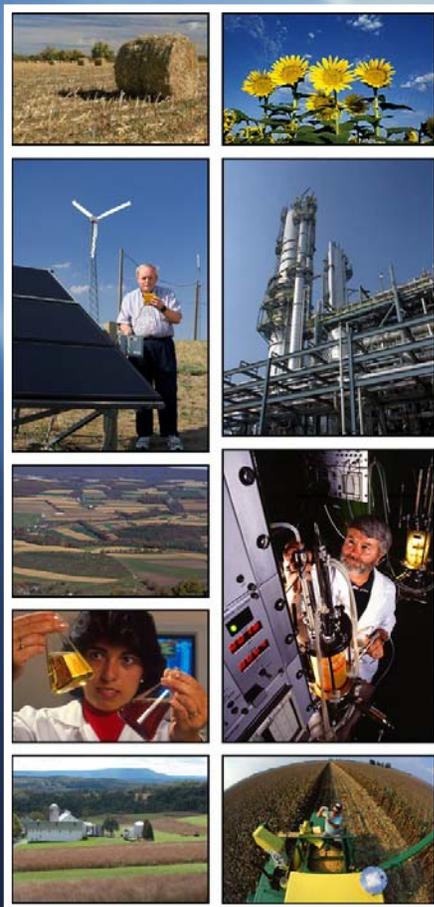


Challenges and Science Needed to Describe Sustainable Biofuel Production

Jeffrey Steiner
Office of National Programs
Agricultural Research Service, USDA
Beltsville, Maryland

Biomass 2009
National Harbor, Washington, D.C.
March 17, 2009



Many Benefits are Derived from Our Rural Landscapes



- Ecosystem services: water, air, wildlife habitat, C-sequestration.
- Income supporting farms and rural communities.
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- New bio-based consumer products, including bioenergy.

Success through out the Bio-based Supply Chain will Depend on a Many-objective Perspective

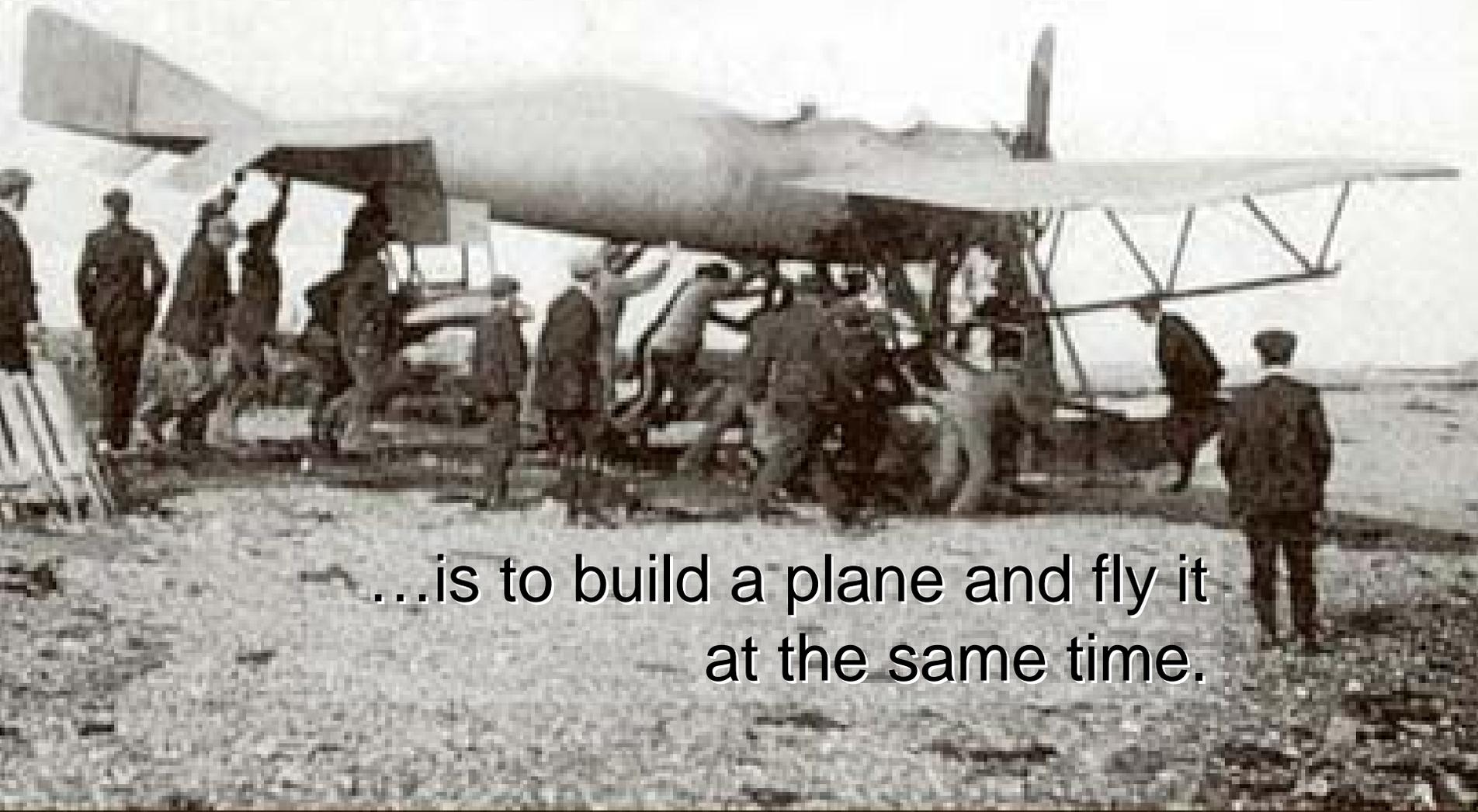
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Profitable

Productive

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To develop criteria and indicators for sustainable biofuel production....

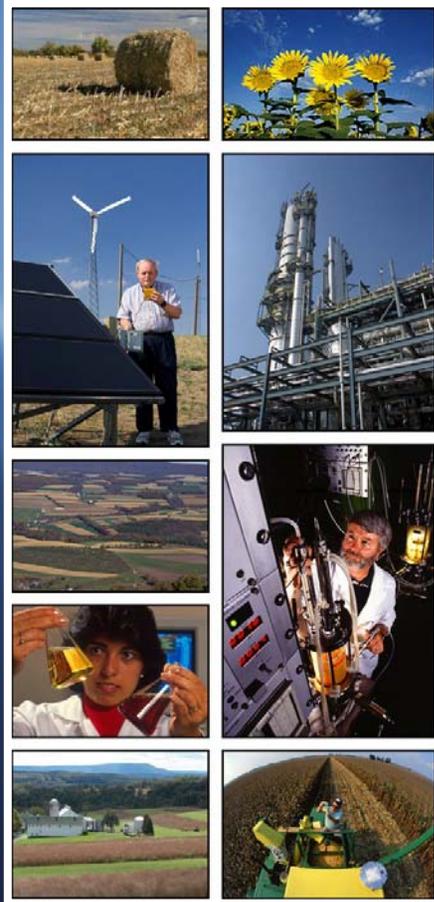


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Many Efforts Seek to Describe Sustainability

- Roundtable on Sustainable Biofuels*
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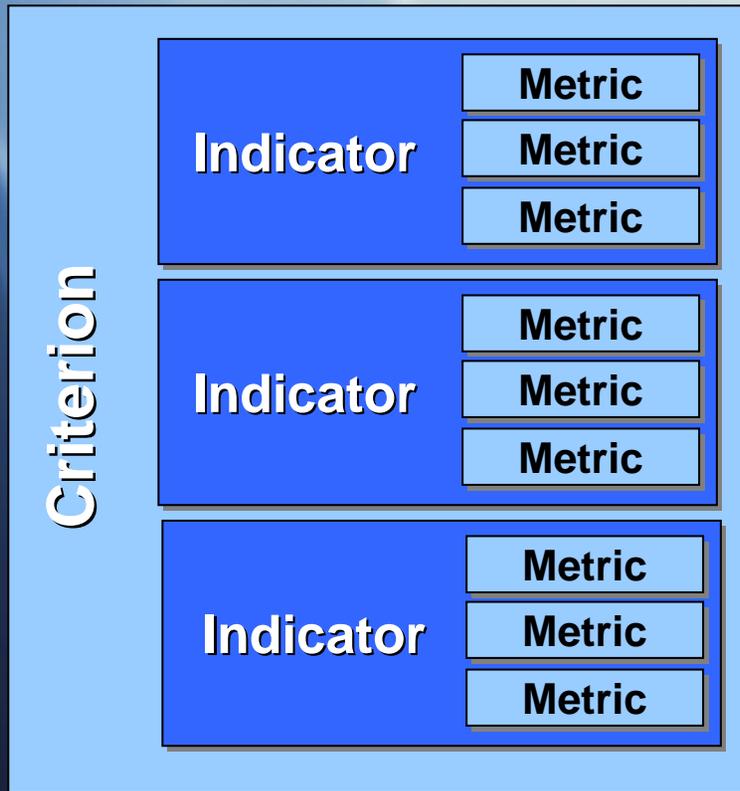
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Sustainability Interagency Working Group

Courtesy: Alan Hecht, US-EPA

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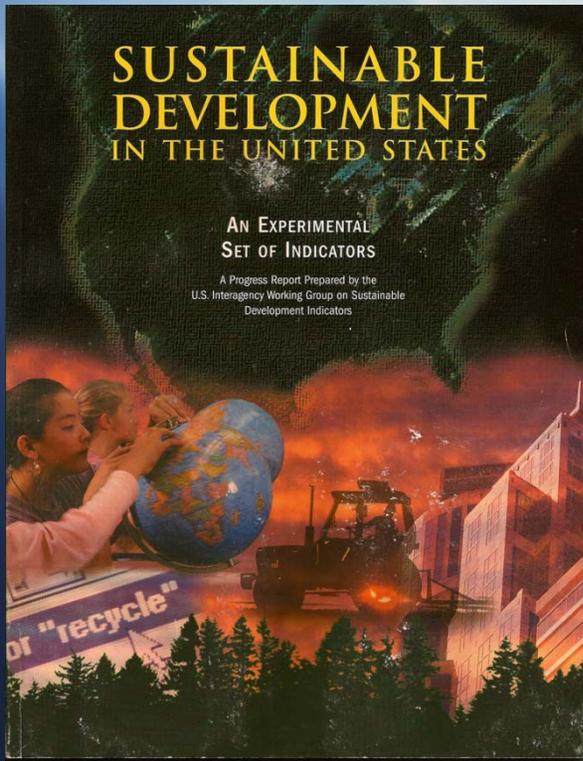


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An Experimental Set of National Indicators

U.S. Interagency Working Group on Sustainable
Development Indicators



Criterion: Environmental (16)

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Criterion: Economic (13)

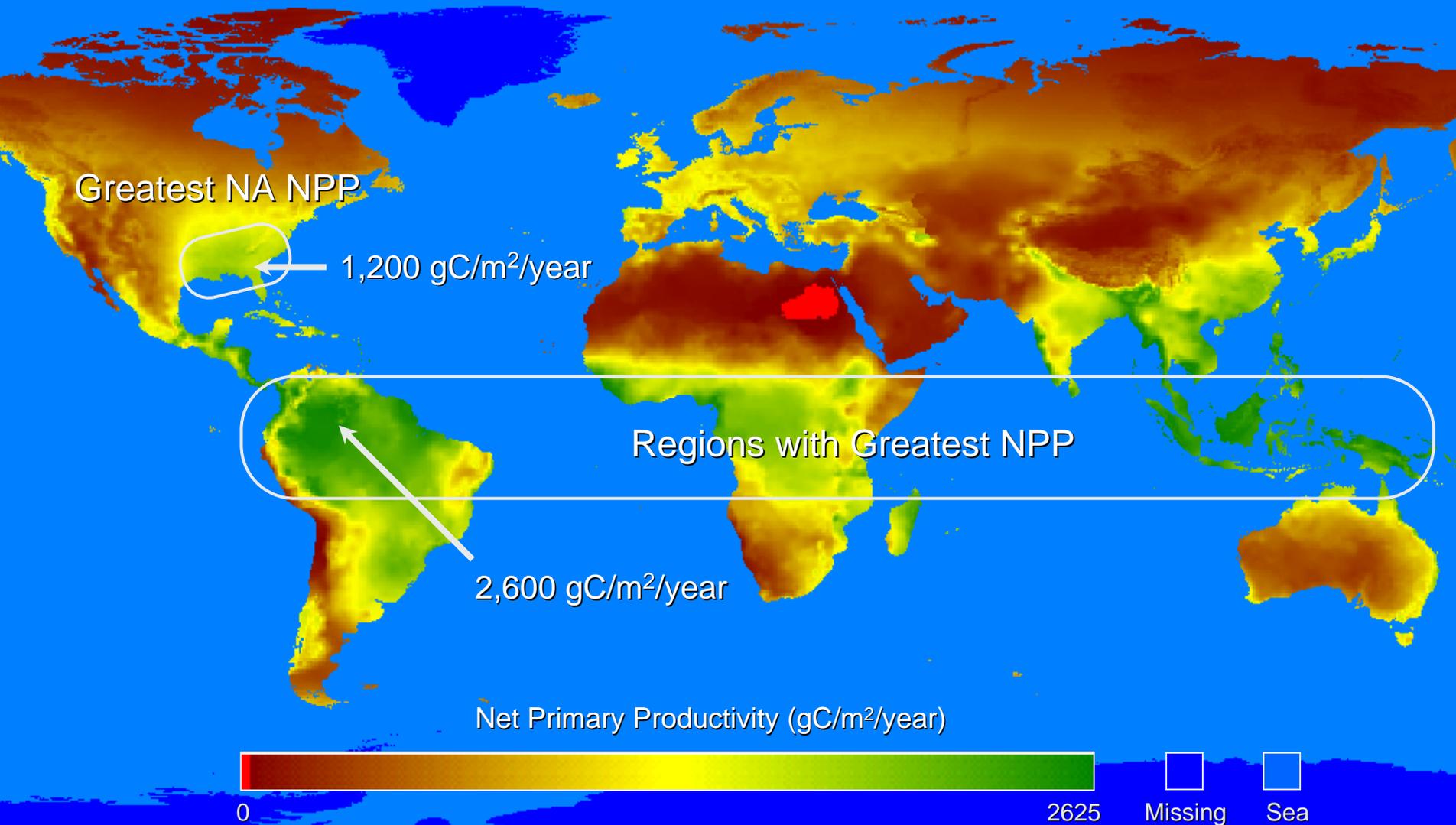
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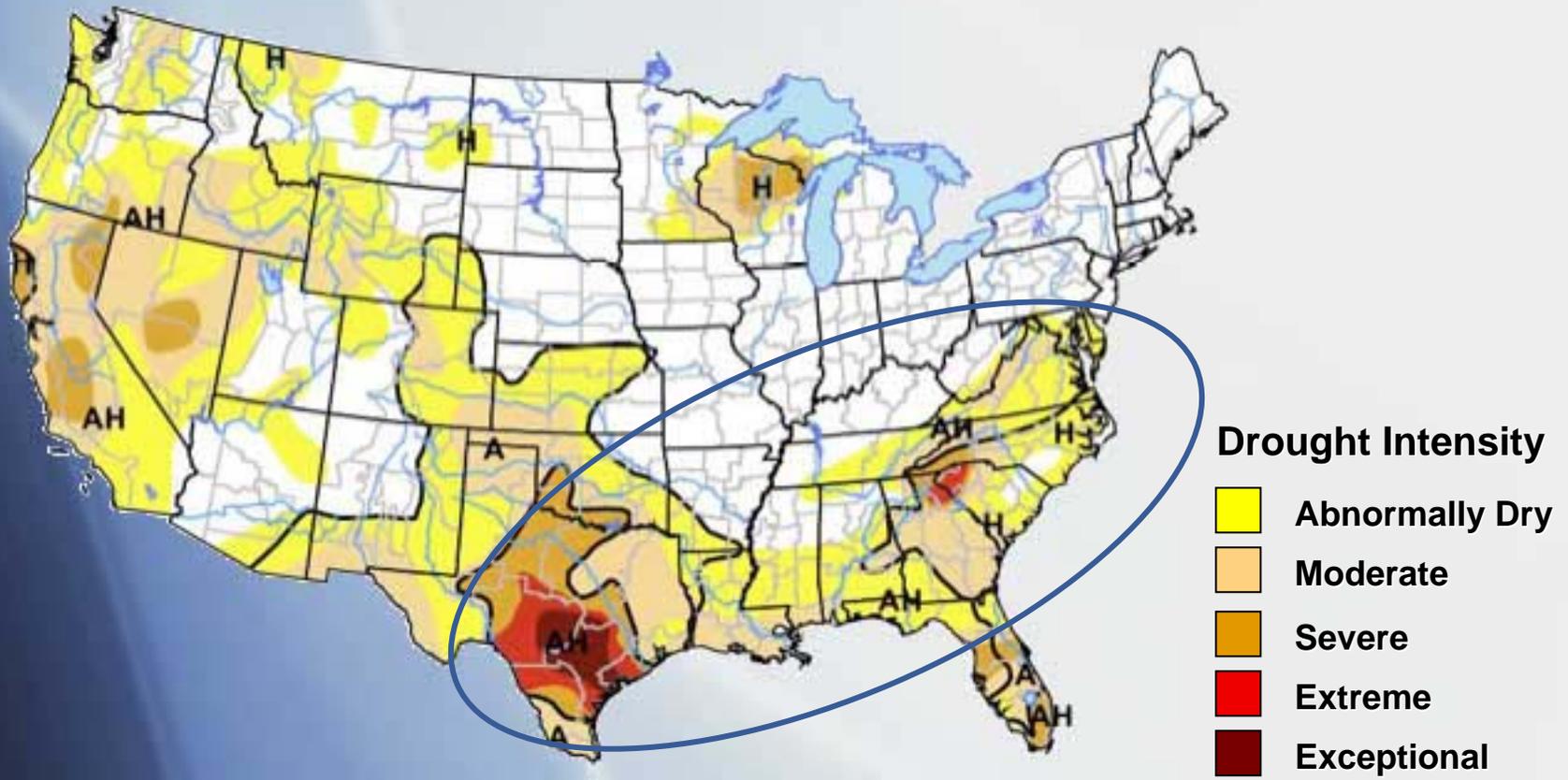
December 1998, Washington, D.C.

Challenges to Sustainable Biofuels



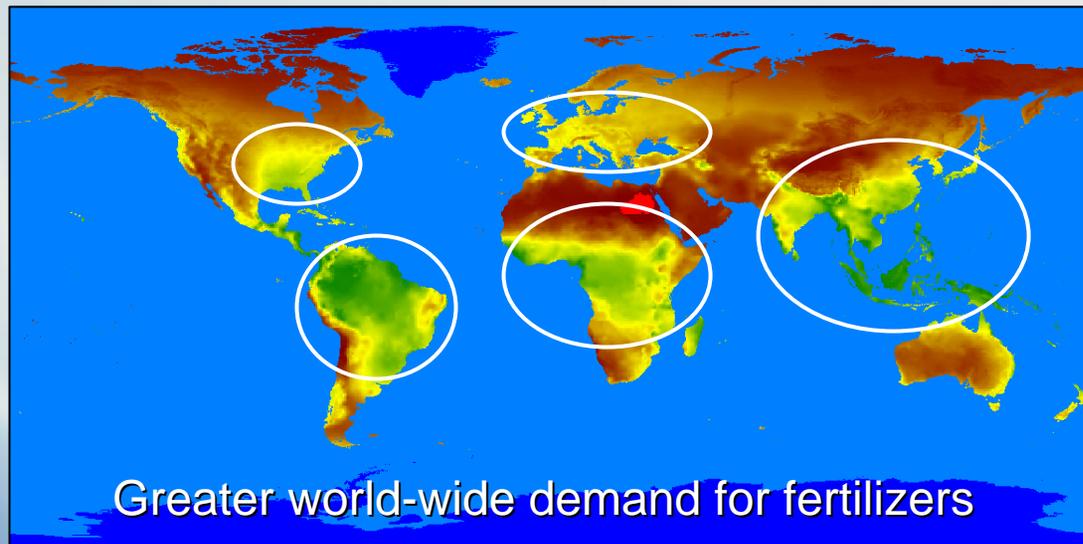
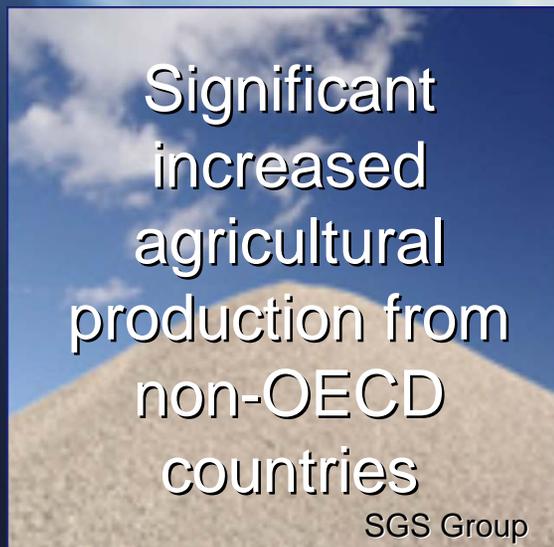
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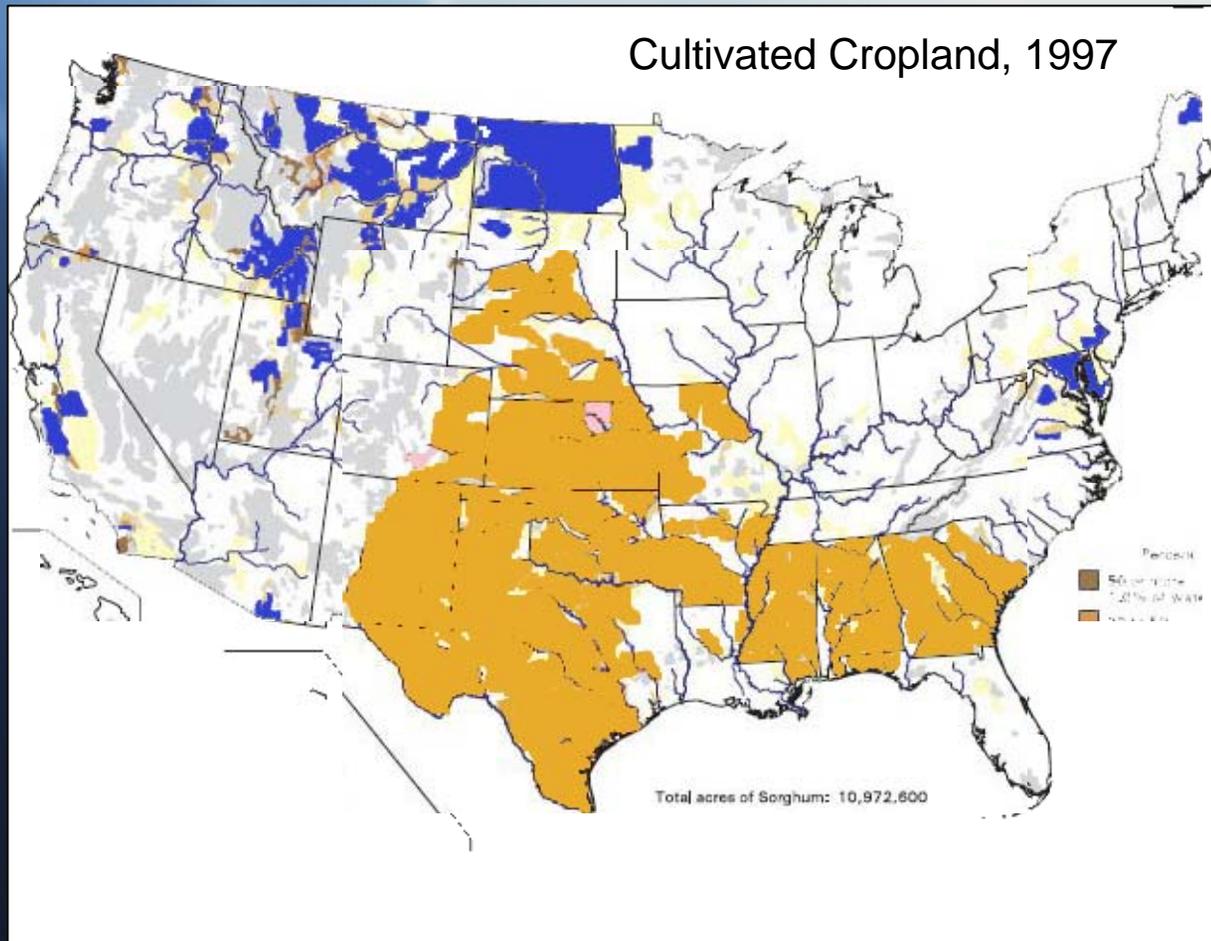


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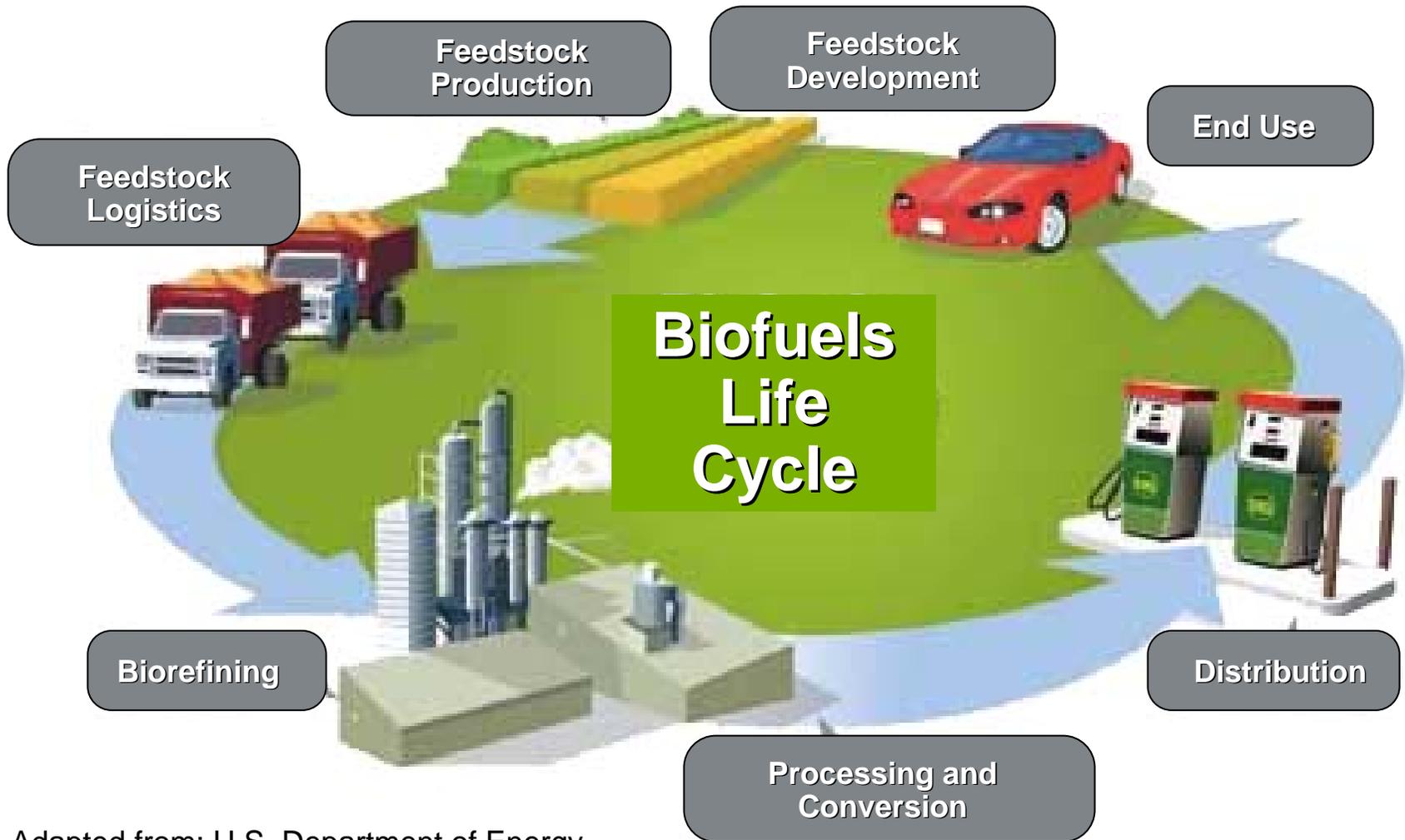
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Corn
Barley
Sorghum



Sustainability Considered Each Step of the Biofuel Supply Chain



Adapted from: U.S. Department of Energy

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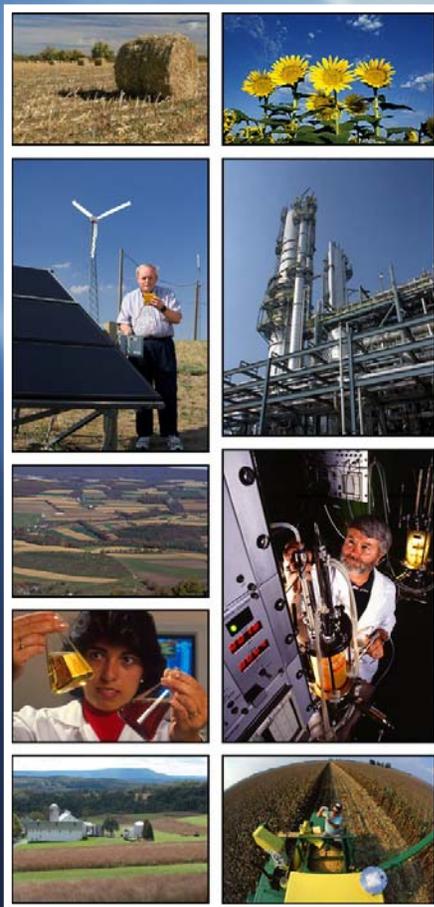


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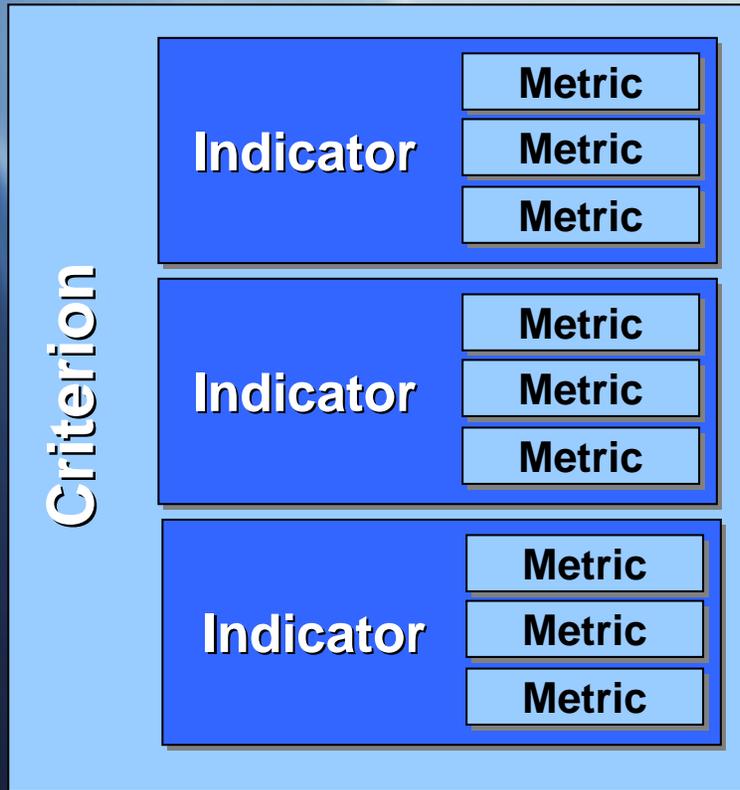
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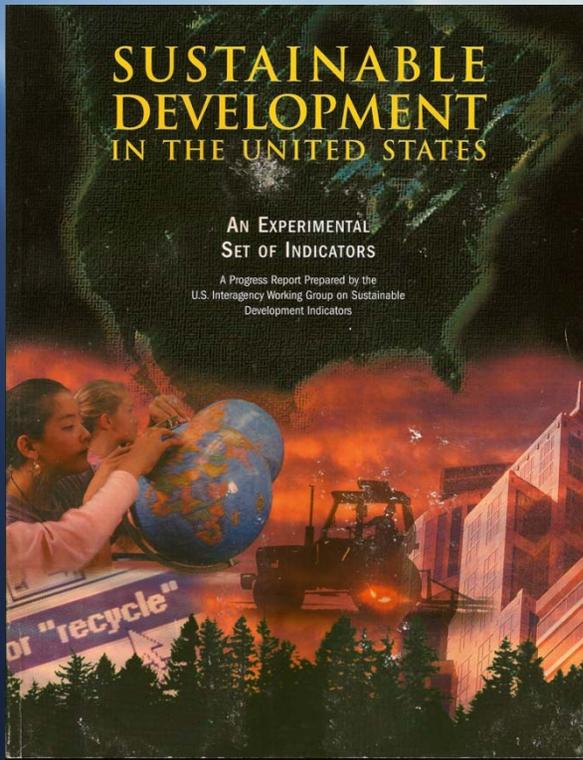


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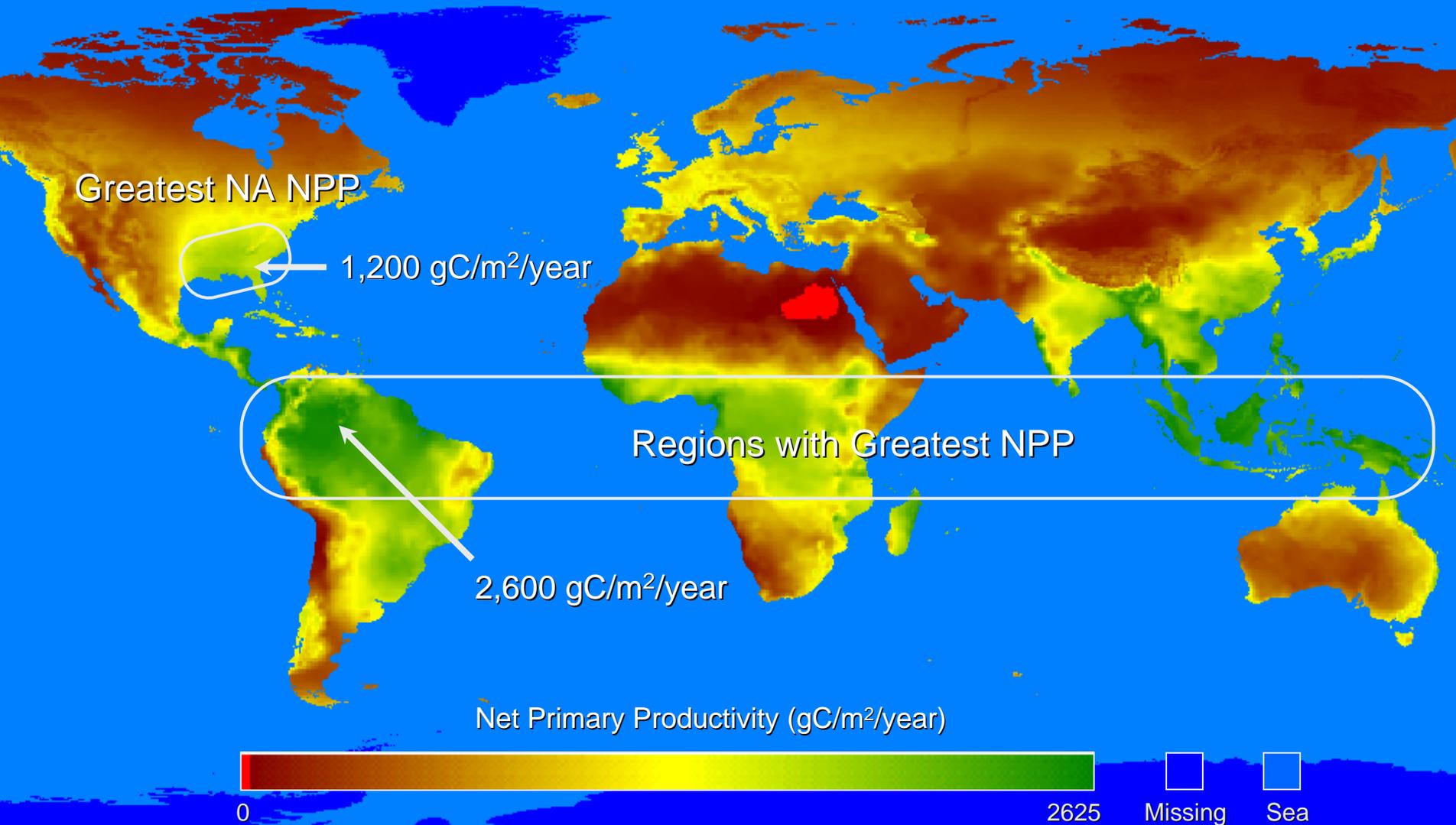
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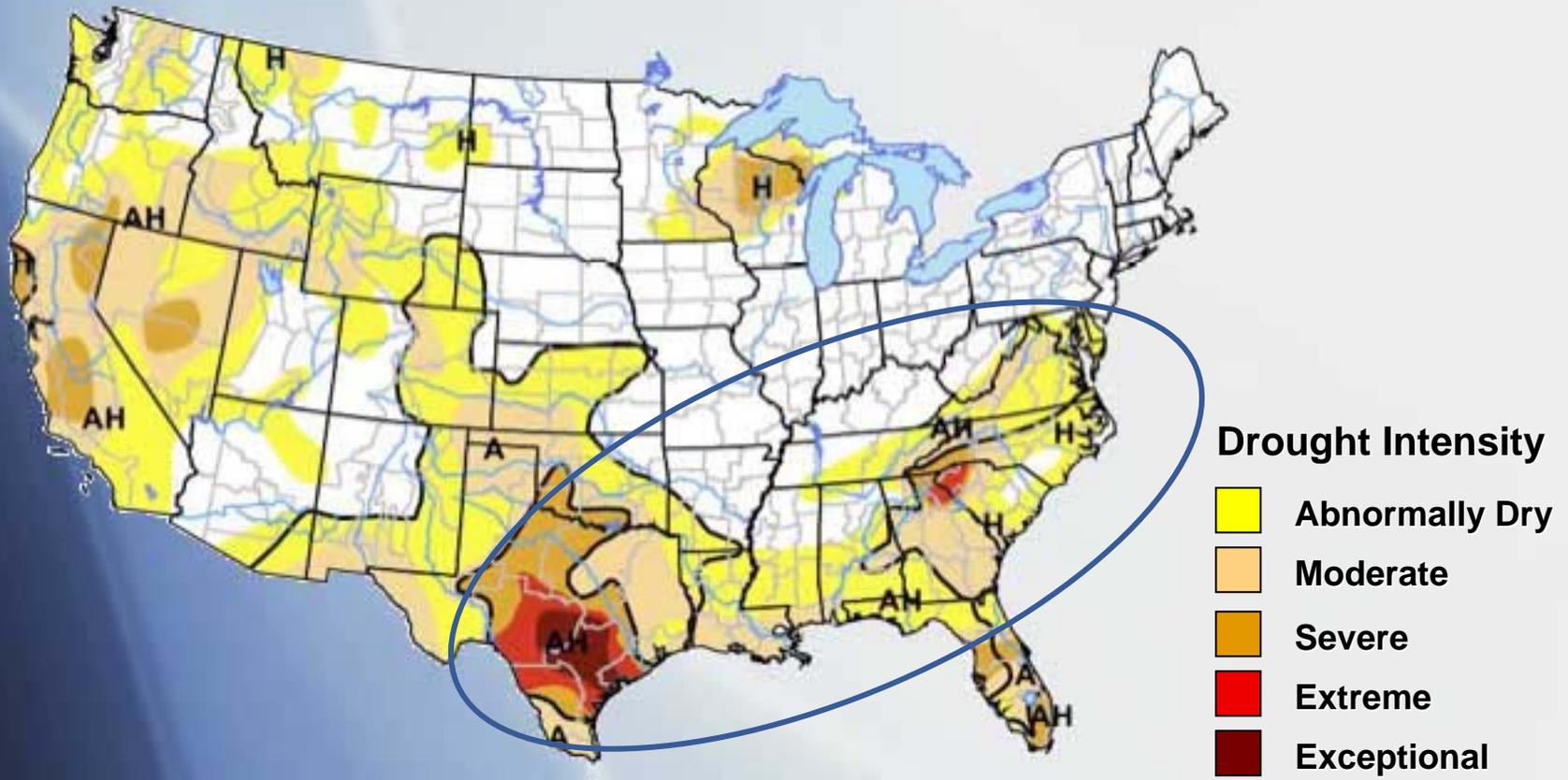
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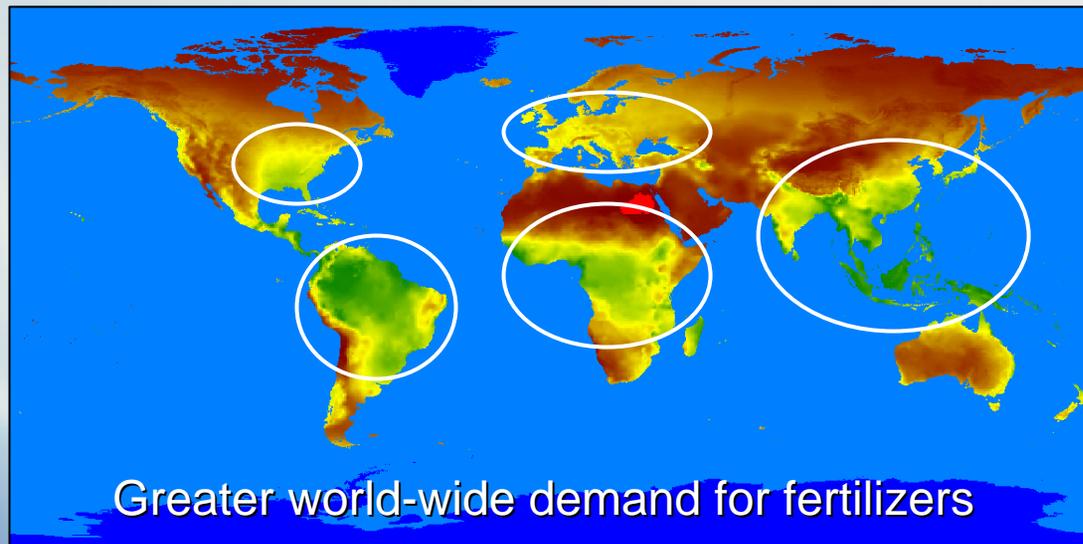
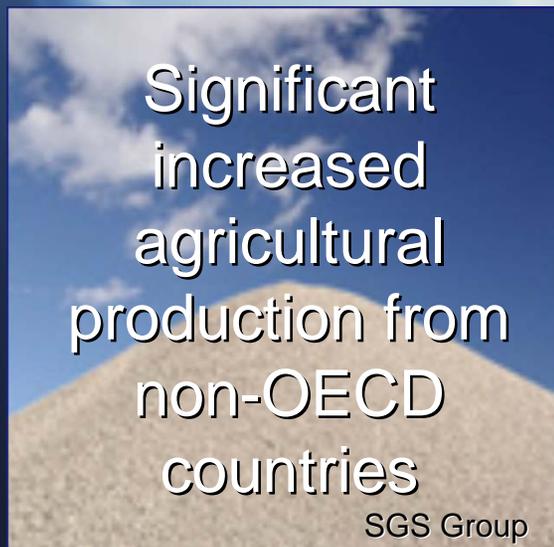
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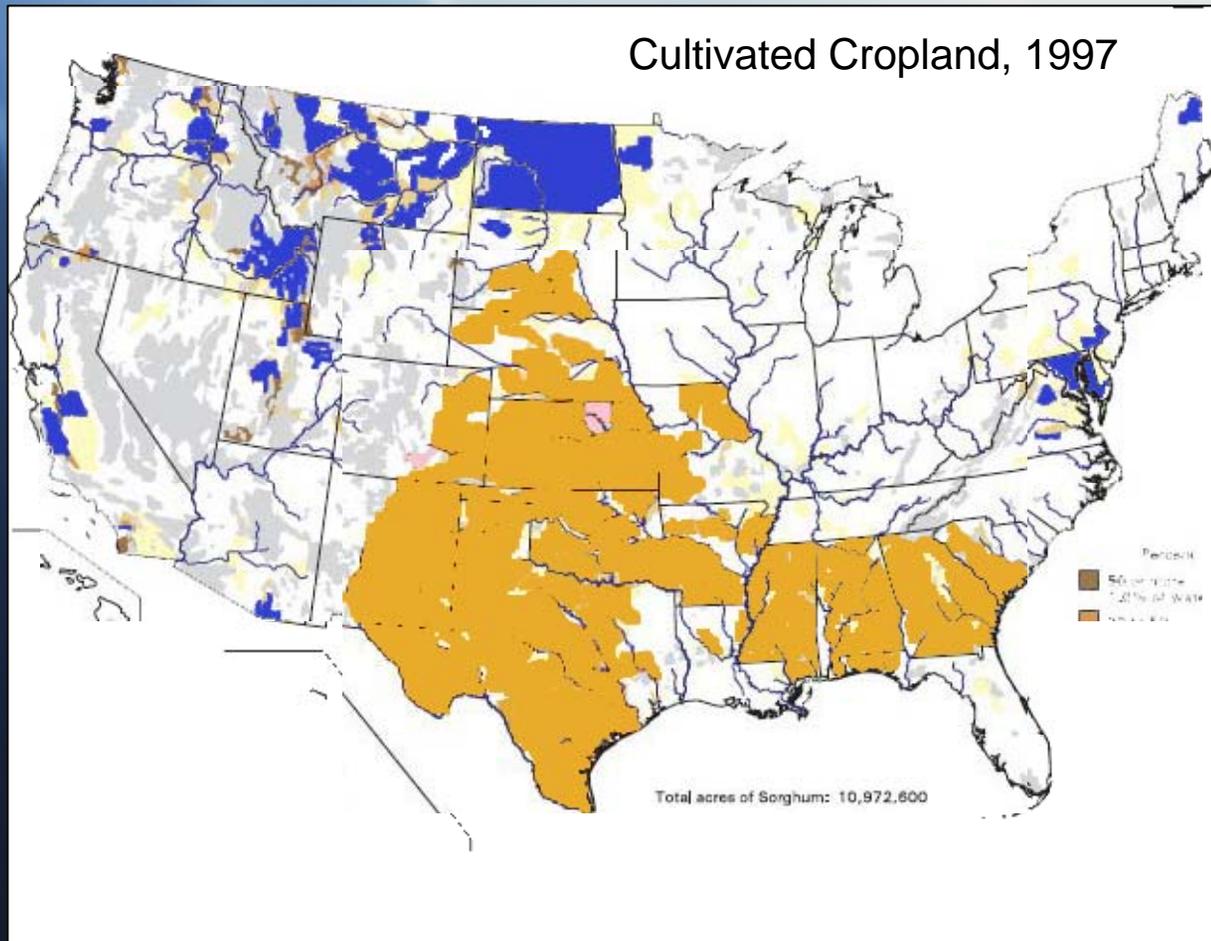


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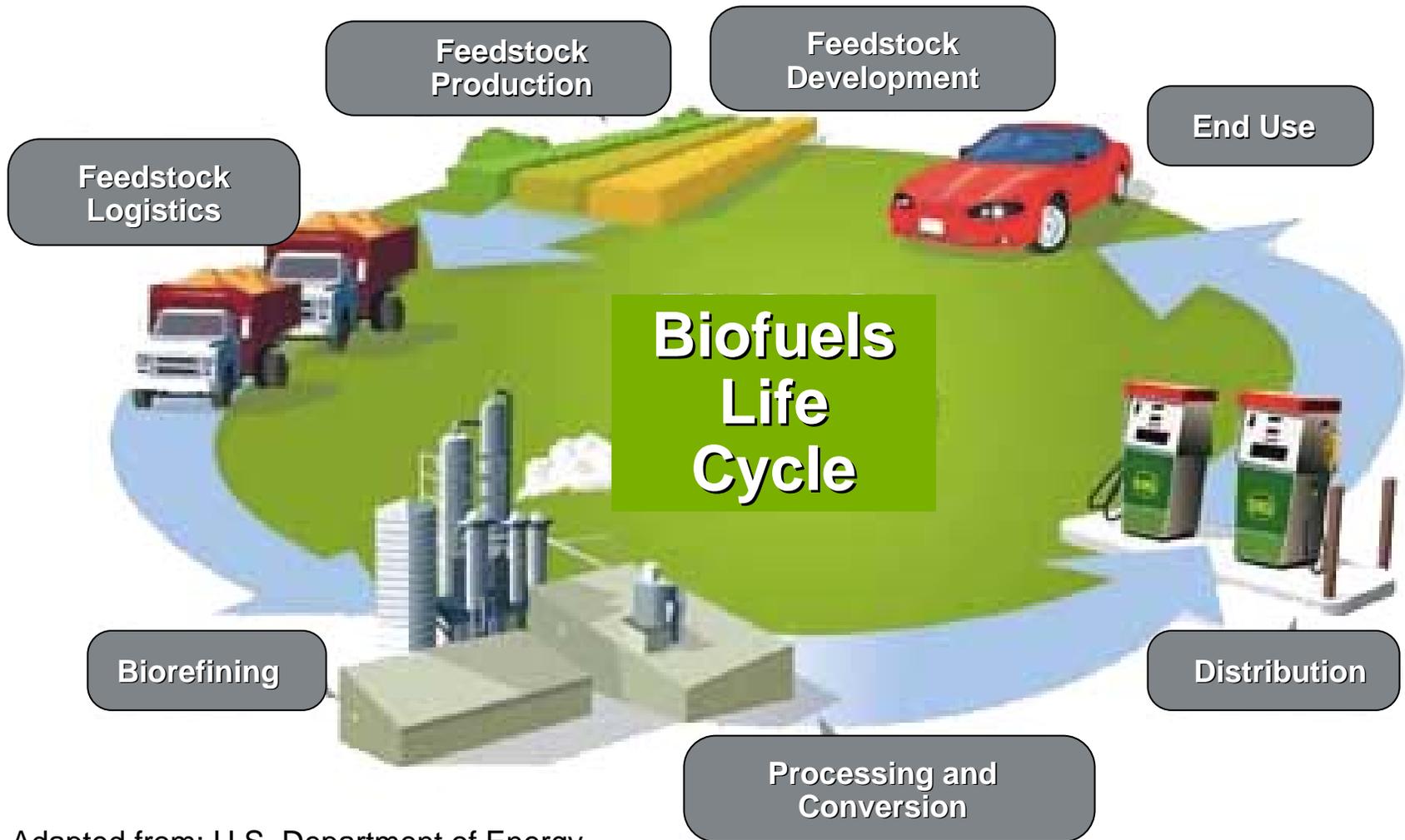
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