AgroClimate for Climate-Smart Agriculture

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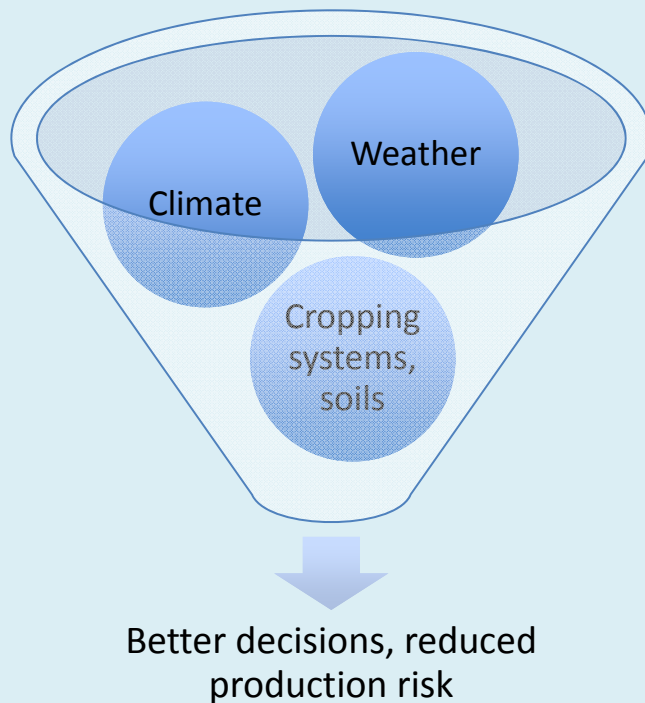
International Conference on Climate Services 4

Montevideo, Uruguay

Dec 10-12, 2014
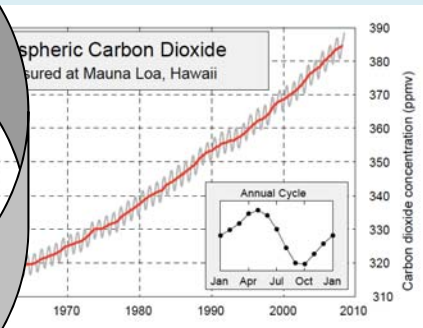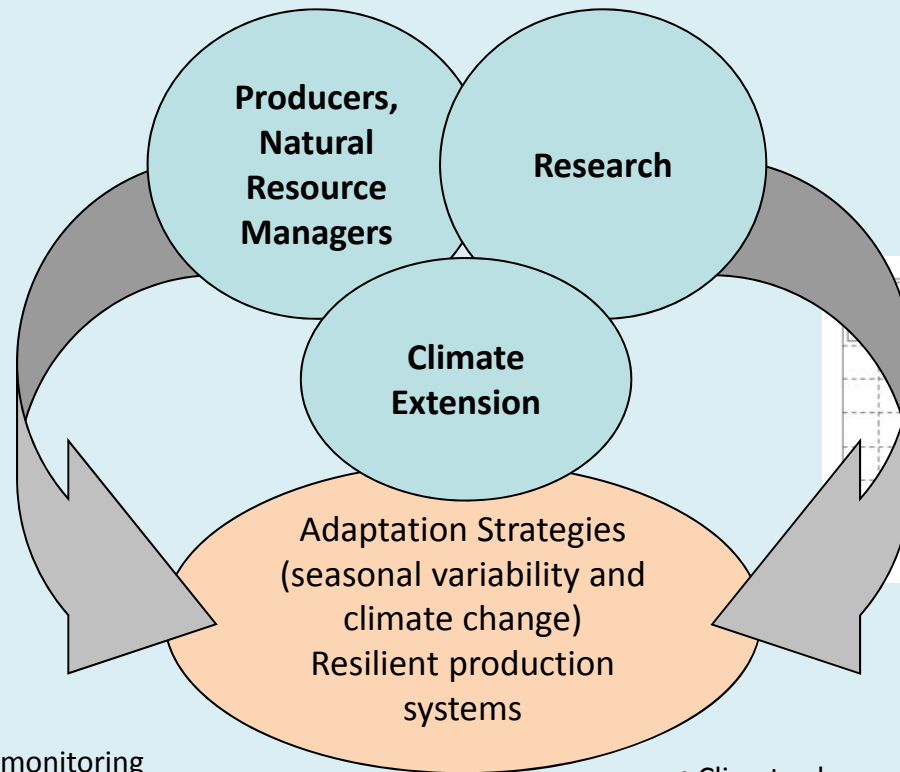
AgroClimate.org

Better decisions, reduced production risk

- Climate extension and applied research program.

- Dedicated to translate **climate and weather** data into information to help producers reduce risk.
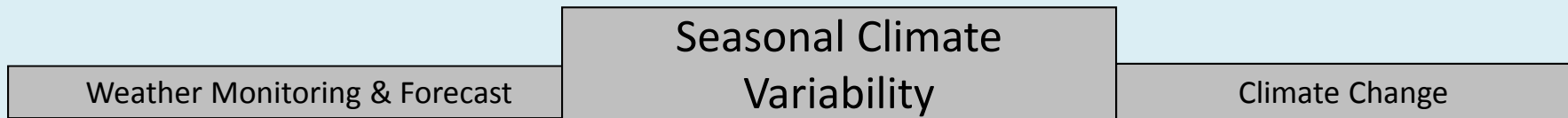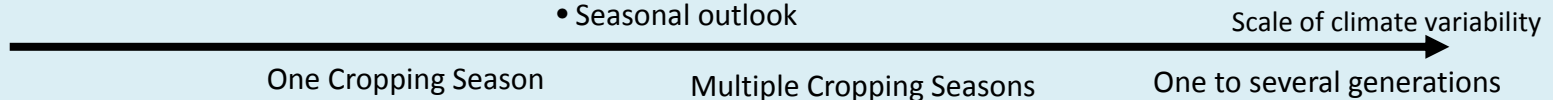
UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL of MARINE & ATMOSPHERIC SCIENCE

AgroClimate

Our Vision for AgroClimate.org

Producers, Natural Resource Managers

Research

Climate Extension

Adaptation Strategies (seasonal variability and climate change) Resilient production systems

- Weather monitoring
- Short term forecast
- Seasonal outlook
- Climate change projections

Scale of climate variability

One Cropping Season   Multiple Cropping Seasons   One to several generations

Weather Monitoring & Forecast	Seasonal Climate Variability	Climate Change

Translating weather/climate information into decisions

Monitoring & Weather Forecast

- What field can I work on this afternoon?

- When can I plant my seeds?

- Should I apply N fertilizer to my fields?

- Will it be dry enough to harvest?

- Should I cut hay today?

- Cold protection tonight?

- Should I apply fungicide today?

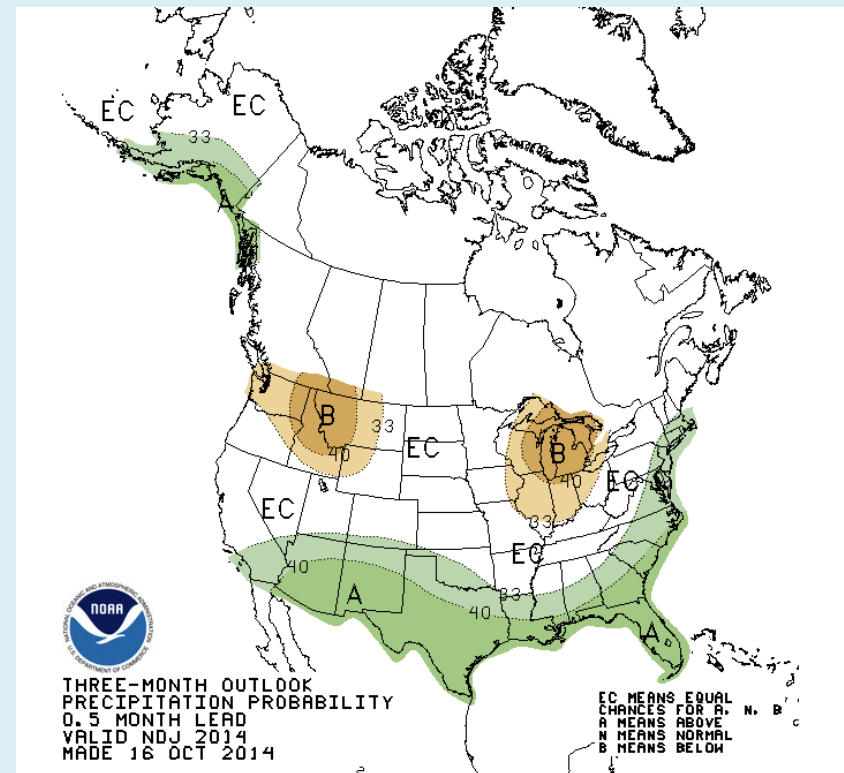Flooded peanut field. Doug Mayo – August 2013.

Blueberry freeze, UF-IFAS, February 2002.

Operational decisions

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Translating weather/climate information into decisions

Seasonal Climate Outlook

- Best crop/variety to plant this season?

- How much should I invest in fertilizer? How to apply N?

- Should I purchase/increase crop insurance coverage?

- Marketing decisions?

- Should I invest in winter pasture or feed?

THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID NDJ 2014
MADE 16 OCT 2014

EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

Strategic decisions

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Our top challenge is to translate climate change projections into decisions

Long-term Climate Projections

- How do I become more resilient to climate extremes?

- What cropping system will be more appropriate based on existing projections?

- Should I invest in land somewhere else?

- ?

Making *decisions based on long-term climate projections is much more difficult!

One of the main reasons for extension faculty to be reluctant about addressing climate change issues is the lack of "practical solutions"

* Decisions at the producer level, not in terms of national or regional planning

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Examples of questions that AgroClimate.org can help answer.

1. Effects of the El Niño Southern Oscillation on rainfall/temperature in your county?

2. Current strawberry disease risk? Should I apply fungicide?

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AgroClimate
Tools for Managing Climate Risk in Agriculture

HOME   TOOLS   FORECASTS   STATE SUMMARIES   MANAGEMENT   CLIMATE   EXTENSION   ABOUT

WaterFootprint Tool

Calculate the water footprint – the consumptive water use per unit yield – for a specific season and production system.

Climate Phase Forecast for Nov-Dec-Jan

- Neutral (28%)
- El Niño (72%)
- La Niña (0%)

Provided by the International Research Institute for Climate and Society

AgroClimate Indicators

Multivariate ENSO Index – MEI
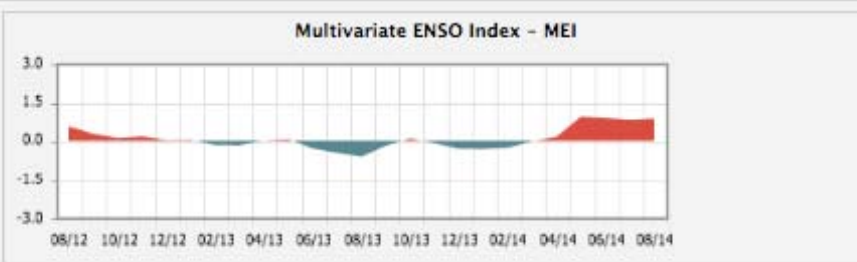
The Multivariate ENSO Index (MEI) is used to characterize ENSO phases and strength. High positive (red) values indicate El Niño, while negative (blue) values indicate La Niña phases (read more)

North Atlantic Oscillation – NAO
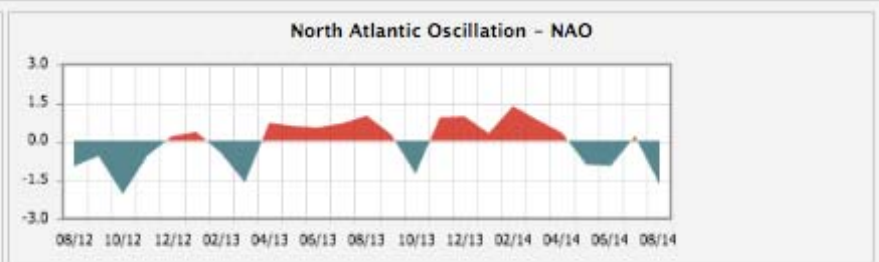
Strong positive (red) phases of the North Atlantic Oscillation (NAO) tend to be associated with above-average temperatures in the eastern United States while strong negative phases tend to be associated with the number of daily cold extremes during the winter (read more)

AgroClimate Tools

All | Climate | Drought Indices | Crop Yield | Crop Diseases | Degree Days and Chill Hours | Footprint Calculators

Climate Risk

Air temperature and precipitation climatology and current observations

Freeze Risk Probabilities

Freeze probabilities based on El Niño Southern Oscillation (ENSO) phases

Climate Anomaly Maps

This tool provides maps showing monthly temperature and rainfall departures from average (1981-2010 climatology).

NWS Forecast

Site-specific, detailed 3-day forecast of hourly weather variables

ARID Monitoring and Forecast

Agricultural Reference Index for Drought

LGMI Monitoring

Lawn and Garden Moisture Index LGMI

County Yield Statistics

Crop yield series, trends and residuals at the county level

Regional Yield Maps

Average yield residuals (%) for El Niño, La Niña, and Neutral years

AgroClimate tools: Climate risk - Maps

Average | Deviation from Average | Digital Map, Average

Average - Total Rainfall (Inch) - El Niño Years ❓ - January

Select region

Select rainfall or temperature

Select ENSO phase

- ○ Neutral
- ◉ El Niño
- ○ La Niña
- ○ Average for all years
- ○ Compare all ENSO phases

Select month

About

Rainfall(in)
- >16
- 12-16
- 8-12
- 6-8
- 5-6
- 4-5
- 3.2-4
- 2.8-3.2
- 2.4-2.8
- 2-2.4
- 1.6-2
- 1.2-1.6
- 0.8-1.2
- 0.6-0.8
- 0.4-0.6
- 0.2-0.4
- <0.2
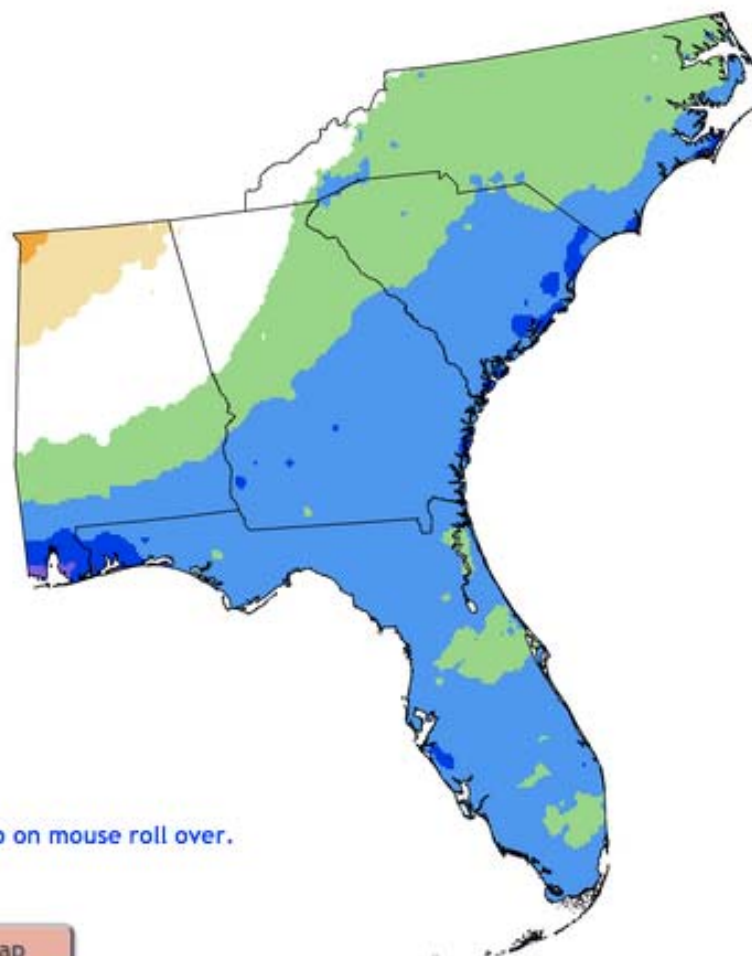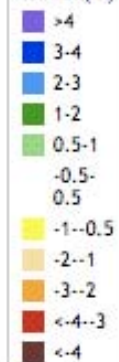
*Enlarge the map on mouse roll over.

Download map

Data source: PRISM Climate Group, Oregon State University

AgroClimate tools: Climate risk - Maps

AgroClimate tools: Climate Risk - Stations
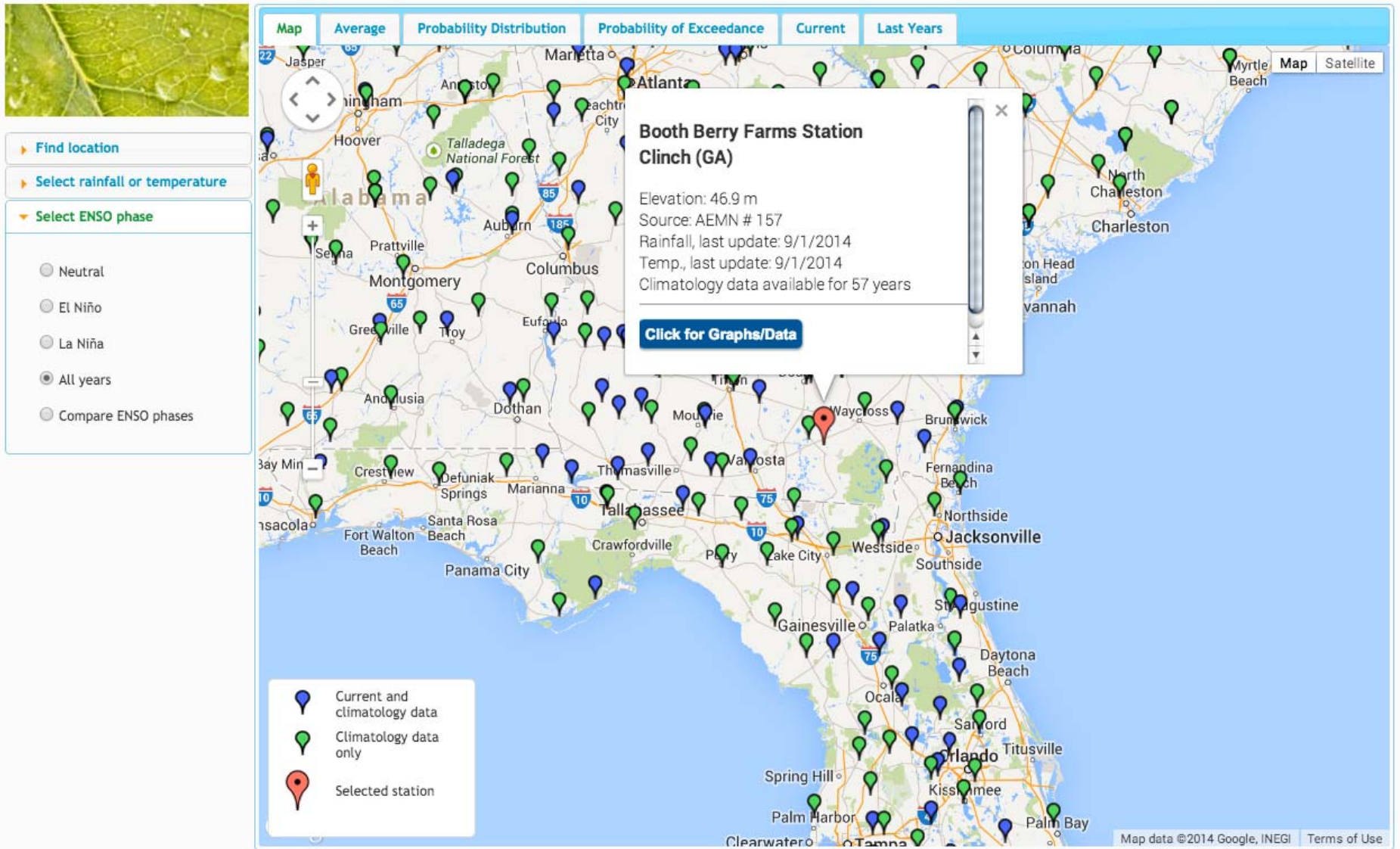
AgroClimate tools: Climate Risk – Average rainfall – El Niño years

AgroClimate tools: Climate Risk – Deviation from long-term average – El Niño years

AgroClimate tools: Climate Risk – Probability of exceedance – Rainfall La Niña years
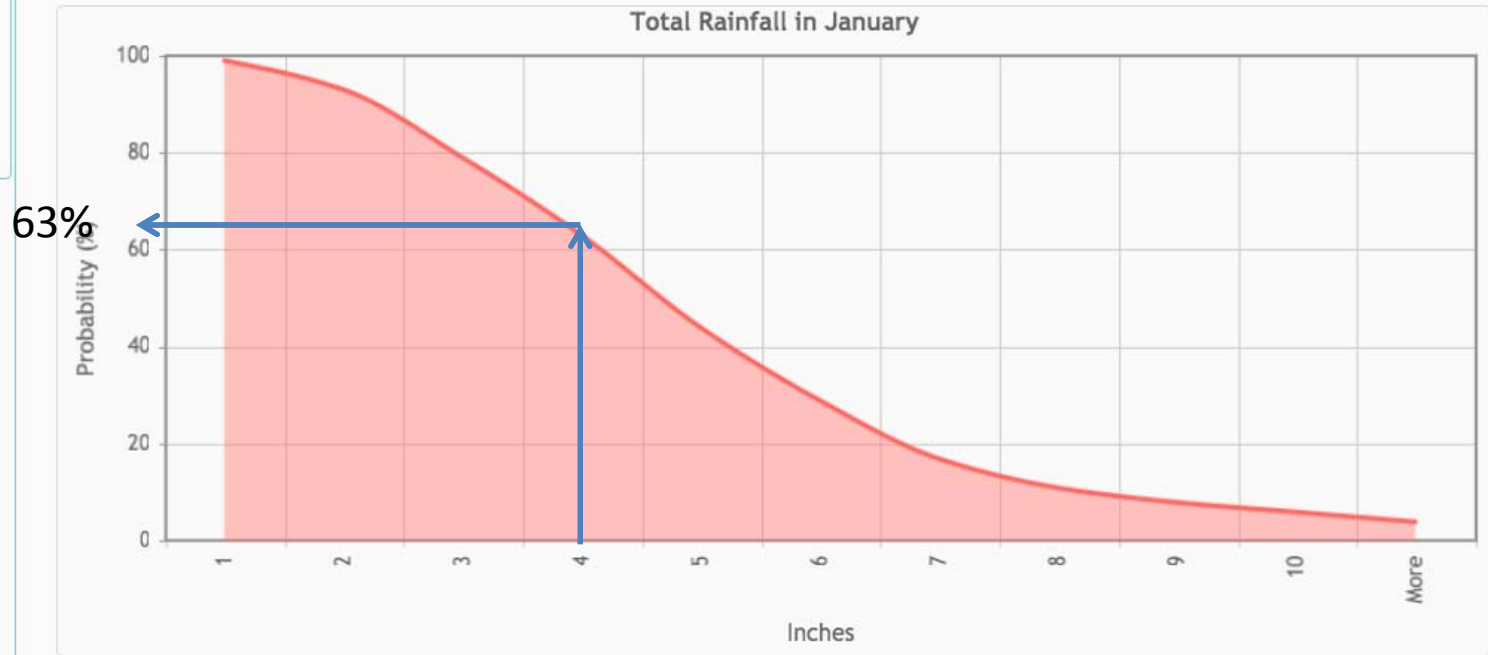
Map | Average | Probability Distribution | **Probability of Exceedance** | Current | Last Years

Close

Probability of Exceedance (%) - Total Rainfall - Clinch County (GA)

Inches	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	99	99	100	87	97	100	100	99	95	71	95	97
2	93	94	99	67	80	99	94	93	85	35	76	88
3	79	79	91	43	59	92	84	81	63	19	54	68
4	63	65	78	25	33	78	69	66	48	11	35	46
5	44	46	56	12	17	65	49	49	34	10	18	30
6	29	31	35	6	6	47	35	36	22	9	8	18

El Niño years

Find location

Select rainfall or temperature

Select ENSO phase

- Neutral
- El Niño
- La Niña
- All years
- Compare ENSO phases

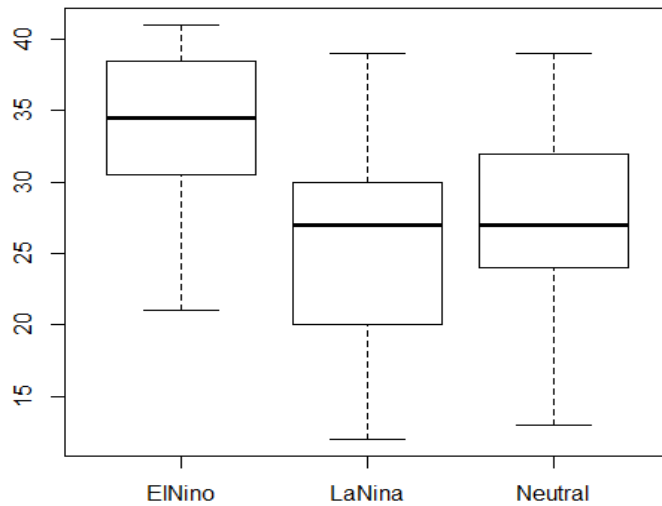**Total Rainfall in January**

63%

Probability (%)

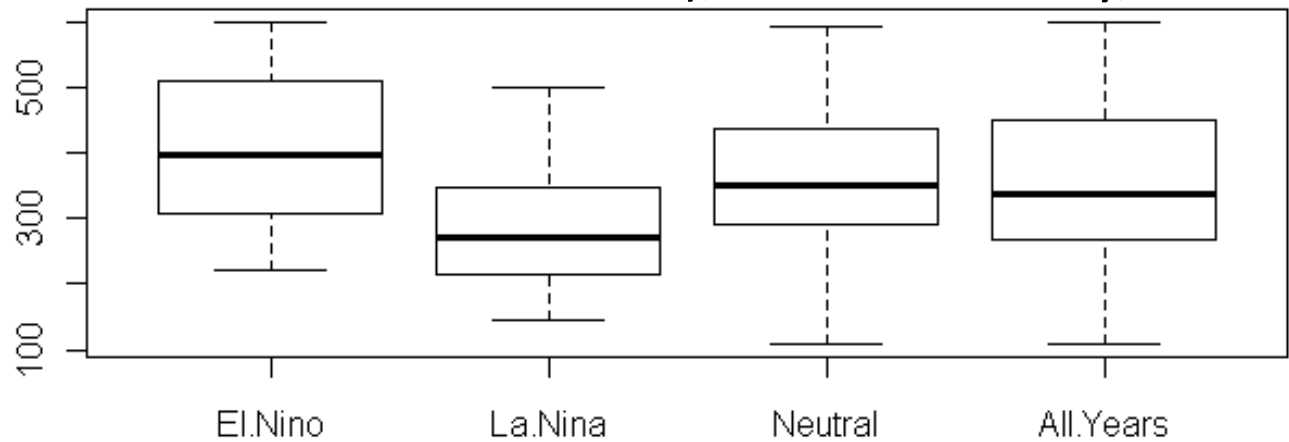Inches

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ENSO Impacts

El Niño   La Niña

Number of days with moderate or high Botrytis risk in Plant City, FL

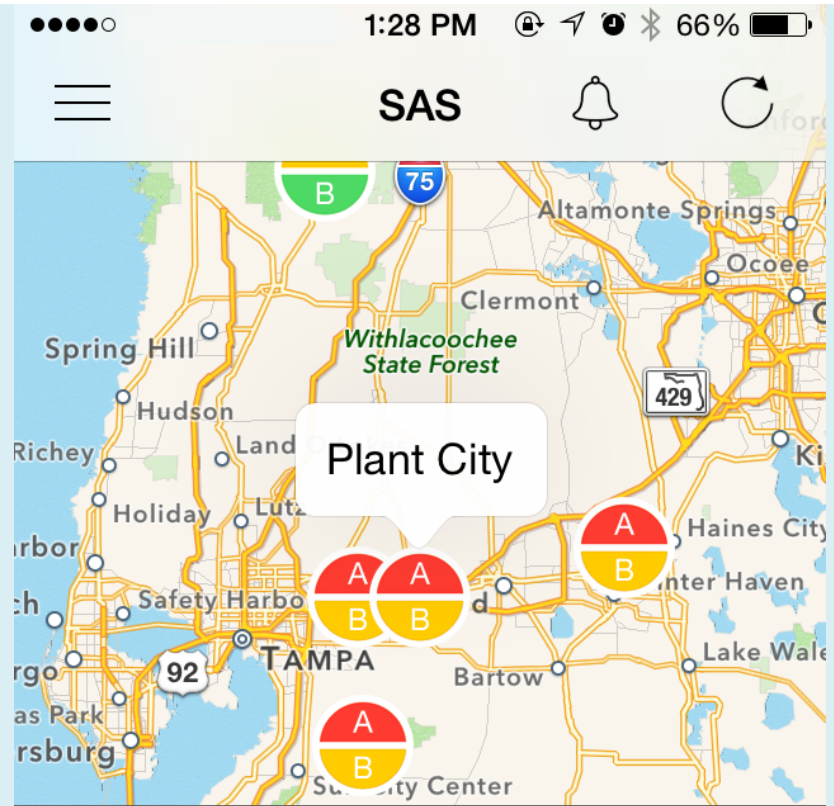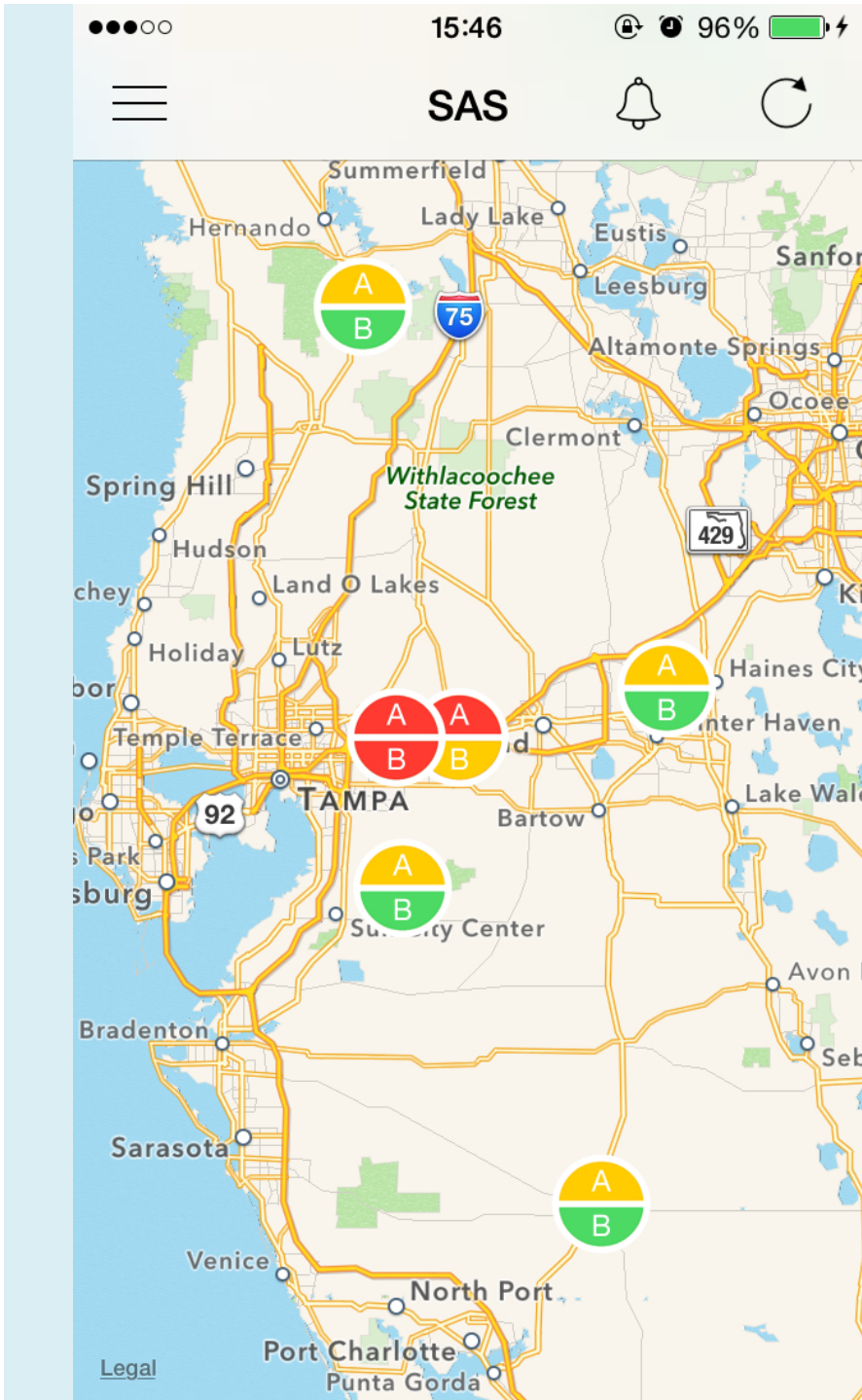Chill accumulation (hours per season), Marion County, FL.

iPhone App 🅐🅑🅐

- One of our most popular tools is the Strawberry Advisory System (SAS).
- Monitors infection risk for Anthracnose and Botrytis fruit rot
- Users receive notification messages when the model detects a potential infection risk according to observed weather conditions.

C. W. Fraisse, UF-IFAS

Recommendations

WHEN WAS YOUR LAST FUNGICIDE APPLICATION?

Last seven days

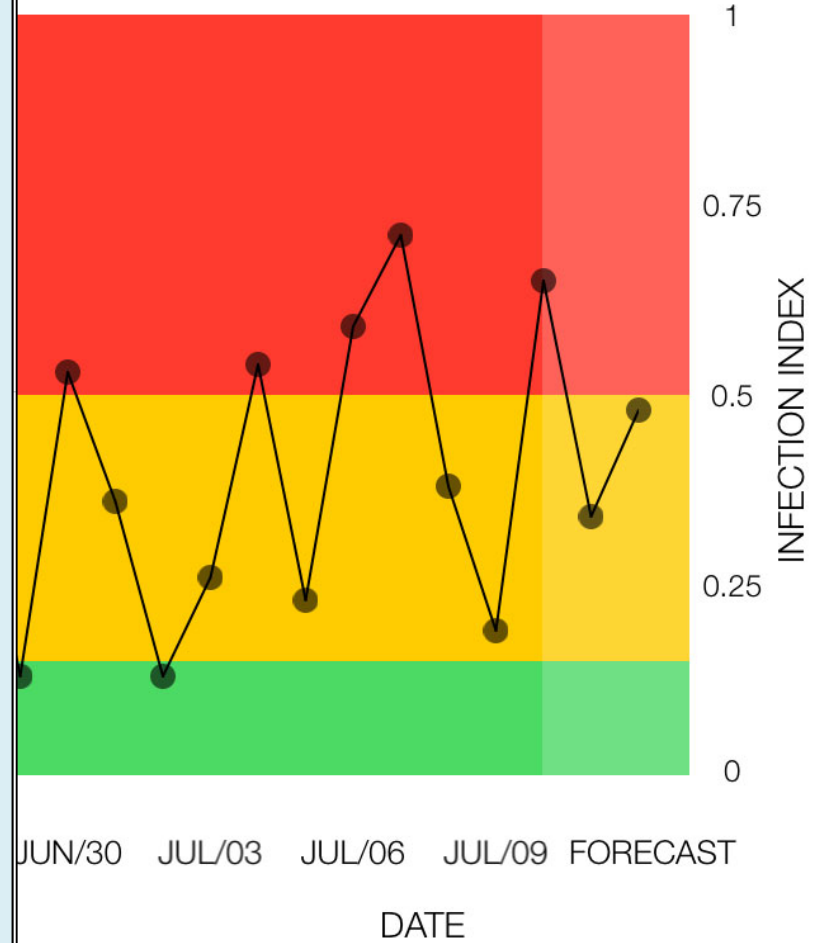More than seven days

None ✓

IS IT CURRENT PEAK OF BLOOM?

Yes

No ✓

ARE ANTRACHNOSE SYMPTONS PRESENT?

Yes

Anthracnose disease simulation

JUL/10 Infection index: 0.65

OK, Looks Great, But What About Data Poor Environments?

- How to apply these tools in a region with **no station-based weather** data or **field trial results** widely available?
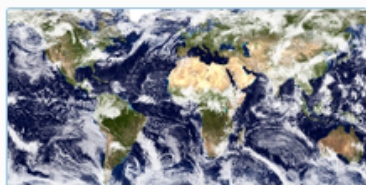
AgroClimate Mozambique (http://mz.agroclimate.org/)

Datas de Plantio
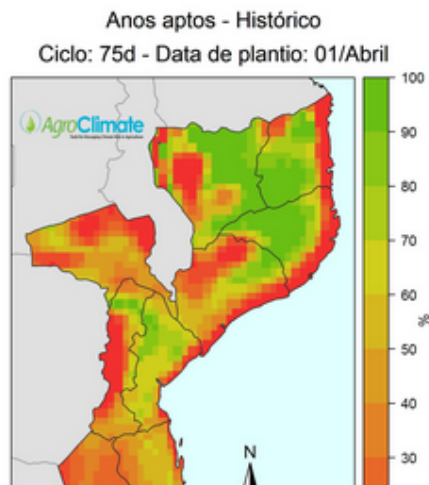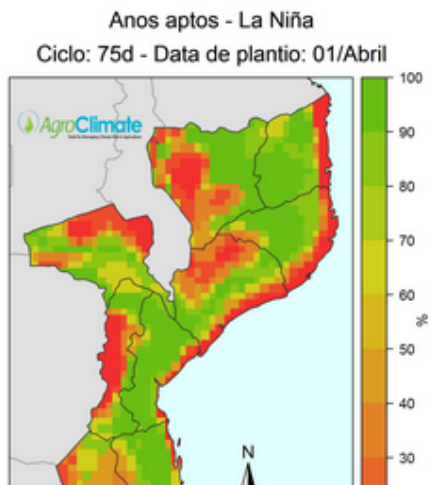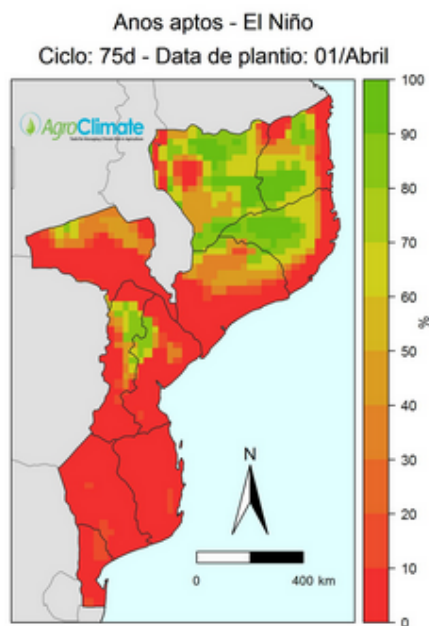
Mapa Unitário   Comparação dos tipos de Mapas   Comparação das fases do ENOS

🔍 Clique no mapa para obter zoom

> Tipo de Mapa

> Data de Plantio

∨ Selecione o ENOS

○ Neutro
○ El Niño
○ La Niña
○ Todos os anos

> Ciclo da Cultura

> Cultura

> Sobre

Anos aptos - Neutro
Ciclo: 75d - Data de plantio: 01/Abril

Anos aptos - El Niño
Ciclo: 75d - Data de plantio: 01/Abril

Anos aptos - La Niña
Ciclo: 75d - Data de plantio: 01/Abril

Anos aptos - Histórico
Ciclo: 75d - Data de plantio: 01/Abril
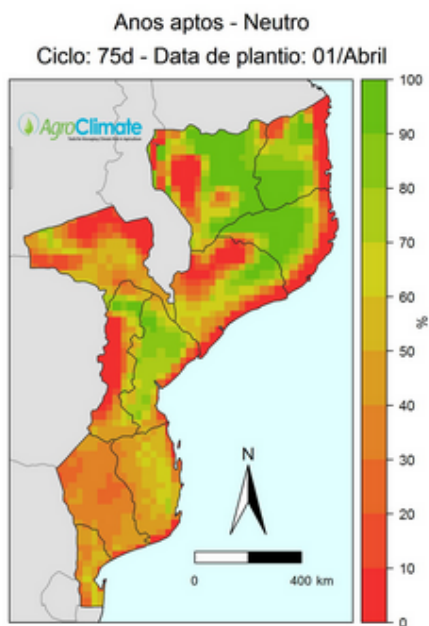
AgroClimate.org as an Appropriate Technology for Mozambique

- The whole website was implemented using **WordPress,** an easy content management system.

- Whole website (except the tools) can be managed by a person with no computer programming knowledge.

- Whole website structure is in **Portuguese.**

- Works well in locations with **limited internet connection.**

- All **images** can be easily **downloaded.**

Thank you!

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Video: https://www.youtube.com/watch?v=r50mZZ9hcy8