

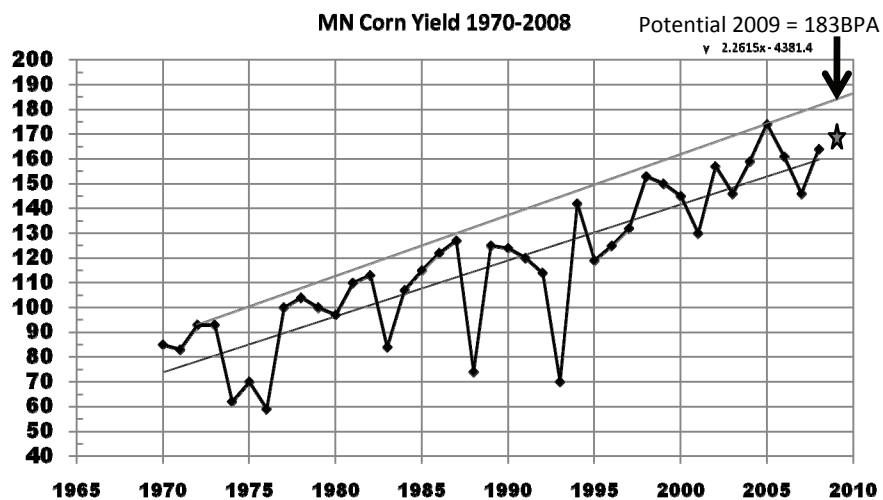
Climate Trends & Impacts

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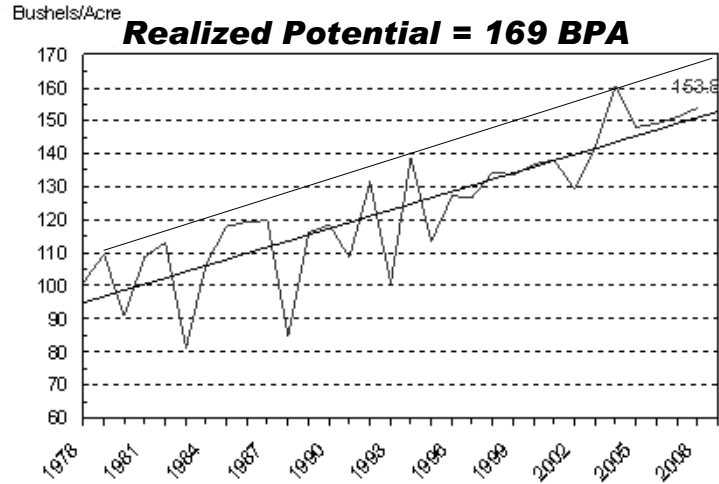
Trend in MN Corn Yield

Potential yield is about Trend + 20%
USDA expected = 167 BPA



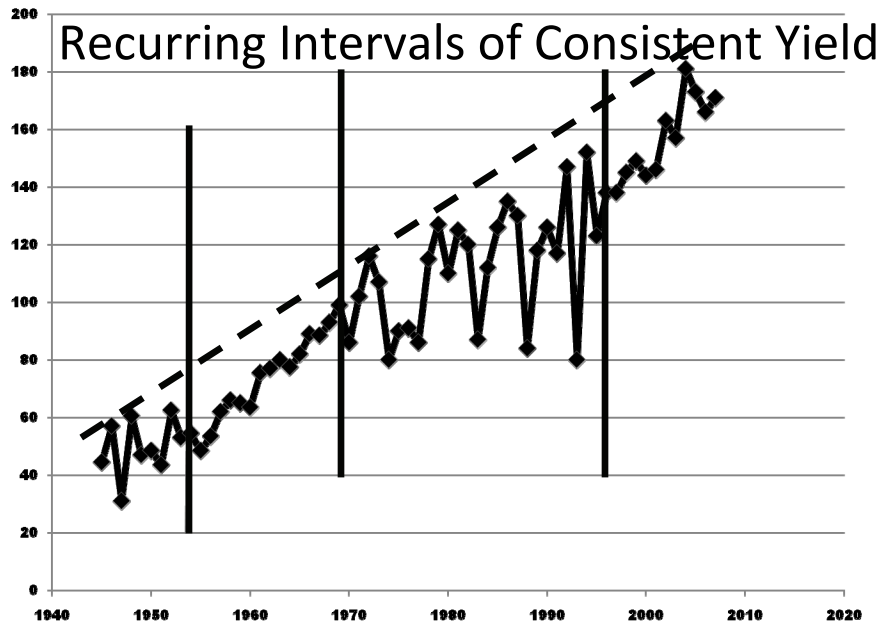


U.S. Corn Yield



- USDA expected U.S. yield is 161.9 BPA

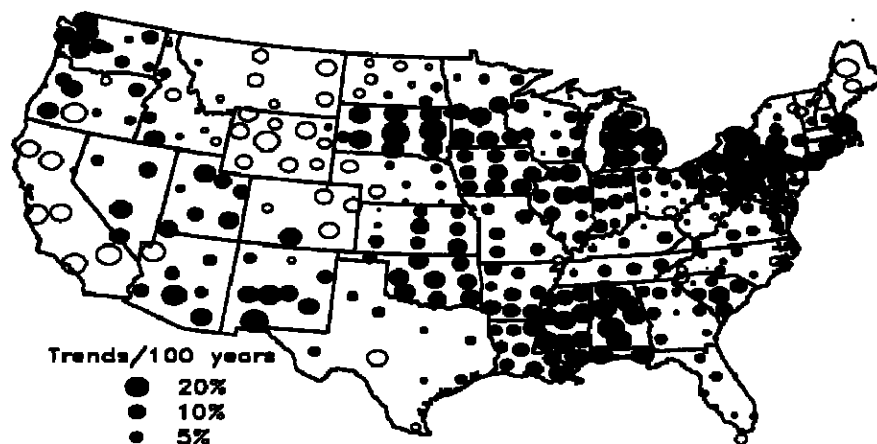
USDA-NASS
11-10-08



Expected Corn \$-risk for 12 Sep.

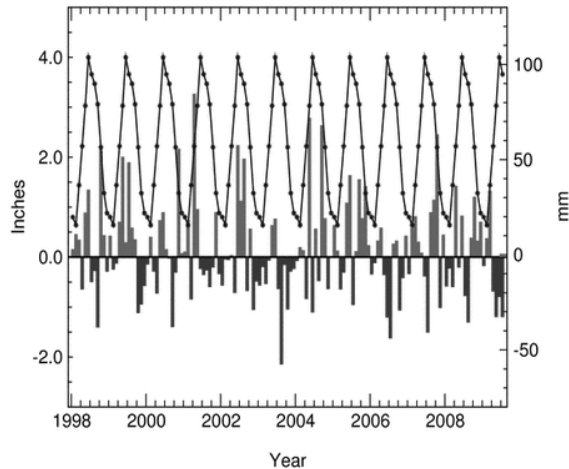
La Nina %	Neutral %	BPA	Dec \$
	17	169	1.76
		167	2.11
	50	162	3.10
		155	4.20
	86	153	4.55

Final Precipitation Trends, Revised for: Bulletin of the American Meteorological Society, Vol. 77, No. 2, Feb. 1996, pp 279-292.



<http://www.ncdc.noaa.gov/oa/climate/gcps/papers/icc-us.pdf>

Minnesota Statewide Precipitation
Normal & Departure, Jan 1998 - Jul 2009



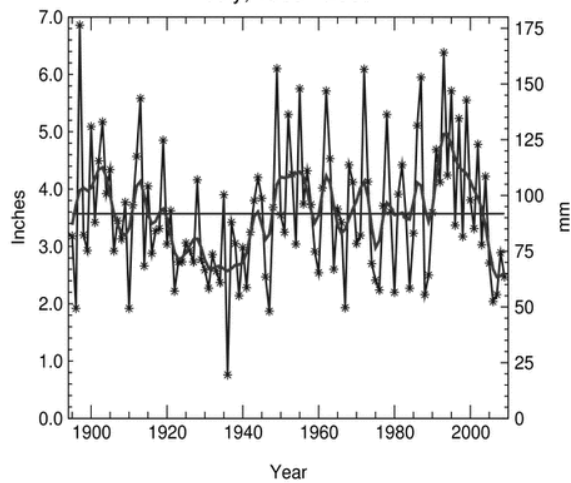
National Climatic Data Center / NESDIS / NOAA

**68 dry vs.
67 wet**

**Past 4 yrs.
19 wet
23 dry**

MN July Rain

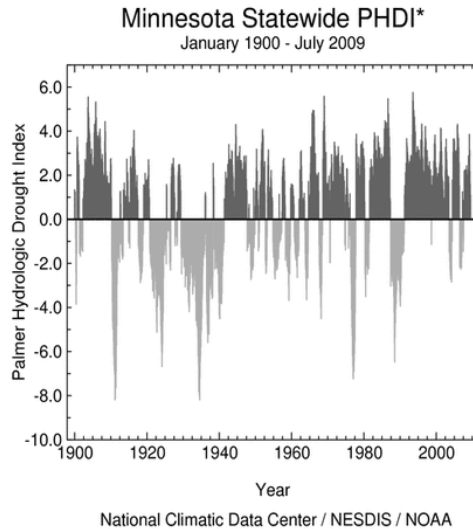
Minnesota Statewide Precipitation
July, 1895 - 2009



National Climatic Data Center / NESDIS / NOAA

**July is “normally warm & wet.”
The warmest period being the moist period is significant to crop production. There is some indication of a trend toward the relatively dry July pattern of the 20s & 30s.**

MN Moisture Index

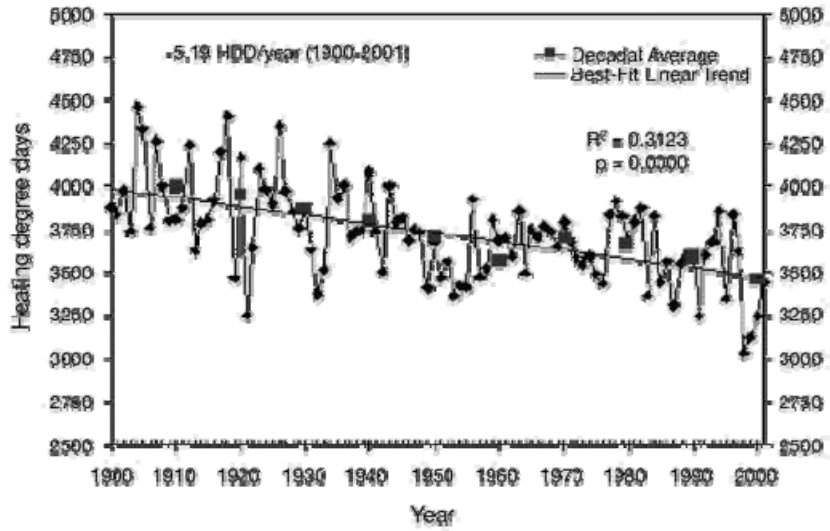


Although MN appears to be approaching the limited precipitation of the 1920s & 30s, the summer temperatures are cooler. Thus the moisture index remains relatively high.

MN Climate History info.

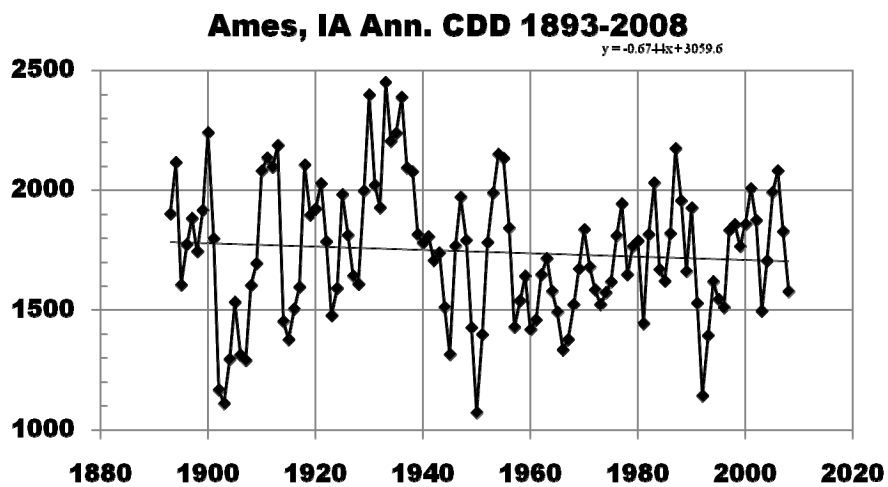
- http://home.att.net/~station_climo/purpose.htm
- <http://www.dnr.state.mn.us/faq/mnfacts/climate.html>
- Generalized Outlook for the Changing Climate (not based on actual assessment for MN):
- http://www.ucsusa.org/assets/documents/global_warming/ucssummarymnfinal.pdf

MN Winters are less Harsh

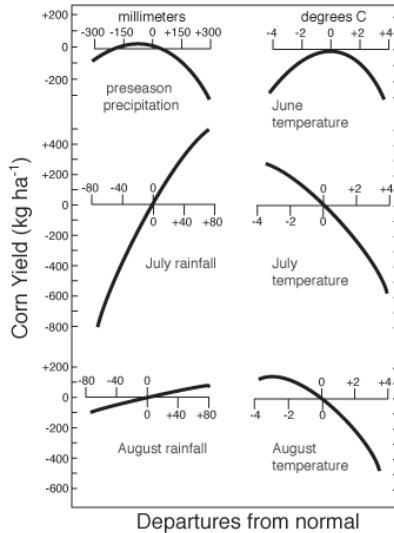


http://adaptation.nrcan.gc.ca/assess/2007/ch6/3_e.php

IA Summer Heat (example)



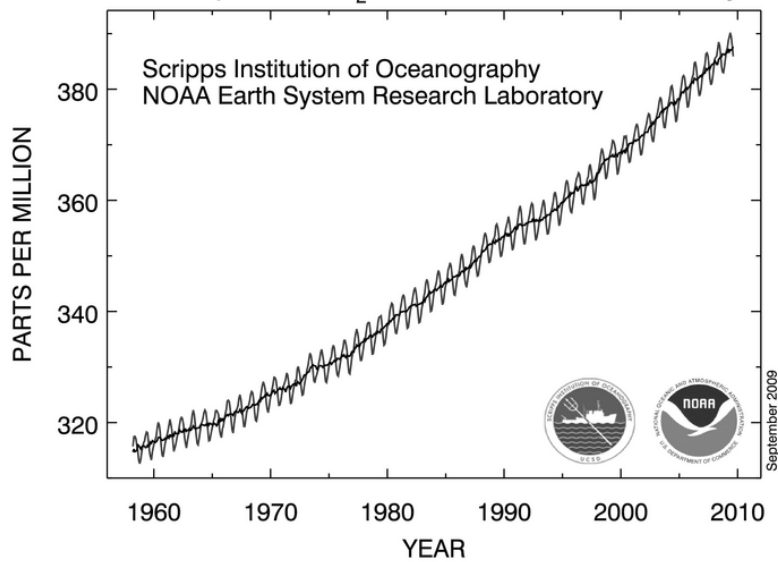
Thompson Model of 1972



Dr. L. Thompson demonstrated that the standardized deviation from normal temperature impact on Midwest crops is fully as significant as the deviations in precipitation.

The sum of the two defines the A. I. (Aridity Index).

Atmospheric CO₂ at Mauna Loa Observatory



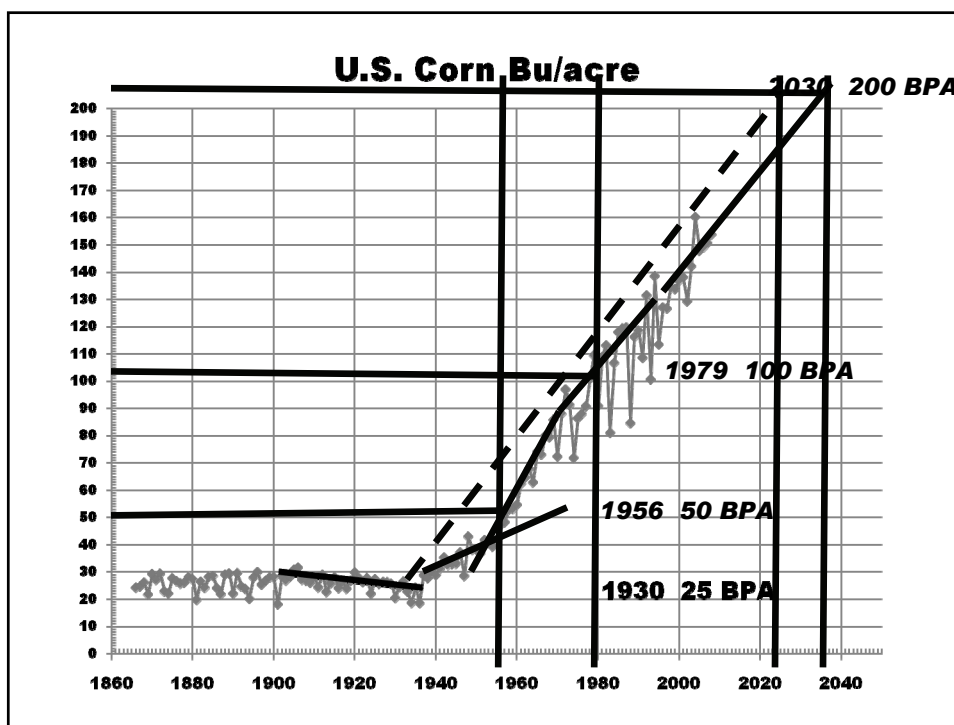
Enough Yield for Food & Fuel?

The major factor to reduce CO2 may be Bio-fuel.

For bio fuel potential native Midwest prairie is superior to corn

AS OF NOW

Can We Double Corn Yield?



Summary

Some anticipate that climate will continue to change in the same direction.

Some anticipate that decadal scale cycles will continue together with change.

It appears that we may have another winter “like” the past 2.