

- Livestock in Food Security – FAO 2011
  - Estimated population in 2050 – 9.15 billion
  - Meat consumed: All meat 2010 – 268.7 million tonnes
    All meat 2050 – 463.8 million tonnes
    All dairy 2010 – 657.3 million tonnes
    All dairy 2050 – 1038.4 million tonnes
- Critical role for meat and dairy in society
  - High quality nutrient dense protein source
  - Significant nutritional value – protein, calcium, B vitamins, etc
  - Vital role for milk worldwide - neonatal nutrition
  - Efficient conversion of forages to human food
- Critical role in sustainable integrated agriculture systems
  - Soil health and fertility
  - Carbon sequestration and green house gas mitigation
  - Enhanced forage production and utility

Food Animal Production
Public Agricultural Research

- Creates extraordinary benefit to society
- Investment in animal sciences lagging
  - While sales of livestock and feed crops are higher than those for plants and fiber crops, public investment is higher for plant sciences than for animal sciences.
- Sustained long term investment required to fuel any ag productivity – including that for animals and their products

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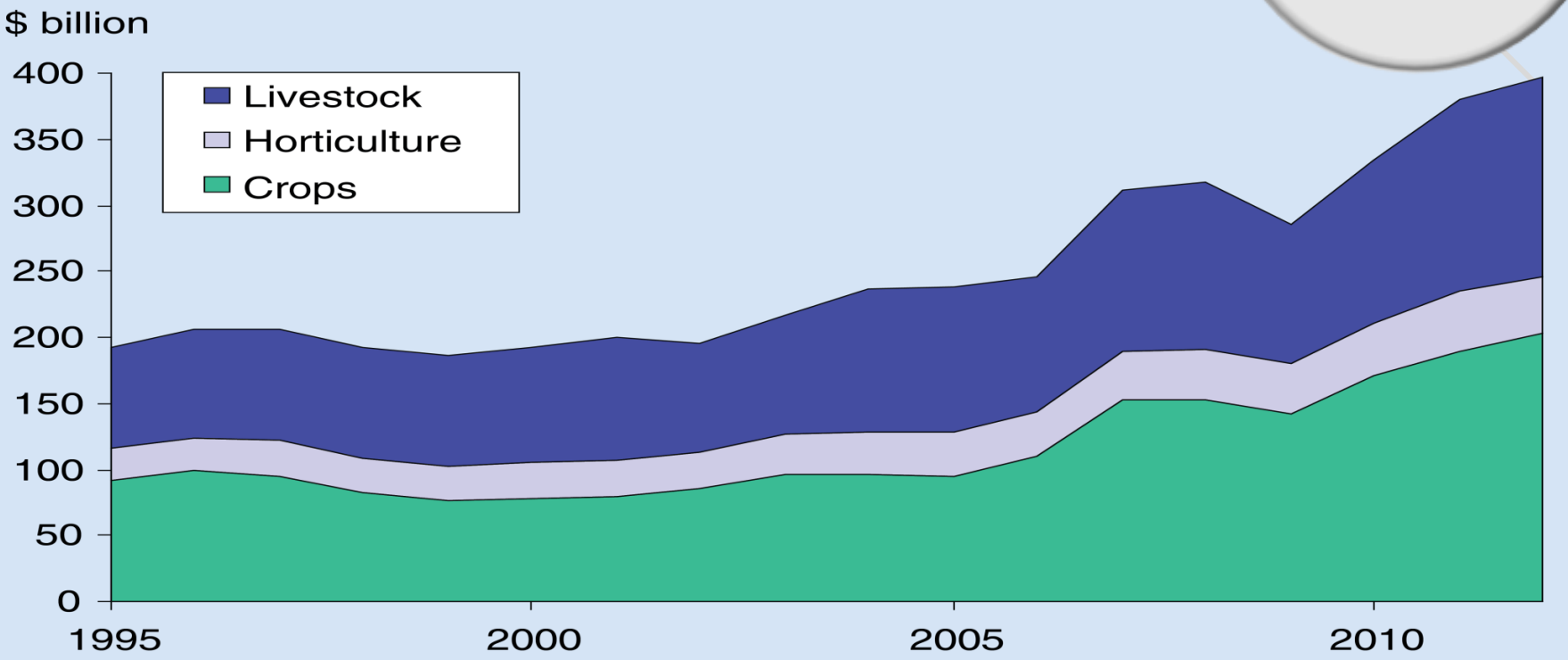
U.S. Food System

Farm value of U.S. agricultural production was $397 billion in 2012.

Value of U.S. agricultural production, 1995-2012



Source: USDA, Economic Research Service calculations using data from ERS and USDA, National Agricultural Statistics Service, Quick Stats Database and various reports.

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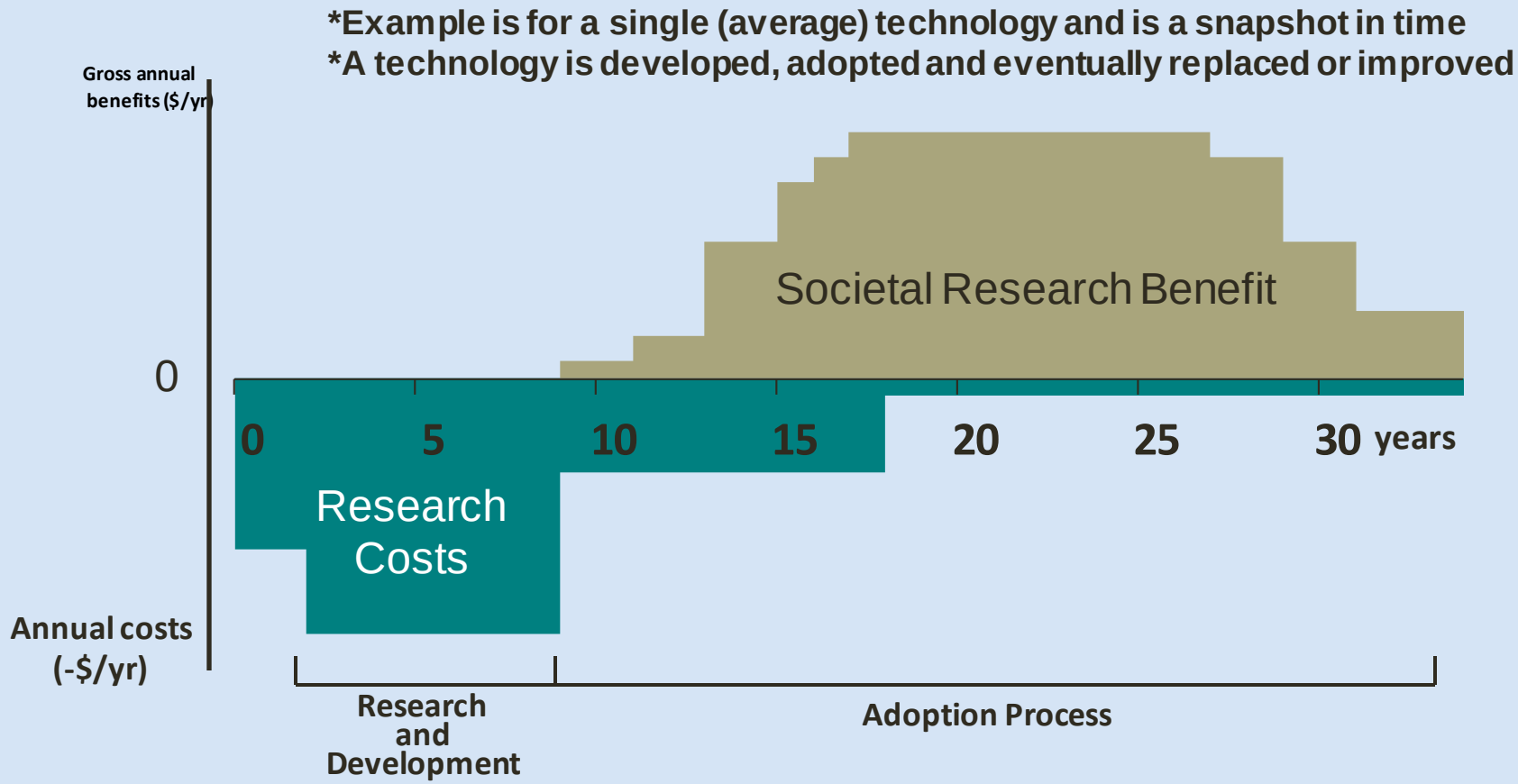
Research Costs & Benefits Over Time



Adapted from: Alston, Norton and Pardey, 1995 USDA - ERS

Global Considerations/Challenges

- Population growth and food security
  - Increasing demand for protein as developing countries transition
- Importance of animal agriculture and related industries to the US economy
- Urgent need to address emerging issues and unprecedented challenges – One Health perspective
- Inadequate infrastructure and decreasing pool of expertise
- Low current investment in research, education and extension is at historic low.

Food Animal Production
Critical Research Needs - 2050

- Integrated production systems
  - Animal production – tenets of sustainability
  - Improved and optimized animal production systems
  - Integrated crop – forage – animal systems
  - Improved pasture and forage yield, quality, environmental efficiency and resiliency
- Animal health and well-being
  - Prevention versus treatment
  - Role of health in sustainable production systems
    - Relationship between health, longevity, well-being and productivity
    - Numerous critical issue both domestically and internationally
      - One Health
      - Zoonotic diseases, emerging diseases, catastrophic effects
      - AMR – antimicrobial resistance

Opportunities Abound

- Relative value and impact of public research sector is growing
  - Excellent at basic and translational research
  - Provide answers and solutions
  - Dramatic improvements in production and efficiency
  - Building powerful connections – NSF, NIH, Industry, International, NGOs, others
- Continually hitting home runs!
  - H1N1, food safety, nutrition, and more …
  - Genomic breeding values in Holsteins, genomes of cow, chickens…
  - Exploring the animal biome
- Will require continued long term and increased investment
  - Must expand the research base including new talent
  - Must expand the research infrastructure - resources
  - Must prioritize animal science research and development

There are many challenges

- Agriculture Act of 2014 and President's budget for 2015 provide additional resources and new ways of working
- We look forward to your examination of these issues
- It is time for this work to go forward

- THANK YOU