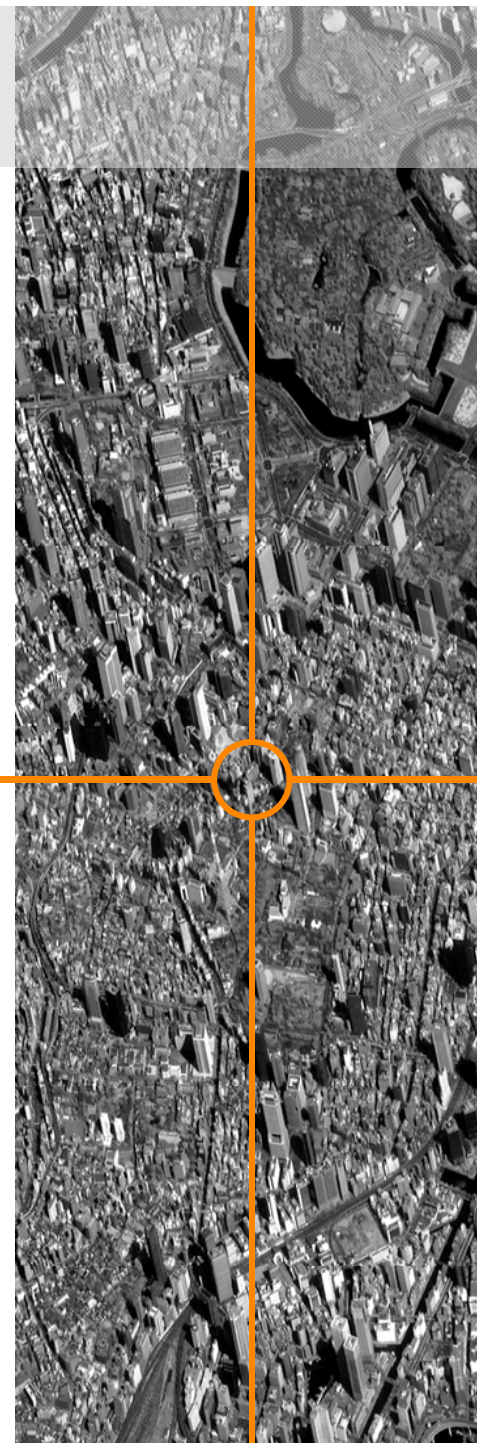


GEO GLAM等に向けた 稲作等の作況見通し情報の利用

- 宇宙技術を用いた農業市場向けの情報提供について -

平成26年6月9日
事業戦略室 農業チームリーダー
奥村 俊夫



- ◆ 農業気象情報のインテリジェンス化
 - ◆ 保険利用事例
 - ◆ 農業市場事例
- ◆ 衛星農業気象情報を活用した業務事例
- ◆ 衛星農業気象情報活用の今後の展開

農業気象情報のインテリジェンス化(保険利用事例)

「ビッグデータによる気候予測のスタートアップ、Climate Corporationをアグリビジネスの巨人モンサントが11億ドルで買収」 (2013年10月3日 TechCrunchより <http://jp.techcrunch.com/>)

The screenshot shows a news article on the Engadget website. The main headline is "ビッグデータによる気候予測のスタートアップ、Climate Corporationをアグリビジネスの巨人モンサントが11億ドルで買収". The article text includes: "Monsantoのアプレスリリースでは買収金額は9億3000万ドルとなっているが、投資家からの情報によると、Climate Corporationの従業員引き止めのための優遇給金などを加えた買収費用総額は10億ドルを超えるという。" and "Climate Corporationへの投資家にはFounders Fund、Khosla、Google Ventures、NEA、Index Ventures、Atomicaが含まれる。このスタートアップは機械学習を利用してビッグデータを解析し、気候変動の予測と農作物の生産のために必要な情報を提供している。" It also mentions that the acquisition is expected to expand on the Climate Corporation's leadership in the area of data science.

The screenshot shows the Monsanto Newsroom page. The headline is "Monsanto to Acquire The Climate Corporation, Combination to Provide Farmers with Broad Suite of Tools Offering Greater On-Farm Insights". The article text includes: "Investment creates industry-leading capabilities to meet the needs of farmers in the agriculture information age" and "Combination to put more information in farmers' hands to increase productivity, utilize resources more efficiently; expands near and long-term opportunity for Monsanto's business and Integrated Farming Systems platform". The acquisition is dated Wednesday October 2, 2013. A quote from Hugh Grant, chairman and chief executive officer for Monsanto, states: "The Climate Corporation is focused on unlocking new value for the farm through data science". The URL <http://www.monsanto.com> is visible at the bottom.

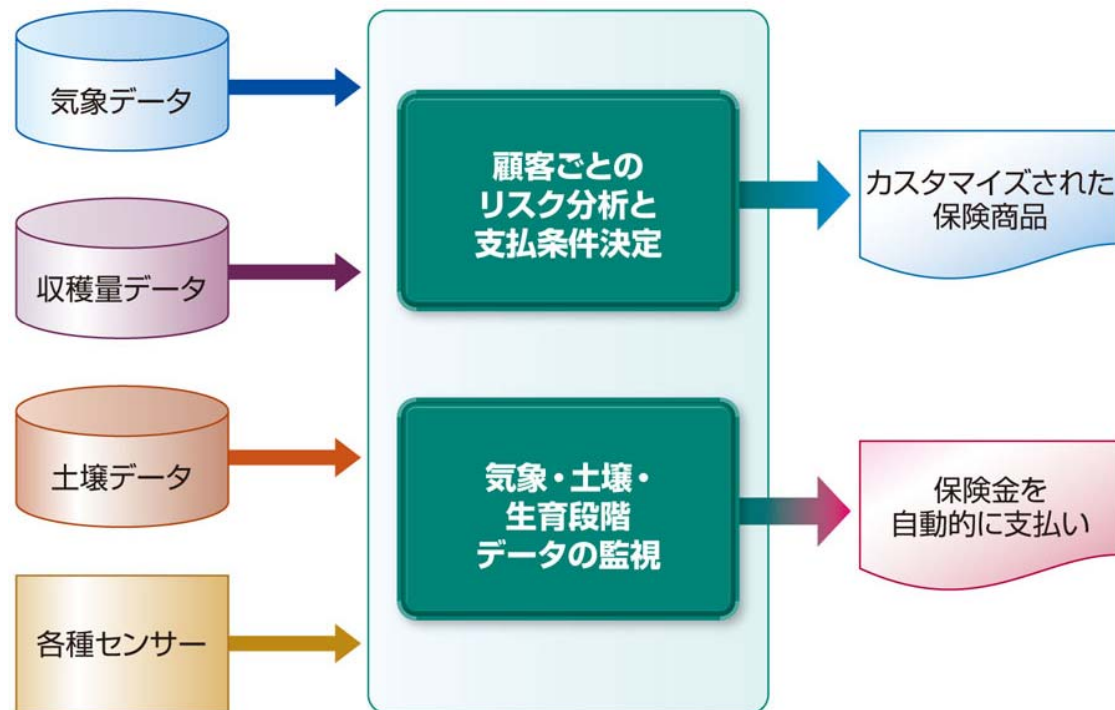
農業気象情報のインテリジェンス化(保険利用事例)

◆ Total Weather Insurance :

掛け率から支払いまで自動化

気象による収穫量の変動リスクを計算するため、米国農務省が提供する過去60年の収穫量データと気象サービスが提供する過去データを利用して相関を分析。

さらにNOAAが提供するリアルタイムの気象情報や先の気象予報を、農業向けにカスタマイズして活用。



<http://itpro.nikkeibp.co.jp/> より

農業気象情報のインテリジェンス化(保険利用事例)

「ビッグデータによる気候予測のスタートアップ、Climate Corporationをアグリビジネスの巨人モンサントが11億ドルClimate Corporationの気候変動監視テクノロジーが地球温暖化などマクロ的スケールにおけるリスクマネージメントに大きく寄与すると考えている。(TechCrunchより)

農業気象情報がインテリジェンスとしてアグリビジネスに貢献

農業気象情報の収集に地球観測衛星は有用な手段 (NOAA、米国農務省は、世界の衛星を活用)

農業気象情報のインテリジェンス化(農業市場事例)

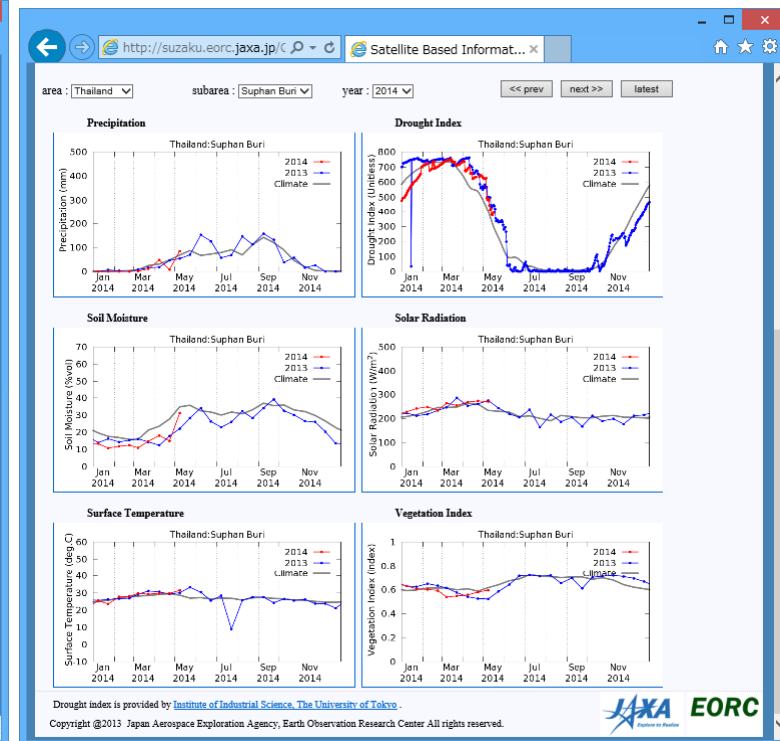
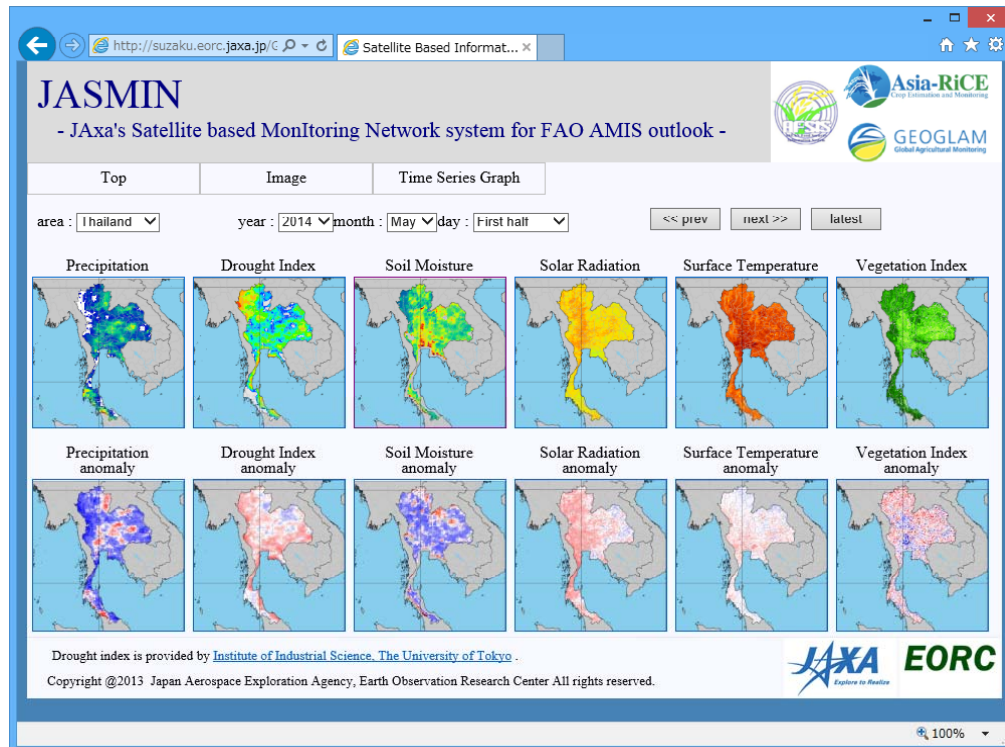
- ◆ 農業市場の乱高下を防ぐために、透明性のある標準手法での作況情報を提供 (世界食糧機関FAOの農業市場情報システムAMIS)
- 地球観測衛星による農業気象情報を用いた作況見通しの提供



衛星農業気象情報を活用した業務事例

◆ 衛星農業気象情報提供Webシステム (JASMIN)

JAXA's Satellite based Monitoring Network system for FAO AMIS outlook
(JAXAにおいてアジアの稲作の作況を判断する情報として農業気象情報を公開するシステム)



衛星農業気象情報を活用した業務事例

提供情報	提供間隔*	空間分解能	提供期間 (平年値)	使用衛星データ
降水量 Precipitation	15日積算	10 km	2002- (2002-2012)	GSMaP (GCOM-W1, TRMM, MTSAT etc.)
日射量 Solar Radiation	15日平均	5 km	2007- (2007-2012)	MODIS
地表面温度 Land Surface Temperature	15日平均	5 km	2002- (2002-2012)	MODIS
土壌水分 Soil Moisture	15日平均	50 km	2009- (2002-2012)	AMSR-E, WINDSAT
干ばつ指数 Drought Index	毎月 15日、月末	10 km	2003- (2003-2012)	GSMaP, MTSAT
植生指数 Vegetation Index	毎月 15日、月末	5 km	2002- (2009-2012)	MODIS

* 提供間隔は月2回。

衛星農業気象情報を活用した業務事例

JASMIN

- Jaxa's Satellite based MonIToring Network system for FAO AMIS outlook -



Top

Image

Time Series Graph

area : Thailand

year : 2014 month : May day : Second half

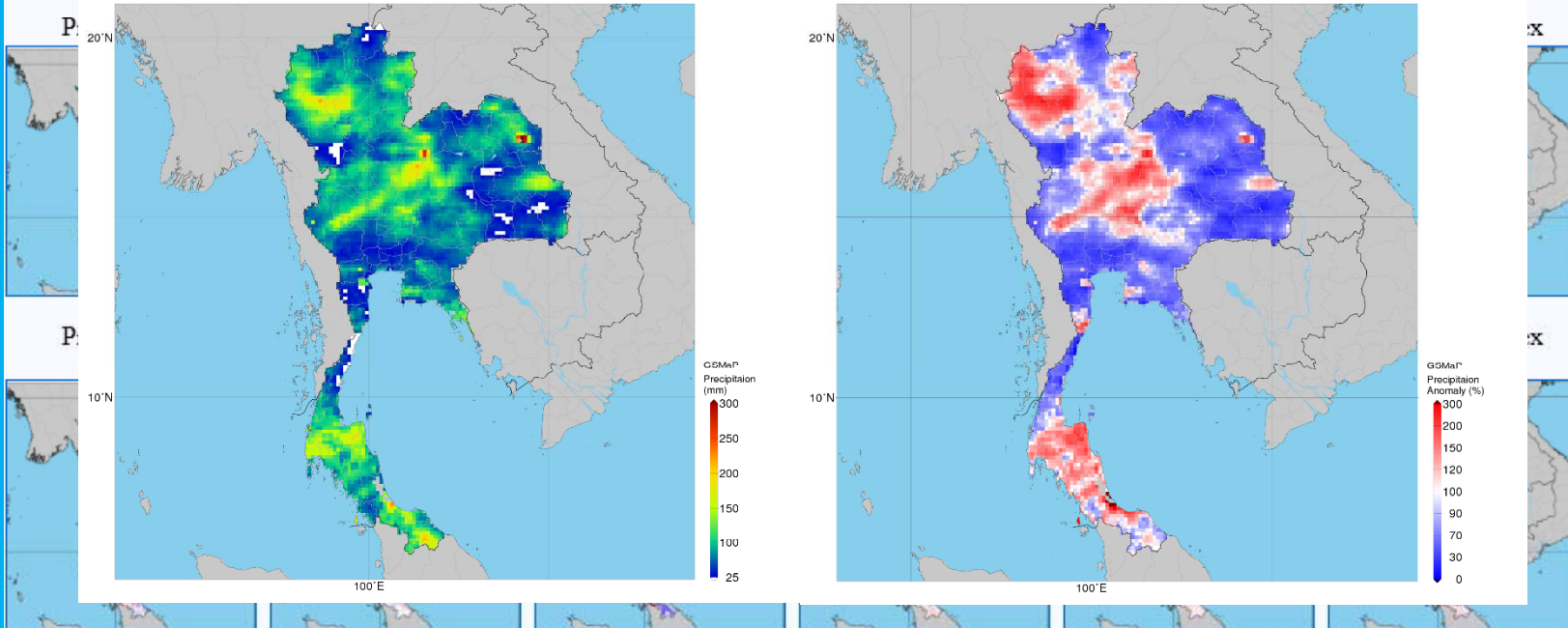
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latest

2014/05/16 - 2014/05/31

2014/05/16 - 2014/05/31

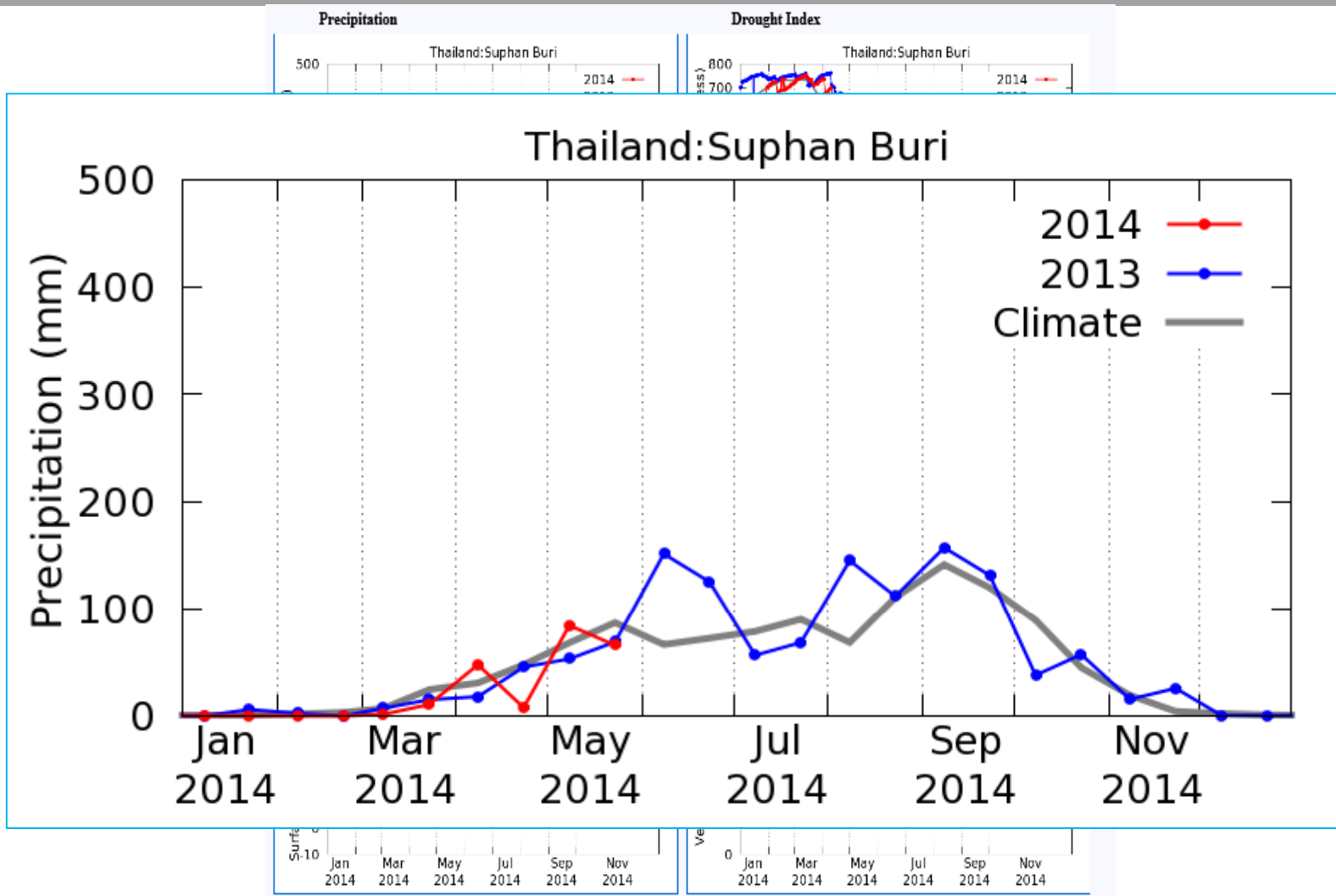


Drought index is provided by [Institute of Industrial Science, The University of Tokyo](#).

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衛星農業気象情報を活用した業務事例



衛星農業気象情報を活用した業務事例

◆ GEOGLAM consultation meeting

主催: AFSIS, JAXA

日付: 2013年10月18日

場所: バンコクAFSIS会議室

参加機関: AFSIS、各国農業統計機関、JAXA、RESTEC

概要:

- 衛星農業気象情報の読み解き方を各国の農業統計官にレクチャー
- 対象国はインドネシア、タイ、ベトナム
- 衛星農業気象情報を参照し、作況見通しを毎月20日までに報告(AFSIS)
- 作況見通しと衛星農業気象情報の関係をレビュー後、毎月23日までにGEO-GLAMを通じてFAO AMISに提出(Asia-RiCEチーム活動)



衛星農業気象情報を活用した業務事例

◆ 4月の作況見通しの事例；

Rice Growing Outlook for the month of April 2014

Indonesia

On April 2014, the rice plants in Indonesia are entering the harvesting stage of planted rice on December 2013, while rice planted on January 2014 is entering to the early generative phase or early ripening stage. Since rice planted on February 2014 is entering the early generative phase or the reproductive stage. In general, 2013's crops condition still has a similar condition for the past five years.

The rainfall in April 2014 is mostly moderate in most regions of Indonesia. While the rainfall is expected to be very ideal and sufficient to support the growth of rice plants, particularly to be optimum on reproductive phase.

The level of flood in Java is predicted no flooding, however, it is looked minor flood in northern part of Banten, West Java and Central Java.

2014年4月、全般的に作況は過去5年と同等。4月の降水量は大半の地域で平年並み。ジャワ島では洪水の予報はないが、一部で小規模な洪水が見受けられる。

衛星農業気象情報を活用した業務事例

◆ 4月の作況見通しの事例；

Rice Growing Outlook for the month of April 2014

Vietnam

April is the last month to sown paddy for the winter-spring season in the North and the South regions. The North of Vietnam has **sown 98.6%** of the last-year area. The South of Vietnam **sowed 98.4%** of the last-year area. The Mekong River Delta region has harvested nearly 800 thousand hectares, however only accounting for approximately **60% of the last-year area**. The main reasons of the **lower sowed** area and **slower speed** of the harvest are the **flood** in January 2014, and the **cold weather**.

4月は冬-春期の播種の最後の月で、**昨年の作付エリアの98%程度で播種**が行われた。メコン川デルタ地帯では、**昨年の作付エリアの60%程度しか収穫**されていないが、80万ヘクタールほどが刈り取られた。

この播種の低下と収穫の遅れの主な原因は、**1月の洪水と寒い天候**のためである。

衛星農業気象情報を活用した業務事例

◆ 4月の作況見通しの事例；

Rice Growing Outlook for the month of April 2014

Thailand

In this month, Thailand is expected intake of harvest of the first rice at the rate of 47 percent of the total country production. The yield is not very good due to the cold weather in the beginning of the year which gave impacts on the rice condition. To this condition, some areas were reaped later than normal. On the other hand regarding the rice field in the Southern region which are located outside of irrigated area, the farmers were encountered with drought which made the rice growth poor. In Western region, the report on pests was received with low damages. Rice in the lower Northern and Central regions were in the vegetative stage and have not been damaged by drought since they are mostly grown inside of the irrigated area.

1期作目の収穫が始まったが、年始めの寒い天候の影響のため収量はそれほど良くない。南部の灌漑設備がない地域では干ばつにより稲の生育が不十分である。西部では害虫による小さな被害の報告を受けている。北の下部および中部地域は、大半が灌漑地域のため干ばつの被害もなく、稲は生育している。

衛星農業気象情報を活用した業務事例

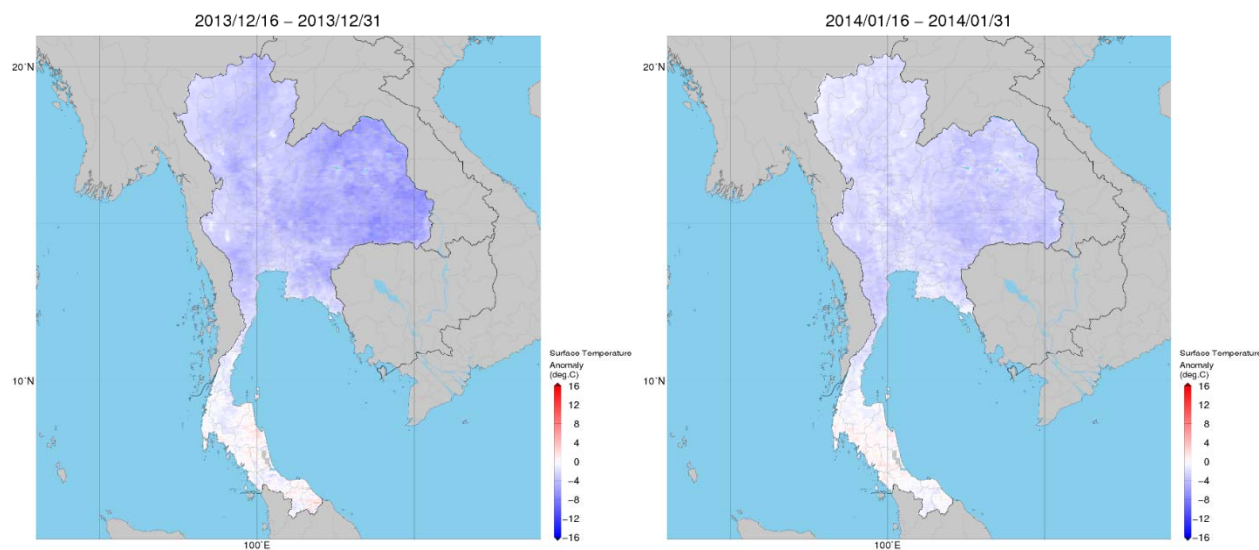
◆ 衛星農業気象情報との関係確認

Thailand

In this month, Thailand is expected to harvest the second rice to be about 47 percent of the country production. Yield is not so good due to the cold weather in the beginning of the year which is impact on the rice condition. To this condition, there are some areas which harvested later than normal.

年始めの寒い天候の影響のため収量はそれほど良くない。

12月後半と1月後半の地表面温度anomaly



衛星農業気象情報を活用した業務事例

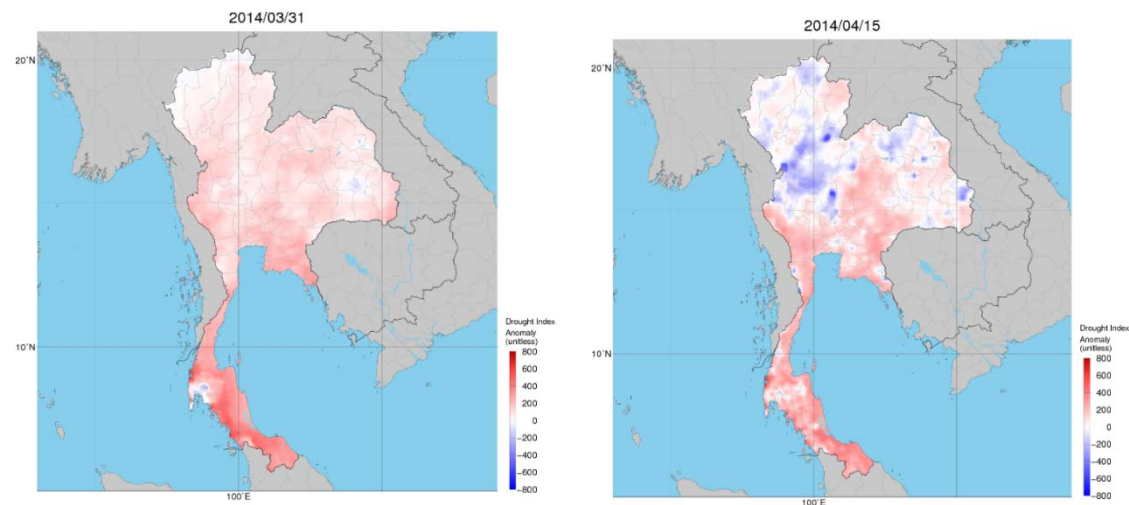
◆ 衛星農業気象情報との関係確認

Thailand

On the other hand regarding the rice field in the Southern region which are located outside of irrigated area, the farmers were encountered with **drought** which made the rice growth poor.

南部の灌漑設備がない地域では**干ばつ**により**稲の生育が不十分**である。

3月下旬と4月中旬の干ばつ指数anomaly



衛星農業気象情報を活用した業務事例

◆ 5月のAMIS Market Monitor No18 (4月作況見通し)

Market Monitor
No. 18 - May 2014
www.amis-outlook.org

The Market Monitor is a product of the Agricultural Market Information System (AMIS). It covers the international markets for wheat, maize, rice and soybeans, giving a synopsis of major market developments and the policy and other market drivers behind them. The analysis is a collective assessment of the market situation and outlook by the ten international organizations that form the AMIS Secretariat. Ultimately, the report aims at improving market transparency and detecting emerging problems that might warrant the attention of policy makers.

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Futures Markets 8
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Explanatory Notes and Calendar 11

World Supply-Demand Outlook
No. 18 - May 2014

Early outlook for major cereals points to a relatively stable supply amid a rising consumption. However, weather uncertainty and tensions in the Black Sea region dampen the generally favourable outlook. In addition, with increasing chances of El Niño hampering cottonseed in the critical growing months ahead, markets could become more volatile.

Commodity	2013/14			2014/15		
	Production	Stocks	Consumption	Production	Stocks	Consumption
WHEAT	687	240	687	687	240	700
Maize	851	889	881	881	871	879
Soybean	479	702	451	702	688	689
Rice	137	351	313	144	139	139
Oilseeds	177	187	139	187	179	180

WHEAT
Wheat production in 2014 to decline by 2 percent from last year's record harvest with most of the reduction in Canada. Utilization in 2014/15 to increase for the first time since 2011/12 on stronger feed use, especially in China and in the EU. Trade in 2014/15 to remain close to the record volume in 2013/14, sustained by continued strong import demand in Asia. Stocks (ending in 2015) up slightly from their opening levels but exportable supplies tighten on lower inventories in Canada, Ukraine and the United States.

MAIZE
Maize production in 2014 to decline by 4 percent from the 2013 record, mostly on lower output in the United States driven by reduced plantings. Utilization in 2014/15 to expand at a slower pace than in 2013/14 but would exceed the 20-year trend for the second consecutive season mainly on strong growth in China. Trade in 2014/15 to fall below the record in 2013/14, reflecting the expectation of smaller imports by the EU given the prospect of large supply. Stocks (ending in 2015) to decline by 4 percent with the bulk of the accumulated decrease in China and in the United States.

SOYBEAN
Soybean 2013/14 production forecast revised slightly on account of an upward revision in Brazil. Global output set to reach an all-time record, though falling short of earlier expectations. Utilization forecast for 2013/14 about unchanged, as downward revisions in US and Argentina are compensated by higher estimates elsewhere. Production in 2014 to reach new record on higher US exports, destined to the EU, China and other Asia. Interestingly, US imports could also be record-high. Stock forecast (2015) carry-over) adjusted upward, confirming v/y recovery in global inventories at around 13%.

Crop Monitor*
No. 18 - May 2014

Crop Conditions in AMIS countries (as of April 28th)

Highlights
Wheat: Overall growing conditions are mostly favourable in the northern hemisphere and in many western regions development is ahead of average due to warm temperatures. However, concern continues in the US southern plains due to persistent dry conditions. In both US and Canada there are delays due to the cold winter and spring. Rice: Conditions are mixed. Production prospects are below average in Vietnam and Thailand, and are average in the Philippines. Maize: In the southern hemisphere the season is coming to a close. In Argentina conditions are favourable and in Brazil, production is down due to reduced planted area. In the hemisphere the season has started and so far Soybean: Overall prospects are favourable. In Argentina conditions are still good as the season draws to a close. In Brazil, despite the climatic adversity during the season, prospects are above average due to increased planted area.

El Niño situation update
As noted in the previous issue, there are prospects for development of El Niño conditions in late summer or autumn of the Northern Hemisphere. April outlook (from the World Meteorological Organization (WMO), the International Research Institute for Climate and Society (IRI), the U.S. National Oceanic and Atmospheric Administration (NOAA), and the Australian Bureau of Meteorology) continues to indicate this possibility, with the probability of occurrence rising above 60%, an increase since last month. Though neutral conditions continue to prevail, March and April saw ocean warming that characteristically precedes El Niño.

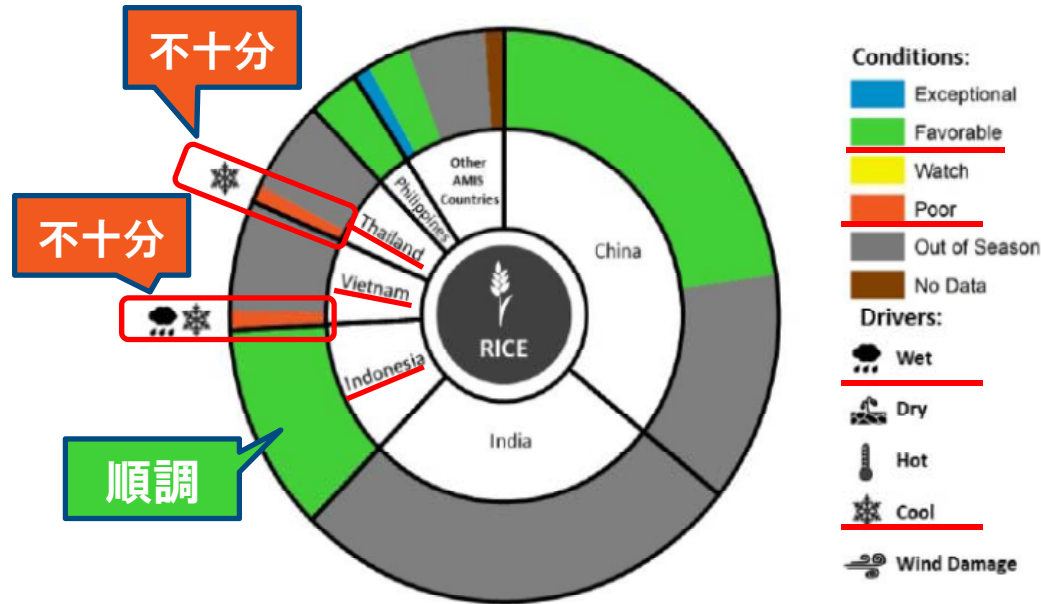
Wheat: In the northern hemisphere winter wheat conditions are favourable. In Russia conditions are mostly good and winter wheat development is between 1 to 2 weeks ahead of average. In central growing areas, warm and dry conditions developed in mid-April and precipitation is needed in coming weeks. In Ukraine, conditions are generally good. Crop development is ahead of average due to the warmer than usual weather. Following a precipitation deficit, April rains and favorable temperatures supported crop development in the majority of the country. Moisture remains low in parts of the country and precipitation is needed in coming weeks. In the EU prospects are generally favourable, and close to 2013. Warmer-than-usual weather continued, leading to advanced vegetative development. The drier spring compensated for the very wet winter and was favourable for fieldwork and sowing of spring wheat, with the exception of Ireland and Scotland, Poland, the Baltic countries, Romania, Bulgaria, Spain and Italy have very favourable conditions. In contrast market scarcity is an emerging concern in eastern France and the Benelux. In Canada, conditions are still favourable, however continued below-normal temperatures and precipitation in April delayed and attenuated the annual spring snowmelt, which resulted in some flooding and delays in spring wheat seeding. Delays range from 3 weeks to less than a week. Areas of low soil moisture persist in southern Alberta and Saskatchewan, and developed in southern Ontario. In the US, winter wheat conditions are mixed and planted area is slightly down relative to last season. Drought in the Southern Great Plains continues to be a significant concern. Other winter wheat growing areas have closer to normal conditions and spring wheat planting has started. In Mexico the crop is in the maturity stage and a good harvest is expected across the country. Decreased production is expected in the northeastern region due to the strong March winds and lack of cool temperatures. In India wheat harvest is progressing and very good prospects are expected. In China conditions are generally favourable for the reproductive to maturing winter wheat. Widespread rainfall maintained good moisture conditions in the majority of growing regions. Pockets of dryness remain in north-eastern, southern and central regions in South West China. Development is ahead of normal by 1 to 2 weeks. In Brazil, wheat planting started in the major producing states and will continue through June. Area is expected to increase as a result of good market prices.

Rice: Conditions are mixed. In Indonesia conditions are close to average for the winter planted crops, which are in the reproductive to harvesting stages. Moderate April rainfall is supporting development in most regions. In Vietnam prospects for the fall-winter rice are lower than last year due primarily to lower sowing area and delayed harvest, which are a result of floods in January and cooler than usual weather. April was the last month for sowing paddy rice for the winter-spring season and area sown is below last year's area. In Thailand prospects remain below average for the second rice crop, primarily due to the cold weather in the beginning of the year as well as due to dry conditions parts of the country. As a result harvest has also been delayed. In China conditions are generally good. Recent precipitation boosted moisture supplies for the early crop rice particularly in central and southern growing regions. In Brazil prospects are good. Harvest is complete, and production is higher relative to last year due to the increase in planted area and favourable weather. In the EU field preparation and sowing is ongoing with favourable conditions in southern Europe (Spain, Italy, Greece, France).

市場関係者など衛星に知見のない世界中の人に作況を可視化して提供

衛星農業気象情報を活用した業務事例

◆ 5月のAMIS Market Monitor No18 (4月作況見通し)



Rice: Conditions are mixed. In Indonesia, conditions are close to average for the winter planted crops, which are in the reproductive to harvesting stages. Moderate April Rainfall is supporting development in most regions. In Vietnam prospects for the fall-winter rice are lower than last year due primarily to lower sown area and delayed harvest, which are a result of floods in January and cooler than usual weather. April was the last month for sowing paddy rice for the winter-spring season and area sown is below last years' area. In Thailand prospects remain below average for the second rice crop, primarily due to the cold weather in the beginning of the year as well as due to dry conditions parts of the country. As a result

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市場関係者など衛星に知見のない世界中の人に作況を可視化して提供

Europe (Spain, Italy, Greece, France).

衛星農業気象情報活用の今後の展開

- ◆ 衛星などによる農業気象情報のインテリジェンスとしてアグリビジネス、各国の食料安全保障としての活用が広がっている
- ◆ JASMINを用いて我が国が主導するAsiaRiCEチーム活動でも、食料安全 保障での利用に向けた作業が始まっている
- ◆ 農業気象情報やそこから作成された作況予測情報は、情報利用者の早期アクションに寄与する