A photograph of three men in business attire walking through a lush green rice field. The man in the center is looking back towards the other two. The background shows a clear blue sky and distant hills.

**The Early Warning Information on
Extreme Weather provided by JMA
and
a Pilot Project to develop an early
warning system to mitigate cold/hot
damage to rice production**

Noritake NISHIDE

*Director-General of Forecast Department
Japan Meteorological Agency (JMA)*

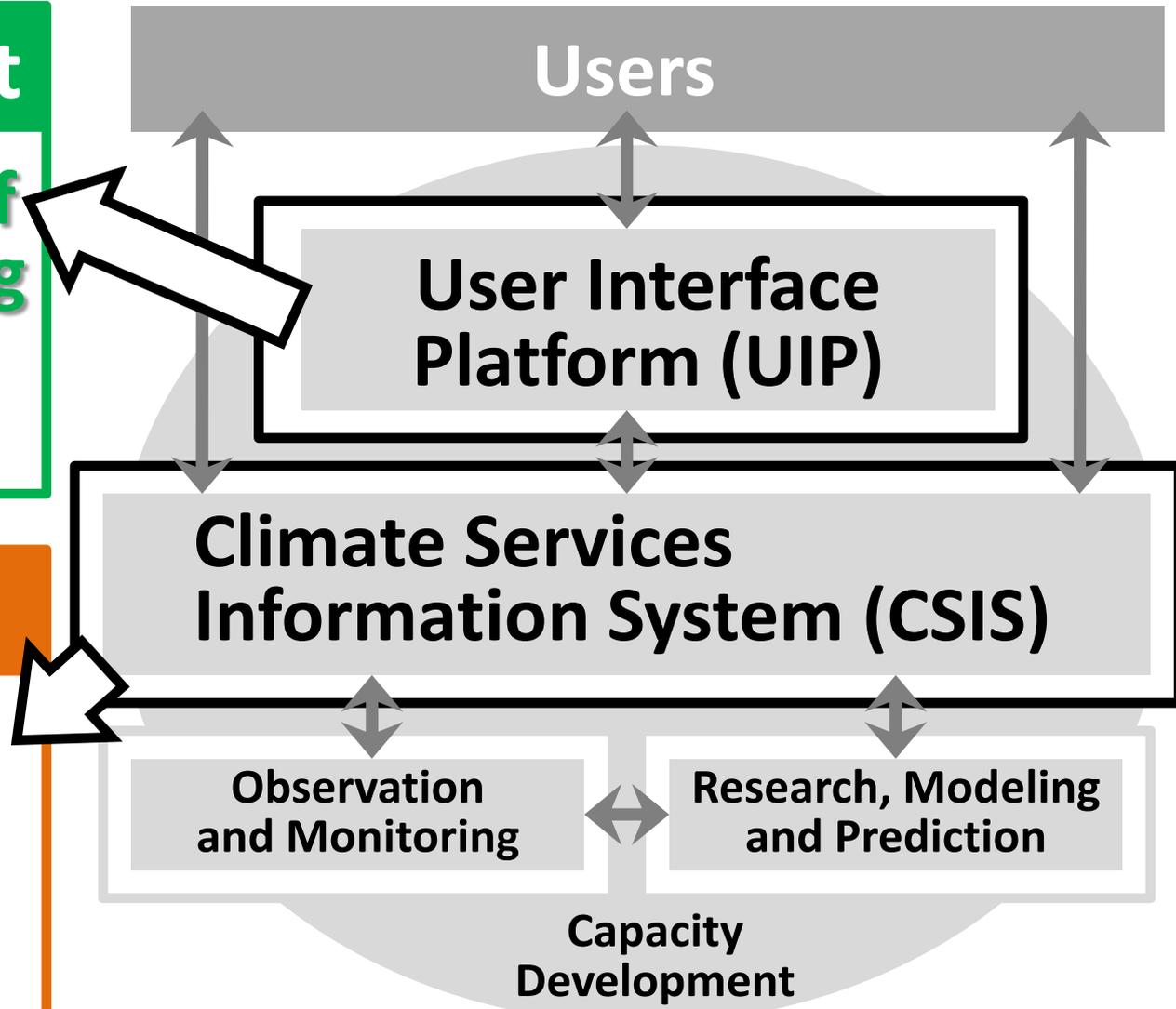
Introduction

2. Pilot Project

Development of an early warning system for agriculture

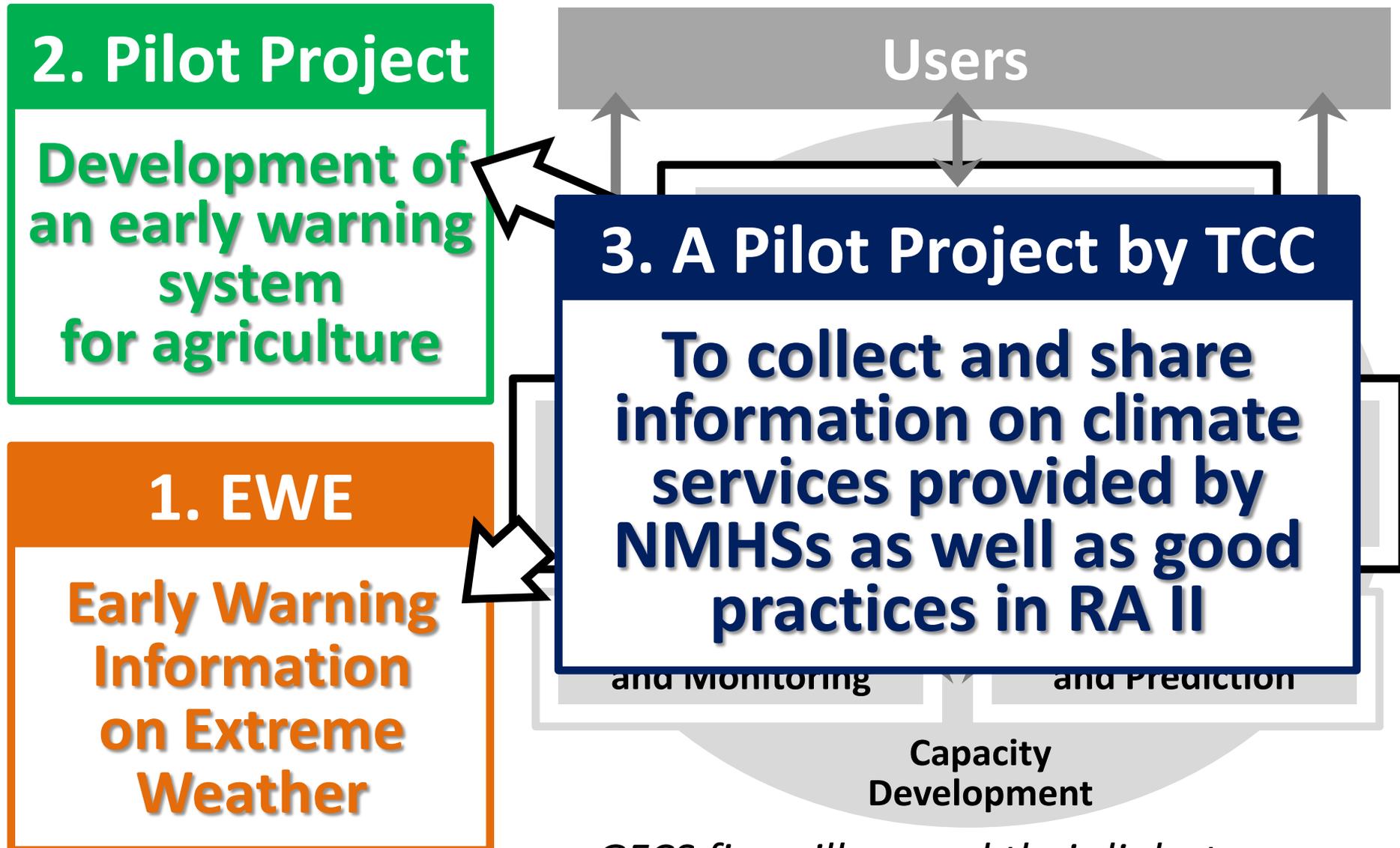
1. EWE

Early Warning Information on Extreme Weather



GFCS five pillars and their links to users

Introduction



GFCS five pillars and their links to users

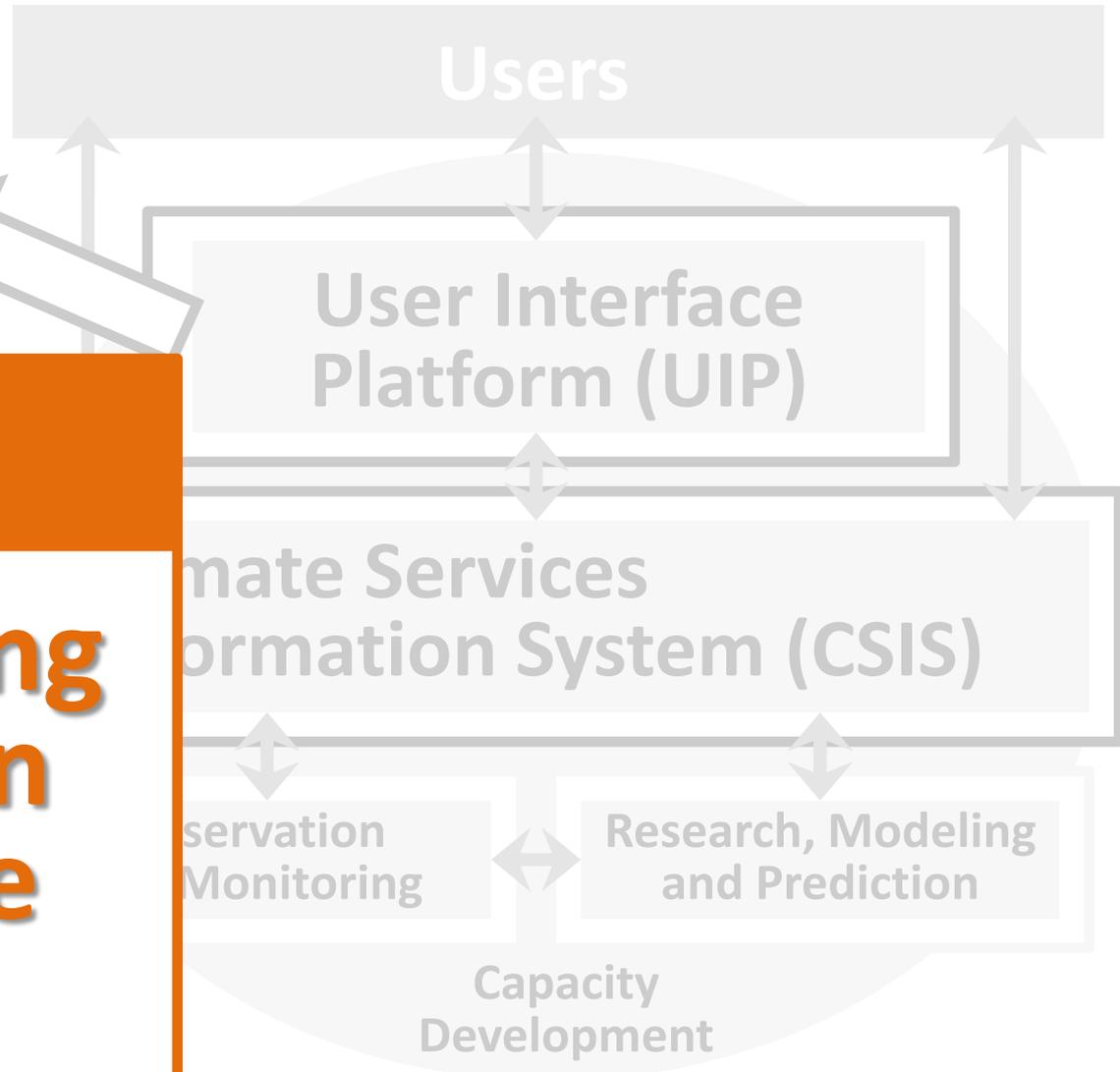
Introduction

2. Pilot Project

Development of an early warning system

1. EWE

Early Warning Information on Extreme Weather



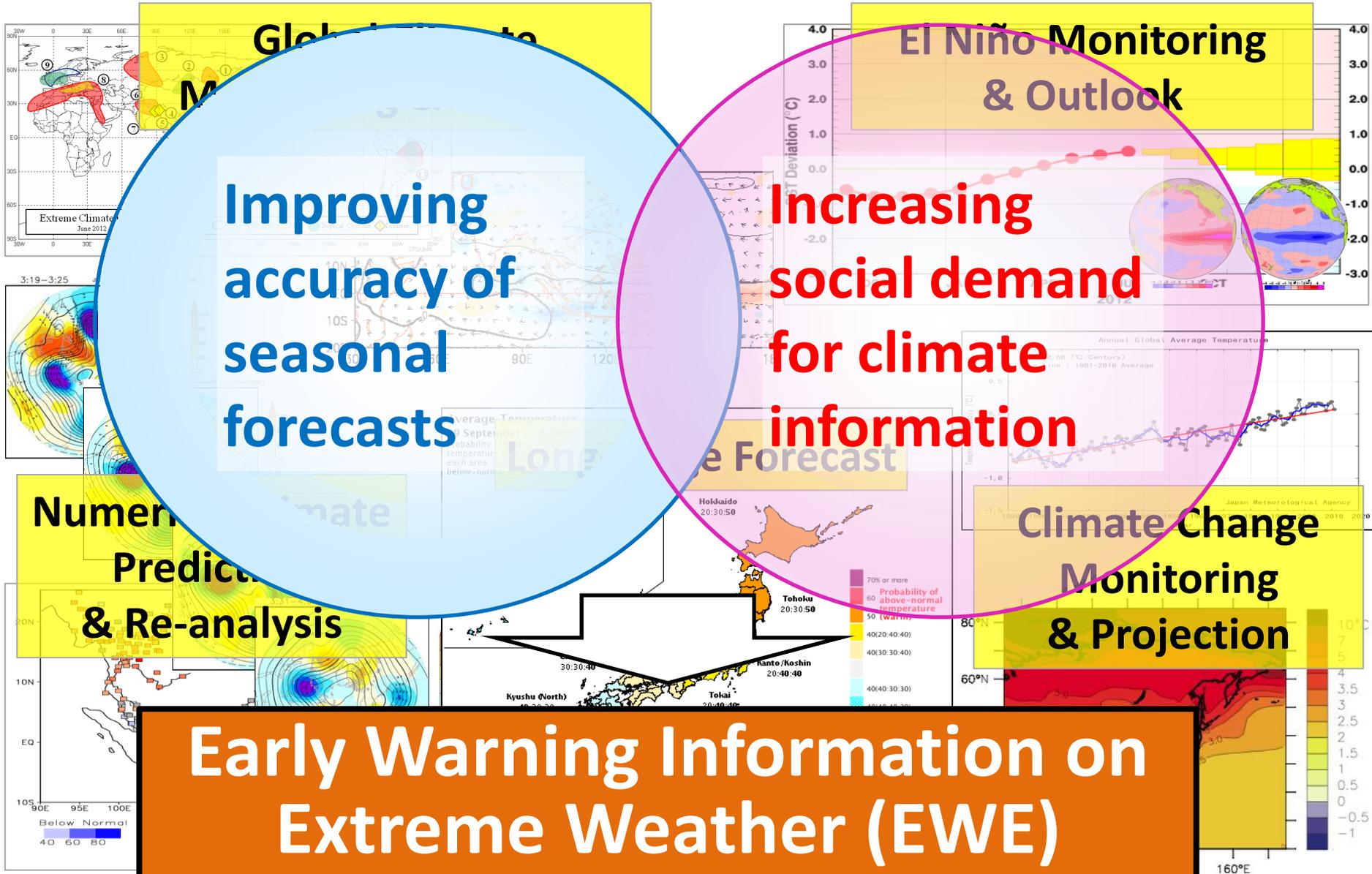
GFC5 five pillars and their links to users

Background for EWE

Improving accuracy of seasonal forecasts

Increasing social demand for climate information

Early Warning Information on Extreme Weather (EWE)



Early Warning Information on Extreme Weather

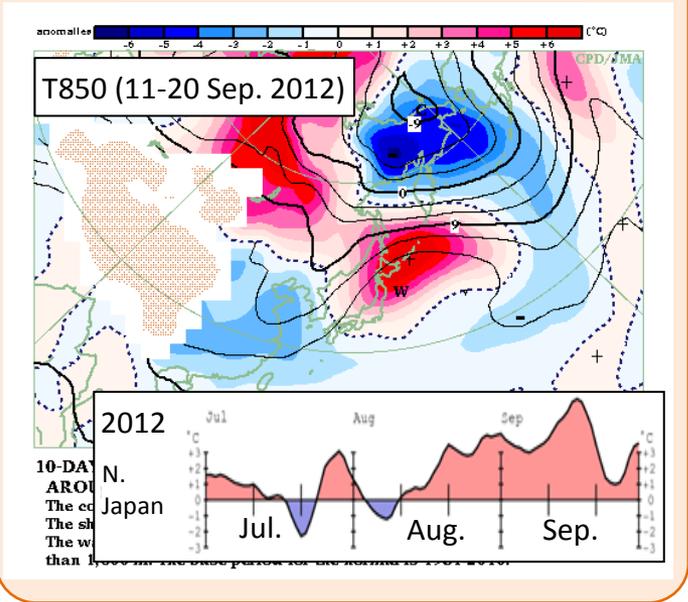
date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Tu	Wd	Th	Fr	Sa	Su	Mn	Tu	Wd	Th	Fr	Sa	Su	Mn	Tu

Issue

Weekly forecast

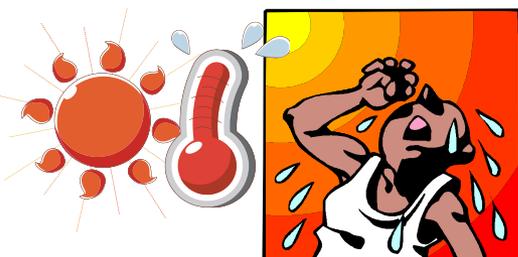
Early Warning Information on Extreme Weather (EWE)
 - Persistent **Heat wave** & **Cold spell** -

Heat wave



Users can take actions for preparedness to mitigate adverse impacts by extremely high/low temp.

Application of EWE in Energy sector



EWE

Expected **T average**
for the week after next

↓ (Statistical relation)

Expected **T maximum**
for the week after next

Provider

JMA

User

ANRE*

**Electric
Power
Companies**

Application

Electricity demand forecast
for the week after next

* the Agency for Natural Resource and Energy of Japan

Application of EWE in Energy sector

In summer 2012, electric power companies in Japan issued **Electricity Demand Forecast** for their responsible areas, and called people **to save electricity**.

翌々週の見通し(6月29日(金)想定)	
(万kW)	
7月9日(月)～13日(金)	
予想最大電力	4,470
ピーク時供給力	5,372
使用率	83%

※予想最大電力は、気象庁の予測値(31.8℃ 期間中の日最高気温の最高値)をもとに算定しています。

Electricity Demand-Supply Outlook for the Week after Next (As of Friday, June 29)

(x 10 MW)

Monday, July 9 – Friday, July 13	
Max. demand forecast	4,470
Max. supply capacity	5,372
Consumption rate	83%

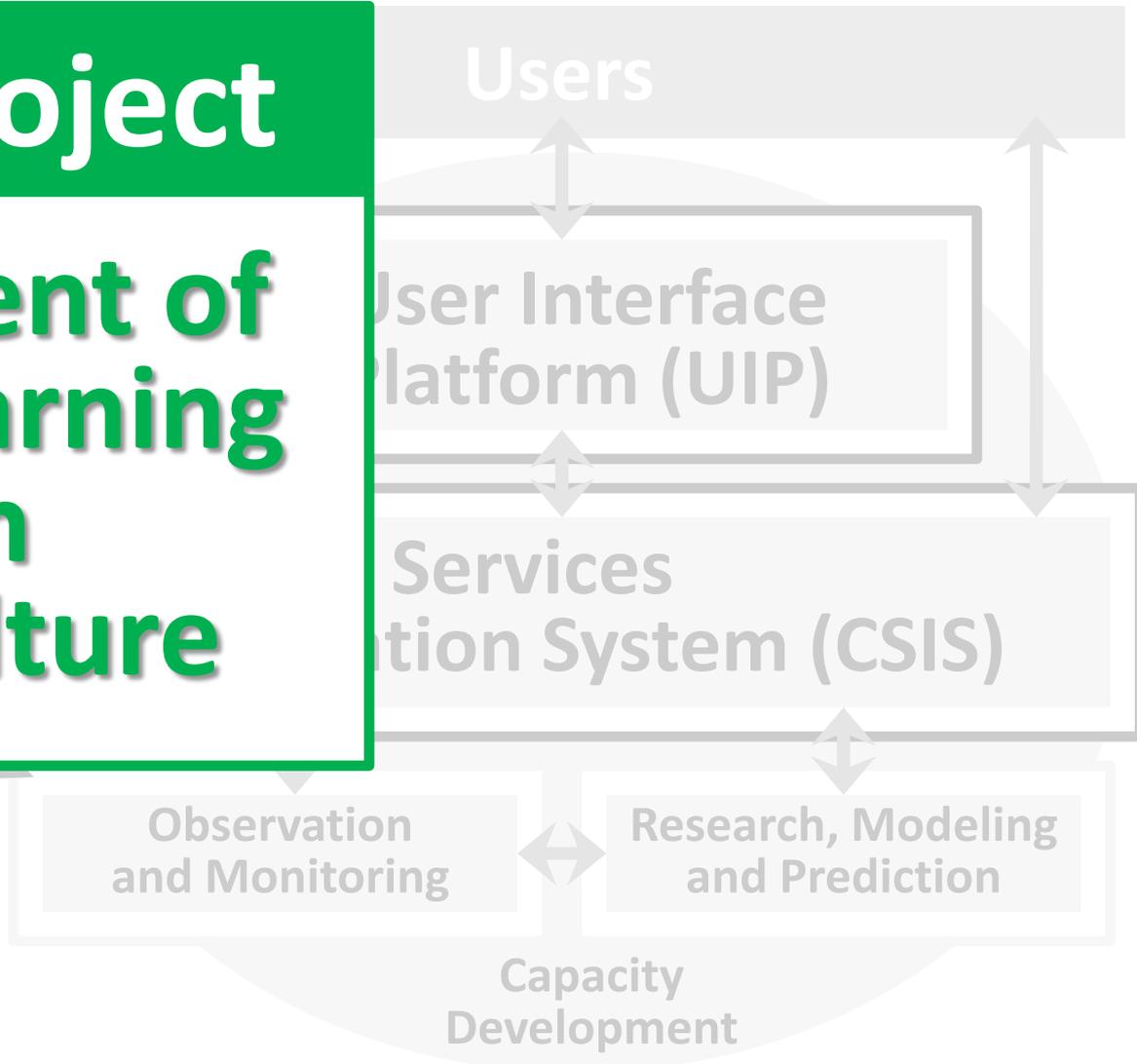
* The maximum power demand outlook is calculated based on the forecast provided by the Japan Meteorological Agency.

Introduction

2. Pilot Project

**Development of
an early warning
system
for agriculture**

(Early warning
Information
on Extreme
Weather)



GFCS five pillars and their links to users

Climate risk impacts on various fields

JMA is making efforts to find best practices to use climate information in various fields.

Impacts on **Agricultural products**

- **Cold/heat** waves hinder the growth of agricultural products.
- **Heavy rainfall** or **drought** causes destruction of crops.



Impacts on **Retail selling**

- **Cold/heat** waves damage the selling of clothes and electric appliances.



Impacts on **Human Health**

- **Heat** waves increase the risk of heat stroke.

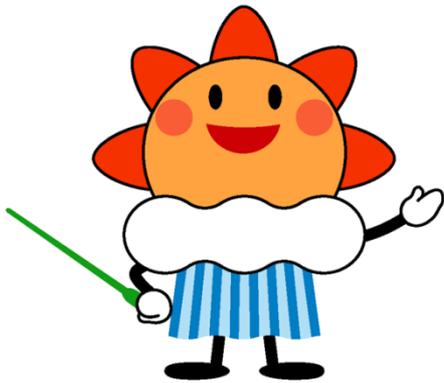
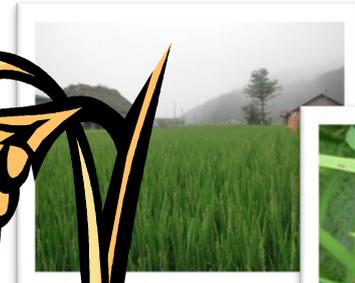


And so on...

A pilot project for agriculture: rice production

Impacts on Rice production

- Cold/hot summer conditions cause damage to rice.



Provider

JMA



Collaboration!



User/Intermediary

Agricultural
Research Institute
(NARO/TARC*)

* National Agriculture and Food Research Organization/Tohoku Agricultural Research Center

Key processes of Pilot Project



1. Dialogue & Sharing knowledge

2. Joint technology development

3. Spread of best practices

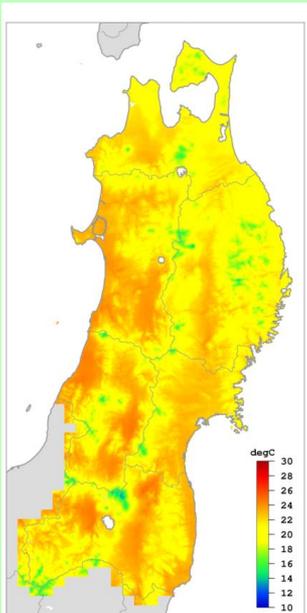
Joint Technology Development

Dialogue & Sharing knowledge



Making 7-day mean temp.(T7d) prediction at **a 1-km resolution up to two weeks ahead**

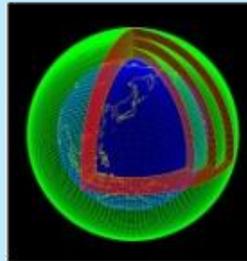
Agricultural Research Inst.



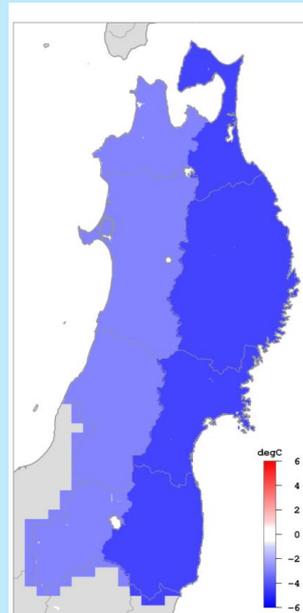
Climatological normal of T7d (1km-resolution)

+

JMA



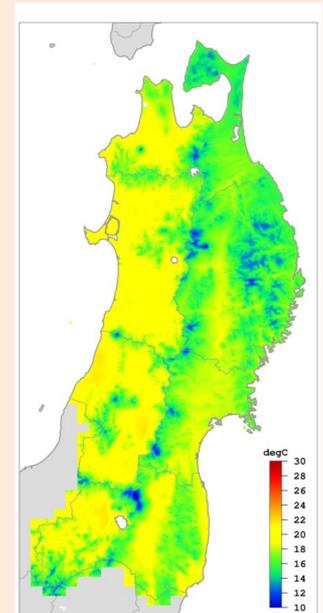
Numerical Weather Prediction



Mean value of predicted T7d anomalies (regional-scale)

=

New Product



Mean value of predicted T7d (1km-resolution)

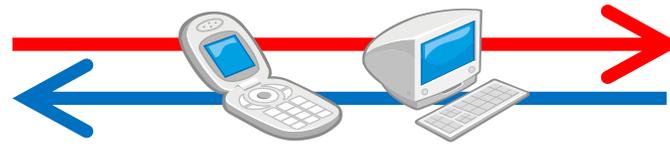
Tailoring and experimental provision

- The agricultural research institute (NARO/TARC) **tailors** temperature prediction to **customized information for agriculture**.
- Farmers can **view the information** for their registered points **on the Internet** and **receive an alert by e-mail**.



**Agricultural
Research
Institute
(NARO/TARC)**

**Tailored climate
information**



**Feedback by
questionnaire survey**

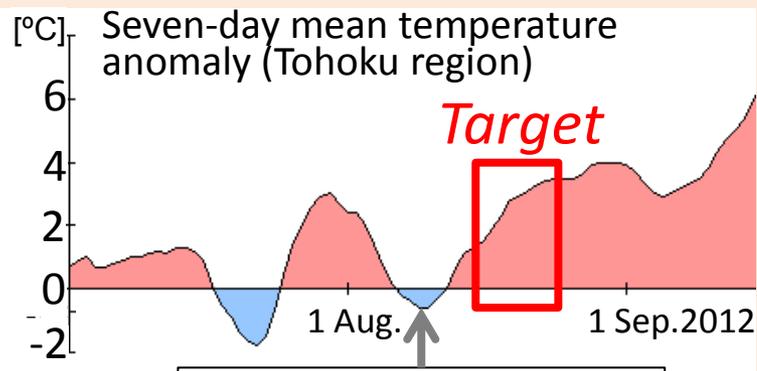
Farmers



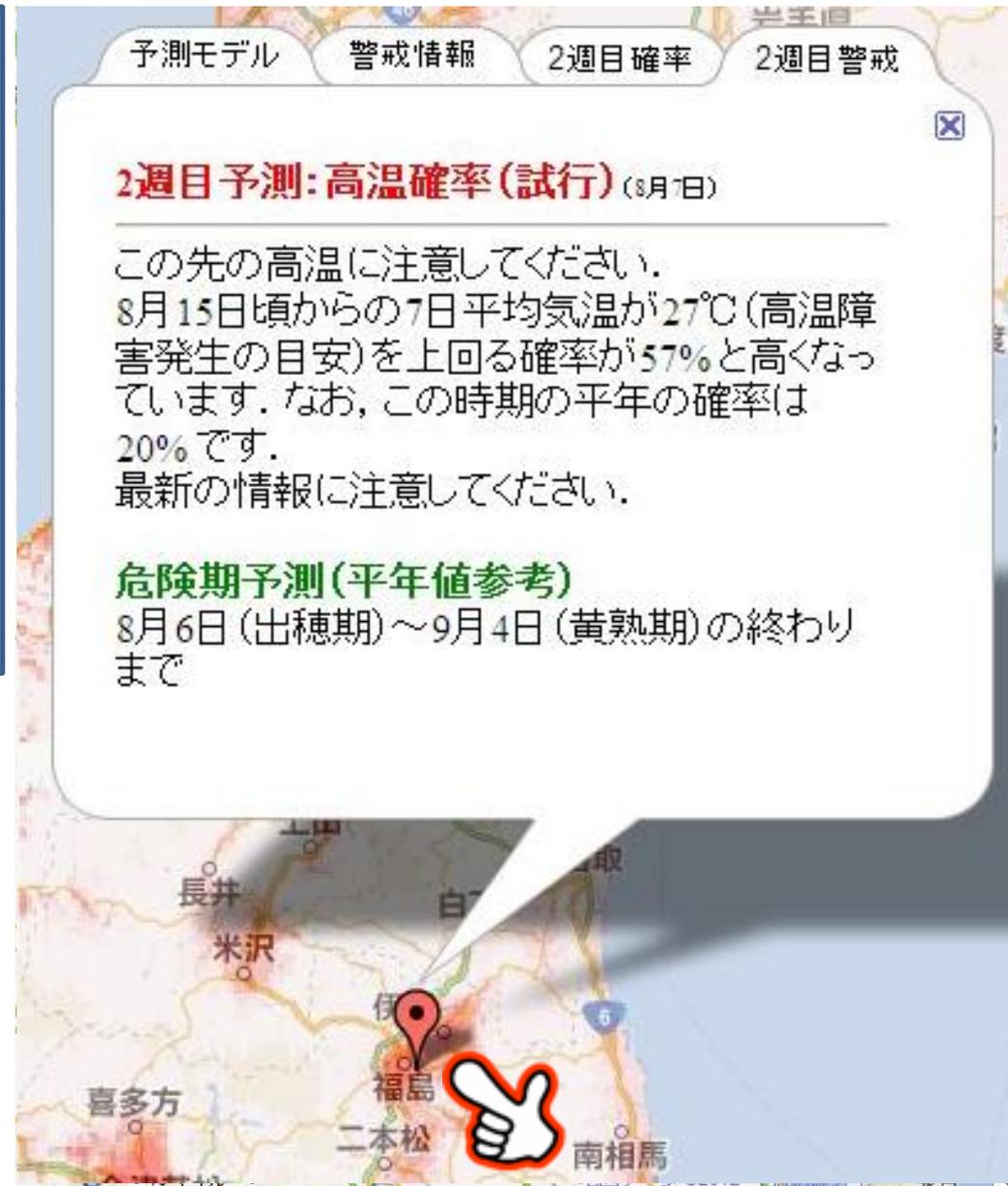
Action!

Tailoring and experimental provision

- On 7 Aug., 2012, predicted probability of temperatures of $\geq 27^{\circ}\text{C}$ was 57% during the period from 15 to 21.
- The agricultural research institute called farmers **to take countermeasures controlling water depth in their rice fields** to avoid poor grain filling in rice crops.



Issued on 7 Aug.

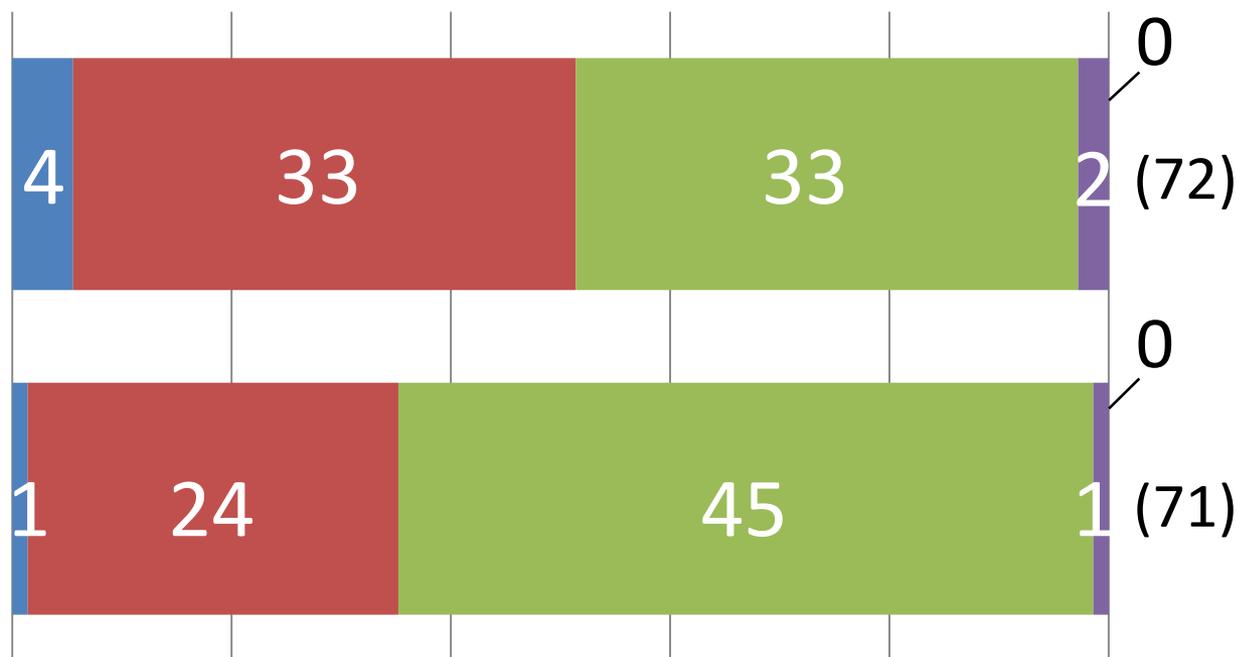


Feedback by questionnaire survey

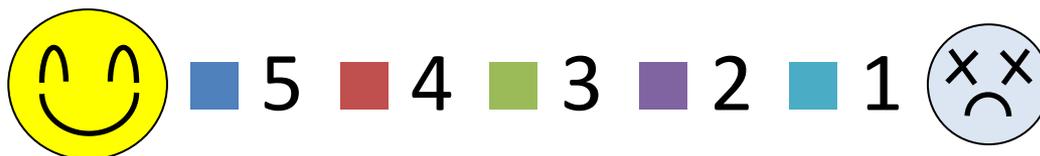
Based on the questionnaire survey in 2011, it has been clarified that the provision of tailored climate information offers **potential benefits to farmers**.

- Do you think whether the provided information was **useful** for your activities to take countermeasures or not?

- Do you think whether the provided information had **appropriate accuracy** of prediction or not?



Questionnaire survey by e-mail (Nov. 2011)
- distributed to the 154 users
- 89 replies were received.



< Regarding predicted probability of **alarming temperature** >

3. A Pilot Project by TCC

To collect and share information on climate services provided by NMHSs as well as good practices in RA II

On Extreme
Weather)

Capacity
Development

Tokyo Climate Center as an RCC in RA II

- TCC serves as a WMO Regional Climate Center in the RA II.
- TCC supports NMHSs through data/information provision and capacity development activities.

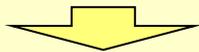
Tokyo Climate Center (TCC)

● Provision of climate data and information via the Internet

- Seasonal forecasts
- Report on extreme events
- Climate system analysis
- Global warming
- Climate monitoring
- Reanalysis data

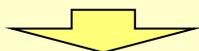
● Capacity Development

- Training seminar
- Expert visit

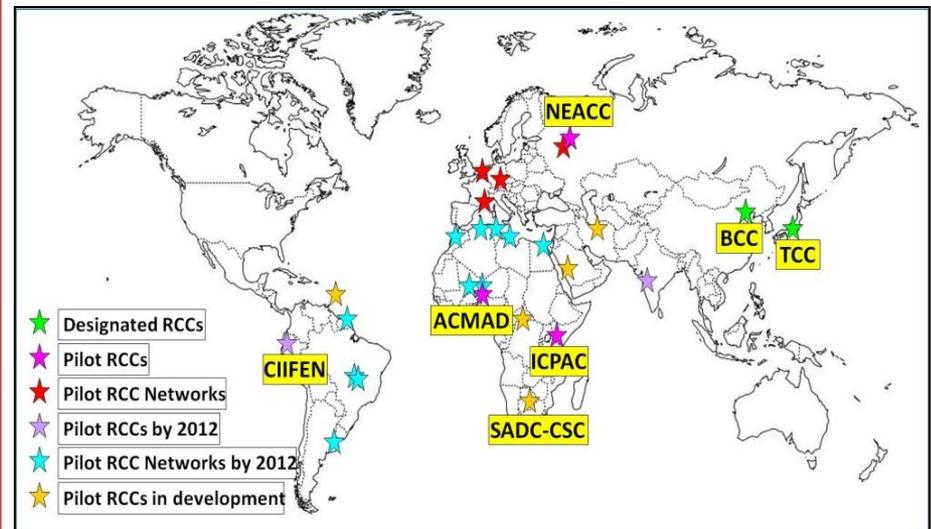


NMHSs in Asia

- Provision of climate information using TCC data based on national requirements



- Natural disaster reduction
- Food security
- Water management



Current status of establishment of RCC

TCC and BCC were designated as RCCs in RA II in 2009.

Capacity Development by TCC

Experts
of NMHSs

Skillful Experts
of NMHSs



Support

TCC

**Improvement of climate services
by NMHSs in Asia and Pacific region**

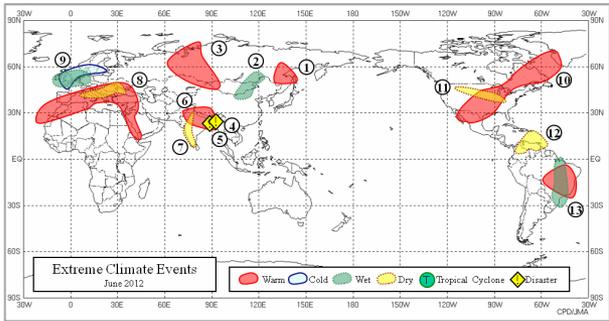
Tokyo Climate Center website

<http://ds.data.jma.go.jp/tcc/tcc/index.html>

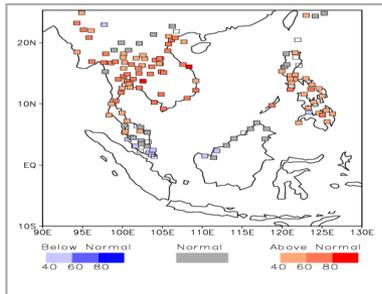
The screenshot shows the Tokyo Climate Center website with several key features highlighted:

- Navigation:** A top menu bar includes "TCC home", "About TCC", "Site Map", and "Contact us". A secondary menu bar lists "Home", "World Climate", "Climate System Monitoring", "El Niño Monitoring", "NWP Model Prediction", "Global Warming", "Climate in Japan", "Training Module", "Press release", and "Links".
- Content Sections:**
 - What are WMO RCCs?:** Explains that WMO RCCs are centers of excellence for regional products, including long-range forecasts and climate monitoring.
 - RCC Functions:** Lists mandatory functions: long-range forecasting (LRF), climate monitoring, data services, and training.
 - Operational Activities:** A red-bordered box highlights four items: "Operational Activities for Long-range Forecasting", "Operational Activities for Climate Monitoring", "Operational Data Services, to support operational LRF and climate monitoring", and "Training in the use of operational RCC products and services".
 - Main Products:** Includes "ClimatView" (with a world map image) and "Introduction to ITACS" (with an "Interactive Tool for Analysis of the Climate System" image).
- News and Updates:** A right-hand column features several news items with dates and "NEW" tags, such as "14 May 2012 NEW" and "11 May 2012 NEW".
- Annotations:** Four blue callout boxes with yellow text are overlaid on the right side of the page, pointing to specific content: "Operational Activities for Long-range Forecast", "Operational Activities for Climate Monitoring", "Operational Data Services, to support operational LRF and climate monitoring", and "Training in the use of operational RCC products and services". A large blue arrow points from the bottom of these boxes towards the "Links to products and services in line with RCC Mandatory Functions" box.
- Footer:** A dark blue box at the bottom right contains the text "Links to products and services in line with RCC Mandatory Functions" in light blue, with a "links" label to its right.

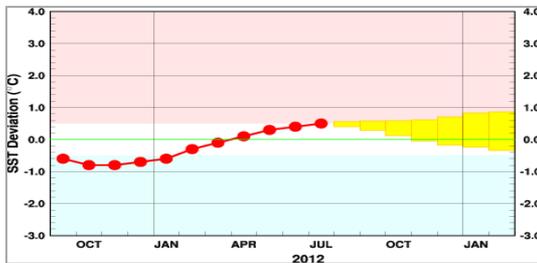
Examples of Climate information, data and products provided through the TCC website



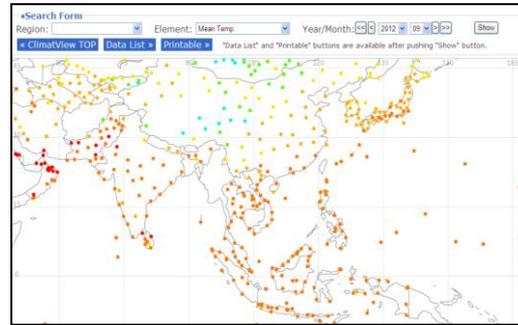
Monitoring of Extreme Climate Events



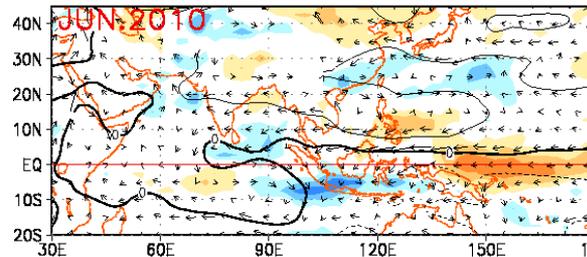
One-month Probabilistic Forecast for Southeast Asia



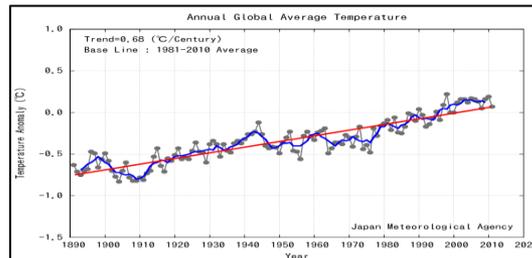
El Niño outlook



Climate database



Asian Monsoon Monitoring



Global Average Surface Temperature Anomalies

Heavy rainfall over the Indochina Peninsula for June – September 2011
31 October 2011
Tokyo Climate Center, Japan Meteorological Agency

1. Precipitation

In general, the Asian summer monsoon over the Indochina Peninsula lasts from around May to around October, and brings the rainy season. In 2011, precipitation over the Indochina Peninsula continued to be above normal from June to September, which caused floods over a wide area in the basins of the Chao Phraya River and the Mekong River. The flood has caused serious damage over the Indochina Peninsula especially in Thailand.

Four-month total precipitation from June to September 2011 was 120% – 180% of the normal for most meteorological observation stations over the Indochina Peninsula (Figure 1, center). Four-month total precipitation for the period amounts to 921mm (134% of the normal) at Chiang Mai in northern Thailand, 1251mm (140% of the normal) at Bangkok (the capital of Thailand), 1641mm (144%) at Vientiane (the capital of Laos) and 835mm (107%) at Phnom-Penh (the capital of Cambodia). It is unusual that heavier-than-normal rainfall continued through the rainy season over the entire area of the basins (Figures 1 and 2).

The heavier-than-normal rainfall over the basin of the Chao Phraya River continued in the first half of October 2011.

Figure 1 Spatial distribution of four-month precipitation ratio compared to normal (center) and the time series of monthly precipitation at Chiang Mai, Bangkok (Thailand), Vientiane (Laos), and Phnom Penh (Cambodia).
The base period for the normal is 1981 – 2010. “X” in the figure for Vientiane represents that monthly data were not reported.

Report on extreme climate event (Heavy rainfall over the Indochina Peninsula in 2011)



Launch of a pilot project by TCC

To collect and share information on climate services provided by NMHSs as well as good practices in RA II in the application of climate information to various fields, such as agriculture and water management.

Sharing lessons learned and best practices among NMHSs



-to develop projects and improve climate services by NMHSs
-to avoid duplication and minimize the risk of failure

Welcome to WMO RA II Pilot Project for Climate Services Homepage

This website has been developed as part of one of pilot projects conducted by the Tokyo Climate Center (TCC) of the Japan Meteorological Agency (JMA) to collect and share information on climate services provided by NMHSs as well as good practices in RA II in the application of climate information to various fields, such as agriculture and water management.

WMO RA II Members

- Afghanistan
- Bangladesh
- Cambodia
- Democratic People's Republic of Korea
- India
- Iraq
- Kazakhstan

Long-range Forecasting

- One-month Prediction Maps
- Three-month Prediction Maps
- Grounds for Three-month Outlooks
- Warm/Cold Season Prediction Maps
- One-month Probabilistic Forecasts at Station Points
- Three-month mean Probabilistic Forecasts and Verifications
- Warm/Cold Season Probabilistic Forecasts and Verifications
- El Niño Outlook
- Verification of One-month Forecasts
- Verification of Three-month Forecasts
- Verification of Warm/Cold Season Forecasts
- HiDocasts

Climate Monitoring

- Monthly Highlights on Climate System
- Seasonal Highlights on Climate System
- Asian Monsoon Monitoring
- Madden-Julian Oscillation Monitoring
- Stratospheric Monitoring
- El Niño Monitoring
- Global Surface Temperature Anomalies (Monthly)
- Global Surface Temperature Anomalies (Annual)
- ClimateView

Images of pilot project webpage to be developed by TCC



Thank you

