

# CropWatch bulletin

QUARTERLY REPORT ON GLOBAL CROP PRODUCTION

February 28, 2014

Volume 14, No. 1 (Total No. 92)



Institute of Remote Sensing and Digital Earth (RADI)  
Chinese Academy of Sciences (CAS)



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**Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences**

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## Abbreviations

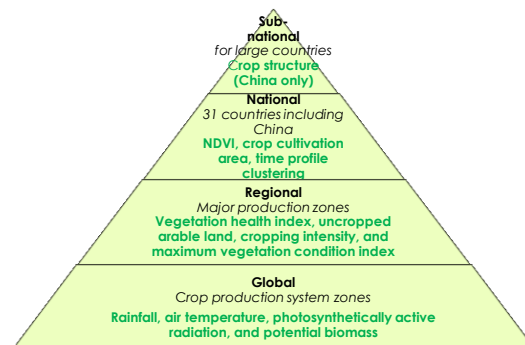
5YA	Five-year average, the average for the October-January periods between October 2008 and January 2013; this is one of the reference periods, also called “recent past.”
12YA	Twelve-year average, the average for the October-January periods between October 2001 and January 2013; this is one of the reference periods, also called, “last decade.”
CAS	Chinese Academy of Sciences
CPSZ	Crop production system zone
EC/JRC	European Commission Joint Research Centre
EI	Environmental index
FAO	Food and Agriculture Organization of the United Nations
FAO GAEZ	FAO Global Agro-Ecological Zones
FAO GIEWS	FAO Global Information and Early Warning System
GAUL	Global Administrative Units Layer
GEO	Group on Earth Observations
GeoGLAM	GEO/GEOSS Global Agricultural Monitoring
GEOSS	Global Earth Observation System of Systems
GIS	Geographic Information System
GPS	Global Positioning System
GSOD	Global Surface Summary of the Day
GVG	GPS, Video and GIS data
ha	hectare
JRC MARS	Joint Research Centre Monitoring Agricultural ResourceS
kHa	Kilohectares (thousand hectares)
kkm <sup>2</sup>	Thousand square kilometers (million acres)
kT	Kiloton (thousand metric tons)
MPZ	Major crop production zones
NCDC	National Climatic Data Center
NDVI	Normalized Difference Vegetation Index
NOAA NCDC	National Oceanic and Atmospheric Administration National Climatic Data Center
NPPP	Net primary productivity potential
PAR	Photosynthetically active radiation
RADI	Institute of Remote Sensing and Digital Earth
Ton	Thousand kilograms
UAL	Uncropped arable land ratio
UN	United Nations
VCI	Vegetation Condition Index
VHI	Vegetation Health Index
W/m <sup>2</sup>	Watt per square meter
WAMIS	World AgroMeteorological Information Service

## About this bulletin

This CropWatch bulletin presents a global overview of crop stage and condition between October 2013 and January 2014. It is prepared by the Chinese CropWatch research team in the Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences in Beijing. The electronic version of this bulletin, along with additional resources, is available on the CropWatch Website at [www.cropwatch.com.cn](http://www.cropwatch.com.cn). Online resources include details about the CropWatch methodology, agricultural profiles for key countries, and long term trends.

CropWatch analyses are based mostly on standard, as well as some new remote sensing indices, following a hierarchical approach (see figure).

Analyses start, in chapter 1, with relatively coarse environmental indices (0.25 degree resolution) for 60 Crop Production System Zones (CPSZ). These zones—covering all continents—are reasonably homogeneous from an ecological, climatic and agronomic point of view. Variables on this level are rainfall, temperature, solar radiation (Photosynthetic Active Radiation, PAR), and an estimate of biomass using a simple model based on rainfall and temperature. Expressed as one number per spatial unit (the CPSZ, MPZ or country), the indices exclusively cover agriculture land, giving more weight to areas with higher production potential.



Chapter 2 introduces additional indicators on cropping intensity and stress: vegetation health index (VHI), uncropped arable land (UAL), and maximum vegetation condition index (VCI). The unit of analysis here is Major Production Zones, which are contiguous areas on all continents where a large fraction of the world's crop are grown. (Australia, India, and China are not considered among the MPZs as they are included as countries.)

Next, chapter 3 presents detailed analyses for 30 countries that, together, represent more than 80 percent of the production of maize, rice, wheat and soybean, as well as 80 percent of exports. Some countries were included in the list based on criteria of proximity to China (Uzbekistan, Cambodia) or global geopolitical relevance (four among the five most populous countries in Africa). Included also in chapter 3 (with additional detail in Annex A) are the sub-national units, with environmental and crop indices provided for the first-level administrative regions in the world's nine largest countries, from Russia to Argentina.

Chapter 4 presents a detailed analysis of China, largely using the same approach as in chapter 3.

In chapter 5, two focus topics are presented. The first is a summary of recent extreme atmospheric events over the reporting period (section 5.1); the second (section 2.5) a discussion on soybean.

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*The current bulletin is the 92<sup>nd</sup> bulletin produced by the CropWatch group. It is released quarterly in both English and Chinese. To sign up for the mailing list, please e-mail [cropwatch@radi.ac.cn](mailto:cropwatch@radi.ac.cn) or visit us online at [www.cropwatch.com.cn](http://www.cropwatch.com.cn).*

## Executive summary

The current CropWatch bulletin covers the months from October 2013 to January 2014, a period that can mostly be regarded as "between seasons:" the harvest of winter crops (wheat) was completed in the southern hemisphere, while summer crops are currently growing, with several months left before the time of harvest. In the northern hemisphere, winter crops have been planted before or up to the beginning of the reporting period and are currently dormant at the higher latitudes or actively growing in the southernmost areas. Summer crops in temperate regions will be planted in a couple of months.

The total output of the recent wheat harvest in the southern hemisphere amounts to 43 million tons; three of the four main producers did well, in spite of initial fears about the dry and hot weather conditions in Australia. In several countries both wheat area and yield improved over 2012, including Argentina (+14 percent production), Australia (+17 percent) and Brazil (+31 percent). In South Africa, this season's production decrease of 6 percent continues the trend initiated more than ten years ago.

Compared to the average of the last five years, cropped land in China increased about 10 percent, reducing the potential losses due to this winter's warm weather. Cropped land area decreased in Russia (-11.8 percent) and also in Turkey, where the decrease in cropped land reached almost 20 percent as a result of reductions in both temperature and rainfall. Cropped land also decreased in Canada (-10.7 percent) and the United States (-5.9 percent).

During the reporting period, typhoon Haiyan swept across the Philippines, also affecting Vietnam and China. According to the Centre for the Epidemiology of Disasters (CRED) and FAO, the cyclone was one of the worst disasters in the recent history of the Philippines, durably impacting society and agriculture for a final economic loss expected to reach around US\$10 billion. Losses to the agricultural sector occurred mostly in the central Philippines' Visaya islands group, which grows about 35 percent of the national rice production. Because of the local crop calendar, other crops suffered less. The combined loss due to Haiyan and Nari, a cyclone that affected the country earlier in the season, is currently put at 5 percent of the annual national production. Rice imports are likely to increase.

Several continent-wide climatic patterns can be recognized. They include (i) unusually low temperature in the United States and Canada; (ii) above average rainfall in South Asia and adjacent semi-arid central Asian countries, decreasing from Iran to Cambodia; (iii) drought in the southern and eastern Mediterranean, and (iv) above average temperatures over most of northern Eurasia, from Siberia and China to Germany, with drought in parts of central Europe.

Moldova recorded one of the highest absolute rainfall drops (-68 percent) of the 173 countries monitored by CropWatch; neighboring countries were affected as well, including Ukraine (-25%). Morocco also experienced severe drought combined with low sunshine, leading to wheat and barley production losses that may reach 30 percent, unless abundant precipitation affects the country from now onwards. Early drought was seen in South America, including the core of the soybean producing zone. The situation seems to have been remedied by now, but mixed crop condition continues to prevail in northwest Argentina and southern coastal Brazil.

Other less spectacular events affected agriculture in a number of countries. Their final impact will need reassessing closer to harvesting time as early negative impacts can possibly be compensated for by favorable environmental conditions during later crop stages.

Overall, CropWatch tentatively summarizes the ongoing season as follows:

*Mostly unfavorable:* Armenia, Azerbaijan, Canada, Georgia, Philippines, Poland, Spain, Turkey, Ukraine, Moldova, Morocco, United States, and Vietnam.

*Mixed:* Argentina, Brazil, China, Denmark, Egypt, France, Hungary, Indonesia, Iran, Italy, Nigeria, Romania, Russia, South Africa, United Kingdom, and Uzbekistan.

*Mostly favorable:* Bangladesh, Czechia, Germany, India, Kazakhstan, Mexico, Myanmar, Pakistan, and Thailand.

## الملخص التنفيذي

تغطي نشرة CropWatch الحالية الشهور من أكتوبر 2013 وحتى يناير 2014، وهي فترة يمكن اعتبارها في الغالب "فترة فاصلة بين موسمين": فقد اكتمل حصاد المحاصيل الشتوية (القمح) في النصف الجنوبي من الكرة الأرضية، بينما يجري حالياً إنماء المحاصيل الصيفية، وهناك شهور عديدة تفصلنا عن وقت الحصاد. أما في النصف الشمالي من الكرة الأرضية، فقد جرت زراعة المحاصيل الشتوية قبل أو حتى بداية الفترة التي يغطيها التقرير وهي حالياً في طور السبات عند خطوط العرض العالية أو يجري زراعتها بشكل نشط في المناطق الواقعة أقصى الجنوب. سيتم زراعة المحاصيل الصيفية في المناطق ذات المناخ المعتدل خلال شهرين.

ورغم أن المخاوف من الآثار الضارة في بعض المناطق لم تتبدد إلا عند اقتراب موعد الحصاد (على سبيل المثال، بسبب ظروف الجفاف والحرارة في أستراليا)، إلا أن ثلاثة من بين منتجي القمح الرئيسيين في النصف الجنوبي من الكرة الأرضية حققوا نتائج طيبة، مما نجم عنه وصول إجمالي الإنتاج إلى 43 مليون طن. وفي بلدان عديدة تحسنت المناطق المزروعة بالقمح والإنتاجية على مدار 2012، مثلما هو الحال في الأرجنتين (بزيادة في الإنتاج تزيد عن 14 بالمائة) وأستراليا (بزيادة في الإنتاج تزيد عن 17 بالمائة) والبرازيل (بزيادة في الإنتاج تزيد عن 31 بالمائة). وفي جنوب أفريقيا، فإن تراجع الإنتاج هذا الموسم بواقع 6 بالمائة يواصل الاتجاه الذي بدأ منذ أكثر من عشر سنوات مضت.

ومقارنة بمتوسط الخمس سنوات الأخيرة، زادت أراضي المحاصيل في الصين بنحو 10 بالمائة، مما خفض الخسائر المحتملة بسبب الطقس الدافئ في هذا الشتاء انخفضت منطقة أراضي المحاصيل في روسيا (بنسبة -11.8 بالمائة) وفي تركيا كذلك، حيث بلغ الانخفاض في أرض المحاصيل نحو 20 بالمائة نتيجة انخفاض درجات الحرارة وسقوط الأمطار. كما انخفضت أراضي المحاصيل في كندا (بنسبة -10.7 بالمائة) والولايات المتحدة (بنسبة -5.0 بالمائة).

وأثناء الفترة التي شملها التقرير، اجتاح إعصار حيان الفلبين، مما أثر كذلك على فيتنام والصين. وبحسب مركز علم أوبئة الكوارث (CRED) ومنظمة الأمم المتحدة للأغذية والزراعة (الفاو)، كان الإعصار من بين أسوأ الكوارث خلال التاريخ الحديث في الفلبين، حيث أثر بشكل ثابت على المجتمع والزراعة ويتوقع وصول الخسائر الاقتصادية النهائية إلى نحو 10 مليار دولار أمريكي. وقعت خسائر القطاع الزراعي في الغالب في مجموعة جزر فيسايا الوسطى في الفلبين، والتي تقوم بزراعة 35 بالمائة من إنتاج الأرز على مستوى الدولة. وقد تعرضت محاصيل أخرى لخسائر أقل بسبب تقويم المحاصيل المحلي. إن الخسائر الإجمالية لإعصار حيان وإعصار ناري، وهو إعصار أثر على الدولة في وقت سابق من هذا الموسم، تبلغ حالياً 5 بالمائة من إجمالي الناتج الوطني. ويرجح أن تزيد واردات الأرز.

كما يمكن كذلك التعرف على العديد من الأنماط المناخية السائدة عبر القارة. وهذا يشمل (1) الانخفاض غير المعتاد في درجات الحرارة في الولايات المتحدة وكندا؛ و(2) معدل سقوط الأمطار فوق المتوسط في جنوب آسيا ودول آسيا الوسطى المجاورة شبه القاحلة، وهذا المعدل ينخفض من إيران إلى كمبوديا؛ (3) الجفاف في جنوب وشرق البحر الأبيض المتوسط، و(4) درجات الحرارة فوق المتوسط في معظم مناطق أوراسيا الشمالية، من صربيا والصين إلى ألمانيا، مع جفاف في أجزاء من وسط أوروبا.

وقد سجلت مولدوفا أحد أعلى معدلات سقوط الأمطار على الإطلاق (-68 بالمائة) من بين المائة وثلاث وسبعين دولة التي جرت مراقبتها بواسطة CropWatch؛ وقد تأثرت الدول المجاورة كذلك، بما في ذلك أوكرانيا (-25%). كما شهدت المغرب كذلك جفافاً حاداً إلى جانب انخفاض سطوع الشمس، مما أدى إلى خسائر في إنتاج القمح والشعير قد تصل إلى 30 بالمائة، ما لم يؤثر هطول الأمطار الوفير على الدولة من الآن فصاعداً. كما شوهد جفاف مبكر في أمريكا الجنوبية، بما في ذلك المنطقة الرئيسية لإنتاج الفول الصويا. ويبدو أن الوضع قد تحسن الآن، لكن الظروف المتباينة للمحاصيل لا تزال سائدة في شمال غرب الأرجنتين والساحل الجنوبي من البرازيل.

وهناك أحداث أقل حجماً أثرت على الزراعة في عدد من الدول. وسوف يلزم إعادة تقييم تأثيرها النهائي عند الاقتراب من وقت الحصاد حيث يمكن تعويض الآثار السلبية المبكرة بفضل الظروف البيئية المواتية أثناء المراحل اللاحقة للمحاصيل.

وبشكل إجمالي، تلخص CropWatch الموسم الحالي على النحو التالي:

*الدول الأكثر ضرراً:* أرمينيا، أذربيجان، كندا، جورجيا، الفلبين، بولندا، أسبانيا، تركيا، أوكرانيا، مولدوفا، الولايات المتحدة، فيتنام.

*الدول ذات التأثيرات المتباينة:* الأرجنتين، البرازيل، الصين، الدنمارك، مصر، فرنسا، المجر، إندونيسيا، إيران، إيطاليا، نيجيريا، رومانيا، روسيا، جنوب أفريقيا، المملكة المتحدة، أوزبكستان.

*الدول الأكثر مواتة:* بنغلاديش، التشيك، ألمانيا، الهند، كازاخستان، المكسيك، ميانمار، باكستان، تايلاند.

## Résumé

Ce bulletin CropWatch couvre la période d'octobre 2013 à janvier 2014, période qui peut être considérée comme « entre deux saisons » : la récolte des céréales d'hiver (blé) s'est achevée dans l'hémisphère sud, tandis que les céréales d'été sont en phase de croissance et qu'il faudra attendre plusieurs mois avant la récolte. Dans l'hémisphère nord, les céréales d'hiver ont été semées avant ou jusqu'au début de la période considérée et sont actuellement au stade dormant sous des latitudes plus élevées, ou en pleine croissance dans les régions les plus méridionales. Les céréales d'été des régions tempérées seront semées dans quelques mois.

La production totale de blé de la récente récolte de l'hémisphère sud s'élève à 43 millions de tonnes, du fait que trois des plus importants producteurs ont obtenu de bons résultats, malgré les craintes d'effets négatifs dus à la chaleur et à la sécheresse en Australie. Dans plusieurs pays, les superficies et rendements en blé ont été améliorés en 2012, comme en Argentine (+14% de production), en Australie (+17%) et au Brésil (+31%). En Afrique du Sud, la production de cette campagne baisse de 6%, continuant la tendance apparue voici plus de dix ans.

Par rapport à la moyenne des cinq dernières années, les terres cultivées en Chine ont augmenté d'environ 10%, réduisant ainsi les pertes potentielles dues aux températures élevées de cet hiver. Les terres cultivées ont reculé en Russie (-11,8%) ainsi qu'en Turquie où cette baisse a atteint pratiquement 20% sous l'effet combiné de la diminution des températures et des précipitations. Les terres cultivées ont également baissé au Canada (-10,7%) et aux États-Unis (-5,9%).

Durant la période considérée, le typhon Haiyan a balayé les Philippines et touché également le Vietnam et la Chine. Selon le Centre de Recherche sur l'Epidémiologie des Catastrophes (CRED) et la FAO, le cyclone fait figure de plus grand désastre de l'histoire récente des Philippines, marquant durablement la société et l'agriculture avec une perte économique qui devrait atteindre au final quelque 10 milliards de dollars US. Les pertes les plus importantes sont celles du secteur agricole dans la partie centrale des Philippines, le groupe d'îles de l'archipel des Visayas, qui cultive près de 35% de la production nationale de riz. Les autres céréales ont moins souffert en raison du calendrier céréalier local. La perte combinée due aux typhons Haiyan et Nari, est actuellement estimée à 5% de la production nationale annuelle. Les importations de riz devraient en conséquence augmenter.

On peut identifier plusieurs tendances climatiques à l'échelle des continents. On note parmi celles-ci (i) des températures anormalement basses aux États-Unis et au Canada; (ii) des précipitations au-dessus de la moyenne en Asie du Sud et dans les pays voisins semi-arides de l'Asie Centrale, selon un gradient décroissant de l'Iran au Cambodge; (iii) la sécheresse dans les pays du Sud et de l'Est de la Méditerranée, et (iv) des températures au-dessus de la moyenne sur la majeure partie de l'Eurasie du nord, de la Sibérie à l'Allemagne en passant par la Chine, avec des conditions de sécheresse dans certaines parties de l'Europe Centrale.

La Moldavie a enregistré l'une des baisses les plus spectaculaires des précipitations (-68%) sur les 173 pays suivis par CropWatch ; les pays voisins sont également touchés, y compris l'Ukraine (-25%). Le Maroc a aussi traversé une forte sécheresse, accompagnée d'un faible ensoleillement, ce qui pourrait entraîner des pertes de production de blé et d'orge qui pourraient atteindre 30% à moins d'abondantes précipitations et de faibles températures sur le pays dès maintenant. On a assisté à une sécheresse précoce en Amérique du Sud, y compris au cœur de la zone productrice de soja. Il semble que la situation

se soit améliorée depuis, mais on continue d'observer des conditions mitigées dans le nord-ouest de l'Argentine et la région côtière du sud du Brésil.

D'autres événements moins spectaculaires ont affecté l'agriculture dans un certain nombre de pays. L'évaluation définitive de leur impact définitif nécessitera une nouvelle analyse à l'approche de la récolte dans la mesure où des facteurs négatifs en début de saison peuvent être compensés par des conditions ambiantes favorables à des stades ultérieurs.

Dans l'ensemble, CropWatch résume, à titre provisoire, la campagne en cours comme suit :

*Plutôt défavorable* : Arménie, Azerbaïdjan, Canada, Géorgie, Maroc, Philippines, Pologne, Espagne, Turquie, Ukraine, Moldavie, Etats-Unis et Vietnam.

*Mitigé* : Argentine, Brésil, Chine, Danemark, Egypte, France, Hongrie, Indonésie, Iran, Italie, Nigéria, Roumanie, Russie, Afrique du Sud, Royaume-Uni et Ouzbékistan.

*Plutôt favorable* : Bangladesh, Tchéquie, Allemagne, Inde, Kazakhstan, Mexique, Myanmar, Pakistan et Thaïlande.

## Краткая информация

В данном выпуске вестника “CropWatch” представлена информация за период с октября 2013 г. по январь 2014 г., который можно в целом охарактеризовать как межсезонье, когда в южном полушарии закончен сбор урожая озимых культур (пшеница), летние зерновые культуры находятся на стадии роста, а до начала сбора урожая остается несколько месяцев. В северном полушарии озимые культуры были посажены до или в самом начале отчетного периода, а в настоящее время они находятся в состоянии покоя в более высоких широтах или на стадии активного роста в самых южных областях. Летние зерновые культуры в регионах с умеренным климатом будут посажены через несколько месяцев.

Невзирая на то, что в некоторых регионах страх перед отрицательным воздействием развеялся только перед самым началом сбора урожая (например, ввиду засушливых и жарких погодных условий в Австралии), три из четырех основных производителей пшеницы в южном полушарии показали хорошие результаты – их совокупный сбор зерна составил 43 млн. тонн. В некоторых странах наблюдалось увеличение площади посевов пшеницы и рост урожайности, включая Аргентину (рост производства на 14%), Австралию (рост на 17%) и Бразилию (рост на 31%). В Южной Африке сокращение производства в текущем сезоне на 6% стало продолжением тенденции, начавшейся более десяти лет назад.

В сравнении со средними показателями за последние пять лет площадь посевов в Китае увеличилась на 10%, при этом потенциальные потери были снижены в связи с теплыми погодными условиями этой зимой. Сокращение посевных площадей наблюдалось в России (на 11,8%) и Турции, где оно достигло почти 20% как следствие падения температур и уменьшения уровня осадков. Сокращение посевных площадей также имело место в Канаде (на 10,7%) и США (на 5,9%).

В отчетный период на Филиппины обрушился тайфун «Хайян», который также затронул Вьетнам и Китай. Согласно Центру по исследованию эпидемиологии стихийных бедствий (ЦИЭСБ) и ФАО, данный циклон стал одним из наихудших стихийных бедствий за всю новейшую историю Филиппин, оказав долгосрочное воздействие на жизнь общества и сельское хозяйство. Предполагаемые окончательные экономические убытки составят около 10 млрд. долларов. Урон сельскохозяйственному сектору был нанесен преимущественно в островной группе Филиппин Висайя, где выращивается около 35% общенационального объема риса. Благодаря местному календарю сбора урожая другие культуры подверглись менее заметному разрушительному влиянию. На настоящий момент общие убытки от тайфуна «Хайян» и «Нари» (циклон, который обрушился на страну ранее в этом сезоне) оцениваются на уровне 5% от годового объема национального производства. Высока вероятность увеличения импорта риса.

Наблюдается несколько континентальных типов распределения климата, которые включают в себя: 1) нехарактерно низкие температуры в США и Канаде; 2) превышающее средние показатели количество осадков в Южной Азии и близлежащих ползасушливых странах Центральной Азии, которое снижается от Ирана до Камбоджи; 3) засуха в южном и восточном

средиземноморье; 4) превышающие средние показатели температуры над большей частью Евразии от Сибири и Китая до Германии с засухой в центральных частях Европы.

Из 173 стран, в которых осуществлялся мониторинг “CropWatch”, в Молдове отмечался один из самых высоких абсолютных показателей снижения уровня осадков (на 68%); соседние с Молдовой страны, включая Украину, также подверглись данному воздействию (снижение уровня осадков в Украине составило 25%). Марокко также попало под влияние катастрофической засухи на фоне преимущественно облачной погоды, что привело к потерям производства пшеницы и ячменя, которые могут составить до 30%, если начиная с этого момента в страну не придут обильные осадки. Ранняя засуха наблюдалась и в Южной Америке, включая центр зоны по производству соевых бобов. По всей видимости, к настоящему моменту были приняты меры реагирования на сложившуюся ситуацию, однако ситуация со смешанными культурами остается прежней в северо-западной части Аргентины и в прибрежных районах на юге Бразилии.

Свое влияние на сельскохозяйственную деятельность оказали и иные, менее заметные события. Для окончательного определения их воздействия потребуется повторная оценка ближе ко времени сбора урожая, поскольку раннее отрицательное воздействие может быть компенсировано благоприятными погодными условиями на более поздних стадиях созревания культур.

В целом, по ориентировочным расчетам “CropWatch” текущий сезон можно охарактеризовать следующим образом:

*Наиболее неблагоприятный:* Азербайджан, Армения, Вьетнам, Грузия, Испания, Канада, Молдова, Польша, США, Турция, Украина и Филиппины.

*Смешанный:* Аргентина, Бразилия, Великобритания, Венгрия, Дания, Египет, Китай, Индонезия, Иран, Италия, Франция, Нигерия, Россия Румыния, Узбекистан и Южная Африка.

*Наиболее благоприятный:* Бангладеш, Германия, Индия, Казахстан, Мексика, Мьянма, Пакистан, Таиланд и Чехия.

## Resumen ejecutivo

El actual boletín informativo de CropWatch comprende entre octubre de 2013 y enero de 2014, período que podríamos considerar mayormente "entre estaciones": ha finalizado la cosecha de cultivos invernales (trigo) en el hemisferio sur y los cultivos de verano crecen aún faltando varios meses para la cosecha. En el hemisferio norte los cultivos de invierno han sido plantados antes o al comienzo del período sobre el que informamos y actualmente se encuentran en etapa de letargo en latitudes septentrionales o creciendo activamente en zonas más meridionales. Los cultivos de verano en las regiones templadas se plantarán en un par de meses.

Aunque en algunas zonas el temor de un impacto negativo no se disipó hasta aproximarse la cosecha (por ejemplo, en Australia, debido a las condiciones de sequía y calor), tres de los cuatro principales productores de trigo en el hemisferio sur tuvieron buenos resultados, cosechando, en conjunto, 43 millones de toneladas. En varios países el área plantada de trigo y su rendimiento mejoraron el año 2012, como es el caso de Argentina (+14% de la producción), Australia (+17%) y Brasil (+31%). En Sudáfrica, la disminución de un 6% en la producción de esta temporada continúa la tendencia iniciada hace más de 10 años.

Los terrenos cultivados en China aumentaron cerca de un 10% en comparación con el promedio de los últimos cinco años, reduciéndose las posibles pérdidas ocasionadas gracias a la particular calidez de este invierno. El área cultivada disminuyó en Rusia (-11,8%) y también en Turquía. En esta última, la reducción alcanzó casi un 20% como resultado de los descensos de la temperatura y de las lluvias. La tierra cultivada también disminuyó en Canadá (-10,7%) y en Estados Unidos (-5.9%).

En el transcurso del período sobre el que informamos, el tifón Haiyan azotó Filipinas, afectando también a Vietnam y a China. Según el Centro para la Investigación de la Epidemiología de los Desastres (CRED) y la FAO, este ciclón fue una de las peores catástrofes de los últimos años en Filipinas y afectó fuertemente a la población y a la agricultura, con una pérdida total en la economía que se espera alcance los 10.000 millones de dólares. Las pérdidas en el sector agrícola ocurrieron mayormente en las islas Bisayas al centro de Filipinas, donde se cultiva alrededor del 35% de la producción nacional de arroz. Otros cultivos se vieron menos afectados gracias al calendario local de plantaciones. La pérdida conjunta debida a Haiyan y a Nari, este último un ciclón que afectó anteriormente al país en la misma temporada, se estima actualmente en un 5% de la producción anual. A consecuencia de ello, se espera un incremento en las importaciones de arroz.

Es posible reconocer diversos patrones climáticos continentales. Entre ellos se incluyen: (i) bajas temperaturas inusuales en Estados Unidos y Canadá; (ii) lluvias por sobre el promedio en el sur de Asia y en los países adyacentes a la zona semiárida del Asia central, disminuyendo desde Irán a Camboya; (iii) sequía al sur y al este del Mediterráneo y (iv) temperaturas por sobre el promedio en la mayor parte del norte de Eurasia, desde Siberia y China hasta Alemania, con sequía en algunas zonas de Europa central.

Moldavia registró uno de los mayores descensos en la pluviosidad absoluta (-68%) entre 173 países monitoreados por CropWatch. Algunos países vecinos también se vieron afectados, como es el caso de Ucrania (-25%). Marruecos, por su parte, experimentó una grave sequía combinada con poca luz solar, liderando las pérdidas en la producción de trigo y cebada que podrían alcanzar hasta un 30%, a menos que una lluvia abundante afectara al país de ahora en adelante. Se ha detectado una sequía precoz en Sudamérica que afecta al corazón de la zona productora de soja. El problema parece haber sido

solucionado por ahora, aunque la condición de cultivos mixtos continúa prevaleciendo en la zona noroeste de Argentina y en el litoral sur de Brasil.

Otras situaciones menos espectaculares han afectado la agricultura en un cierto número de países. Se deberá reevaluar su impacto final al acercarse la cosecha, ya que las consecuencias negativas iniciales posiblemente podrán contrarrestarse con condiciones medioambientales favorables en etapas posteriores de cultivo.

En líneas generales, CropWatch resume de forma tentativa la temporada actual de la siguiente manera:

*Mayormente desfavorable:* Armenia, Azerbaiyán, Canadá, Georgia, Filipinas, Polonia, España, Turquía, Ucrania, Moldavia, Estados Unidos y Vietnam.

*Mixta:* Argentina, Brasil, China, Dinamarca, Egipto, Francia, Hungría, Indonesia, Irán, Italia, Nigeria, Rumania, Rusia, Sudáfrica, Reino Unido y Uzbekistán.

*Mayormente favorable:* Bangladesh, República Checa, Alemania, India, Kazajistán, México, Myanmar, Paquistán y Tailandia.

# Chapter 1. Global environmental indices for agriculture: light, temperature, and water

Chapter 1 presents an overview of environmental indices—specifically rainfall, temperature, photosynthetically active radiation (PAR), and biomass, which form the broad and global background for the CropWatch analyses presented in subsequent chapters. The global overview of the environmental indicators presented here focuses on the sixty global Crop Production System Zones (CPSZ) and the six identified Major Production Zones (MPZ). For more information about these zones or methodologies, see the CropWatch online resources Definition of Spatial Units and Methodology, at [www.cropwatch.com.cn](http://www.cropwatch.com.cn). Environmental indices for all CPSZs are also provided in Annex A, table A.1.

## 1.1 Overview

Weather variables do not normally vary independently, nor do weather anomalies. Several clear examples are provided by a detailed analysis of figures 1.1 to 1.4, covering rainfall, temperature, PAR, and biomass for the sixty global CPSZ. The largest positive departures from the twelve-year average (also referred to as the “last decade” in this report) for rainfall are associated with low sunshine in boreal North America, South Africa (western Cape), Sierra Madre, Madagascar, South Asia (Punjab to Gujarat), and—to a still significant but lesser extent—in the Southern Himalayas, Qinghai-Tibet, the Amazon, and Western Europe.

Negative rainfall departures (that is, drought) usually create difficult conditions for many human activities, especially for agriculture. Listed in decreasing order of percent rainfall deficit, some notable areas with negative rainfall departures are: the North American west coast (by some accounts a one in five hundred year event), the tip of the Southern Cone in Latin America, Mediterranean north Africa, two areas in southern Australia (Nullarbor-Darling in the west and Queensland to Victoria in the east), New Zealand, the Caribbean CPSZ, and, in China, the Huanghuaihai ecological zone. Among these areas, several also underwent unusually high temperatures, especially the American west coast and adjacent sub-boreal region, along with a number of areas in Asia: eastern central Asia, Mongolia, and eastern Siberia, four ecological zones of China (the Lower Yangtze CPSZ, Huanghuaihai, the Loess region, and Inner Mongolia) and, finally, China’s Gansu-Xinjiang area, where the extreme was less marked.

Mediterranean Europe, Turkey, as well as the North African Mediterranean are characterized by a combined occurrence of low rainfall and sunshine. Countries, by increasing order of drought severity, include Portugal, Algeria, Libya, Syria, Israel, Cyprus, Morocco, and Lebanon. According to information kindly provided to CropWatch by Moroccan sources, experts foresee a yield reduction of wheat in the range of 20 to 30 percent, compared to recent historical data. However, this forecast is subject to change depending on expected precipitations and the level of temperatures in the coming dekads: satisfactory rainfall from February could obliterate the drought, resulting in normal or even above normal crop output.

The biomass indicator largely follows rainfall, with negative changes in the areas where rainfall fell short of expectations, essentially the Mediterranean areas, the southwestern Southern Cone, the American west coast, Huanghuaihai, southern Australia, and New Zealand. Positive effects are identified over large expanses of central and east Asia, but actual crop growth will be subject to sufficient soil moisture becoming available when crop growth resumes, with other factors such as pest and weed overwintering also playing a role.

Table 1.1 provides a closer look at the major production zones and compares the environmental indices with their recent five-year average. The West African MPZ largely coincides with the Gulf of Guinea CPSZ, an area that underwent favorable rainfall and PAR. Considering that the southernmost part of the MPZ undergoes bimodal rainfall, even a semi-quantitative assessment of the crop impact is not immediately possible, as the main cereal season corresponds mostly with the northern hemisphere summer (with some exceptions linked with mountain conditions). In South and Southeast Asia, another MPZ with a large positive rainfall departure (+26 percent, compared with +10 percent in West Africa), crops are currently in the field. Biomass, which measures the combined impact of rainfall and temperature, increases significantly in Asia. Given the local crop calendar, there is a real chance that the biomass indicator increase will eventually manifest itself as yield increase, all the more because PAR also increased over average conditions. Among the other MPZs, North America suffered from a cold spell (-1.2°C) and South America from a mild drought. Both, however, are characterized by only a weak negative departure of biomass from the recent reference period, which suggests the areas, despite the particularly unfavorable conditions in some locations in South America, could still result in an acceptable growing season. Despite some localized floods (for example in the United Kingdom), western Europe on average did not suffer from excess water, while temperature was higher than the recent past five years and PAR increased 1 percent. In comparison, the Central Europe and Western Russia MPZ underwent a marked reduction in precipitation (-11 percent) and above average temperature. For both MPZs, the biomass indicator shows a slight increase over the previous seasons.

**Table 1.1. Environmental indices by Major Production Zones, October 2013-January 2014**

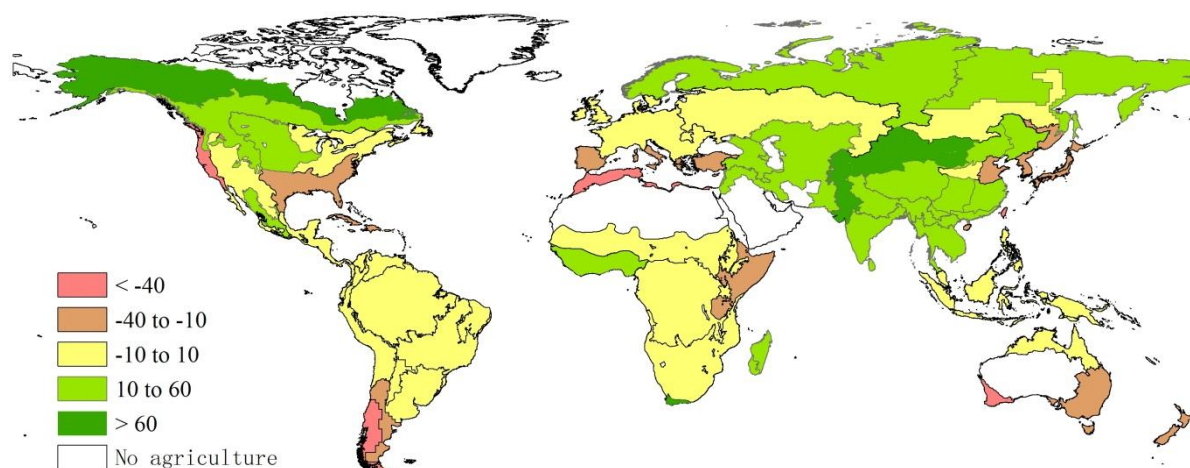
	Rainfall		Temperature		PAR		Biomass	
	Current (mm)	Dep. from 5YA (2008-13) (%)	Current (°C)	Departure from 5YA (°C)	Current (MJ/m <sup>2</sup> )	Departure from 5YA (%)	Current (gDM/m <sup>2</sup> )	Dep. From 5YA (%)
<b>West Africa</b>	239	10	26.8	0.0	1007	9	639	12
<b>South America</b>	660	-5	24.1	0.6	1385	3	1763	-0.2
<b>North America</b>	284	3	3.5	-1.2	534	2	707	-2
<b>South and Southeast Asia</b>	250	26	21.4	-0.5	953	2	573	22
<b>Western Europe</b>	283	-1	6.7	1.3	284	1	947	3
<b>Central Europe and Western Russia</b>	181	-11	0.8	1.0	226	1	659	2

Note: Current season indicators are compared to the five-year average (5YA) for the months of October-January between October 2008 and January 2013.

## 1.2 Rainfall

Figure 1.1 shows the October 2013 to January 2014 rainfall anomaly. Unusually dry winter conditions occurred in the regions of North China plain, northeast Asia (including the Korean peninsula and Japan), Turkey, the Iberian Peninsula, north Africa, and southeastern United States and the U.S. west coast; rainfall decreased more than 40 percent in comparison with the twelve-year average (2001-13) for the same period. At the same time, abnormal dry summer conditions occurred in eastern Africa, eastern Australia, and particularly in southern Argentina and southwest Australia. Wet winter conditions occurred in major regions of China, Southeast Asia, the Indian subcontinent, central Asia, the northern region of Russia, Europe, and North America, and especially in west China, Pakistan, and West Africa. Major regions of the southern hemisphere recorded average rainfall compared to the twelve-year average.

**Figure 1.1. Rainfall by Crop Production System Zone, October 2013-January 2014 compared with the 12YA (2001-13), difference expressed as percentage**



Note: 12YA=Twelve-year average for the October-January periods between October 2001 to January 2013.

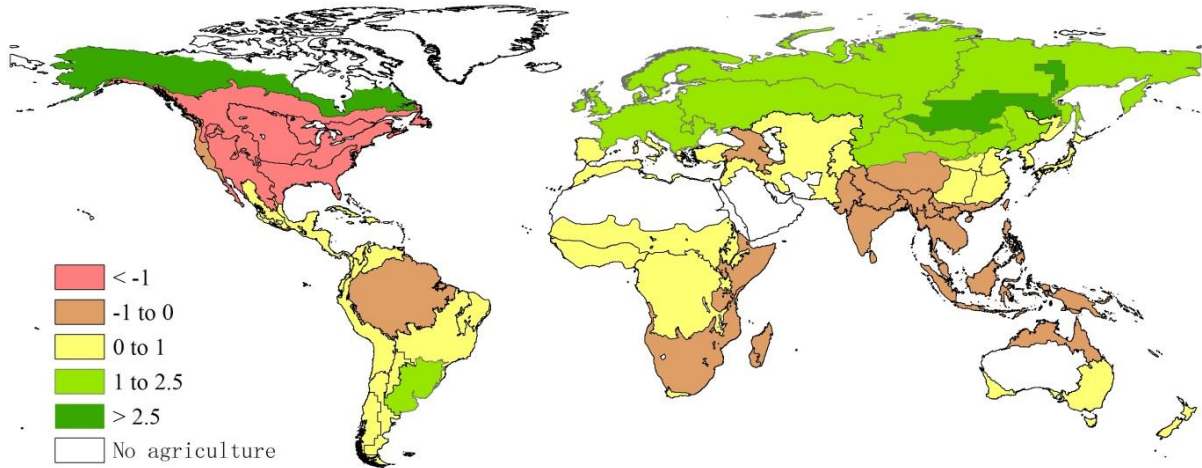
### 1.3 Temperature

As shown by the temperature departures from the recent twelve-year average (figure 1.2), sharply contrasting temperature patterns developed between the northern and southern hemispheres and between the continents for the recent monitoring period.

Specifically, in the extreme north of Canada and Alaska, the CPSZ of boreal America presents significantly warmer than average weather. According to NOAA National Climatic Data Center (NCDC) climate anomalies, Alaska experienced warmer than usual weather in October and January, which is confirmed by the positive thermal anomaly in this region. In contrast, the remaining areas of the United States and Canada (down to and including the cotton belt) and the Mexican coastal plain CPSZ, the north Mexican highlands, and the southwestern Mexico CPSZ experienced lower than average temperatures. A closer look at the country and sub-country temperature map indicates that the cooling was more marked in the United States than in Mexico. The North American boreal high temperatures are paralleled in Eurasia where, however, the warming extends much further south, to the latitude of the Inner Mongolia CPSZ and Gansu-Xinjiang in China, all the way to western Europe, avoiding only the western Asia CPSZ and Mediterranean Europe. These findings are confirmed by JRC/MARS, reporting that Europe experienced a mild winter with above-average temperature from December to February. In Spain a cold November followed a warm October, resulting in overall temperature conditions closer to average. Other noteworthy positive anomalies include areas showing temperature increases, including Mongolia and the southeastern Brazil-Conception-Bahia Blanca CPSZ, which largely overlaps with the main agricultural areas of the South America MPZ.

A closer look at the data indicates that, as a country, the United States experienced one of the largest negative temperature departures ( $-1.0^{\circ}\text{C}$ )—widely presented in the media as “the October blizzard”—and later extreme cold weather manifestations. Although this is not so apparent in the figure, it is stressed that the largest national negative departures also include a group of near-eastern countries: Turkey ( $-1.1^{\circ}\text{C}$ ), Azerbaijan ( $-1.3^{\circ}\text{C}$ ), Georgia ( $-1.3^{\circ}\text{C}$ ), and Armenia ( $-2.1^{\circ}\text{C}$ ).

**Figure 1.2. Air temperature for Crop Production System Zones, October 2013-January 2014 compared with the 12YA, difference expressed in degrees Celsius**

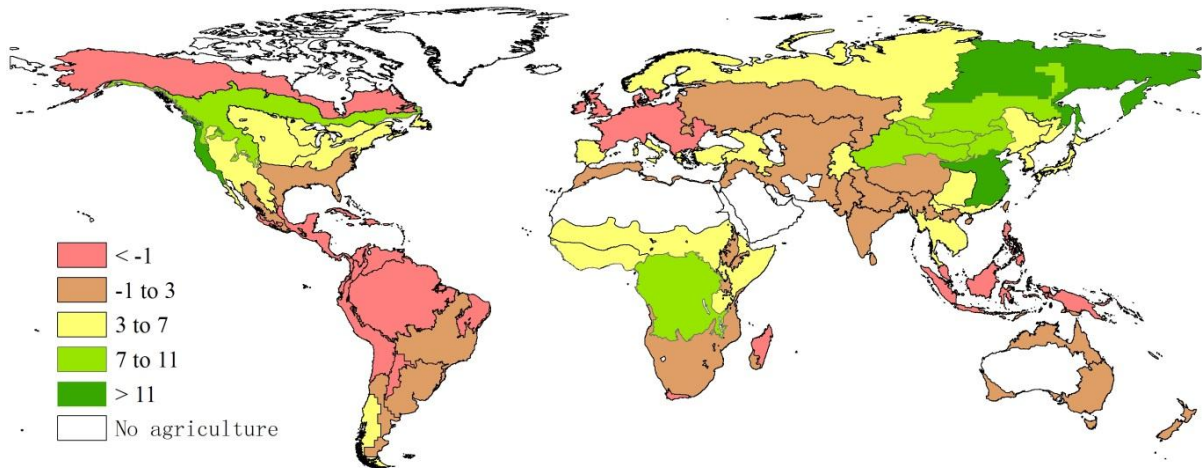


Note: 12YA=Twelve-year average for the October-January periods between October 2001 to January 2013.

### 1.4 Photosynthetically active radiation

Figure 1.3 compares the current season with the recent twelve-year average for PAR over the global CPSZs. About 20 percent of the CPSZs are below this average, which, of course, does not take into account their respective areas. Altogether, Latin America experienced less than average PAR conditions, particularly in the center of the continent, including the Amazon, northern South America and Central America, the Caribbean islands, and central-north Argentina. The same observation applies to boreal North America, southeast Asia islands, Madagascar, South Africa’s Western Cape, and non-mediterranean western Europe, the area with the largest departure of all CPSZs (-5 percent). All of the departures are in the range of -1 to -5 percent.

**Figure 1.3. PAR by Crop Production System Zone, October 2013-January 2014 compared with the 12YA (2001-13), difference expressed as percentage**



Note: 12YA=Twelve-year average for the October-January periods between October 2001 to January 2013.

Other areas such as New Zealand, the American cotton belt, the Mexican coastal plain, Nullarbor to Darling in Australia, South Asia, West Asia, and eastern Africa, received average PAR in 2014.

Particularly favorable PAR conditions, with increases of 7 to 15 percent compared to the reference period (as illustrated in table A.1 in Annex A), affected the American west coast, north-western South America,

equatorial central Africa, as well as large areas of Russia and China. They are listed here by increasing departure values, from Inner Mongolia (7 percent) to eastern central Asia, Mongolia, Gansu-Xinjiang, eastern Siberia, the China Loess region, Huanghuaihai (13 percent), and the Lower Yangtze region (14 percent).

## 1.5 Biomass

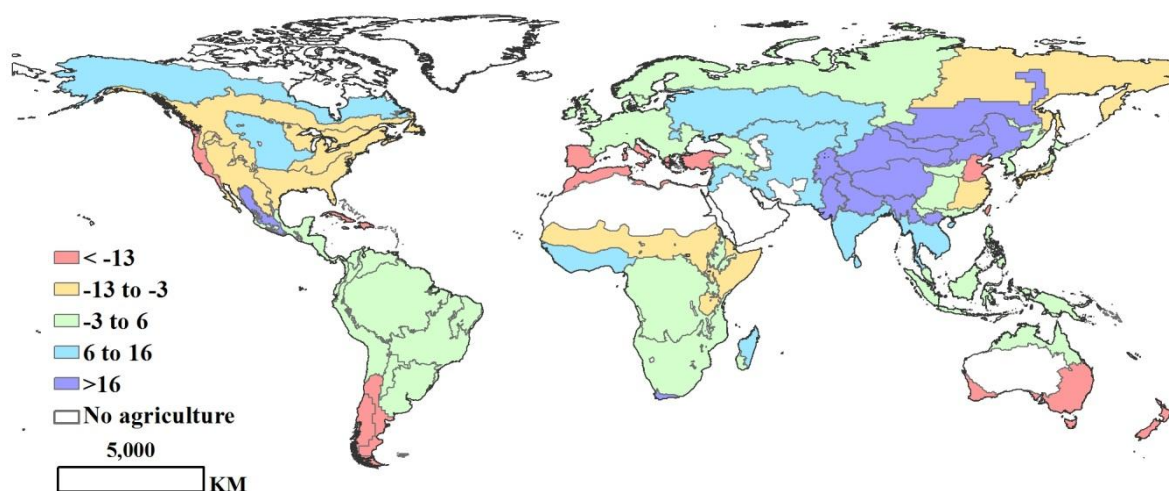
The biomass index (referred to as “biomass” or “biomass accumulation” in this report) expresses the combined effect of rainfall and temperature on the biomass accumulation during the reference period (see the online resources for more details about this methodology.) It is expressed in grams of dry matter per square meter over one year.

At CPSZ level (figure 1.4a), the greatest positive biomass departures (in percentage) are found in Asia, especially in the Mongolia CPSZ, followed by Gansu-Xinjiang, Punjab to Gujarat, Qinghai-Tibet, Inner Mongolia, the Central Asia-Pamir mountains, and Southern China, in decreasing order of departure. These regions correspond well with the area where significant positive thermal anomaly occurred during the reference period. When scaled down to pixel level (figure 1.4b), the general pattern remains unchanged and more subtle areas with large above-average temperature are captured, such as the center of America (covering Montana and South Dakota), north of Somalia, Kyzylordinskaya of Kazakhstan, and Navoiy of Uzbekistan.

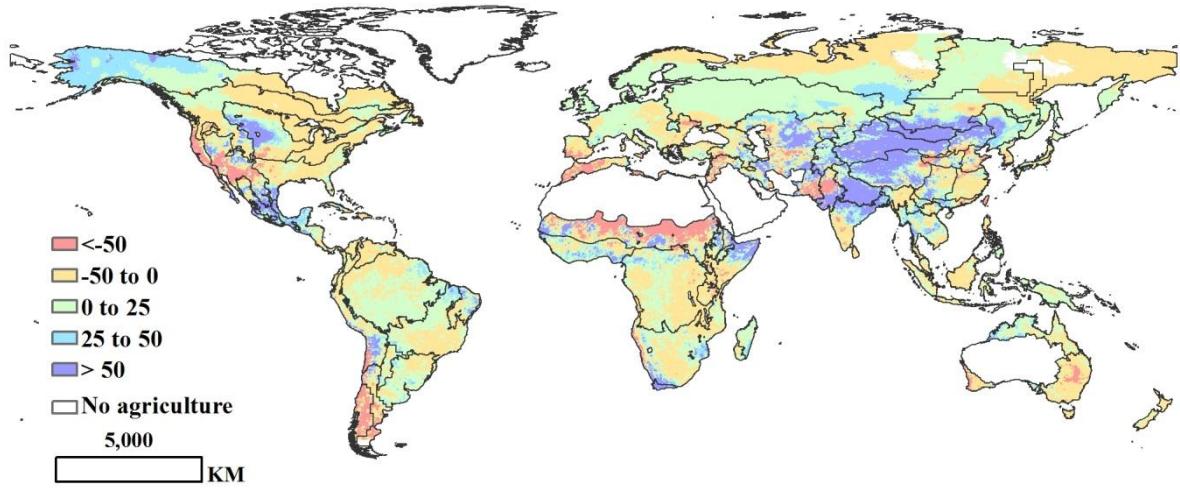
Other regions such as boreal North America, the Gulf of Guinea region in West Africa, Madagascar, Ukraine to Kazakhstan, western, south and southeast Asia (including Thailand, Cambodia, Laos, and Vietnam) present a slightly increased biomass. Southern Canada and most parts of the United States present a decreased biomass potential, as do the Sahel region, Horn of Africa, eastern Siberia, and the Lower Yangtze region in China.

The largest biomass percentage drop is observed in the Taiwan CPSZ (-53 percent), followed by the North American west coast (-49 percent). Other areas with marked drops in biomass include Huanghuaihai in China, parts of Oceania (New Zealand, Queensland to Victoria, Nullarbor-Darling), the Caribbean, the north-African mediterranean, and the southwestern Southern Cone in Latin America.

**Figure 1.4. Biomass accumulation by Crop Production System Zone (a) and pixel (b), October 2013-January 2014 compared to the 12YA, difference expressed as percentage**



(a)



(b)

Note: 12YA=The twelve-year average for the October-January periods between October 2001 and January 2013.

## Chapter 2. Farming intensity and stress in major production zones

With Chapter 1 presenting a global overview of key environmental indices relevant to agriculture, Chapter 2 provides more detail on agriculture-specific indices—percentage of uncropped arable land (UAL), the vegetation condition index (VCI), and the vegetation health index (VHI)—to describe farming intensity and stress in six Major Production Zones (MPZ) across all continents. For more information about these zones and methodologies used, see the CropWatch online resources Definition of Spatial Units and Methodology, at [www.cropwatch.com.cn](http://www.cropwatch.com.cn). Additional information on environmental indices for the MPZs is provided in Annex A, table A.2.

### 2.1 Overview

Several MPZs have been affected by large spatial weather anomalies. However, several months will still pass before harvest and crop condition will likely change, requiring a reassessment when the crop stage is more advanced. Current weather can also affect the spring and summer crops still to be planted through soil moisture and their effect on pests and diseases.

The north American MPZ, with the exception of Mexico, was affected by abnormally low temperatures (-1.4°C in the United States and -1.3°C in Canada). In comparison with the recent five-year average, uncropped arable land (UAL) values for the current season increased in Canada (+10.7 percentage points) and the United States (+5.9 percentage points), possibly reflecting unfavorable growth conditions, while UAL decreased in Mexico (-4.3 percentage points).

Countries in the South American MPZ currently grow summer crops, mainly soybean and maize; both crops suffered drought in some major agricultural areas, including the core of the soybean producing zone. The situation affected early stages and has been remedied by now, although mixed crop condition continues to prevail in northwest Argentina and southern coastal Brazil.

Central-eastern Europe winter crops (essentially wheat, with some barley) are currently in the vegetative/dormant stage, although complex interactions between above normal temperature, presence/absence of snow, and late hardening may have led to increased winter kill. Most of the MPZ experienced temperatures that were above the recent twelve-year average, decreasing from east to southwest: Russia +1.7°C, Poland +1.2°C, Moldova and Romania +1.1°C, Belarus 1.0°C, and Ukraine 0.7°C. Some of the countries in the west also underwent parallel drought, in particular Ukraine (precipitation 25 percent down compared with the twelve-year average), Poland (-16 percent), and Romania (-8 percent), and -62 percent in Moldova, one of highest absolute rainfall drops of the 173 countries monitored by CropWatch. Uncropped arable land nevertheless decreased in Poland and Romania (-24.2 and -12.5 percentage points, respectively), but increased in Russia (+11.8 percentage points).

Several areas in Western Europe suffered floods (United Kingdom, +43 percent over the recent twelve-year average) or drought (Hungary, -33 percent), with Hungary continuing the spatial pattern already noted for central-eastern Europe. Temperatures were above average east of and including Germany (+1.2°C), reaching increases of 1.4°C in Czechia and 1.7°C in Hungary, resulting in unseasonably high biomass accumulation and VCI (11 percentage points in Germany) and a very large decrease in uncropped arable land (-10.7 percentage points). Overall, based mostly on maximum VCI, crop condition is good in

Germany, Denmark, Czechia, and Northern Italy, but mixed in France, the United Kingdom, Hungary, and particularly in southern Italy and Spain, where high values are interspersed with patches of unusually low values.

In the South and Southeast Asian MPZ, the dominant feature is excess rainfall decreasing from west to east (India +52 percent, Bangladesh +11 percent, Myanmar +27 percent, Thailand +13 percent, Cambodia +5 percent, and Vietnam -1 percent, compared to the twelve-year average). In spite of some unusual drops in temperature, all countries are characterized by increased biomass accumulation in comparison with the twelve-year average. Uncropped arable land decreased in India (-3 percentage points) and more significantly so in Myanmar (-4.8 percentage points). Maximum VCI values are usually high in most of the north western quadrant of India, in close agreement with the VHI clusters, and clearly denote satisfactory rabi crop condition. In the south and east of Bangladesh, there is a larger proportion of low values; the same occurs in the eastern half of the MPZ, indicating mixed crop condition, or sometimes distinctly poor conditions, as in the Red River delta of northern Vietnam.

In the African MPZ, covering the Gulf of Guinea states and adjacent areas of the Sahelian countries, only the southernmost areas harvested a crop, usually maize, during the reporting period. Crop condition is generally satisfactory, especially in the west. In Nigeria, significant areas indicated as uncropped arable land correspond to the main maize growing areas in the center of the country, which were harvested before the current reporting period.

**Table 2.1. Agricultural indicators by Major Production Zone, October 2013-January 2014, showing current season values and departure from the 5YA (2008-2013)**

	Uncropped arable land		Maximum vegetation condition index (VCI)	
	Current (% of pixels)	Departure (% points)	Current	Departure (absolute difference)
West Africa	7.7	1.9	0.85	0.00
South America	2.6	0.1	0.82	0.01
North America	49.6	8.0	0.80	0.07
South and Southeast Asia	2.5	-2.1	0.88	0.06
Western Europe	1.1	-6.1	0.88	0.08
Central Europe and Western Russia	47.0	-1.9	0.81	0.09

Note: 5YA=the five-year average, which is the average value for the periods October-January between October 2008 and January 2013.

## 2.2 West Africa

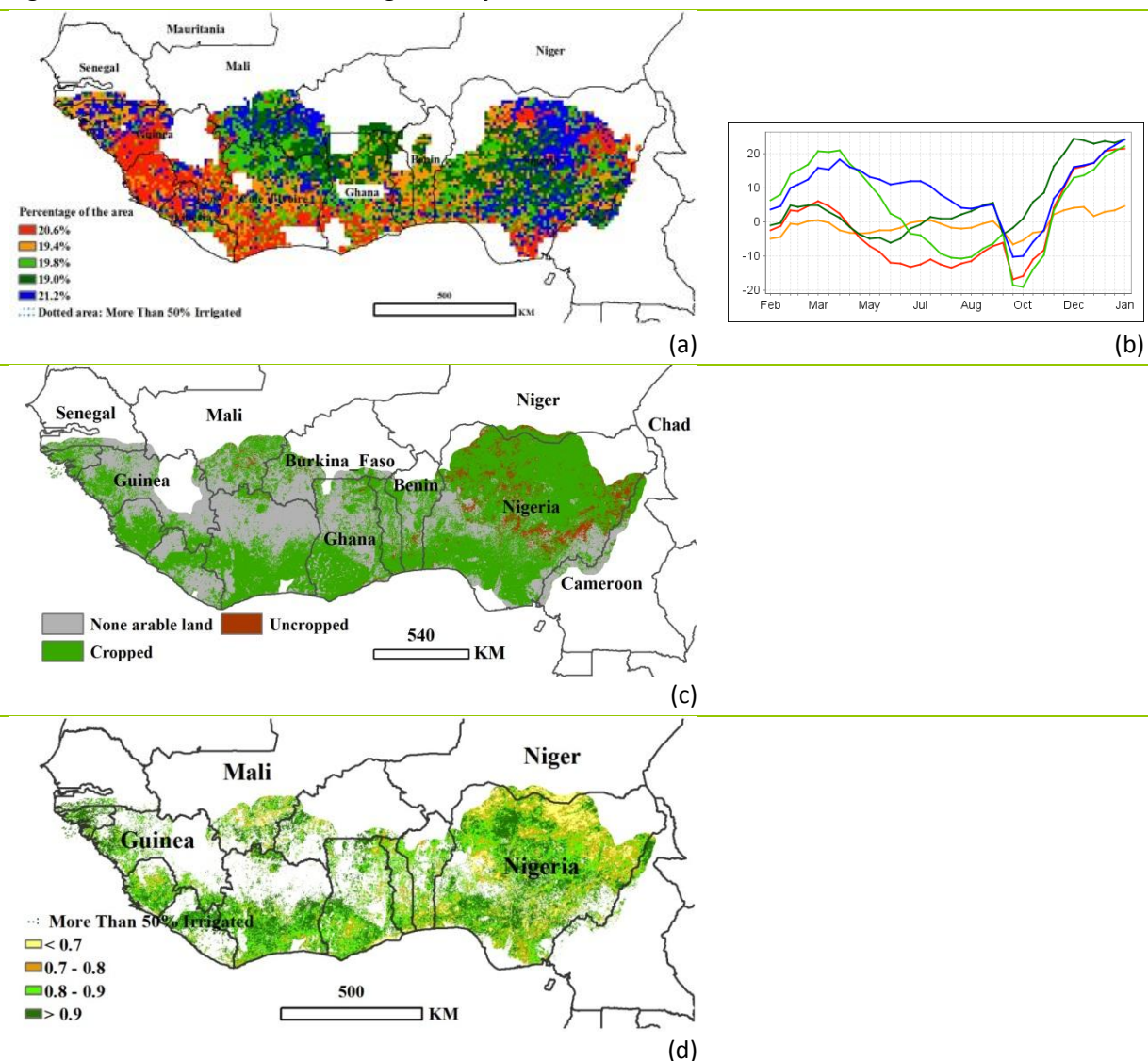
The Gulf of Guinea countries are mostly characterized by one or two rainy seasons in the south and one, much shorter, in the north; in the north, Sahelian conditions prevail with one season of varying length that peaks in August. August is also the time when the "short dry season" occurs in the bimodal rainfall areas. Although the general crop calendar can be modified by altitude, particularly in Guinea, maize and rice are widely grown and usually harvested towards the end of the year, around December. Yams and cassava are important crops in the region, but their phenology is not well defined, particularly in the case of cassava. When conditions permit and the growing season is sufficiently long in the south of the region, a "second" maize crop is usually grown and harvested around September. This "second" crop is usually the main one in terms of production.

Based on VHI profiles, conditions in the MPZ were average (19.4 percent of pixels) or above average throughout the region over the middle and the end of the reporting period, indicating favorable conditions for the maize and rice crops harvested at the end of the year in the southern part of the region.

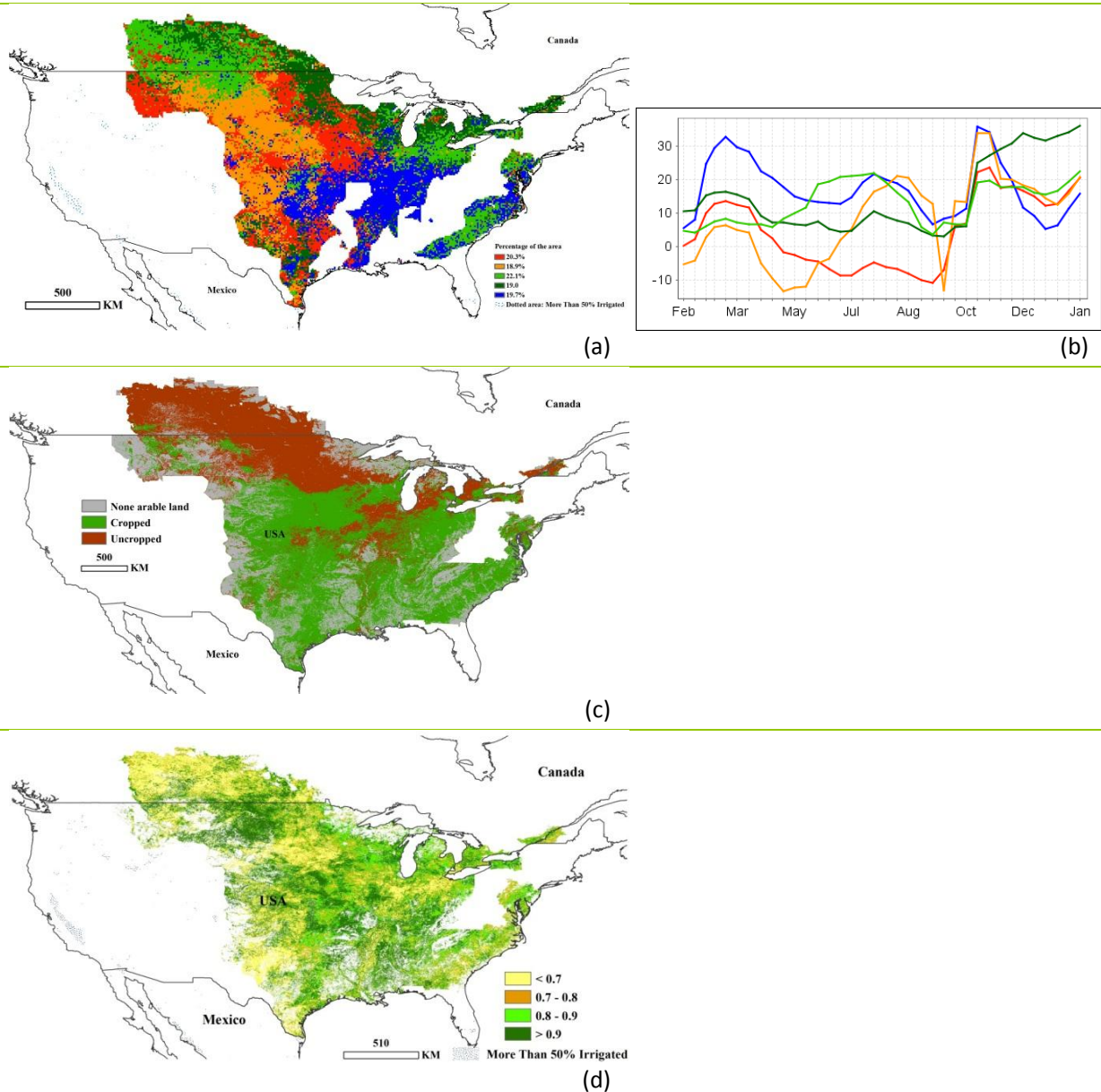
This is also where maximum VCI values tend to be highest, thereby confirming satisfactory crop condition, particularly in the west where all countries show rather high maximum VCI values of around 0.84, with a slight positive departure over the reference period.

October was characterized by a marked dip in VHI in many areas, particularly west of Nigeria, including most of the MPZ. It is likely that long cycled crops have been affected. Caution is, however, required as the MPZ still enjoys large extension of forest that are not filtered out in the current VHI profile analysis. Uncropped arable land is concentrated in central Nigeria, in the main maize growing areas where it probably corresponds to post-harvest conditions. Maps and graphs for the West Africa MPZ are provided in figure 2.1.

**Figure 2.1. West Africa MPZ: Farming intensity and stress**



(a) Spatial distribution of VHI profiles between February 2013 and January 2014 (VHI departure from the twelve-year average for 2001-2013); (b) Typical VHI profiles associated with the pixels in (a); (c) Cropped and uncropped arable land; (d) Maximum vegetation health index (VCI).

**Figure 2.2. North America MPZ: Farming intensity and stress**

(a) Spatial distribution of VHI profiles between February 2013 and January 2014 (VHI departure from the twelve-year average for 2001-2013); (b) Typical VHI profiles associated with the pixels in (a); (c) Cropped and uncropped arable land; (d) Maximum vegetation health index (VCI).

## 2.3 North America

Compared to the twelve-year average, VHI departure in the North American MPZ (figure 2.2) displays various patterns in the central United States. In Kentucky, Tennessee, Missouri, Kansas, and Oklahoma, VHI in 2013/14 was above average, especially in spring and autumn season; after autumn, VHI decreased sharply to become average. In Canada, the south of Alberta, Saskatchewan, and Manitoba, the Great Lakes, and the east coastal region of the United States (Indiana, Ohio, South Carolina, and Georgia), VHI was slightly above average, increasing sharply after October. In Wisconsin, Iowa, and Montana, as well as in scattered areas in Texas, VHI was abnormally lower than the reference value between May and September; it increased sharply after October. For the major regions of central and western United States (such as Nebraska, Wyoming, Kansas, and Colorado), VHI was below the twelve-year average during the

period from March to July and sharply increased after July. During the period from October 2013 to January 2014, large areas of uncropped arable lands were distributed in Canada and in North Dakota in the United States, resulting from the harvest of summer crops when spring crops have not yet been planted.

Also over the monitoring period, all winter wheat planting has been completed, with the largest VCI values occurring in Kansas, Nebraska, and Kentucky. Maximum VCI is well above normal, due to near normal rainfall, temperature, and PAR. In the east and south regions, maximum VCI is low due to abnormal winter storms.

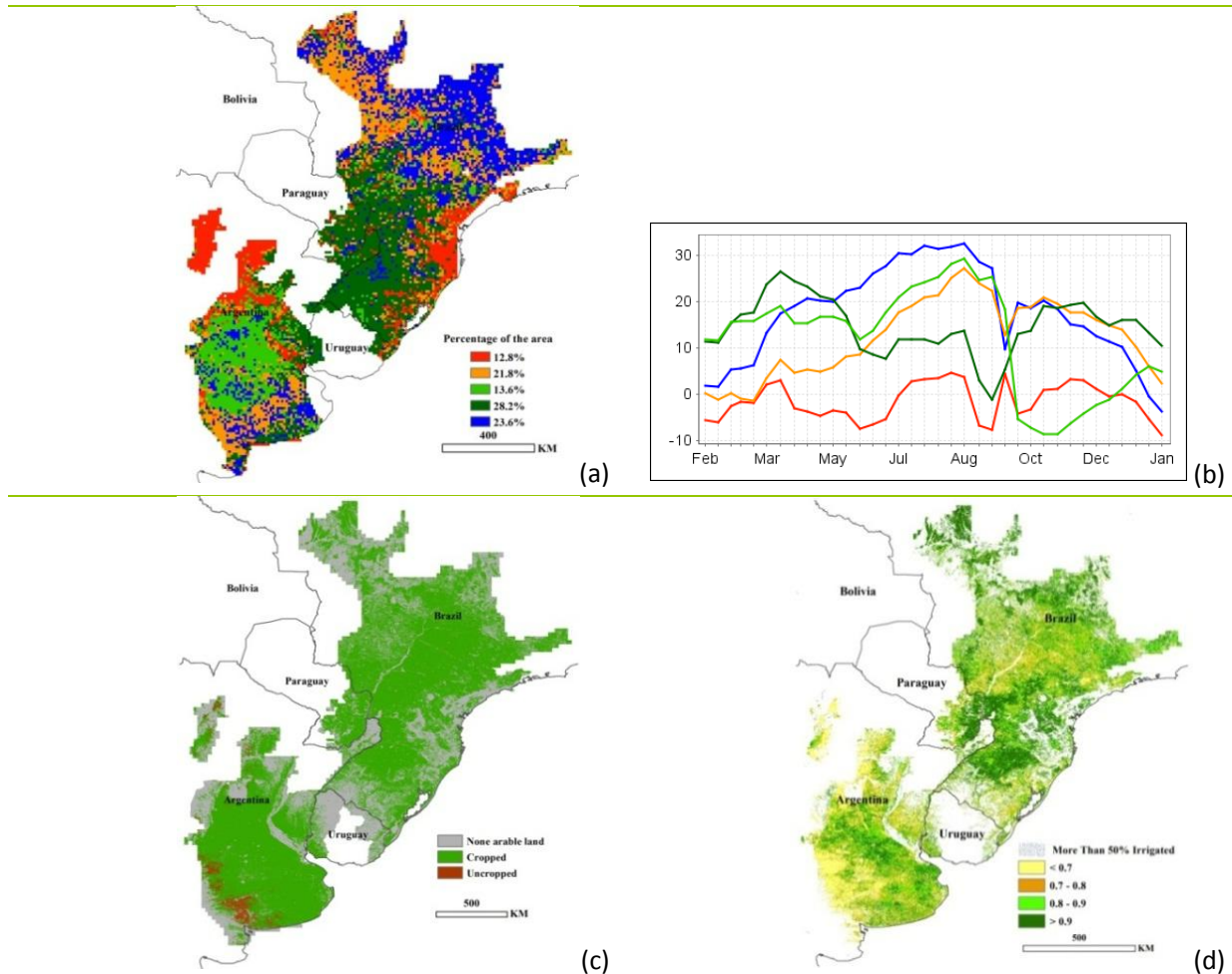
## 2.4 South America

Regarding recent growing conditions in the South America MPZ over the last four months, rainfall was 5 percent less than the previous five-year average for the same period and temperature was above normal. Consistently, PAR increased by 3 percent. Limited precipitation and high temperature stressed crops in central Pampas. The VHI profile indicates that crops in the core soybean producing region (north western Buenos Aires, Córdoba, and south of Santa Fe; regions shown in light green in figure 2.3a) suffered from agricultural drought. Recent rains in January benefitted the crops there and vegetation condition turned normal. In the northern-most parts of Argentina as well as the coastal regions of Santa Catarina and Paraná, lack of radiation hampered crop development. Favorable conditions over other regions in the South America MPZ (mostly in Brazil and adjacent Paraguay) benefitted crop growing.

Although growing conditions were unfavorable in the core soybean producing region, the maximum vegetation condition index (VCI) was still relatively high. The rainfall in January boosted soil moisture supplies and soybean and maize crop recovered from the stressed conditions. However, limited rain was recorded in western Buenos Aires and eastern La Pampa and the low soil moisture damaged some crops, as indicated by the low maximum VCI.

Generally, maximum VCI for the whole MPZ was at an average level, although concerns remain for soybean and maize crops; more rainfall is needed so that stressed crops can recover from the hot and dry conditions.

Uncultivated arable land was only 2.6 percent over the last four months, slightly above the previous five-year average, but almost double the twelve-year average reference value. Most cropped arable land is distributed in northwest of Bahía Blanca to Santa Rosa, capital of La Pampa province. The percentage of uncropped arable markedly increased in 2008. One reason is that farmers prefer crop rotation farming systems with one fallow season every two or three years. Another reason is the extreme weather conditions that occurred. Crops in Argentina suffered severe drought during two of the last five years, which delayed crop planting. Some farmers even decided not to plant due to the high risk. In southern Brazil, most arable land is cultivated.

**Figure 2.3. South America MPZ: Farming intensity and stress**

## 2.5 South and Southeast Asia

The South and Southeast Asia MPZ (even after excluding the Maritime Southeast Asia) covers a heterogeneous region. Rice is the dominant crop in the whole MPZ, while wheat and maize are grown mostly in India and Myanmar. Figure 2.4 shows relevant maps and graphs for this MPZ.

All countries in the region cultivate, in one way or another, "summer crops" (Kharif), harvested around the end of the year (with a planting date that varies from February to June) and winter "crops" (Rabi), planted between September and December for harvesting from May to August, depending on cycle length, farming practices, and, to a large extent, local traditions. For all the countries in the MPZ, the reporting period thus includes harvests as well as planting or crops in vegetative stage. Most of the cropped areas are distributed in India, Bangladesh, the dry zone of Myanmar, the Red River delta and the Mekong delta in Vietnam, the Tonle Sap region, and central and northeast Thailand.

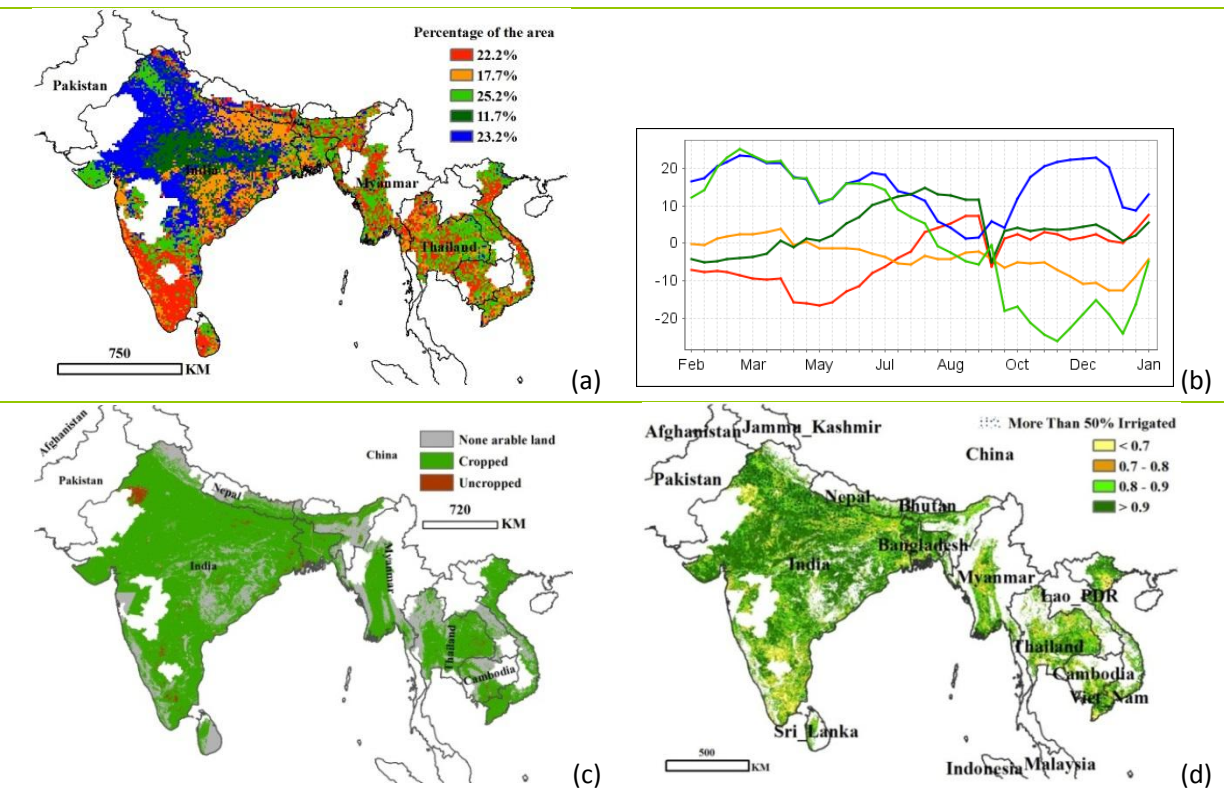
According to the analysis of environmental indices, rainfall was almost 30 percent over both the last five years' average and the twelve-year average, resulting in a biomass accumulation of about 20 percent above the last decade. Of the six MPZs monitored by CropWatch, South and Southeast Asia displays the highest biomass departure over the monitoring period, compared with both the last five years (19 percent) and the twelve-year period (22 percent).

During October to January, uncultivated arable land concerned 2.5 percent of the land pixels, 2.1 percent points down from the average of the previous five years. The uncropped areas are located mostly in north Rajasthan in India.

VHI departures from the twelve-year reference period (2001-2013) show four very distinct types of behavior: (i) Average conditions in about 34 percent of the area's pixels, indicated by dark green and red colors. The pattern occurs in northern central India and in southern India. The absence of fluctuations is typical of harvested crops. (2) Mostly above average conditions, increasing rapidly in October then decreasing in January, covering about 23 percent of the areas (in blue). This corresponds to winter crops, many of them irrigated in northeast India. (iii) Decreasing condition in about 18 percent of pixels; condition decreased almost linearly from October, followed by a slight improvement at the end of January, occurring mostly in north-east India rainfed winter crops. (iv) Well below average conditions during most of the period and recovering in January, while staying below average (25 percent of pixels). This behavior occurs in a patchy pattern mostly intermixed with (i) and (iii) over much of the eastern half of the MPZ; it is tempting to associate the third pattern with excess water, including the impact of the two October cyclones Phailin and Nari (see also section 5.1). In fact, India, Bangladesh, and Myanmar all recorded significantly above average rainfall (+56 percent, +46 percent, +26 percent, respectively), while the other countries in the MPZ are closer to average.

Maximum VCI values are usually high in most of the north western quadrant of India, in close agreement with the VHI clusters and clearly denote satisfactory rabi crop condition. In the south and east and in Bangladesh, there is a larger proportion of low values; the same occurs in the eastern half of the MPZ, indicating mixed crop condition, or sometimes distinctly poor, as in Red River delta of northern Vietnam.

**Figure 2.4. South and Southeast Asia MPZ: Farming intensity and stress**



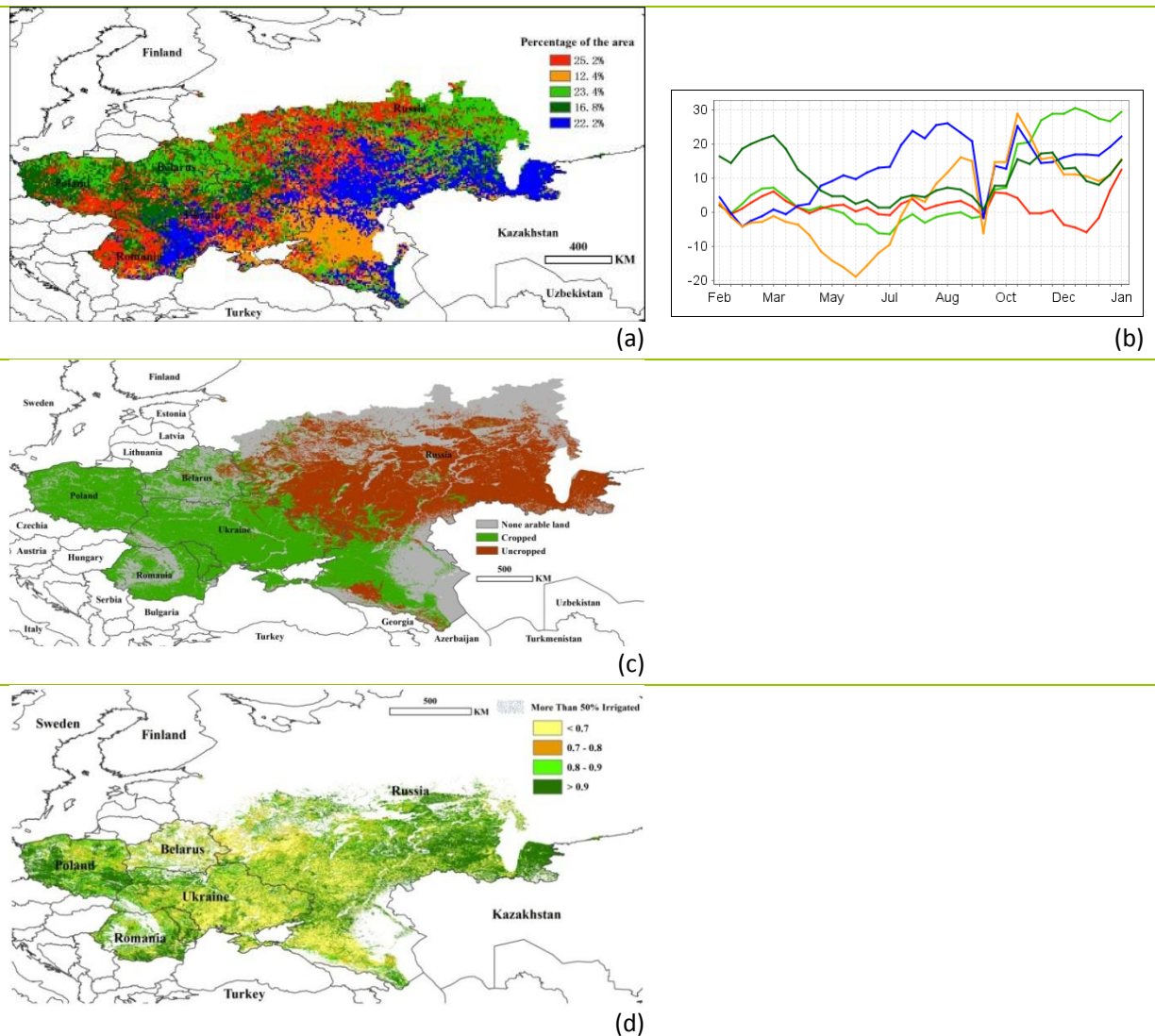
(a) Spatial distribution of VHI profiles between February 2013 and January 2014 (VHI departure from the twelve-year average for 2001-2013); (b) Typical VHI profiles associated with the pixels in (a); (c) Cropped and uncropped arable land; (d) Maximum vegetation health index (VCI).

## 2.6 Central Europe and Western Russia

In the region of interest, the reporting period covers the harvest of summer crops (maize, sugar beet, sunflower) and the early vegetative stages of winter crops (winter wheat and winter barley). (See figure 2.5).

Less than half of the arable land is currently cropped (uncropped arable land (UAL) ratio 47 percent). More than 80 percent of the uncropped areas are distributed in Russia with some scattered plots along its border with Belarus and Ukraine (figure 2.5b). At MPZ scale, UAL drops by 1.9 percent compared with the recent five-year average, indicating an overall effort on cropland expansion in the region. However, Russia is the only country that presents an increased UAL compared with the previous year and recent five-year average (see Online resources: C. Time series of indicators). This finding is consistent with the estimation from the Russian Ministry of Agriculture that the winter wheat planted area in 2013 is lower than the planted area last year, according to HGCA crop updates.

**Figure 2.5. Central Europe and Western Russia MPZ: Farming intensity and stress**



A positive departure from the five-year average is observed from table 1.1, for temperature (1.0°C), PAR (1 percent) and biomass (2 percent) in this region, but rainfall is below the five-year average (with -11 percent departure). The VHI cluster profiles (b) show that (from October) the vegetation condition is above average with the exception of scattered areas in the arable land of southeast Poland, west Romania, south of Ukraine, and the central and northern region of Russia (colored red in figure 2.5a). These regions are also captured in the maximum VCI map with low values highlighted in yellow. In addition, the maximum VCI map shows the most promising crops are currently distributed in the west and southeast of Poland, northwest of Ukraine, and the Urals and Siberia region of Russia, compared with other regions. The average maximum VCI at MPZ scale is above the recent five-year average, which is consistent with the increase of biomass in this region. All countries (Poland, Romania, Ukraine, Belarus and Russia) exhibit an increased maximum VCI value over the recent five-year average, but all countries except Russia experienced decreased biomass accumulation. This may result from rather abnormal temperature over the east of the region.

## 2.7 Western Europe

Wheat is cultivated almost everywhere in the Western Europe MPZ (figure 2.6), while maize is more frequent in the warmer areas of the south, especially in southwest France (Poitou-Charentes, Aquitaine, and Midi-Pyrénées), south-east France (Rhone-Alpes) and the adjacent areas in Italy, starting with Liguria and proceeding along the Po valley through Lombardy and eventually Veneto. In the east, main maize growers include Oberösterreich and Steyermark in Austria and all of Hungary. Rice is grown in the Po valley in Italy and soybean is virtually absent.

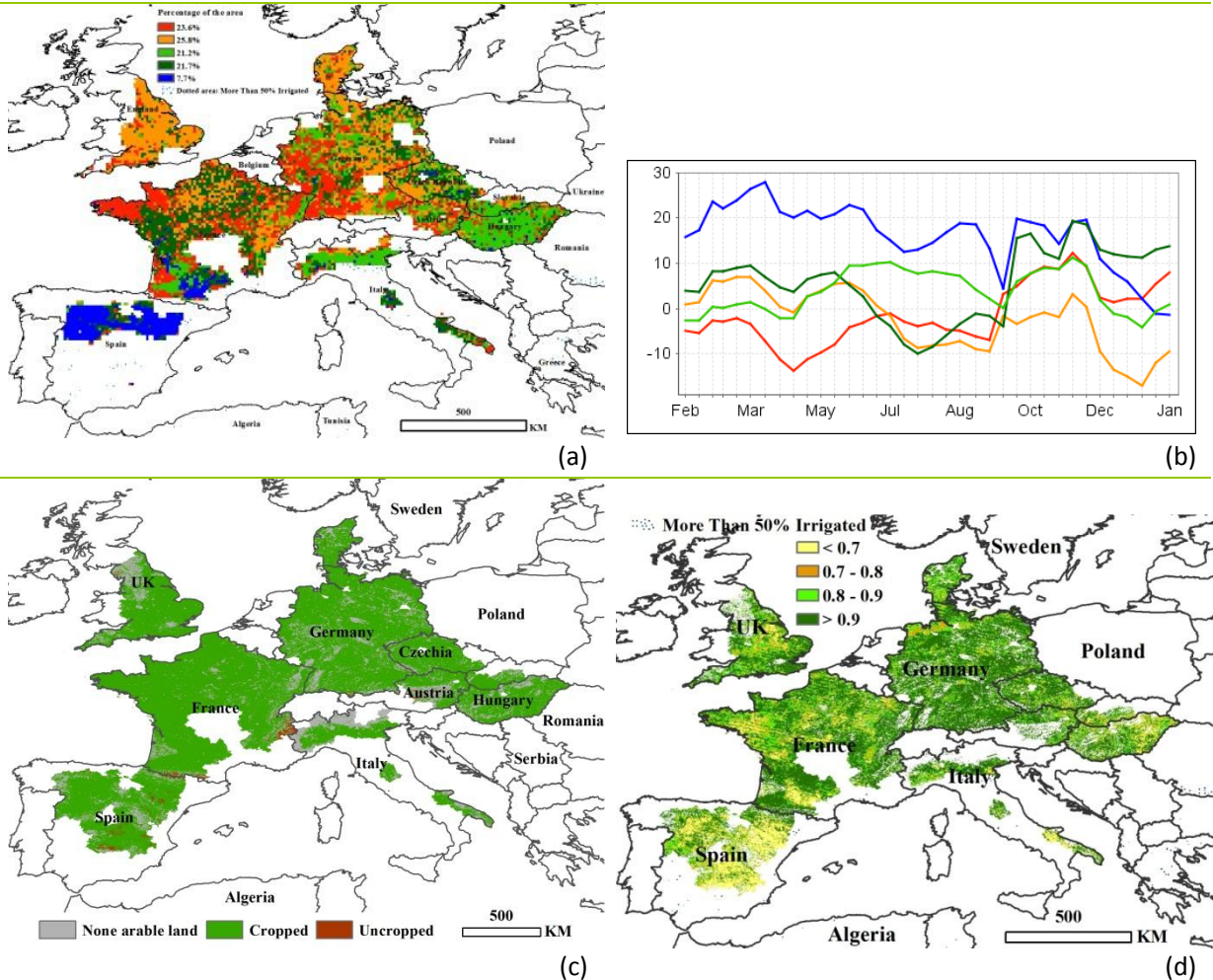
As already mentioned in section 1.1, several areas experienced abnormal environmental conditions, including high rainfall in the United Kingdom (43 percent above the recent 13 year) and Hungary (a drop of 33 percent). But the most spectacular and spatially coherent departures concern temperature, mostly in the northern center and east of the MPZ: a 2.1°C increase in Denmark and close to a 2.0°C increase in Germany, Hungary, Czechia, Slovakia, and Austria (+1.5°C). Abnormal PAR was recorded only in Denmark (-4.5 percent).

Based on VHI clusters, crop conditions in Europe can be described for the three corners and middle area of a triangular area across the continent. In the first (i) point of the triangle—in the United Kingdom and Denmark—the area is characterized by a sharp deterioration in VHI in December and January, associated with floods and possibly low radiation in Denmark. At this stage of the season, the season's final outcome will still very much depend on the conditions that will prevail during February and the following months. The second point (ii) of the triangle covers Spain and the east of south-western France, where VHI was well above expectations for most of 2013, but rapidly deteriorated in December, compared with the reference period, reaching values close to average at the end of January. In a third corner (iii), covering the Po Valley and the eastern part of the MPZ (Hungary), VHI values are about average and then close to average in December and January.

Next, between the three listed "corners," the continent is characterized by a patchwork of the three described behaviors, mostly in areas with high maximum VCI values (above 0.8). Lower values are seen for the peripheral areas, especially south and east Spain (Aragon and Castilla), south-west and north-west France (Central Midi-Pyrénées and east Brittany), the United Kingdom (Cambridgeshire and Lincolnshire), the north of Lower Saxony in Germany, and eastern Hungary. As with VHI, the remaining areas are best described as random patches of high and low VCI, with different mixes of both, approximately 30 low-70 high in France and Hungary, 10-90 in Germany, Denmark, Czechia, and north Italy, and 70-30 in Spain and

southern Italy. The average VCI in the MPZ is nevertheless rather high, 0.88, up 8 percent over the latest season.

Figure 2.6. Western Europe MPZ: Farming intensity and stress



(a) Spatial distribution of VHI profiles between February 2013 and January 2014 (VHI departure from the twelve-year average for 2001-2013); (b) Typical VHI profiles associated with the pixels in (a); (c) Cropped and uncropped arable land; (d) Maximum vegetation health index (VCI).

## Chapter 3. Production and crop condition of key countries

Following information on global environmental indices (chapter 1) and indicators of farming intensity and stress (chapter 2), chapter 3 presents CropWatch assessments for thirty individual countries, from Argentina (ARG) to South Africa (ZAF). For each, CropWatch analyses include a comprehensive array of variables and indicators. Section 3.1 summarizes—as far as possible—the global production outlook based on these country assessments, while section 3.2 presents details and analysis for each of the countries. Additional information is presented in Annex A, including environmental indices by country (table A.3) and indices for major regions within some of the larger countries (tables A.5 through A.12, covering Argentina, Australia, Brazil, Canada, India, Kazakhstan, Russia, and the United States). For each of those countries, only major producing areas are listed.

### 3.1 Production outlook

As implicitly mentioned in previous sections, this CropWatch bulletin is very much "between seasons:" the harvest of winter crops (wheat) was completed in the southern hemisphere, while summer crops are currently growing, with several months left before the time of harvest. In the northern hemisphere, winter crops have been planted before or up to the beginning of the reporting period; they are currently dormant at the higher latitudes and actively growing in the southernmost areas. Summer crops will be planted in a couple of months in the cooler climates.

This must be kept in mind when comparing and interpreting the data in table 3.1, which summarizes environmental indices and crop indicators for the countries, listing departures from the recent twelve-year average (environmental indices) and five-year average (crop indicators).

It is interesting to highlight the extreme values listed in the table. Rainfall shortage, for instance, was largest in Australia (-27 percent), followed by Ukraine (-25 percent), and Poland (-16 percent), ignoring Egypt where all crops are irrigated. The largest positive departures occur in mostly semi-arid countries, where the availability of additional water is definitely going to improve crop prospects, for instance in Uzbekistan (+72 percent), Mexico (+48 percent), Iran and Pakistan (+42 percent), and India (+52 percent), which, however, is much less arid than the other listed countries. Looking at the global spatial patterns of the environmental indicators (figures A.1 to A.3), it becomes obvious that the extremes stressed in this subset of thirty countries do in fact quite naturally occur in adjacent areas as well; the most extreme conditions do not even necessarily occur in the thirty countries examined here.

Cold spells affected North America (United States -1.0°C, Canada -1.3°C) and part of Southeast Asia (Thailand, -1.0°C), while large expanses of Eurasia, from Siberia and Russia (+1.7°C) to Germany (+1.2°C), enjoyed above average temperatures compared to the twelve-year average. Argentina (+1°C) is also mentioned here, as the country experienced drought early in the growing season of summer crops. Whether the high temperatures in Eurasia will eventually result in improved winter crop output is open to debate, as the direct and indirect effects need to be evaluated against the weather of the period between February and the time of harvest.

Table 3.1. Environmental and crop indices for October 2013 to January 2014, departure from 5YA and 12YA

	Environmental indices departure from 12YA (2001-2013)				Crop indicators departure from 5YA (2008-2013)	
	Rainfall total (%)	Temperature average (°C)	PAR accumulation (%)	Biomass accumulation (%)	Uncropped arable land in % of pixels (Absolute difference in % points)	Maximum VCI (absolute difference)
Argentina	5	1.0	0.1	-1	0.7	-0.05
Australia	-27	0.3	3	3	9.2	0.01
Bangladesh	11	-0.5	-0.5	33	-0.2	0.06
Brazil	-1	0.2	-0.4	2	-0.4	0.01
Cambodia	5	-0.8	5	8	0.5	-0.01
Canada	8	-1.3	6	-2	10.7	0.01
China	19	0.5	8	21	-3.3	0.03
Egypt	-24	0.2	3	26	-1.0	0.05
Ethiopia	28	0.3	0.2	16	-4.3	0.01
France	-3	0.8	0.1	4	-2.0	0.07
Germany	5	1.2	-0.4	8	-10.7	0.11
India	52	-0.3	1	33	-3.0	0.11
Indonesia	-2	-0.2	-2	-2	0.4	-0.01
Iran	42	-0.4	2	19	-2.8	0.06
Kazakhstan	25	2.0	4	17	-1.9	0.23
Mexico	48	-0.1	-3	31	-4.3	0.04
Myanmar	27	-0.2	2	4	-4.8	0.01
Nigeria	23	0.3	6	9	1.6	-0.01
Pakistan	42	-0.1	3	14	-3.5	0.04
Philippines	11	-0.3	-4	-0.2	-0.4	0.00
Poland	-16	1.2	4	-7	-24.2	0.09
Romania	-8	1.2	2	-6	-12.5	0.10
Russia	-1	1.7	4	6	11.8	0.12
South Africa	-3	0.0	3	0.0	3.0	-0.03
Thailand	13	-1.0	5	6	0.6	0.02
Turkey	-6	-0.2	7	-9	18.9	-0.03
United Kingdom	42	0.7	1	10	-3.0	0.09
Ukraine	-25	0.7	-1	-11	-30.5	0.04
United States	-4	-1.4	3	-2	5.9	0.05
Uzbekistan	72	0.5	4	52	-8.6	0.01
Vietnam	-1	-0.6	1	-7	-1.5	-0.01

Note: Departures are expressed in relative terms (percentage) for all variables, except for temperature, for which absolute departure in degrees Celsius is given. Zero means no change from the average value; Relative departures are calculated as  $(C-R)/R*100$ , with C=current value and R=reference value, which is the five- or twelve-year average for the same period between October 2008 and January 2013 (5YA) or October 2001 and January 2013 (12YA). VCI=Vegetation condition index.

Satellite derived PAR is less variable than rainfall or temperature and no large extreme values occur. Nevertheless, high departures occurred in China, Canada, Turkey, and Nigeria (between +6 and +8 percent). Low sunshine in Mexico (-3 percent) and in the Philippines (-4 percent) is associated with abundant precipitation. In Mexico, water is a major limiting factor in many areas and the benefits of abundant rain will outweigh the negative effect of reduced PAR, while in the Philippines, the large impact of Haiyan combined with low sunshine is bound to result in production loss.

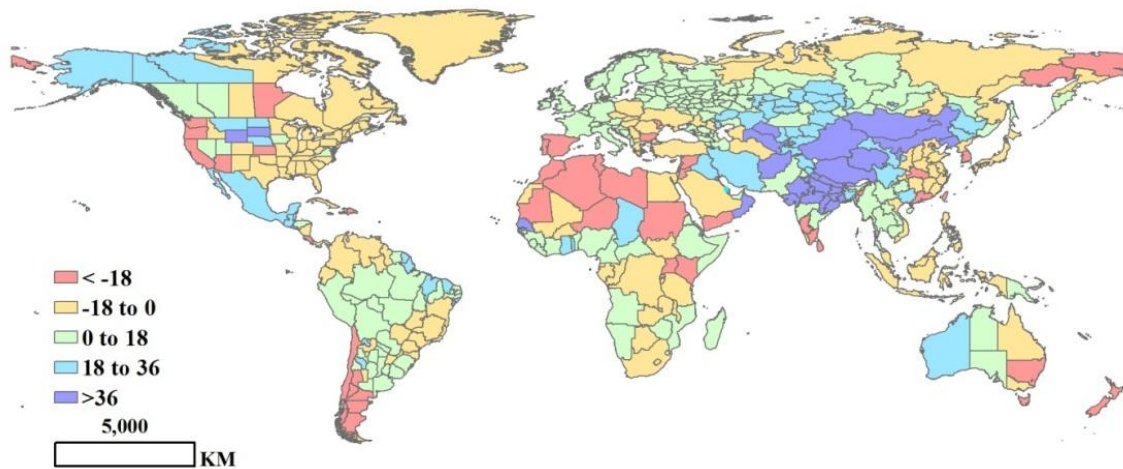
Biomass departures from the reference values (figure 3.1) can result from either higher than normal temperatures or higher than normal rainfall. The relative contribution of rainfall is most marked in warm, semi-arid climates; this is the case in Mexico (+31 percent), India (+33 percent), and Uzbekistan (+52 percent). The effect of temperature is dominant in areas where rainfall is normally not limiting, or in irrigated areas, such as China (+21 percent). The largest decreases occur in countries that were already mentioned for their poor performance in terms of rainfall (Poland with -7 percent and Romania with -6

percent). Two countries combine a relatively mild drought with below average temperature: Turkey (-9 percent) and Vietnam (-7 percent).

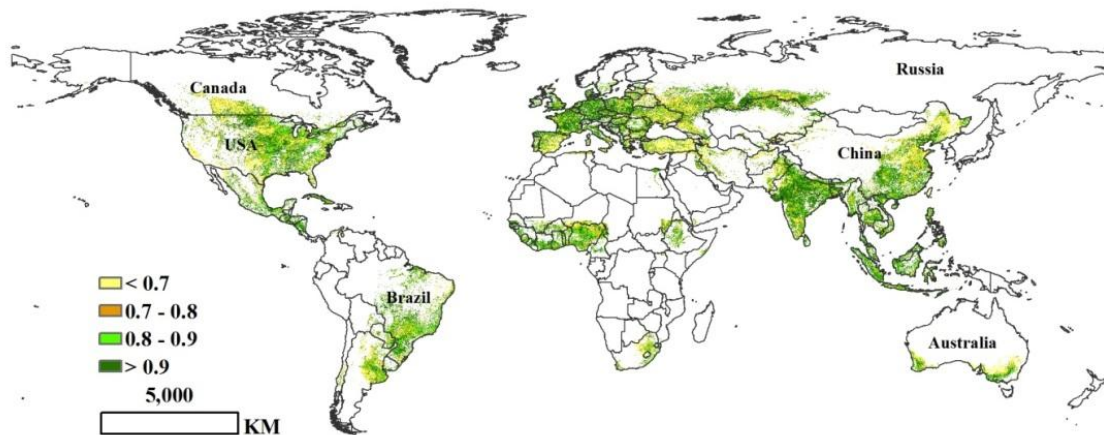
One of them (Turkey) also displays the largest uncropped arable land (UAL) value (+18.9 percent) indicating a dramatic increase in uncropped land. Although the mechanism is difficult to assess with the available data, the detailed national analysis in section 3.2 clearly identifies the most affected areas, based on the biomass map and VHI profiles. Other large UAL departures occur in Canada and the United States because of the cold spell, and in Russia (+11.8 percent), where the increase is more difficult to interpret. It is, however, confirmed by national sources.

Maximum VCI departures are consistent with the environmental indices in most instances, starting with Kazakhstan (+0.23, due to a favorable combination of rainfall (+25 percent) and temperature (+2.0°C)), followed by most of the Eurasian countries that experienced a "warm spell," for example +0.12 in Russia and +0.11 in Germany. The largest negative departures for VCI are reported for Argentina (-0.5) and South Africa (-0.3). See also figure 3.2.

**Figure 3.1. Global map of biomass accumulation by country and sub-national areas, departure from twelve-year average (2001-13) average (percentage)**



**Figure 3.2. Global map of maximum VCI by country and sub-national areas**



Argentina is one of the countries where CropWatch has estimated wheat yield and production, alongside with other major wheat producers of the southern hemisphere: Brazil and Australia (table 3.2). All countries underwent significant production increases in the range from about 15 percent (Argentina, Australia) to 30 percent (Brazil). The production drop in South Africa is the continuation of a trend, mostly due to the fact that wheat is less profitable than other crops.

**Table 3.2. CropWatch estimates of 2013 wheat production in the southern hemisphere (Australia, Brazil, and Argentina), together with South-African production data (x1000 tons)**

	Wheat					
	Yield	Δ%	Area	Δ%	Production	Δ%
Argentina	2.82	8.9	3321	5.1	9356	14.1
Australia	1.96	11.3	13335	4.3	26181	16.5
Brazil	2.60	12.3	2212	16.9	5750	31.3
South Africa (*)					1750	-6

Note: Δ%=Percentage increase expressed against 2012 data from national sources; (\*) national data.

Source: CropWatch estimates (Australia, Brazil, and Argentina); South African data is from national sources.

### 3.2 National crop condition

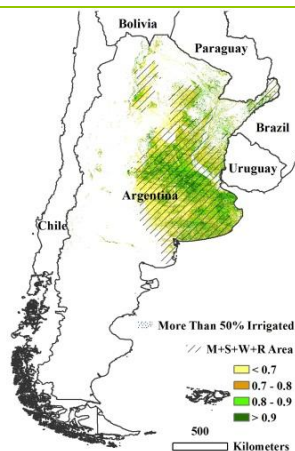
On the subsequent pages, results are presented for each of the thirty key countries. For each, CropWatch results include information—maps, graphs, and text—on crop condition, covering maximum vegetation condition index (VCI), NDVI, and biomass. The maps refer to crop growing areas only, except biomass maps, which are given for the whole country to not exclude rangeland, which is important in the economy of livestock producers on all continents.

Information for each country is presented as follow: (a) Maximum VCI (over arable land mask) for October 1 2013-January 30 2014 by pixel; (b) Spatial NDVI patterns for October 2013- January 2014 (compared to the 5YA); (c) NDVI profiles associated with the spatial pattern under (b); (d) Biomass for the period October 1 2013 – January 30 2014 compared to the 5YA, difference expressed in absolute values (gDM/m<sup>2</sup>); and (e) Crop condition development graph based on NDVI, comparing the latest season (since October 2013) to the five-year average (5YA), the five-year maximum, and the October 2012-September 2013 period. Note that biomass in these graphs is based in temperature and rainfall and expresses to what extent rainfall and temperature were conducive to biomass development (see also CropWatch online resources on methodology.)

As mentioned before, additional resources for the countries are available in Annex A, tables A.3 and A.5-A.12, as well as online at [www.cropwatch.com.cn](http://www.cropwatch.com.cn), where brief agricultural profiles for each country are posted (visit online resources: Country profiles).

**Figures 3.3-3.32. Crop condition for individual countries ([ARG] Argentina- [ZAF] South Africa) for October 2013-January 2014**

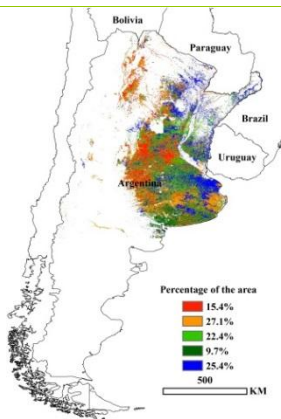
# [ARG] Argentina



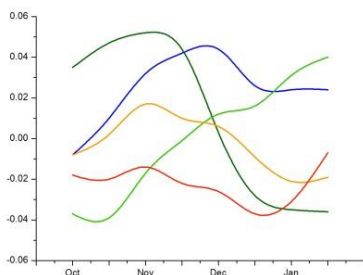
**Figure 3.3. Argentina crop condition, Oct. 2013-Jan. 2014 (a)**

November and December are the harvesting months for wheat in Argentina; summer crops, in particular maize and the first soybean crops, are in emergence and establishment stages. Rainfall from October to January was 10 percent above the previous five years, but 6 percent below last year's. Temperatures were above normal. The crop condition profiles indicate that the development of soybean and maize was delayed due to the hot and dry weather conditions. Recent rainfall in January promoted crop emergence and establishment in part of the main soybean and maize planting regions, but more rainfall is needed in western Buenos Aires and eastern La Pampa regions. Droughts there resulted in low maximum VCI and lower biomass, compared to the five-year average.

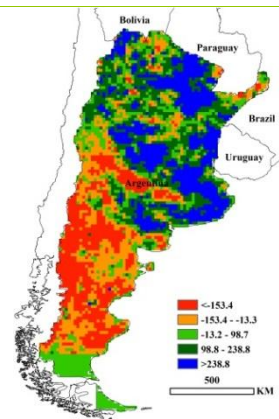
As indicated by the NDVI clustering profiles, crop condition is changing from 'above normal' to 'normal' or 'below normal' in most of Argentina, except for scattered regions in northwestern Buenos Aires and northern Santa Fe (figure (b), regions in light green). This confirms the unfavorable conditions that started from November. Winter wheat in the southern coastal regions of Buenos Aires province—the key winter wheat producing regions contributing 50 percent of total wheat production—was not affected by the dry season. In contrast, the above normal PAR in the grain filling and maturing stage is beneficial for winter wheat yield, as shown by the CropWatch estimate of a 9 percent increase in yield compared to last year. Together with the increasing planting area, CropWatch puts the wheat production estimates for Argentina at 9.4 million tons, 14 percent up from last year's severely reduced production, but still well below the five-year average.



(b)



(c)

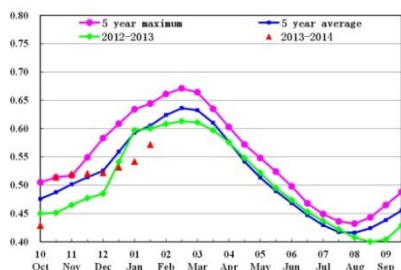


(d)

**Table 3.3. Argentina wheat production estimate for 2013-2014**

	Area (kHa)	Yield (tons/ha)	Production (kT)
Chaco	85	1.26	107
Tucuman	97	1.13	110
Salta	153	1.05	160
La Pampa	171	2.22	379
Entre Rios	226	1.83	414
Santiago Del Estero	237	2.90	688
Santa Fe	407	2.85	1157
Cordoba	424	2.82	1196
Buenos Aires	1495	3.41	5101
Other regions	27	1.62	45
<b>Total</b>	<b>3321</b>	<b>2.82</b>	<b>9356</b>

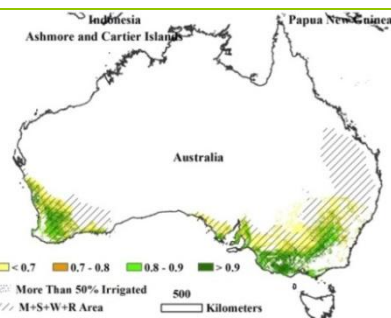
Note: Data are CropWatch estimates calibrated against national statistics.



(e)

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

# [AUS] Australia

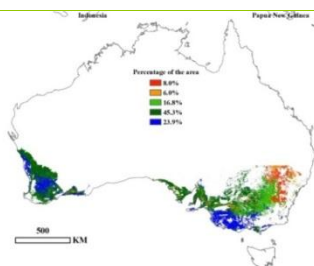


**Figure 3.4. Australia crop condition, Oct. 2013-Jan. 2014 (a)**

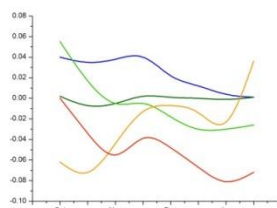
In Australia, November is the main harvesting season for wheat, which is planted in the southwestern part of Western Australia, the southeastern part of South Australia, across Victoria, and in the southeastern part of New South Wales. For the period under consideration, the crop condition in Australia shows average to above-average conditions compared to last five years, except for the beginning of October and the period from mid-December to mid-January when conditions are below average. For the environmental indexes in general, the maximum VCI increases by 0.01 compared to the five-year (2008-2013) average. The average temperature increases by 0.3°C, which is confirmed by the NOAA NCDC climate anomalies reporting that the warmest September-February period from 2013-2014 contributed to overall record warmth in Australia. Consistently, PAR increases also by 3 percent. Total rainfall, however, decreases by 37

percent from the recent decadal average, which is confirmed by the Australia Bureau of Meteorology reporting a drought in October and January. In this situation, irrigation is provided to assure the rapid growing of wheat before harvest. In general, CropWatch results indicate a biomass accumulation increase of 3 percent, which means wheat in Australia is still looking at a good production season in 2013-2014.

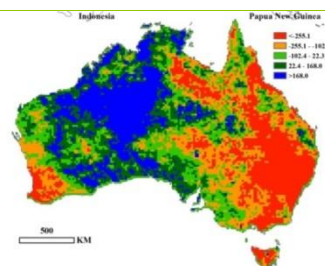
In terms of production, the production of wheat in Australia has attained to 26,181 kton (kT) for 2013-2014, with a yield of 1.96 tons/ha and a total wheat area of 13,335 kHa. Compared with the previous season in 2012-2013, production has increased by 16.5 percent, with the yield and area each increasing by 11.3 percent and 4.3 percent respectively, consistent with a report from the Australian Bureau of Agricultural Resource Economics and Sciences. Specific production in the individual states varies; the poor condition in New South Wales and Victoria has led to the decrease of production, while increases in production are mainly concentrated in Western and South Australia.



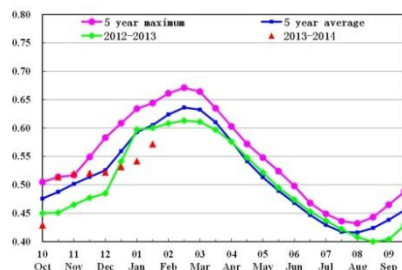
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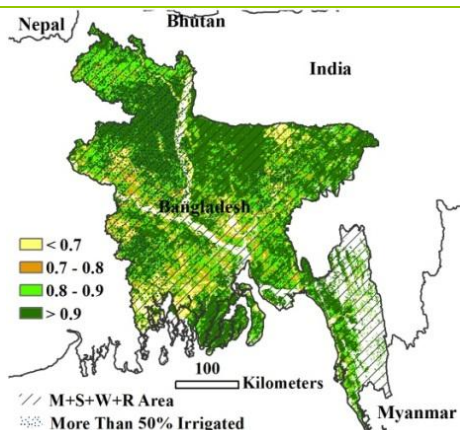
**Table 3.4. Australia wheat production estimate for 2013-2014**

	Area (kHa)	Yield (tons/ha)	Production (kT)
Western Australia	5015	1.75	8845
South Australia	2172	1.89	4120
New South Wales	3617	2.15	7777
Victoria	1623	2.28	3701
Other regions	908	1.91	1738
<b>Total</b>	<b>13335</b>	<b>1.96</b>	<b>26181</b>

Note: Data are CropWatch estimates calibrated against national statistics.

For a description of (a) through (e), see introduction to section 3.2.

# [BGD] Bangladesh

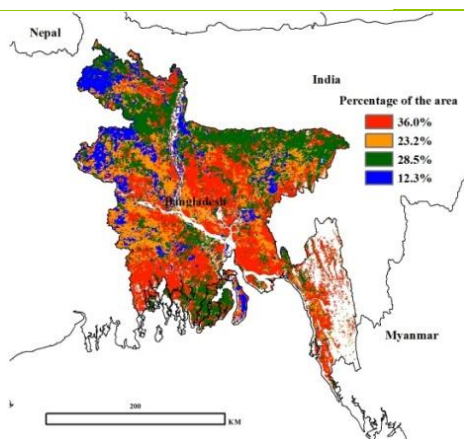


**Figure 3.5. Bangladesh crop condition, Oct. 2013-Jan. 2014 (a)**

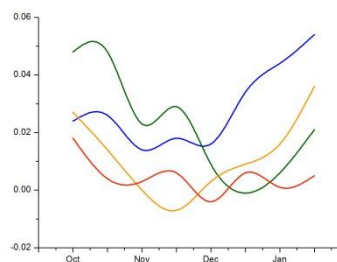
The period covered by this bulletin includes the harvest of the 2013 Aman rice, the planting of the irrigated Boro rice and wheat, as well as the early season crops, which is now completed.

As illustrated in figures A.1-A.3, Bangladesh suffered from a combination of lower rainfall and PAR. The temperature kept the same level as the previous 2001-2013 average. Almost 60 percent of the crops were below average in the current monitoring season. Crop condition during the Aman season from October to December was inferior to that of the recent five year, due to poor rainfall. Only the northern and central southern part of the country show favorable conditions over the whole period from October to the end of January.

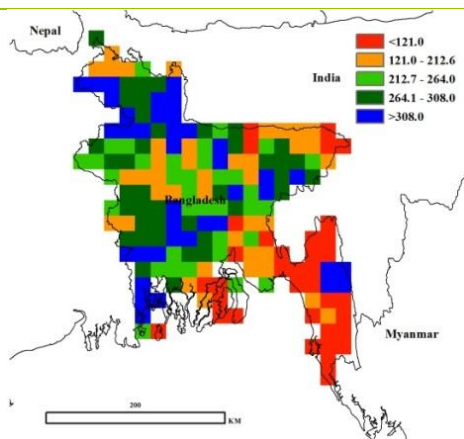
The distribution of poor crop conditions coincides with the low maximum VCI in the southwest of the country, where the value is less than 0.7. For the irrigated Boro season, crop condition kept balance with that of the previous five year average, indicating good prospects for the future rice crop. As for biomass, the whole country seems to enjoy a more favorable condition than during the recent five year period.



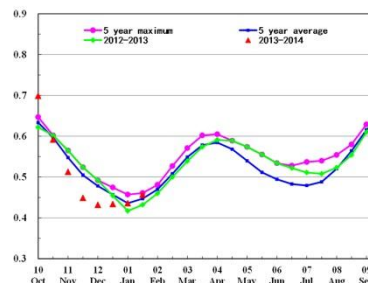
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(d)



(e)

For a description of (a) through (e), see introduction to section 3.2.

# [BRA] Brazil

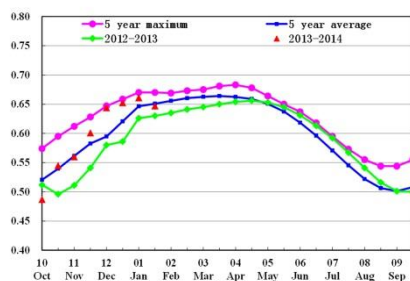
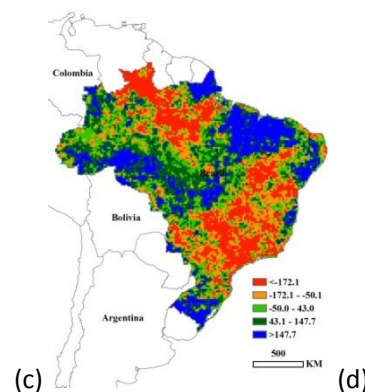
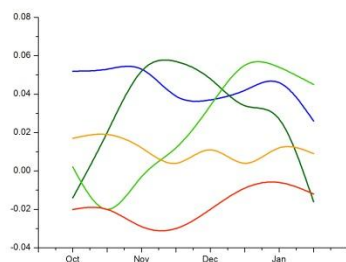
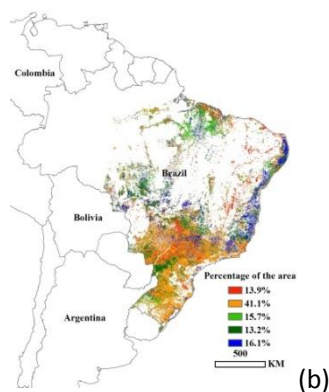


**Figure 3.6. Bangladesh crop condition, Oct. 2013-Jan. 2014 (a)**

At the end of December, the harvest of both maize in the northeast and wheat (planted in May to June) was completed. First season maize has reached maturity and is ready to be harvested. Generally, rainfall over the monitoring period was below the five- and twelve-year averages, but still 10 percent above the same period last year. The below normal precipitation for the last four months is still sufficient for wheat and first season maize yield establishment. Crop condition was generally above normal and better than the same period one year ago, confirmed by the crop condition development graph (e). Considering the spatial patterns of NDVI departure clusters and corresponding profiles, most areas in Brazil benefited from average to above average conditions, except for central and southern Goiás. Crop condition in Rio Grande Do Sul, the first wheat producing state in Brazil, is slightly above normal with high maximum VCI and biomass. Low precipitation (12 percent below normal) in the second wheat producing state—Parana—significantly affected wheat yield; CropWatch estimates the yield for this state at 1.84 ton/ha, 30 percent below the country’s average yield. Below normal rainfall in Goiás, Mato Grosso Do Sul, Minas Gerais, Parana, and Sao Paulo resulted in low biomass compared to the five year average (d).

In general, unevenly distributed rainfall was the dominant stress factor for crops over the monitoring period, but the key wheat producing regions were rarely or slightly affected by the water stress. Maize and soybean in the field may be influenced by the dry weather conditions if lack of rainfall continues. Overall, CropWatch estimates put the output of the recently harvested wheat crop at 5.75

million tons (table 3.5), coinciding with national estimates and representing a welcome improvement (about 30 percent increase) over the reduced 2012 output.



**Table 3.5. Brazil wheat production estimate for 2013-2014**

	Area (kHa)	Yield (tons/ha)	Production (kT)
Minas Gerais	36	3.36	121
Sao Paulo	35	2.40	84
Parana	990	1.84	1823
Santa Catarina	74	3.01	223
Rio Grande Do Sul	1061	3.26	3464
Other regions	16	2.19	35
Total	2212	2.60	5750

Note: Data are CropWatch estimates calibrated against national statistics.

(e)

For a description of (a) through (e), see introduction to section 3.2.

# [CAN] Canada

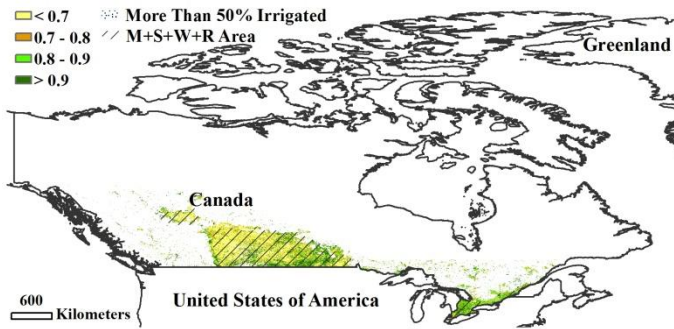
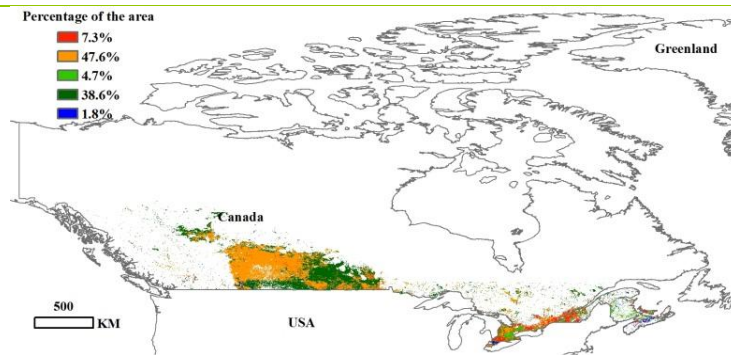
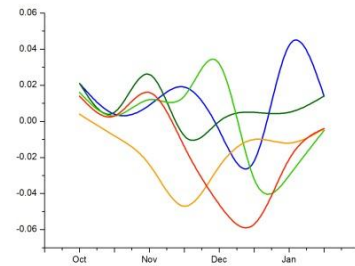


Figure 3.7. Canada crop condition, Oct. 2013-Jan. 2014 (a)

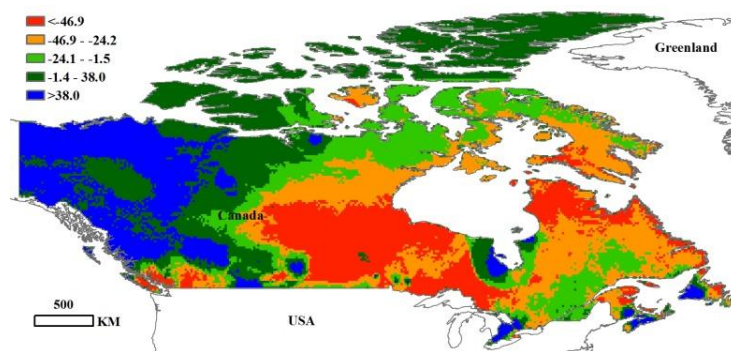
Winter crops in Canada are sowed in September-October, with almost all crops growing in the southern parts of Alberta, Saskatchewan, and Manitoba. Over the monitoring period, all crops have been harvested completely and are currently waiting to be sowed in the coming crop season. The maximum VCI, NDVI, and biomass have little meaning in this period due to the absence of crops. In comparison with the recent twelve-year average for the same period, rainfall tends to increase (+7 percent) and temperature was slightly below normal. As almost croplands in Canada are rainfed, the abundant rainfall in this period would create wet conditions for the coming crop growing season; the lower temperature could also decrease the risk of insect pest.



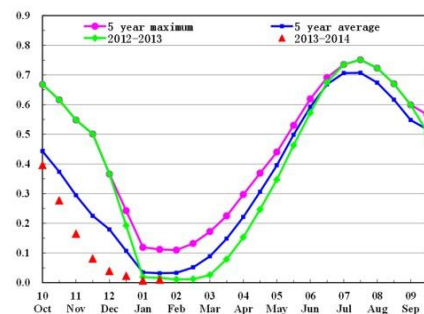
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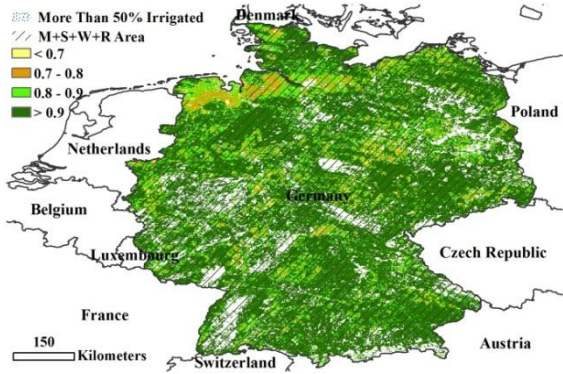


(e)

For a description of (a) through (e), see introduction to section 3.2.

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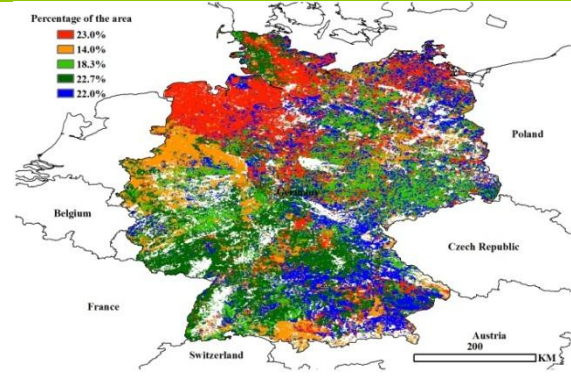
# [DEU] Germany



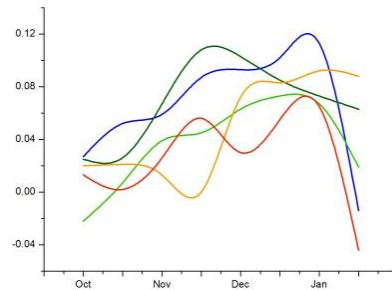
**Figure 3.8. Germany crop condition, Oct. 2013-Jan. 2014 (a)**

This analysis covers the late stages of sugar beets (October harvest) and the early vegetative stages of winter wheat and winter barley (planted in October). According to HGCA crop updates, the maize harvest was completed at the beginning of December, 2013. The CropWatch environmental indices indicate above average rainfall, temperature, and PAR accumulation (3 percent increase, 1.2°C, and 1 percent increase respectively compared with the last five years' average), which is consistent with the NOAA NCDC report on climate anomalies that Germany experienced the 10<sup>th</sup> warmest December since its national records began in 1881. With the positive moisture and thermal anomalies, biomass is expected to increase by 10 percent compared to the five-year average at the national scale. This observation is confirmed by the NDVI profiles, with the national NDVI values well above average and even higher than the five-year maximum (except for a sharp drop at the end of January). The NDVI clusters also indicate that NDVI values over the country are above average from the

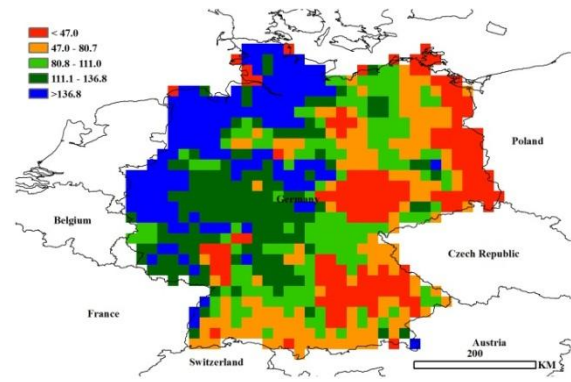
end of October to early January; a sharp drop of NDVI in January is mostly occurring in Niedersachsen, Mecklenburg-Vorpommern, and Bavaria (the red and blue color). The maximum VCI map presents an overall good crop condition with one exception in the northwest of Niedersachsen (a), which is consistent with the red area and red curve in the NDVI clusters (figures (b) and (c)).



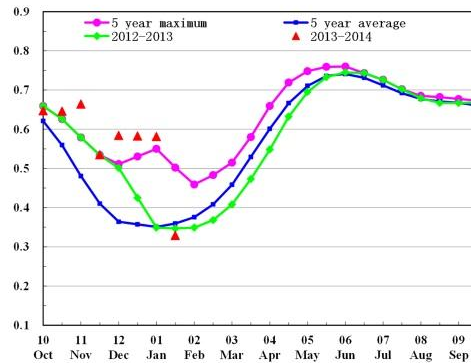
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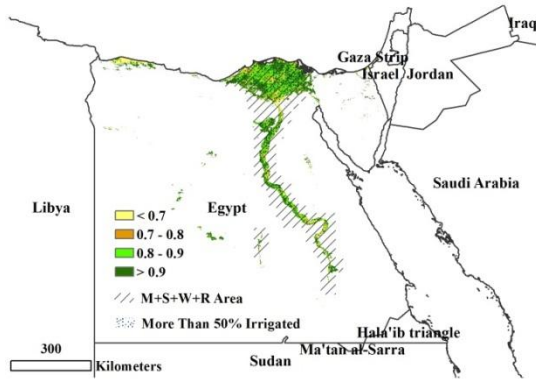
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(e)

For a description of (a) through (e), see introduction to section 3.2.

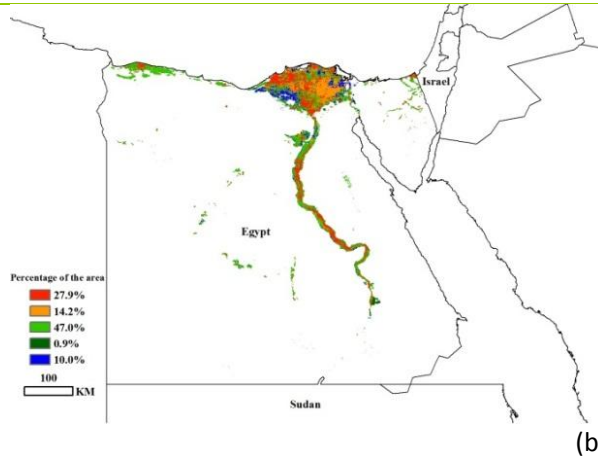
# [EGY] Egypt



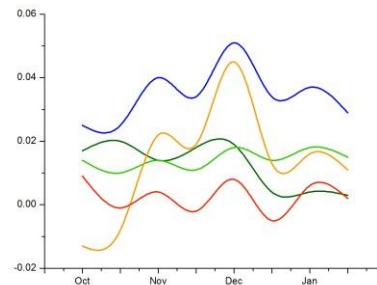
**Figure 3.9. Egypt crop condition, Oct. 2013-Jan. 2014 (a)**

Egypt is notoriously difficult to monitor, as close to 100 percent of agriculture is irrigated; even the wettest places in the north can only rarely sustain a pure rainfed crop. The environmental indices, which measure conditions only over agricultural areas, indicate below average rainfall (-20 percent), but average temperatures and a slight but positive PAR departure from the last decade. The national biomass increase is listed as about +20 percent. Maximum VCI is close to the 0.9, which denotes a season that is comparable with the best conditions of the recent five years, although the NDVI profile stays below the reference values, possibly reflecting the influence of lower than expected rainfall on natural vegetation, considering all crops are irrigated. The profiles of NDVI clusters are mostly above average but very variable. Biomass accumulation is not meaningful over most of the country, except over the Delta (Behera to Islamailia) where the indicator shows negative (-20 percent in the west) to close to average conditions (-3 percent in the east). Qualitatively, the

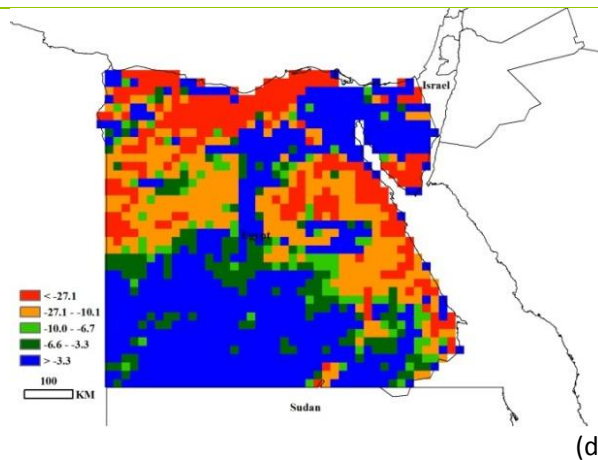
available indices are compatible with close to average or slightly below conditions for crops harvested in October and November. At the time of reporting, winter wheat is in average to slightly above average condition.



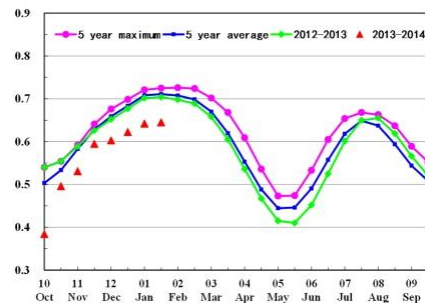
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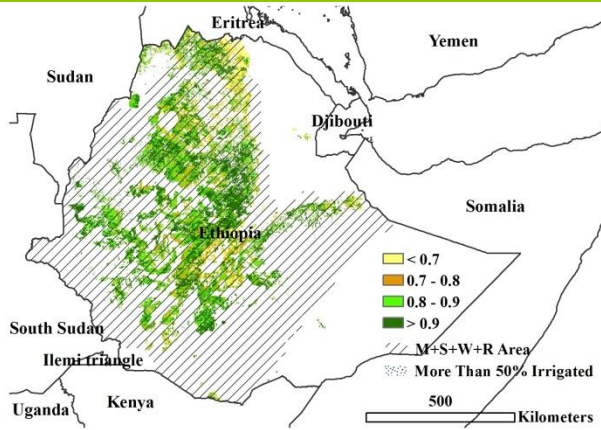


(e)

For a description of (a) through (e), see introduction to section 3.2.

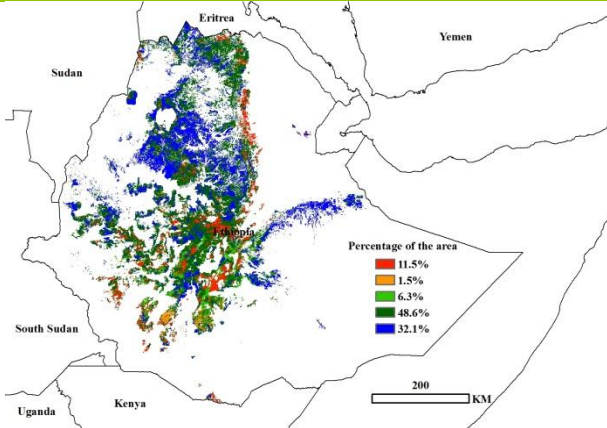
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# [ETH] Ethiopia

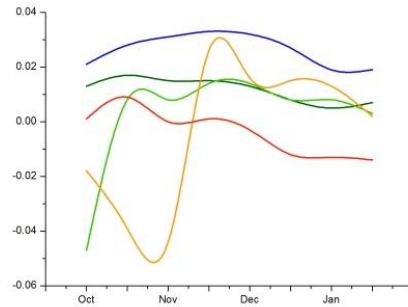


December is the main harvesting season for all "meher" crops in Ethiopia, although many of them mature earlier and stay in the field until labor availability permits their harvest. This report thus covers the late stages of the 2013 crops. The national environmental indices (October to January) are average for temperature and PAR but above average for rainfall (+30 percent) and biomass accumulation (about +20 percent over both the last decade and the last five years). Vegetation condition indices are mostly high or very high (>0.8) confirming the overall positive outcome of the 2013 season, except in limited areas bordering the semi-arid Afar, or east SNPP and adjacent areas in central Oromia. The biomass departure map confirms that some areas had close to average outcomes, but large portions of the country were above.

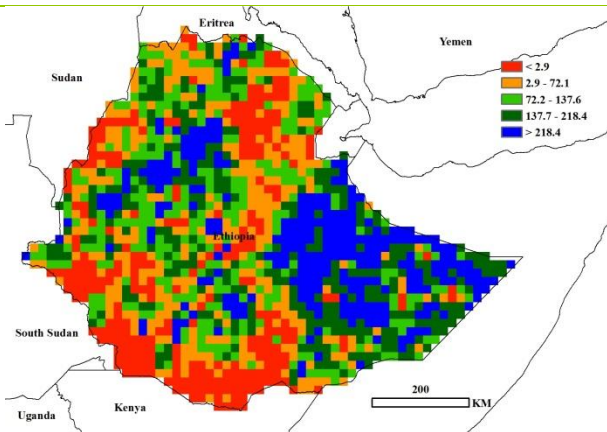
Figure 3.10. Ethiopia crop condition, Oct. 2013-Jan. 2014 (a)



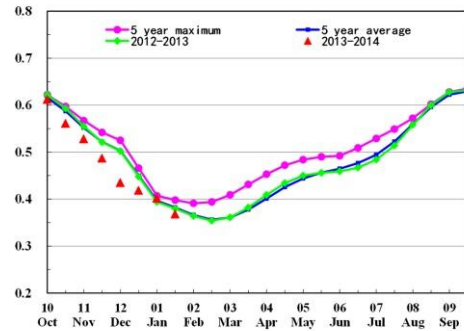
(b)



(c)



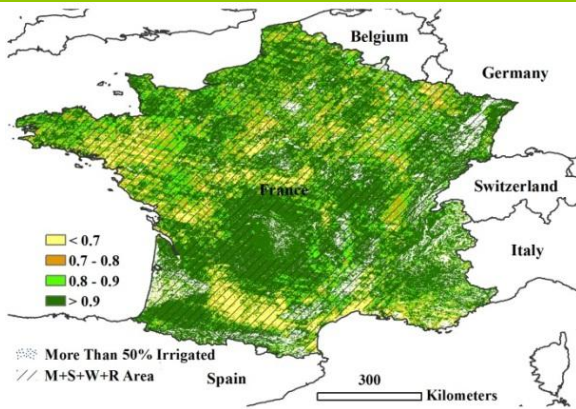
(d)



(e)

For a description of (a) through (e), see introduction to section 3.2.

# [FRA] France

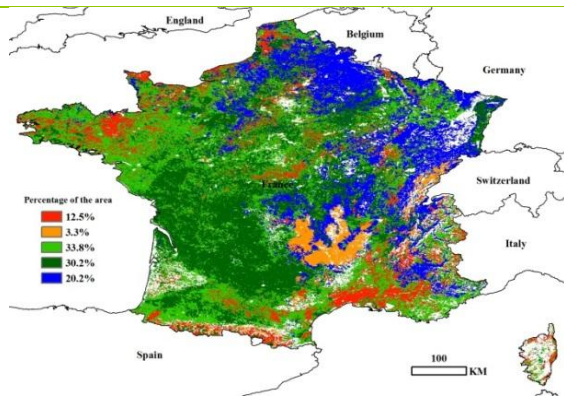


**Figure 3.11. France crop condition, Oct. 2013-Jan. 2014**

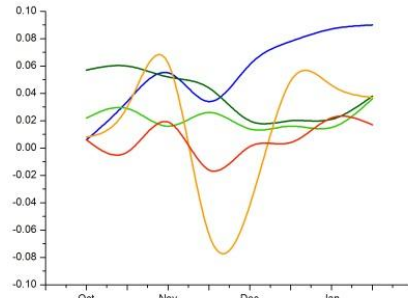
(a)

exception of the south of Auvergne and the north of Languedoc-Roussillon region, where NDVI values are below average from late November to mid-December. The Aquitaine and Midi-Pyrenees regions (dark green in figure (b)) present high NDVI values from October to November, but gradually decrease thereafter, after maize has been harvested. Generally good NDVI conditions are present in Picardie and Champagne-Ardenne region and the east and south of Bourgogne-Franche Comté (figures (b) and (c)), which agrees well with the positive biomass departure shown in dark green and blue in figure (d).

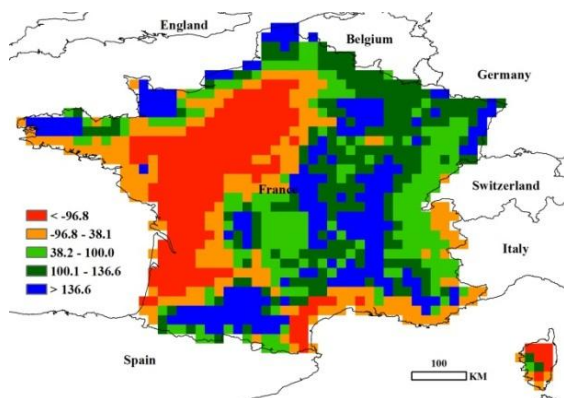
This analysis covers the late stages of sugar beets (October harvest) and the early vegetative stages of soft wheat and winter barley (planted in October). According to HGCA crop updates, the maize harvest was a little delayed with 85 percent of maize area harvested by December 2, 2013, compared with 99 percent harvested at the same time last year. Compared with the last five-year average, the CropWatch environmental indices show warmer than average weather and close to normal PAR at the national scale. These observations are consistent with the warmer than usual weather in Europe recorded in the JRC/MARS bulletin. At the national level, biomass presents a 3 percent increase compared to the recent five-year average, which agrees with the increase of national maximum VCI value and the well above average national NDVI values in the NDVI profiles (e). According to the NDVI clusters ((b) and (c)), NDVI values are above average across the country with the



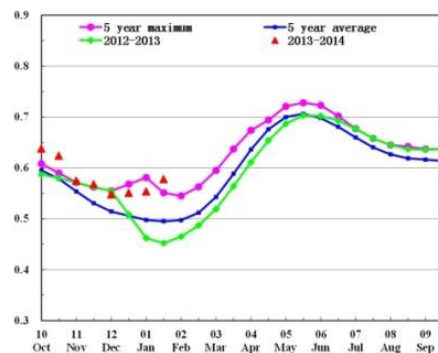
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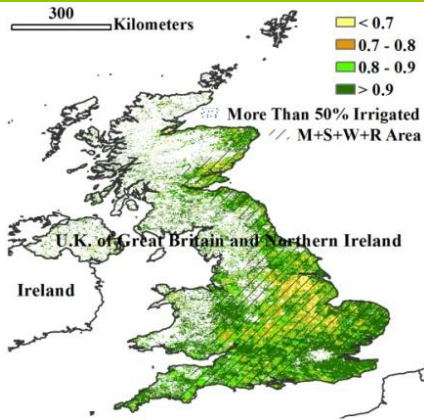


(e)

For a description of (a) through (e), see introduction to section 3.2.

ARG AUS BGD BRA CAN DEU EGY ETH FRA **GBR** IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

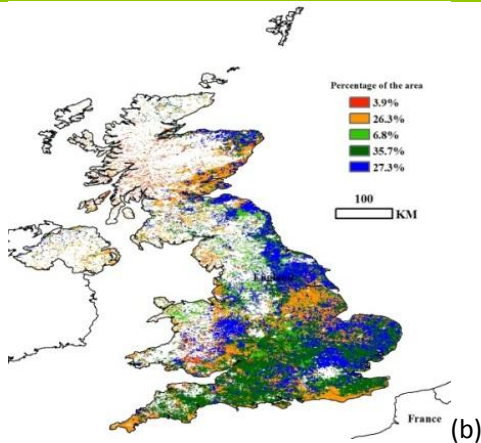
# [GBR] United Kingdom



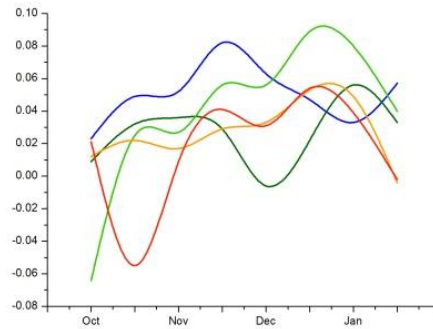
**Figure 3.12. United Kingdom crop condition , Oct. 2013-Jan. 2014 (a)**

This analysis covers the late stages of sugar beets (December harvest) and the early vegetative stages of winter wheat, winter barley, and rapeseed. According to HGCA crop updates, by the end of November 2013, 94 percent of intended wheat area was planted and the planting of winter barley and winter oilseed rape had been completed. The United Kingdom presents abnormal weather conditions in this period with an increase of all CropWatch environmental indices, especially rainfall (up 43 percent compared with both the recent five years and the 2001-2013 average). These observations are supported by the NOAA NCDC report on climate anomalies and the JRC/MARS bulletin, which suggested that the national mean temperature during December 2013 was the warmest since 1988 and that the country continued to have wetter than average conditions in January. Based on this period, the biomass at the national scale is expected to increase by 14 percent compared with the last five years, assuming favorable conditions prevail from now onwards. This is consistent with the interpretation of the NDVI profile (e), which shows that the national NDVI average is well above the recent five-year average and close to the five-year maximum value.

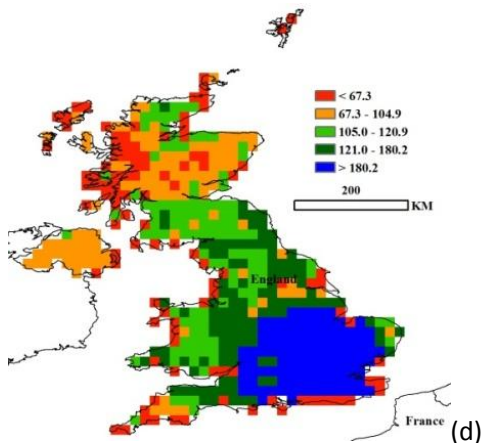
According to the NDVI clusters, from November onwards, the NDVI values across the country are above average. The southwest and southeast regions present a NDVI decrease from November to December due to excess water, but have since recovered. A shift from positive departure to negative departure of biomass from south to north is observed in figure (d).



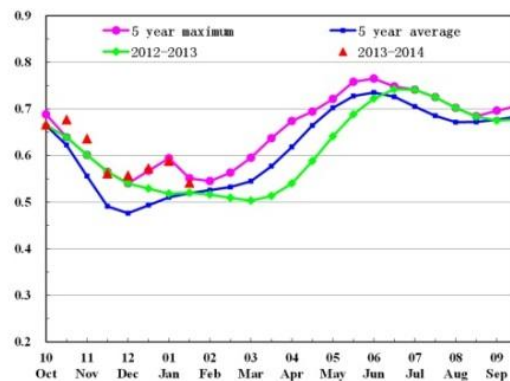
(b)



(c)



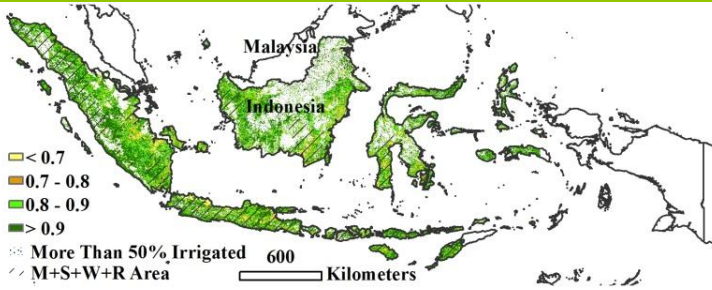
(d)



(e)

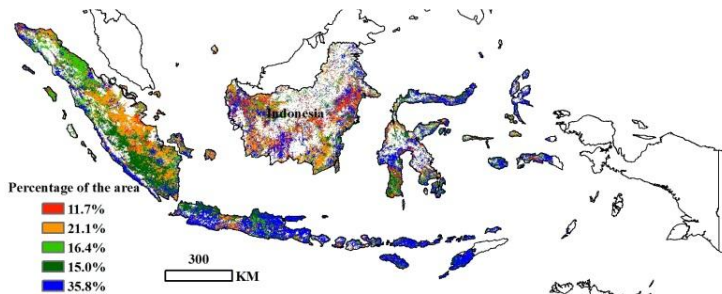
For a description of (a) through (e), see introduction to section 3.2.

# [IDN] Indonesia

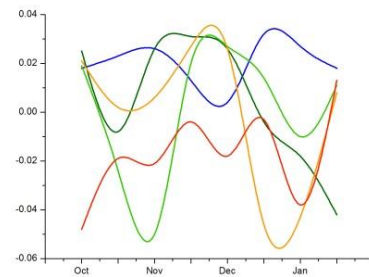


Wet season crops are currently in the field, to be harvested from March. Low environmental indices (including PAR and air temperature) indicate unfavorable crop condition, possibly compensated by normal to above-normal rainfall conditions. Compared with the recent past, the national NDVI profile was below average in December, but improved at the end of January. As a result, crop condition is now generally average or above average, except for the west of Sumatra, possibly as a result of recent flooding.

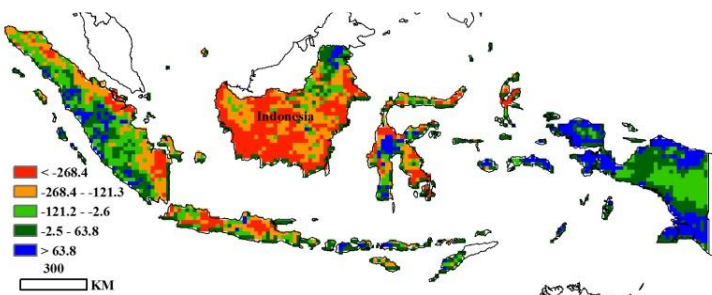
Figure 3.13. Indonesia crop condition , Oct. 2013-Jan. 2014 (a)



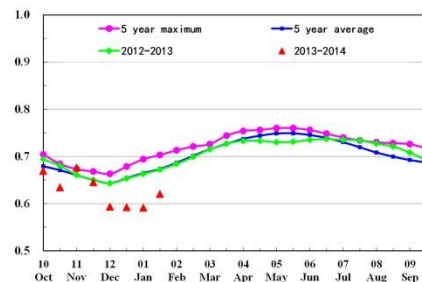
(b)



(c)



(d)

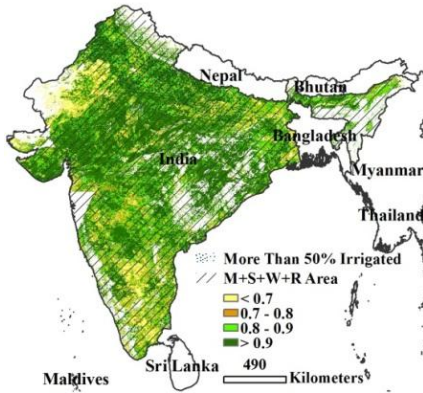


(e)

For a description of (a) through (e), see introduction to section 3.2.

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN **IND** IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

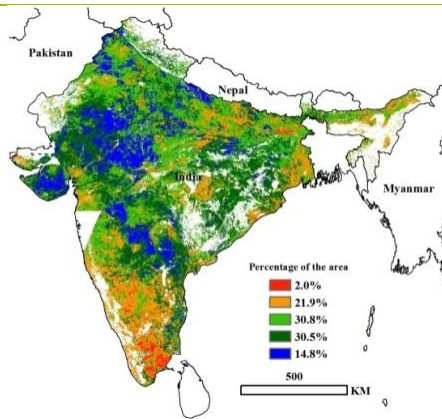
# [IND] India



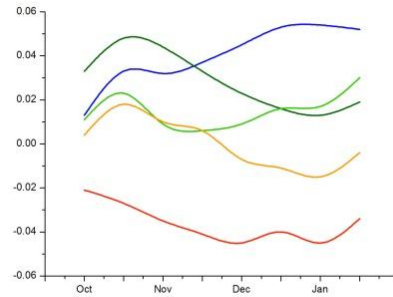
**Figure 3.14. India crop condition , Oct. 2013-Jan. 2014 (a)**

The period from October 2013 to January 2014 is of relevance for the rabi (winter) wheat and rice crops in India, whose planting has been completed by December. The results of the environmental conditions monitoring by CropWatch indicate that the country enjoyed favorable rainfall over the whole monitoring period except in the southern region where rainfall was below the 2001-2013 average. On the contrary, the air temperature was generally lower than the average except in the northwestern tip of India. The PAR kept balance with that of the reference period.

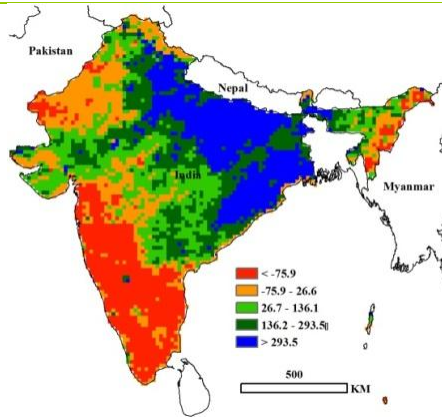
Crop condition in India was below average from October to end November; it then improved until January, when it came close to the recent five-year average. The favorable rains boosted planting of rabi cereal crops and the prospects for maize and rice are good. The NDVI was below the five-year average in the southern tips of Tamil Nadu throughout the monitoring period. This is confirmed by maximum VCI: most of India enjoys a maximum VCI in excess of 0.9, with the exception of Rajasthan in the northeast, the southern tip of Tamil Nadu, and Puducherry where the maximum VCI is below 0.7. Low biomass accumulation in the southwestern part of India (including Maharashtra, Goa Karnataka, southern Andhra Pradesh, and Puducherry) coincides with the lower rainfall regions.



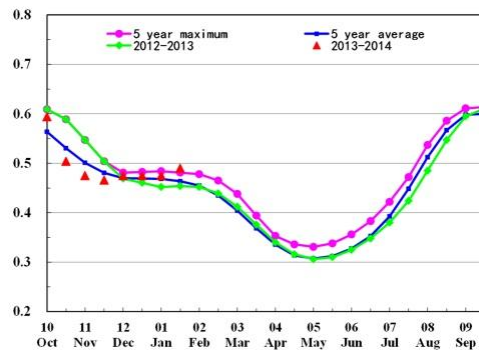
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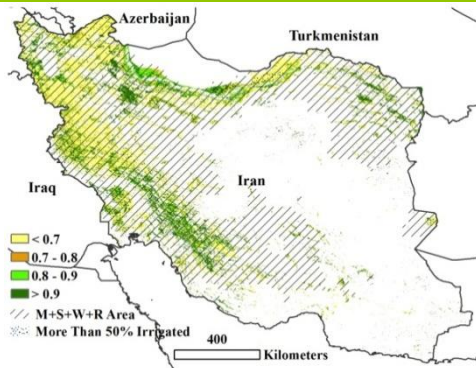
(d)



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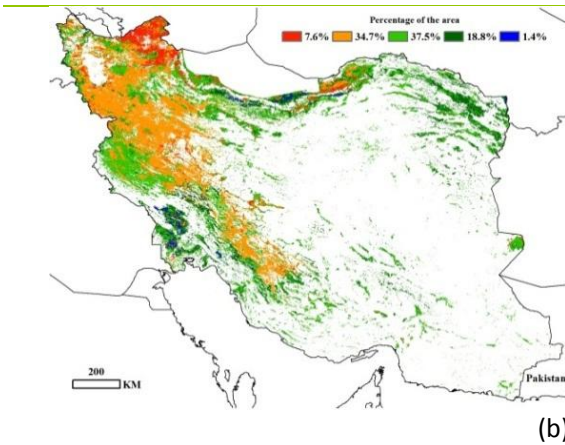
For a description of (a) through (e), see introduction to section 3.2.

# [IRN] Iran

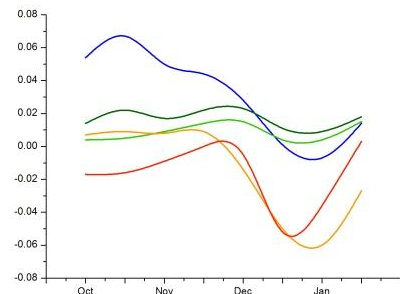


**Figure 3.15. Iran crop condition , Oct. 2013-Jan. 2014**  
(a)

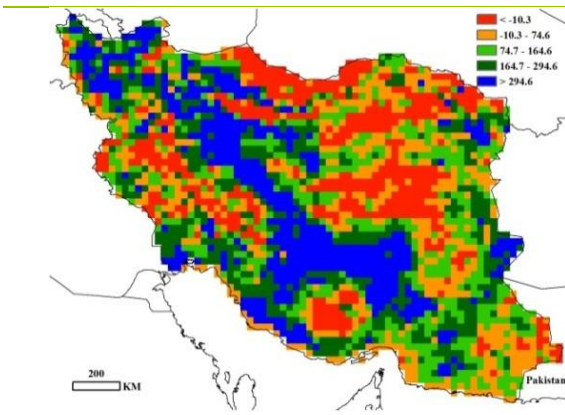
Accumulated rainfall, PAR, and biomass for October 2013 to January 2014 were above the five-year and twelve-year averages for the same period, while the accumulated temperature was below. At the end of January, the planting of winter wheat had been finished, while the planting of barley is still underway. The environmental indices for the current season indicate mixed conditions for winter crops. Compared to the twelve-year average, maximum VCI decreased by 0.06, indicating unfavorable crop conditions for winter. Conditions were close or above the five year average in the Razavi Khorasan and North Khorasan provinces of the northeast region, the Mazandaran and Golestancenter provinces of the central-north region, and the Khuzestan, Kermanshah, and Fars provinces of the southwest region. The crop conditions in the northwest, particularly the East Azerbaijan province, West Azerbaijan province and Kurdistan province, were below the five year average. Most regions experienced close to average crop conditions from October to November and below average crop conditions through December, with a return to average at the end of January. However, when major wheat producing areas are considered, Iran's latest winter crop generally underwent unfavorable conditions so far. Rainfall from February will be crucial in determining the final outcome of the season.



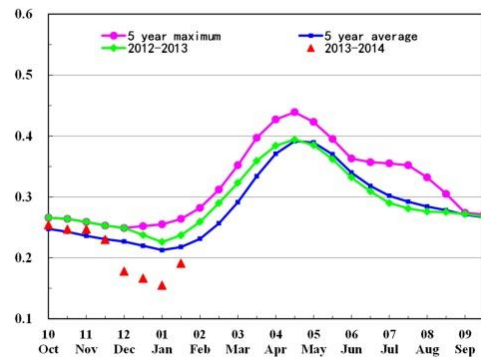
(b)



(c)



(d)



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# [KAZ] Kazakhstan

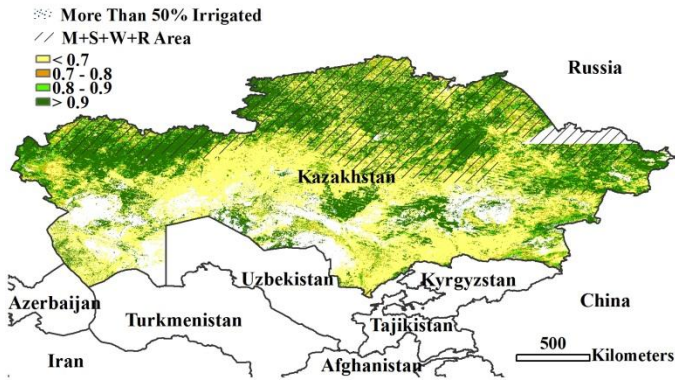
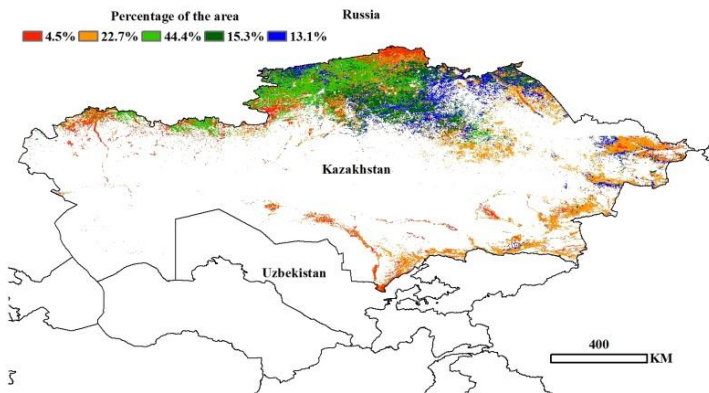
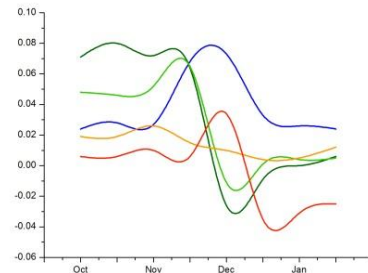


Figure 3.16. Kazakhstan crop condition , Oct. 2013-Jan. 2014 (a)

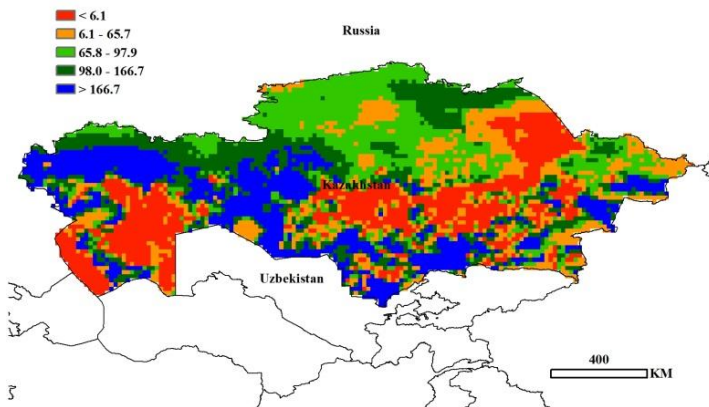
This analysis covers the harvesting period of last year's summer crops (cereals, spring barley, and wheat) from October 2013 to late January of this year. The NDVI clusters (figure b) indicate that crops were in good condition from October to late November. No crop was planted since November and from December the NDVI index has been close to the zero (figure e). Compared with the recent five-year average, the CropWatch environmental indices show a sharp increase of rainfall (32 percent) and biomass (22 percent), along with a slight increase in temperature and PAR. Favorable rainfall has provides the soil moisture for the initial stages of the next crops. The maximum VCI map presents a good crop condition with the value higher than 0.9 (figure a).



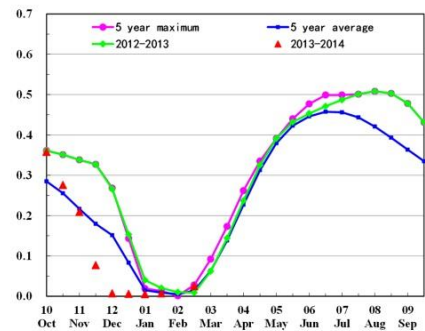
(b)



(c)



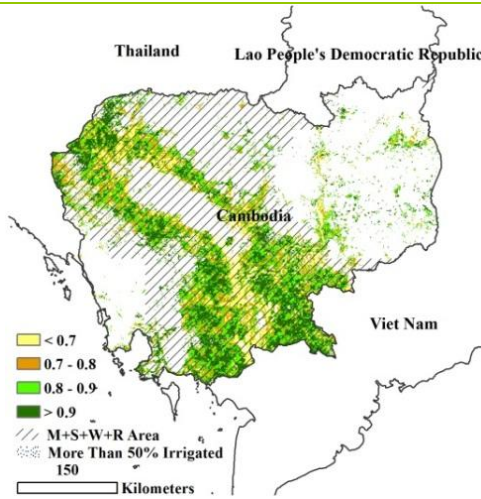
(d)



(e)

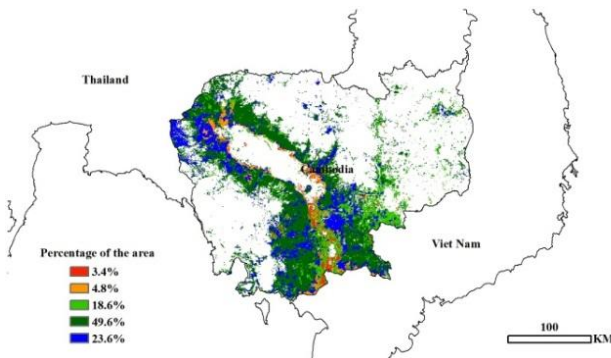
For a description of (a) through (e), see introduction to section 3.2.

# [KHM] Cambodia

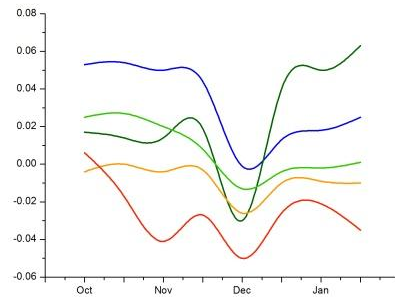


**Figure 3.17. Cambodia crop condition , Oct. 2013-Jan. 2014 (a)**

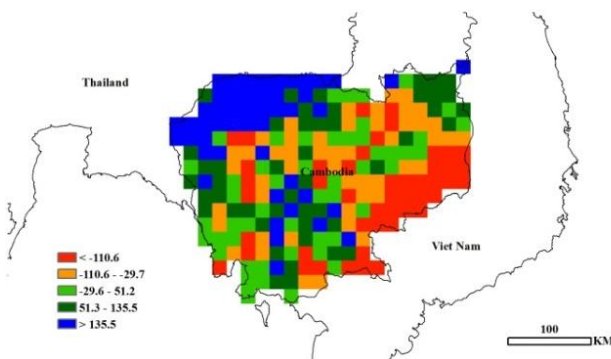
This analysis covers the growing stages of the main (wet season) rice crop in October and the initial stages of second (dry season) rice planting in November. The major rice cultivation covers the area of the Tonle Sap basin and the southern Mekong River, where the vegetation condition index is highest in Banteay Meanchey, Prey Veng, Svay Rieng, and Takeo provinces. Conditions from October to November were above the five-year average because of the heavy monsoon rains resulting in favorable conditions for the main rice crop. The CropWatch environmental indices show almost average rainfall but a temperature decrease of 1 degree (in comparison with the last five years). However, there is no effect on biomass accumulation. Generally, the profiles of NDVI clusters are about average in all areas, while they exceed average conditions around Phnom Penh, Banteay Meanchey, and Battambang. In December, NDVI cluster profiles sharply declined for all areas due to below average rainfall. The biomass index indicates overall average conditions in the northwest region along the Thailand border as well as Tonle Sap, while unfavorable conditions prevail in the east region, along the Vietnam border.



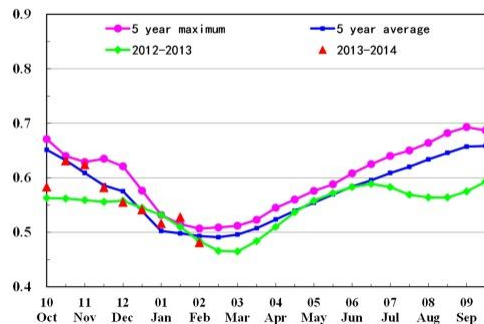
(b)



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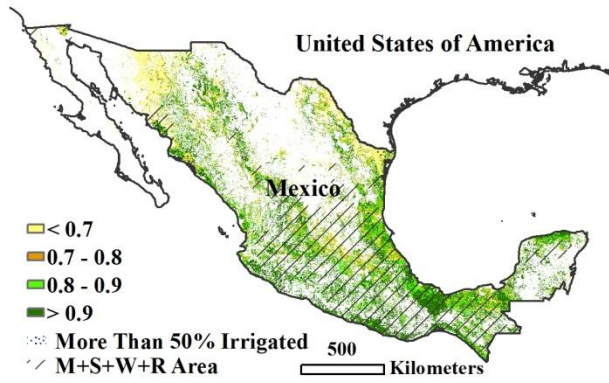


(e)

For a description of (a) through (e), see introduction to section 3.2.

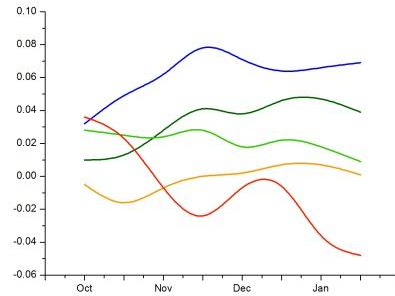
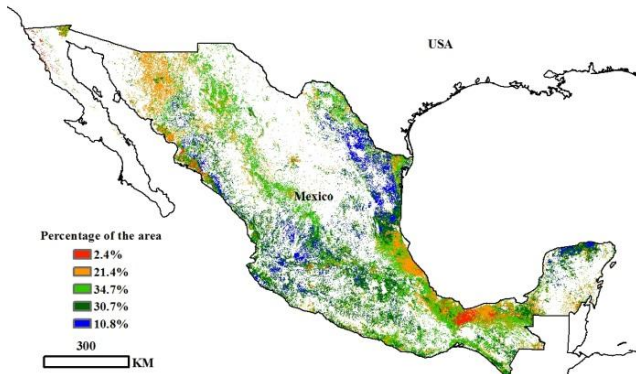
ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

# [MEX] Mexico



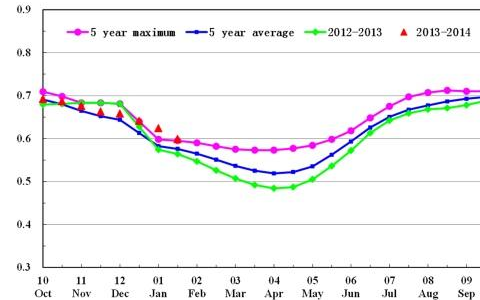
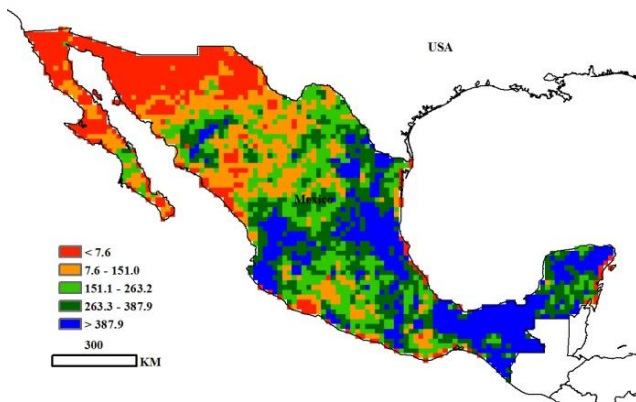
The monitoring period (October 2013 to January 2014) coincides with Mexico’s dry season. More than 70 percent of the summer crop has been harvested. During this period, the rainfall was higher than the recent five-year average (+ 81 percent) for the same period; temperature and photosynthetically active radiation were near average. Thanks to good weather conditions, the maximum VCI in the south region of Mexico is much above the five-year average, indicating good crop growing condition. Crop growing condition is above the five-year average, but below the five-year maximum and last year’s value. More than 40 percent of crop areas display relatively good growing condition (compared again to the five-year average), while 23.8 percent shows an inferior condition.

Figure 3.18. Mexico crop condition, Oct. 2013-Jan. 2014 (a)



(b)

(c)

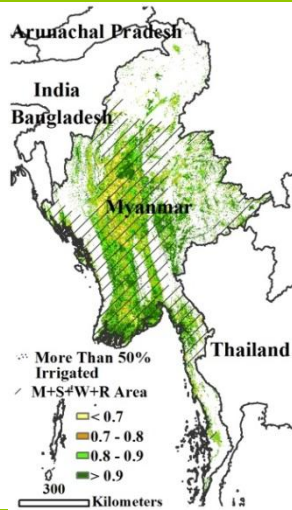


(d)

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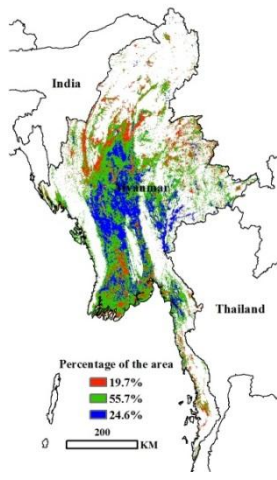
For a description of (a) through (e), see introduction to section 3.2.

# [MMR] Myanmar

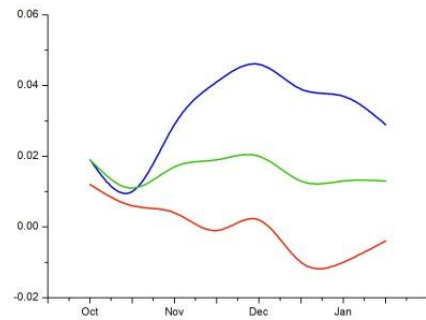


October is the harvesting season for the main rice crops, while the crops currently in the field include wheat, maize, and the second rice crop. For the period under consideration, the environmental indices are average for temperature and PAR but above average for rainfall (+26 percent) and biomass accumulation (almost 10 percent compared with the last five years). In general, the favorable precipitation condition in the cultivation period over large parts of the country benefited the vegetative stage. On the contrary, the average NDVI profile shows below average conditions compared with the last five years, possibly due to severe monsoon rains during late July to October, which caused devastating flooding in the southern region, Kayin state, and Bago state. Maximum vegetation condition indices are very high in Sagain, Ayeyarwady, Bago, and Yangon where rice is the major crop. The profiles of NDVI clusters are mostly above average in the largely irrigated dry zone, which is a major rice producing region and also a cultivation area for wheat. Biomass accumulation points at average to below average conditions mostly in the northern region, and to favorable conditions in the central dry zone of Myanmar.

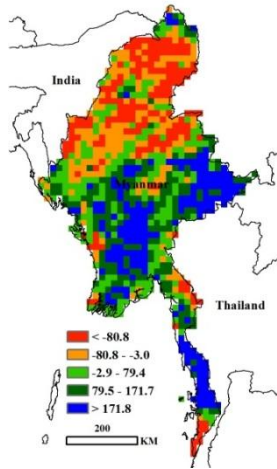
Figure 3.19. Myanmar crop condition, Oct. 2013-Jan. 2014 (a)



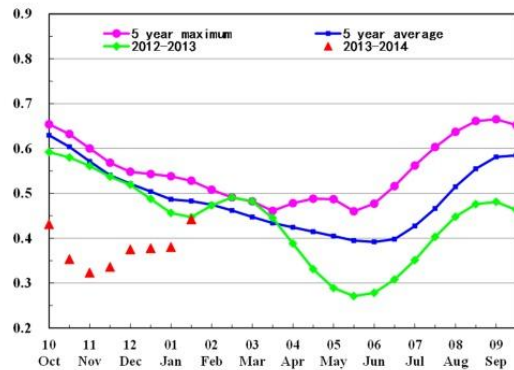
(b)



(c)



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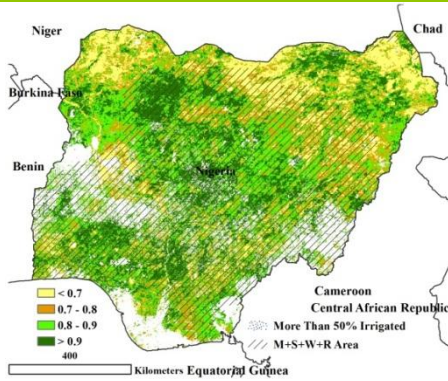


(e)

For a description of (a) through (e), see introduction to section 3.2.

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR **NGA** PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

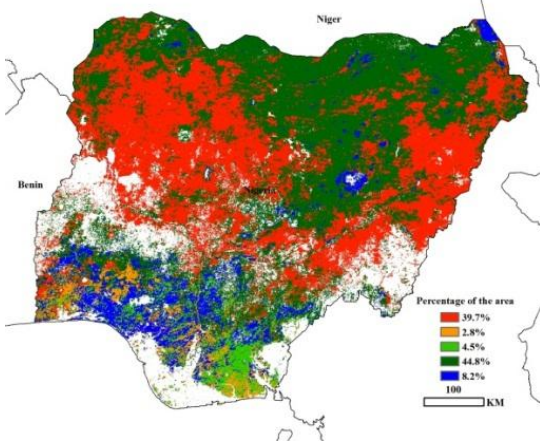
# [NGA] Nigeria



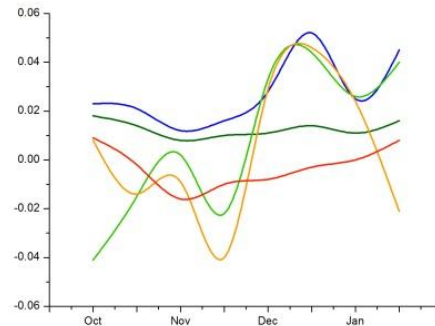
The crops currently cultivated in Nigeria include mostly yams and cassava and limited amounts of irrigated rice in east Niger (central Nigeria) to Taraba and Crossriver states along the border of Cameroon. In the southernmost states, where the season reaches a length of ten months, a second maize crop can be produced. Both rice and the secondary late maize (in terms of area and output) have been harvested in January and the maps in this section thus cover their final stages. The main maize crop was harvested just before the current reporting period started. According to the CropWatch environmental indices, the current period is characterized by an unusual combination of both above average rainfall and radiation resulting in a national biomass accumulation almost 10 percent above the average of the recent decade, but below the average of the last five years. Current national NDVI values are close to the seasonal average, recovering from below average four months ago. NDVI profiles are usually about average everywhere (including in rice growing areas), but above average in large reaches of the south, pointing at favorable conditions of the second maize crop. Fluctuating conditions occurred

**Figure 3.20. Nigeria crop condition , Oct. 2013-Jan. 2014 (a)**

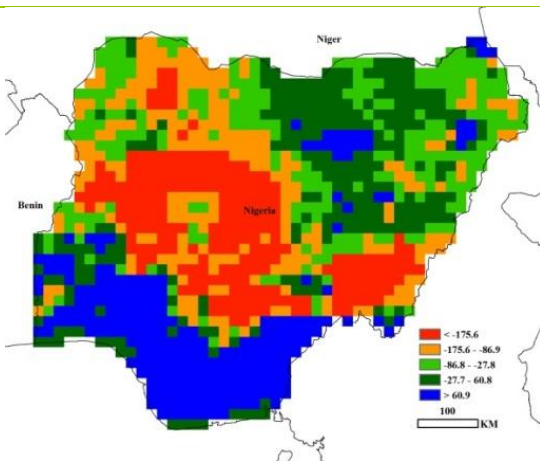
mostly in the southern areas around Oyo State (west) but are unlikely to have affected crops. Biomass accumulation points at unfavorable growth in the eastern rice growing areas, but confirms the favorable situation for the second maize crop.



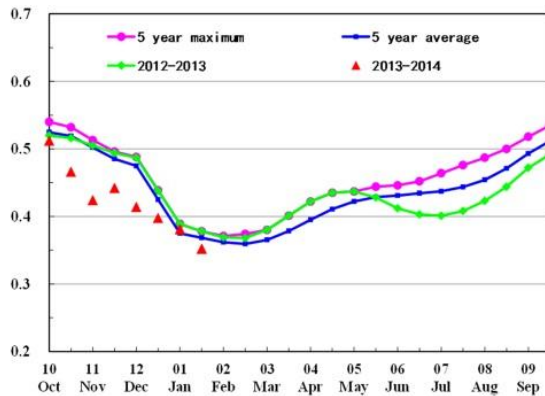
(b)



(c)



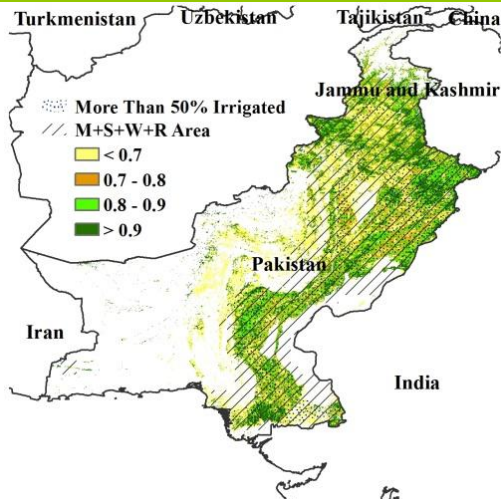
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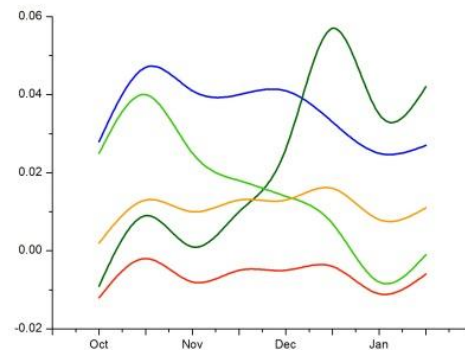
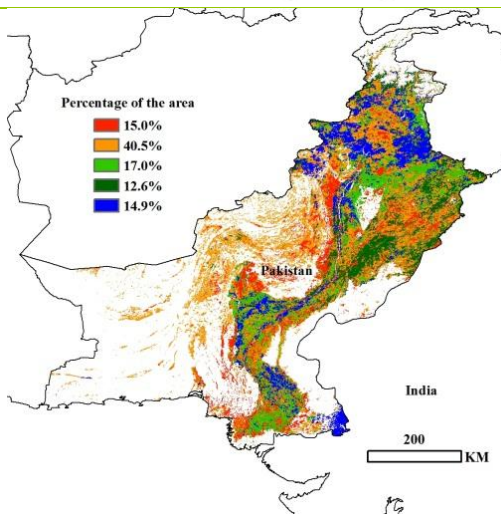
For a description of (a) through (e), see introduction to section 3.2.

# [PAK] Pakistan



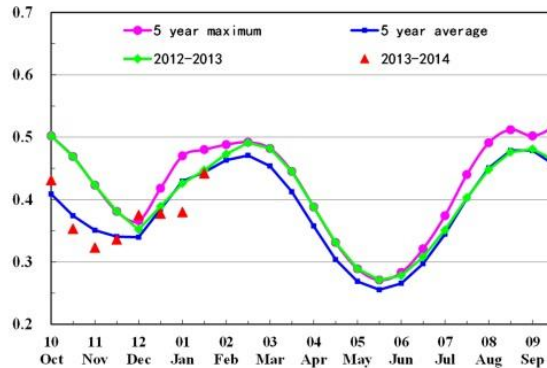
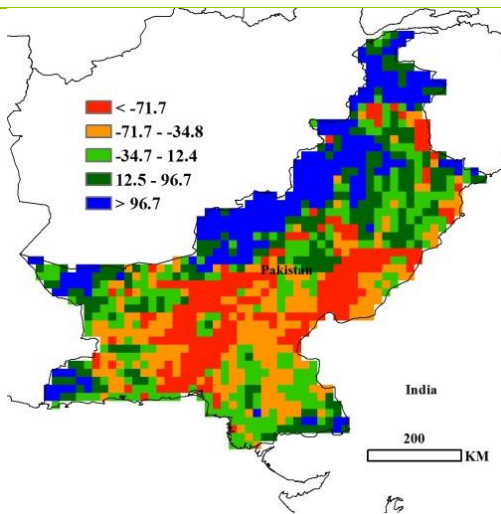
This monitoring period covers the harvesting stage of last year's summer crops (maize, rice and sorghum), as well as the sowing and growing stage of winter wheat and winter barley. Environmental indices indicate a sharp increase of rainfall (67 percent) and biomass (19 percent), while PAR is a little above last the five-year average level for the same period. Favorable rainfall improved the soil moisture condition. Since December, the average NDVI profiles (figure e) indicate that crop condition is now close to the five-year average, after a less favorable period in January, a period when other sources report a drop in rainfall. All indicators agree in assessing the condition of crops (essentially rabi wheat) in north Punjab as in better condition than in the eastern-central areas of the province.

Figure 3.21. Pakistan crop condition, Oct. 2013-Jan. 2014 (a)



(b)

(c)



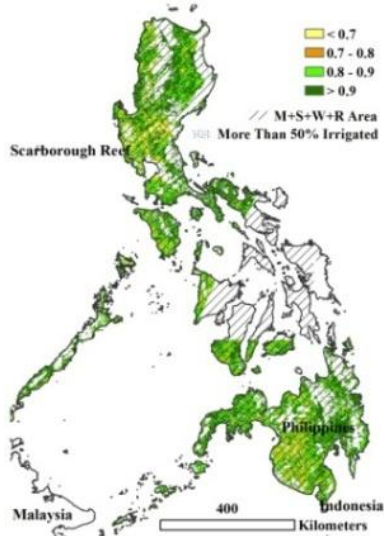
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For a description of (a) through (e), see introduction to section 3.2.

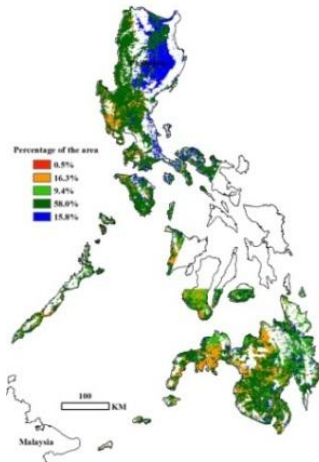
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# [PHL] The Philippines

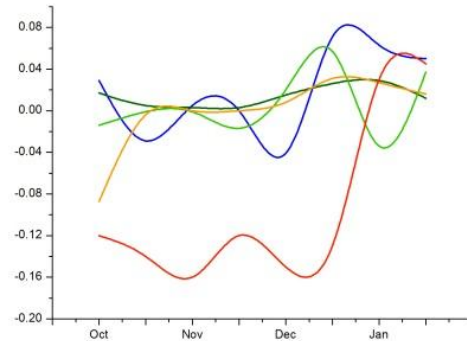


The Philippines, like Indonesia, mostly enjoys a very long humid season with ample moisture supply, interrupted locally by a short dry season around the beginning of the year. As illustrated by below average environmental indices for air temperature and PAR, accompanied by above-average rainfall, crops planted in November (for harvesting around April) may suffer from the unfavorable weather conditions for the season. NDVI profiles (e) indicate that throughout the season the country underwent average conditions comparable with those of previous years. According to the recent crop condition map (b and c), northeast of Luzon generally enjoyed average conditions. For biomass, Mindanao experienced a favorable season, in stark contrast with most areas of Luzon (d). According to the National Disaster Risk Reduction and Management Council (NDRRMC), Typhoons Haiyan and Nari (Santi) led to significant damage to paddy production. As mentioned in section 5.1 on natural disasters, the production loss is currently set to about 5 percent of the national production.

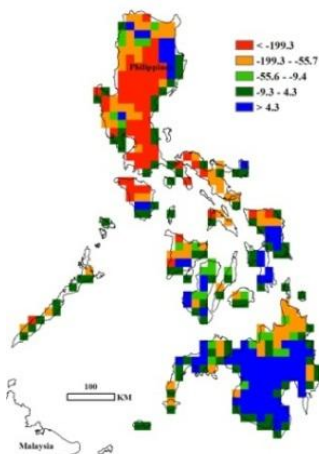
Figure 3.22. Philippines crop condition, Oct. 2013-Jan. 2014 (a)



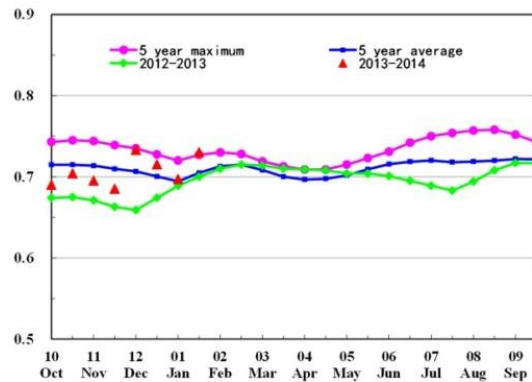
(b)



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For a description of (a) through (e), see introduction to section 3.2.

# [POL] Poland

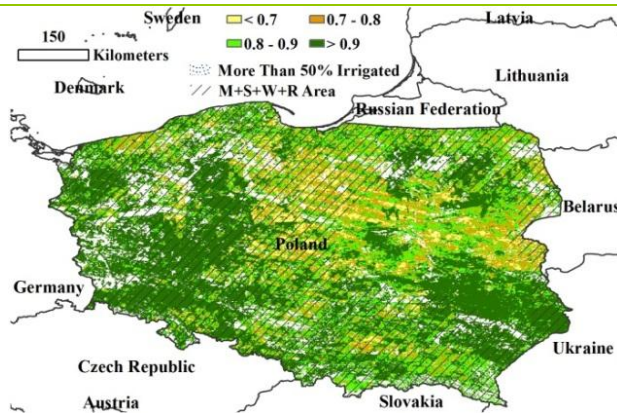
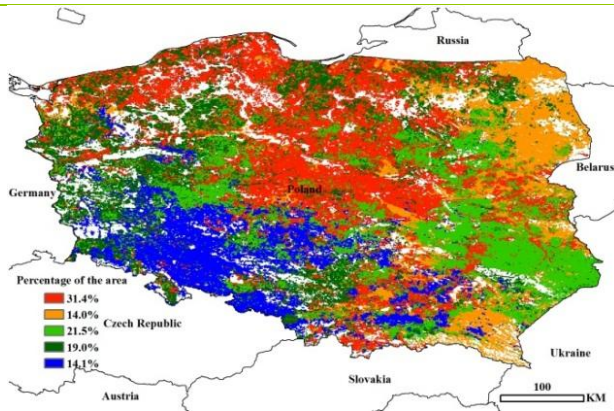


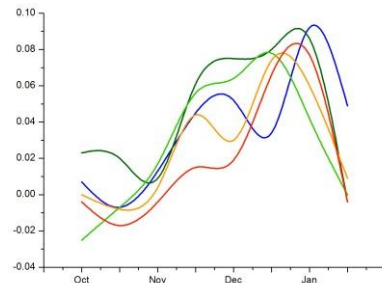
Figure 3.23. Poland crop condition, Oct. 2013-Jan. 2014 (a)

This analysis covers the late stages of sugar beets and maize (harvest completed in November, according to HGCA crop updates) and the early vegetative stages of wheat and rapeseed. The CropWatch environmental indices show an increase in temperature and PAR accumulation (1.7°C and 2 percent respectively), and a decrease in rainfall and biomass (-20 percent and -5 percent respectively) compared with the last five-year average. These observations are consistent with the records in the JRC/MARS bulletin that Poland experienced a positive thermal anomaly and drier than usual weather condition, which may cause a slow down or delay in the crop hardening process. This slow-down process is well captured by the NDVI profiles (e) with an overall decreasing trend of national NDVI values (although above the five-year average from December to early January). The sharp drop in late January in both figures (e) and (c) might be due to the cold air flow over

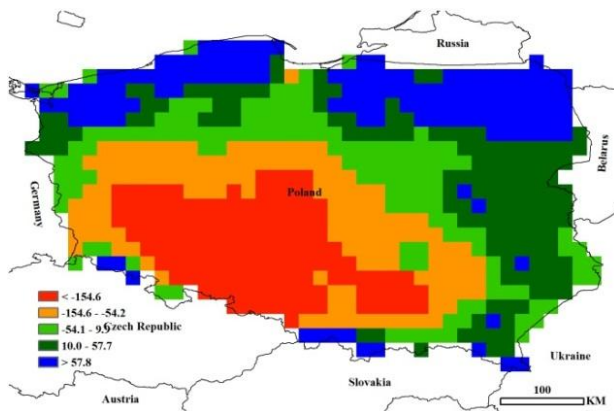
Poland around January 15, as reported by JRC/MARS. The maximum VCI map indicates that the best crop condition (a, in dark green) in this period prevails in the southwest (Wielkopolskie, Dolnoslaskie) and southeast (Mazowieckie, Lubelskie) of the country, while crop condition in the central and northern region is less favorable, which agrees well with the pattern from the NDVI cluster (b). Figure (d) shows that, compared with the recent five years, the spatial distribution of biomass over the reporting period present a patterns increasing from southwest to northeast.



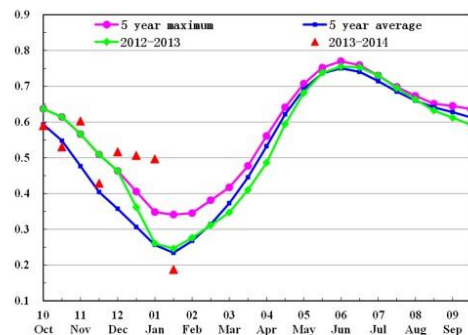
(b)



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For a description of (a) through (e), see introduction to section 3.2.

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# [ROU] Romania

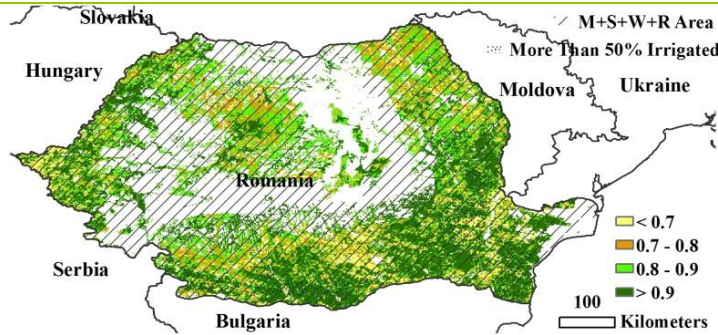
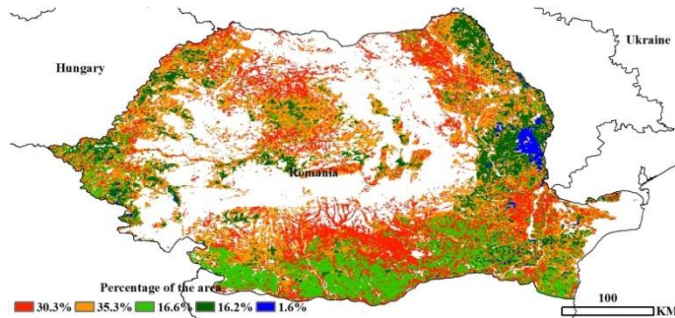


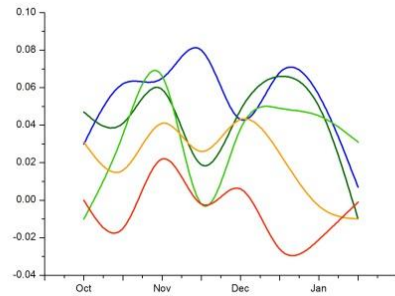
Figure 3.24. Romania crop condition, Oct. 2013-Jan. 2014 (a)

This analysis covers the late stages of maize (harvest completed in November) and the early vegetative stages of wheat (planted in October). The CropWatch environmental indices show above average temperature (up 1.1 °C) and slightly increased PAR accumulation, but a large decrease in rainfall (-20 percent compared with the five-year average). These indices agree well with the explicit positive thermal anomaly and scarce rainfall in Romania reported by the JRC/MARS bulletin based on ground data. The NDVI profile (e) of Romania shows a pattern similar to that of Poland, with national NDVI significantly above the five-year

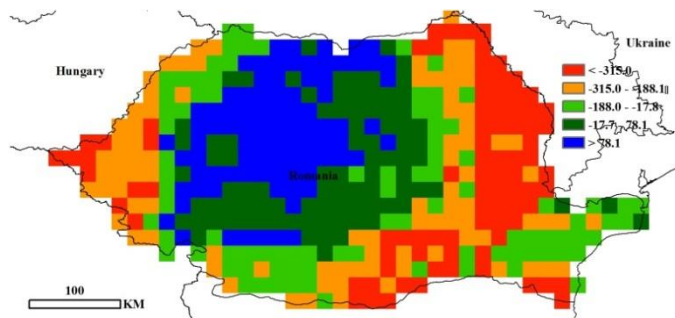
maximum from late December to early January. This might be attributed to the delay of the crop hardening process caused by the exceptional warm winter season over Europe. The NDVI clusters show the outer area (green and blue area in figure b) along the country's border possesses well above average NDVI values (c) throughout this period, which significantly corresponds to the dark green area with maximum VCI values above 0.9 in (a). The biomass in the study period is estimated to drop by 15 percent compared with the recent five years on the national scale. Figure (d) shows that growing conditions are usually better in the center than in peripheral areas of the country.



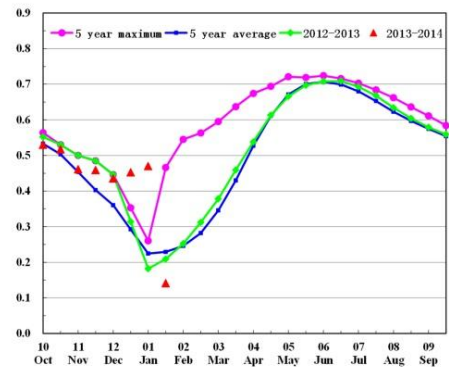
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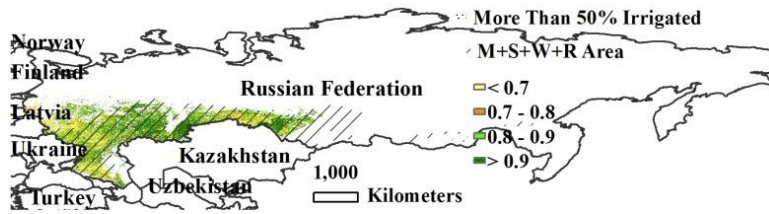
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For a description of (a) through (e), see introduction to section 3.2.

# [RUS] Russia

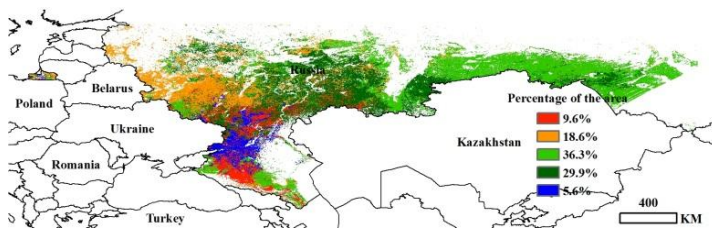


**Figure 3.25. Russia crop condition, Oct. 2013-Jan. 2014 (a)**

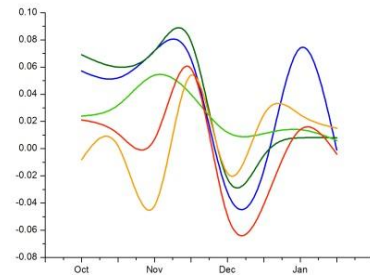
This analysis covers the late stages of maize and sunflower seed (October harvest) and the early vegetative stages of winter wheat and winter barley. The CropWatch environmental indices show slightly decreased rainfall (-2 percent) and slightly increased PAR accumulation (+4 percent) compared with the recent five-year average at the national level. Although the temperature is below zero with  $-3.5^{\circ}\text{C}$ , it is still  $2^{\circ}\text{C}$  above the five-year average, which is consistent with the warmer-than usual weather condition reported by NOAA NCDC climate anomalies and JRC/MARS bulletin. The national biomass is estimated increasing by 4 percent compared with recent five-year average. According to the NDVI profiles, NDVI dropped sharply from November and remained below the average until late December. This might contribute to the above-average precipitation during this period, which contaminated the NDVI value to a certain degree. According to the NDVI clusters, most of the crop growing areas in the southwest of Russia experienced below average NDVI values from late November to late December, especially for the south of Southern Region (including Stavropolskiy kray, Karachayevo-cherkesiya rep., and Kabardino-balkariya rep.) and the southwest of Volga region (Volgogradskaya oblast and Saratovskaya oblast). This might be due to the cold spell during this period and the harvest of crops. Before mid-November, most of the Volga region, south of Urals Region, and Chelyabinskaya oblast (which is dominated by winter wheat) enjoyed above average NDVI condition, while the Central Region presented an NDVI valley in November. These findings are also confirmed by the maximum VCI map (a, high values are dark green; lower values are yellow). In January, the north of the Southern Region—5.6 percent of the country's area and including Rostovskaya oblast, Krasnodarskiy kray, Stavropolskiy kray, Kalmykiya Rep., and the north of Volgogradskaya oblast—present an NDVI peak.

This analysis covers the late stages of maize and sunflower seed (October harvest) and the early vegetative stages of winter wheat and winter barley. The CropWatch environmental indices show slightly decreased rainfall (-2 percent) and slightly increased PAR accumulation (+4 percent) compared with the recent five-year average at the national level.

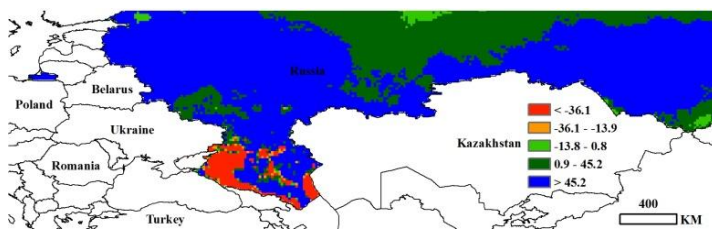
Although the temperature is below zero



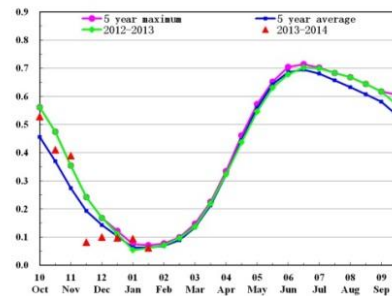
(b)



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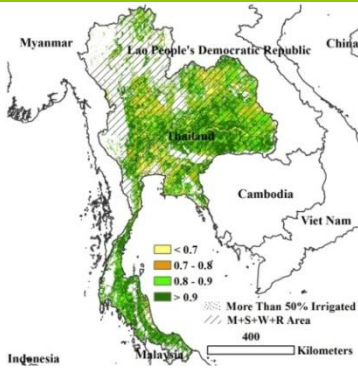


(e)

For a description of (a) through (e), see introduction to section 3.2.

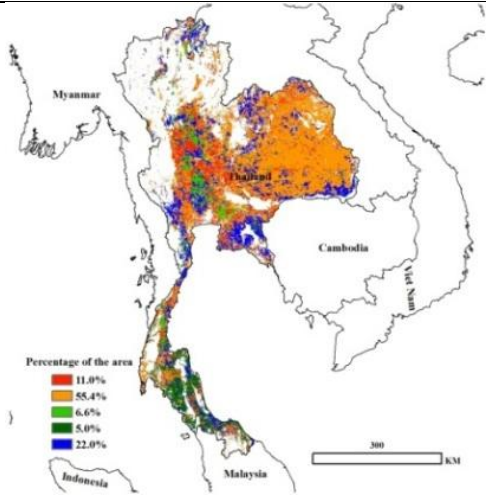
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# [THA] Thailand

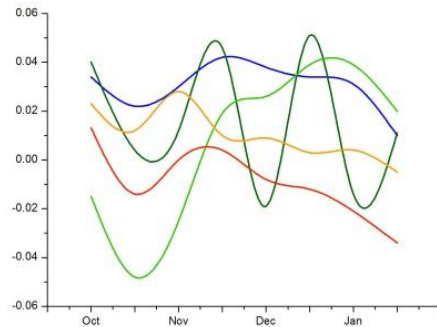


**Figure 3.26. Thailand crop condition, Oct. 2013-Jan. 2014**

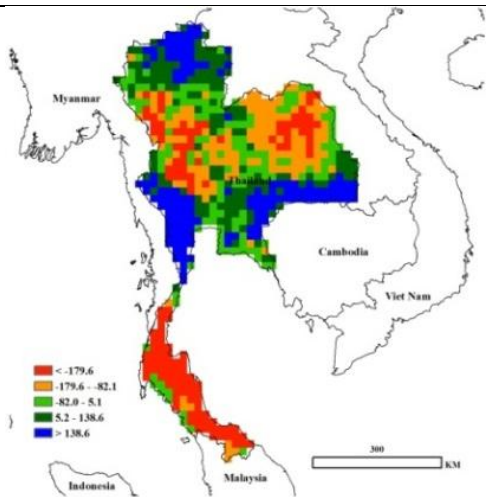
October to January are the harvesting months of the main rice crop in the country, while planting of the second rice crop starts in early January. Thailand’s cultivated rice region can be divided into two areas: the rainfed rice system in the northeast and the irrigated rice system in the Central Plains, known as the “rice bowl” of Thailand. Vegetation condition indices are very high (>0.9) in the Tung Kula Rong Hai region (a large plateau in the northeastern area). For the period under consideration, the environmental indices show slightly above average rainfall and PAR, but about a 6 percent decrease in biomass accumulation. From November to December, crop condition was above the recent five years average. In mid-January, the condition was below average due to the reduced rainfall over the country, delaying the second rice planting operations. The profiles of NDVI clusters are mostly above average in the rainfed rice system regions, though gradually decreasing until the end of January. The biomass index indicates a mostly favorable situation in the Western region along the Myanmar border and the south of the northeast region close to Cambodia, while unfavorable conditions prevail in the south and northeast regions.



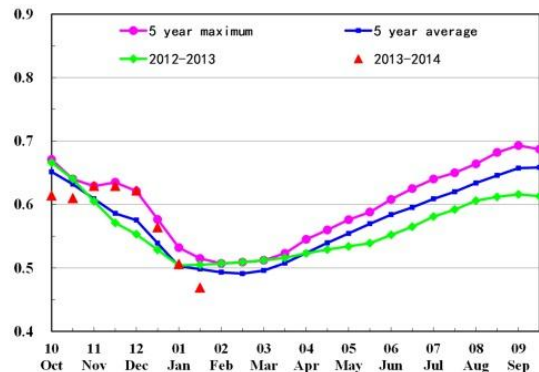
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For a description of (a) through (e), see introduction to section 3.2.

# [TUR] Turkey

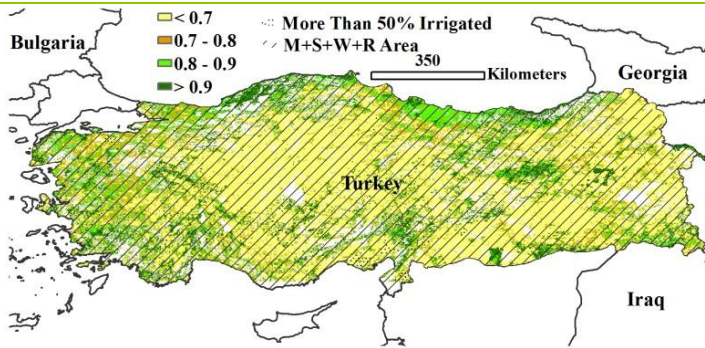
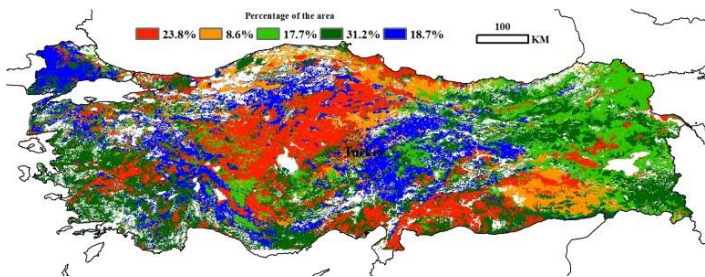


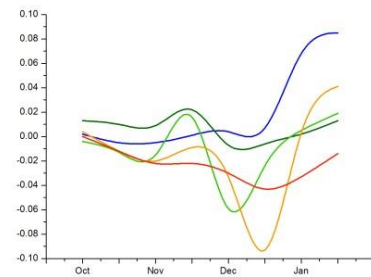
Figure 3.27. Turkey crop condition, Oct. 2013-Jan. 2014 (a)

Accumulated rainfall and temperature for October 2013 to January 2014 were below the five-year and twelve-year average; among all countries monitored, Turkey had the largest negative departure for temperature. Accumulated PAR was above average. Biomass was far below in comparison with both reference periods. During the monitoring period, the planting of winter grains was completed. The environmental indices indicate poor growing conditions for winter crops in the current season and crops may be affected; this is confirmed by the maximum VCI decrease by 0.03. Crop condition close to or above the five-year average for October to January was found

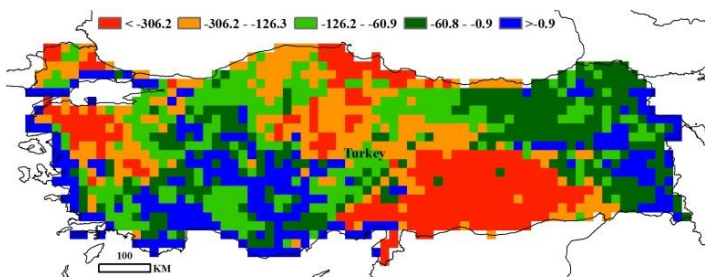
in the northeast of the Aegean Region, the east of Central Anatolia, and the Thrace region. Other regions suffered unfavorable conditions mostly from October to December, with an apparent recovery in January. The final outcome of the season will be largely determined by soil moisture from March, when vegetative grows will resume.



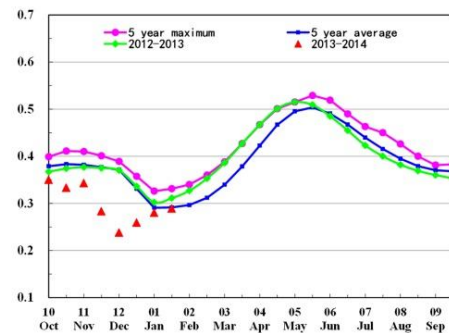
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(e)

For a description of (a) through (e), see introduction to section 3.2.

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# [UKR] Ukraine

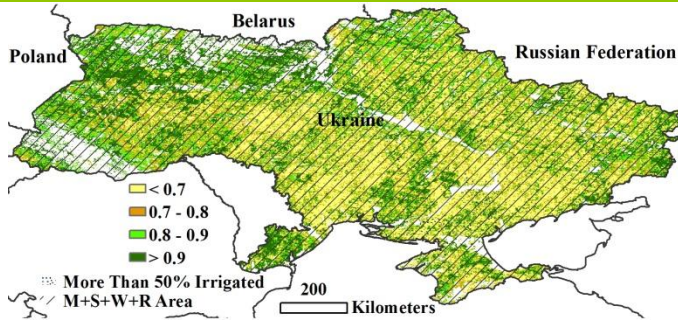
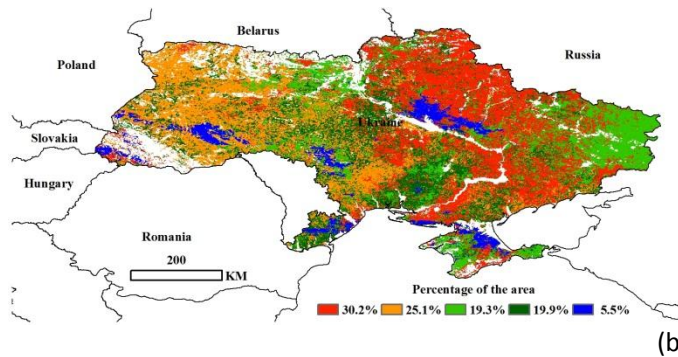


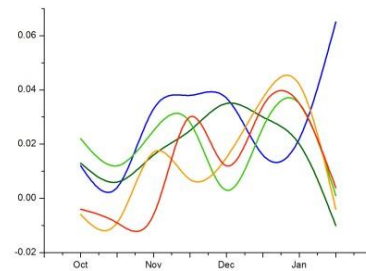
Figure 3.28. Ukraine crop condition, Oct. 2013-Jan. 2014 (a)

This analysis covers the late stages of maize (October harvest) and the early vegetative stages of winter wheat. The CropWatch environmental indices show below average rainfall (-25 percent compared with the recent five-year average), slightly warmer than average weather, close to normal PAR, but a drop of biomass production at the national scale larger than 10 percent compared with both the recent five-year average and the last decade. Maximum VCI tends to be high in some areas in the west and south west, an indication of overall good conditions by local standards (centered around the south of the Rivne and Odessa oblasts). Until December, average

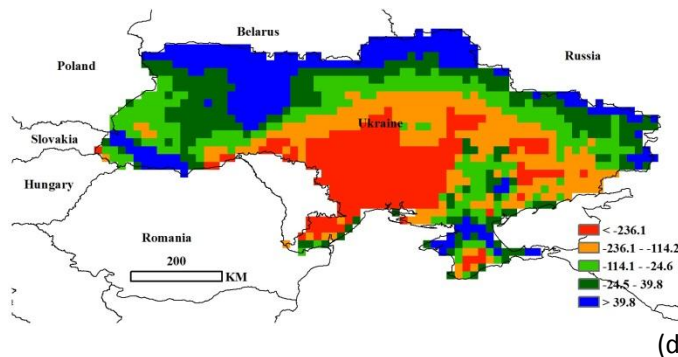
national NDVI profiles were significantly above average (probably reflecting high temperatures); the profiles however dropped sharply in January. This observation is confirmed by NDVI curves dropping to below average values in January as well, with few exceptions (covering about 5 percent of agricultural areas and located around the Poltava and Cherkasy oblasts, and around the Khmelnyk oblast). The biomass index indicates overall average conditions in the north along the Russian and the Belarus borders. Conditions are mixed in the rest of the country and unfavorable in an area roughly centered around the Mykolayiv oblast.



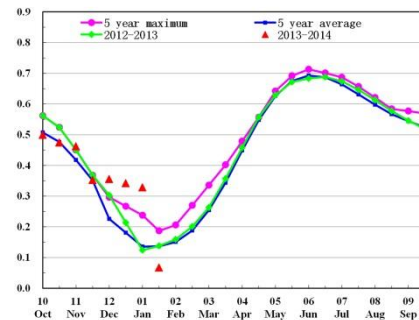
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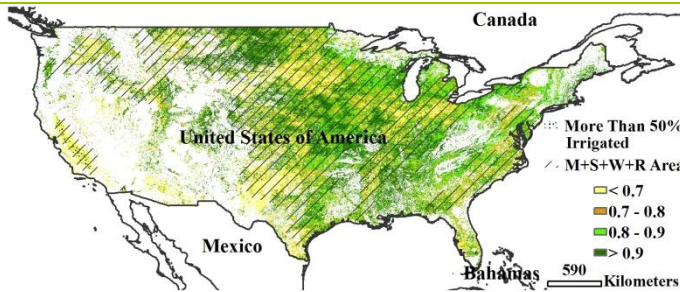
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For a description of (a) through (e), see introduction to section 3.2.

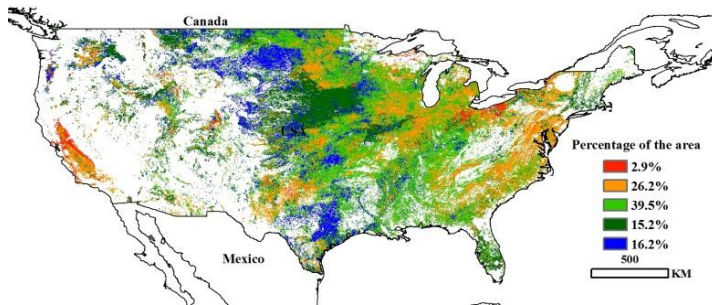
# [USA] United States



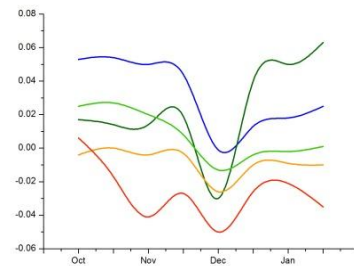
**Figure 3.29. United States crop condition, Oct. 2013-Jan. 2014 (a)**

The maize harvest was completed early on in the monitoring period and winter wheat has been sowed and has since emerged. Compared to the twelve-year average for the same period, rainfall is below average, especially in the west, including California, resulting in below average NDVI and biomass. The east and south of the United States suffered an abnormal winter storm and low temperatures in December; winter wheat growth was limited. The abnormal rainfall (in the west) and temperatures (in the east) resulted in low maximum VCI and below normal crop condition. In the central regions, such as Nebraska, Iowa,

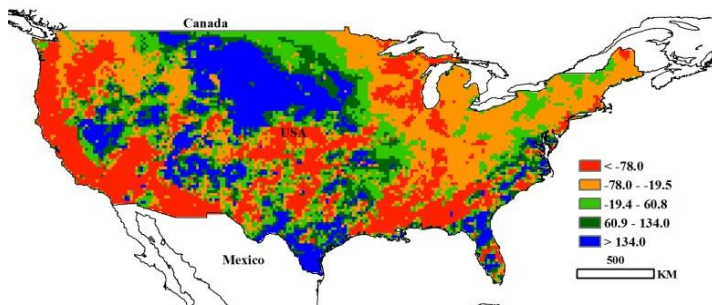
Kansas, and Missouri, rainfall and temperature were near normal, resulting in an above-normal maximum VCI and biomass, showing good crop condition in those regions. Compared to the five-year average, nearly 30 percent of crop areas enjoyed good growing condition, with those areas mainly distributed over North Dakota, South Dakota, Iowa, Nebraska, Kansas, and Arkansas. Another 30 percent of crop areas in the country show worse growing condition, especially in the east and south coastal zone due to the above mentioned storm. Thanks to normal rainfall and temperature in north and center regions (North Dakota, South Dakota, and Iowa) CropWatch biomass estimates are much above the twelve-year average.



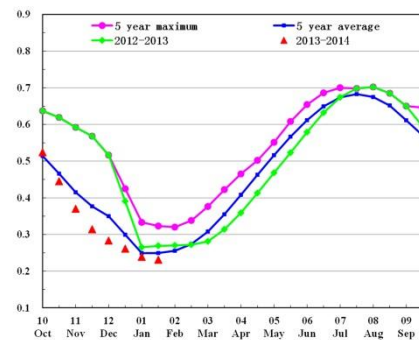
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For a description of (a) through (e), see introduction to section 3.2.

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# [UZB] Uzbekistan

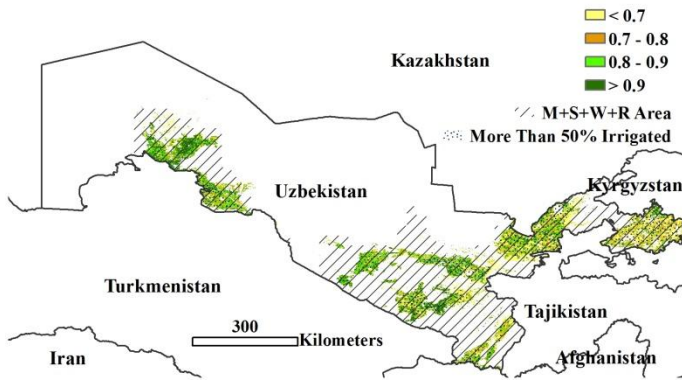
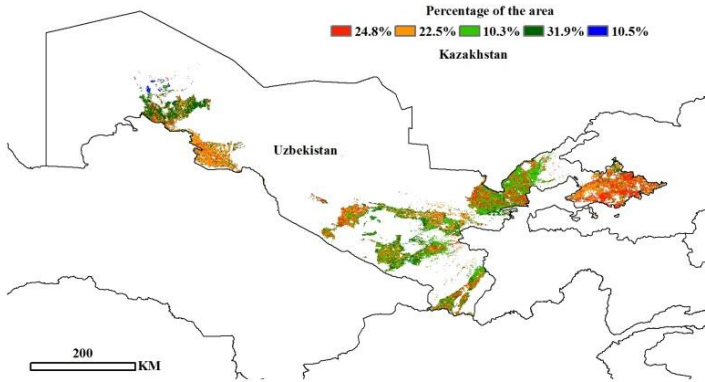


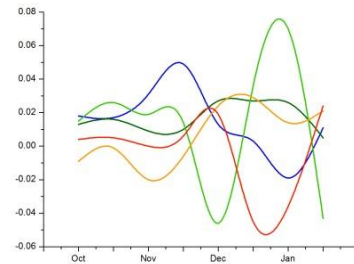
Figure 3.30. Uzbekistan crop condition, Oct. 2013-Jan. 2014 (a)

This analysis covers the sowing and growing stage of winter cereals in Uzbekistan from October 2013 to late January 2014. Currently in the field are mostly winter wheat and barley. The country as a whole enjoyed a large increase of rainfall (95 percent) and biomass (66 percent) while temperature and PAR are just above the recent five-year average (2008-2003) for the same period. A detailed look at the indicators shows a less rosy picture in some parts, especially in the very east (Ferghana, Andijan, and Namangan) where maximum VCI (figure a) is mostly below 0.7. From December to early January, the national NDVI profiles (figure e) indicate that crop condition is well below the recent five-year average. More precise spatial information is provided by the NDVI clusters, which show a drop in early January and a

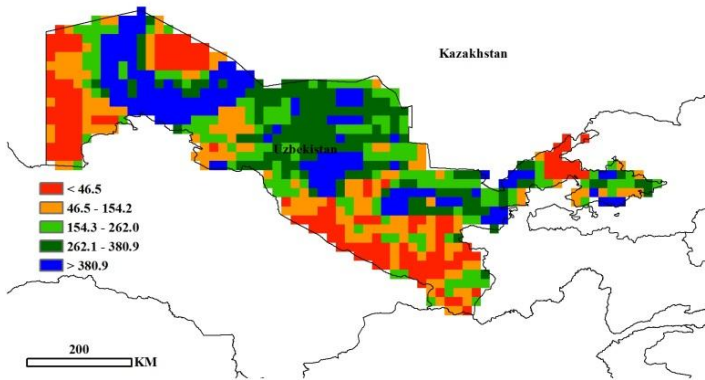
recovery thereafter in the mentioned areas of Ferghana, Andijan, and Namangan (due to heavy rainfall and snow), while other eastern areas underwent a sharp decrease at the end of January (Sirdarya, Jizzakh, Samarkand, Kashkadarya, and Bukhara; figures b and c). However, the rain and snow will help replenish water reserves and improve soil moisture conditions for the upcoming spring and summer crops. Altogether, prospects for the ongoing and future spring seasons are rather positive.



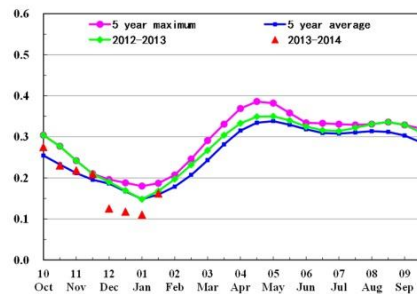
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(e)

For a description of (a) through (e), see introduction to section 3.2.

# [VNM] Vietnam

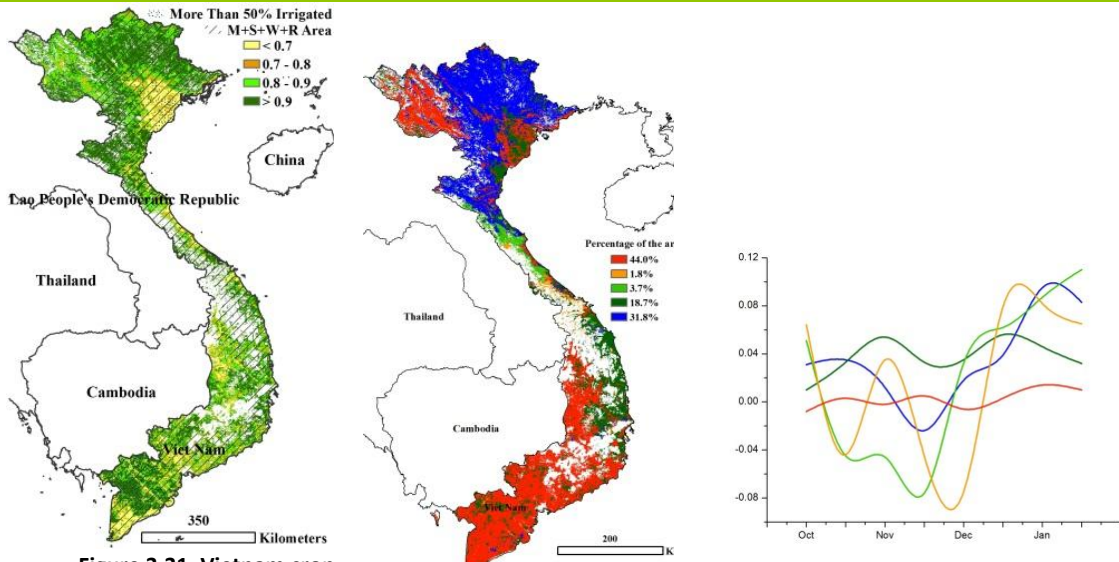
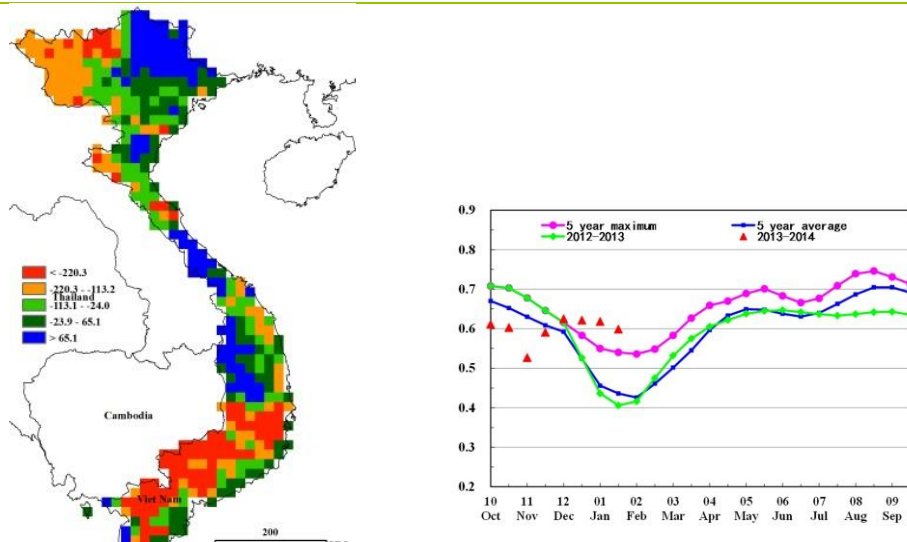


Figure 3.31. Vietnam crop condition, Oct. 2013-Jan. 2014 (a)

(b)

(c)

Late November and December is the harvesting time of the “10<sup>th</sup> month rice,” while planting of the winter/spring rice crop began in mid-November and continues until early April. The rice cultivation region can be divided into two areas: the Red River delta in the North and the Mekong River delta in the south; in the Red River delta, map (e) indicates a low VCI because of the planting period. National environmental indices show below average rainfall (-7 percent), a temperature decrease of about 1 degree compared with the last five years, and a biomass accumulation of about 10 percent below the average of the last five years. Crop condition from October to November was below the five-year average because of the heavy rains and typhoon Nari (see also section 5.1), affecting Danang, Ha Tinh, Nghe An, and Quang Binh provinces. However, the storms had a minimal effect on rice production because these provinces are not the main rice cultivation areas. The profiles of NDVI clusters are about average in both main rice cultivation areas, gradually increasing between December and January.



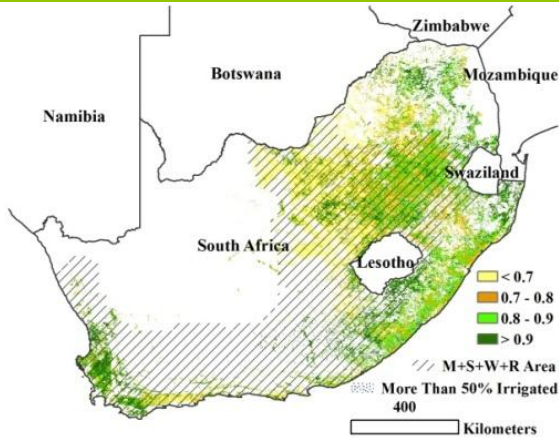
(d)

(e)

For a description of (a) through (e), see introduction to section 3.2.

ARG AUS BGD BRA CAN DEU EGY ETH FRA GBR IDN IND IRN KAZ KHM MEX MMR NGA PAK PHL POL ROU RUS THA TUR UKR USA UZB VNM ZAF

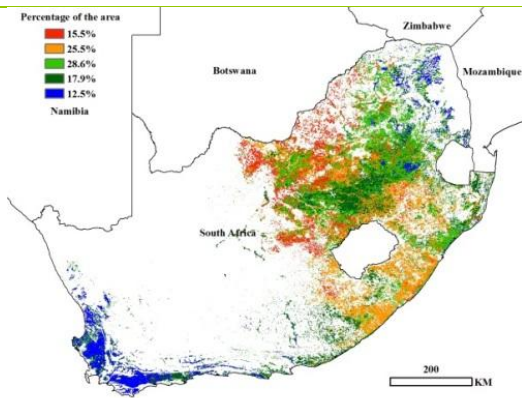
# [ZAF] South Africa



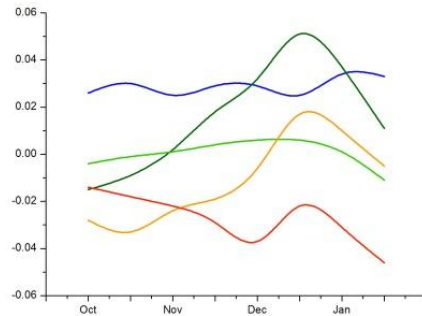
**Figure 3.32. South Africa crop condition, Oct. 2013-Jan. 2014 (a)**

South Africa is currently in the main maize season (summer), which extends approximately from October to May. The major maize growing areas are centered around Gauteng and include the Free State, Northwest, and Mpumalanga; the vegetation condition index is highest in the eastern Free State, extending to the Swazi border. For the period under consideration, the environmental indices consistently describe a situation of mild drought with rainfall decreasing 6 percent compared with the last five years, accompanied by slightly above average temperature, increased PAR, and about 2 percent decrease in biomass accumulation. With some exceptions in the very northeast (mostly in the northern province) where NDVI remained consistently higher than average, NDVI mostly deteriorated during January, particularly so in the westernmost areas. Altogether, indicators point at lower than average conditions of the current maize areas, particularly in December and January. The slow start of the season is one of the reasons why, according to several sources, South Africa is witnessing a

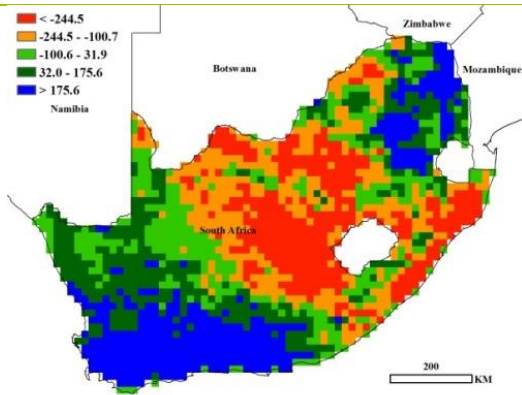
relative shift from maize to soybean, to be harvested in June. Biomass accumulation indicates average to below average conditions in the center and favorable conditions in the Northern province and in the two Cape provinces (western Cape and Eastern Cape) where harvest took place in November. With harvest still three to four months away, February rainfall (important for maize flowering) is the most important variable to watch in South Africa, as it largely determines the outcome of the maize season.



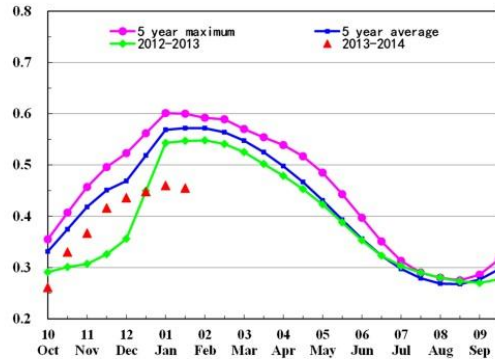
(b)



(c)



(d)



(e)

For a description of (a) through (e), see introduction to section 3.2.

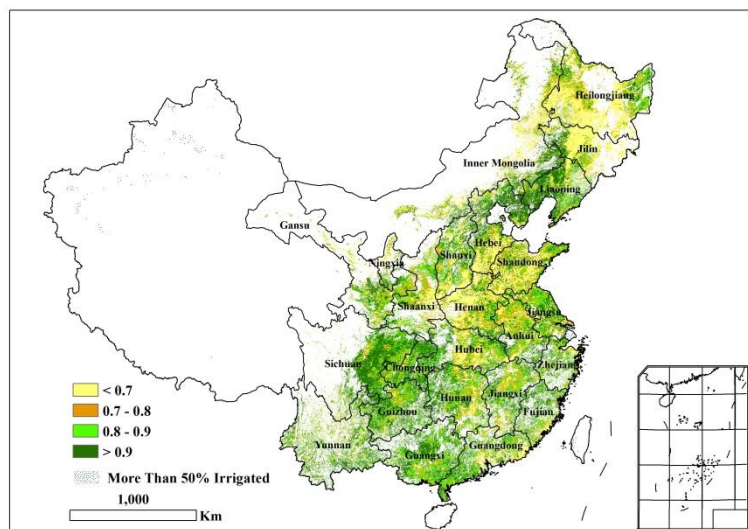
## Chapter 4. Crop and growing conditions in China

Chapter 4 presents a detailed CropWatch analysis for China, focusing on seven regions. Environmental indices by province are provided in table A.4 in Annex A.

### 4.1. Overview

In China, early October—the beginning of the reporting period for this bulletin—is the time most winter crops like winter wheat and rapeseed are planted, right after the harvesting of the autumn crops. From October 2013 to January 2014, environmental conditions in China were generally favorable, compared to averages for the same period over the previous five years (table 4.1). Specifically, average temperature was almost one and a half degrees above the five-year and 2001-2013 average. It should be highlighted that rainfall was 25 percent higher than normal and PAR even exceeded the record level of 2001, reaching  $680 \text{ W/m}^2$ . However, the maximum Vegetation Condition Index (VCI) for China was only at a 12-year average level and slightly below the recent five-year average. Figure 4.1 illustrates the maximum VCI by pixel.

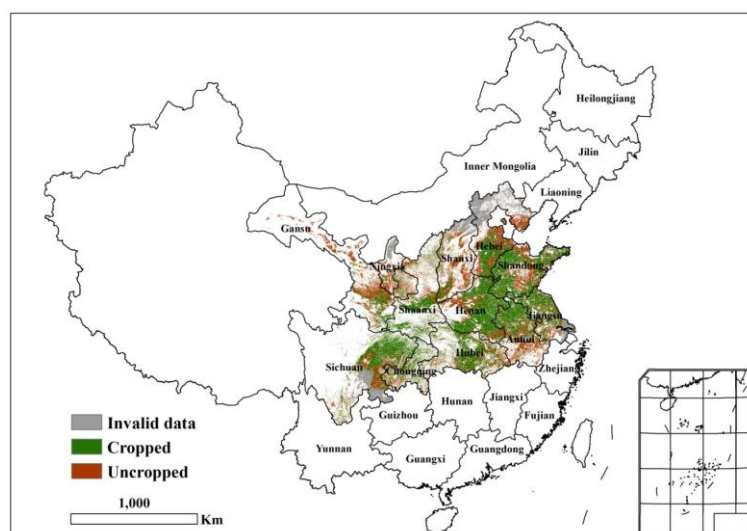
**Figure 4.1. China maximum Vegetation Condition Index (VCI), by pixel**



Environmental conditions are distributed unevenly, resulting in a very interesting situation. Favorable conditions benefited winter crops in Sichuan Basin and neighboring regions, as well as Guangxi, eastern Jiangsu, and north coastal area of the Bohai Gulf. However, for the Central of North China Plain—major winter wheat producing regions—rainfall was only 61 mm during October to January, 20 percent below normal. In addition, almost no snow fell until the end of January and the winter wheat in this region is suffering agricultural drought. Then, in early February, a wide range of heavy snowfall occurred, covering the whole northern China. Good moisture conditions were maintained after the snow melted. Together with the warmer and sunny winter weather, the development of winter wheat in those regions will be advanced, despite the drought during the winter period.

The ratio of uncropped arable land (UAL, figure 4.2) was 0.31 for the last four months, with most of the UAL found in the Northeast China region and the most northern part of the North China Plain where almost no crops can survive during the cold winter. In general, because of the warmer temperatures across China, more winter crops survived and the UAL ratio was 3 percent below the 2001-2013 average.

**Figure 4.2. Cropped and uncropped arable land for major winter wheat producing regions in China, November 2013**



Note: Map based on 30m resolution HJ-1 CCD images. White (inside the major producing region) means no arable land; white (outside the major producing region) means not covered; invalid means no data.

Considering only the twelve provincial level divisions (the colored sections in figure 4.2) that normally produce 85 percent of wheat in China, the uncropped arable land ratio is 0.02 below the ratio of the winter crop season in 2012-2013 (0.28), a notable decrease—indicating that the planting area of winter crops (winter wheat and rapeseed) increased compared to last year.

**Table 4.1. Environmental and crop indices for China, October 2013 to January 2014 departure from 5YA and 12YA**

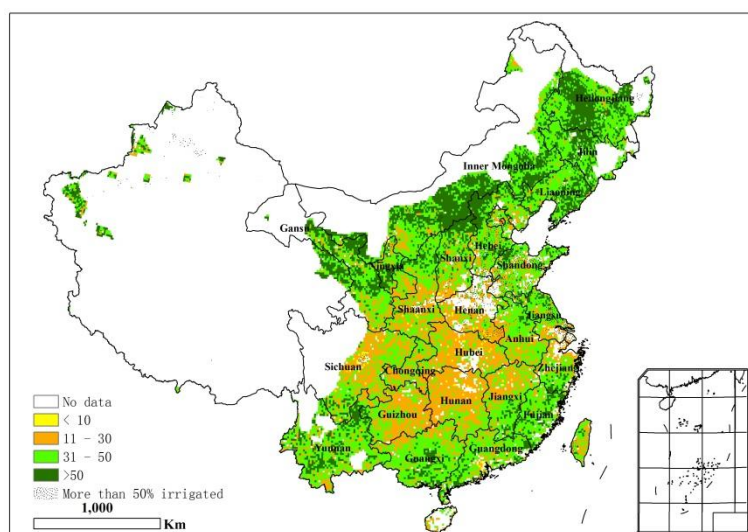
	Environmental indices departure from 12YA (2001-2013)				Crop indicators departure from 5YA (2008-2013)	
	Rainfall total (%)	Temperature average (°C)	PAR accumulation (%)	Biomass accumulation (%)	Uncropped arable land in % of pixels (Absolute difference in % points)	Maximum VCI (absolute difference)
Huanghuaihai	-25	0.9	13	-16	-2.5	0.01
Inner Mongolia	38	1.7	7	43	-18.2	0.16
Loess region	3	1.0	12	0	1.5	0.03
Lower Yangtze	16	0.4	14	-13	1.4	0.00
North-East	55	1.3	6	28	-2.5	0.02
Southern China	20	0.3	4	3	0.2	-0.01
South West	26	-0.5	5	5	-5.0	0.03

Note: Departures are expressed in relative terms (percentage) for all variables, except for temperature, for which absolute departure in degrees Celsius is given. Zero means no change from the average value; Relative departures are calculated as  $(C-R)/R \times 100$ , with C=current value and R=reference value, which is the five- or twelve-year average for the same period between October 2008 and January 2013 (5YA) or October 2001 and January 2013 (12YA). VCI=Vegetation condition index.

Most of the uncropped arable land this reporting period was located in northern and western Gansu province, mountain areas in eastern Shanxi province, and in southern Anhui. Farmlands in the first two regions were uncropped due to the low temperatures, while the uncropped arable land in southern Anhui and southeastern Sichuan are paddy fields kept for rice cultivation in spring. Uncropped arable lands were also observed along the west coast areas of the Bohai Bay and in the Yellow river delta. In these regions, salinization and alkalization of farmland soil are the major problems for the crops.

Minimum VHI during the last four months indicates that Chongqing and adjacent provinces, as well as Henan, north of Jiangxi, and Yangtze River delta experienced mild water stress, while in other regions, water was adequate for crop growth or planting (figure 4.3).

**Figure 4.3. Minimum Vegetation Health Index China, October 2013-January 2014**



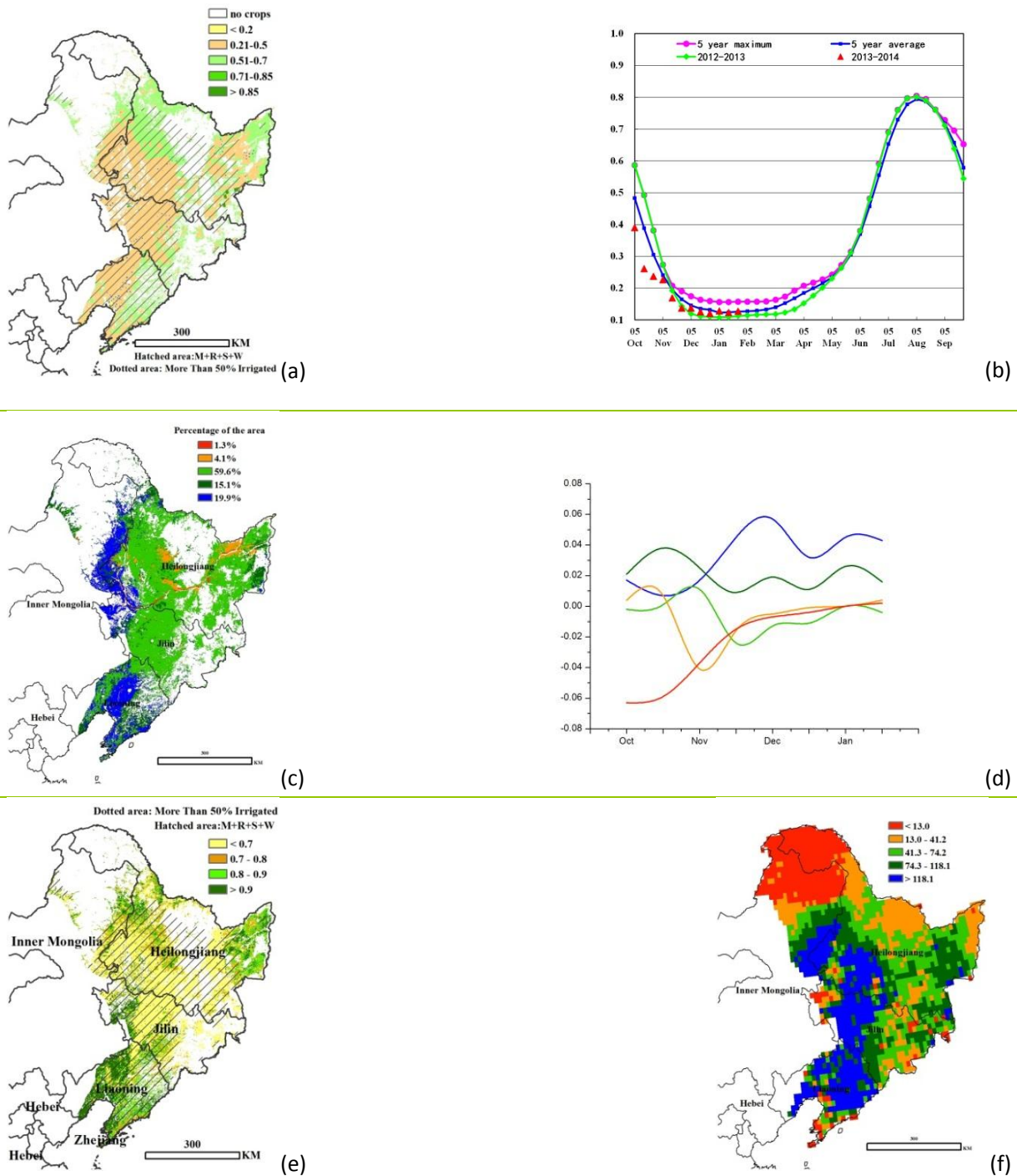
## 4.2. Regional analysis

For each of China's seven regions, the figures 4.4 through 4.10 present crop condition information. The provided information is as follows: (a) General setting: NDVI background; combined maize, rice, soybean and wheat cultivation area, and areas where more than 50 percent of the land is irrigated; (b) Crop condition development graph based on NDVI, comparing the latest season (since October 2013) to the five-year average (5YA), the five-year maximum, and the October 2012-October 2013 period; (c) Spatial NDVI patterns for October 3 2013- January 3 2014 (compared to the 5YA); (d) NDVI profiles associated with the spatial patterns under (c); (e) maximum VCI (over arable land mask) for October 1 2013- January 30 2014; and (f) biomass for the period October 1 2013 – January 30 2014. Additional information about environmental indices for China is provided in Annex A, table A.4.

# North-east region

No crops are grown from early October 2013 to late January 2014 in North-east China due to the low temperature. Ample snow and light in December ensure good soil moisture, which will benefit spring crops in 2014. The national environmental indices monitored by CropWatch indicate that average temperature for northeast China was slightly below average, compared to the twelve-year average (2001-2013), while rainfall (+68 percent) was well above average. PAR (2 percent) was just about average.

**Figure 4.4. Crop condition China North-east region**

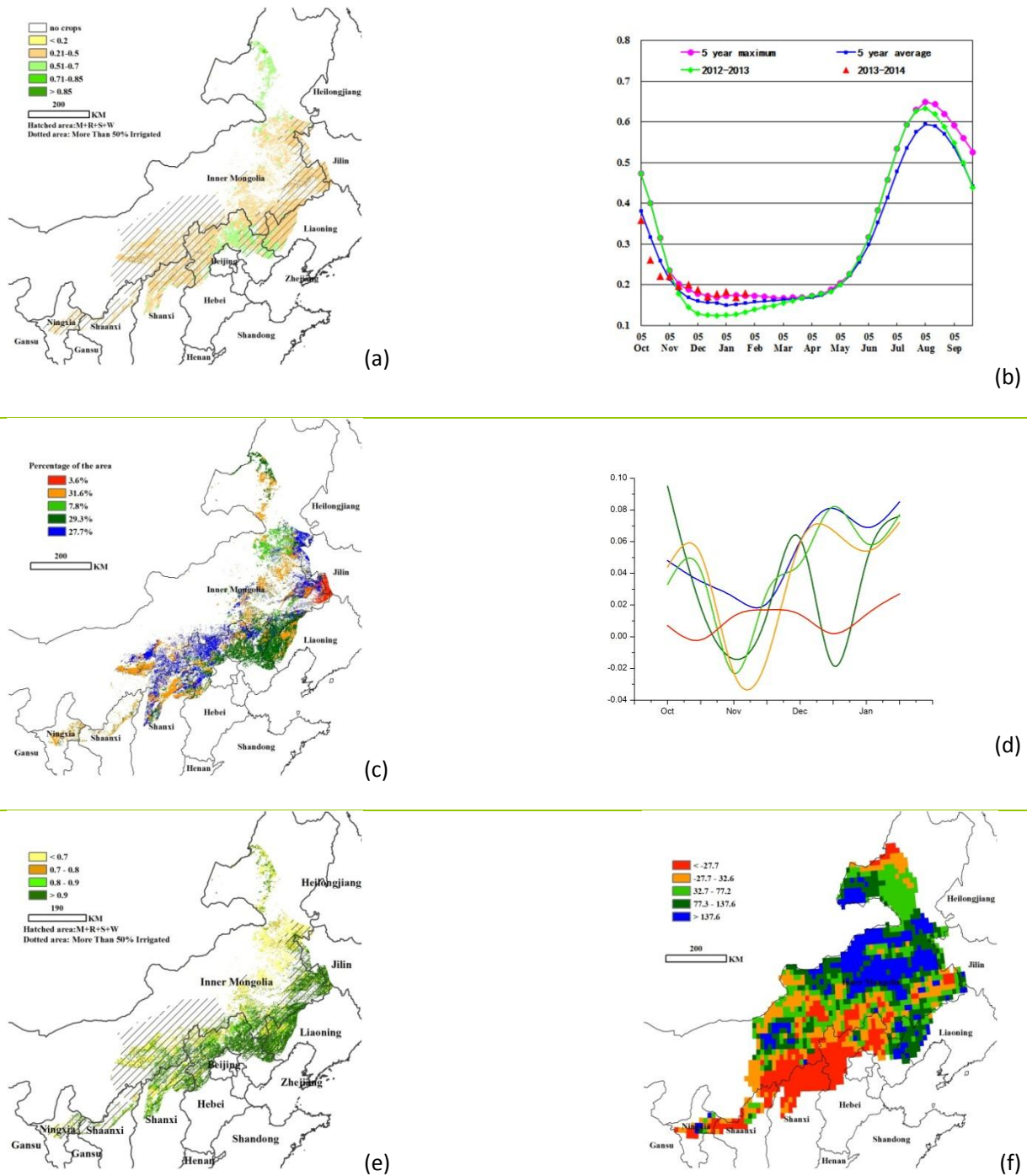


For a description of (a) through (f), see introduction to section 4.2..

# Inner Mongolia

Due to low temperature, no crops can survive in the four months (October to January) covered by this bulletin. Considering the last four months, rainfall and biomass index are above the recent five-year average. As a result, conditions will be favorable for the sowing of spring crops. However, temperature was higher than average and rainfall below average in January in most areas in Inner Mongolia, which may have some influence on spring crops by prematurely depleting soil moisture reserves.

**Figure 4.5. Crop condition China Inner Mongolia region**

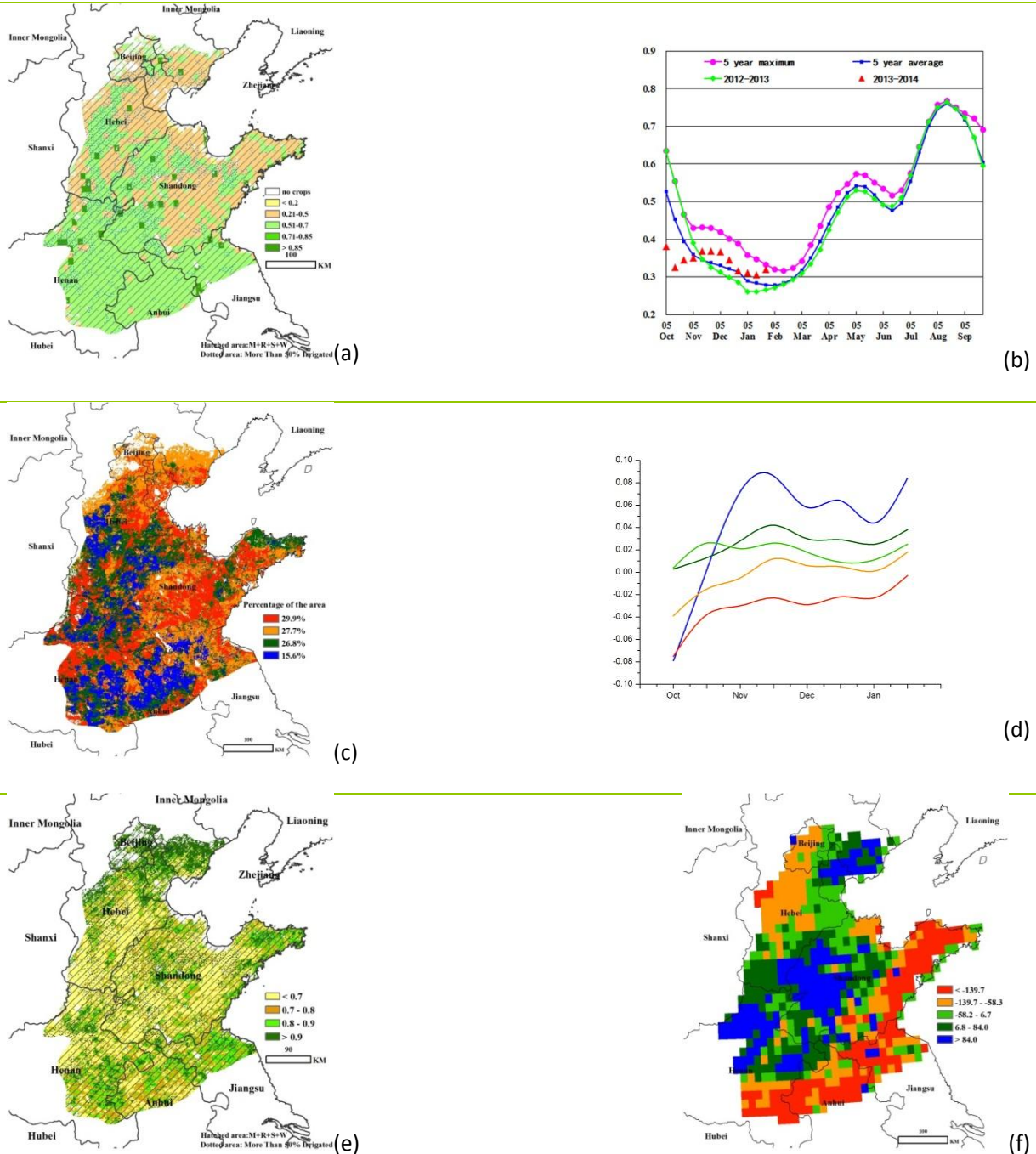


For a description of (a) through (f), see introduction to section 4.2.

# Huanghuaihai

After winter wheat sowing in October 2013 in Huanghuaihai region, the crop was initially negatively affected by dry weather: compared with the 2001-13 (twelve-year) average, rainfall and biomass decreased, while temperature and PAR were above average. In early November, enough rainfall and moderate temperature promoted the growth of crops; by the end of January 2014, crop condition was better than that of the last year and recent five-year average. The profiles of NDVI clusters are mostly above average, except for the regions in central Shandong where maximum VCI is low (as shown in figure (e)). The uncropped arable land ratio decreased by 2.5 percentage points, indicating an increased winter wheat area. Maximum VCI was 1 percentage point higher than the average of the previous five years.

**Figure 4.6. Crop condition China Huanghuaihai region**

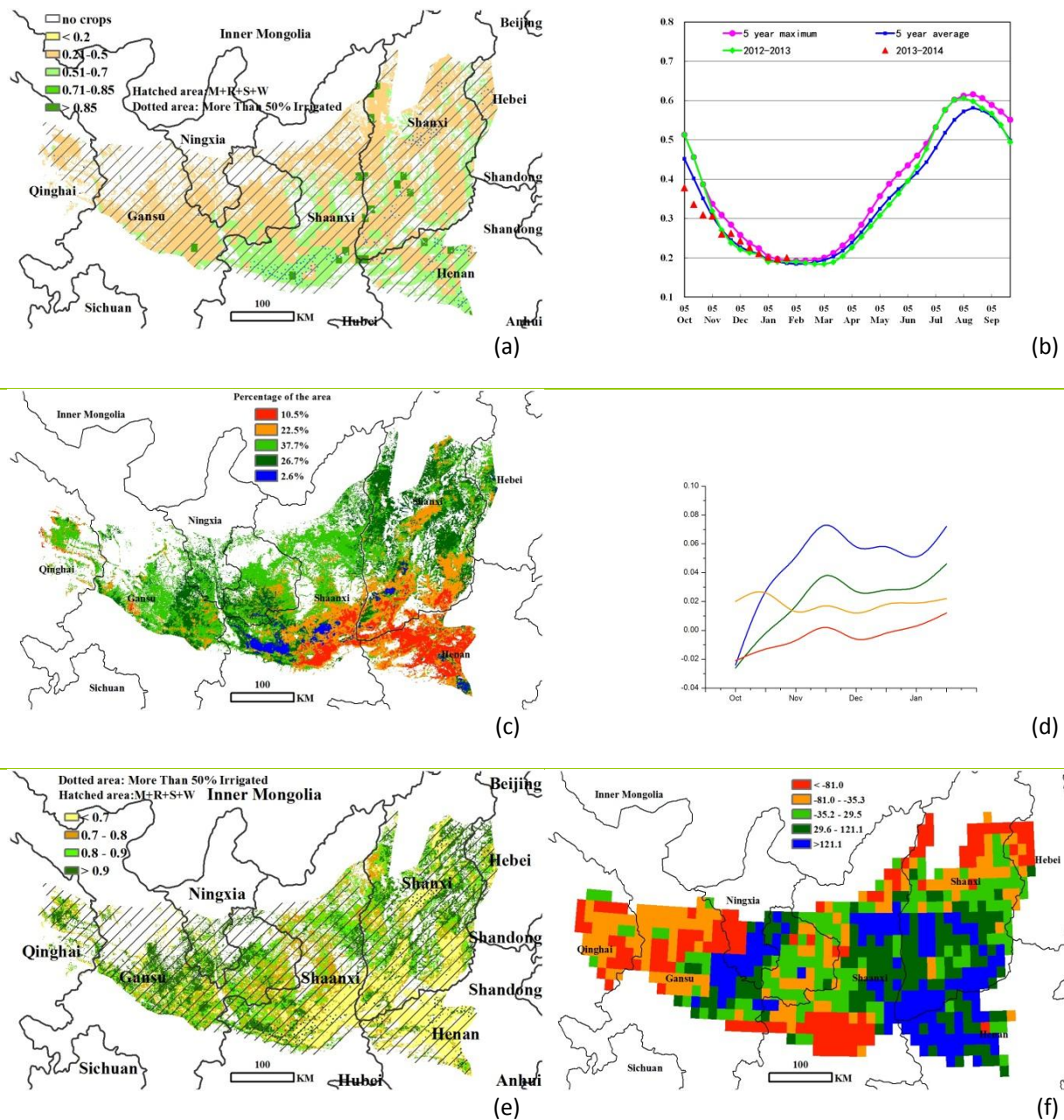


For a description of (a) through (f), see introduction to section 4.2.

# Loess region

The early growth of winter wheat in the Loess region was inhibited due to drought and high temperature. In November, weather conditions favored the growth of winter wheat, while in December rainfall was below the previous year's. Crop condition showed fluctuations conditioned by rainfall changes. The NDVI cluster and profiles confirm that crop condition was below normal in the north of Henan province, while in most of Shanxi, Shaanxi, and Gansu provinces, crop condition was above average when compared to the recent five years. The maximum vegetation condition indices are very high in central Gansu province, and the value of maximum VCI increased by 3 percent when compared to the twelve-year average. This might be the result of favorable rainfall (+18 percent over the last decade), temperature (+1.1 percent), and PAR (+10 percent).

**Figure 4.7. Crop condition China Loess region**

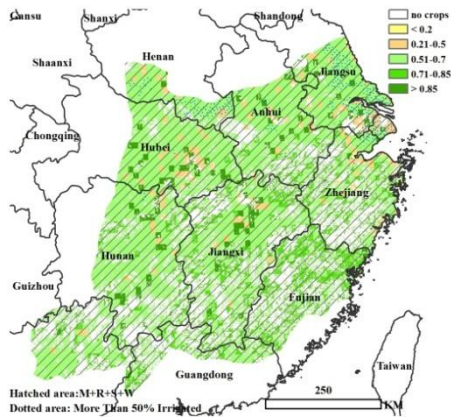


For a description of (a) through (f), see introduction to section 4.2.

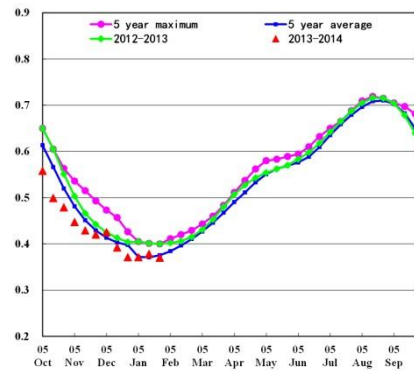
# Lower Yangtze region

The environmental indices indicate that rainfall, temperature, and PAR are higher than the twelve-year average in the Lower Yangtze region, which promoted the growth of winter wheat in the past four months. From October 2013, the drought and below average rainfall constrained the growth of crops. In November, temperature in most areas in the region remained normal or was above temperatures the previous year; suitable moisture favored the recovery of crops. By the end of November, crop condition was better than the five-year average. As for January 2014, crops in the Lower Yangtze region were affected by heavy rainfall, resulting in below average condition in the center the region. The profiles of NDVI clusters are mostly above average, in other words, crops in Lower Yangtze region performed well over the monitoring season. High value of the maximum vegetation condition index in Jiangsu and Hunan province also support this.

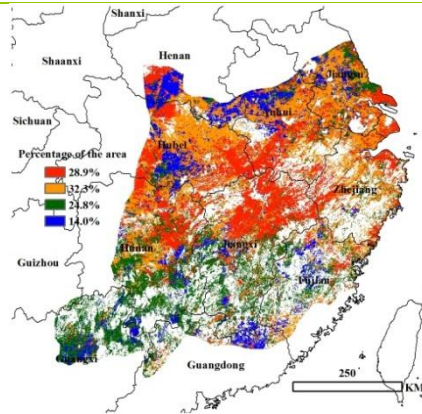
**Figure 4.8. Crop condition China Lower Yangtze region**



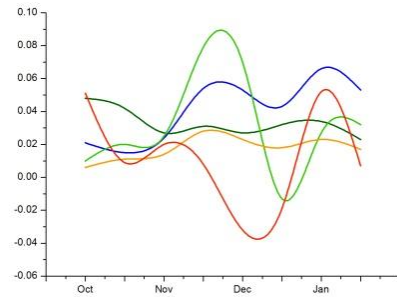
(a)



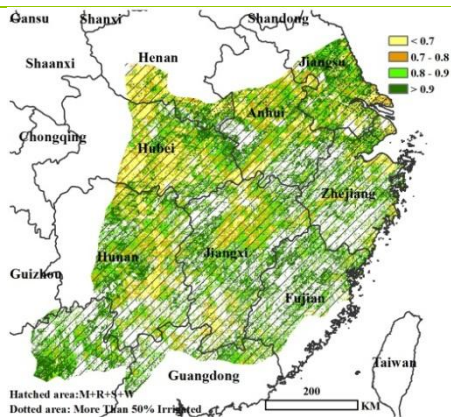
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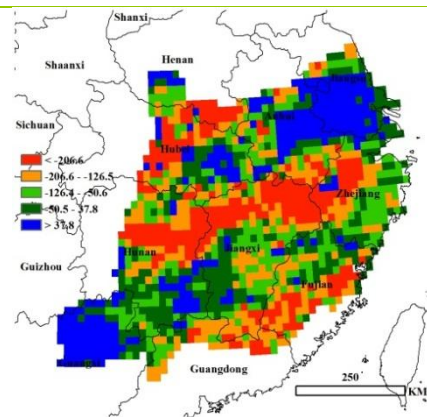
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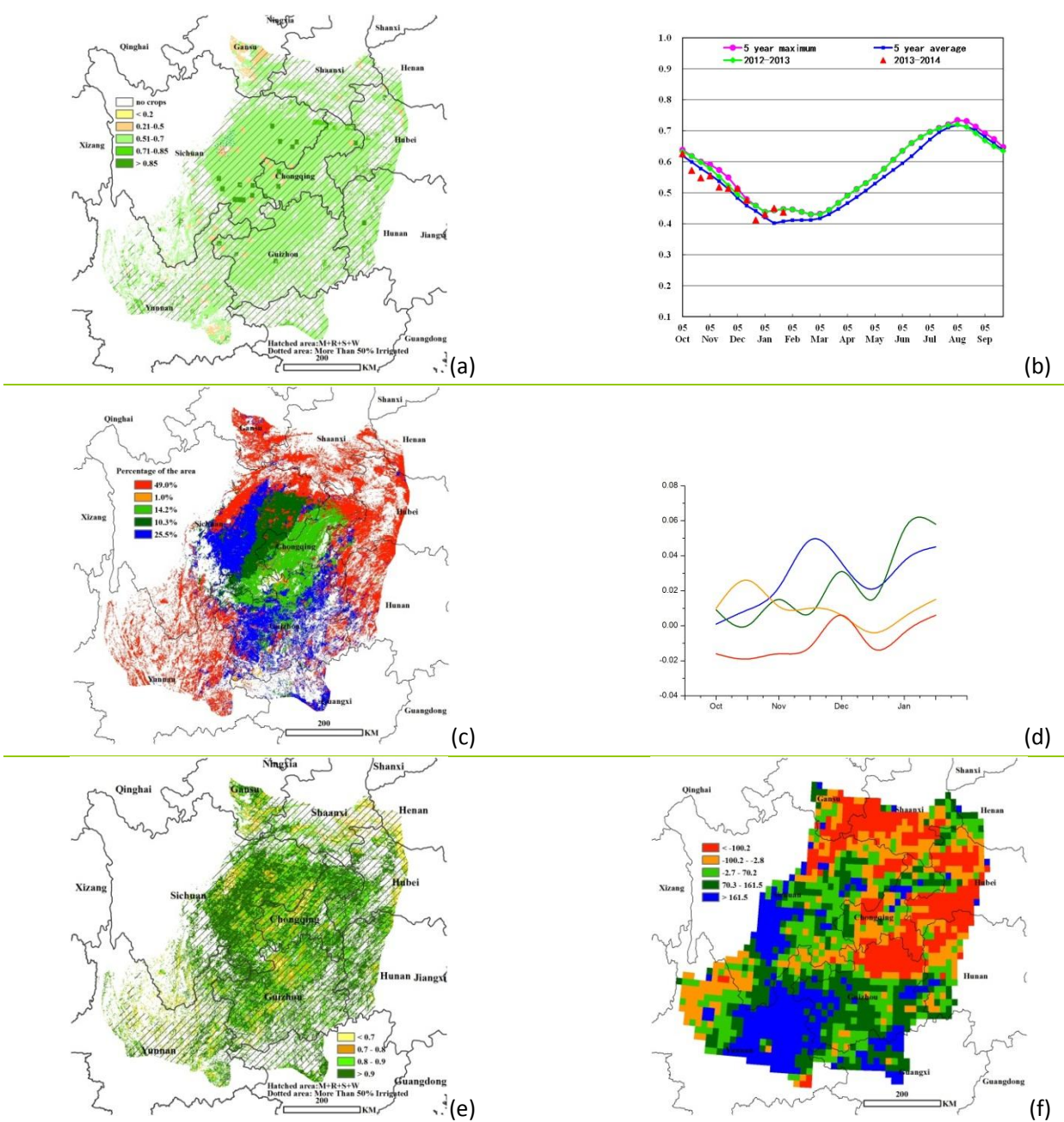
(f)

For a description of (a) through (f), see introduction to section 4.2.

# Southwest China

The characteristics of the ongoing season in Southwest China were excessive precipitation (17 percent above the twelve-year average), lower temperature (0.3°C below the average) and normal PAR accumulation. All these features led to an increase in biomass by 5 percent. In October, the dry weather inhibited the growth of the crops in southwest China. In early November, southeast Sichuan, southwest Chongqing, and northwestern parts of Guizhou all experienced excessive rainfall along with limited sunshine (less than 40 hours of bright sunshine per month) which reduced crop photosynthesis. Furthermore, lower temperature in December limited the growth of crops. In January, favorable temperature and adequate light boosted the growth of crops. The cluster and profiles of NDVI show that crop condition in the east of Sichuan province was better than in the other areas. The maximum VCI in most regions of Southwest China was above 0.8 which indicates a positive outcome of the season is not unlikely.

**Figure 4.9. Crop condition Southwest China region**

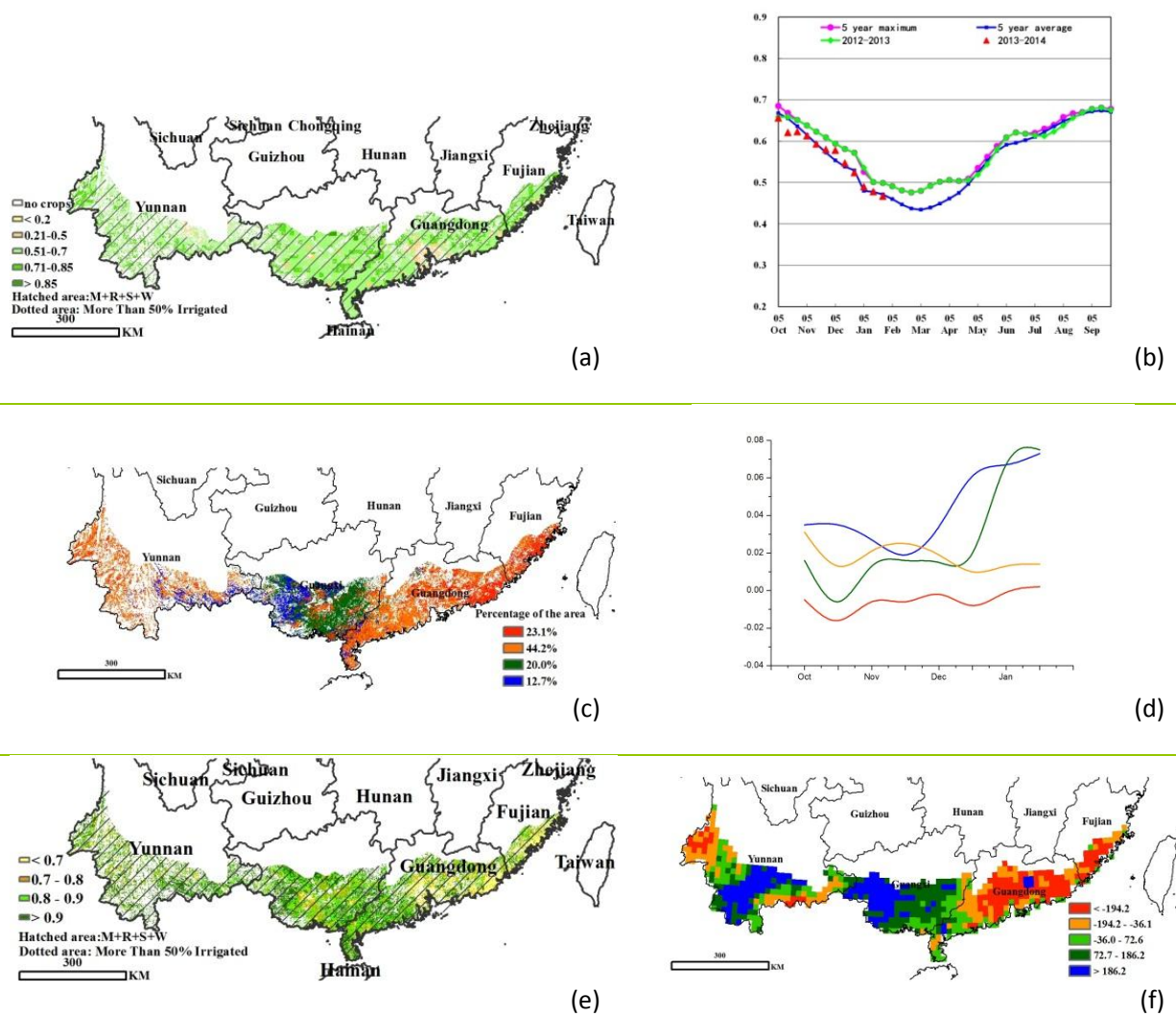


For a description of (a) through (f), see introduction to section 4.2.

# Southern China

In Southern China, November is the main harvesting season for late rice. The results of the environmental conditions monitoring by CropWatch in the past four months show that the maximum VCI decreased by 1 percent from the five-year (2008-2013) average and average temperature increased by 0.4°C from the twelve-year average; PAR also increased (+2 percent) and rainfall exceeded the average of the recent twelve years by 17 percent. All these changes led to an estimated biomass accumulation increase of 3 percent. The profile of NDVI clusters and maximum VCI indicate that crops in Guangxi grew better than in other regions: only 23 percent of pixels show crop condition below the average of the recent five years. The maximum VCI is below 0.7 in southeast of Fujian and Guangdong province, which indicates that crop condition in these regions was inferior to the average of the previous five years. Several reasons can account for this, especially typhoon Haiyan (which brought excessive precipitations in November) as well as the low temperature in January 2014.

Figure 4.10. Crop condition Southern China region



For a description of (a) through (f), see introduction to section 4.2.

## Chapter 5. Focus and perspectives

This focus section complements CropWatch analyses presented in chapters 1 through 4 by presenting two topics of relevance to global agriculture. Section 5.1 presents an overview of extreme atmospheric factors that interfered with crop production over the monitoring period. In section 5.2, a closer look is provided on a subject of general interest to agricultural development in China and the world. The current issue examines soybean production, in particular the unusual situation of one major global buyer and just three main producers.

### 5.1. Disaster events

In the four months covered by this edition of the CropWatch bulletin (October 2013-January 2014), several disasters across the globe have affected people, properties, and agriculture. Most notably, events have included typhoon Haiyan, along with a range of other flooding, extreme weather, and drought events.

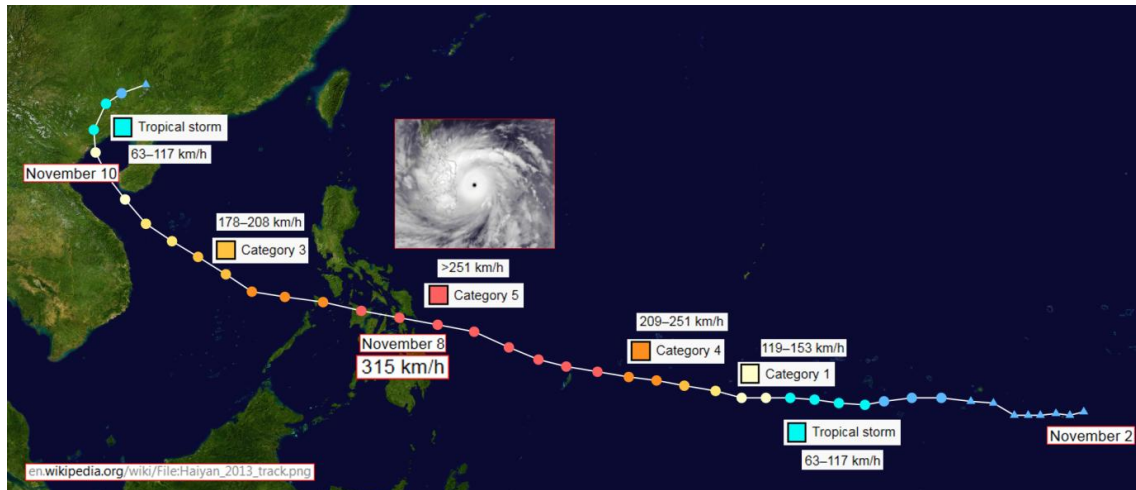
While the overview of disaster events in this section is meant to deepen the understanding of factors influencing global crop production, objectively describing recent disasters in the absence of detailed *ad hoc* studies is not always straightforward. While dedicated disaster data bases include some measure of the magnitude of impacts (and thereby allow the separation of real disasters from anecdotal ones picked up by the media), they are not updated in real time and rarely focus on agriculture. Moreover, for many of the atmospheric factors that lead to negative impacts on agriculture, their actual effect can only be assessed through field visits and models. Low or high frequencies of occurrence (e.g. "highest rainfall in 35 years") or descriptions of spatial extent ("10,000 hectares flooded in Somerset") are not, *per se*, accurate indicators of impact in the absence of knowledge about the absolute intensity of the event and its specific local impacts.

Furthermore, the risk exists that any 'objective' reporting is influenced by the media's pre-selection of stories, which is based on readers' interests, while other factors of serious insecurity are omitted. Indeed, war and civil unrest have recently returned to several areas of Africa (South Sudan, Nigeria, and Central African Republic), not to mention chronic unrest in areas such as the central and eastern Congo (DRC). In terms of suffering and food insecurity, these conflicts dwarf most natural disasters.

#### **Typhoon Haiyan and other storms**

The main weather event over the reporting period undoubtedly was typhoon Haiyan in the Philippines. Haiyan (also known as Yolanda) affected East Asia in November and made lasting impacts on crop production in areas where floods recede only slowly and where perennial crops will recover only after several years. After making landfall and creating havoc in the Philippines, Haiyan also affected Vietnam and China.

According to the Centre for Research on the Epidemiology of Disasters (CRED) and FAO, the typhoon was one of the worst disasters in the recent history of the Philippines, inflicting severe suffering (4 million people were displaced, with another 8 million also affected), loss of life (6,200 people died and 1,800 are still missing at the time of writing), and destruction of goods and infrastructure (worth at least 808 million U.S. dollars). The final economic loss is expected to reach around US\$10 billion. Figure 5.1 illustrates the track and intensity of the typhoon.

**Figure 5.1. Track and intensity of typhoon Haiyan between November 2 and November 10**

*Note:* Intensity is indicated with the categories from the Saffir-Simpson Hurricane Wind Scale, with the corresponding range of wind speed and the maximum wind speed over the Philippines on November 8.

*Source:* Based on data and maps from Wikipedia and Wikimedia Commons.

Within the Philippines, about 20 of the country's 81 provinces were affected. In the areas most directly hit, record wind speeds reached more than 300 km per hour—measured on the islands of Leyte and Samar in the eastern Visaya Group. Losses to the agricultural sectors therefore occurred mostly in the Visayas and include fisheries, livestock, and paddy crop (of which 35 percent is produced in the area); an estimated 150,000 ha of rice paddies, maize, and other cash earners such as coconut, sugarcane, banana, cassava, mango, and vegetables have been affected. The typhoon coincided with the harvesting of the 2013 main paddy crop, representing just above half of the annual production in the central Philippines. The planting of the mostly irrigated 2013/14 secondary season rice was underway. Fortunately, the harvest of maize had been completed about a month earlier, resulting in some damage to stored produce only, but nothing comparable with the impact on rice for which the combined loss due to Haiyan and Nari (in the north) is put at 5 percent of the national production. Since the country is a net paddy importer, imports are likely to increase.

In Vietnam, Haiyan affected mostly the northern part of the country (Quảng Ninh Province on November 10) at a time when it had been downgraded to tropical storm and winds were still strong but precipitation was no longer exceptional. In China, Haiyan reached Hainan province where approximately 25,000 hectares of crops were destroyed.

In addition to Haiyan, other storms are also worth mentioning, including—in the beginning of October—cyclones Phailin and Nari. While Phailin created havoc on the East Indian coast, cyclone Nari affected the Philippines on October 12 and later made landfall on the central coast of Vietnam on October 15. Despite its relatively modest wind speeds (102 km per hour), Nari had a big impact, killing people, flooding homes, and destroying cropland. Affected provinces in Vietnam include Quang Nam, Thua Thien-Hue, Quang Ngai, Quang Tri, Nghe An, Quang Binh, and Binn Dinh.

A few weeks later, on November 10—on the heels of Haiyan but in another part of the world—a rare tropical cyclone hit Somalia, causing the typical damage associated with excess rainfall in normally semi-arid areas. The event created intense suffering among populations not used to cyclones.

### **Extreme temperatures, rainfall, and droughts**

Other extreme weather events during the reporting period include extreme temperatures, rainfall, floods, and droughts. In Cambodia, during the last days of September, heavy rainfall and flash floods affected close to half a million people and claimed 152 lives in 16 of the country's 24 provinces; an estimated 300,000 hectares of rice were affected. Although Nari was of no direct concern to Cambodia, the timing of the events was such that abundant rain over the Mekong basin in Vietnam and Laos eventually reached Cambodia at a time when floods would normally have been receding, providing an example of a remote cyclone worsening the effect of a local flood.

Other floods, sometimes accompanied by landslides in hilly terrain, are reported from Thailand (October), Vietnam (November), Indonesia, and Brazil (mostly the south-eastern states of Rio and Bahia, in December), the United Kingdom (first with local events in early December—including a record tidal surge—then widespread from late December to early January), the Philippines, Bolivia, and Peru (Huancavelica Province, in January.)

Cold waves were observed in the occupied Palestinian territory in December, accompanied by heavy rain fall and snow storms that affected both the West Bank and Gaza. In north America, low temperatures and limited snow cover occurred in the first dekad of January, impacting parts of Canada, the eastern United States (with record lows close to  $-40^{\circ}\text{C}$ ), and north east Mexico. The economic loss is important but agriculture is not a major sector in the area. On the other hand, snow cover was abundant over the main maize, soybean, and wheat areas, which has resulted in good soil moisture. Despite the cold spell, NOAA's National Climatic Data Center indicated that the "warm West" counterbalanced the "cold East" for the contiguous United States in January, with overall monthly temperature only slightly below average.

In Australia, significant droughts and fires were reported, first in mid-October and later in January and early February 2014.

### **5.2. Soybean: a story of three producers and one buyer**

The production and trade in soybean, a major crop and one of the four CropWatch focus areas, presents some interesting particularities. For starters, with a global production of about 260 million tons, the crop is unique among the major agricultural commodities in that 80percent is produced by just three countries (United States, Brazil, and Argentina) and 91 percent by just six (add China, India, and Paraguay). Next, more than half (56 percent) of the traded volume (90 million tons, 2009-2011 average) is bought by just one country: China (50 million tons during 2009-2011). Since 1995, China has gradually become the main customer of the top three producers—the country now depends on imports for about 80 percent of its soybean supply.

Another interesting aspect is that the current pattern of major market suppliers only partly reflects the global agroclimatic production potential, suggesting there is much untapped potential for some already established producers to increase their production and for others to enter the global soybean production scene.

This short focus section briefly presents some background on the current situation, discusses global production potentials and production, and highlights differences in per hectare income from soybean among countries. Additional insights are planned to be shared as an article; the many experts who

already kindly contributed their insights on global soybean production for this focus section are listed in the acknowledgments.

### Development of the current situation

Over the last 30 years, the list of top five producers of soybean has remained virtually the same (table 5.1). The table also lists the average per annum hectareage growth in percentage over the 2001-2012 period, to be compared to the world average of 2.7 percent. The numbers provide an interesting glimpse into how countries maintain or lose their ranking: in China, soybean areas continue to decrease, while the United States relies more on yield increase than on areas to maintain their position. Area increases larger than 10 percent per year occur in countries that clearly intend to increase their share of the Soybean market. They include several African countries (Benin +10.8 percent, Tanzania +11.1 percent, South Africa +13.1 percent and Zambia +16.5 percent).

**Table 5.1. Indicators and statistics describing the ten top soybean producers**

	Rank			2012 production (% of world total)	2008-2012 average yield in T/ha	2001-2012 yield trend (kg/(year.ha))	2001-2012 average annual area change (%)
	2008- 2012	1999- 2001	1989- 1992				
<b>United States</b>	1	1	1	33.9	2.80	24	0.4
<b>Brazil</b>	2	2	2	27.2	2.83	27	3.6
<b>Argentina</b>	3	3	4	16.9	2.49	-14	4.8
<b>China</b>	4	4	3	5.2	1.77	8	-1.9
<b>India</b>	5	5	5	4.7	1.13	24	5.1
<b>Paraguay</b>	6	6	6	3.4	2.52	28	7.0
<b>Canada</b>	7	7	9	2.0	2.79	85	4.3
<b>Bolivia</b>	8	8	14	1.0	2.04	16	4.2
<b>Uruguay</b>	9	38	33	1.2	2.15	5	22.2
<b>Ukraine</b>	10	30	79*	1.0	1.71	66	18.9

Note: Ranking follows the average 2008-2012 production. The rank for the Ukraine (\*) corresponds to the USSR, of which the Ukraine used to be the main soybean producer.

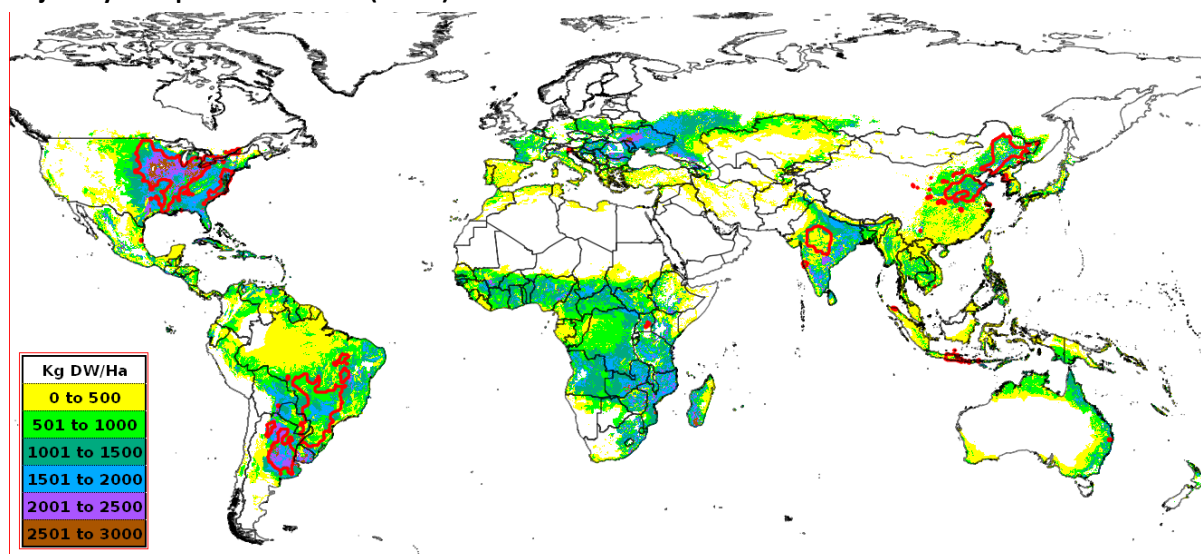
Source: Authors based on FAOSTAT data

Yields are highest in the developed countries and close to 2.8 tons/ha. At the bottom of the list in terms of yield (among the ten main producers) are India (1.13 tons/ha), Ukraine (1.71 tons/ha), China (1.77 tons/ha), Bolivia (2.04 tons/ha), and Uruguay (2.15 tons/ha). Clearly, if India intends to maintain its current favorable dependency ratio of zero (that is, virtually no imports) a major effort will be required. An interesting question is whether soybean is undergoing a slowdown in yield growth, as is well documented for rice and wheat after 1990; analyses show that, if there is such a slowdown for soybean at all, it occurred recently and cannot currently be ascertained with any confidence.

### Global soybean potential and effects on current production

Figure 5.2 shows a global map of agroclimatic attainable yield—an indicator of countries' production potential and based on FAO Global Agro-Ecological Zones (GAEZ)—along with current major soybean production areas. To some extent, the current pattern of major market suppliers simply reflects the production potential, especially for the United States and Argentina, though less so for Brazil and India. However, the map also indicates a largely untapped potential, showing high potential areas for rainfed soybean on all continents, including some areas that are currently not major producers.

**Figure 5.2. Agroclimatic attainable yield (kg of total dry weight/ha) for rainfed soybean compared to current major soybean production areas (in red)**



Note: The map is based on data for rainfed soybean with intermediate inputs over currently cultivated land, 1961-90 reference period, overlaid with major soybean production areas according to EC/JRC (in red); dry weight includes all parts of the plants, including grains. Source: Based on data from FAO GAEZ and EC/JRC.

As shown on the map, the areas with high and in some cases untapped potential cover either relatively large and contiguous areas, or more "dispersed areas" of non-contiguous but nevertheless grouped spots. Among the large contiguous areas, the first is in the United States (mostly in an area from Iowa to Ohio—already an established producer), followed by Argentina (provinces of Buenos Aires, Cordoba, and Santiago del Estero), east Uruguay, southern India (mostly in northwest Andhra Pradesh), central Ukraine and north Moldova, and south Russia (Kray of Krasnodar). The more dispersed areas with high potential include east Georgia, Romania, Serbia and Hungary, and several African countries along the Mozambique Channel, including north Mozambique, Zimbabwe, Madagascar, and the east Eastern Cape province in South Africa. The main disadvantage of these more dispersed areas may be their relatively high transport costs to concentrate the production and reach international markets.

Interestingly, the map also indicates that some major producing areas in fact are located in regions with relatively low production potential (including southern Brazil and China's northern plains and northeast areas). Moreover, it should be noted that some high potential areas also contribute very little to the global output of soybean because they grow other crops, such as the Ukraine (globally ranking 9th as producer and 7th as exporter) and Moldova.

India deserves a special mention because the main production zones in Madhya Pradesh, Maharashtra, and east Andhra Pradesh are irrigated in areas with low production potential for rainfed soybean. In East but particularly Southeast Asia, potentials are rather low due to poor sunshine conditions associated with abundant monsoon rain, conditions altogether unfavorable to soybean cultivation. In fact, in equatorial Southeast Asia, only Indonesia grows soybean in eastern Java. In comparison, conditions are significantly more favorable at the same latitude (but generally drier climate) in Southern Africa where, however, the soybean potential remains largely untapped.

Including irrigation does alter the global patterns, but not substantially in most areas; in Asia major producing areas in India and China (North China Plain, including southern Hebei, Shandong, southern Shanxi and northwest Henan provinces) benefit relatively little, while the potential for improvement is larger in China's North East region (southern Heilongjiang, west Jilin, and Liaoning). More substantive

yield increases (larger than 1 ton/ha) are probably possible in southern Nepal, northwest India and eastern Pakistan, as well as in Myanmar. For all areas with current underused potential, any future role will largely depend on the combination of production potential, local production costs, and proximity to major markets.

### **Income from soybean cultivation**

Among the top ten producers, China has the highest income per hectare of soybean: US\$1,239/ha, 7 percent above the income per hectare in the United States and about 30 percent above the global average, in a clear move to slow down the ongoing decreasing areas cultivated domestically. Overall, among all countries, China ranks 7<sup>th</sup> in the price offered domestically for soybean, below South Korea (US\$4,660/ha) and Japan (US\$2,453/ha), while low prices are offered in Pakistan (US\$255/ha), Russia (US\$479/ha) and the Ukraine (US\$616/ha). However, compared to other summer crops, the income derived from soybean is unattractive in China: for wheat the income is 1.1 times larger than for soybean, for maize 1.2, for sugar beet 1.8, and as high as 4.0 for potatoes.

In terms of farmers' income growth over the recent decade (1999-2001 to 2009-2011), the major producers are usually close to the world average (global prices per hectare nearly tripled (an increase of 177 percent) in the ten years), which is the only economically sustainable approach in the long run. High values for income growth over the decade occurred in Uruguay and Bolivia (increases of 240 and 254 percent respectively), although the absolute values of income per hectare in both stay well below the world average, probably to compensate for transport costs in the two landlocked countries. In some countries, such as Argentina, soybean income increases are significantly lower than the world average due to environmental conditions more than producers' choice or national policy.

Clearly, soybean is most atypical among major crops, resulting from rapidly changing demand patterns and reflecting the combined effect of production potential and national agricultural policies. There is potential for change and for the reduction of existing vulnerabilities in the relatively long term, but also for new sources of vulnerability in the shorter term.

## Annex A. Environmental indices

Tables in this Annex provide additional information about the environmental indices for the Crop Production System Zones (table A.1), Major Production Zones (A.2), and countries (tables A.3 through A.12). Figures A.1, A.2, and A.3 illustrate global distribution of environmental index values.

**Table A.1. Current season environmental indices by Crop Production System Zones, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Equatorial central Africa	526	-5	-8	25.1	0.2	0.2	1205	6	7	1552.8	-2	-2
East African highlands	206	1	0	19.5	-0.2	0.2	1237	2	1	716.8	4	0
Gulf of Guinea	262	10	15	26.8	0	0	991	8	6	728.1	7	14
Horn of Africa	268	-20	-24	24.1	-0.1	-0.1	1319	4	6	622.7	-3	-6
Madagascar (main)	925	35	23	24.5	0	0	1329	-3	-1	1903.4	13	12
SW Madagascar	554	33	18	25.3	-0.5	-0.5	1449	0	2	1269.5	6	1
North Africa	88	-57	-54	13.7	0.5	0.6	663	3	3	303.8	-46	-43
Mediterranean												
Sahel	48	-3	2	27.5	0.1	0.2	1125	7	5	160.3	2	5
Southern Africa	167	19	20	9.2	0.4	0.3	695	2	4	1034	-3	-0.4
S. Africa Western Cape	273	163	123	17.7	0.5	0.2	1550	-1	-2	857.8	100	81
Boreal North America	443	77	61	-5.4	4.1	2.8	107	-6	-3	284.1	17	12
America northern great plains	188	29	31	-1.5	-1.2	-1.6	469	5	5	549.4	13	12
America corn belt	363	4	2	0.5	-1.4	-1.7	441	3	3	724.2	-4	-6
America cotton belt-Mexican coastal plain	307	-10	-15	10.8	-0.8	-1.1	660	0	1	914.5	1	-5
Sub-boreal North America	223	17	16	-6.5	-1	-1.4	344	7	7	404.3	-4	-4
America West Coast	93	-74	-74	6.6	-0.2	-0.3	549	14	15	396.1	-48	-49
Sierra Madre	169	66	36	14.8	0.1	0.1	971	-2	-1	565	61	32
SW Mexico and N. Mexico highlands	90	15	-3	6.5	-0.9	-1.5	745	3	4	339.9	4	-7
Northern South and Central America	450	-2	-2	25.4	0.1	0	965	-4	-3	1188.9	1	-1
Caribbean	232	-25	-33	25	0.7	0.5	921	-3	-2	787.3	-12	-18
Central-Northern Andes	605	5	2	16.8	0.2	0.3	1186	1	-2	1064.4	6	5
Brazil Nordeste	255	-2	-9	27	-0.1	0.6	1377	2	-1	854.1	-1	4
Central-Eastern Brazil	729	-5	-3	25.9	0	0.2	1273	4	-1	1877.7	-	2
Amazon	867	4	6	27.4	-0.3	-0.2	1070	2	-2	2085.6	0.20	3
Central-North Argentina	459	19	6	26.2	0.5	0.8	1455	-1	-1	1351.7	12	4
SE Brazil-Concepcion-Bahia Blanca	628	8	3	23.5	0.8	1	1451	0	0	1623.8	10	4
SW Southern Cone	67	-57	-62	13.8	-0.2	0	1510	2	3	321.6	-44	-48
Semi-arid Southern Cone	109	-3	-11	19.4	0.5	0.9	1584	1	1	317.3	-15	-19
Caucasus	304	21	16	3.5	-1.2	-0.5	529	4	4	752.3	0.30	-1
Central Asia Pamir mountains	242	131	110	3.3	0.2	0.5	686	4	4	489	43	37
Western Asia	163	38	26	7.3	0.3	0.5	619	2	3	439.8	24	15
China Gansu-Xinjiang	109	125	155	-2.7	1.4	1.2	530	8	8	246.5	115	129
China Hainan	307	-47	-22	20.1	-0.6	-0.9	904	5	2	733.7	-9	10
China Huang Huaihai	61	-14	-25	6.7	1.1	0.9	605	10	13	291.9	-6	-15
China Inner Mongolia	58	17	38	-4.1	2.2	1.7	522	7	7	264.5	25	43
China Loess region	70	18	3	2.3	1.1	1	640	10	12	286.2	7	-
China Lower Yangtze	281	16	16	11.8	0.6	0.4	737	12	14	686.6	-10	-13

	Rainfall total			Temperature average			PAR accumulation			Biomass		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
North East China	126	38	55	-6.5	1.8	1.3	426	6	6	378.8	23	29
China Qinghai-Tibet	147	68	59	0.6	-0.2	-0.3	836	2	2	282.1	42	49
Southern China	244	15	12	23	-0.3	-0.2	992	1	1	575.7	1	2
South-West China	373	-7	-12	9.1	0.1	0	591	4	4	526	9	5
Taiwan	62	-76	-73	17.5	-0.3	-0.5	831	-1	0	342.1	-59	-53
East Asia	166	-25	-24	-0.7	0.7	0.6	469	6	6	476.1	-4	-3
Southern Himalayas	213	17	26	15.3	-0.3	-0.5	857	6	5	513.9	43	35
Southern Asia	452	0	0	24.7	-0.1	0	1406	1	3	560	2	6
Southern Japan and Korea	209	71	60	16.9	-0.4	-0.4	873	1	1	1103.2	-6	-5
Mongolia region	52	173	185	-7.7	2	1.7	440	7	7	191.6	134	157
S. Asia Punjab to Gujarat	43	42	62	20.1	-0.5	-0.6	913	2	1	151.6	30	50
SE Asia islands	1124	-7	-1	25.2	0	-0.2	945	-2	-3	2196.9	-4	-2
SE Asia mainland	368	3	11	23.9	-0.8	-0.7	1018	4	3	816.6	-0.2	7
Eastern Siberia	189	8	15	-8.2	2.6	2.5	239	14	11	120.8	-10	-7
Eastern Central Asia	50	-9	-4	-12.7	3.5	3.1	313	8	7	187.4	14	20
North Australia	678	-5	9	26.7	0	-0.1	1281	3	1	1357.8	-2	6
Australia Queensland to Victoria	170	-41	-32	20.3	0.3	0.3	1558	4	3	650.8	-31	-24
Australia Nullarbor-Darling	56	-54	-44	19.6	0.3	0.7	1624	2	1	302.7	-40	-29
New Zealand	203	-37	-39	13.5	0.3	0.4	1374	0	0	963.4	-17	-19
Boreal Eurasia	288	19	14	-2.7	2.6	1.8	109	5	4	307.7	5	6
Ukraine to Kazakhstan	172	-6	-4	-1.6	1.8	1.5	206	2	3	573.9	11	12
Mediterranean Europe and Turkey	270	-26	-21	8.7	-0.2	0.1	508	5	4	825.2	-18	-14
W. Europe (non-Mediterranean)	284	-7	-2	6	1.4	1.1	279	0	-5	893	-1	-
												0.10

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.2. Current season environmental indices by Major Production Zone, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
West Africa	239	10	15	26.8	0.0	0.1	1007	9	5	639.2	4	12
South America	660	-5	-6	24.1	0.6	0.7	1385	3	1	1762.8	2	-0.2
North America	284	3	0	3.5	-1.2	-1.6	534	2	3	706.9	2	-2
South and Southeast Asia	250	26	27	21.4	-0.5	-0.4	953	2	2	572.5	19	22
Western Europe	283	-1	0	6.7	1.3	1.0	284	1	-0.4	946.8	3	3
Central Europe and Western Russia	181	-11	-8	0.8	1.0	0.9	226	1	2	658.6	2	2

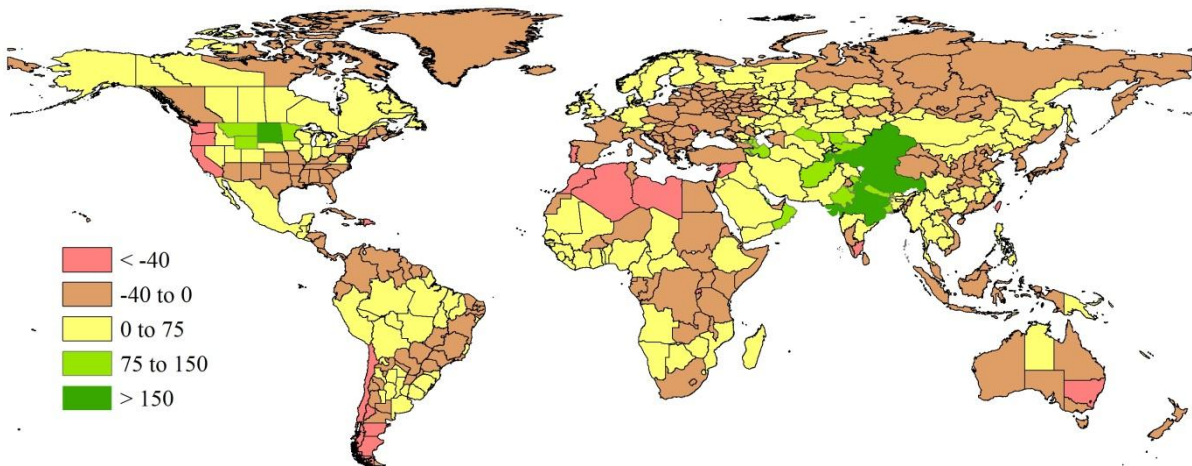
Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.3. Current season environmental indices by country, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Argentina	513	11	5	23.4	0.7	1	1491	0.40	0.10	921.9	5	-1
Australia	190	-37	-27	20.8	0.3	0.3	1550	3	3	773.5	-6	3
Bangladesh	253	46	11	21.2	-0.4	-0.5	881	-0.20	-0.50	665.7	55	33
Brazil	730	-3	-1	26	0	0.2	1237	3	-0.40	1891.7	-1	2
Cambodia	362	-1	5	25.6	-0.9	-0.8	1090	6	5	947.5	0	8
Canada	243	7	8	-6.4	-1	-1.3	288	5	6	292.9	-3	-2
China	177	16	19	7	0.7	0.5	680	6	8	355.7	20	21
Egypt	50	-16	-24	18	-0.1	0.2	770	2	3	71.6	26	26
Ethiopia	198	31	28	20.3	-0.1	0.3	1196	1	0.20	612.3	21	16
France	328	-3	-3	7.5	1.1	0.8	311	0.40	0.10	1051.8	3	4
Germany	262	3	5	5.6	1.7	1.2	218	1	-0.40	995.5	10	8
India	199	56	52	20.7	-0.3	-0.3	945	1	1	458.2	30	33
Indonesia	1140	-7	-2	25.5	0	-0.2	965	-1	-2	2217.1	-5	-2
Iran	264	68	42	7.4	-0.8	-0.4	703	1	2	565.0	33	19
Kazakhstan	141	32	25	-3.9	2.5	2	310	2	4	479.6	22	17
Mexico	274	81	48	18.6	0	-0.1	927	-4	-3	595.9	56	31
Myanmar	288	26	27	21.7	-0.5	-0.2	939	1	2	675.9	8	4
Nigeria	201	5	23	27	0	0.3	1014	9	6	442.6	-6	9
Pakistan	89	67	42	14	0	-0.1	825	2	3	189.0	19	14
Philippines	1032	2	11	24.9	-0.2	-0.3	910	-3	-4	1768.9	-5	-0.2
Poland	160	-18	-16	4.2	1.7	1.2	205	2	4	752.6	-5	-7
Romania	188	-20	-8	4.1	1.1	1.2	348	1	2	668.4	-15	-6
Russia	170	-2	-1	-3.5	2	1.7	211	3	4	268.4	4	6
South Africa	366	-6	-3	20.1	0.1	0	1497	2	3	932.2	-2	0.0
Thailand	328	1	13	23.7	-1	-1	1051	5	5	749.2	-6	6
Turkey	292	-14	-6	4.9	-1.1	-0.2	565	7	7	803.2	-17	-9
United Kingdom	495	43	42	6.9	1.4	0.7	172	1	1	1144.9	14	10
Ukraine	139	-30	-25	2.7	0.7	0.7	258	1	-1	639.7	-14	-11
United States	279	0	-4	4.1	-1	-1.4	551	2	3	567.5	3	-2
Uzbekistan	232	95	72	5.5	0.3	0.5	544	2	4	557.1	66	52
Vietnam	432	-7	-1	20.7	-0.6	-0.6	902	3	1	828.9	-10	-7

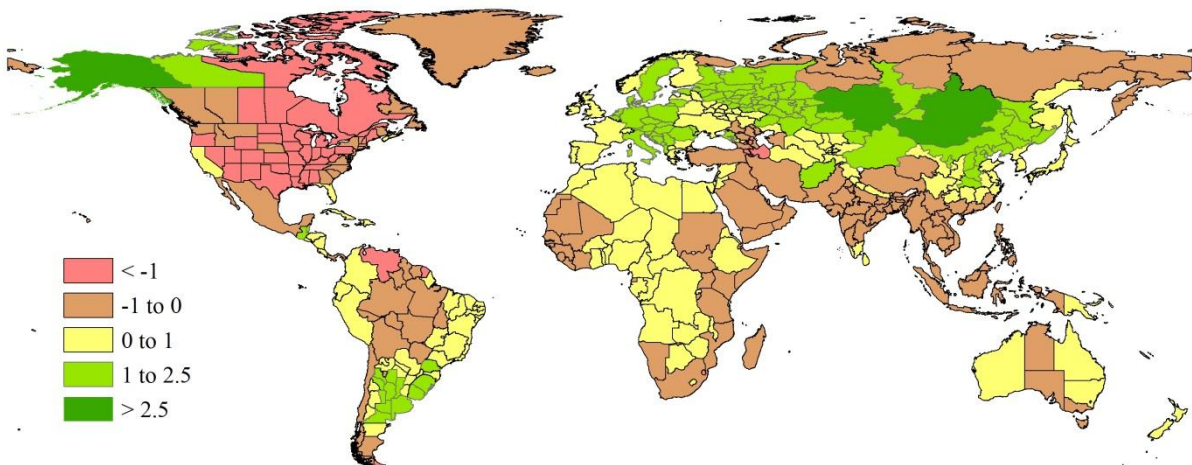
Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Figure A.1. Global map of rainfall by country and sub-national areas, departure from 12YA (2001-13) (percentage)**



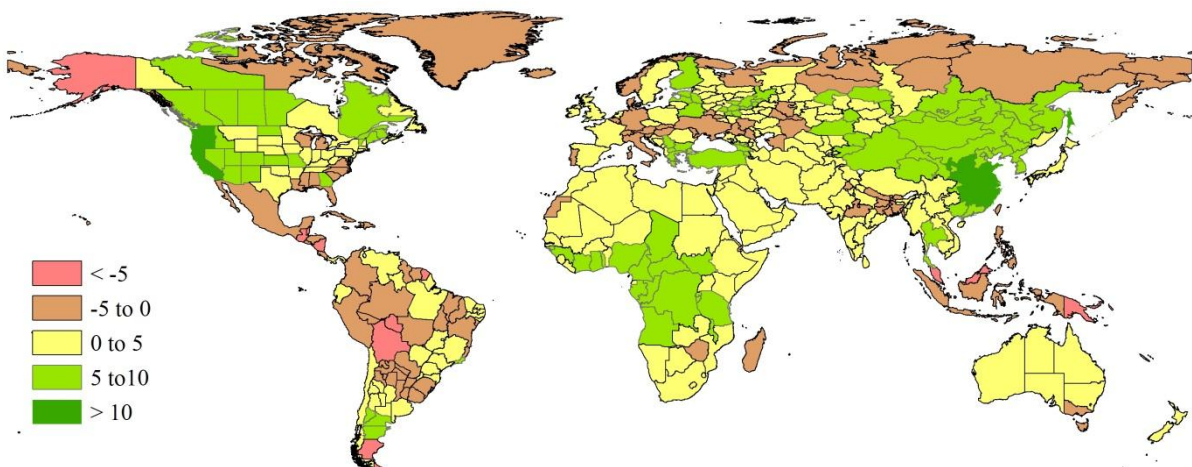
Note: 12YA=Twelve-year average; the average for October-January periods between October 2001 and January 2013.

**Figure A.2. Global map of air temperature by country and sub-national areas, departure from 12YA (2001-13) (°C)**



Note: 12YA=Twelve-year average; the average for October-January periods between October 2001 and January 2013.

**Figure A.3. Global map of PAR by country and sub-national areas, departure from 12YA (2001-13) average (percentage)**



Note: 12YA=Twelve-year average; the average for October-January periods between October 2001 and January 2013.

**Table A.4. Current season environmental indices for China, by province, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure(°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Anhui	206	19	5	10.0	0.7	0.5	663	11	15	612.1	-5	-13
Chongqing	148	-17	-12	9.3	0.7	0.6	601	4	7	588.6	-3	-2
Fujian	231	-14	-6	12.4	-0.1	-0.5	807	14	13	643.9	-19	-16
Gansu	153	-23	-10	16.3	-0.1	-0.5	866	8	7	199.4	34	35
Guangdong	44	-12	-15	0.9	0.7	0.6	658	7	8	465.2	-24	-18
Guangxi	289	38	54	15.1	0.2	-0.1	805	8	8	727.7	21	21
Guizhou	231	36	44	10.2	0.6	0.4	678	2	3	598.3	9	6
Hebei	43	-12	-16	1.9	1.7	1.2	570	7	9	213.4	-7	-8
Heilongjiang	93	5	-13	8.1	1.2	1.2	635	11	15	361.9	21	27
Henan	128	47	66	-8.6	1.6	1.1	390	7	6	414.3	7	-7
Hubei	141	-20	-25	9.7	1.1	1.1	665	10	13	532.0	-16	-21
Hunan	256	1	3	11.8	1.1	1.0	721	13	15	722.0	-10	-12
Jiangsu	123	22	40	-5.0	1.8	1.2	461	6	6	528.1	6	-7
Jiangxi	193	52	27	9.6	0.7	0.3	649	10	13	751.1	-17	-17
Jilin	332	10	14	12.5	0.6	0.4	766	14	16	456.6	24	31
Liaoning	134	37	49	-0.7	1.8	1.4	508	5	6	518.1	32	38
Inner Mongolia	67	39	67	-6.3	2.5	2.0	473	6	6	248.7	46	67
Ningxia	56	62	63	0.6	1.2	1.2	639	9	10	218.0	33	47
Shaanxi	110	16	15	8.0	0.2	0.1	690	0	1	328.4	-11	-12
Shandong	70	0	-6	6.6	1.1	0.8	600	10	12	305.5	-3	-6
Shanxi	84	-11	-17	4.2	0.9	0.8	625	9	11	270.8	-0.3	-6
Sichuan	59	7	-5	0.4	1.4	1.1	625	10	12	405.6	24	19
Yunnan	223	68	54	11.2	-0.6	-0.6	856	0	1	557.0	24	14
Zhejiang	449	61	56	10.8	0.4	0.0	733	14	15	788.6	-13	-15

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.5. Current season environmental indices for Argentina, by province, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Buenos_Aires	489	18	13	21.1	0.7	1.1	1542	2	3	1438.1	16	8
Chaco	622	25	14	26.1	0.4	0.8	1434	-0.2	-2	1689.4	23	15
Cordoba	544	32	25	23.3	1.0	1.2	1521	1	2	1516.9	16	10
Corrientes	680	-4	-4	25.2	0.5	0.9	1441	-1	-2	1707.0	8	0
Entre_Rios	624	18	14	23.5	0.5	1.0	1472	-3	-3	1707.0	19	12
La_Pampa	330	-10	-12	22.4	1.2	1.6	1574	3	4	969.6	9	3
Misiones	734	-7	-15	24.6	0.9	0.9	1415	1	1	1777.3	-3	-8
Santiago_DeL_Estero	442	11	0	26.3	0.8	1.1	1460	-0.5	-1	1406.3	12	5
San_Luis	390	5	1	22.6	1.1	1.3	1552	2	2	1134.8	-3	-6
Salta	421	5	-7	25.4	0.3	0.6	1458	-1	-3	1079.8	8	-3
Santa_Fe	559	5	4	24.3	0.9	1.2	1476	-1	-1	1645.7	11	6
Tucuman	-1	-1	-1	-1	-1	-1	-1	-1	-1	1210.8	3	-10

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.6. Current season environmental indices for Australia, by state, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
<b>New_South_Wales</b>	140	-52	-44	20.9	0.4	0.3	1589	7	5	535.2	-42	-32
<b>South_Australia</b>	108	0	-2	18.3	-0.1	0.0	1567	0.2	0.0	428.8	-7	2
<b>Victoria</b>	151	-36	-27	16.8	-0.3	0.0	1510	-0.1	-0.3	680.0	-23	-17
<b>Western_Australia</b>	96	-33	-19	20.3	0.3	0.6	1607	2	1	748.2	16	30

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.7. Current season environmental indices for Brazil, by state, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
<b>Ceara</b>	155	-6	-18	28.1	0.1	0.6	1360	3	1	615.7	19	20
<b>Goiias</b>	769	-16	-11	25.3	0.0	0.1	1294	9	2	2094.8	-6	-1
<b>Mato_Grosso_Do_Sul</b>	589	-13	-14	26.4	0.0	-0.3	1325	5	0.2	1799.6	-3	-4
<b>Mato_Grosso</b>	1059	4	5	26.7	-0.3	-0.4	1169	4	-4	2401.4	4	4
<b>Minas_Gerais</b>	738	-16	-12	24.2	0.5	0.8	1318	7	2	1813.3	-8	-5
<b>Parana</b>	654	-12	-13	23.8	0.9	1.0	1386	4	3	1826.1	-4	-5
<b>Rio_Grande_Do_Sul</b>	798	17	14	23.3	1.0	1.2	1422	1	-0.2	1787.7	9	4
<b>Santa_Catarina</b>	807	6	3	21.3	0.8	0.9	1348	3	2	1892.2	-4	-5
<b>Sao_Paulo</b>	596	-29	-26	24.6	0.7	1.0	1336	7	4	1762.1	-12	-11

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.8. Current season environmental indices for Canada, by province, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
<b>Alberta</b>	142	28	43	-6.3	0.1	-0.3	249	6	6	393.2	4	8
<b>Manitoba</b>	139	9	13	-9.8	-3.0	-3.1	298	7	7	298.4	-17	-20
<b>Saskatchewan</b>	104	-4	6	-9.1	-1.7	-2.0	284	9	7	328.8	-13	-9

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.9. Current season environmental indices for India, by state, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Arunachal_Pradesh	238	8	11	14.9	-0.1	-0.2	865	3	2	621.8	-5	-14
Andhra_Pradesh	286	49	37	24.5	-0.2	-0.1	1006	1	1	568.9	3	8
Assam	187	25	3	20.7	-0.3	-0.4	871	1	1	523.3	25	4
Bihar	242	359	224	20.6	-0.4	-0.7	857	-1	-1	585.5	204	141
Chandigarh	-1	-1	-1	-1	-1	-1	-1	-1	-1	504.4	66	63
Chhattisgarh	231	210	150	21.2	-0.3	-0.2	957	0.3	0.4	265.7	125	86
Daman_and_Diu	60	125	192	25.1	0.6	0.8	1045	2	1	278.3	-34	-9
Delhi	60	134	63	18.3	-0.5	-0.8	845	2	1	188.6	59	140
Dadra_and_Nagar_Haveli	68	-50	-24	24.0	-0.1	0.1	1047	3	2	472.3	-23	-12
Gujarat	49	60	152	23.3	-0.6	-0.5	1006	2	2	398.6	28	29
Goa	97	-60	-48	25.7	-0.2	-0.2	1097	3	3	240.8	81	62
Himachal_Pradesh	228	132	121	3.1	0.0	0.1	810	0.4	0.5	621.6	86	88
Haryana	66	101	79	17.6	-0.3	-0.5	827	1	0.2	969.0	-16	-16
Jharkhand	330	279	233	19.8	-0.4	-0.5	900	-1	-0.3	424.0	-29	-22
Kerala	352	-34	-35	25.5	0.2	0.3	1114	3	4	514.2	33	8
Karnataka	129	-38	-35	23.5	-0.1	0.0	1080	3	3	308.4	-15	6
Meghalaya	282	51	5	17.3	-0.3	-0.4	886	2	1	431.5	-13	-28
Maharashtra	109	-8	14	23.0	-0.4	-0.2	1017	2	1	402.0	68	126
Manipur	172	-5	-16	15.6	-0.4	-0.5	899	1	0.3	565.5	-6	-19
Madhya_Pradesh	136	104	179	20.3	-0.6	-0.6	930	-0.2	-1	457.3	-0.3	-22
Mizoram	213	-12	-20	18.2	-0.7	-0.8	908	1	1	733.1	85	69
Nagaland	164	12	-7	16.3	-0.2	-0.2	887	2	1	269.0	28	14
Orissa	449	244	186	22.0	-0.3	-0.2	956	0.0	1	131.7	45	96
Puducherry	233	-51	-46	25.6	0.1	0.2	1062	2	2	473.8	51	49
Punjab	55	13	-3	17.3	0.0	-0.1	781	-1	-1	849.8	-23	-23
Rajasthan	37	73	149	19.7	-0.8	-0.9	918	2	1	656.7	35	14
Sikkim	284	155	125	5.8	0.3	0.0	898	-5	-4	526.6	100	94
Tamil_Nadu	271	-49	-48	25.9	0.2	0.3	1046	1	2	562.1	215	210
Tripura	224	-5	-11	20.9	-0.3	-0.5	868	-2	-2	683.2	96	65
Uttarakhand	264	227	239	8.2	0.6	0.6	854	1	1	621.8	-5	-14
Uttar_Pradesh	195	303	316	19.4	-0.3	-0.6	862	1	0.4	568.9	3	8
West_Bengal	360	236	121	21.0	-0.4	-0.4	883	-1	-0.1	523.3	25	4

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.10. Current season environmental indices for Kazakhstan, by province, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Akmolinskaya	124	44	29	-5.8	2.7	2.1	269	0.4	3	465.4	21	20
Karagandinskaya	100	11	8	-5.9	2.3	1.9	328	4	5	410.4	9	8
Kustanayskaya	126	37	22	-5.0	2.5	1.9	243	-1	0.4	511.8	24	24
Pavlodarskaya	77	8	-4	-5.3	3.9	2.9	255	3	5	382.6	11	6
Severo_kazachstanskaya	113	29	11	-5.4	3.1	2.6	217	1	3	483.7	24	25
Vostochno_kazachstanskaya	157	3	9	-6.1	3.7	3.0	344	4	4	419.0	19	18
Zapadno_kazachstanskaya	151	43	20	-1.6	1.1	1.0	262	-2	1	653.5	36	23

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.11. Current season environmental indices for Russia, by oblast, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
Bashkortostan_Rep.	210	31	18	-4.6	1.6	1.5	180	-6	-4	498.6	10	13
Chelyabinskaya_Oblast	109	1	-7	-4.9	2.4	2.0	200	-1	0.0	471.0	13	20
Gorodovikovsk	-1	-1	-1	-1	-1	-1	-1	-1	-1	836.7	11	6
Krasnodarskiy_Kray	196	-16	-18	-0.7	2.5	2.4	257	2	2	783.5	-14	-13
Kurganskaya_Oblast	105	1	-8	-5.3	2.7	2.1	184	2	3	479.9	15	21
Kirovskaya_Oblast	242	5	9	-3.3	2.0	1.8	120	6	5	528.2	12	14
Kurskaya_Oblast	162	-23	-14	0.3	0.5	0.5	210	-1	-1	742.2	6	8
Lipetskaya_Oblast	150	-22	-21	-0.4	0.7	0.7	209	4	6	708.5	7	9
Mordoviya_Rep.	178	-12	-12	-1.5	1.4	1.3	180	5	7	651.9	11	12
Novosibirskaya_Oblast	148	15	6	-5.8	4.8	3.8	182	4	4	447.7	20	21
Nizhegorodskaya_Oblast	187	-15	-12	-1.5	1.7	1.6	149	5	6	639.9	13	15
Orenburgskaya_Oblast	180	38	21	-3.6	1.5	1.3	225	-3	-1	559.9	14	15
Omskaya_Oblast	129	20	5	-6.0	3.9	3.3	175	3	4	445.4	15	20
Permskaya_Oblast	254	26	25	-5.3	1.7	1.5	125	1	0.3	427.7	5	9
Penzenskaya_Oblast	177	-9	-11	-1.6	1.2	1.1	198	2	5	642.2	11	11
Rostovskaya_Oblast	162	-18	-27	1.9	-0.6	-0.4	286	-3	-2	716.1	-3	-5
Ryazanskaya_Oblast	169	-17	-16	-0.8	1.2	1.0	185	8	9	686.2	9	10
Stavropolskiy_Kray	204	24	8	4.0	-1.2	-0.7	363	2	2	741.4	9	-1
Sverdlovskaya_Oblast	155	19	15	-5.6	2.1	1.9	147	3	3	424.7	6	11
Samarskaya_Oblast	168	11	3	-2.3	1.5	1.3	205	-0.3	3	612.2	13	14
Saratovskaya_Oblast	142	-4	-10	-1.2	0.9	0.9	235	-1	2	656.8	14	11
Tambovskaya_Oblast	156	-20	-22	-0.8	0.8	0.7	212	5	7	692.2	8	9
Tyumenskaya_Oblast	127	8	1	-5.9	3.2	2.6	160	4	5	434.0	11	16
Tatarstan_Rep.	192	3	3	-2.5	1.8	1.7	165	1	2	597.1	12	14
Ulyanovskaya_Oblast	157	-8	-10	-1.8	1.8	1.6	190	2	4	632.9	15	15
Udmurtiya_Rep.	245	22	22	-4.0	1.7	1.5	131	2	2	527.6	10	13
Volgogradskaya_Oblast	169	17	5	0.3	0.2	0.2	260	-3	-1	739.8	17	13
Voronezhskaya_Oblast	151	-15	-18	0.1	0.2	0.3	240	2	3	727.2	6	7

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

**Table A.12. Current season environmental indices for the United States, by state, current value and departure from 5YA and 12YA**

	Rainfall total			Temperature average			PAR accumulation			Biomass accumulation		
	Current (mm)	Departure (%)		Current (°C)	Departure (°C)		Current (MJ/m <sup>2</sup> )	Departure (%)		Current (gDM/m <sup>2</sup> )	Departure (%)	
		5YA	12YA		5YA	12YA		5YA	12YA		5YA	12YA
<b>Arkansas</b>	435	-8	-11	8.1	-1.2	-1.6	624	3	4	1229.8	3	0.3
<b>California</b>	61	-75	-76	7.9	0.1	0.1	650	12	13	260.1	-55	-55
<b>Idaho</b>	196	13	5	-2.7	-0.9	-0.9	471	9	9	517.6	-1	-3
<b>Indiana</b>	427	23	12	2.7	-1.6	-2.1	497	3	3	893.9	-7	-11
<b>Illinois</b>	364	9	7	2.3	-1.8	-2.1	512	4	4	875.0	-5	-9
<b>Iowa</b>	263	25	32	-0.9	-2.0	-2.4	492	4	5	708.8	4	2
<b>Kansas</b>	122	-23	-28	3.8	-1.0	-1.3	618	5	5	462.1	-18	-24
<b>Michigan</b>	395	41	29	-0.9	-2.0	-2.3	380	-1	-0.5	702.7	-8	-10
<b>Minnesota</b>	296	80	83	-5.7	-2.7	-3.3	388	4	3	512.3	0.4	-5
<b>Missouri</b>	273	-12	-16	4.3	-1.4	-1.7	569	5	5	924.5	2	-5
<b>Montana</b>	183	86	94	-2.5	-0.3	-0.6	403	6	5	557.9	28	34
<b>Nebraska</b>	172	38	43	1.1	-0.4	-0.7	543	4	4	644.1	34	33
<b>North Dakota</b>	253	153	172	-6.1	-2.0	-2.5	386	7	6	472.9	14	17
<b>Ohio</b>	384	14	12	2.9	-1.0	-1.5	478	3	4	905.2	-4	-8
<b>Oklahoma</b>	185	-18	-30	7.3	-1.2	-1.6	662	2	4	704.0	-3	-15
<b>Oregon</b>	128	-63	-64	2.4	-1.0	-1.0	433	15	16	512.5	-30	-31
<b>South Dakota</b>	261	137	160	-1.6	-1.0	-1.4	454	3	2	654.0	51	57
<b>Texas</b>	227	9	-12	11.6	-1.2	-1.3	729	0.4	3	633.0	8	-10
<b>Washington</b>	169	-54	-53	1.6	-0.7	-0.8	345	15	13	583.8	-18	-18
<b>Wisconsin</b>	365	55	53	-3.5	-2.7	-3.2	393	-1	-1	598.0	-11	-14

Note: 5YA/12YA= five-year and twelve-year averages, respectively, for the October-January periods between October 2001 (12YA) or 2008 (5YA) and January 2013.

## Data notes and bibliography

A note on the data: Careful attention has been paid to the appropriate acknowledgement of the many sources for the current CropWatch bulletin and all references are listed below. In the event that a source is not properly acknowledged, this is unintentional; when brought to our attention this error will be rectified in the next edition of the bulletin.

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## Online resources

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This bulletin is only part of the CropWatch resources available. Visit [www.cropwatch.com.cn](http://www.cropwatch.com.cn) for access to additional resources, including the methods behind CropWatch, country profiles, and other CropWatch publications. For additional information or to access specific data or high-resolution graphs, simply contact the CropWatch team at [cropwatch@radi.ac.cn](mailto:cropwatch@radi.ac.cn).

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### Online Resources posted on [www.cropwatch.com.cn](http://www.cropwatch.com.cn):

- ✓ **A. Definition of spatial units**  
A description of the four spatial levels of analysis: Crop Production System Zones (CPSZ), Major Production Zones (MPZ), key countries, and sub-national administrative areas.
- ✓ **B. Methodology**  
Overview of CropWatch data sources and methods.
- ✓ **C. Time series of indicators**  
Additional time series of environmental indices and crop indicators.
- ✓ **D. Country profiles**  
Short profiles for each of the 30 countries and China, highlighting key facts of interest to agriculture.
- ✓ **E. Country long term trends**  
Quick overview of average crop area, yield, and production values for maize, rice, soybean, and wheat for recent years, along with long-term (2001-12) trends (based on FAOSTAT data).

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The latest CropWatch bulletins introduce the use of several new and experimental indicators. We would be very interested in receiving feedback about their performance in other countries. With feedback on the contents of this report and the applicability of the new indicators to global areas, please contact:

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