Agricultural Issues
The Soil Resource

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Adapting to Weather Extremes: The Economic Impact in Iowa

Food Demand ↑: Can we keep up?

WHY?
Supply/Productivity Limitations

- Land conversion

- 1982-2007
- on by 2030[1]

[1]FAO. 2002. World Agriculture: Towards 2015/2030. FAO, Rome.


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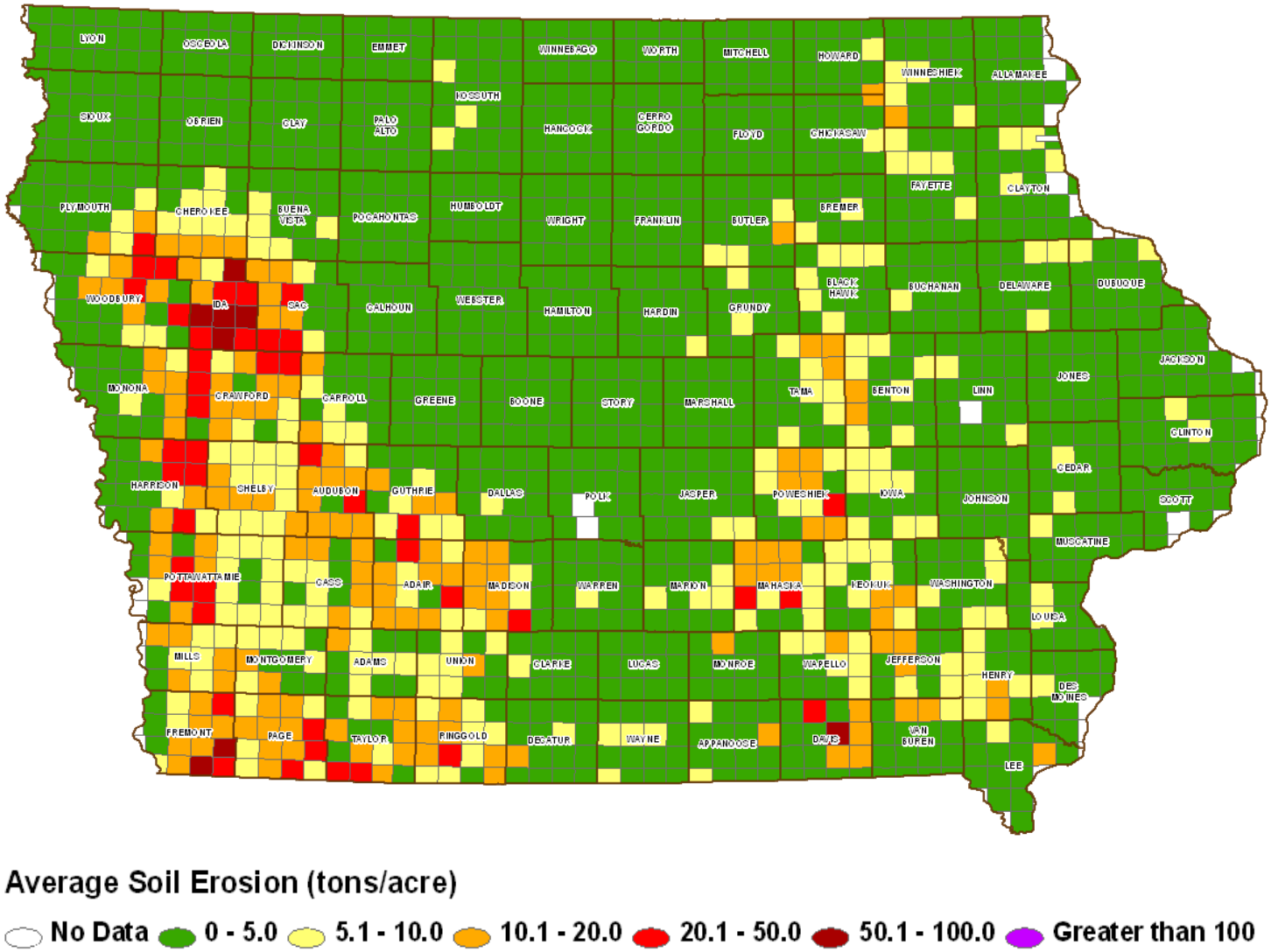
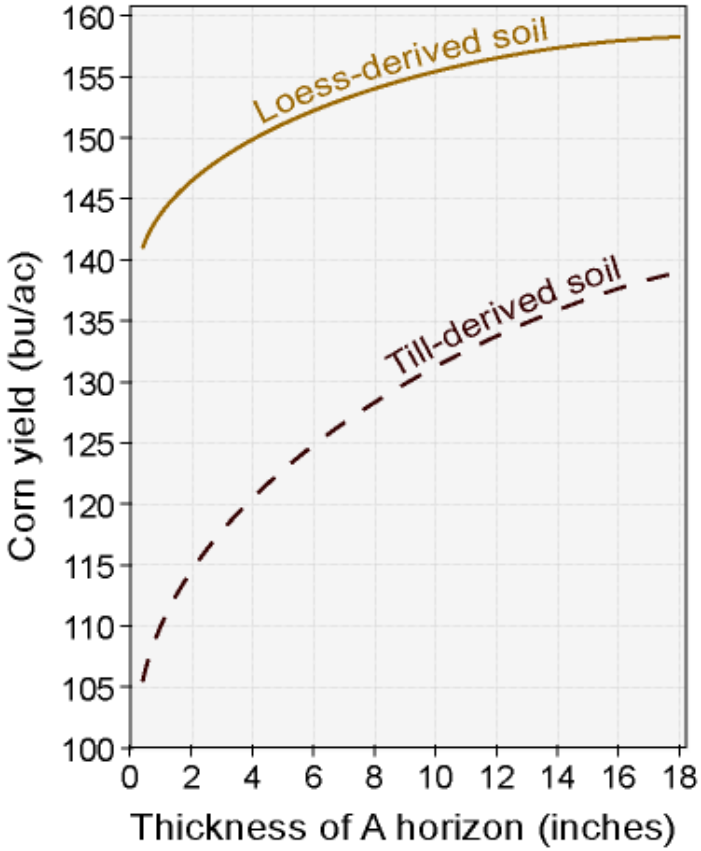
Six million acres eroded at > 10 T/A in 2007
(Tolerable soil loss 5 T/A/YR; renewal rate ~0.5 T/A/YR)



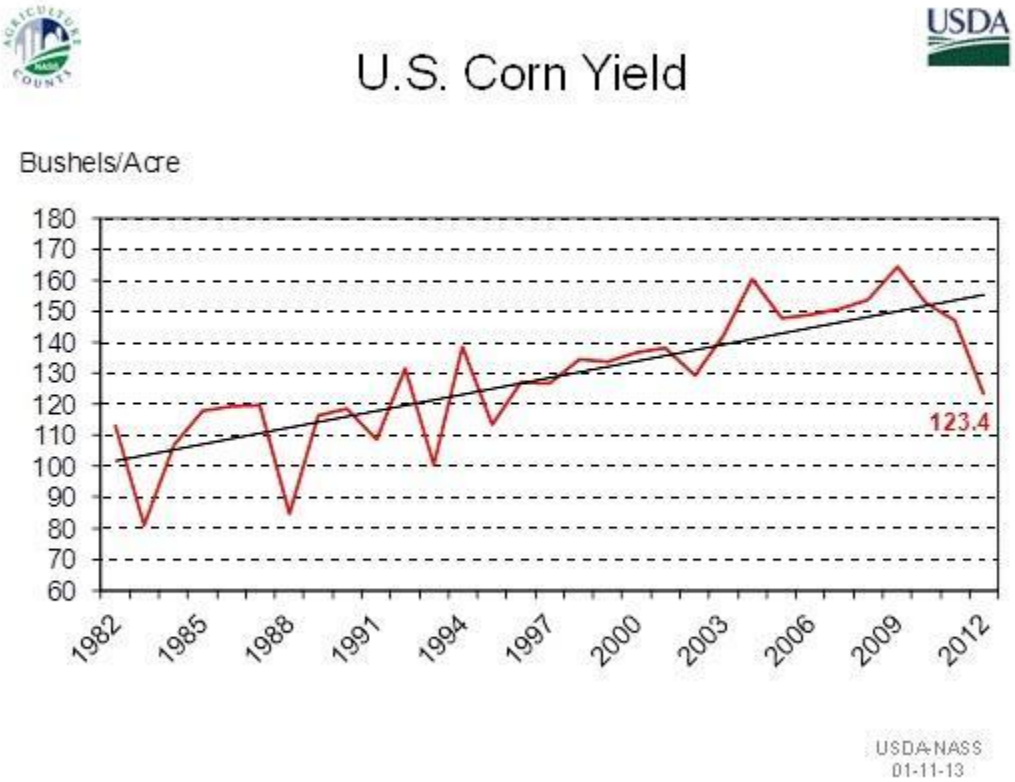
Cox, Craig, Andrew Hug, and Nils Bruzelius. 2011. Losing Ground. Environmental Working Group. Available at:
http://static.ewg.org/reports/2010/losingground/pdf/losingground_report.pdf

WHY Important?



Kazemi, Masoud, L.C. Dumenil, and T.E. Fenton. 1990. Effects of accelerated erosion on corn yields of loess-derived and till-derived soils in Iowa. Final report for Soil Conservation Service, Agreement No. 68-6114-0-8, Des Moines, IA.

Evidence – We Can Produce Enough



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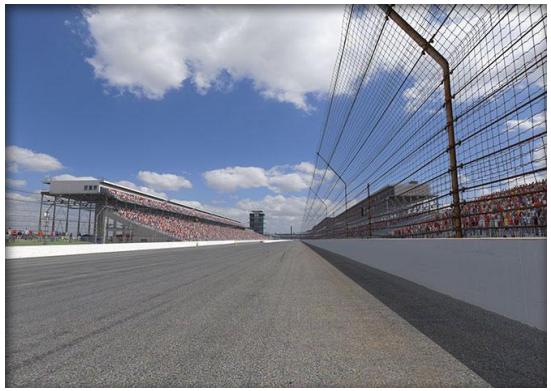

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1 ton of Iowa soil has pore space to store
~ 93 gallons of water

Soil Erosion Flooding Implications

- 1 ton Iowa soil accommodates 93 gal. water
- Translocation 5 T/A from upland for 1 section
  - Reduces potential water storage by ~300,000 gal
  - 12/4/2013 DSM River flow was 1425 gal/sec (193 cfs)
    - Equivalent to ~ 3.5 minutes of flow
- Loss of soil greater flooding implication than loss of wetlands
- Erosion, upland water storage and extreme events???

Policy

- Tolerable soil loss gold standard (5 T/A/YR) established in 1940's – lacks credibility
  - Science indicates soil development 0.5 T/A/YR
- Gold standard for estimating soil erosion
  - Only sheet and rill estimated
  - Ephemeral gullies ignored
  - Reality – erosion much greater than estimates
- Policies are tied to misrepresentation of soil erosion and sustainability claims that cannot be defended

Conclusion- In Light of Climate Extremes

- Iowa's production increasingly important
- Production potential is being reduced through land degradation
- Degradation will continue and degradation rate very likely to increase
- Land degradation is limiting technology's ability to elevate yields
- Off site erosion economic impacts are likely greater than we suspect


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