The Need for International Weather Data and Related Products at the U.S. Department of Agriculture

Presented to

CoCoRaHS
Weather Talk Webinar Series

February 26, 2015
Global wheat supplies for 2012/13 are projected 3.1 million tons lower mostly due to lower expected production in Russia. An increase in foreign beginning stocks partly offsets the projected 4.1-million-ton reduction in world wheat output. Beginning stocks are raised for Canada and Egypt, but lowered for Argentina. Production for Russia is reduced 4.0 million tons with lower reported area and reduced yields as harvest results confirm additional drought and heat damage to both the winter and spring wheat crops. Production is also lowered 0.5 million tons for adjoining Kazakhstan, which experienced the same adverse drought and heat during July and August that affected spring wheat in the central and eastern growing regions of Russia. EU-27 production is lowered 0.5 million tons mostly reflecting lower expected yields in the United Kingdom. Ukraine production is raised 0.5 million tons based on higher reported yields. Production for Afghanistan is raised 0.4 million tons mostly on higher reported area.
USDA Situation and Outlook Organizational Structure

Secretary/Deputy Secretary

OCE Chief Economist

WAOB Chairperson

Chief Meteorologist
USDA Contingent
Joint Agricultural Weather Facility

Interagency Agricultural Projections Coordinator

Interagency Commodity Estimates Committees
Chaired by WAOB Senior Analysts

Grains  Livestock  Fibers  Oilseeds  Specialty Crops
USDA/JAWF’S Main Responsibilities

- Routinely collect **global agricultural weather information** to determine the cumulative impact of growing season weather conditions on crops and livestock production prospects;

- Provide information on weather-related agricultural developments to the Office of the Chief Economist and the Secretary of Agriculture;

- Publish the *Weekly Weather and Crop Bulletin*; and

- Provide crop-weather assessments for WAOB’s monthly World Agricultural Supply and Demand Estimates (WASDE) lockup report.
JOINT AGRICULTURAL WEATHER FACILITY

U.S. Dept. of Commerce
National Oceanic & Atmospheric Administration

Climate Prediction Center (CPC)
National Weather Service/National Centers for Environmental Prediction

Global Weather Data

U.S. Dept. of Agriculture
Office of the Chief Economist
National Agricultural Statistics Service

World Agricultural Outlook Board

International Crop Information

Domestic Crop Statistics

Agricultural Statistics Board

USDA
Agricultural Weather Assessments
World Agricultural Outlook Board
Oilseed, Soybean Production

Source: USDA

United States, Brazil, Argentina, China, India

2012 to 2014 Average (Last Update: January 2015)
Oilseed, Soybean Exports

Source: USDA
Price Impact of 2008 Argentina Drought

Soybean prices up 40 to 50 percent:
U.S. acreage up 1.5 million acres from intentions
Sampling of Press Report Headlines - February 2015

- Soaking rains to benefit Brazil coffee, sugar cane, grain crops - RTRS
- Rain fosters soy and corn crops in Argentina - meteorologist - RTRS
- Higher-than-normal temperature in north China favorable for wintering of wheat - XINHUN
- Hailstorm damages upto 20% wheat crops in Shahkot, Nakodar - HINDUT
- UPDATE 1-Cyclone threatens over 10 pct of Australian sugarcane - industry body - RTRS

23-Feb-2015 11:05 - MOROCCO COULD HARVEST RECORD CEREAL CROP ABOVE 10 MLN TONNES THIS YEAR AFTER FAVOURABLE RAINS - FARM MINISTRY OFFICIAL

+ many others regarding weather impacts in other parts of the world
Weather has a significant impact on crop development from pre-planting to harvesting.

Weather events must be closely monitored in all crop areas as each crop is affected differently by heat, drought and other weather and climate extremes during the growing season.
* Random sampling of available daily weather data

* Most have data since at least 1982 (many with normals)

Location of weather stations received daily via the WMO

1 United Nations World Meteorological Organization
Data obtained by CPC from the Mexican weather bureau are incorporated into the weekly rainfall chart created for the *Weekly Weather and Crop Bulletin* and are provided separately to USDA analysts for their analysis of crop weather impacts.
The maps above highlight the differences that arise using WMO data, which are sparse in coverage, versus the supplemental rain gauge data, which provides a denser network of stations and a better representation of rainfall.
Comparison with other sources of information, including satellite derived estimates (CMORPH), support the rain gauge analysis.
Higher Yields
*Average (2005/06-09/10)
Intensity
Production
Lower
*Source: SAGPyA

* Corn Yields
* Soybean Yields

*Average (2005/06-09/10)
Yields
Lower Production Intensity Higher
*Source: SAGPyA

Stations in “Main Crop Area”
Argentina Corn Yield Actual vs. Forecast

Min Ag Yield f(trend, 2012 Dummy, Dec-Jan Avg Temp, Dec-Jan Total Pcp, Dec-Jan Total Pcp^2)

2014 Forecast: 8.53 MT/HA, SE: 0.37
Soybean Production
Brazil and Paraguay

*Average (2005-09)

Source: MINAG / IBGE

Soybean crop calendar for most of Brazil & Paraguay

Soy: ~60%
1st Corn: ~50%

Aw: Tropical wet and dry
Cr: Subtropical Rain

Soy: ~40%
1st Corn: ~50%
2011: Above-normal rainfall, then early end to season

2nd crop yield: 4.02 mT/ha (down 15.5%)
2012: Near-normal rainfall, then unusual May / June rainfall

2nd crop yield: 5.70 mT/ha (up 15.5%)

Source: IBGE/CONAB
2013: Above-normal rainfall, then scattered showers in May

2nd crop yield: 5.78 mT/ha (up 13.4%)
Brazil Soybeans

* State-Level Production (as % of total)

- Mato Grosso: 30%
- Parana: 19%
- Rio Grande do Sul: 13%
- Goias: 12%
- Mato Grosso do Sul: 8%
- Minas Gerais: 5%
- Bahia: 4%
- Sao Paulo: 3%
- Maranhao: 2%
- Santa Catarina: 2%
- Tocantins: 2%
- Other: ~2%

* 2005 to 2009 Average
Source: IBGE Brazil

Soybean crop calendar for most of Center-South Brazil

Flower Fill Harvesting Planting

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Soybean Production
*Average (2005-09)

Minor Production Intensity Major

*Source: IBGE
Elements: Average Temperature, Days $\geq 35^\circ$C, Precipitation, Days Between Rainfall

**Rio Grande do Sul:**
- Jan, Feb, Mar ($r^2 = .99$)

Estimated yield: **2.54 mT/ha**

March Lockup: **2.45 mT/ha**

**Parana:**
- Dec, Jan, Feb ($r^2 = .92$)

Estimated yield: **2.78 mT/ha**
Comparison of Yield Departures From Trend
Parana versus Mato Grosso do Sul

Agricultural Weather Assessments
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Precipitation (mm):
- 600 - 5000
- 500 - 600
- 600 - 500
- 300 - 400
- 250 - 300
- 200 - 250
- 150 - 200
- 100 - 150
- 75 - 100
- 50 - 75
- 35 - 50
- 25 - 35
- 20 - 25
- 10 - 20
- 5 - 10
- 3 - 5
- 1 - 3
- 0 - 1

Crop Mask (~50 mm or less)

*Soy: 25% (2009-13)
*1st Corn: 34% (2011-13)

* Source: IBGE
Brazil Corn (First Crop)

* State-Level Production (as % of total)

<table>
<thead>
<tr>
<th>State</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parana</td>
<td>23</td>
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<tr>
<td>Minas Gerais</td>
<td>17</td>
</tr>
<tr>
<td>Rio Grande do Sul</td>
<td>14</td>
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<tr>
<td>Santa Catarina</td>
<td>10</td>
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<tr>
<td>Sao Paulo</td>
<td>10</td>
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<td>Goias</td>
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<td>Bahia</td>
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<tr>
<td>Mato Grosso</td>
<td>3</td>
</tr>
<tr>
<td>Para</td>
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</tr>
<tr>
<td>Mato Grosso do Sul</td>
<td>2</td>
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<tr>
<td>Ceara</td>
<td>2</td>
</tr>
<tr>
<td>Sergipe</td>
<td>1</td>
</tr>
<tr>
<td>Maranhao</td>
<td>1</td>
</tr>
<tr>
<td>Other States</td>
<td>~4</td>
</tr>
</tbody>
</table>

* 2007 to 2009 Average
Source: IBGE Brazil

1st Corn crop calendar for most of Center-South Brazil

In Northeast Brazil, 1st crop planted Dec - Jan (harvested May - Jul).

Corn Production *Average (2007-09)

Minor Production Intensity
Major

*Source: IBGE
Brazil Corn (First Crop)

* State-Level Production (as % of total)

Minas Gerais 20
Parana 20
Rio Grande do Sul 14
Santa Catarina 10
Goias 9
Sao Paulo 9
Bahia 5
Maranhao 2
Piaui 2
Para 2
Mato Grosso 1
Mato Grosso do Sul 1
Ceara 1
Other States ~4

* 2011 to 2013 Average
Source: IBGE Brazil

Corn Production *Average (2011-13)

In Northeast Brazil, 1st crop planted Dec - Jan (harvested May - Jul).

1st Corn crop calendar for most of Center-South Brazil

Period of Highest Intensity
Plant
Harvest

*Source: IBGE
FACTBOX- The boy is back? El Nino expected within months - RTRS

09-Oct-2014 10:14

Oct 9 (Reuters) - The U.S. weather forecaster said on Thursday the El Nino weather phenomenon could surface within one or two months and last into the Northern Hemisphere spring, though it will remain weak throughout its duration.

El Nino, Spanish for "the boy", is a warming of sea-surface temperatures in the Pacific Ocean. Below are some key commodities that could be affected by its return.

**GRAINS, OILSEEDS, LIVESTOCK**

El Nino could bring dry weather to Australia, which is already struggling with a drought, and it could also curb the country's wheat, sugar and cotton production.

An El Nino episode usually results in below-average rainfall in main palm oil producers Indonesia and Malaysia, cutting yields and pushing up global prices.

It could also worsen drought conditions in Thailand, a leading rice exporter.

El Nino would bring milder-than-normal temperatures to the U.S. Midwest. Iowa and Minnesota would benefit from the event's tendency for wetter-than-normal summers as the western Corn Belt recovers from a drought.

But excessive rains on the saturated soils of the eastern Corn Belt could be troublesome after an overly snowy winter. Drought-hit California, a major dairy and wine grape state, could see above-normal rainfall.
El Niño and Rainfall

El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. Although they vary somewhat from one El Niño to the next, the strongest shifts remain fairly consistent in the regions and seasons shown on the map below.
Australia: Wheat

Source: PSD-Online

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Sea Surface Temperature Anomalies (°C)
Niño Region 3.4

1997/98
09/10
2002/03
06/07

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Thank You!

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