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United States Department of Agriculture

USDA's
93rd
Annual

Agricultural Outlook Forum

A New Horizon: The Future of Agriculture

February 23-24, 2017 • Crystal Gateway Marriott Hotel, Arlington, Virginia

Presentation from the USDA Agricultural Outlook Forum 2017

United States Department of Agriculture
93rd Annual Agricultural Outlook Forum
“A New Horizon: The Future of Agriculture”

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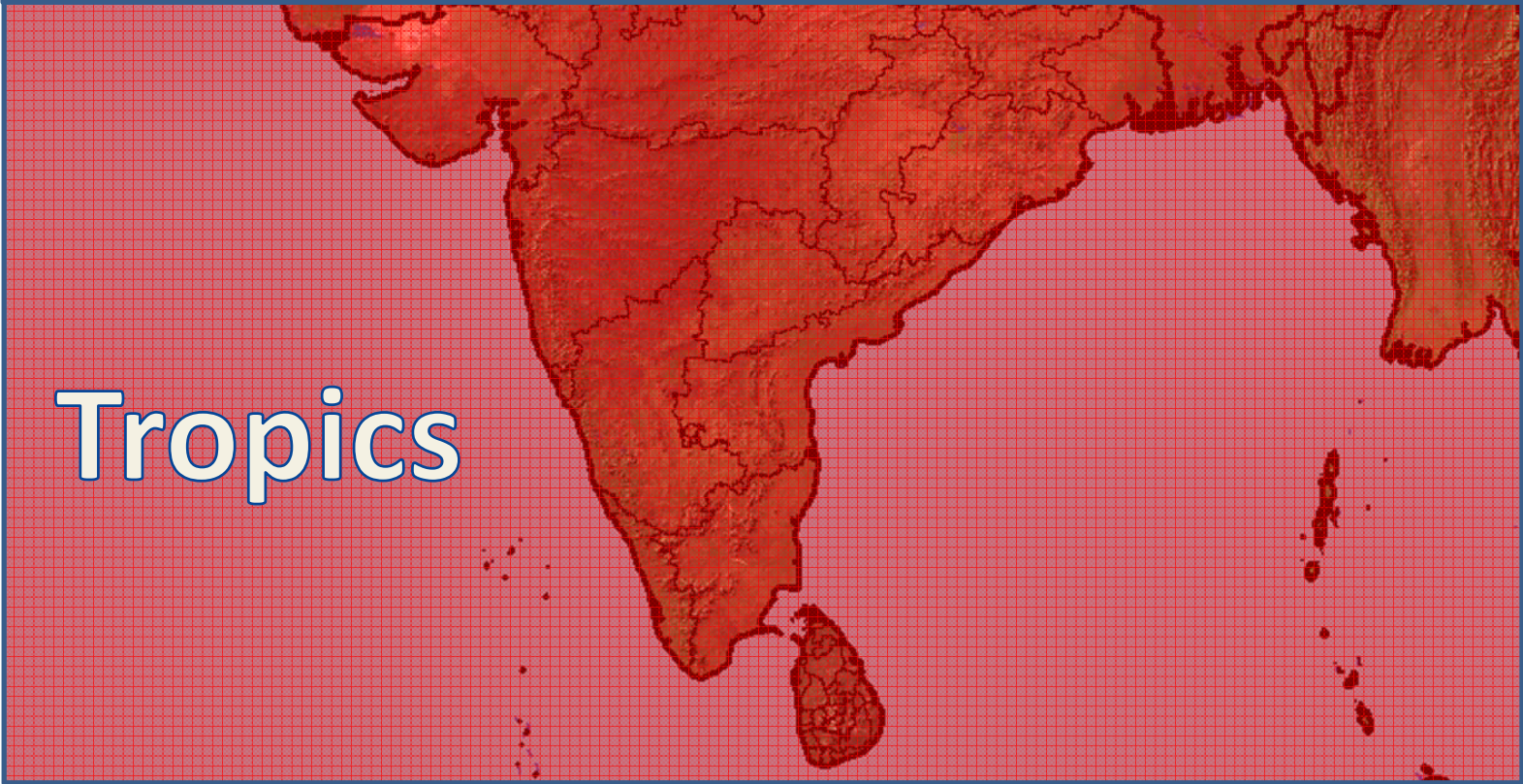
USDA's
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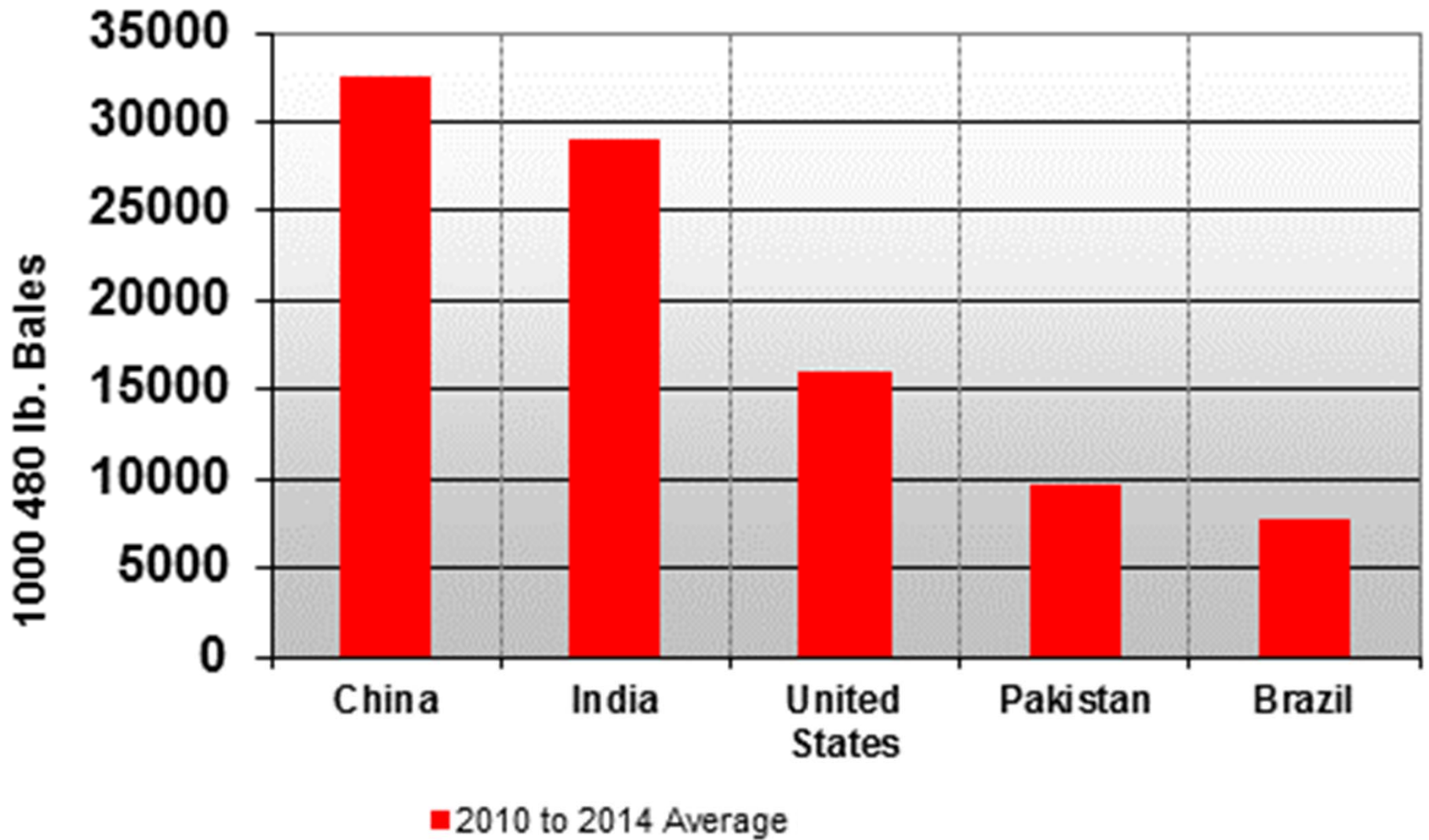
A stylized background featuring a bright yellow sun on the left side, partially obscured by a dark green hill. The sky is composed of several horizontal bands of light orange and peach colors, with rays of light emanating from the sun. The bottom of the image shows a dark green foreground.

Weather-Driven Cotton Yield Analysis for India

Brian Morris
Agricultural Meteorologist - Asia Specialist
USDA/OCE/WAOB

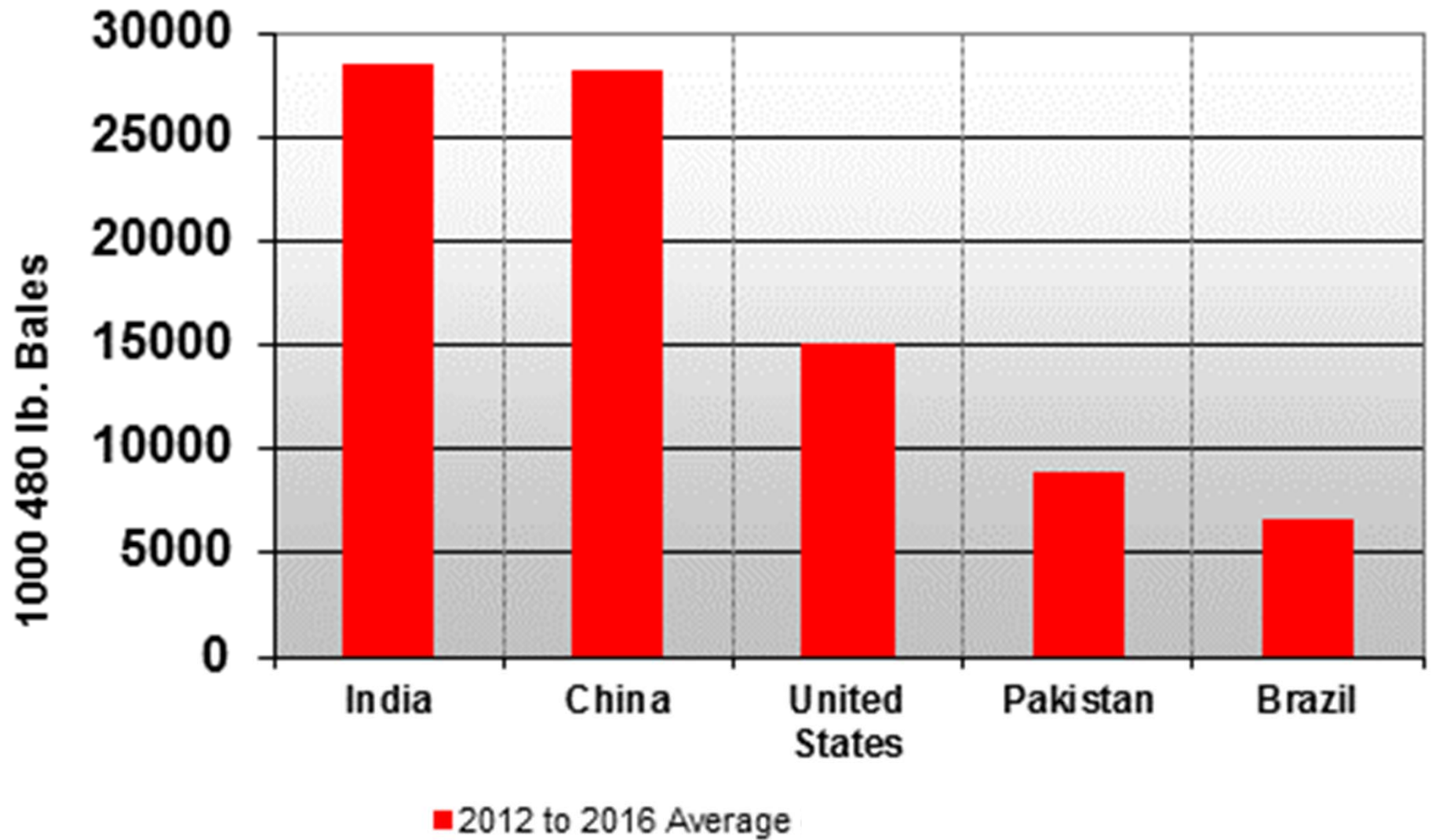


Cotton Production



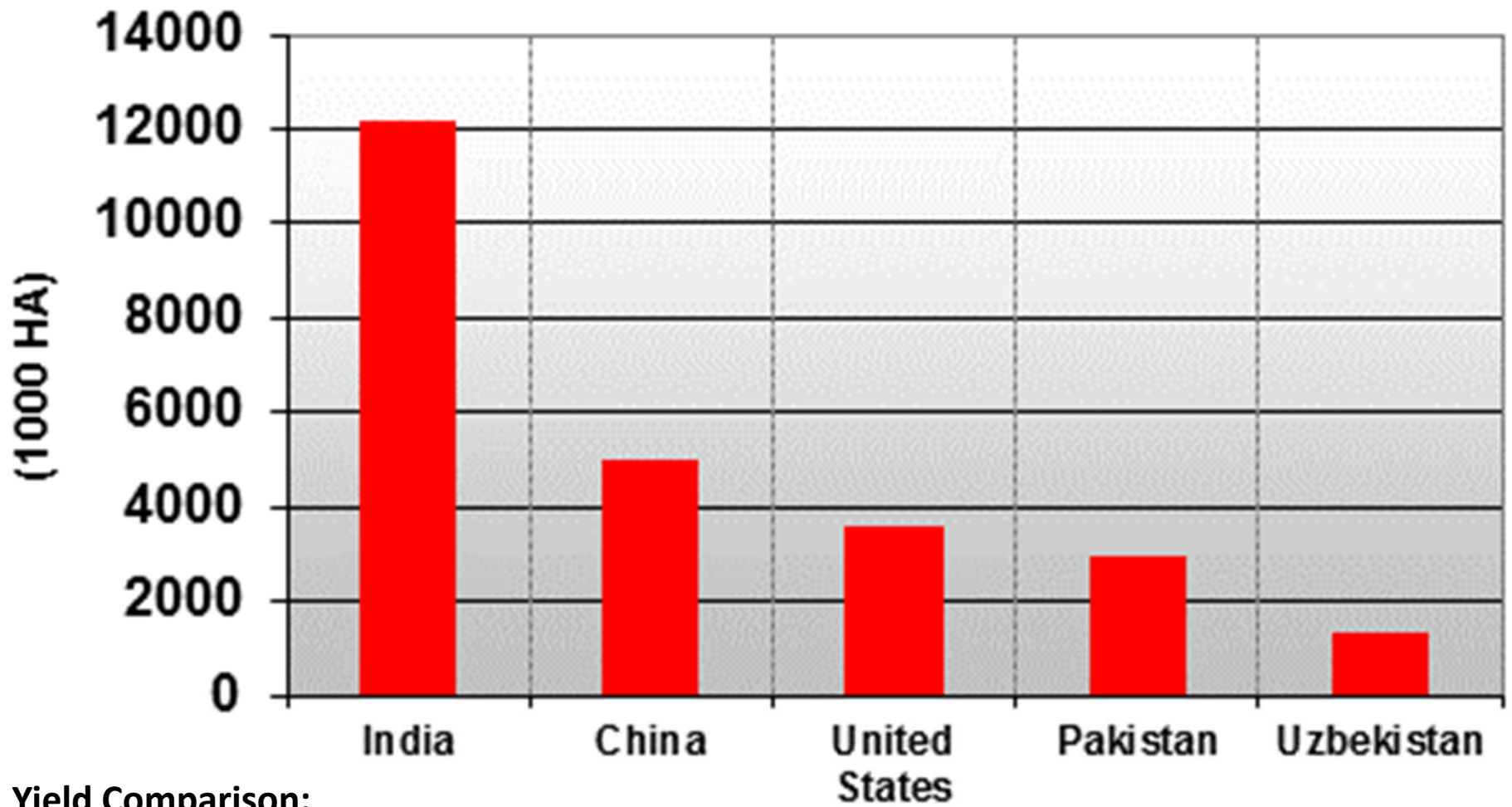
Source: USDA/FAS - PSD

Cotton Production



Source: USDA/FAS - PSD

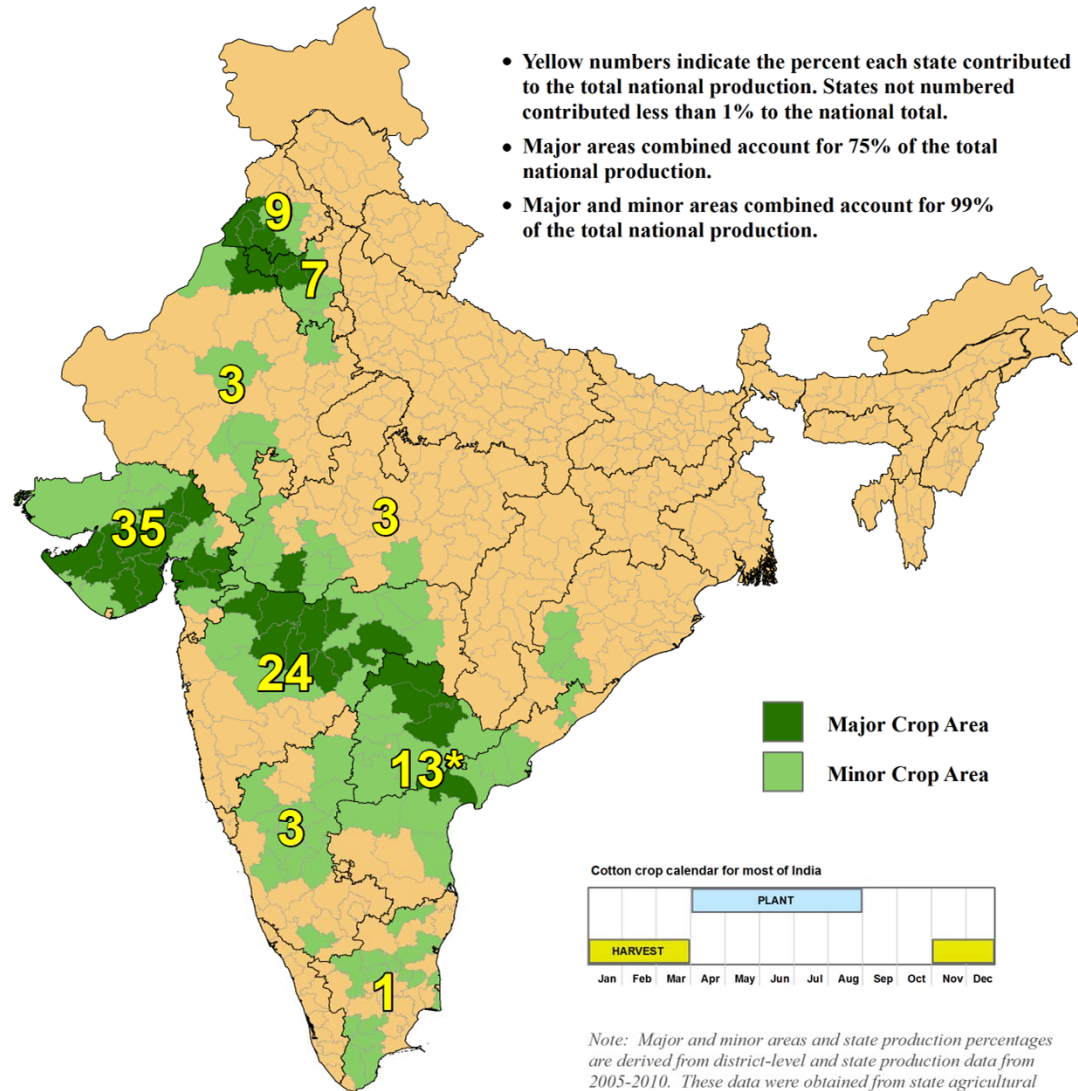
Cotton Area Harvested



Yield Comparison:
China: 1,404 kg/ha
India: 529 kg/ha

■ 2011 to 2014 Average

India: Cotton



Note: Major and minor areas and state production percentages are derived from district-level and state production data from 2005-2010. These data were obtained from state agricultural departments.

*Combined average for both Andhra Pradesh and Telangana.

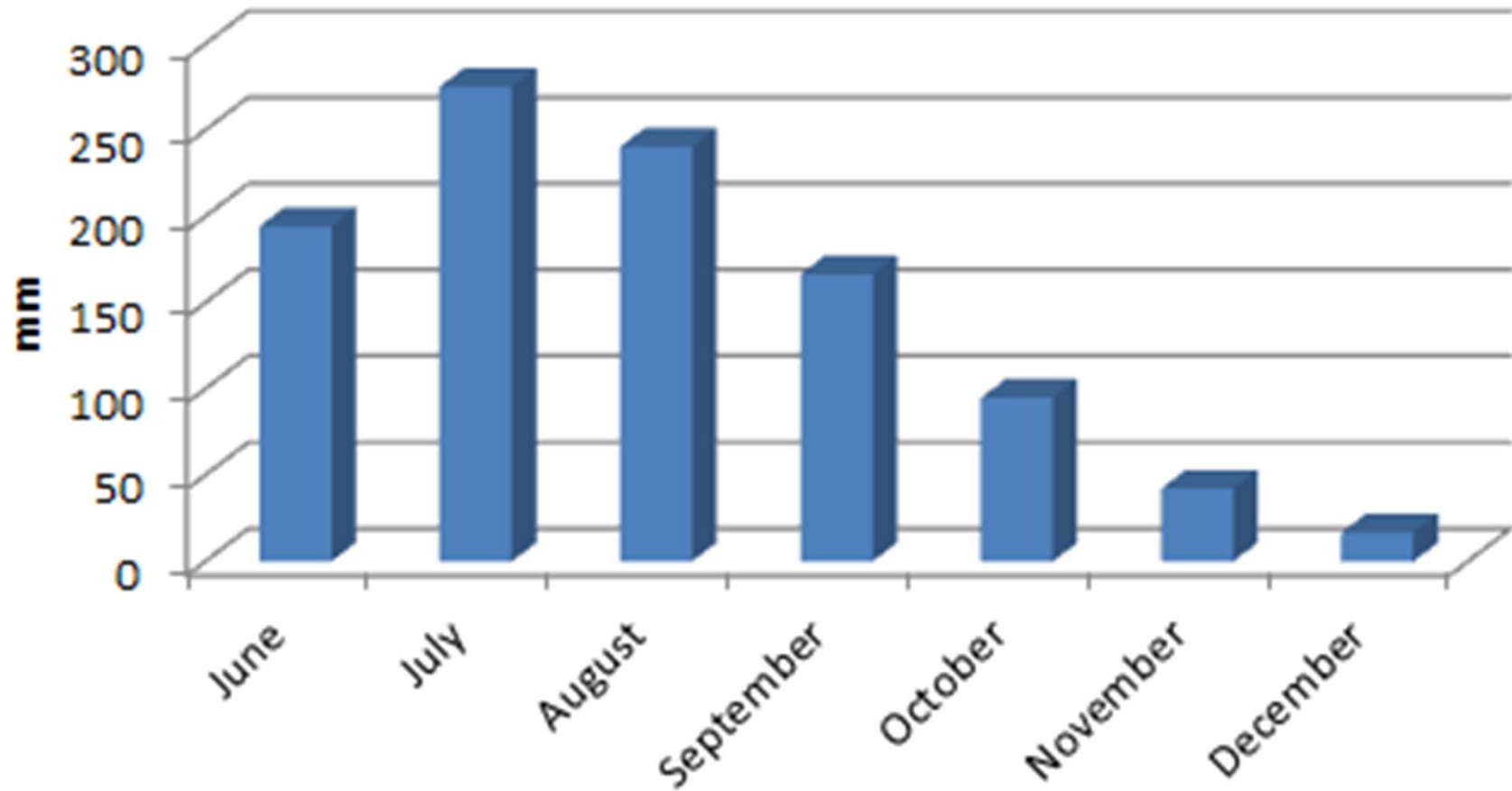


In early summer the land heats up faster than the water due to the larger heat capacity and volume of the oceans. A low pressure system forms drawing moist air inland from the ocean and bringing the wet monsoon to India in June.

Click on each button at points 1, 2 and 3 to view air directions.

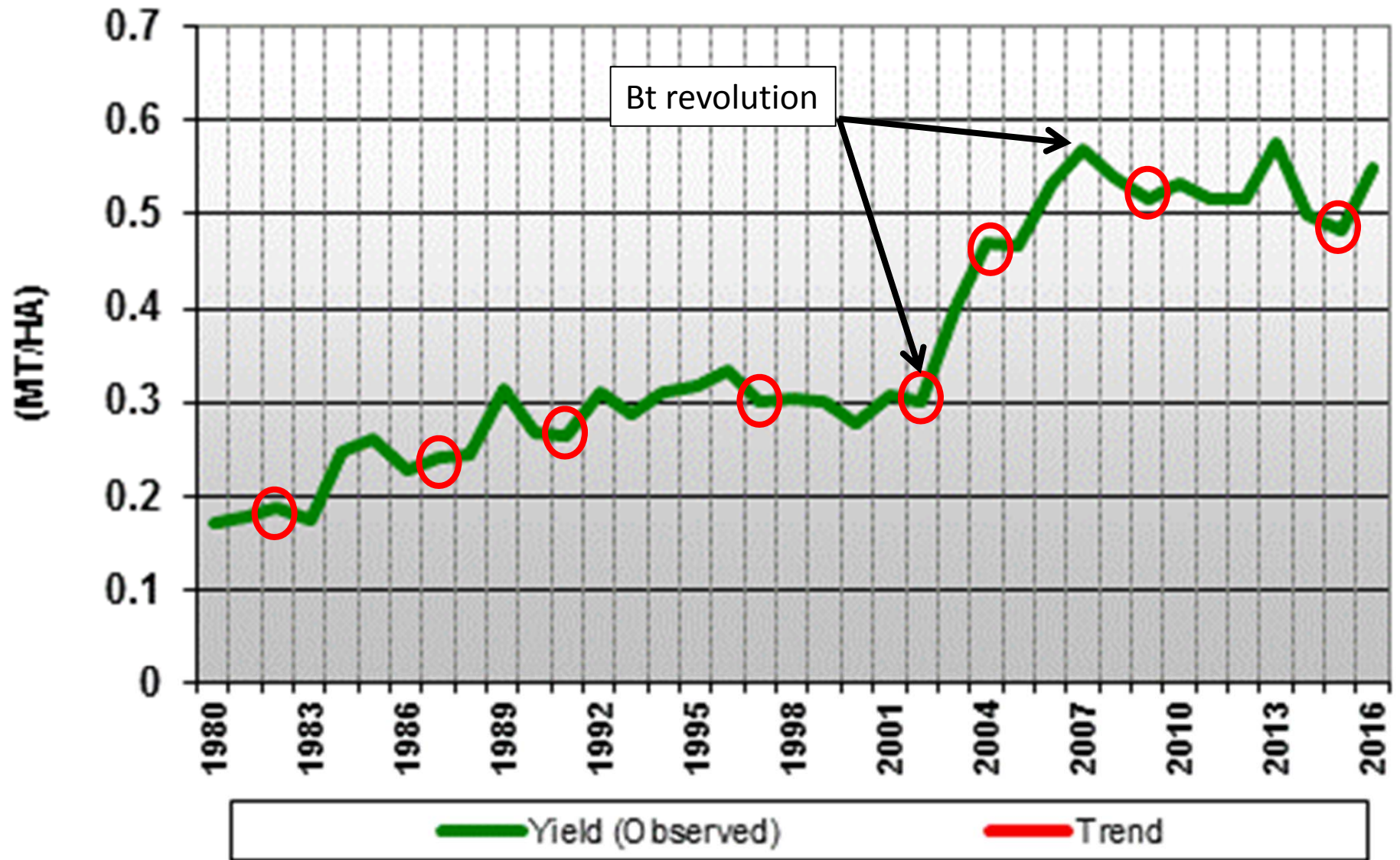
1. As the air cools over the Western Ghats rain begins in the area for a duration of up to 60 days.
2. North east airflow from the Bay of Bengal

India Average Rainfall



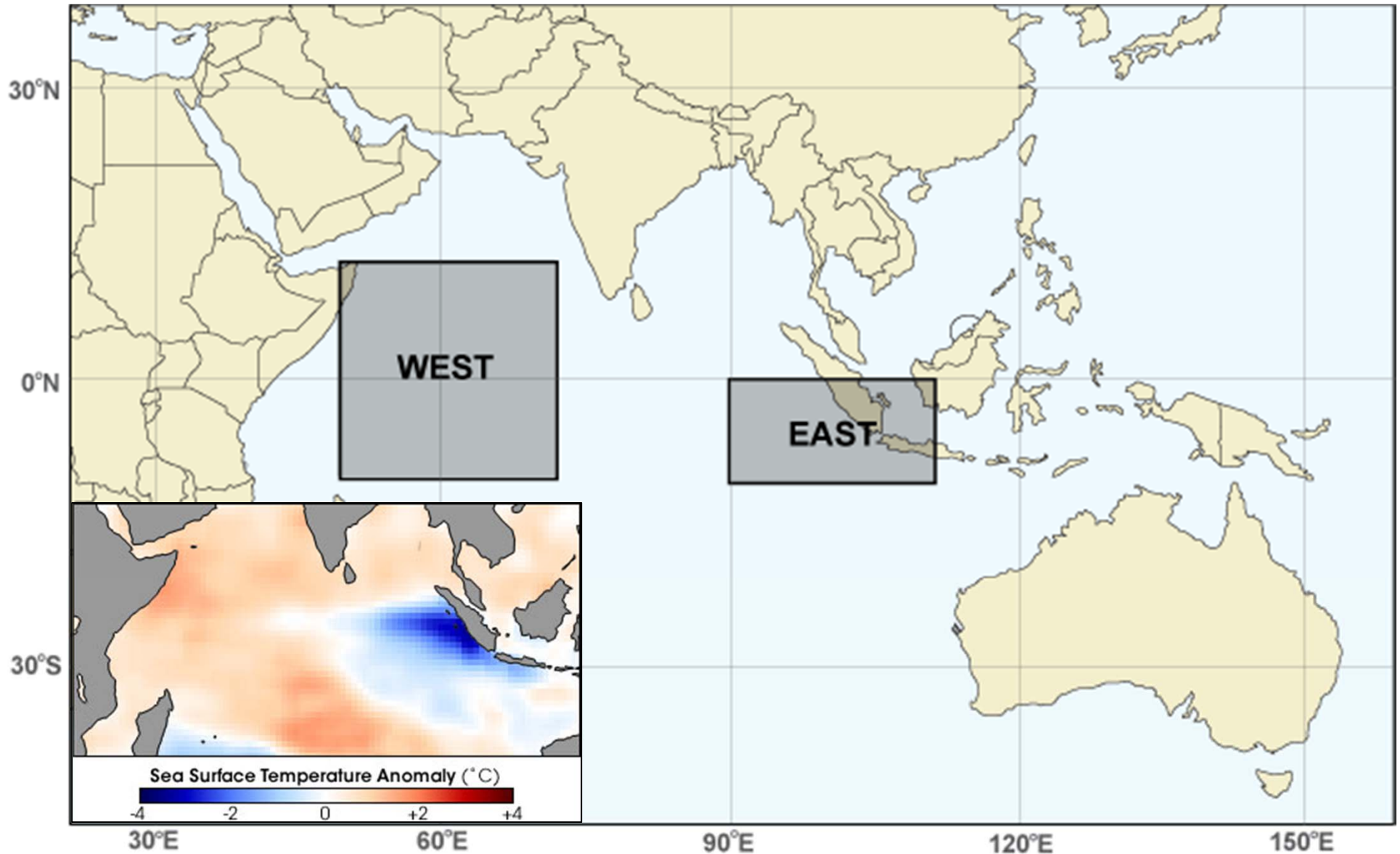
80% of yearly rainfall between Jun-Sep

India: Cotton



○ El Niño

Indian Ocean Dipole



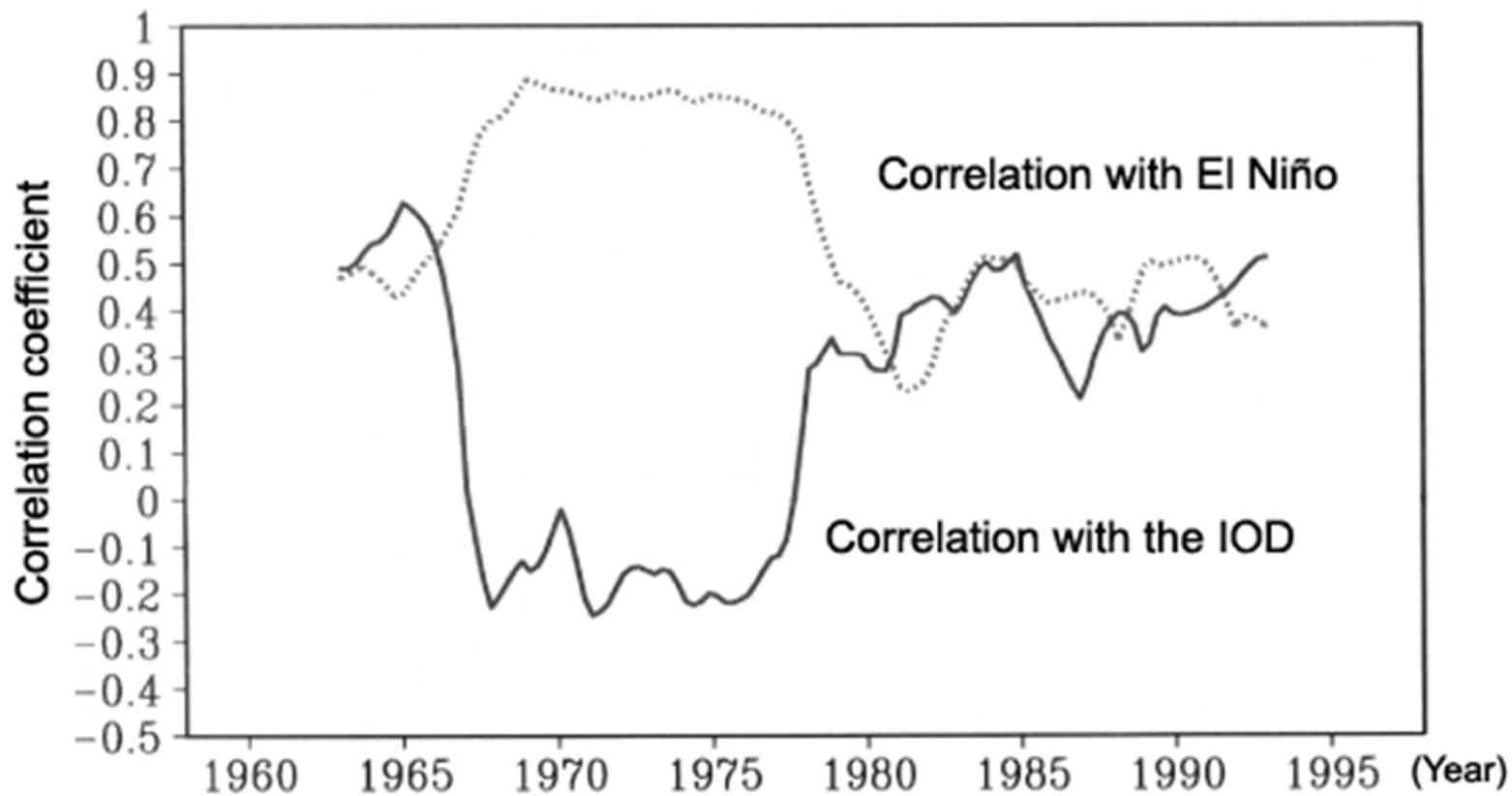
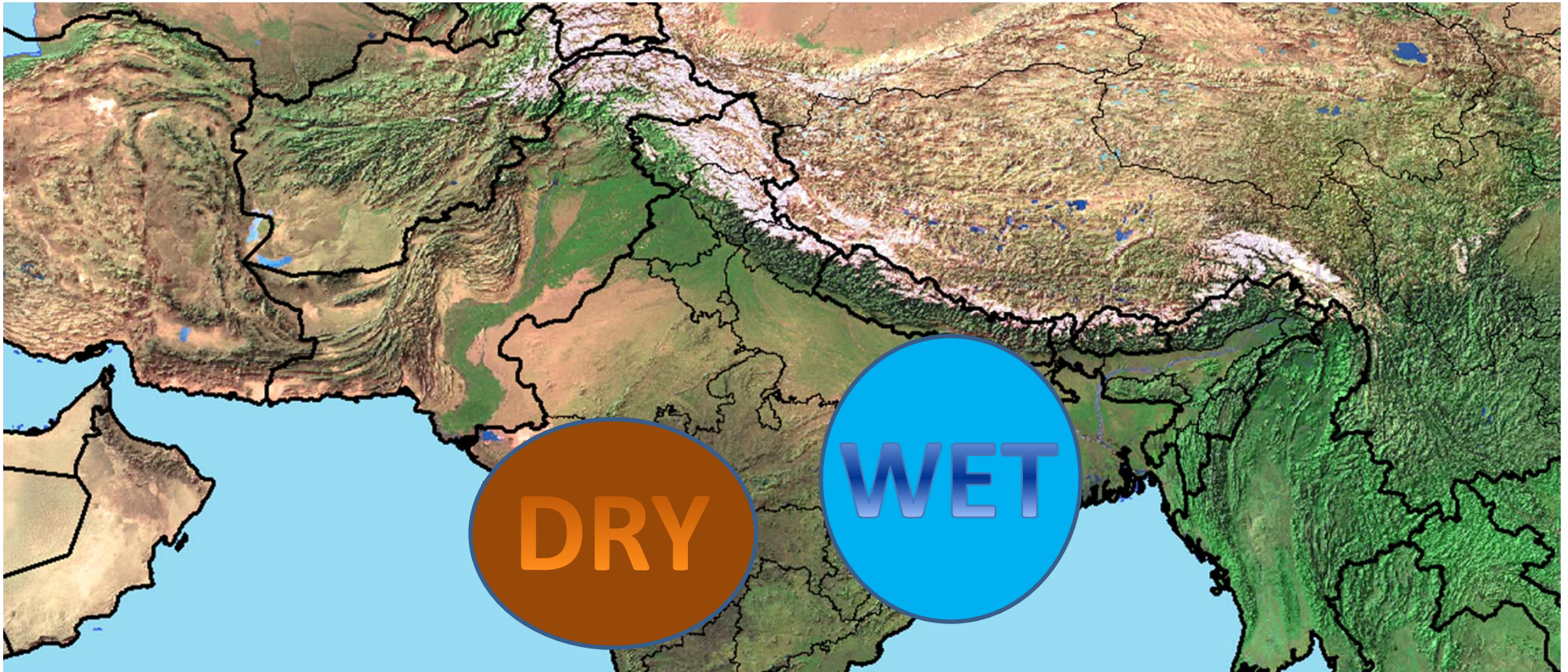


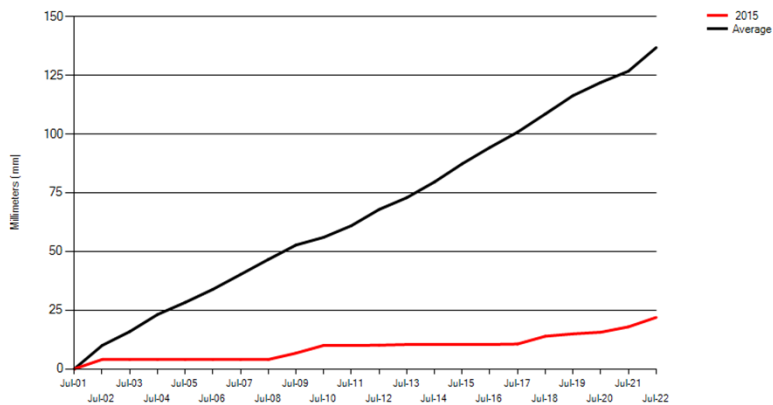
Fig. 1. Relationship of the Indian Ocean Dipole (IOD) and El Niño with Indian Monsoon Rainfall.

The solid line represents the relationship with the IOD, and the broken line shows the relationship with El Niño. These results, which were obtained by using the statistical method known as moving correlation, show that El Niño and the IOD have opposite impacts on monsoon rainfall.

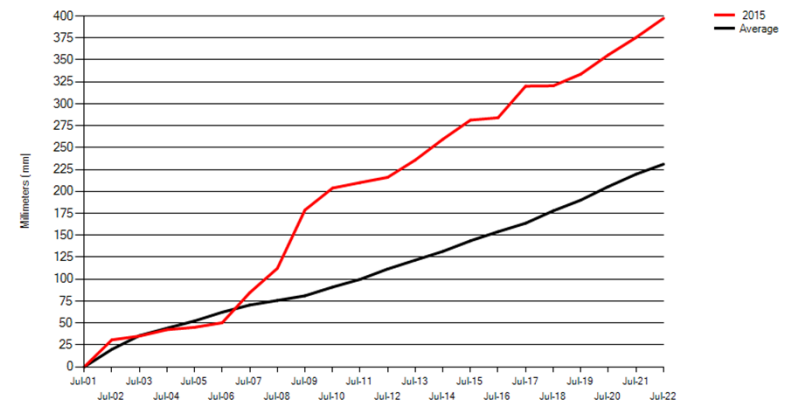
More Detailed Examination: Polarization of Impacts



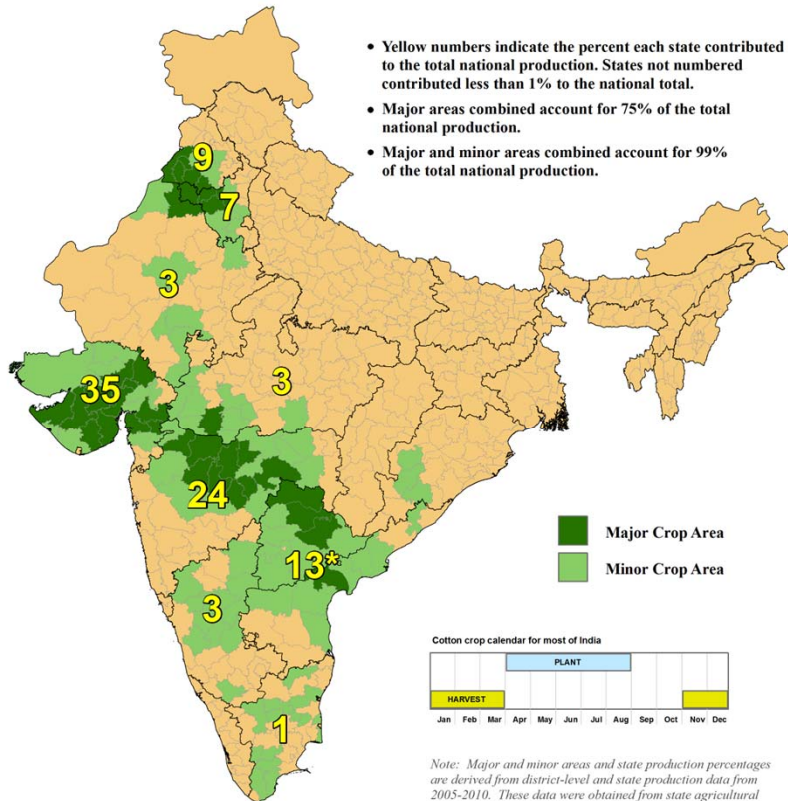
10 - MAHA INTERIOR
Cumulative Precipitation



5 - ORISSA-S. WEST BENGAL
Cumulative Precipitation



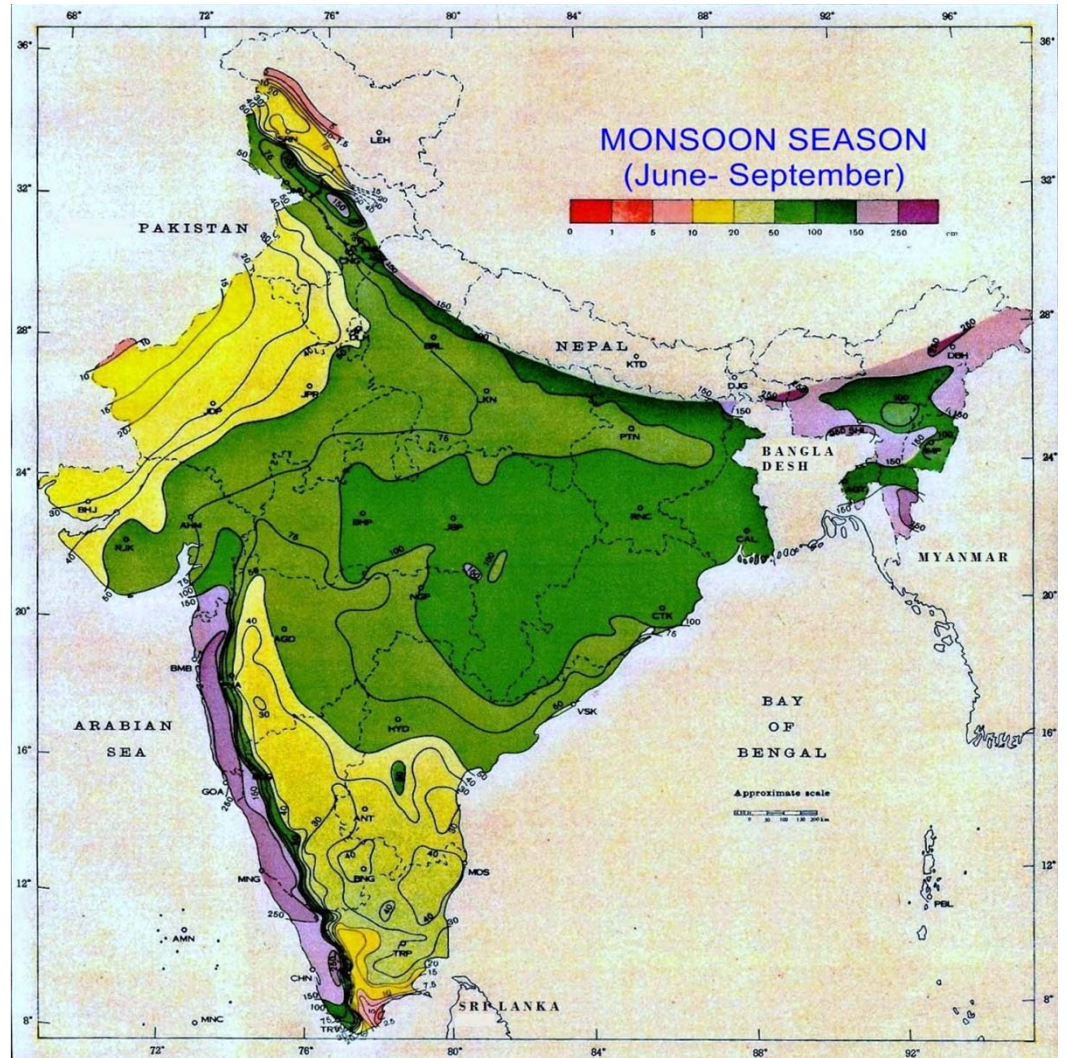
India: Cotton



Note: Major and minor areas and state production percentages are derived from district-level and state production data from 2005-2010. These data were obtained from state agricultural departments.

*Combined average for both Andhra Pradesh and Telangana.

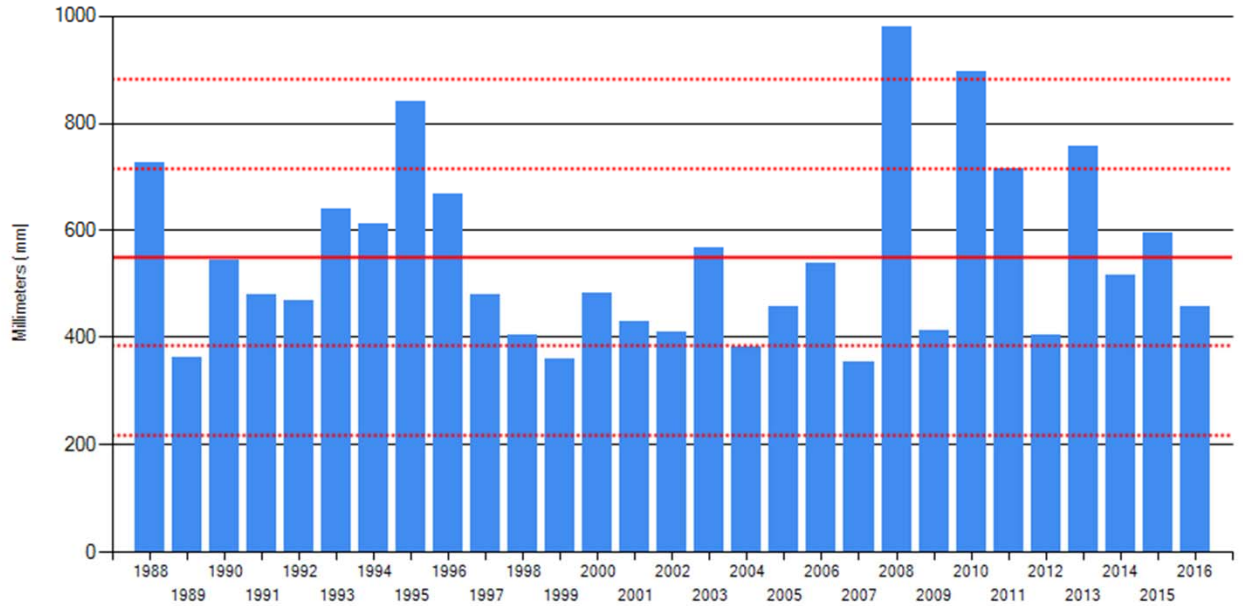
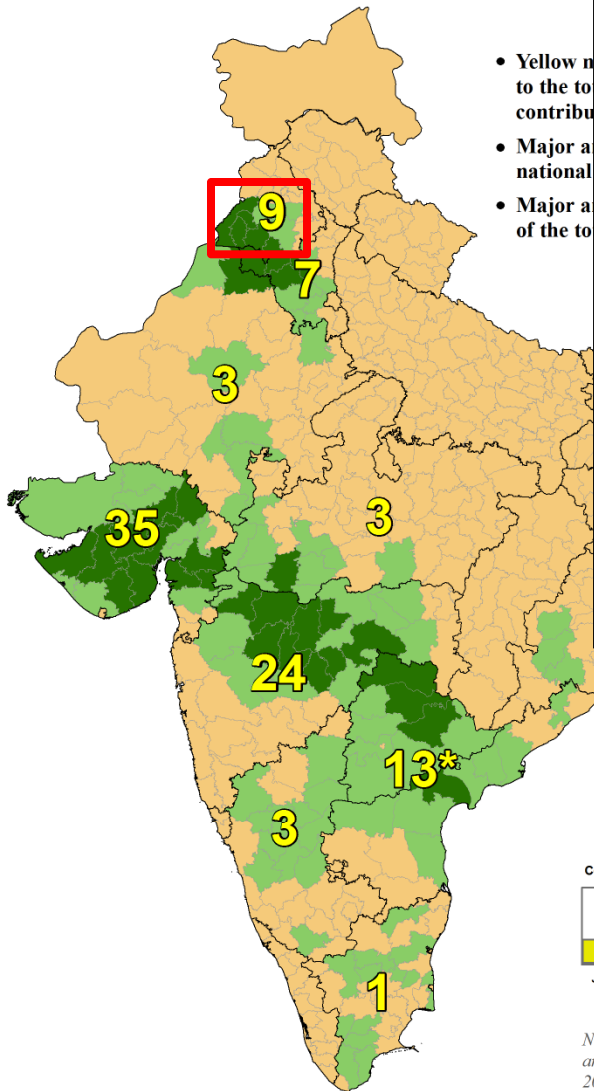
USDA Agricultural Weather Assessments
 World Agricultural Outlook Board



Even without the effects of El Nino and the IOD, cotton is grown along the fringe of the eastern rainfall maxima.

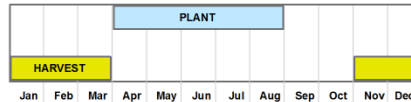
India: Cotton

1 - PUNJAB
Total Precipitation: Jun 1 to Sep 30



Major Crop Area
 Minor Crop Area

Cotton crop calendar for most of India



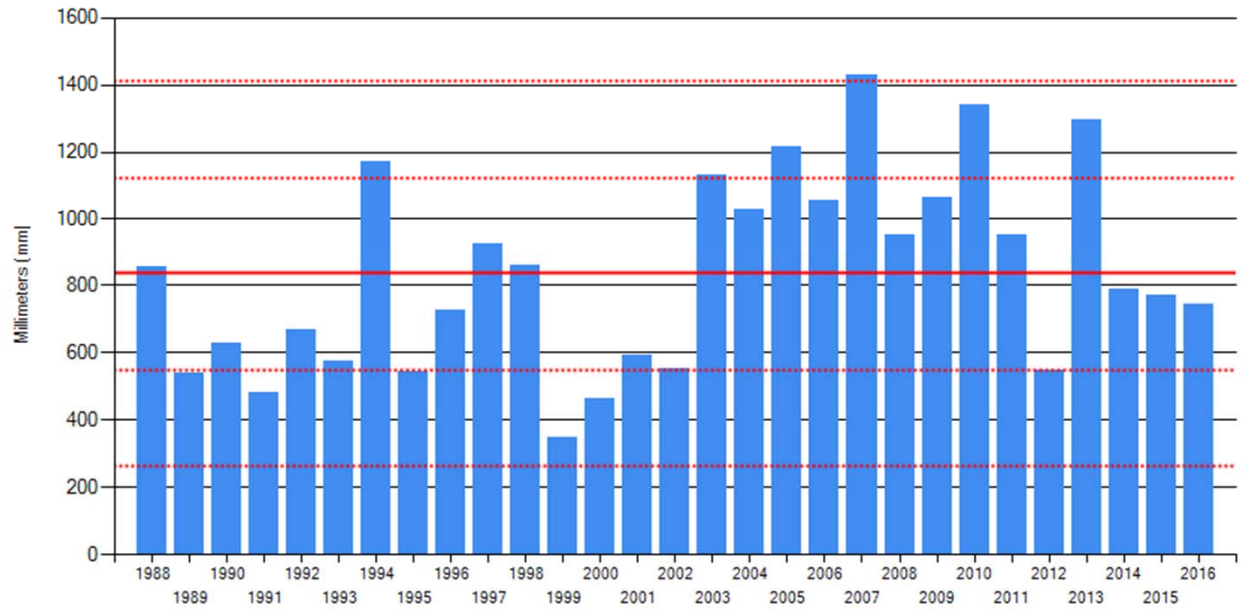
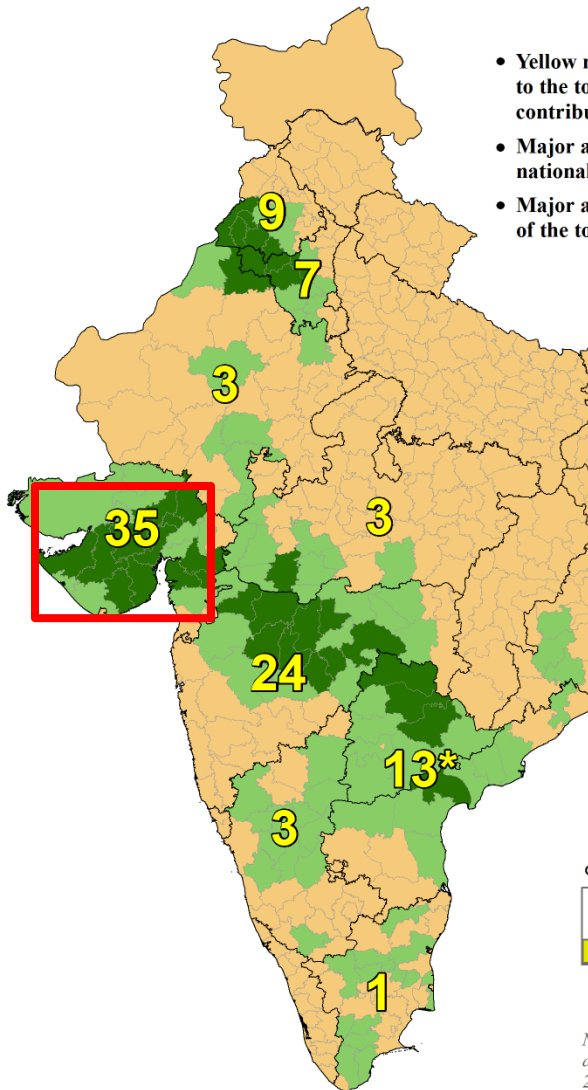
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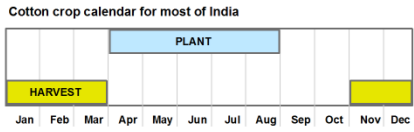
The farther from the rainfall maxima, the more variable the rainfall.

India: Cotton

8-GUJARAT Total Precipitation: Jun 1 to Sep 30



Major Crop Area
 Minor Crop Area



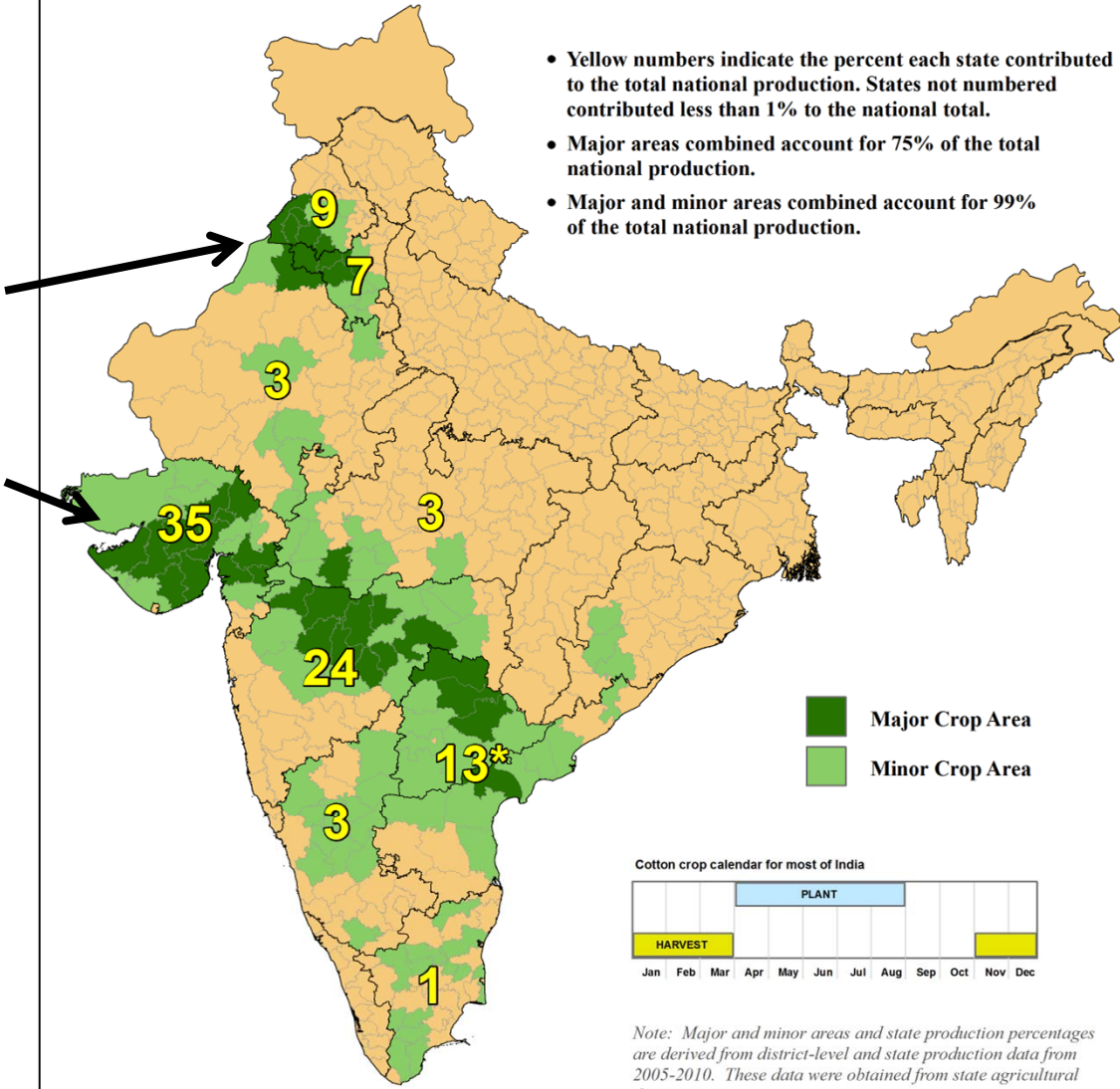
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India: Cotton

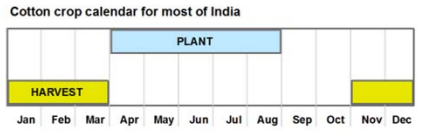
Irrigation:
 100% in Punjab
 and Haryana

 60% in Gujarat.



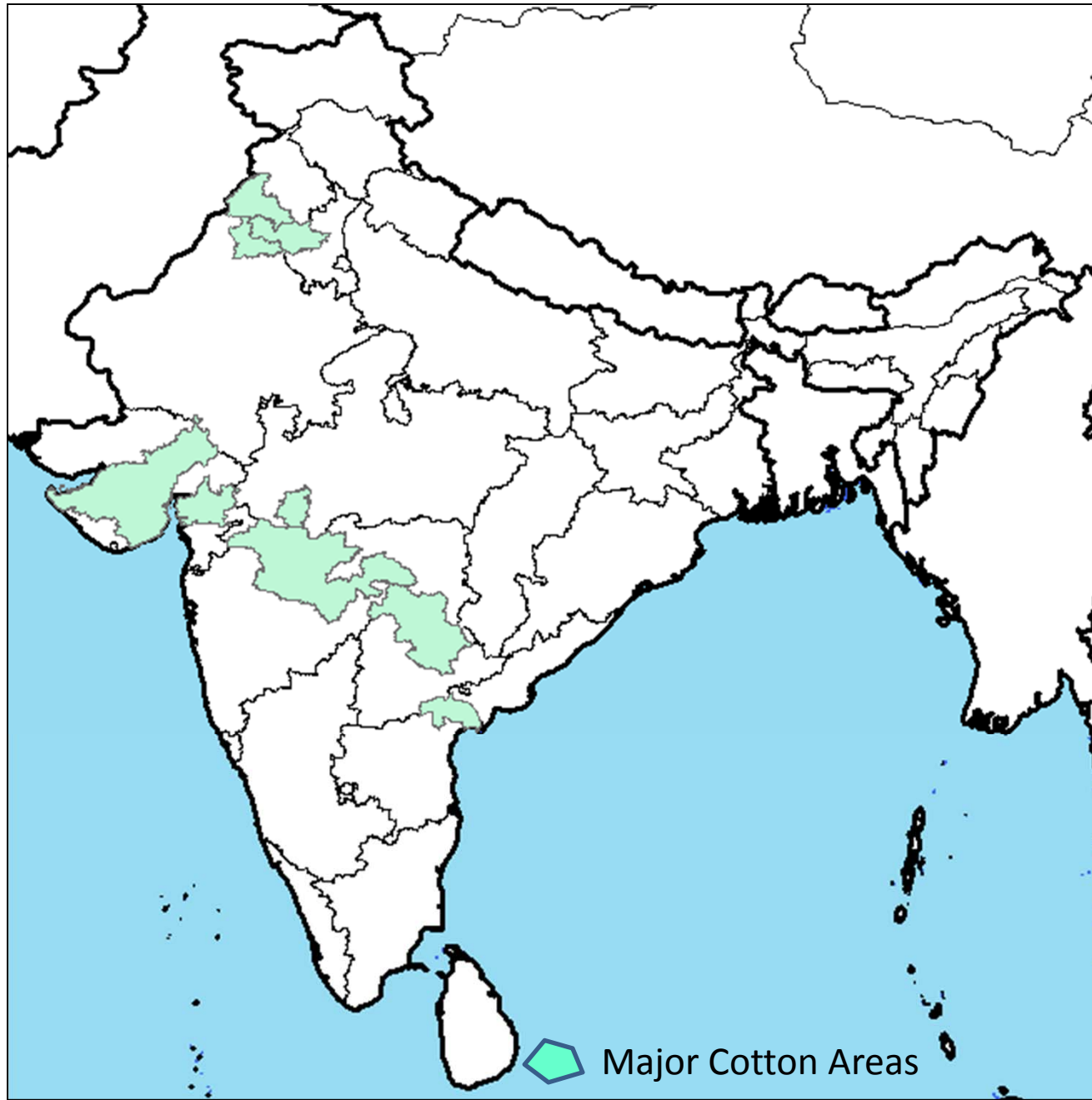
- Yellow numbers indicate the percent each state contributed to the total national production. States not numbered contributed less than 1% to the national total.
- Major areas combined account for 75% of the total national production.
- Major and minor areas combined account for 99% of the total national production.

Major Crop Area
 Minor Crop Area

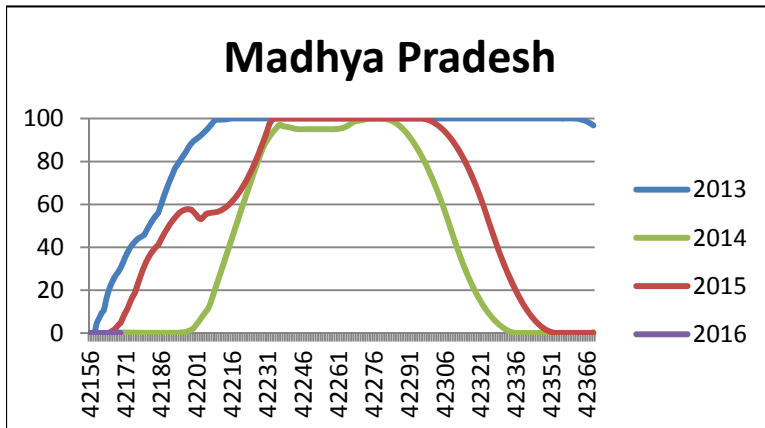
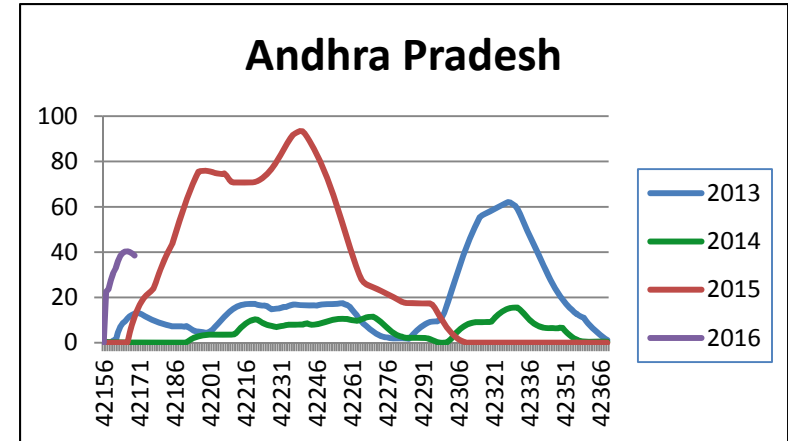
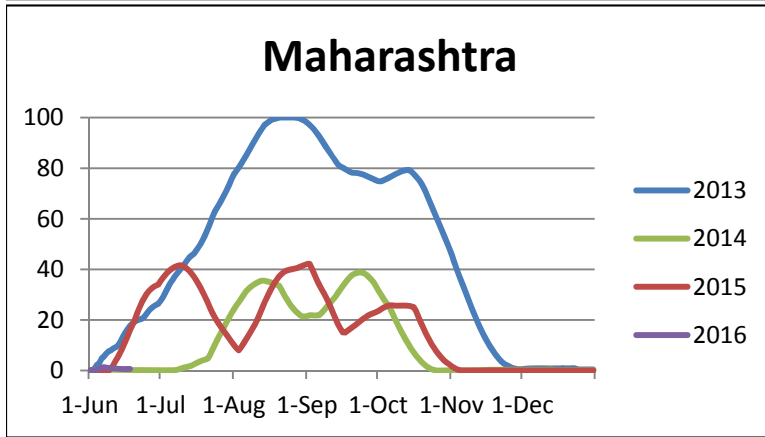
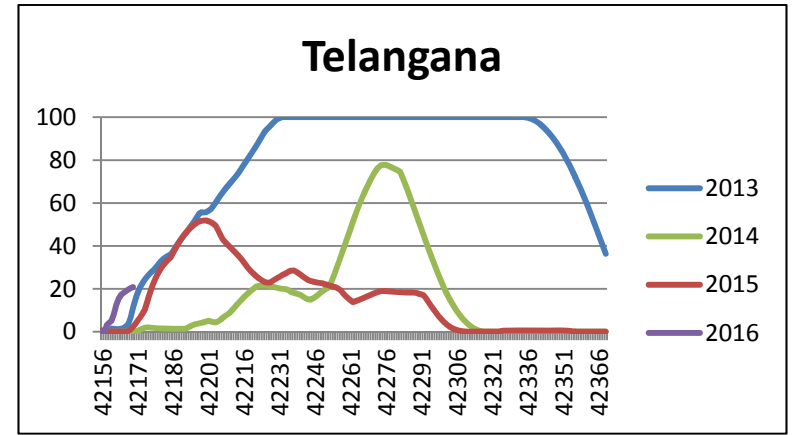
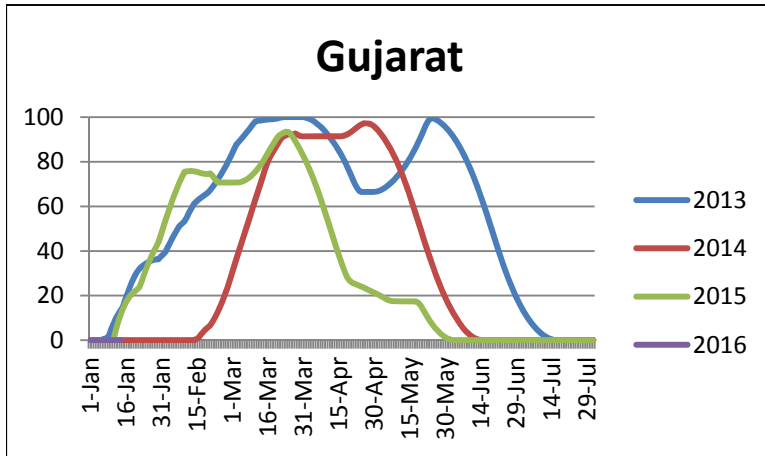


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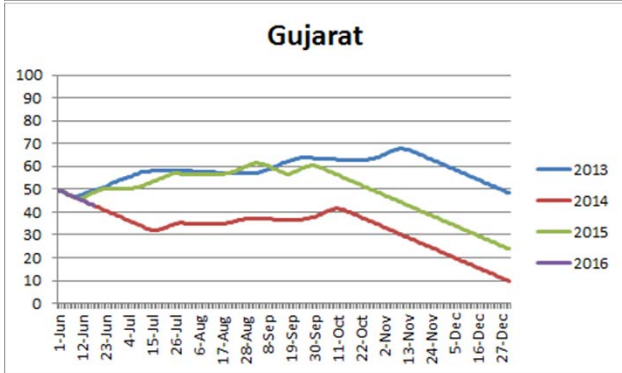
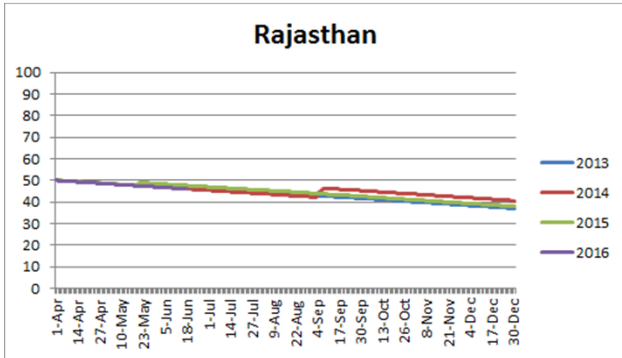
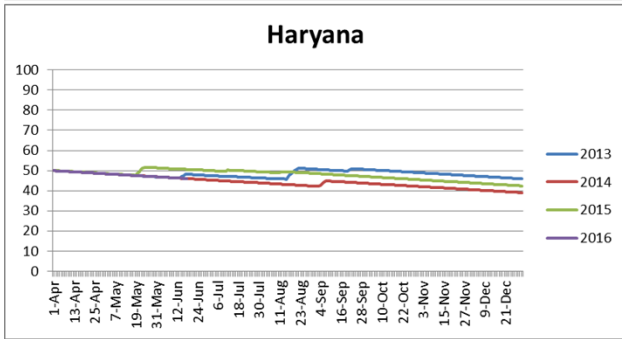
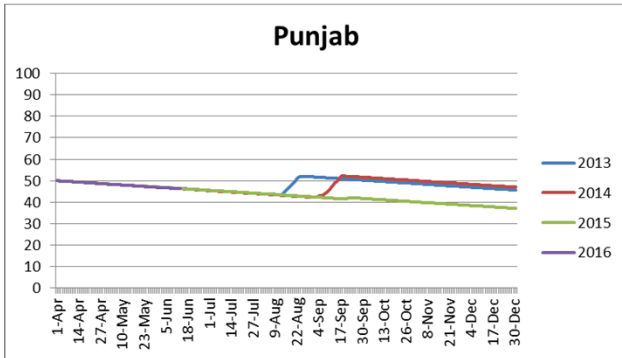
**Combined average for both Andhra Pradesh and Telangana.*



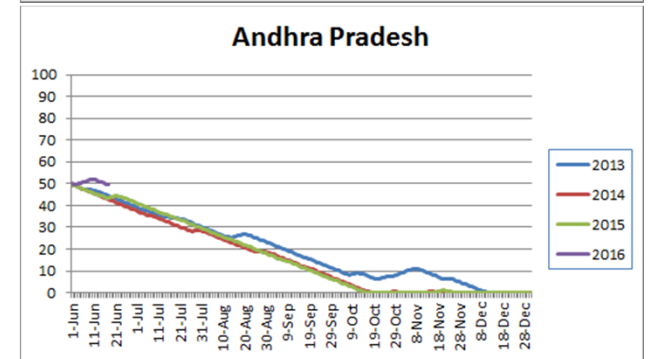
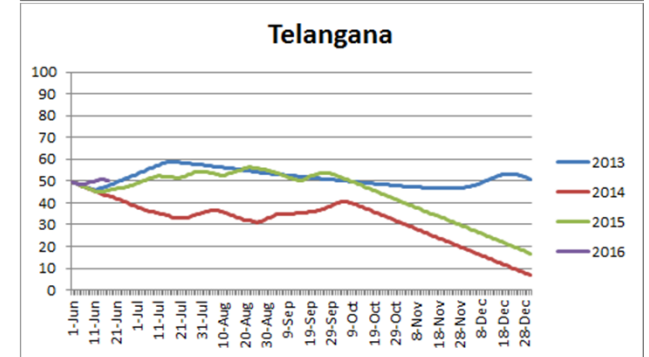
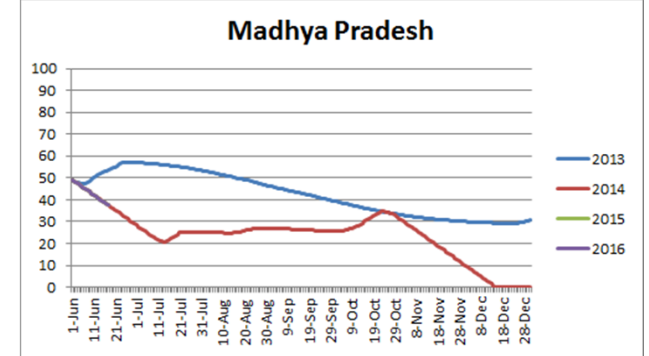
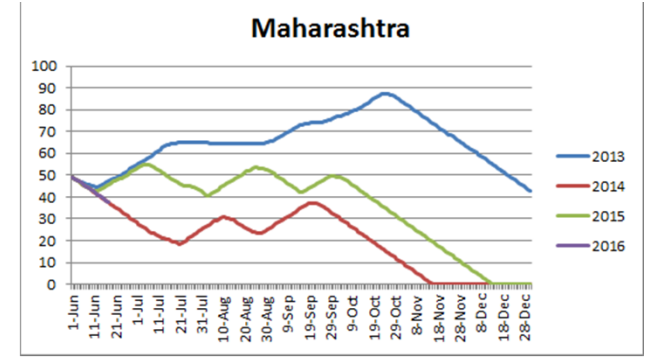
Volumetric Soil Moisture (10cm) for Rainfed Cotton



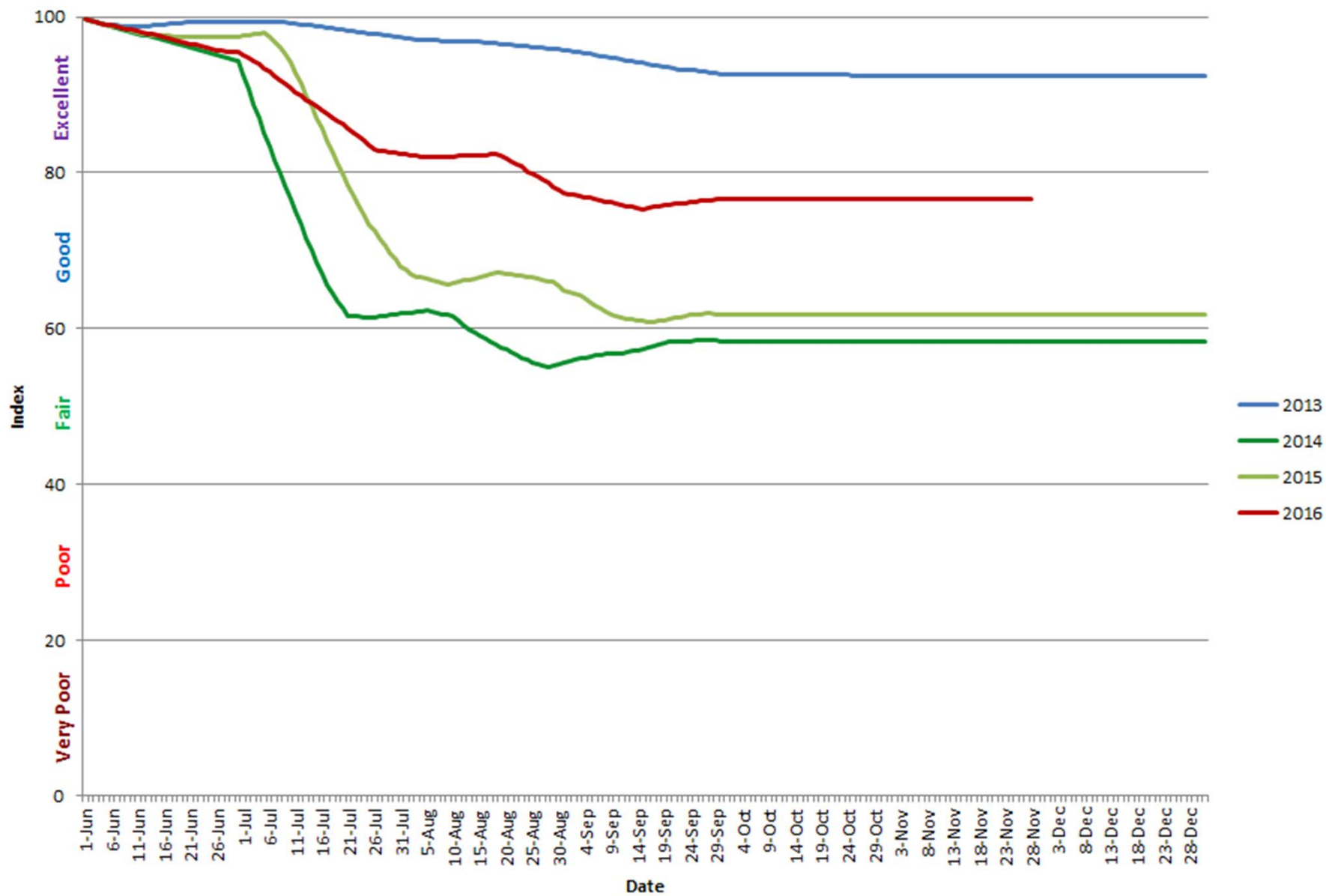
Daily rainfall and temperature data are used along with general regional soil types to calculate a soil moisture.



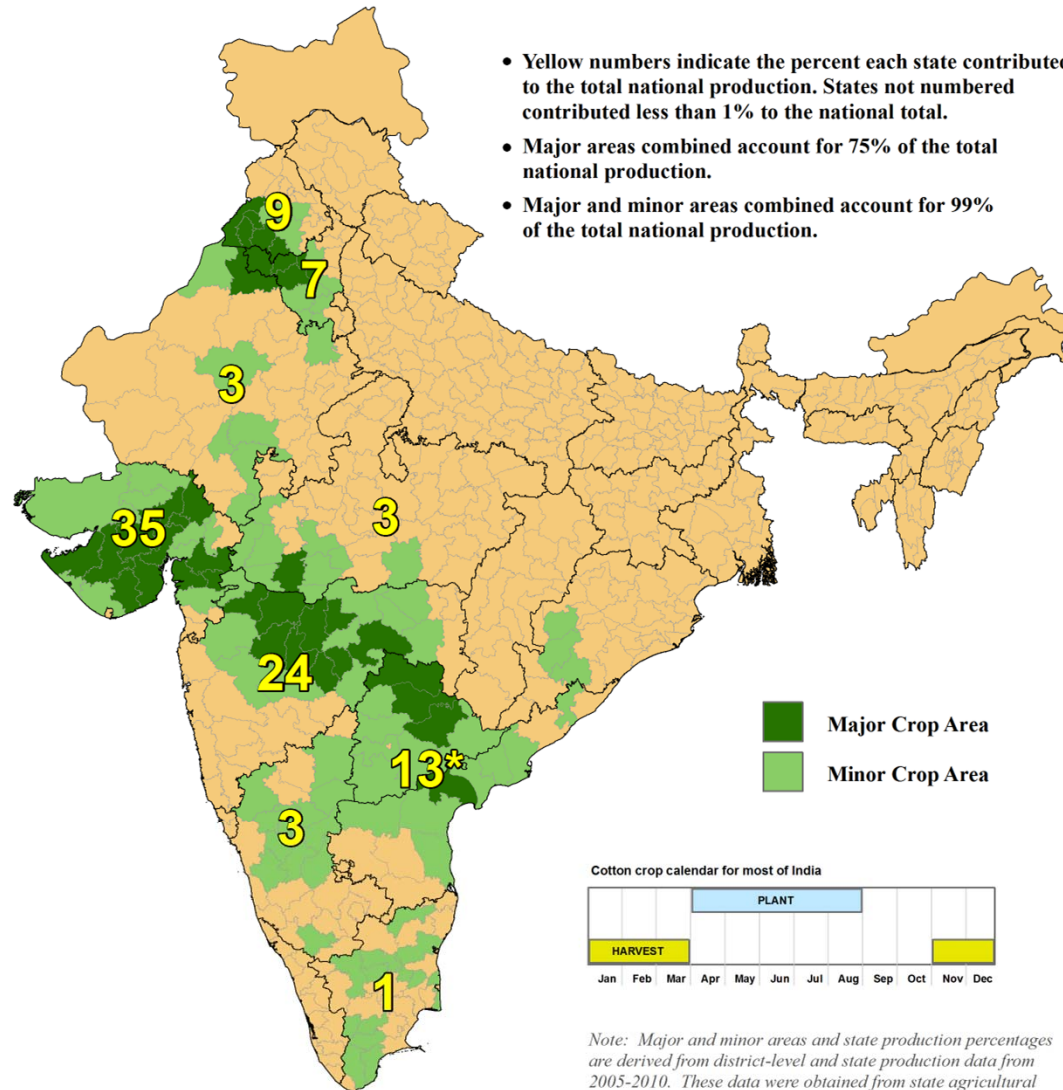
Cotton Condition Index



Weighted Average Cotton Condition Index

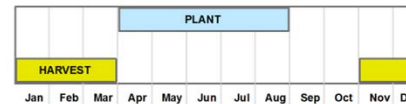


India: Cotton



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Cotton crop calendar for most of India



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