

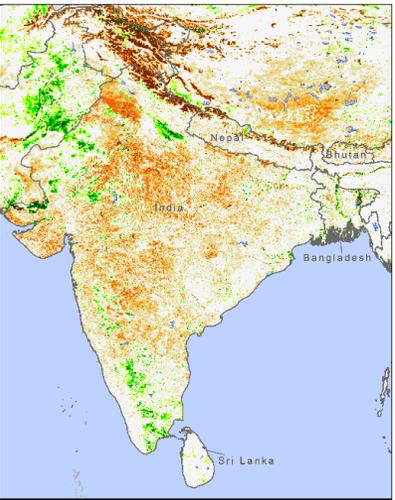
East Asia

The 2015 Rainfall Season

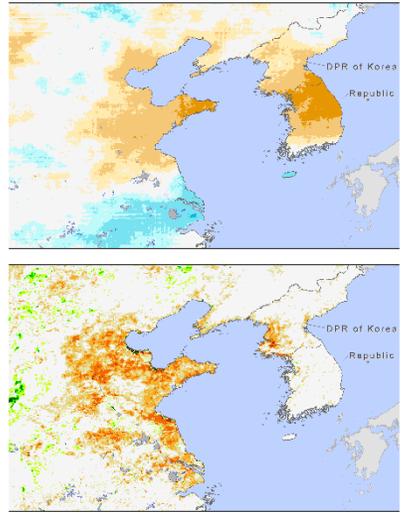


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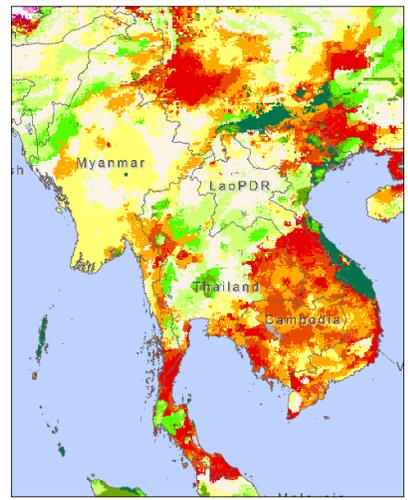
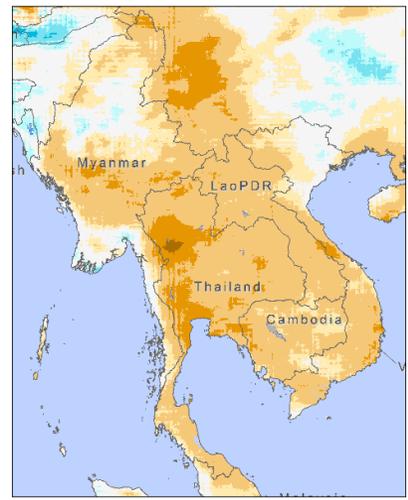
- The growing season of May-October 2015 in east Asia is unfolding under an **evolving El Nino** event that will peak in late 2015.
- **Below average rainfall** has been the **dominant feature** of the **2015** season across East Asia, particularly from Myanmar across to southern Vietnam, where noticeable delays in the onset of the agricultural growing season have already been detected.
- After a **timely and wetter** than average **start of the monsoon** season, **India** has been affected by rainfall **deficits from late June** onwards. Stronger impacts are so far being felt in the western half of the country.
- **Drier than average** conditions and **poor vegetation** cover are also affecting the **Korean peninsula** and **northeast China**. In DPRK, this adds to the effects of a significantly drier than average season in 2014.
- In contrast, **Afghanistan** and **Pakistan** have so far enjoyed a **favourable rainfall** season, with high rainfall in the Pakistani highlands ensuring adequate irrigation.
- **Seasonal forecasts** indicate **drier than average** conditions for the August-October rainfall in **India** and **southeast Asia**.
- Much **drier than average** conditions are forecast for **Indonesia**, potentially leading to negative impacts on the main agricultural season starting in late 2015.



India
 After a good start to the Monsoon, recent drier than average conditions have lead to some vegetative stress.



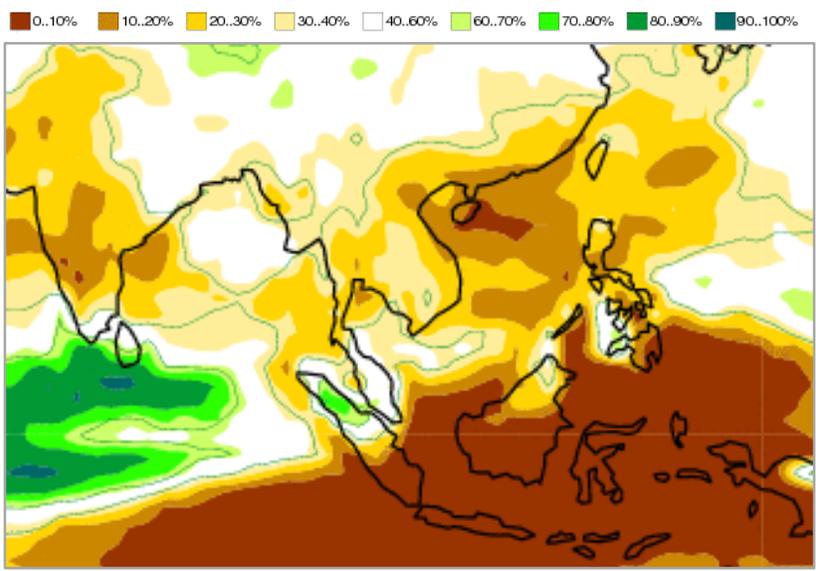
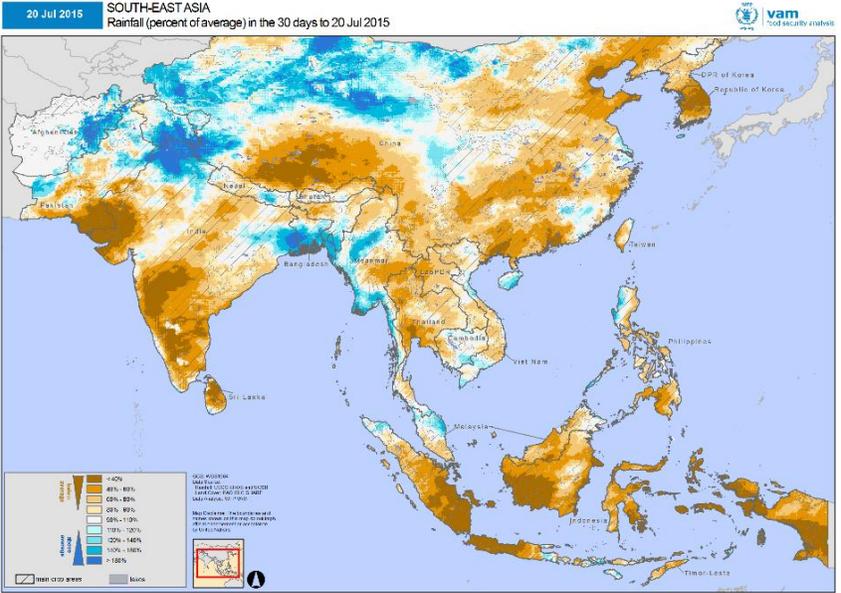
Korea and NE China
 Persistent below average rainfall in the Korean Peninsula and China (Hebei, Shandong).
 Vegetation cover visibly affected.



SE Asia
 Continued drier than average conditions since early in the season (brown areas, left map) led to significant delays in the start of the agricultural season and other disturbances (orange and red shades, right map).

Dryness settling in?

In the 30 days between late June to mid July, drier than average conditions extended across most of Asia (brown shades in map on the right).
 Should these continue into August, significant impacts on the main cropping season across the continent will be felt.



And pessimistic perspectives

Forecasts for the coming three months predict below average rainfall across most of the continent.

Current Situation and Near Term Perspectives



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20 Jul 2015

SOUTH-EAST ASIA
Total Rainfall (percent of average) by 20 Jul 2015



Overall Rainfall Performance

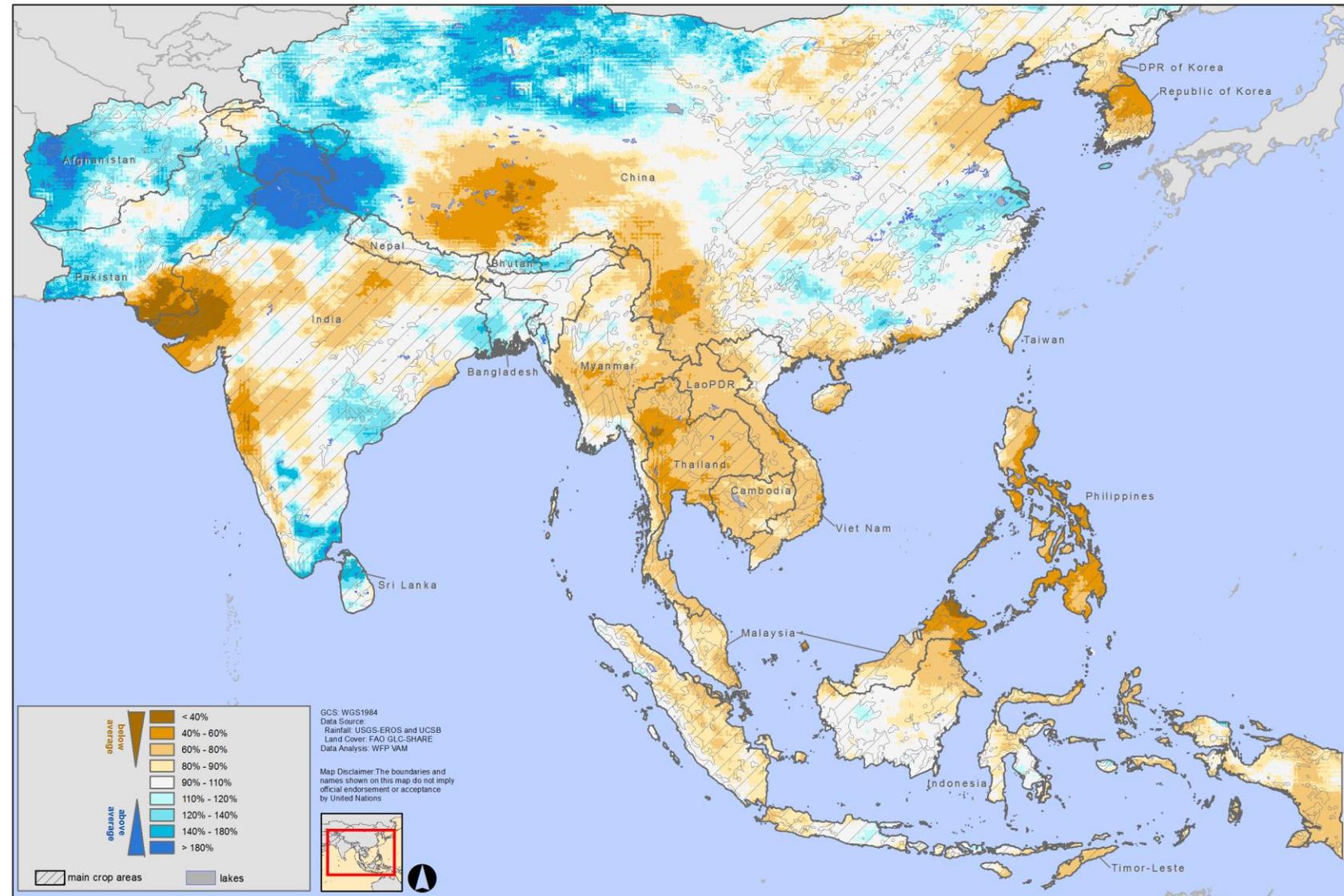
The dominant feature of the 2015 season is widespread below average rainfall.

In the Indian subcontinent, early Monsoon rains were timely and above average. However, since mid June weather conditions became drier, particularly in the west of the country (from Gujarat to Karnataka). This is leaning towards the official forecasts of a poor Monsoon cropping season.

SE Pakistan and Gujarat have endured very severe rainfall deficits since the beginning of the season. Rest of Pakistan and Afghanistan have enjoyed a favourable rainfall season thus far.

Southeast Asia, from Myanmar to southern Vietnam, and the Philippines have experienced persistent drier than average conditions since the start of the season. Although some improvements were observed in July, Thailand and northern Laos continue to face marked rainfall deficits.

Northeast China (Hebei-Shandong) and the Korean Peninsula as well as south western China (Yunnan) have continued to face rainfall deficits since early 2015. Agricultural areas of DPRK are also suffering from the cumulative effects of a fairly dry autumn and winter of 2014. During July, severe rainfall deficits have spread across Tibet and across Guangdong and Guangxi in southern China.



Total rainfall from February to 20 July 2015 as a percentage of the 20 year average.
 Hashed pattern indicates main agricultural areas.
 Brown shades indicate below average rainfall, blue shades indicate above average seasonal rainfall

EAST ASIA SEASONAL ANALYSIS - 2015

04Jul-20Jul 2015 SOUTH-EAST ASIA
NDVI (percent of average) 04Jul-20Jul 2015



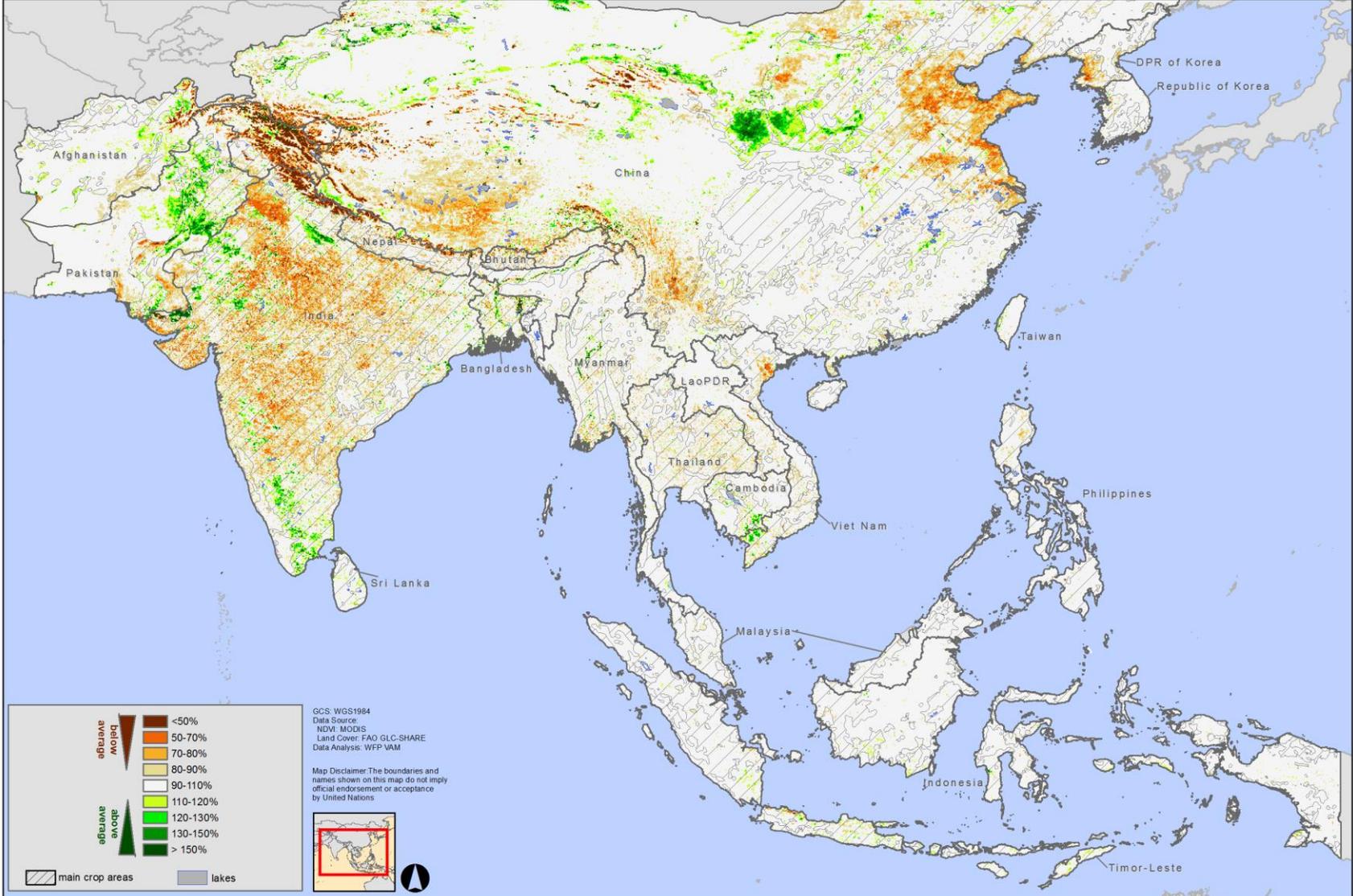
Overall Vegetation Status

Recent drier than average conditions at the onset of the core Indian Monsoon period (July to September) led to lower than average vegetation cover across most of the subcontinent. This is most noticeable in major crop growing areas of the northwest and central north.

Much below average vegetation development is also affecting major crop (wheat and corn) growing areas in NE China (Hebei and Shandong) and the agricultural areas of southwest DPRK. Similar patterns are also developing in Tibet and in south-western China (Yunnan).

SE Asia shows no discernible impact on vegetation cover arising from the early season rainfall deficits. This is due to lack of sensitivity of satellite vegetation indicators in this region – however this does not preclude impacts on farming activities such as reduction in area planted, delayed planting and stressed early crop development.

Elsewhere, strongly below average vegetation in the Kashmir region arise from longer lasting patterns of snow cover.

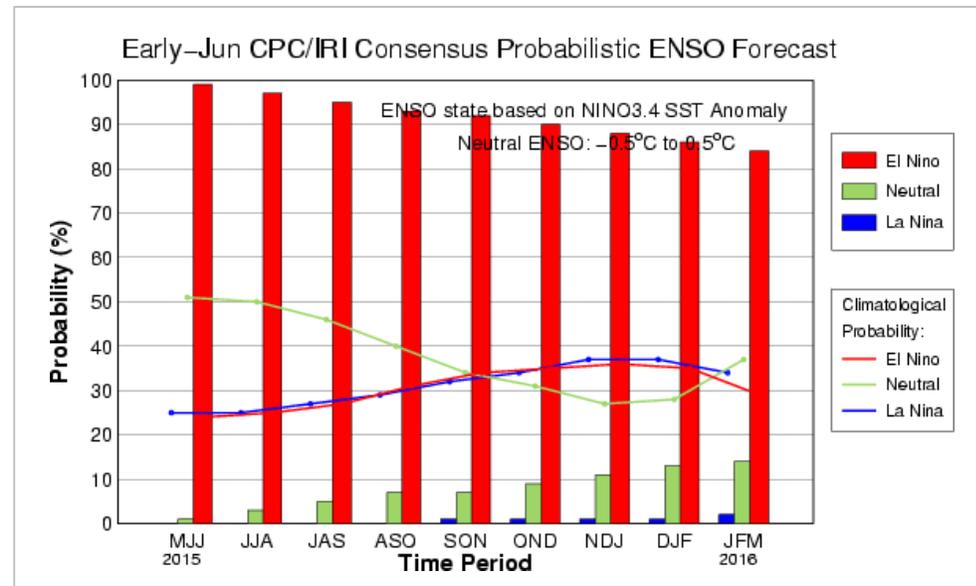


Vegetation index in mid July 2015 as a percentage of the 12 year average.
Hashed pattern indicates main agricultural areas.
Yellow-orange shades indicate below average vegetation, green shades indicate above average vegetation

The Situation So Far (late June 2015)

El Nino is historically associated with lower rainfall amounts during the northern hemisphere Summer in the Indian subcontinent and in north-eastern China, and southeast Asia to a lesser degree. Indonesia also has a strong El Nino response, with marked rainfall deficits extending throughout the year.

The critical period in terms of seasonal performance, particularly in India, is July to September. For Indonesia, the main cropping season is during October-February.



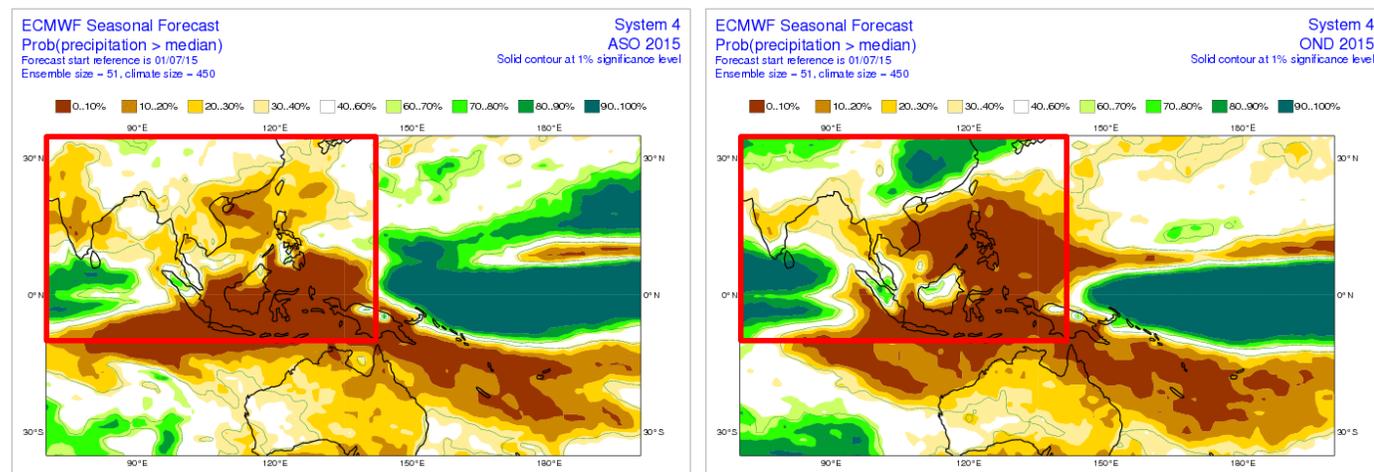
Probability of an El Nino event (red bars) vs neutral conditions (green) and La Nina (blue). El Nino probabilities remain above 90% throughout the growing seasons of Asia.

Forecasts for the season (August-October, October-December)

Forecasts for the August-October rainfall indicate drier than average conditions over most of India, southeast Asia and Indonesia. The Indian Meteorological Department issued a Monsoon forecast stating that rainfall during this period would reach 88 percent of the normal, slightly below the official “drought” threshold of 90 percent.

Forecasts for the later part of the year (October to December) are equally pessimistic with drier than average conditions intensifying over southeast Asia and particularly affecting Indonesia, where the last quarter of the year includes the planting and early development stages of the main rice and maize crops.

In the Philippines these drier than average conditions will affect the second season crops.



Seasonal forecasts for August-October rain (left) and October-December rainfall (right); orange to browns, drier than average, green shades wetter than average.

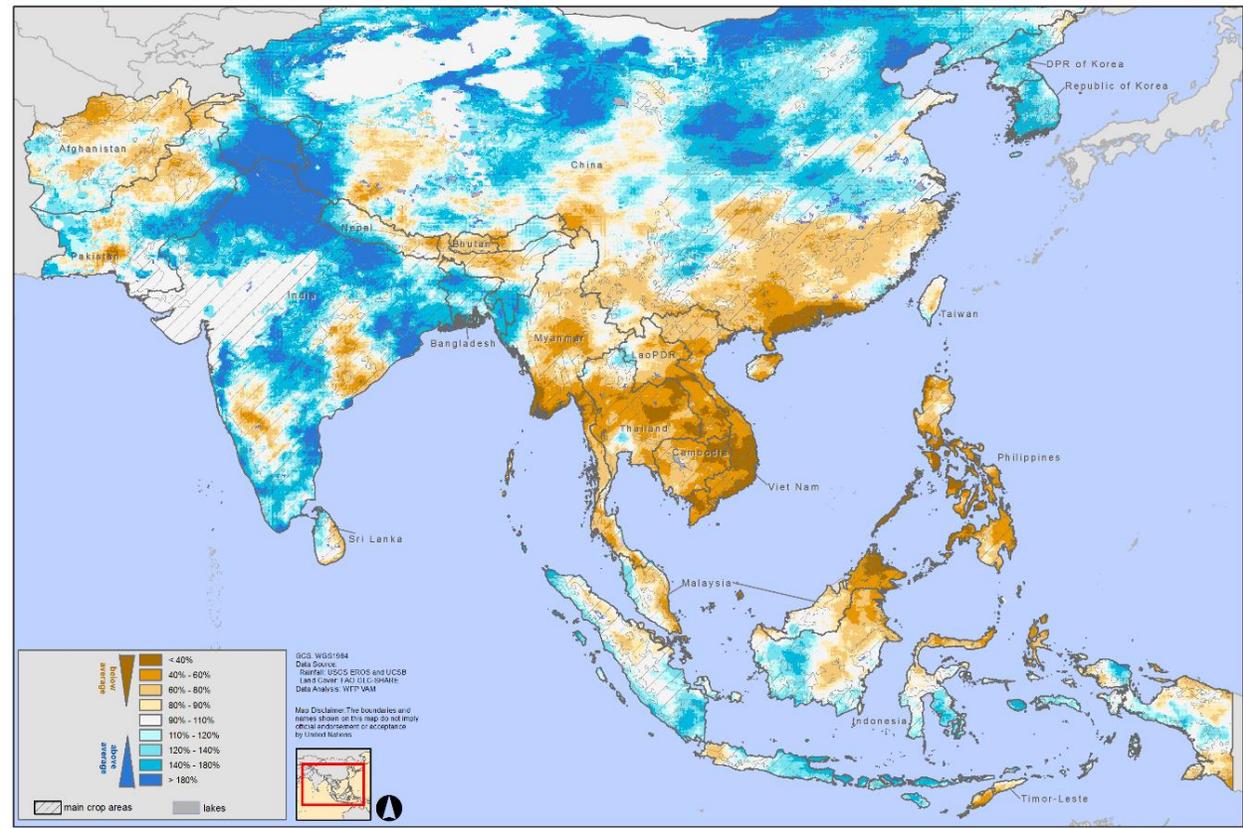
How the Season Evolved



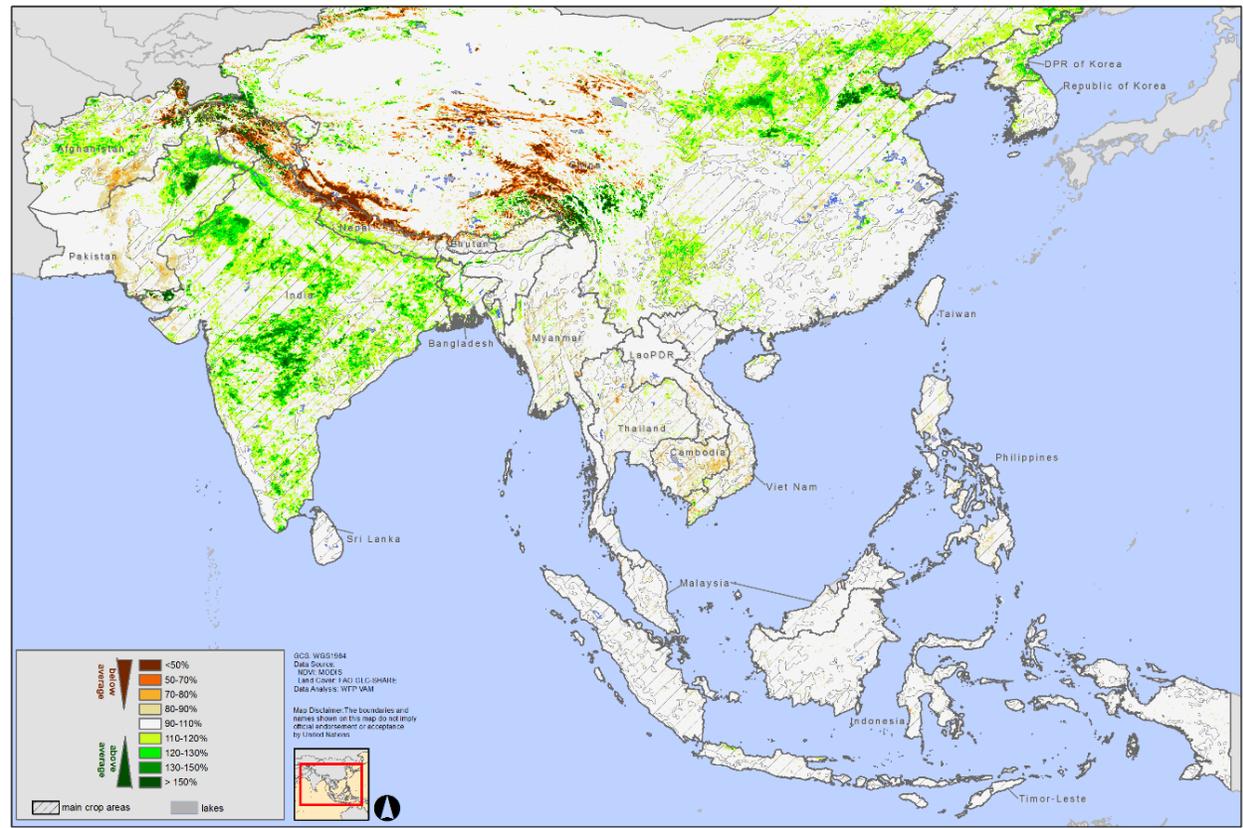
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EAST ASIA SEASONAL ANALYSIS - 2015

30 Apr 2015 SOUTH-EAST ASIA
 Rainfall (percent of average) in the 30 days to 30 Apr 2015



23Apr-09May 2015 SOUTH-EAST ASIA
 NDVI (percent of average) 23Apr-09May 2015



April 2014

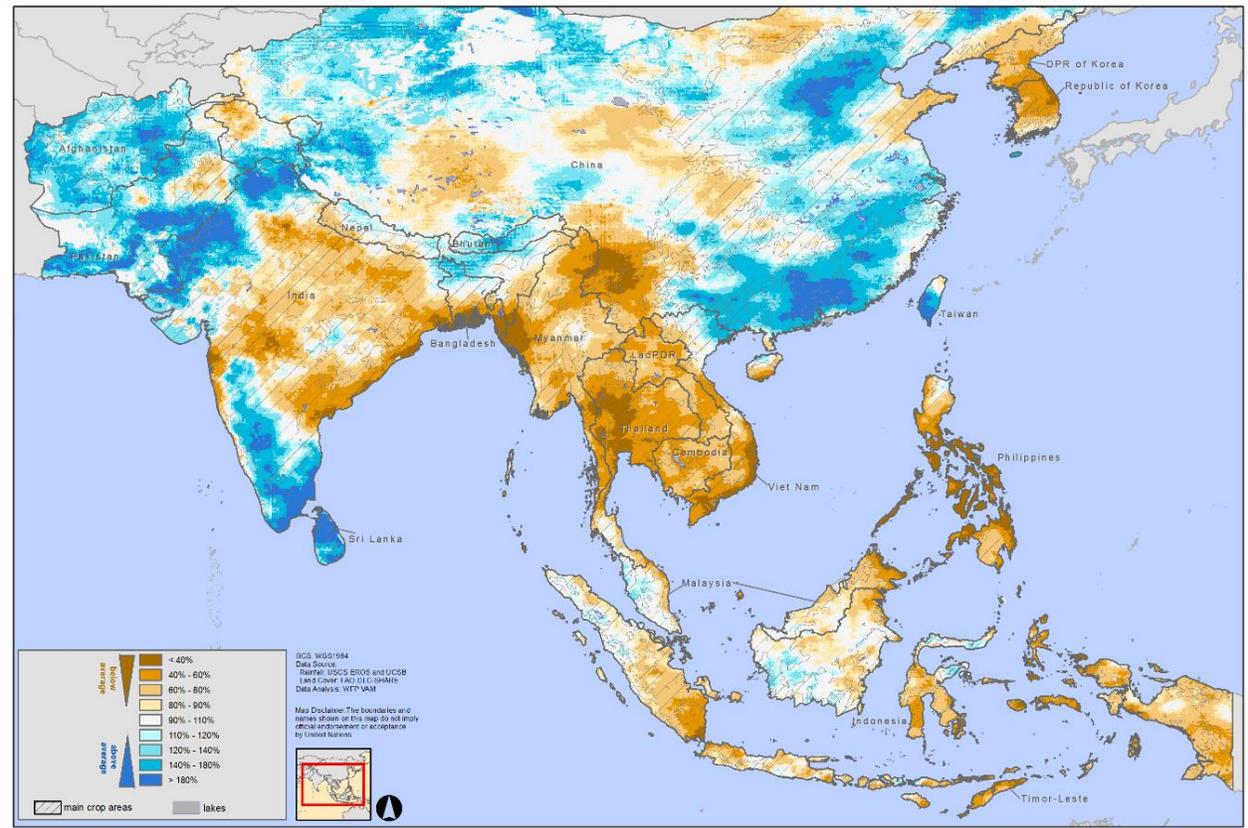
The early stages of the season (March to April) presented a variable picture across the continent, with markedly wetter than average conditions across most of India (northwest in particular), northeast China and the Korea. For DPRK this represented a brief change in a longer lasting pattern of persistent rainfall deficits. In contrast SE Asia, southeast China and Philippines showed markedly drier than average conditions during this period.

This was reflected in above average vegetation across most of the Indian subcontinent as well as northeast China. Elsewhere, very slight response was noticed in areas subjected to early season dryness.

April 2015 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall
Early May 2015 vegetation index as a percent of a 12 year average (right). Orange shades for below average, green shades for above average vegetation.
Hashed pattern indicates main agricultural areas.

EAST ASIA SEASONAL ANALYSIS - 2015

31 May 2015 SOUTH-EAST ASIA
Rainfall (percent of average) in the 30 days to 31 May 2015



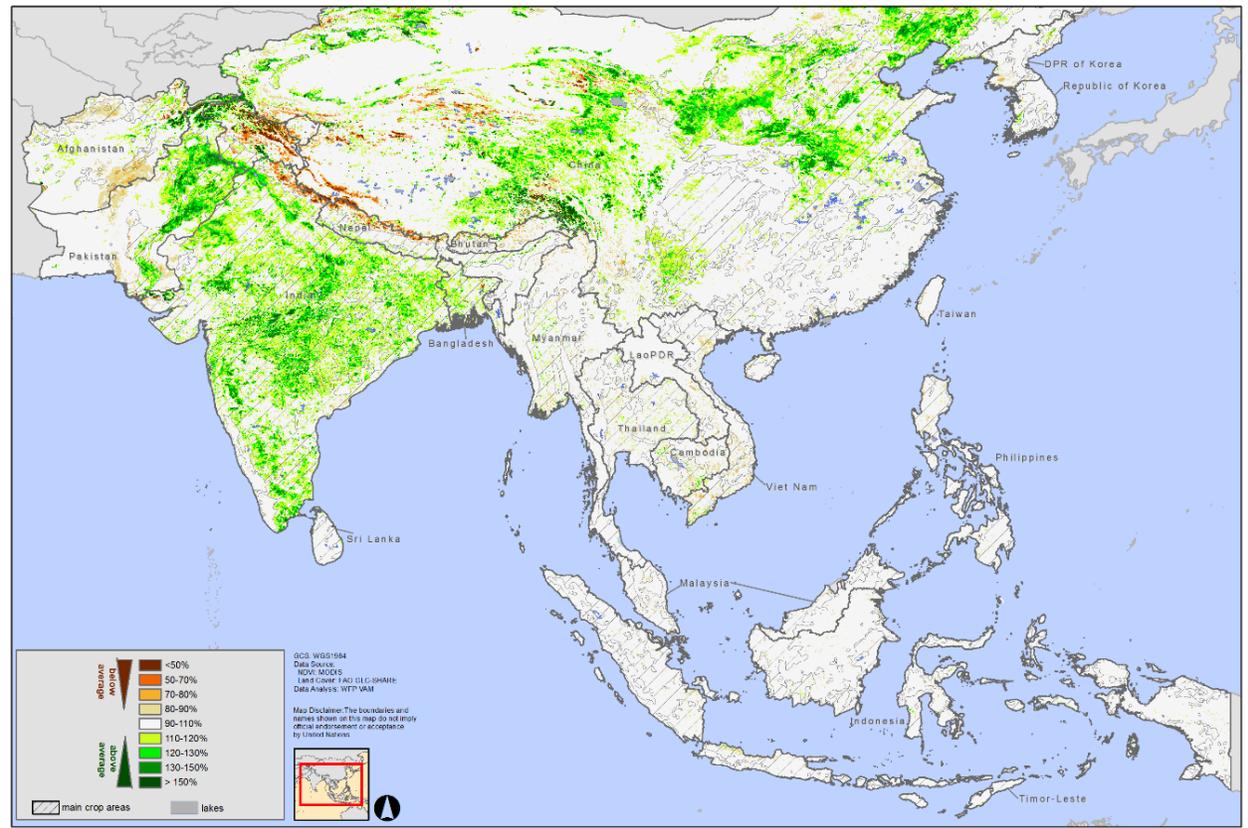
May 2014

In May, pronounced dryness continued to affect southeast Asia from Myanmar across to southern Vietnam as well as the Philippines, leading to delays in the start of the agricultural activities (planting and land preparation). The same pattern of dryness was observed across Bangladesh and into eastern and central India.

While wetter than average conditions continued in eastern China, severe dryness affected the Korean peninsula. Wetter than average conditions continued in Afghanistan and Pakistan as well.

Vegetation levels were above average due to plentiful rainfall in April and May.

25May-10Jun 2015 SOUTH-EAST ASIA
NDVI (percent of average) 25May-10Jun 2015



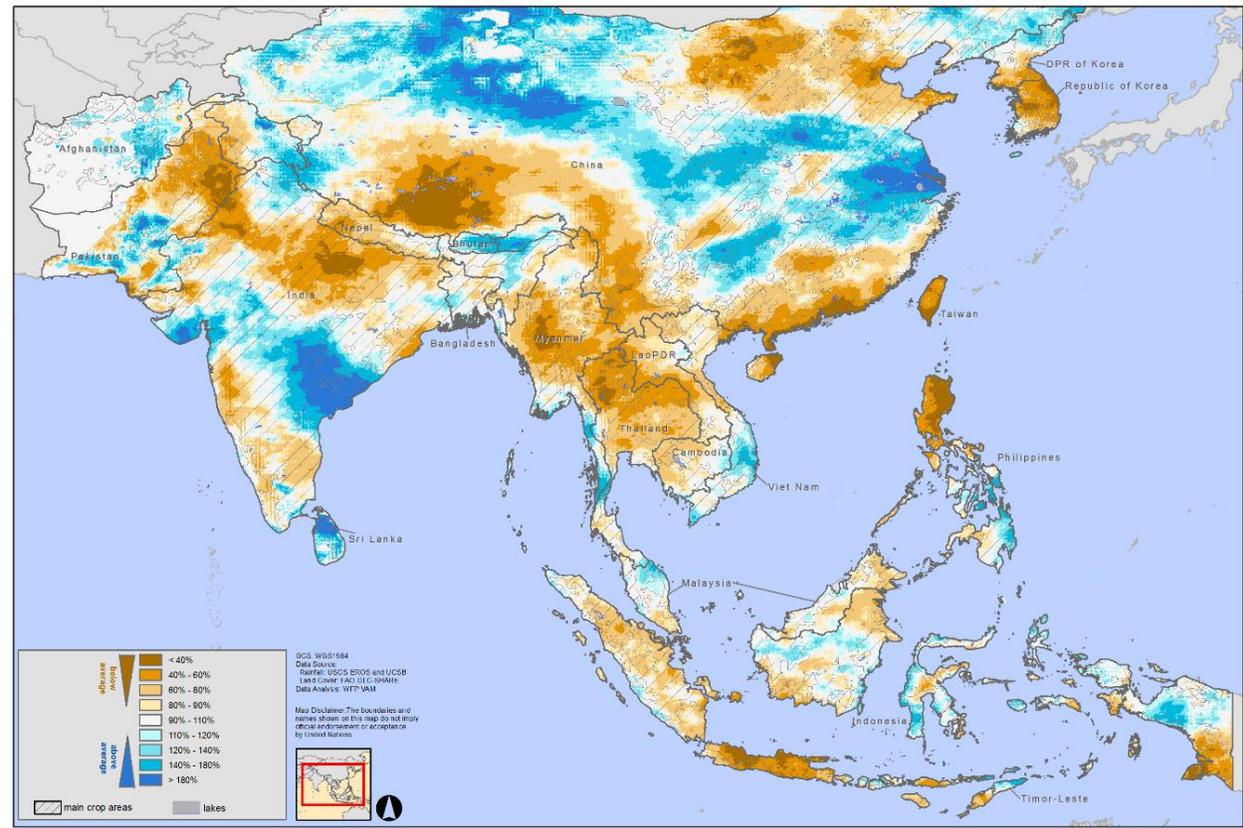
May2015 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Early June2015 vegetation index as a percent of a 12 year average (right). Orange shades for below average, green shades for above average vegetation.

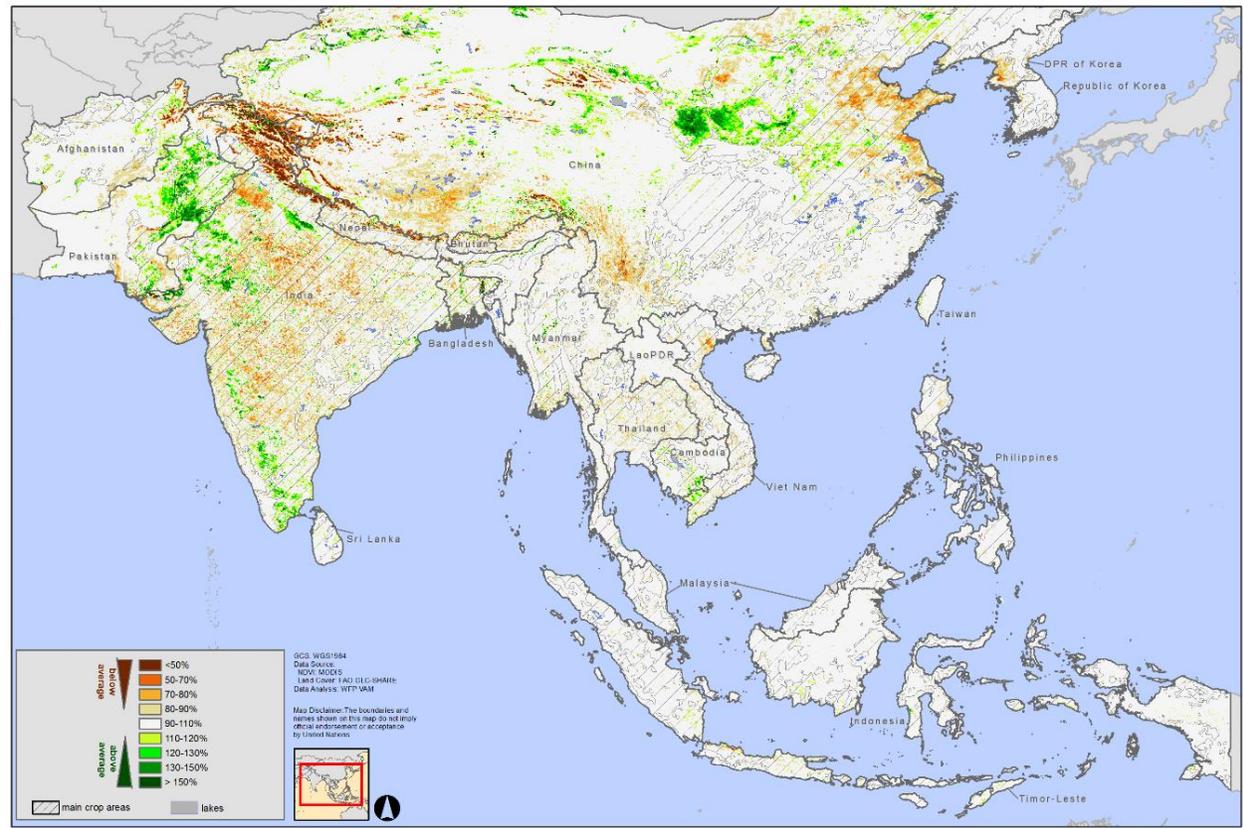
Hashed pattern indicates main agricultural areas.

EAST ASIA SEASONAL ANALYSIS - 2015

30 Jun 2015 SOUTH-EAST ASIA
Rainfall (percent of average) in the 30 days to 30 Jun 2015



26Jun-12Jul 2015 SOUTH-EAST ASIA
NDVI (percent of average) 26Jun-12Jul 2015



June 2014

In June, drier than average conditions continued to affect southeast Asia but also extended to southeast China. Markedly drier than average conditions continued to affect the Korean Peninsula and northeast China with renewed intensity.

These drier than average conditions also extended into northern and northwest India, resulting in visible negative impacts on satellite vegetation cover.

June 2015 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Early July 2015 vegetation index as a percent of a 12 year average (right). Orange shades for below average, green shades for above average vegetation

Hashed pattern indicates main agricultural areas.

Data Sources:

Rainfall: CHIRPS, Climate Hazards Group, UCSB

Vegetation: MODIS NDVI, EOSDIS-NASA

Land Cover: FAO GLC-Share

Processing:

VAM software components, ArcGIS

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