

Economic Impacts & Farmer Adaptation to Drought

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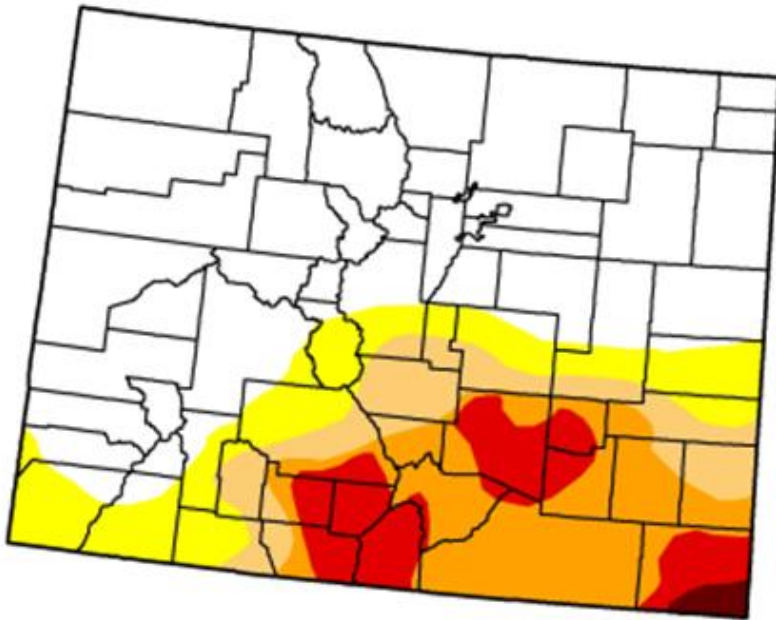
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this work.

**Colorado
State**
University

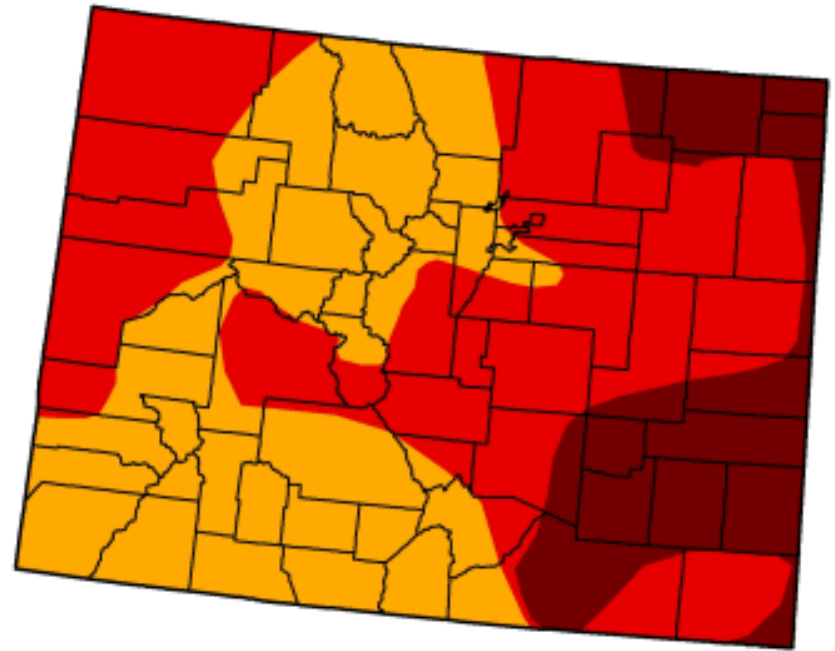


Drought Conditions: 2011 versus 2012

2011



2012



Released Thursday, September 29, 2011

Michael Brewer, National Climatic Data Center, NOAA



Released Thursday, September 27, 2012

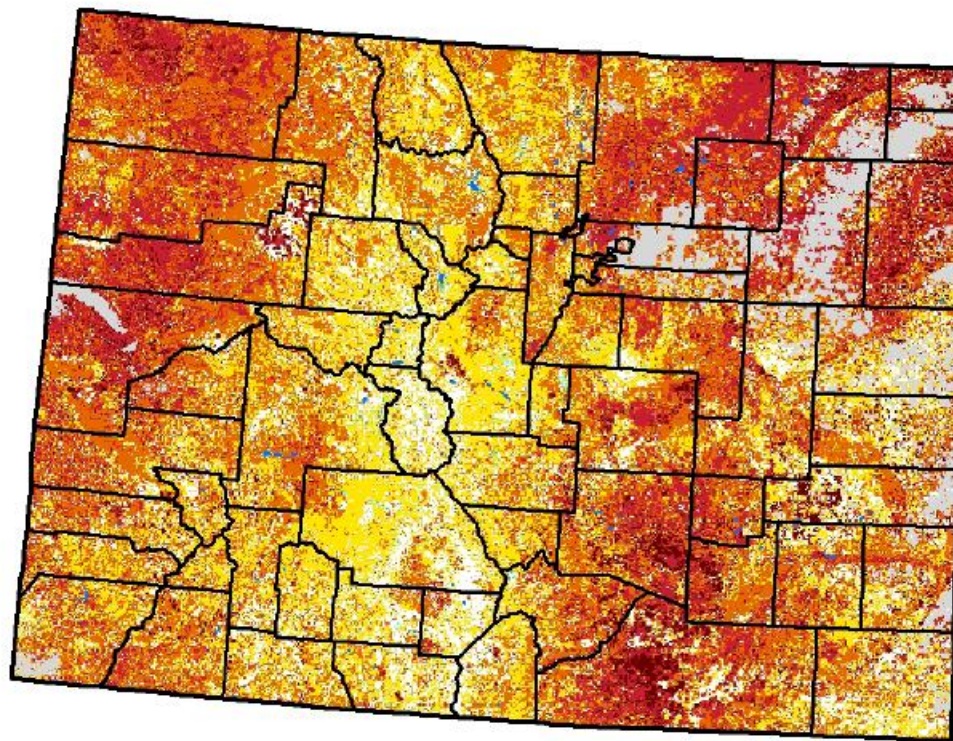
Anthony Artusa, NOAA/NWS/NCEP/CPC

Vegetation Conditions

... very little winter feed

Vegetation Drought Response Index
Complete: Colorado

October 15, 2012



Vegetation Condition

- Extreme Drought
- Severe Drought
- Moderate Drought
- Pre-Drought
- Near Normal
- Unusually Moist
- Very Moist
- Extremely Moist
- Out of Season
- Water



Three Approaches to Characterizing Impacts

- **Impacts to producers: practices, yields, profits, etc...**
 - **Survey**
- **Statewide direct and indirect economic impacts**
 - **Economic Input-Output Model**
- **Impact of the drought on the resiliency of farm and ranch operations**
 - **Survey**

2012 Drought Survey

Statewide Online Survey <http://tinyurl.com/CSU-drought>

- Survey link distributed via stakeholder groups
- Open in December 2012, closed end of March 2013
- Survey Themes
 - Impacts to production
 - Managerial response
 - Local Community Impacts

*533 completed surveys, 412 with zip codes, 4.4 million acres for agricultural land

IMPACTS TO PRODUCERS

Producer Practices

Estimating Economic Impacts with Linkages

Backward Linkages

Δ in \$ amount of inputs purchased

Δ in \$ amount of labor employed

Primary Impact Industries

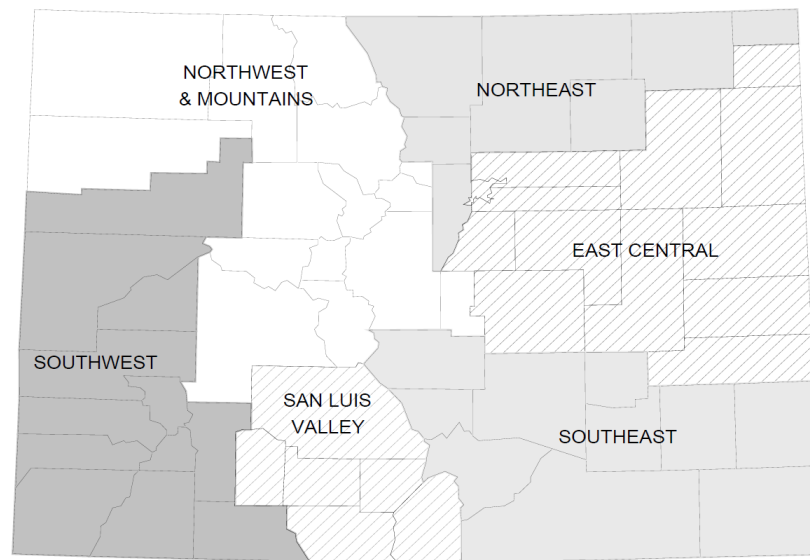
Crop/Forage Production

Δ in yields, Δ in acres harvested

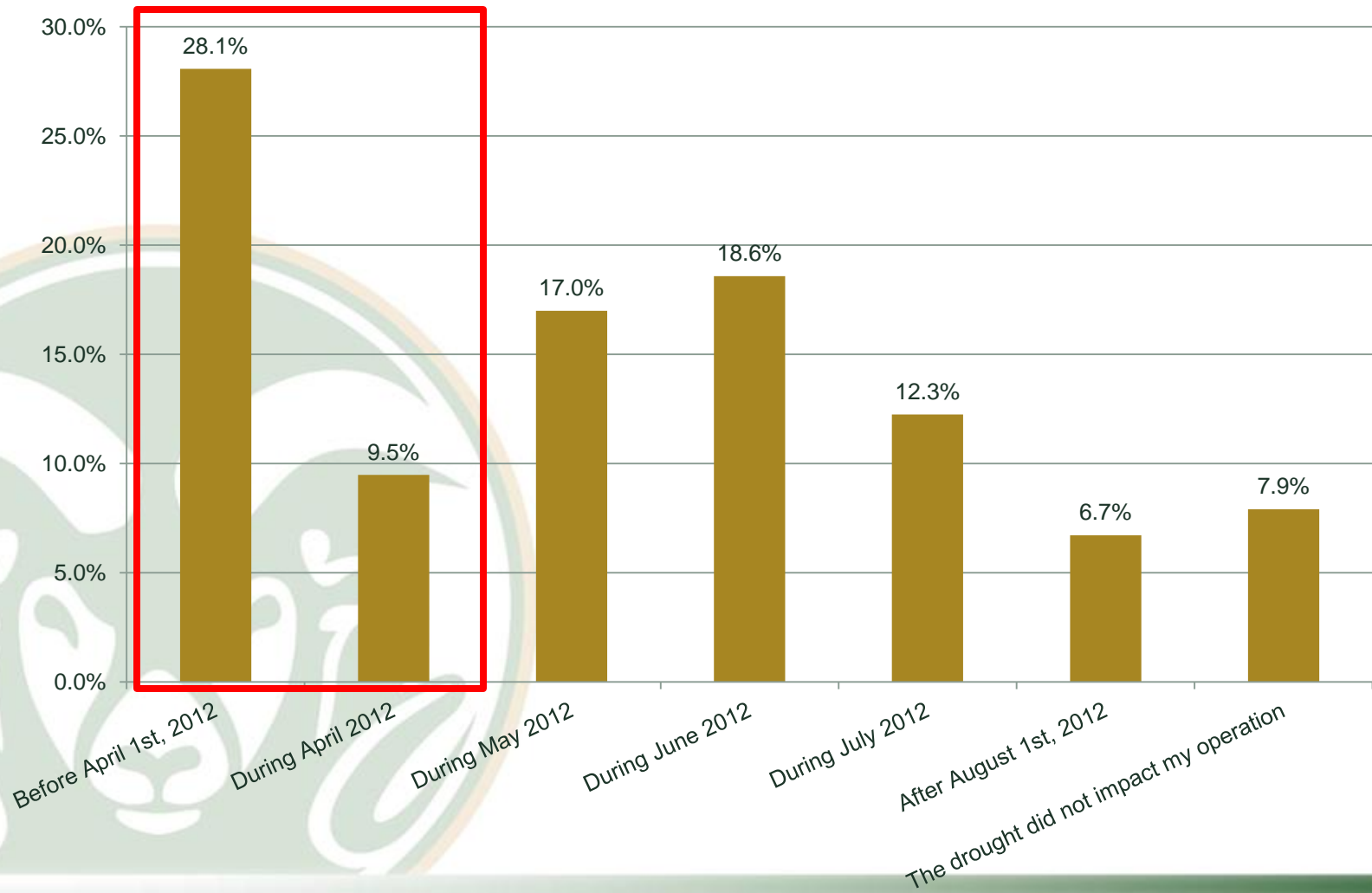
Alter Production Practices Before or During Drought?

Region	Pct 'Yes'
Northwest & Mtns	66%
Southwest	42%
San Luis Valley	63%
Northeast	70%
East Central	60%
Southeast	92%
Statewide	64%

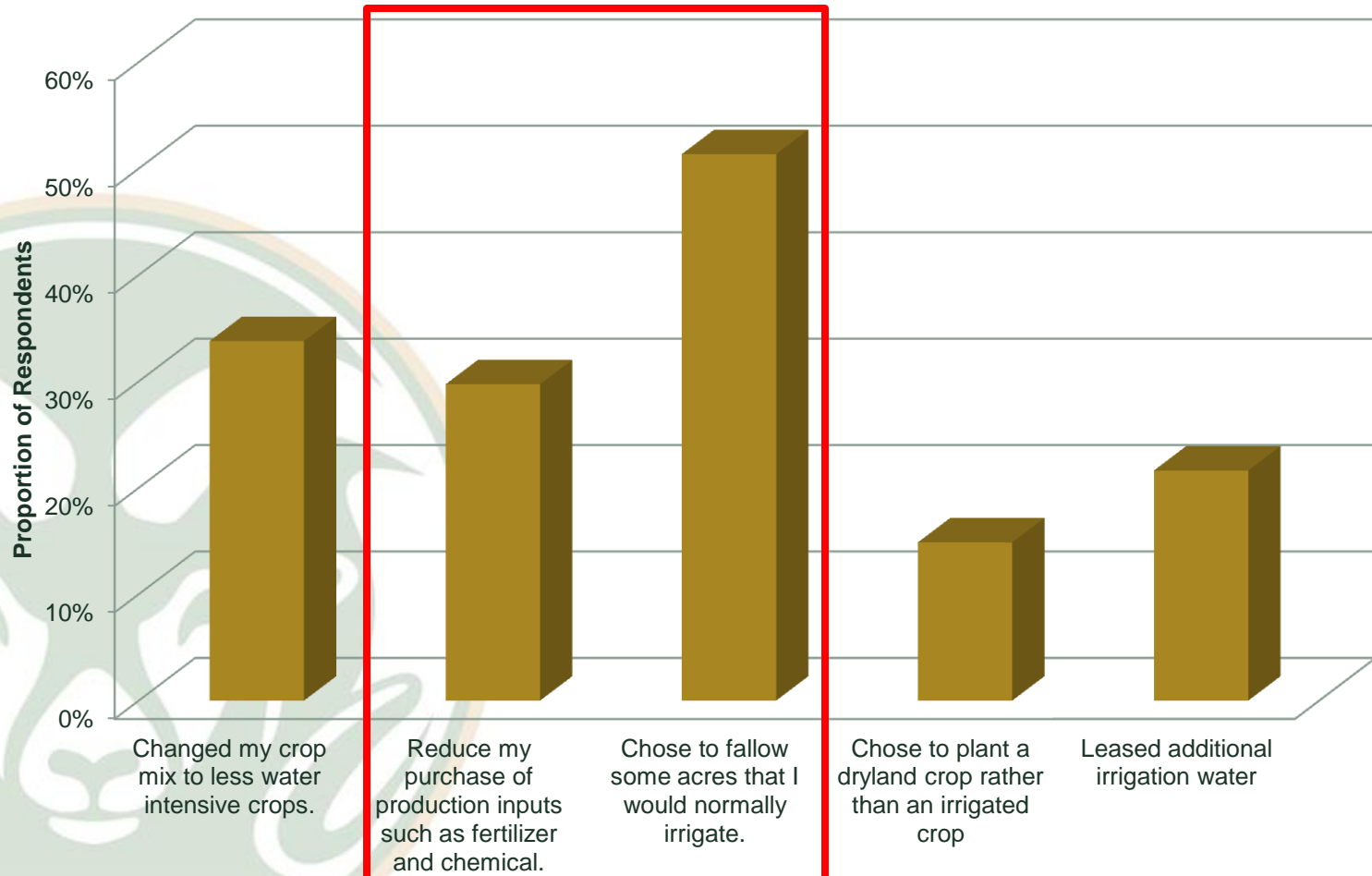
AGRICULTURAL STATISTICS DISTRICTS



When did you first make changes in your production practices because of the 2012 drought?



Anticipating Drought: Changing Cropping Practices



What are typical responses?

- *Reduce Expenses*
- *Improve Cash Flow*
- *Increase Asset Turnover*
- *Begin to Cull Assets*



Managing Cash Flow

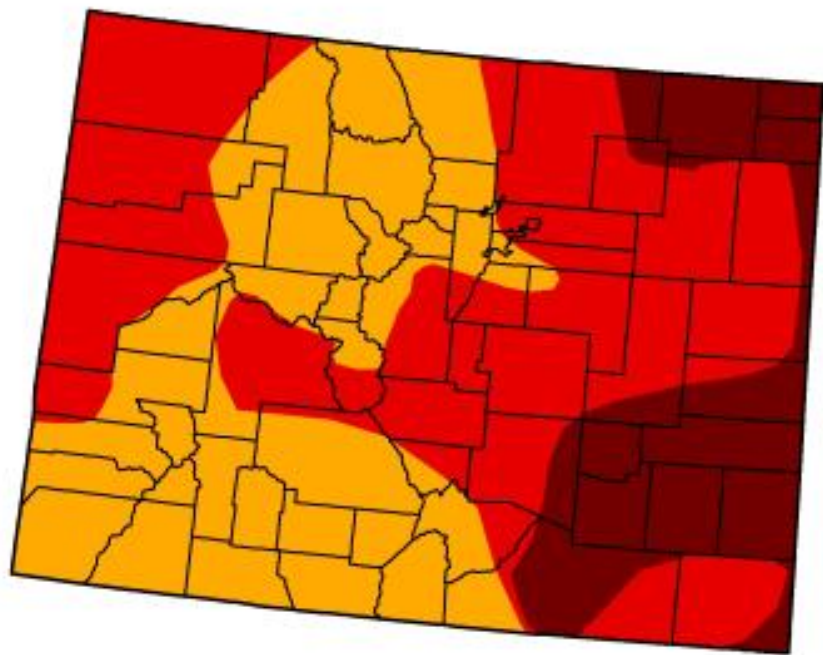
	<i>In response to drought our operation ...</i>	<i>If the drought continues our operation will ...</i>
<i>Custom Farm(ed)</i>	12%	14%
<i>Sought/ Seek Off-Farm Employment</i>	25%	26%
<i>Reduce(d)Family Expense</i>	59%	40%
<i>Sought/ Seek Federal Assistance</i>	18%	25%

Managing Assets

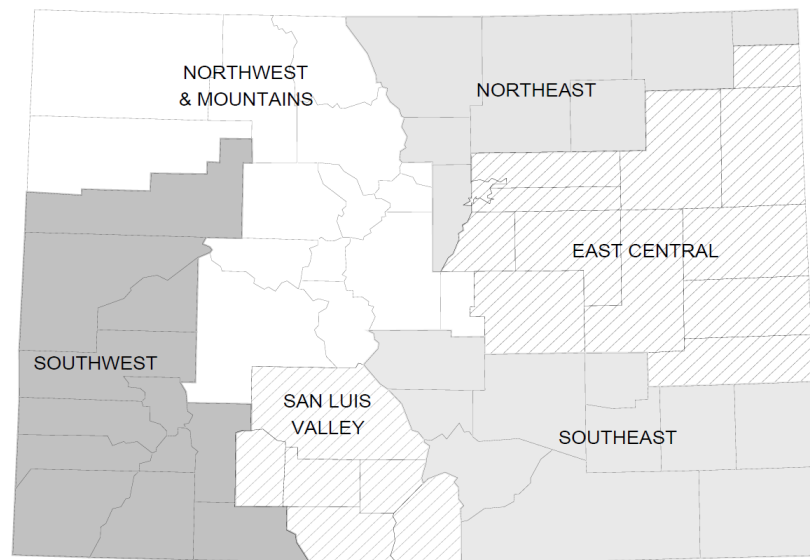
	<i>In response to drought our operation ...</i>	<i>If the drought continues our operation will ...</i>
<i>Sold / Will Sell Breeding Livestock</i>	41%	29%
<i>Sold / Will Sell Equipment</i>	13%	19%
<i>Sold / Will Sell Land</i>	2%	9%

IMPACTS TO PRODUCERS

Yields, Revenues and Profits



AGRICULTURAL STATISTICS DISTRICTS



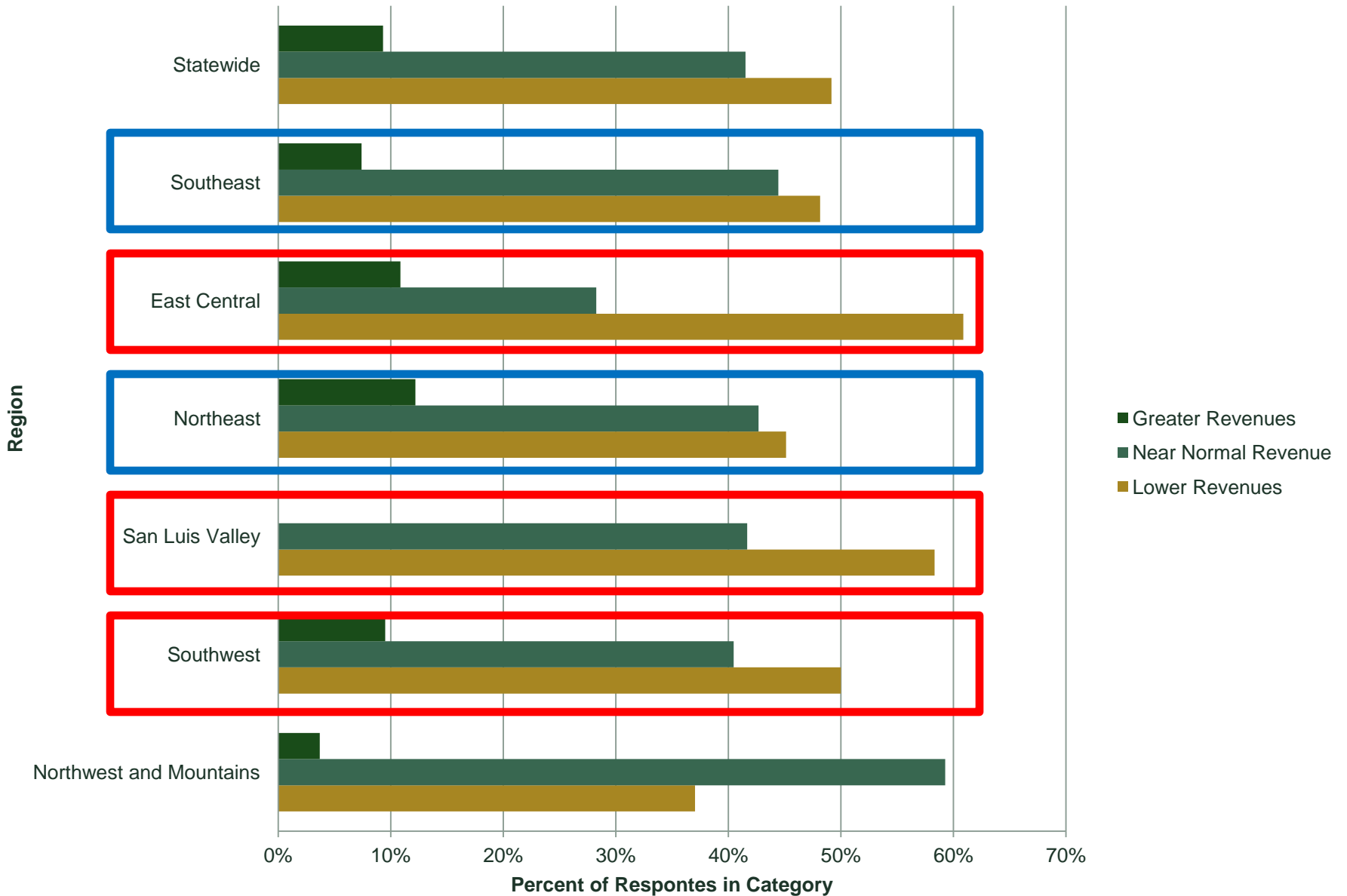
Irrigated Crop Yield & Acreage Impacts

	<i>Corn Grain</i>	<i>Corn Silage</i>	<i>Wheat</i>	<i>Dry Beans</i>
<i>Actual vs. Expected Yield</i>	- 28%	-34%	-29%	-21%
<i>Harvested vs Planted Ac. For Respondents</i>	-19%	-17%	-6%	0%

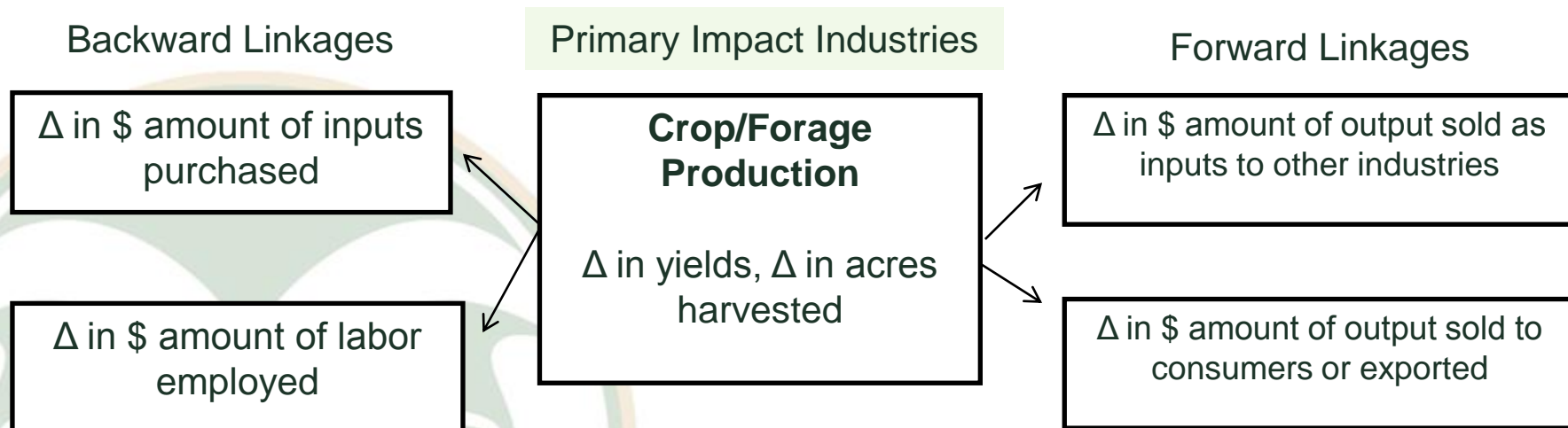
Dryland Crop Yield & Acreage Impacts

	<i>Wheat</i>	<i>Milo</i>	<i>Millet</i>	<i>Sunflower</i>	<i>Corn</i>
Actual vs. Expected Yield	-30%	-69%	-75%	-55%	-87%
Harvested vs Planted Ac. For Respondents	-6%	- 63%	-45%	-44%	-68%

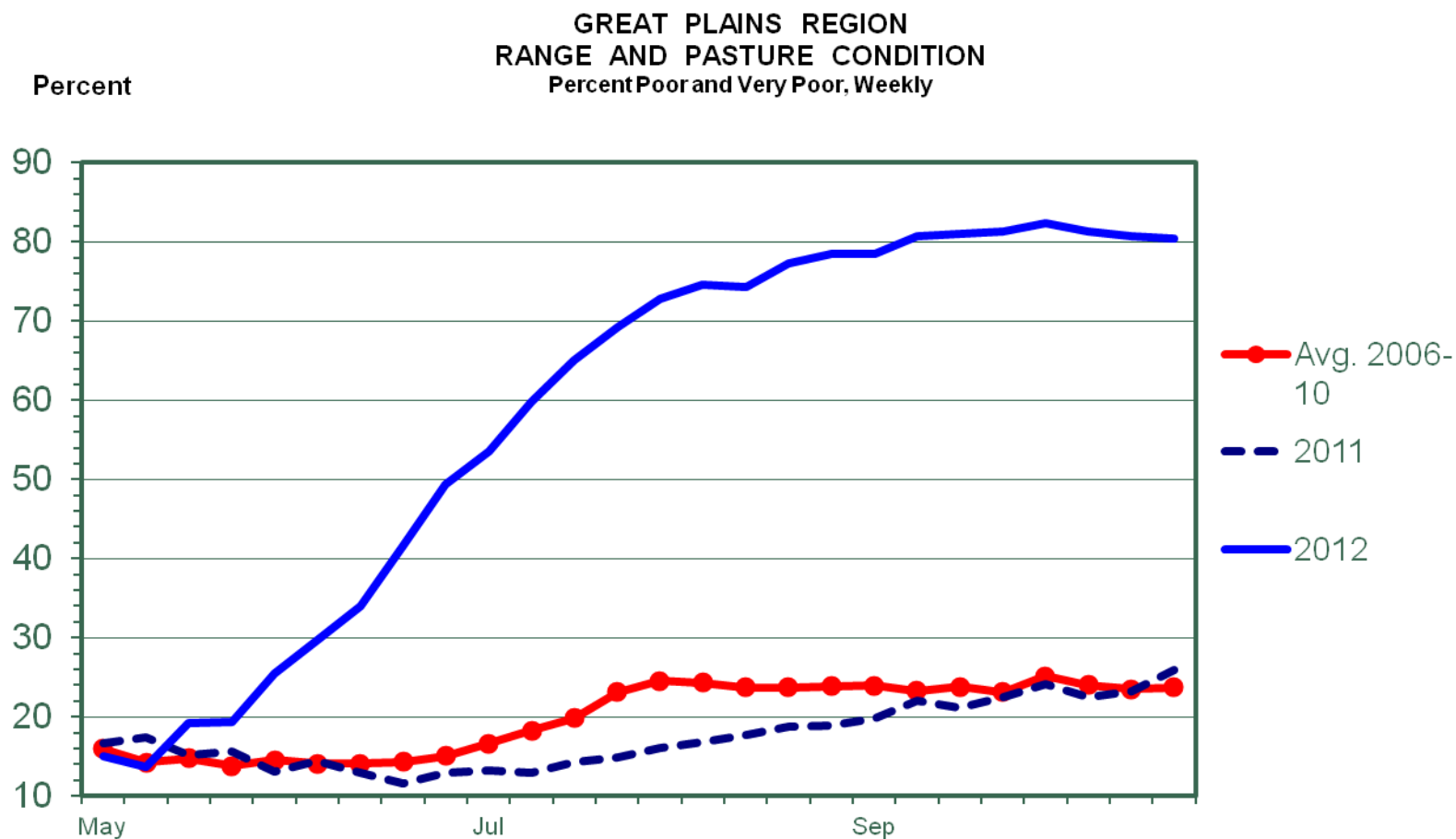
Respondents' Assessment of Revenues Relative to 'Normal'



Estimating Economic Impacts with Linkages



Pasture and Range Conditions



G-NP-32
10/31/12

Cow/Calf Production

Production Metric	Change from Typical Conditions
Number of Cows	- 48%
Culling Rate	21%
Average Weaning Weight	- 16%

Forage Production

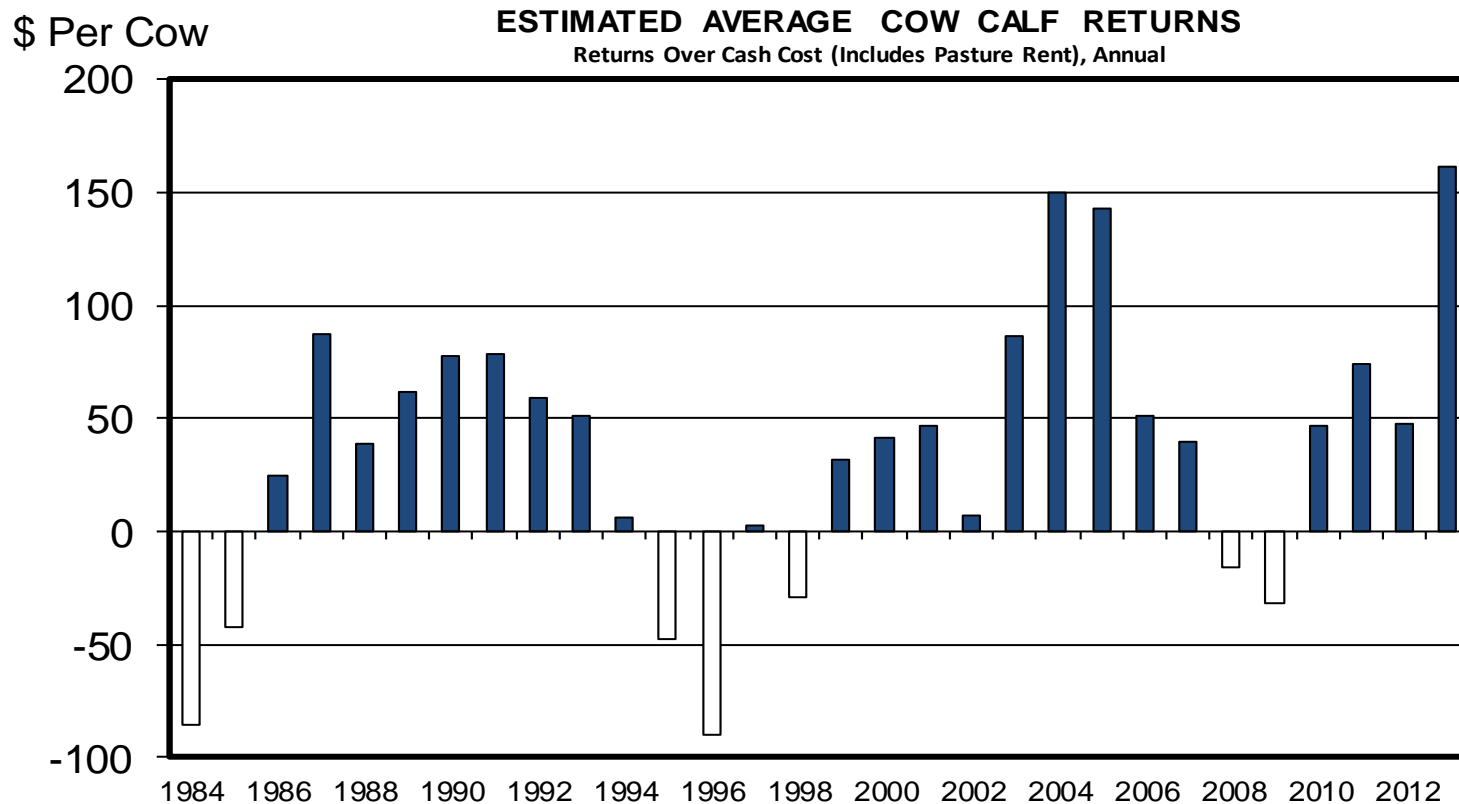
Hay/Forage Production

Hay/Forage Source	Change in Production Amt.
Alfalfa	-37%
Grass	-40%
Pasture	-45%

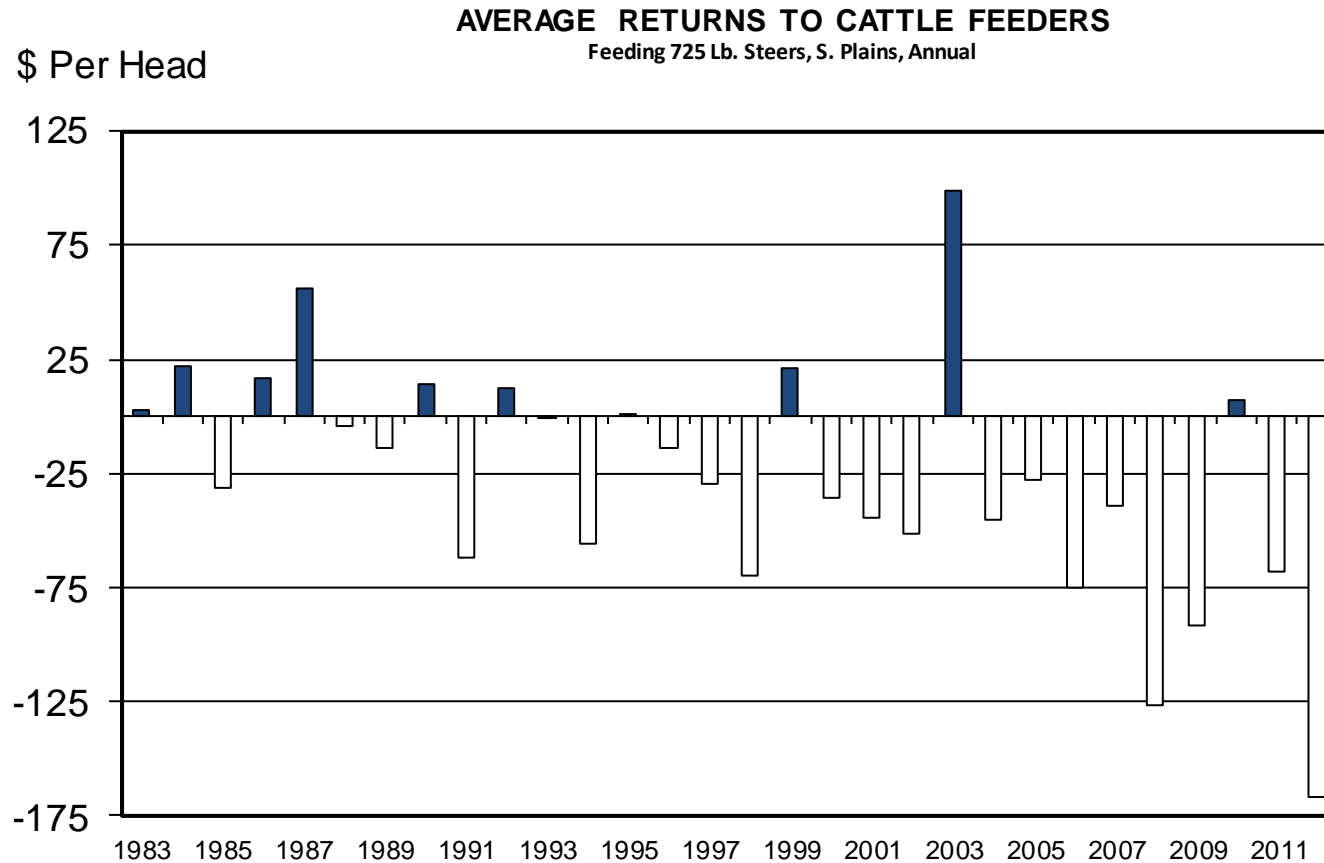
Range & Grazing

Forage Source	Percent Change in AUMS
Owned Pasture	- 40%
Private Lease	- 9%
Federal Lease	- 31%
State Lease	- 34%
Purchased Hay	51%

Impacting profitability?



Impacting profitability?



Livestock Marketing Information Center

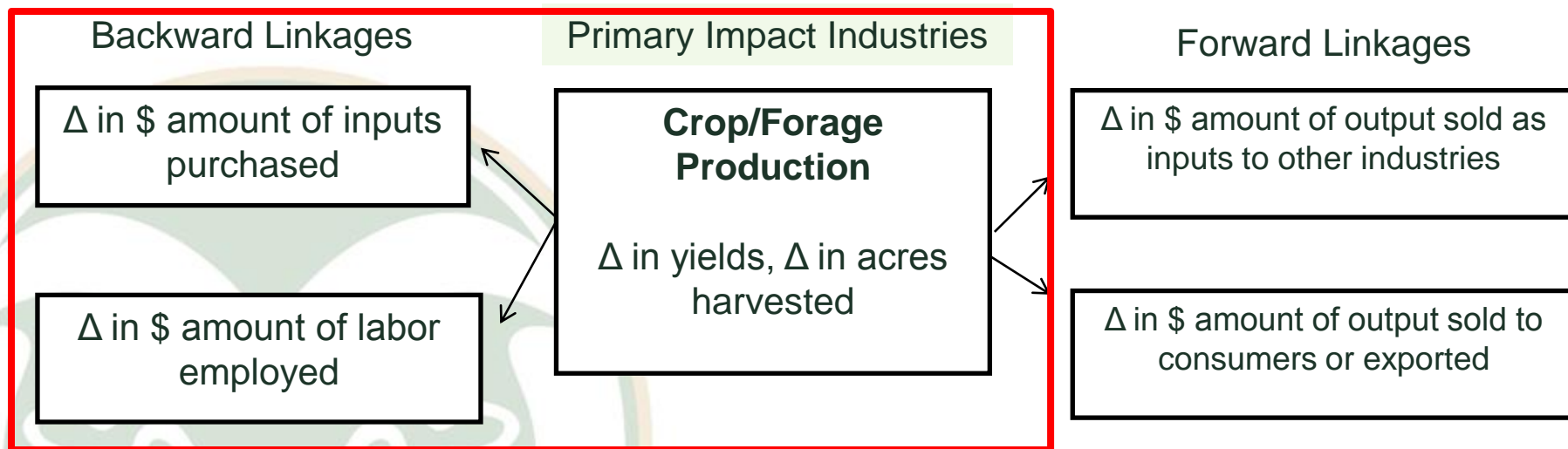
Data Source: USDA-AMS & USDA-NASS, Compiled & Analysis by LMIC

C-P-10
01/11/13

STATEWIDE DIRECT AND INDIRECT ECONOMIC IMPACTS



Estimating Economic Impacts with Linkages



Impacts to Primary Impact Industries

- Lost Potential Revenue = Actual - Potential Revenue

Potential Revenue =

$$Planted\ Acres_{2012} * Adj\ Ave\ \% Harvested_{2000-2010} * Adj\ Ave\ Yield_{2000-2010} * Price_{2012}$$

- Potential Revenue represents what producers would have earned if they experienced typical growing conditions.
- Lost Potential Revenue represents the direct, indirect, and induced economic impacts to PII.

Impacts to Primary Impact Industries

	2012 Revenues	2000 - 2010 Average Revenue
<i>Crops</i>		
<i>Barley</i>	\$45,663,750	\$29,513,530
<i>Corn Grain</i>	\$947,026,500	\$514,752,255
<i>Corn Silage</i>	\$166,400,000	\$62,668,182
<i>Dry Beans</i>	\$32,457,600	\$26,968,564
<i>Hay (alfalfa & other)</i>	\$885,198,000	\$473,898,618
<i>Millet</i>	\$22,848,000	\$20,393,591
<i>Potatoes</i>	\$150,678,450	\$188,995,952
<i>Sorghum</i>	\$20,328,000	\$14,940,581
<i>Sunflower</i>	\$18,313,120	\$22,091,421
<i>Wheat</i>	\$602,482,930	\$301,562,112
Total	\$2,891,396,350	\$1,655,784,805

Total Direct and Indirect Economic Impacts

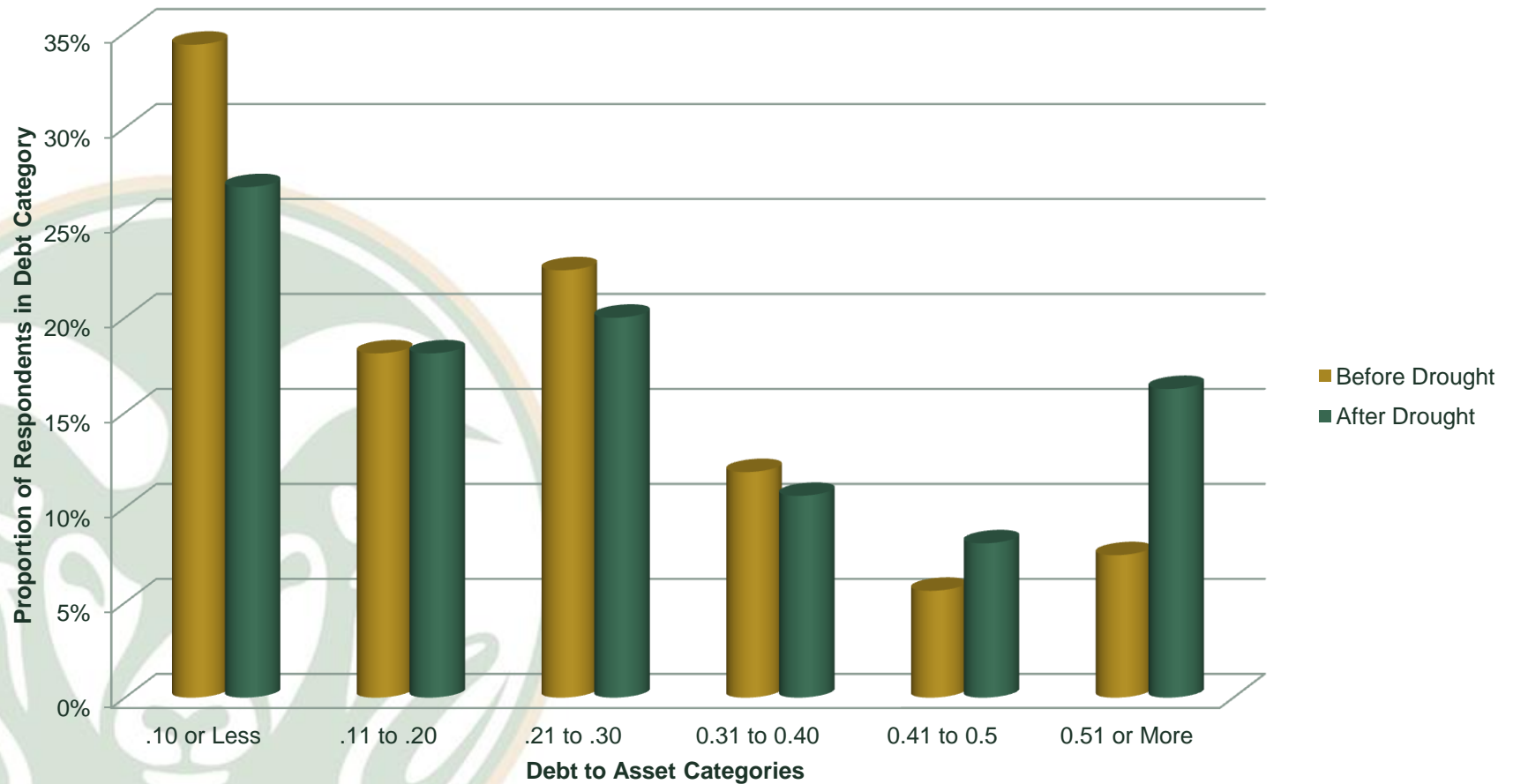
Crop	Difference Between 2012 Revenues and What Might Have Been	Foregone Indirect and Induced Economic Activity
<i>Barley (bu/ac)</i>	\$1,304,078	\$988,322
<i>Corn Grain (bu/ac)</i>	\$254,492,561	\$192,872,377
<i>Corn Silage (tons/ac)</i>	\$16,640,000	\$12,610,963
<i>Dry Beans (lbs/ac)</i>	-\$2,448,189	-\$1,855,410
<i>Hay (tons/ac)</i>	\$75,210,099	\$66,040,493
<i>Millet (bu/ac)</i>	\$40,694,169	\$30,840,906
<i>Potatoes (cwt/ac)</i>	-\$4,977,830	-\$3,801,866
<i>Sorghum (bu/ac)</i>	\$13,957,537	\$10,578,004
<i>Sunflower (lbs/ac)</i>	\$9,692,718	\$5,483,312
<i>Wheat (bu/ac)</i>	\$4,496,584	\$3,407,828
Total	\$409,061,726	\$317,164,929

IMPACTS TO RESILIENCY

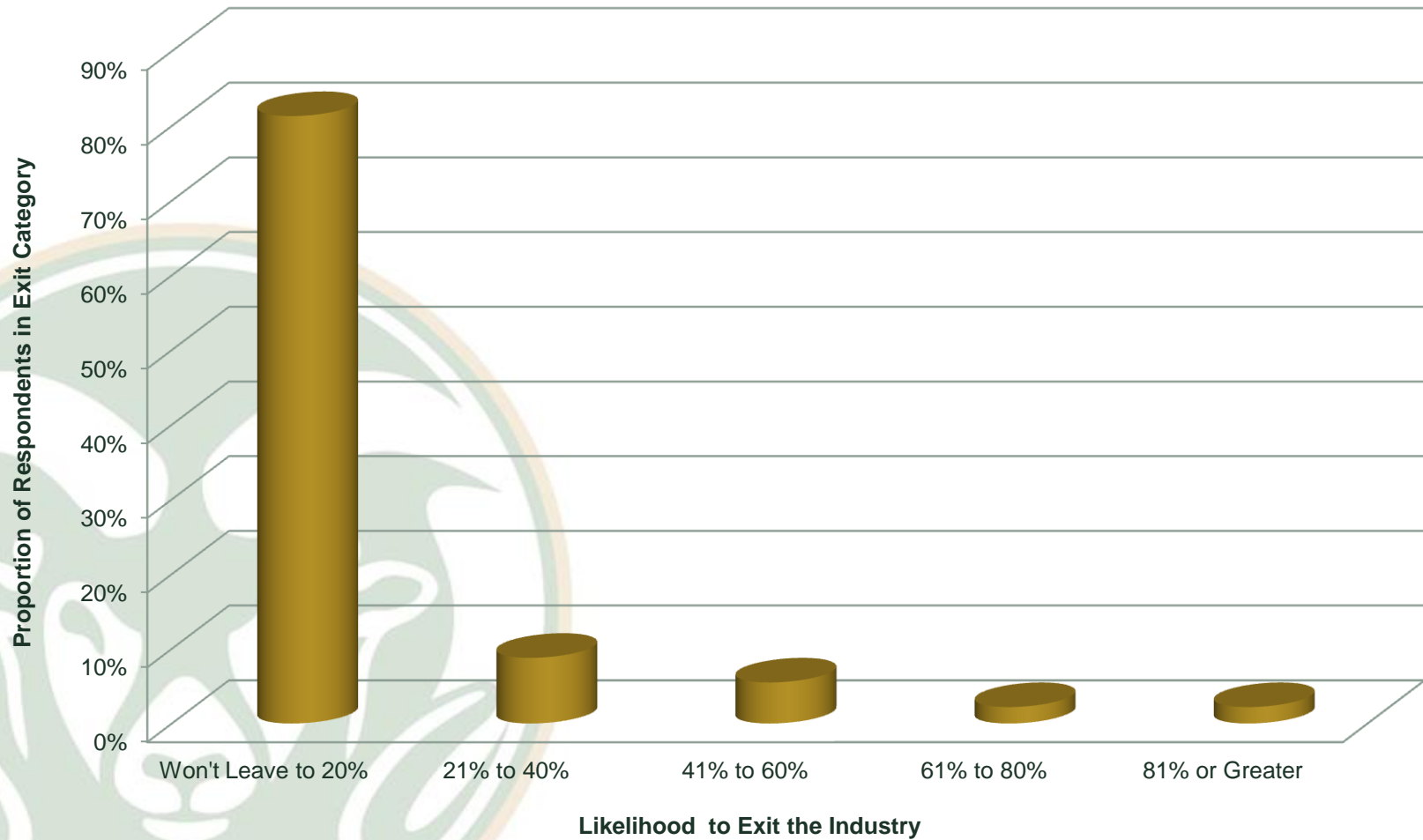


Long-term Impacts

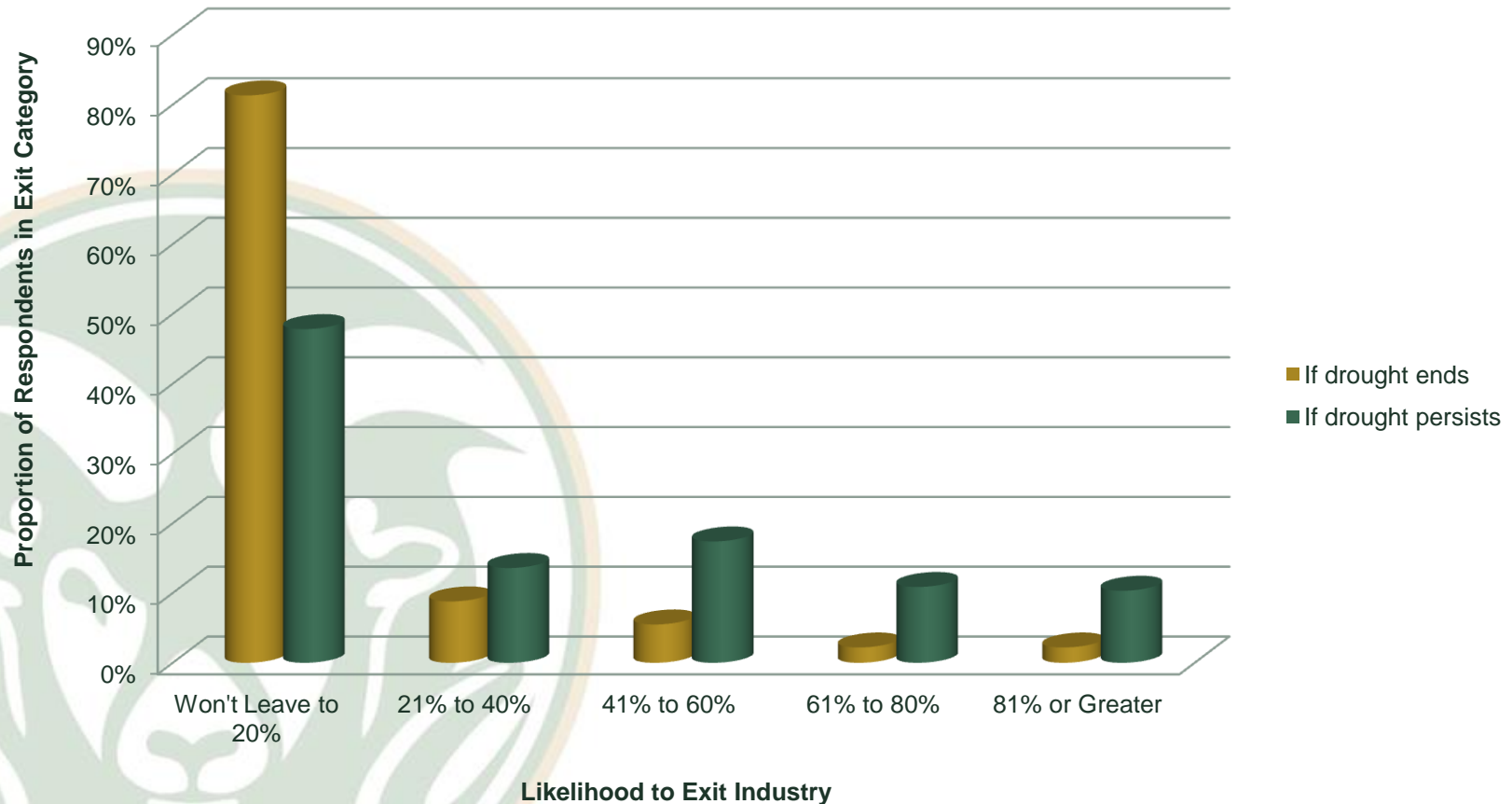
Respondents' Changing Debt to Asset Ratios



Respondents' Likelihood to Exit: Drought Ending



Respondents' Likelihood to Exit: Drought Ending or Persisting



Questions? Comments?

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