



East Asia

The 2014 Rainfall Season



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SUMMARY IMPACTS

In 2014, the monsoon rains were late across most of East Asia, leading to delays in the start of the growing season. Improved rainfall from August onwards, allowed for a good recovery across the region.

In most countries, reliance on irrigation systems and a steady expansion in the area planted helped to minimize significant impacts on national aggregate crop production. The exception is DPRK which remains structurally vulnerable to weather events. Nevertheless, there will be localised negative impacts on most vulnerable, food insecure and poor households in the affected areas. More specifically, the following countries were most affected by the drier than average 2014 season.

DPRK: A markedly drier than average 2014 has led to significant impacts on the country's agricultural production. Further shortfalls in the main cereal production will add to the already established severe drops in wheat production this spring, leading to a prolonged lean season and reduced stocks for the following season.

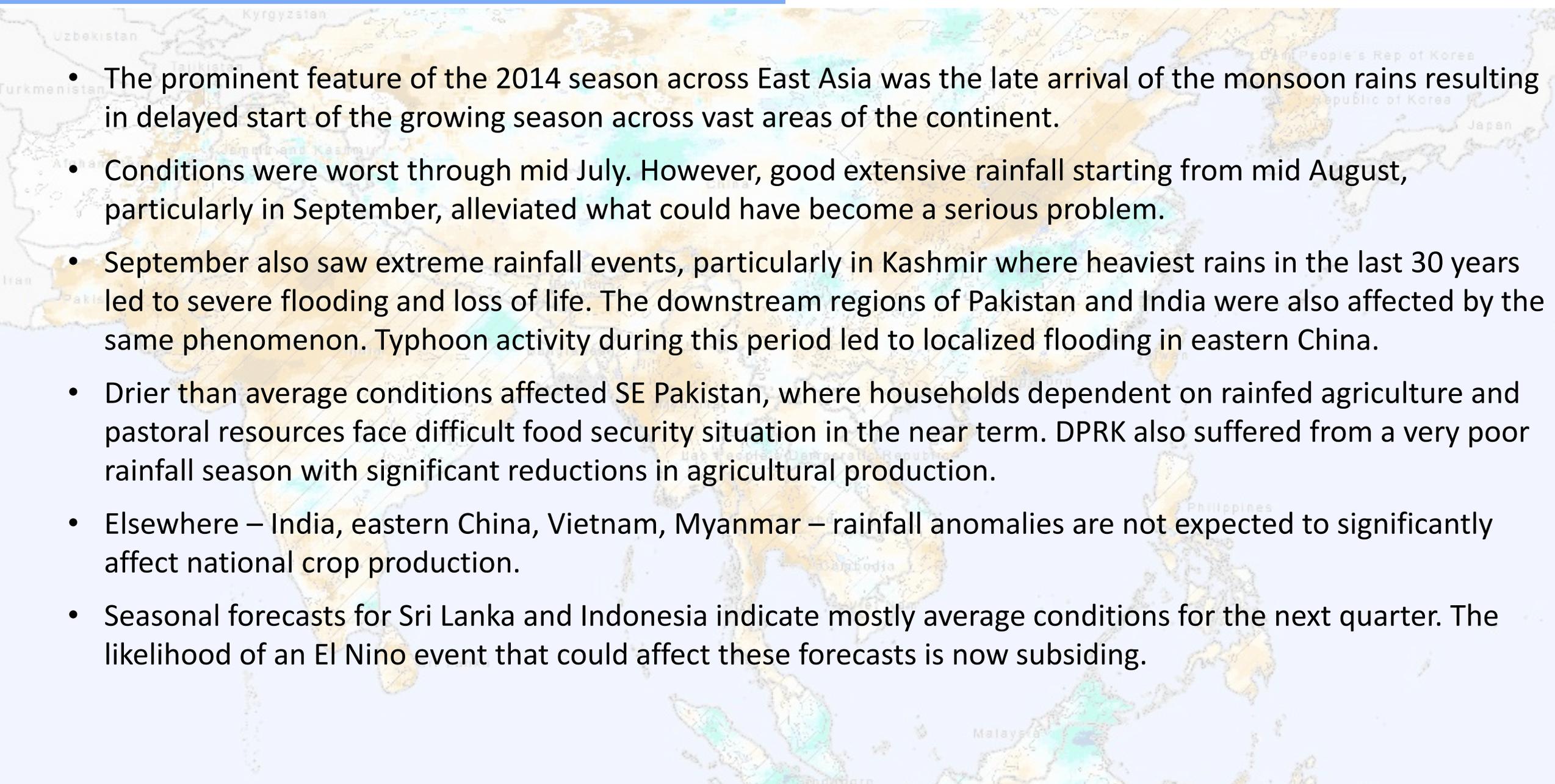
Pakistan: Though national aggregate crop production remained largely unaffected by rainfall patterns (mostly irrigated), SE areas of the country where rainfed agriculture and pastoralism are the dominant livelihoods, experienced extensive drought. Populations in Thar and other areas of Sindh province away from the irrigated agriculture will face very difficult conditions in the months ahead.

India: Late monsoon and widespread rainfall deficits will lead to a small reduction in cereal national production, largely impacting Madhya Pradesh and Maharashtra. More localised and more serious impacts are felt in NW India (Rajasthan and Gujarat) with extremely dry conditions affecting poor agro-pastoralists.

Vietnam: Drier than average conditions persisted for long periods in 2014, particularly in the South Central Coast and North Central Coast regions. Delayed arrival of the rains and mid season deficits caused problems for rainfed agriculture and also led to lower water levels in reservoirs throughout these regions.

China: Eastern areas of China endured drought conditions affecting mainly the provinces of Henan, Shandong, Shaanxi and Hebei. Significant rainfall deficits hit these areas at the critical development stage of cereal crops (mainly corn). Although there will be little if any consequences on the national aggregate production, localised impacts could be significant.

Myanmar: Drier than average conditions were again the norm, in particular with late starts of the season, and dry conditions during critical crop development stages (July). The season was also shorter, with much drier than average late stages (Oct-Nov). The central mainly agricultural regions, were most seriously affected.

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- The prominent feature of the 2014 season across East Asia was the late arrival of the monsoon rains resulting in delayed start of the growing season across vast areas of the continent.
 - Conditions were worst through mid July. However, good extensive rainfall starting from mid August, particularly in September, alleviated what could have become a serious problem.
 - September also saw extreme rainfall events, particularly in Kashmir where heaviest rains in the last 30 years led to severe flooding and loss of life. The downstream regions of Pakistan and India were also affected by the same phenomenon. Typhoon activity during this period led to localized flooding in eastern China.
 - Drier than average conditions affected SE Pakistan, where households dependent on rainfed agriculture and pastoral resources face difficult food security situation in the near term. DPRK also suffered from a very poor rainfall season with significant reductions in agricultural production.
 - Elsewhere – India, eastern China, Vietnam, Myanmar – rainfall anomalies are not expected to significantly affect national crop production.
 - Seasonal forecasts for Sri Lanka and Indonesia indicate mostly average conditions for the next quarter. The likelihood of an El Nino event that could affect these forecasts is now subsiding.

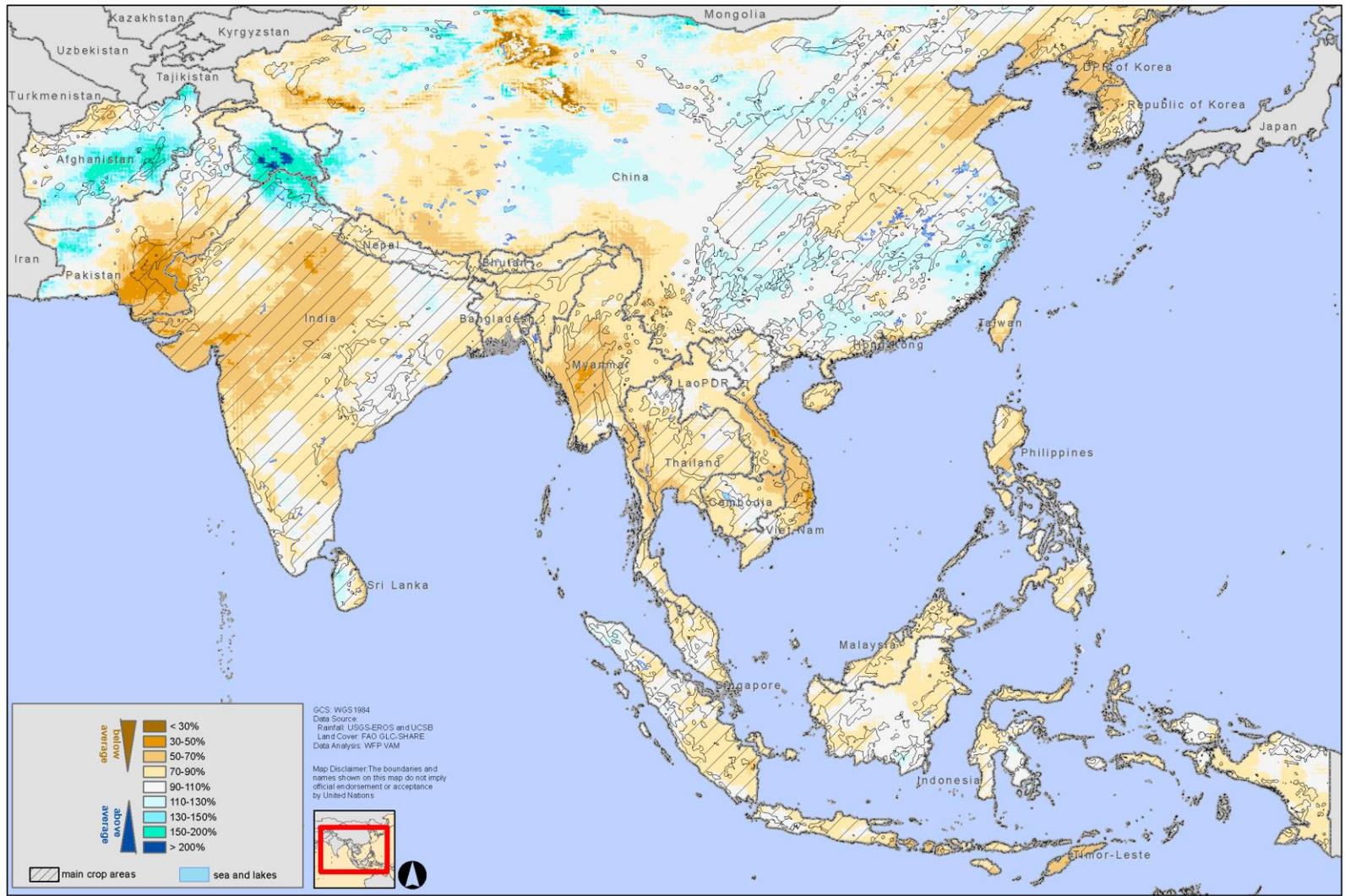
Current Situation and Near Term Perspectives



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30 Oct 2014 SOUTH-EAST ASIA
 Total Rainfall (percent of average) by 30 Oct 2014



Overall Rainfall Performance

The dominant feature of the 2014 season is the vast extent of below average rainfall. During the first half of the year, El Nino like conditions affecting weather across the globe, led to late arrival of the monsoon and delayed starts of the growing season across much of the continent.

This was followed by continued drier than average conditions across many areas, compounded by irregular rainfall distribution. Good September rains provided relief to an otherwise difficult situation.

In September, heavy rainfall events led to flooding in Kashmir along with downstream India and Pakistan. Eastern China also experienced flooding due to typhoon activity. These events however do not reverse the overall dominance of rainfall deficits which defined the 2014 season.

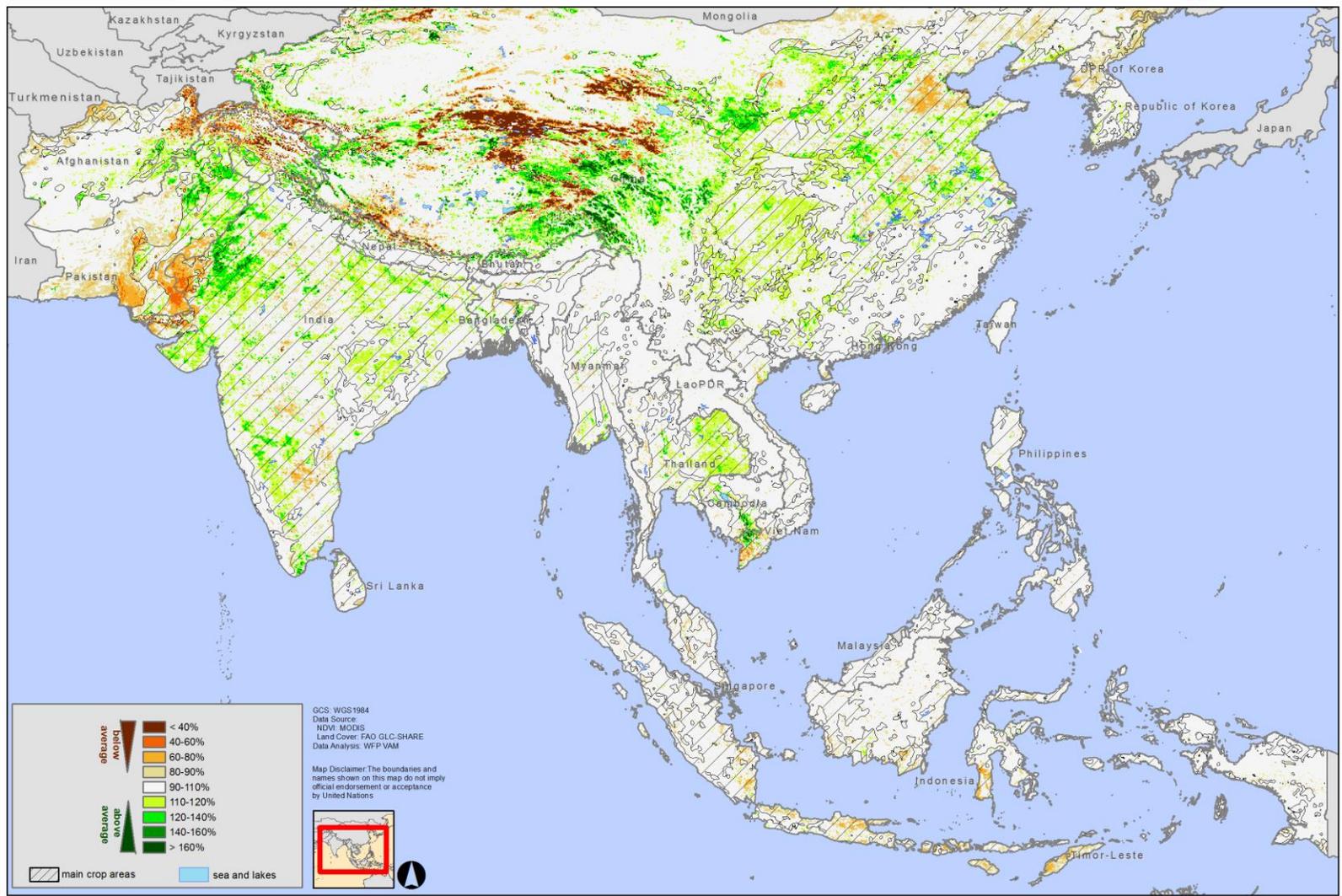
Accordingly, widespread patterns of below average rainfall can be seen in SE Pakistan, NW India, North Korea, NE China as well as parts of SE Asia (Myanmar and Vietnam). Areas of above average rainfall mainly result from exceptional September rains.

Areas worst affected by dry conditions include SE Pakistan with persistent and serious dryness since early 2014. Dryness also affected DPRK, eastern China (Henan and Shandong), India (Rajasthan, Madhya Pradesh, Maharashtra), central Myanmar and Vietnam. However, in most cases, the effect on aggregate national crop production has been minimal.

Total rainfall from 1 February to 30 October 2014 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

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16Oct-01Nov 2014 SOUTH-EAST ASIA
NDVI (percent of average) 16Oct-01Nov 2014



Overall Vegetation Status

Towards the end of 2014, above average vegetation was dominant across most of the region. This is not tied to a better than average growing season, but instead a result of late vegetation development due to generalized delays in the onset of the monsoon.

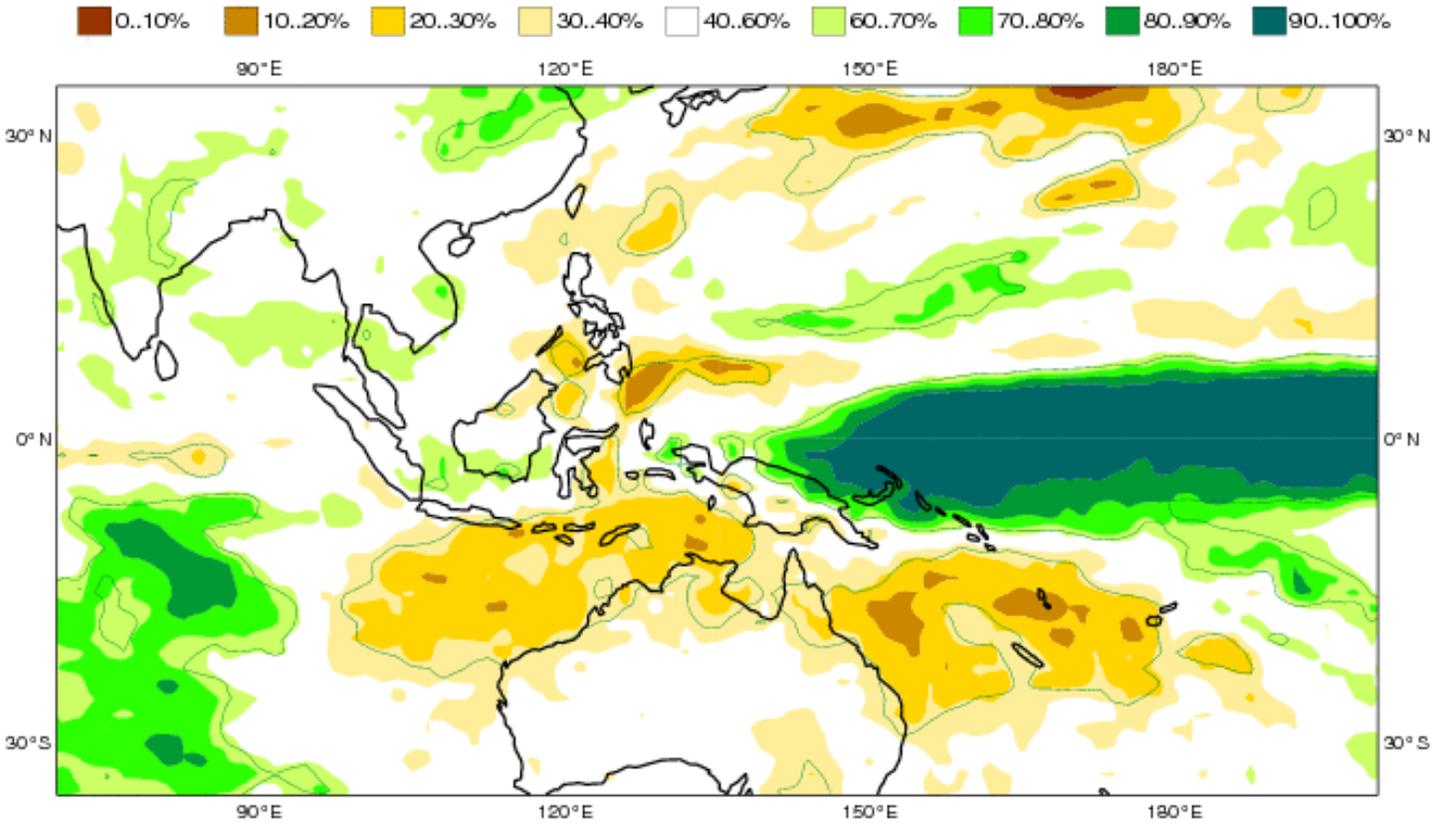
These delays in the season, led to markedly below average vegetation levels particularly evident during the first stages of the season (July). The late arrival of rains and wetter than average September pushed vegetation development to the later part of the season, resulting in higher vegetation levels than usual for this time of the year.

The exception to this overall pattern occurs in SE Pakistan (Sindh province), where pronounced vegetation deficits are observed away from the major irrigated areas, resulting from continued below average rainfall. This reflects serious problems for households dependent on rainfed agriculture or pastoral resources. Over the border in India, exceptional vegetation growth is a consequence of wetter than average rains during September.

*Vegetation index in late August 2014 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*

ECMWF Seasonal Forecast
Prob(precipitation > median)
Forecast start reference is 01/11/14
Ensemble size – 51, climate size – 450

System 4
DJF 2014/15
Solid contour at 1% significance level



Forecasts for the remainder of the season (December 2014 – February 2015)

During this period, most of the region does not register significant rainfall except for Indonesia, Malaysia, eastern Philippines as well as the southeast India coast and Sri Lanka. In these areas the period October to April is the wettest in the year.

Forecasts for the rainfall within this period for these areas are broadly normal with some tendency for drier than average conditions in parts of Indonesia and the Philippines.

Forecast for the December-February (DJF) 2014-2015 rainfall: Probability of DJF rainfall exceeding the usual amount (long term median).

Green shades – higher likelihoods of wetter than usual conditions, yellow/browns – higher likelihoods of drier than usual conditions.

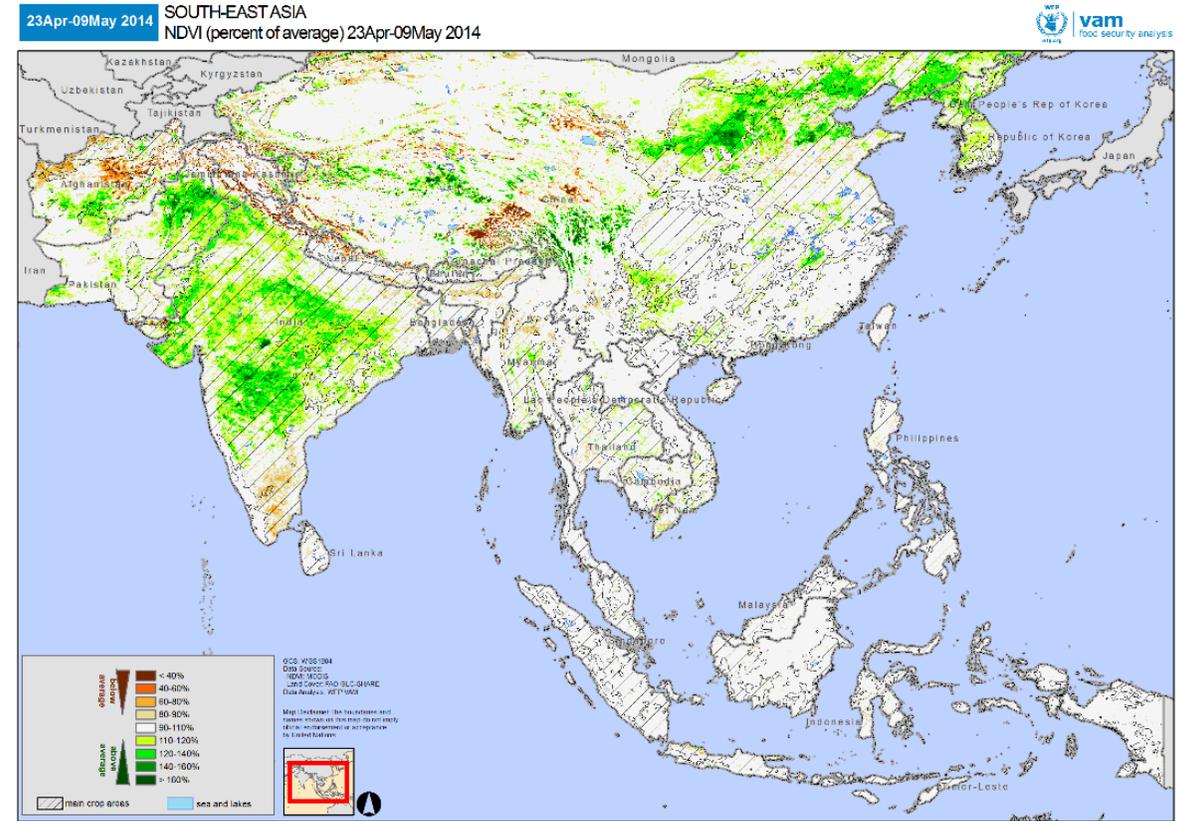
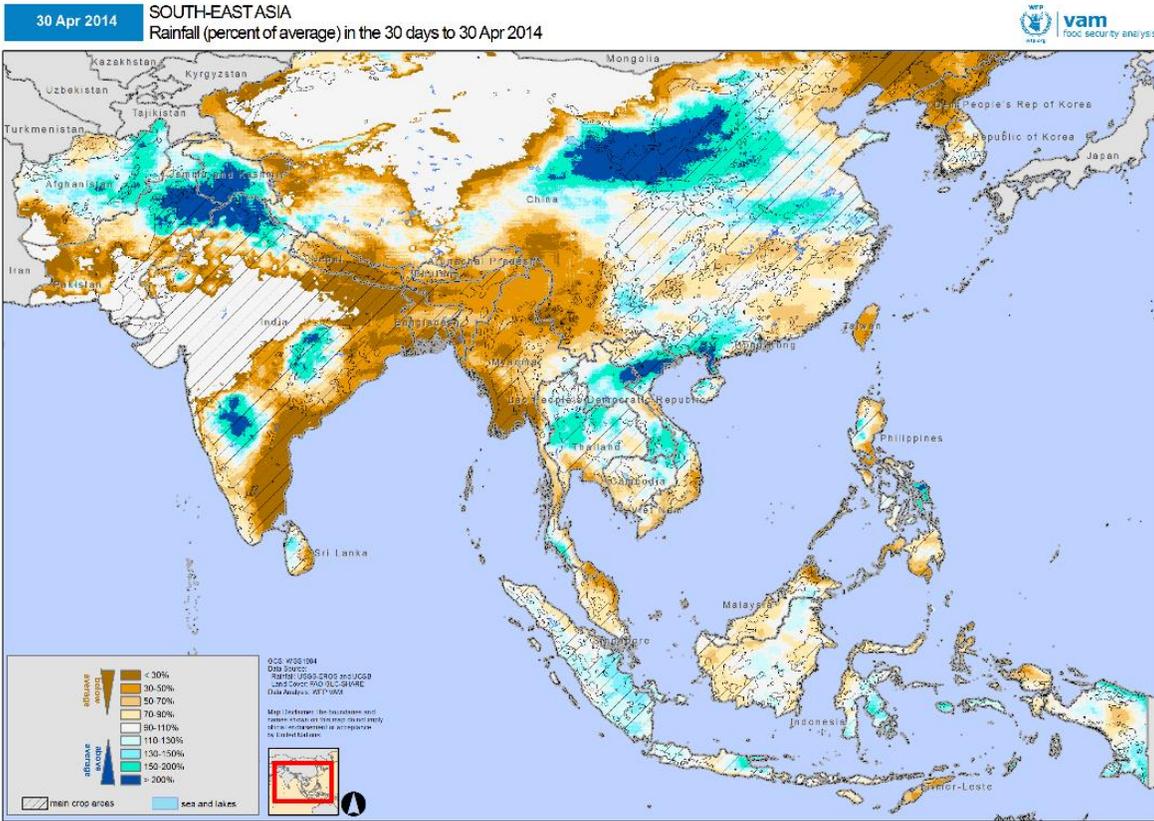
Source: ECMWF.

How the Season Evolved



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April 2014

The early stages of the season (March to April) presented a variable picture across the continent, with markedly wetter than average conditions in northern India, northern Pakistan, central India and northern China. This led to earlier than usual vegetation development in these areas.

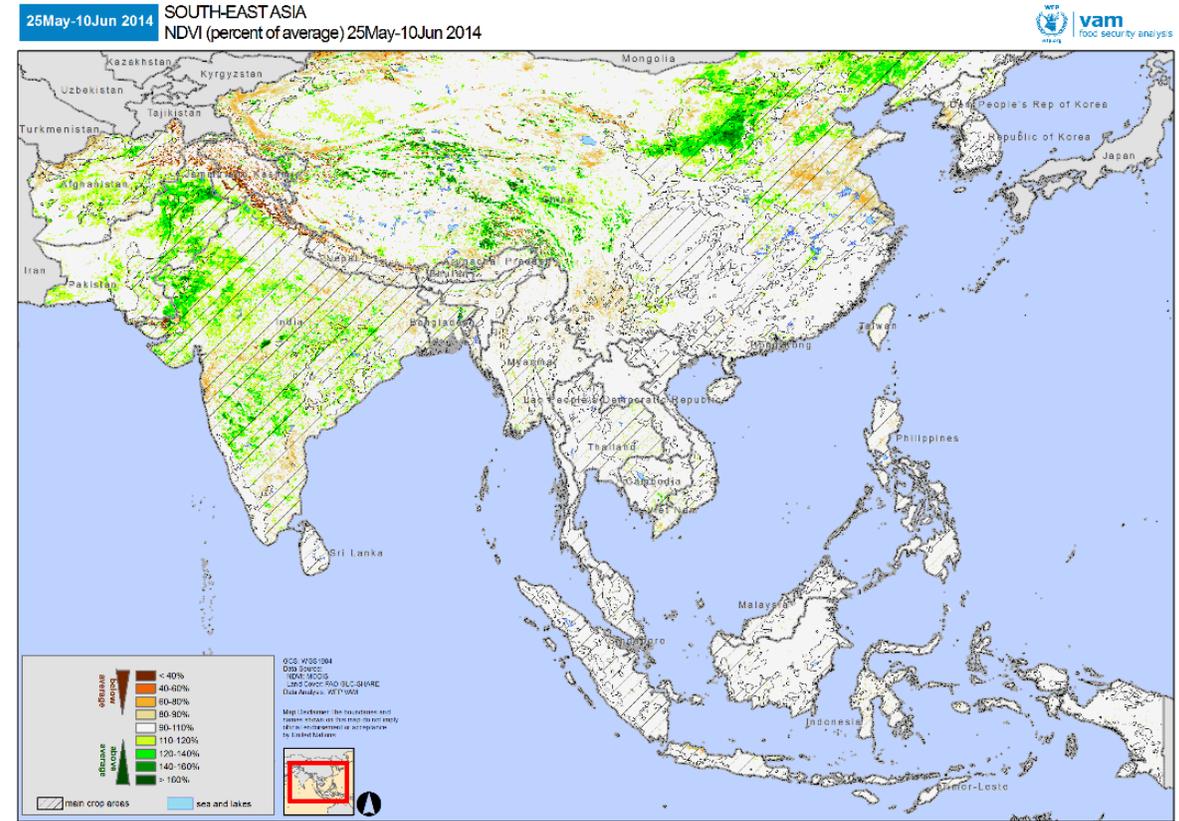
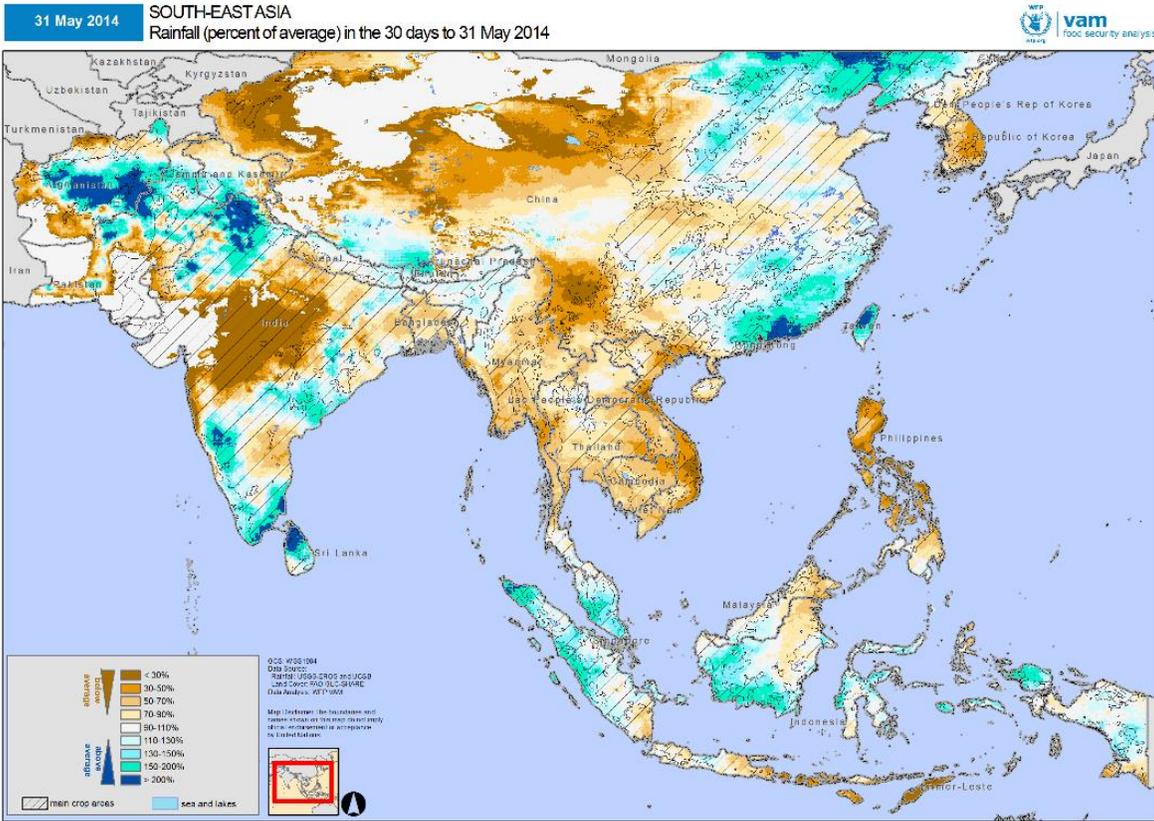
Although elsewhere drier than average conditions persisted, they posed less concern as it was during the early stages of the agricultural season.

April 2014 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 2014 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.

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May 2014

During May, wetter than average conditions continued in a vast region from Afghanistan to Nepal as well as Southern India and SE China.

Dry conditions also continued across Madhya Pradesh and Gujarat, India. Southeast Asia and the Philippines also faced drier than average conditions, though this did not extend to Malaysia and Indonesia.

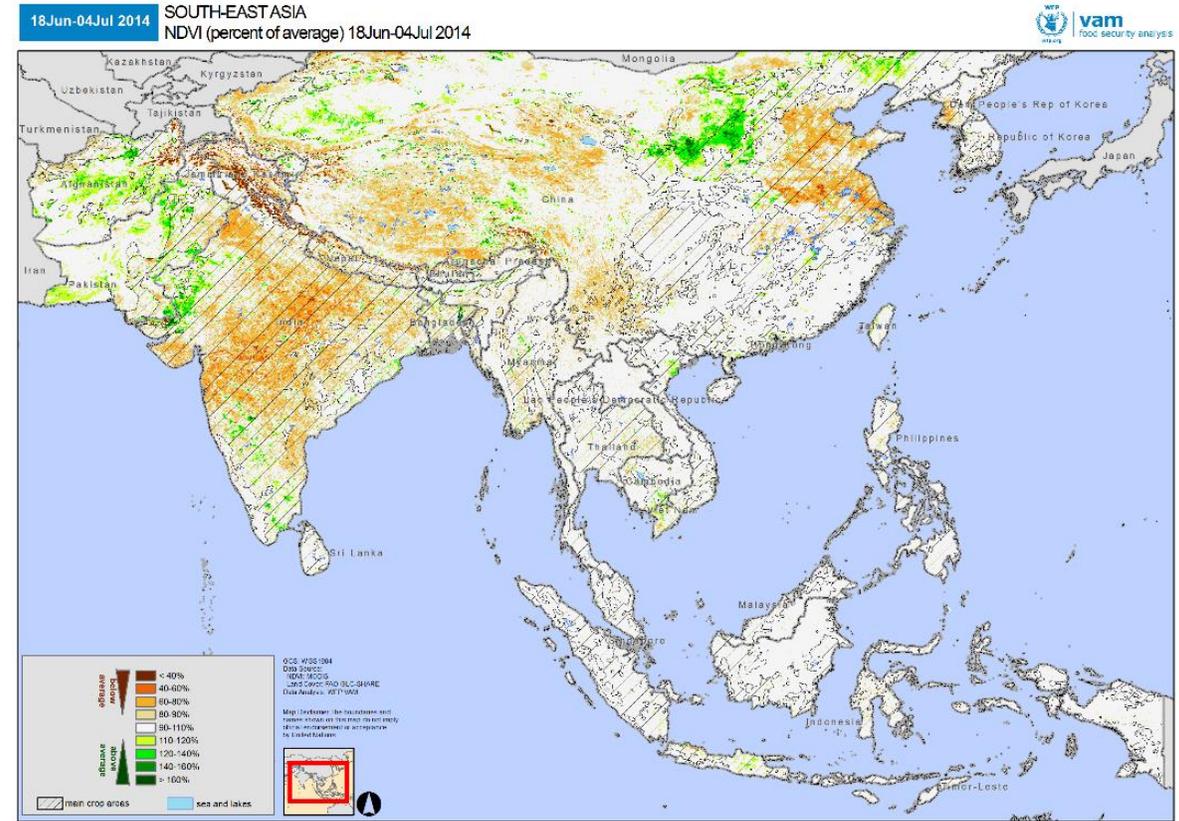
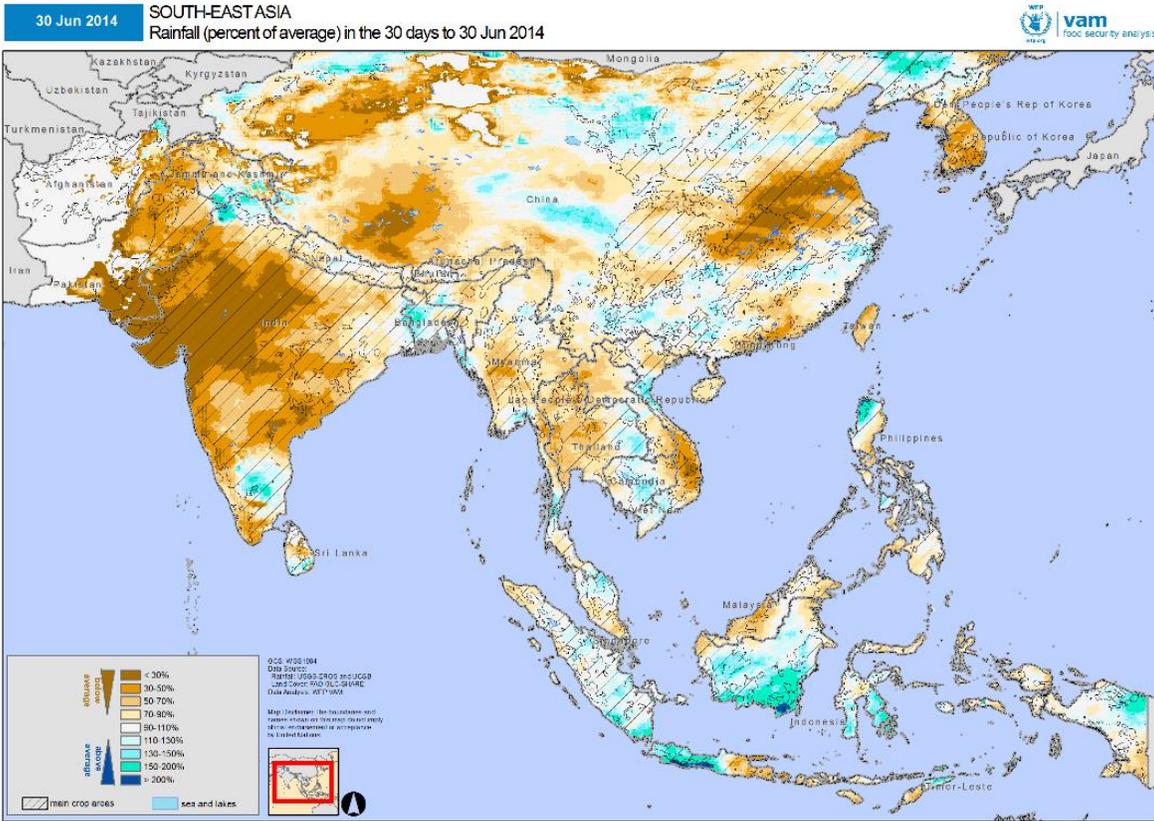
Vegetation levels started to converge to normal as previous rainfall surpluses decreased.

May 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Early June 2014 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 - 2014



June 2014

In June, El Nino like conditions spreading across wide areas of the globe led to marked dryness across much of Asia. In particular much drier than average conditions extended further across India spreading from Gujarat – Madhya Pradesh into southern Pakistan.

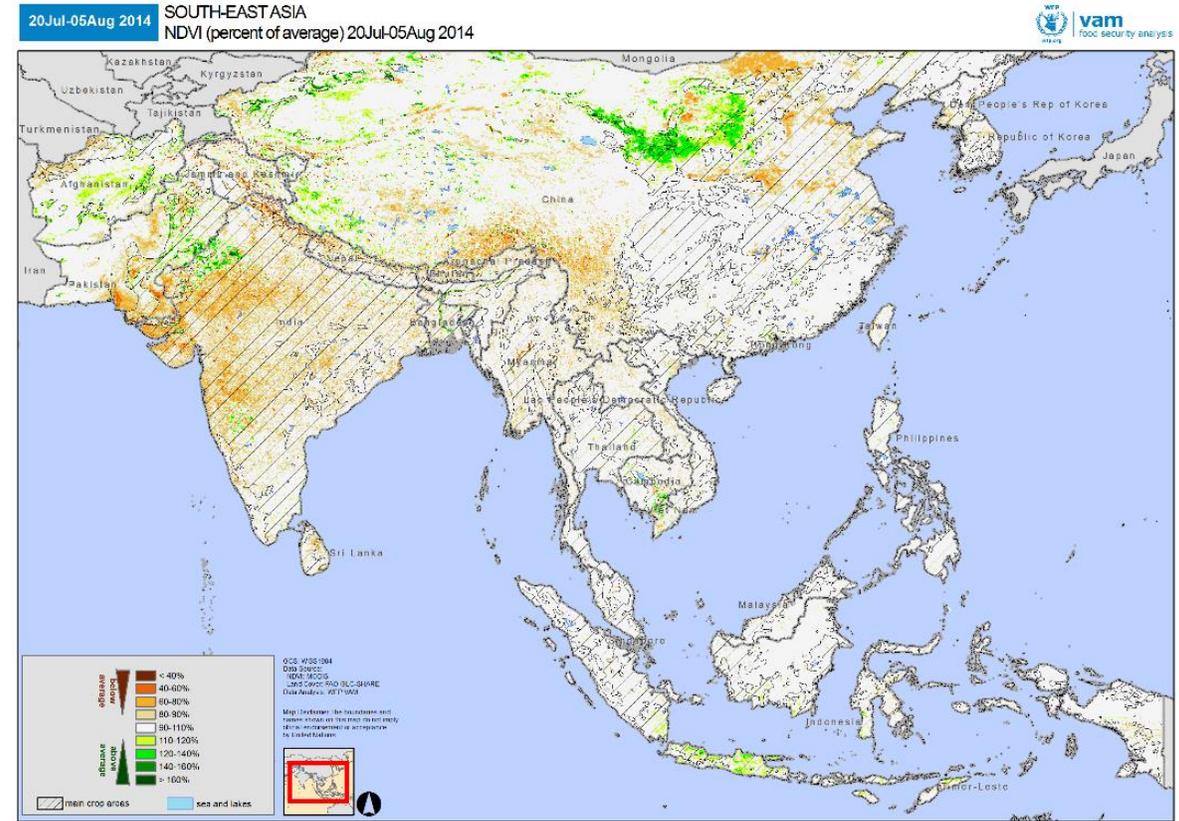
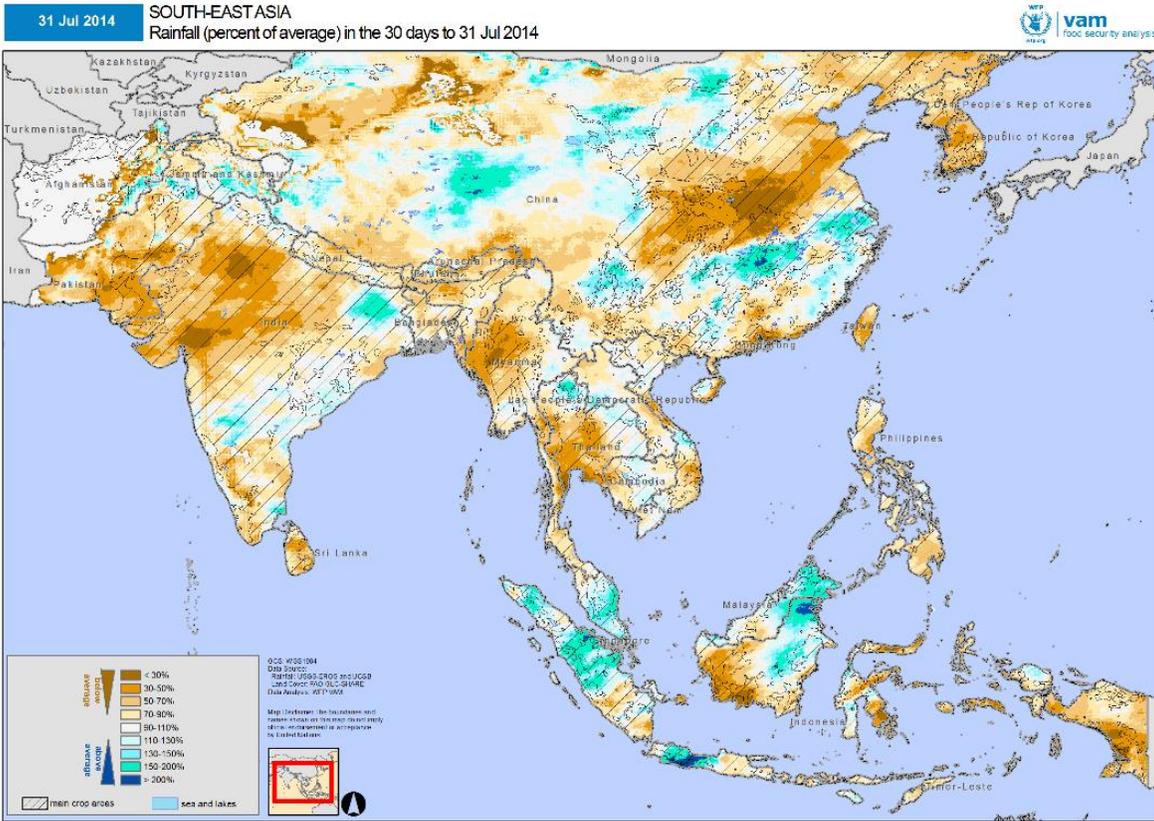
This was also the case in Myanmar, Thailand and Vietnam as well as in the agricultural regions of eastern China and the Koreas. Indonesia and, to a lesser degree, Malaysia were not really affected.

In the more seriously affected regions, below average vegetation levels show the impact of the rainfall deficits, particularly across India's agricultural regions.

June 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Late June 2014 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 - 2014



July 2014

Drier than average conditions were again much in evidence across Asia. These reached maximum intensity around mid-July in India and SE Pakistan. Other affected regions included the Myanmar dry zone, central Thailand, southern Vietnam and eastern China (Shandong-Henan); the Korean peninsula endured yet another drier than average month.

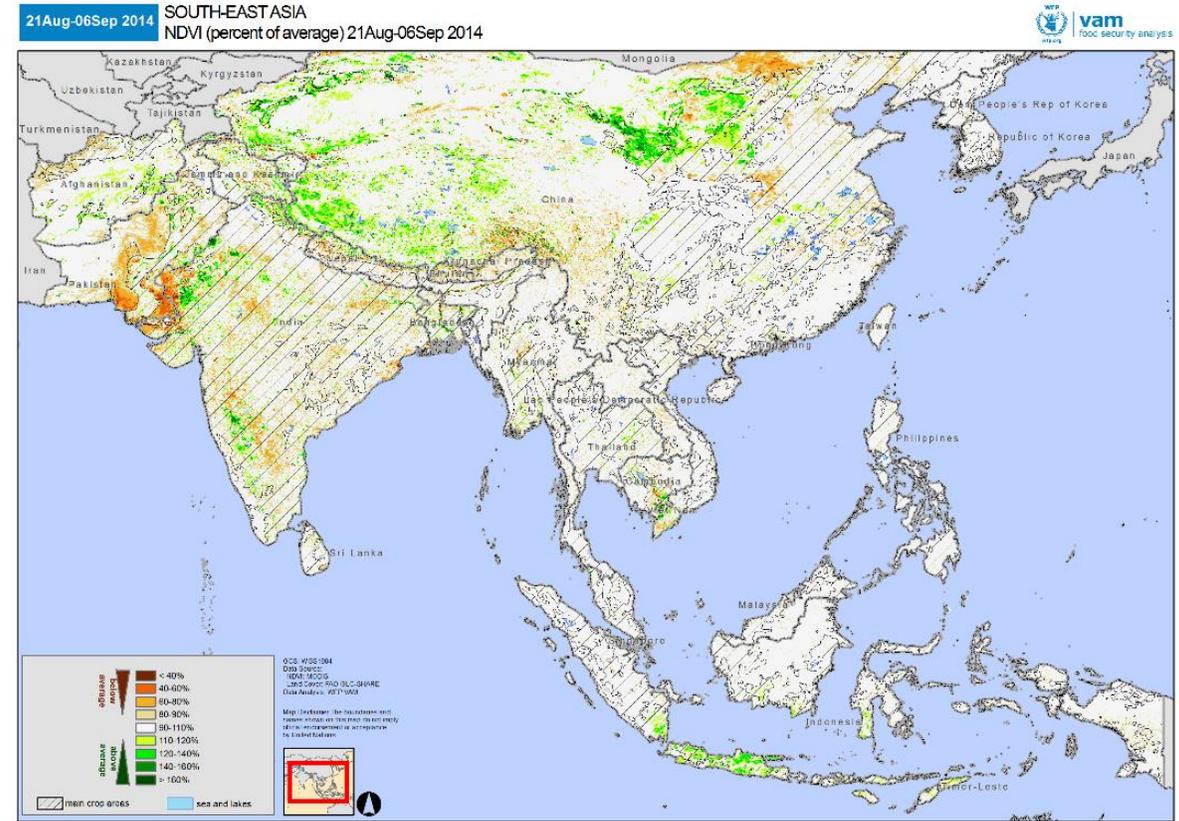
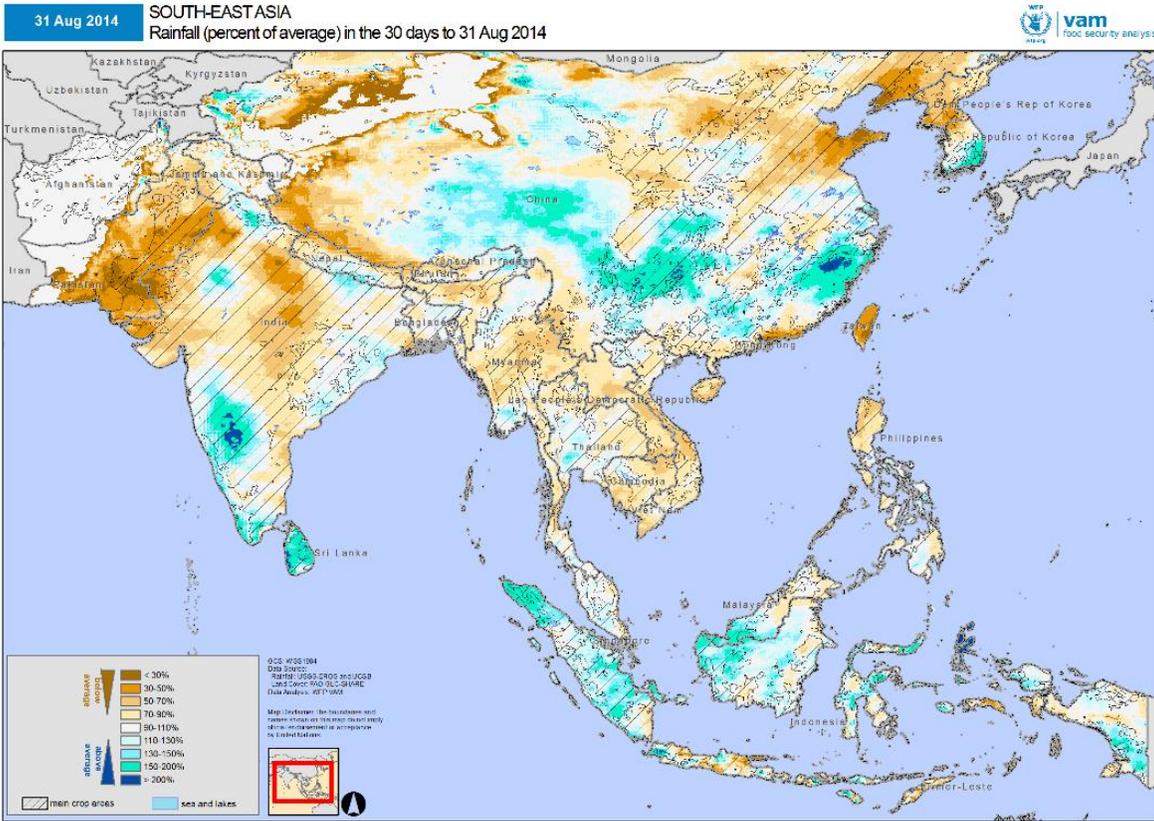
Late July brought significant improvement across most of these regions but overall dryness remained.

Greater rainfall deficits led to more markedly below average vegetation levels in NW India and in SE Pakistan, but the wetter conditions in late July brought significant recovery elsewhere.

July 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Early August 2014 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 - 2014



August 2014

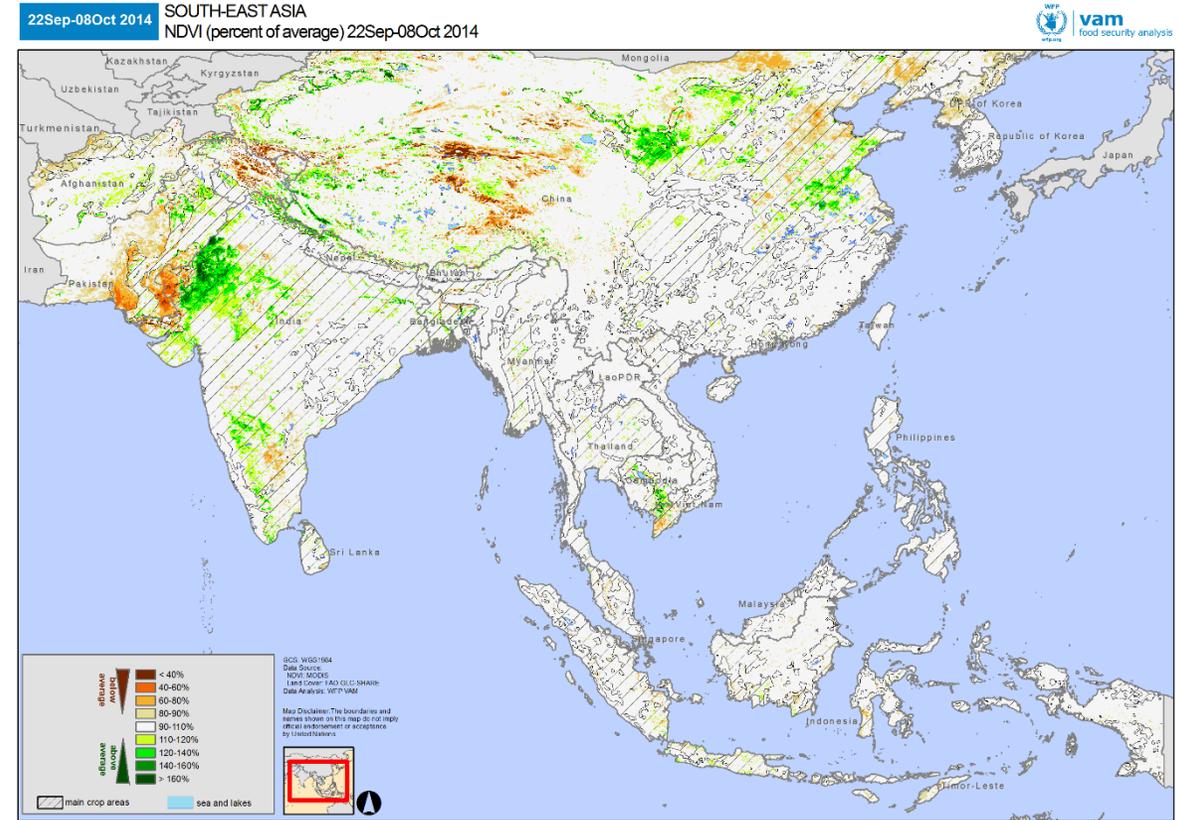
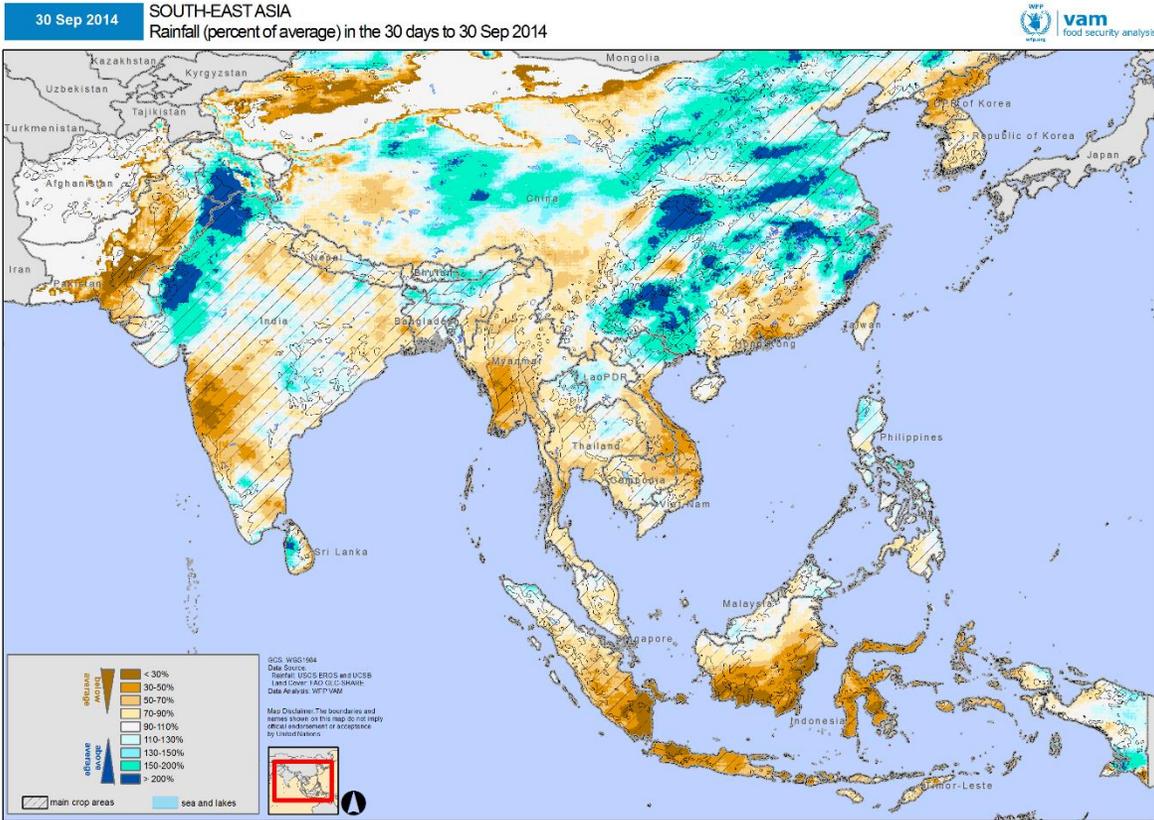
Conditions in August improved as rainfall deficits became less intense. Previously affected regions registered only moderate deficits this month, except for southern Pakistan where rainfall deficits were maintained or even increased. Here, impacts on rainfed crops may be significant.

Noticeable improvements were observed over China, though intense rainfall led to flooding in some areas; conditions remained good across Indonesia and Malaysia.

More favourable rainfall has helped to recover vegetation back to normal levels across the region by the end of August. However, unfavourable conditions still remain in SE Pakistan.

August 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall
Late August 2014 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 - 2014



September 2014

Kashmir registered very heavy rains early in the month, resulting in widespread flooding with loss of life and population displacement. There was additional flooding in the Punjab and Rajasthan, due to further heavy rains along the India-Pakistan border. In eastern China there was widespread above average rainfall with very intense events leading to localised flooding, partly due to tropical storms coming across from the Philippines.

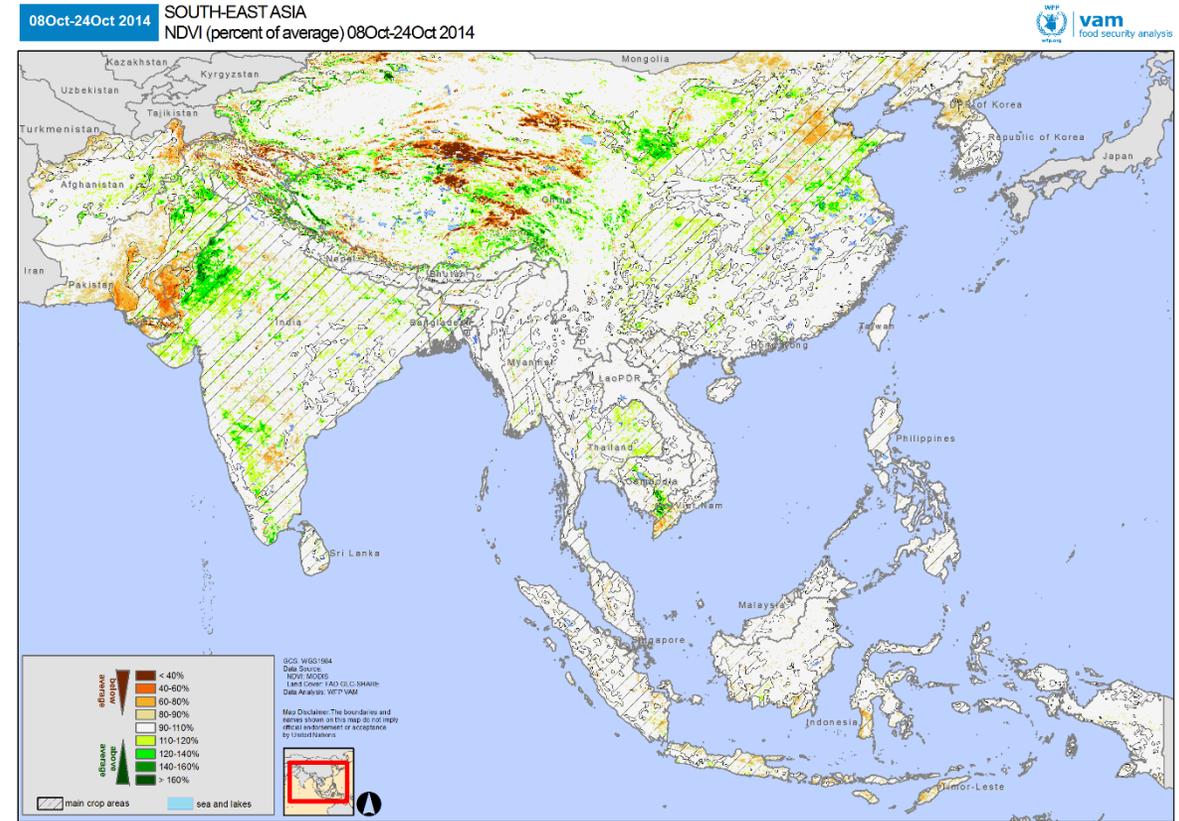
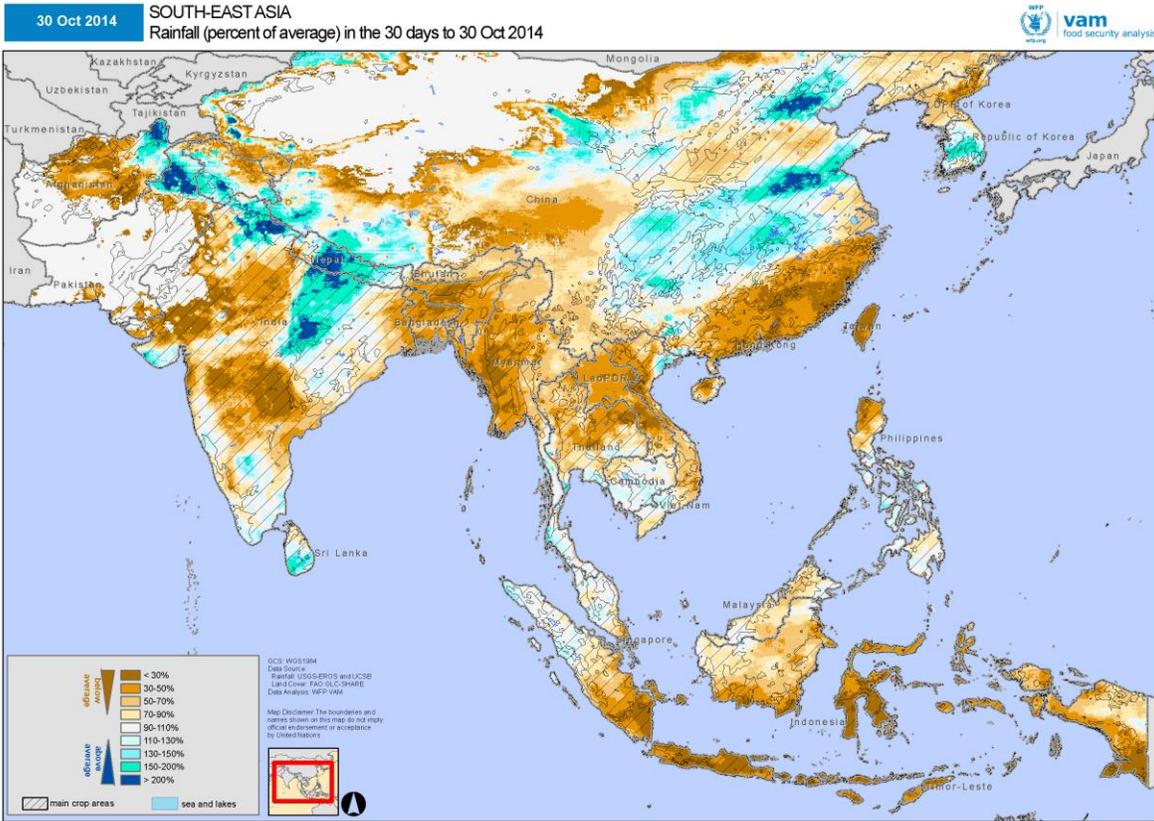
Drier than average conditions continued in SE Pakistan and the Korean peninsula, areas affected by persistent dryness throughout the season; Indonesia and Malaysia also experienced a drier than usual September. Vegetation levels are clearly above average across most of the region, given the wetter than average conditions this month and a broadly delayed growing season.

September 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Late September 2014 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 - 2014



October 2014

For most of the region, October corresponds to the late stages of the season. Drier than average conditions dominated across the region in October, except for localized above average rains from NE Afghanistan to Nepal. Given the general tendency for a delayed start of the season, these drier later stages will have negative impacts on still developing crops.

For southernmost India, Sri Lanka and Indonesia, October instead leads to the wettest period of the season (Nov-Feb), so a dry October may signal a poor start to the main cropping season in these areas. However, it is too early in the season for more definitive statements.

Vegetation levels remain markedly above average which is mostly due to delays in growing season development. Should drier than average conditions continue, they are expected to decrease rapidly to normal levels.

October 2014 rainfall as a percent of a 20 year average (left). Brown shades for below average rainfall, blue shades for above average seasonal rainfall

Mod October 2014 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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