AgClimate: Yield Risk Decision Support System

Clyde Fraisse
Agricultural & Biological Engineering

Southern Conservation Agricultural Systems Conference

June 25-27, 2007

North Florida Research & Education Center
Quincy, Florida

SOUTHEAST CLIMATE CONSORTIUM
CLIMATE AGRICULTURE WATER PEOPLE

UF UNIVERSITY of FLORIDA
IFAS Extension

1. Risk management tools
2. Climate forecast
3. Management options for selected crops, forestry, pasture, and livestock
4. Information about climate variability
5. Climate and weather links

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http://www.agclimate.org/Development/apps/agClimate/controller/perl/a

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Page Tools

Current Climate Phase: Neutral

- AgClimate Tools
- Forecasts
- Crops
- Fruits
- Forestry
- Pasture
- Livestock
- Coastal
- Climate & El Nino
- Links
- About

Forecasts

AgOutlook

Date Updated: June 1st 2007

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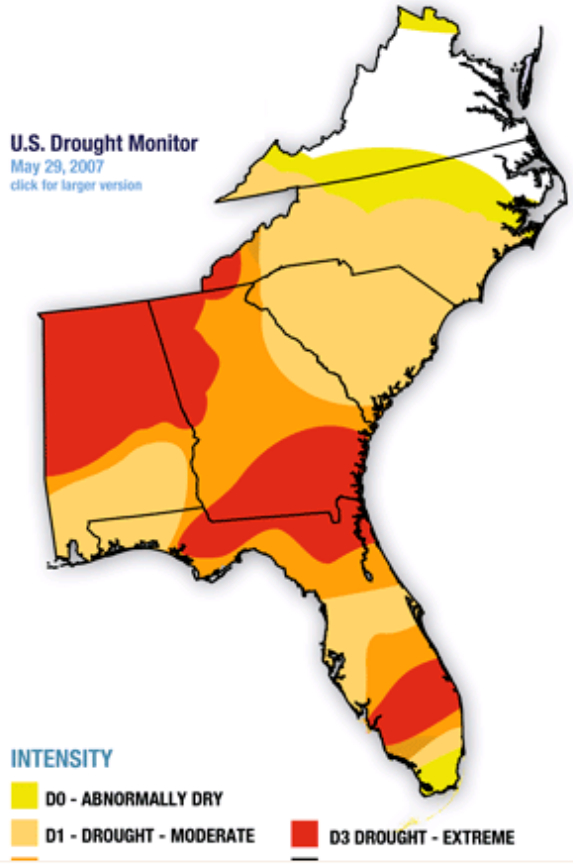

Normal convective summer rains are beginning in South Florida. This type of "hit and miss" afternoon thunderstorm will be moving northward into Central and Northern Florida and arriving in Georgia and Alabama as temperatures increase. While not a solution for all producers, these rains may mitigate drought effects in selected areas. In addition, an active tropical storm and hurricane season has been announced. While this brings a chance of crop destruction, rains associated with summer storms are important in Georgia and Alabama and are expected to contribute and alleviate the current drought situation.

TRI-STATE Region: Extreme drought (D3) has taken a toll on most crops. Crop emergence on non-irrigated land is poor, leading to poor stands. Corn planted in April and early May is most at risk. Drought during flowering and pollination delays silking, reduces silk length, and inhibits embryo development after pollination. Drought during grain-filling increases leaf dying, shortens the

http://www.drought.unl.edu/dm/DM_southeast.htm

Internet 100%

Climate and Agriculture Outlooks

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AgClimate

Map for county selection: AL | FL | GA

County/State ALACHUA , FL

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AgClimate Tools

Climate

Climate Risk
County level forecasts of temperature and precipitation

Freeze Risk Maps
Freeze probabilities based on ENSO phases

Drought

KBDI Maps
Forecasts of the Keetch-Byram Drought Index (KBDI)

Crop Yield

County Yield Database
Crop yield series, trends and residuals at the county level

Regional Yield Maps
Map of average residuals (%) for El Ni–o, La Ni–a, and Neutral years

Yield Risk Forecast
Yield risk based on location, planting date, soil type and climate scenario

Crop Development

Growing Degree Days
GDD forecast, historical patterns, and probability, associated with ENSO Phases

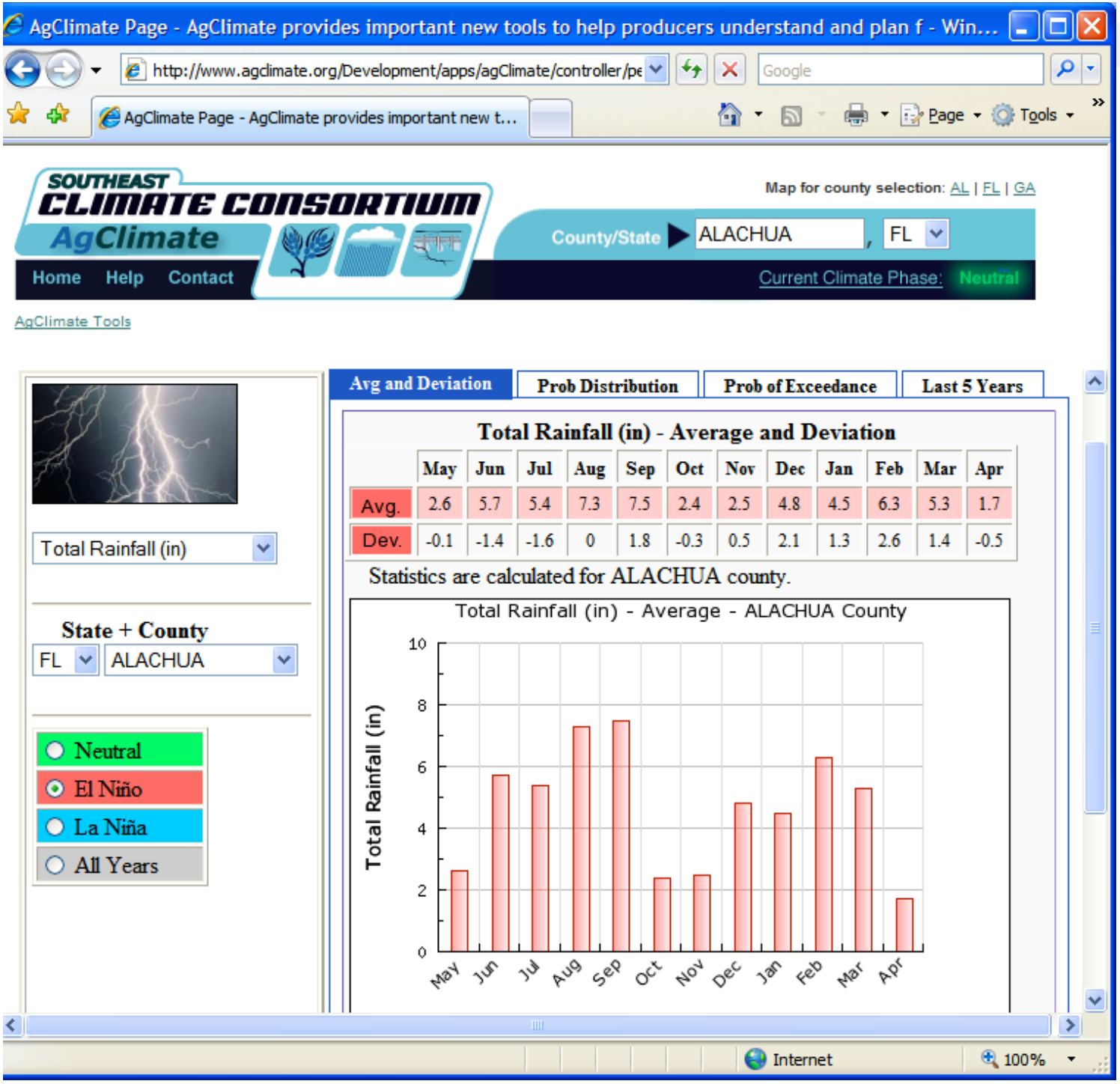
Chill Accumulation
Forecasts of expected chill hours (45¡F) and chill units accumulation for selected fruit crops

Chill Accumulation Maps
Chill accumulation for seasonal and biweekly periods from Oct 1 through April 30

Irrigation Tool

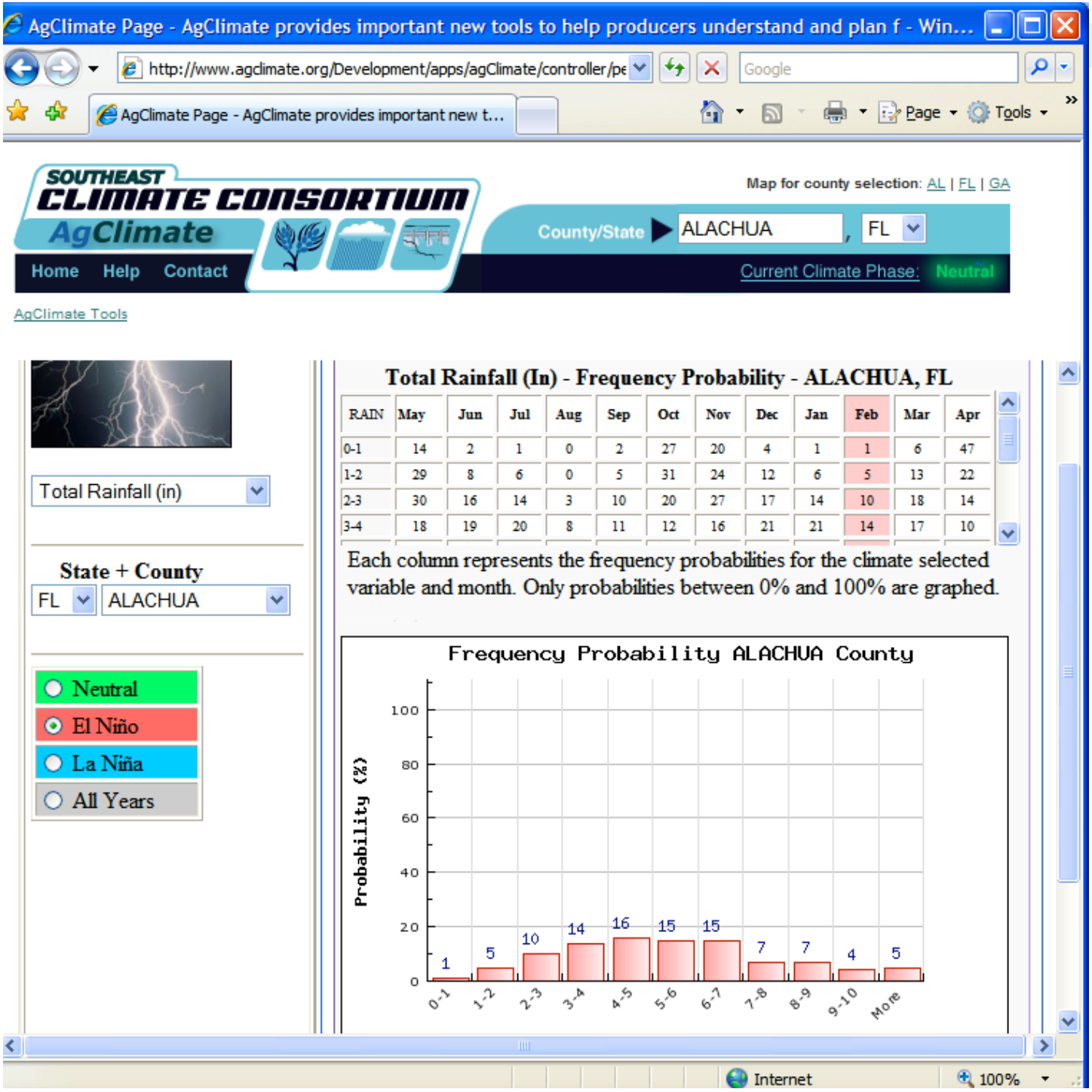
Internet 100%

Risk Management Tools



Alachua County
Expected for
Jan = 4.5”
Feb = 6.3”
Mar = 5.3”

Observed for
Jan = 3.5”
Feb = 1.8”
Mar = 1.5”



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Irrigation Tool

Internet 100%

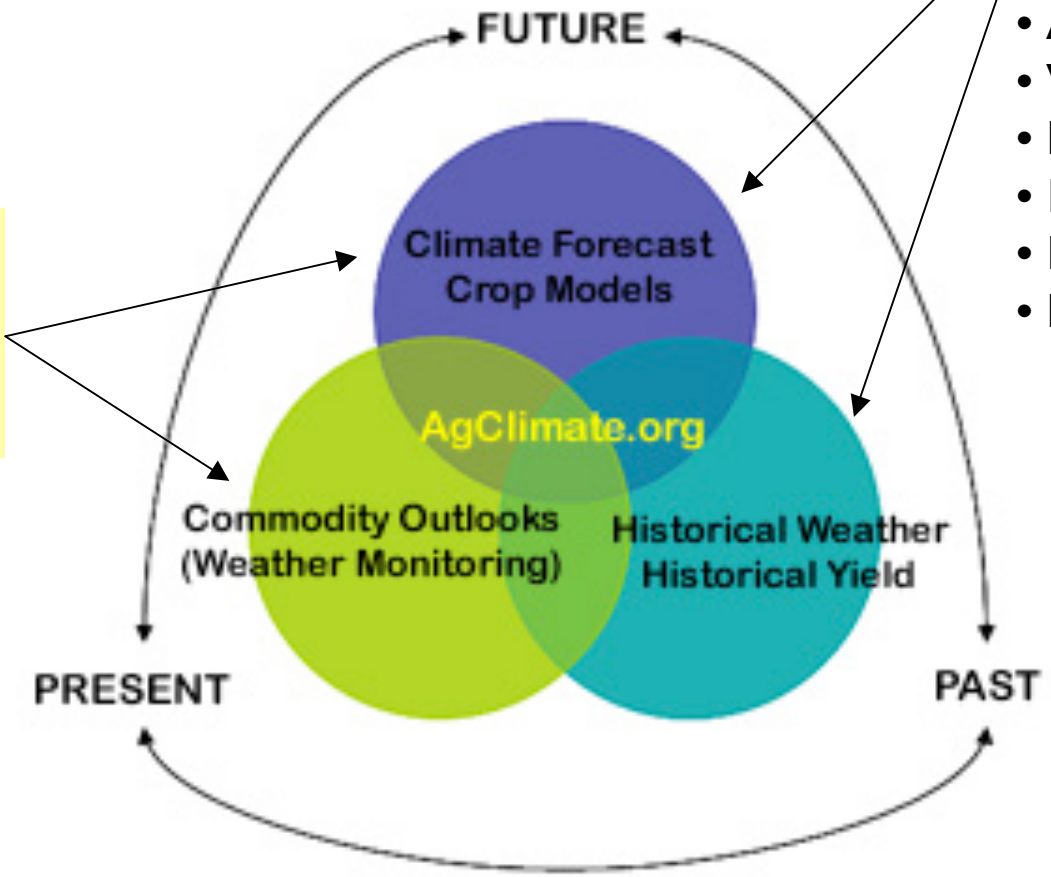
AgClimate Tools

Yield Risk

Pre-season

- Acreage allocation
- Variety
- Planting date
- Insurance coverage
- Purchase of inputs
- Marketing

During the growing season



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Irrigation Tool

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AgClimate Tools

http://www.agclimate.org/tools/yieldhistTool/report.php - Windows Intern...

NEUTRAL
EL NIÑO
LA NIÑA

COUNTY	JACKSON		JEFFERSON	
YEARS	Yield	Residuals	Yield	Residuals
1966	45.00	30.0	41.00	1.0
1967	45.00	23.8	50.00	19.7
1968	37.00	-2.9	41.00	-4.6
1969	32.00	-19.7	35.00	-20.8
1970	28.00	-32.7	23.00	-49.3
1971	52.00	20.0	59.00	26.7
1972	43.00	-4.6	56.00	17.3
1973	37.00	-21.0	55.00	12.4
1974	38.00	-21.8	56.00	11.7
1975	37.00	-26.5	43.00	-16.2
1976	53.00	1.8	65.00	23.8
1977	22.00	-59.1	37.00	-31.1
1978	55.00	-1.0	57.00	3.8
1979	60.00	4.7	59.00	5.2
1980	65.00	10.1	68.00	18.7
1981	86.00	41.5	60.00	2.6
1982	80.00	28.0	70.00	17.3
1983	70.00	8.9	66.00	8.5
1984	80.00	21.2	60.00	-3.3
1985	76.00	12.2	64.00	1.2
1986	50.00	-28.1	45.00	-30.1
1987	70.00	-1.7	75.10	14.5
1988	60.00	-17.8	50.00	-25.2
1989	85.00	13.7	85.00	25.0
1990	69.50	-9.1	63.80	-7.8
1991	78.00	-0.3	76.00	8.0
1992	82.00	2.5	69.00	-3.6
1993	68.00	-16.8	52.00	-28.5
1994	91.90	10.1	85.00	14.9
1995	85.00	-0.2	80.70	7.4

nd plan f - Win...

Page Tools

unty selection: AL | FL | GA

FL

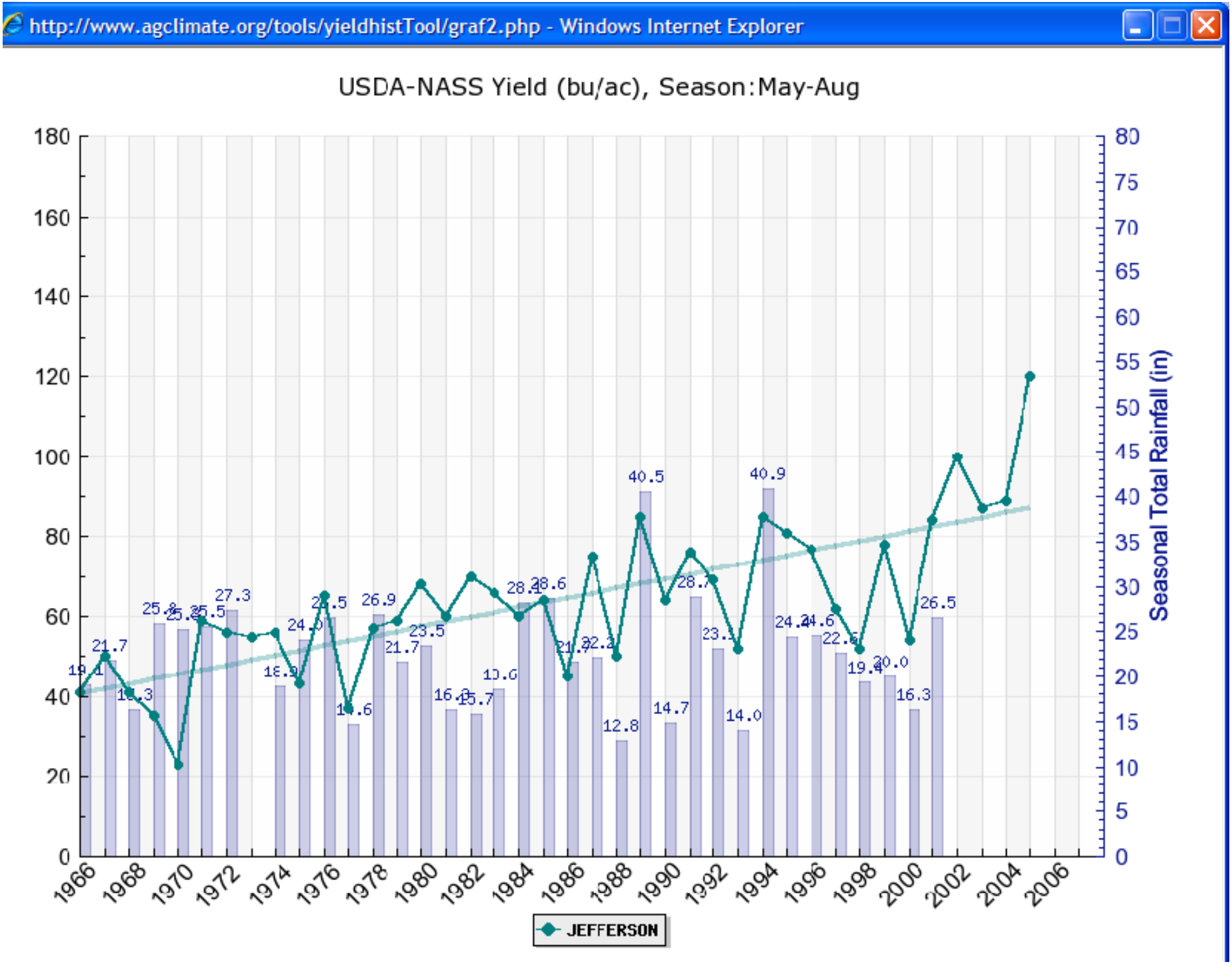
mate Phase: Neutral

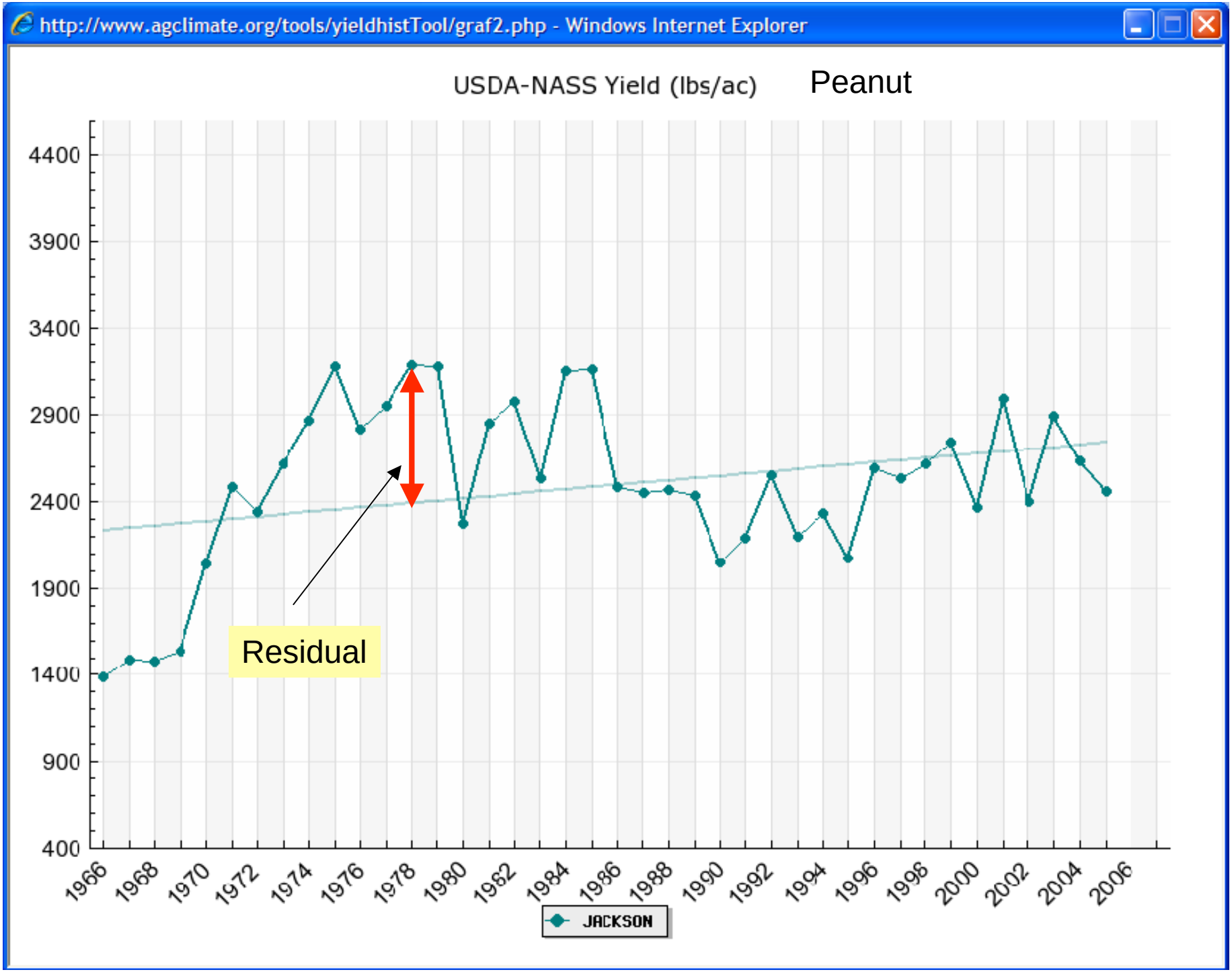
Yield Data

ALL YEARS
65.8
21.2
22
119.8
65

2000 2002 2004 2006

100%


http://www.agclimate.org/tools/yieldhistTool/graf2.php - Windows Internet Explorer
USDA-NASS Yield (bu/ac), Season:May-Aug
Seasonal Total Rainfall (in)
JEFFERSON
0
20
40
60
80
100
120
140
160
180
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
21.7
27.3
40.5
40.9
28.7
26.5
16.3
14.0
14.7
12.8


http://www.agclimate.org/tools/yieldhistTool/graf2.php - Windows Internet Explorer
USDA-NASS Yield (lbs/ac)
Peanut
4400
3900
3400
2900
2400
1900
1400
900
400
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Residual
JACKSON

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Current Climate Phase: Neutral

AgClimate Tools

CORN

Yield Residuals

Seasonal Climate

None Rain Temp

State + County

FL

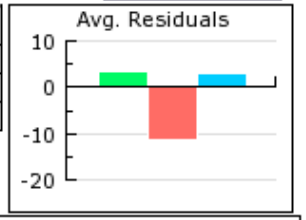
----Select County---
ALACHUA
BAKER
BAY
BRADFORD
CALHOUN
COLUMBIA
DIXIE
DUVAL
ESCAMBIA
FLAGLER
GADSDEN

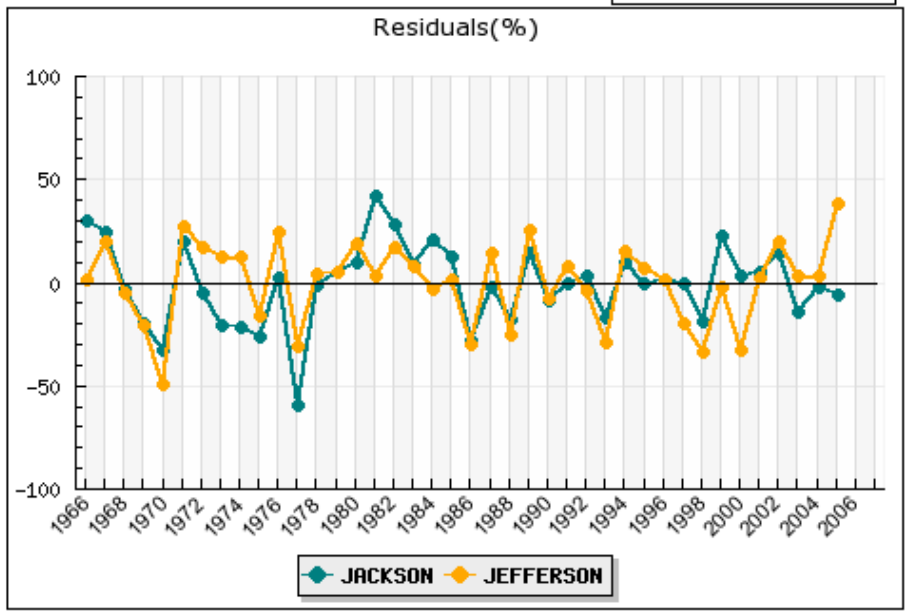
Residuals (%) for selected County(ies).

*Basic statistics calculated for selected county(ies)

Yield Data

	NEUTRAL	EL NIÑO	LA NIÑA
Average	3.3	-11.3	3
Minimum	-30.1	-59.1	-32.9
Maximum	41.5	30	26.7





Click on the graph to expand

Done

Internet

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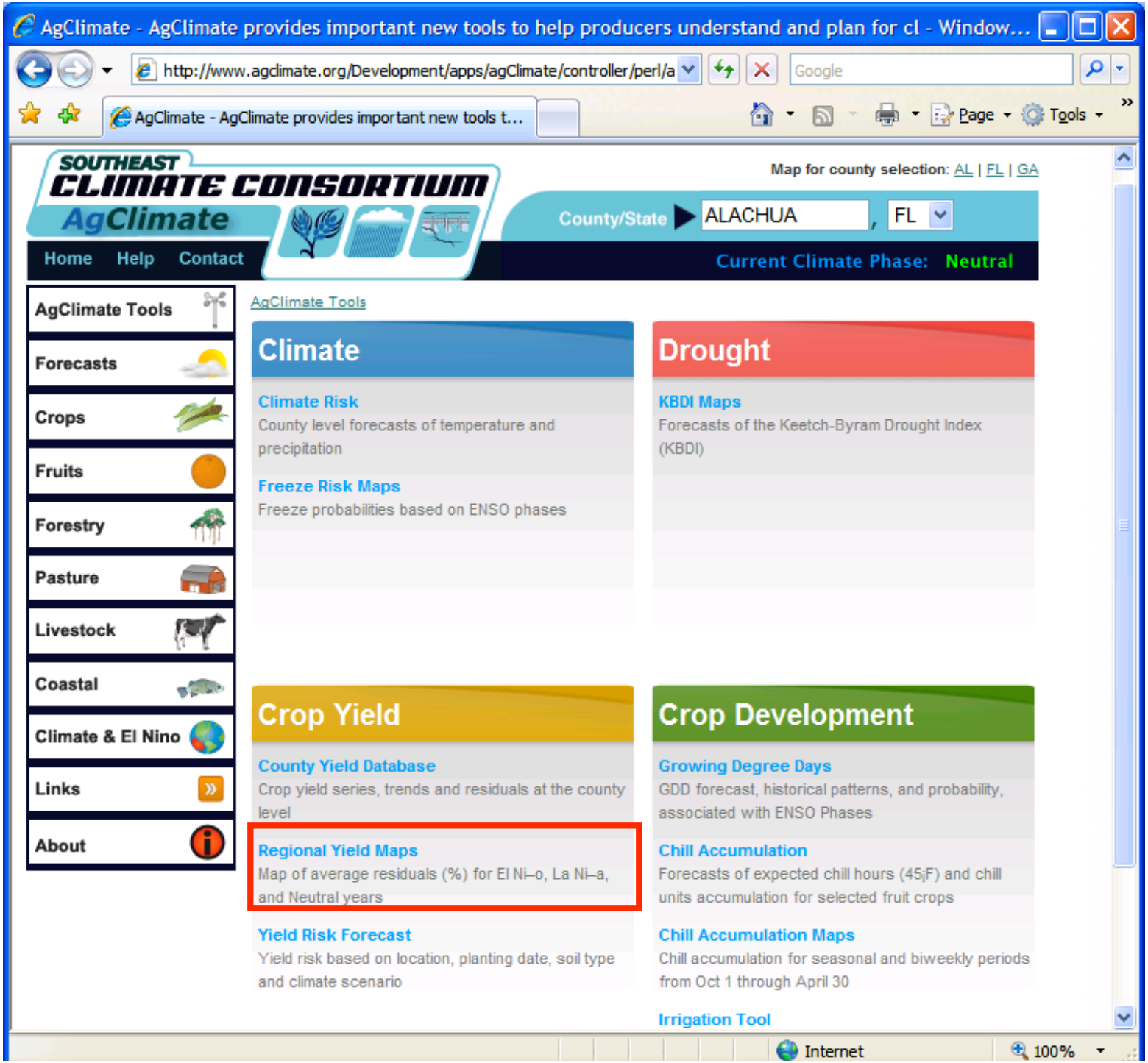
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Internet
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http://www.agclimate.org/Development/apps/agClimate/cont

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County/State JACKSON , FL

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Current Climate Phase: Neutral

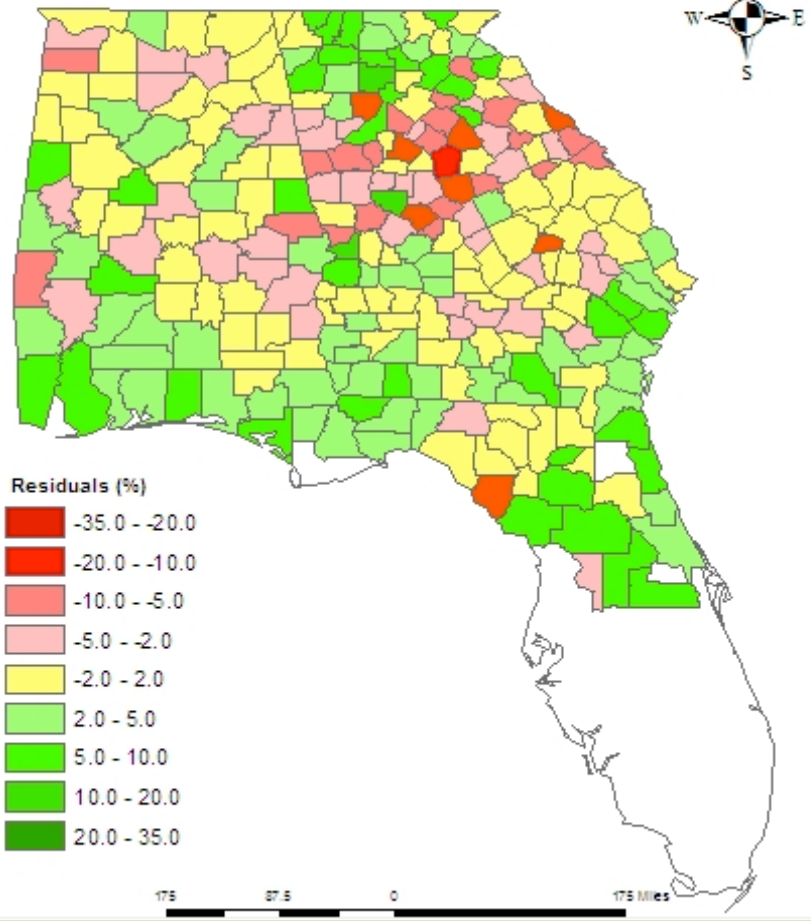
AgClimate Tools

CORN

- NEUTRAL
- EL NIÑO
- LA NIÑA

The map represents average yield residuals calculated for the selected commodity. Positive values (green colored counties) indicate that yields are on average good during the selected climate scenario (Neutral, EL Niño, or La Niña).

Average Corn Residuals - Neutral Years



Done

Internet

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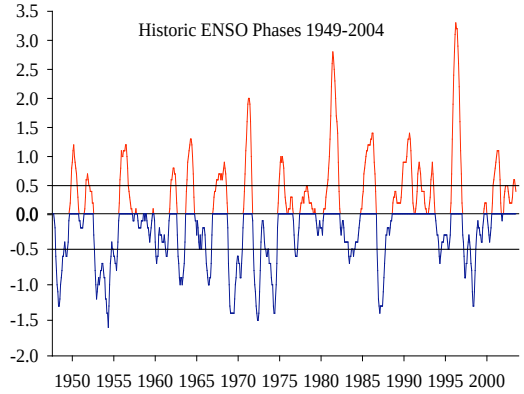
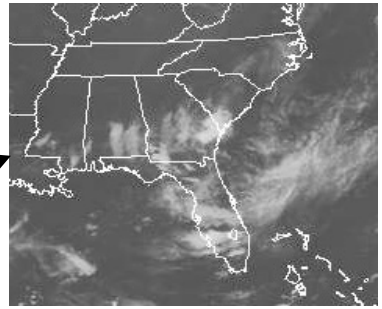
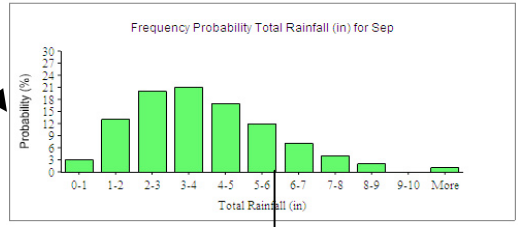
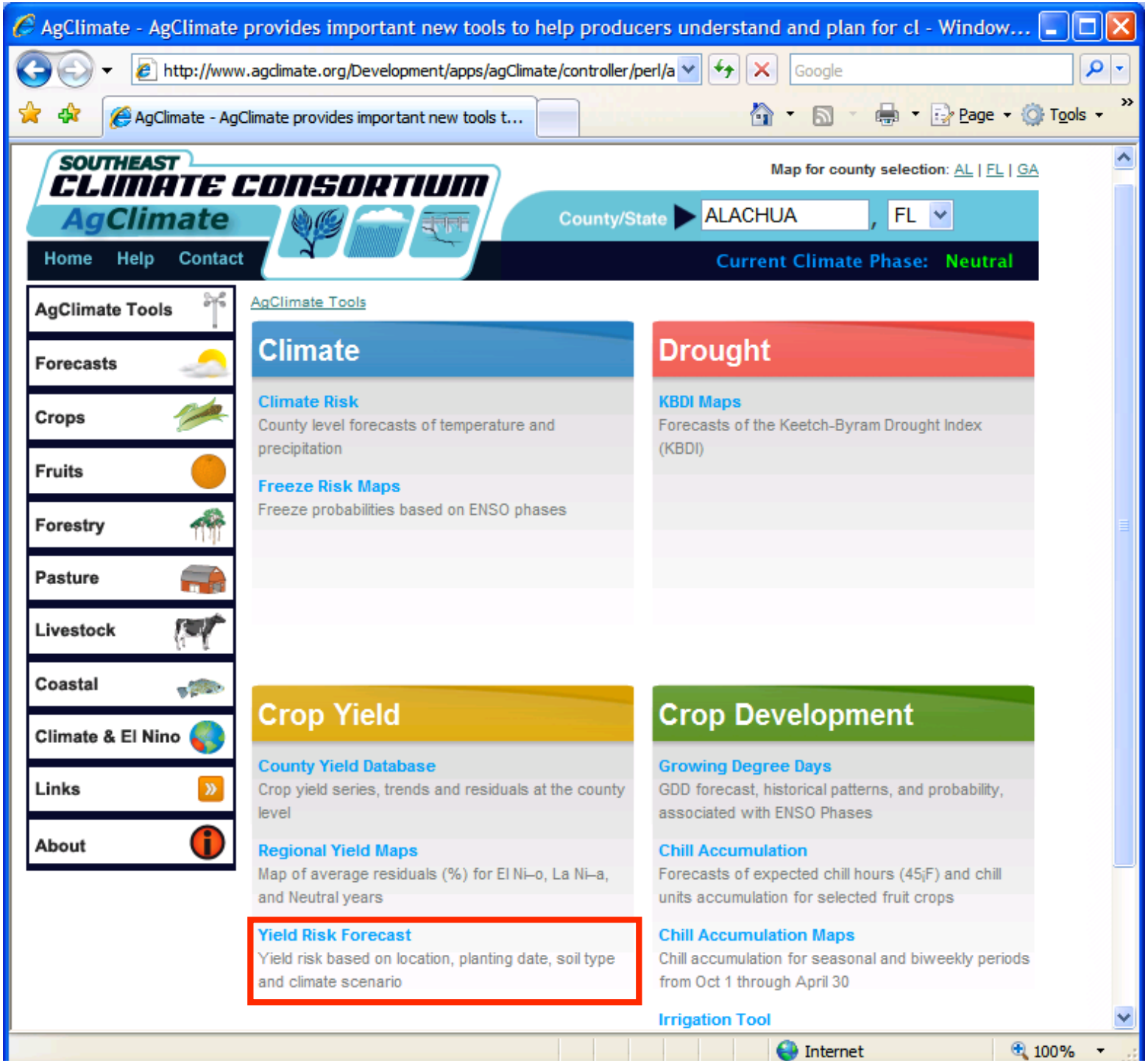
Crop Modeling & Yield Forecasting







Variety
Planting Date
Plant Population
Soils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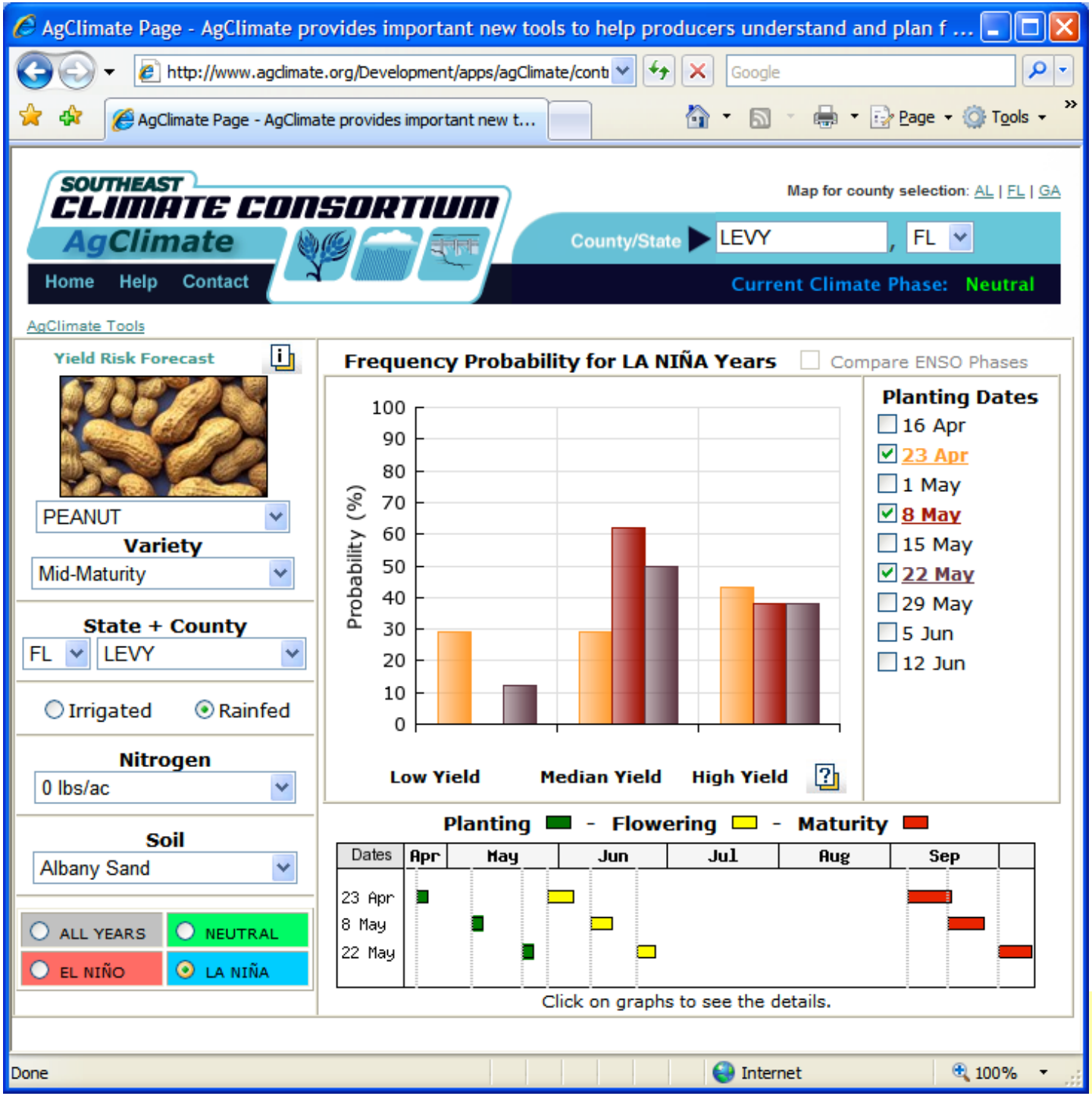
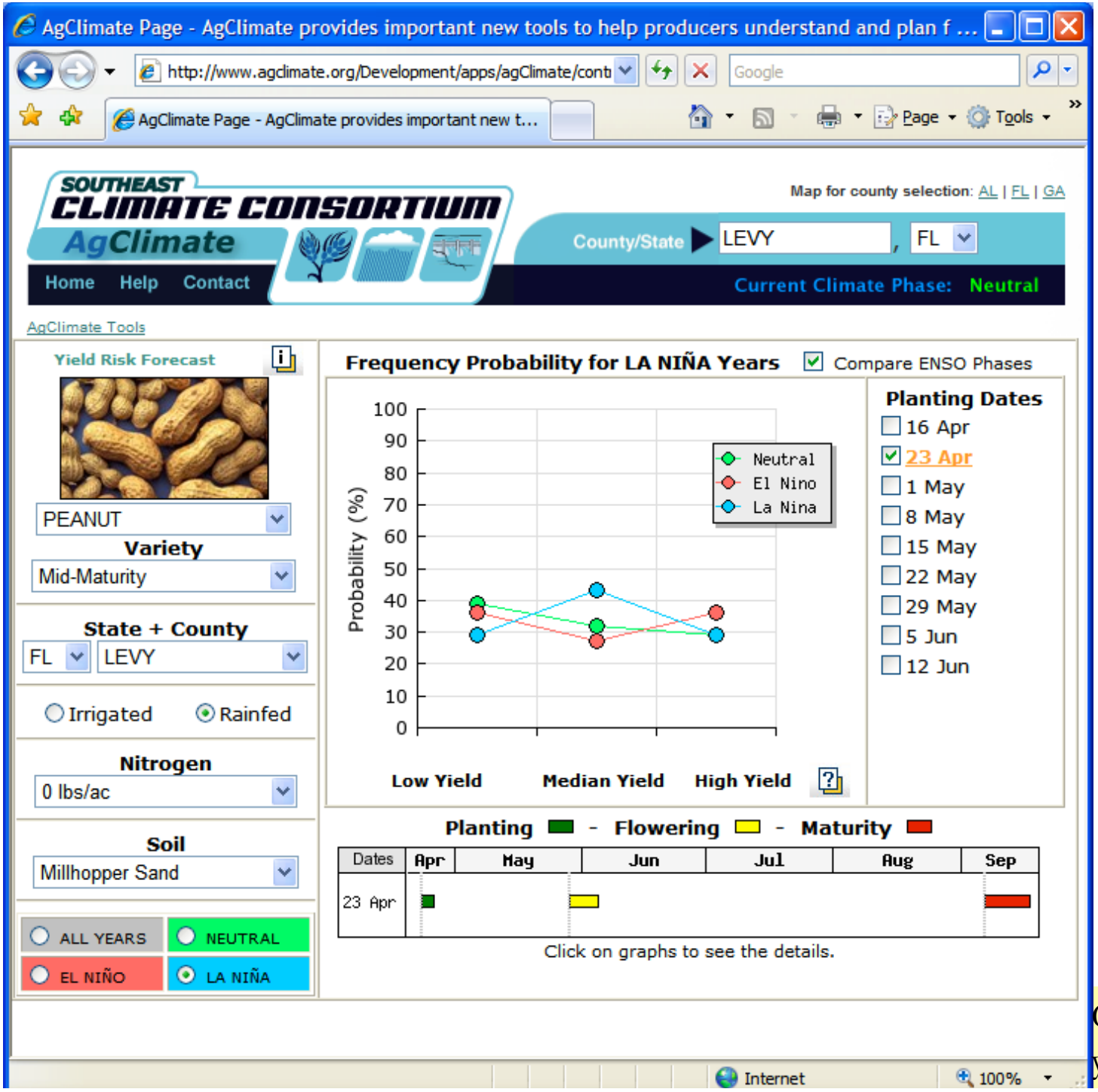


Crop model-based yield risk



Crop model-based yield risk

Plans for 2007

- Add cotton and corn to the yield risk tool
- Start running the model for in-season updates
- Test tools for short-term forecasts

County Alachua map

Next 24 Hours 5 Day Forecast

Alachua, Forecast for next 24 hours, starting at 7am, June 11								
TIME	7am	10am	1pm	4pm	7pm	10pm	1am	4am
SKY (%)	 0%	 0%	 30%	 40%	 100%	 0%	 100%	 60%
PRECIPITATION Amount (inch) Probability (%)	0 90%	0 100%	30 30%	40 45%	40 50%	70 50%	70 100%	70 90%
TEMP. (F°)	80°	82°	81°	81°	75°	60°	61°	59°
DEW POINT (F°)	59°	66°	77°	50°	79°	99°	99°	59°
RELATIVE HUMIDITY (%)	30%	30%	40%	50%	70%	30%	40%	80%
WIND (mph) Direction	1 SW	2 SW	5 W	0 SW	2 SE	10 SW	25 W	25 W
SPRAYING CONDITIONS	good	good	fair	bad	n/a	bad	bad	fair
DRYING CONDITIONS	fair	fair	bad	n/a	bad	good	fair	fair
LEAF WETNESS	NO	NO	YES	YES	NO	NO	YES	YES

24 hours forecast

Alachua, Forecast for 5 Days, Starting June 12 at 7am

DAY	1 Day	2 Day	3 Day	4 Day	5 Day
SUNRISE TIME	7am	7:15am	7:20am	7:20am	7:25am
SUNSET TIME	7pm	6:55pm	6:55pm	6:50pm	6:50pm
DAY PRECIPITATION Amount (inch) Probability (%)	0 90%	0 100%	40 45%	40 50%	70 50%
NIGHT PRECIPITATION Amount (inch) Probability (%)	40 45%	40 50%	0 90%	70 50%	70 50%
HIGH TEMPERATURE (F°)	90 F°	85 F°	95 F°	80 F°	75 F°
LOW TEMPERATURE (F°)	50 F°	60 F°	32 F°	50 F°	30 F°
MORNING WIND (mph) Direction	1 S	1 S	10 Varies	9 W	20 SW
AFTERNOON WIND (mph) Direction	10 NW	15 Varies	20 Varies	30 S	10 E
LEAF WETNESS	NO	NO	YES	YES	NO
DRYING CONDITIONS	fair	fair	bad	n/a	bad
LIVESTOCK STRESS	YES	YES	NO	NO	YES
GROWING DEGREE DAY 50	28	28	27	26	25
GROWING DEGREE DAY 60	18	18	17	17	16

5-day forecast

AgClimate

A Service of the Southeast Climate Consortium

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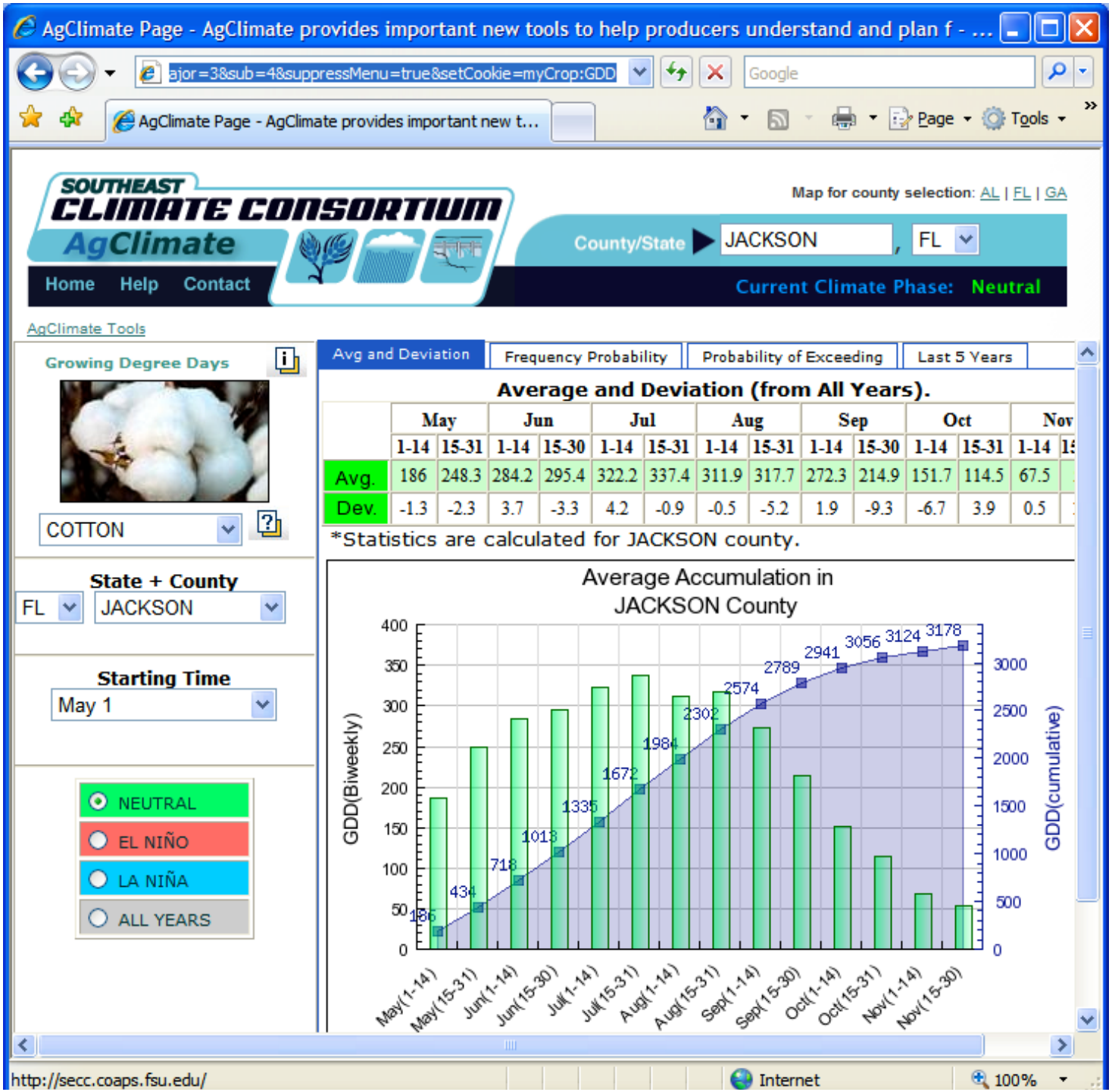

Growing degree-days or heat units