Development of Climate Risk Management Techniques for Agriculture at JMA

Nobuyuki Kayaba, Akina Yamada, Sakie Hira, and Masayuki Kyouda

Climate Prediction Division,
the Global Environment and Marine Department,
Japan Meteorological Agency

Outline

1. Introduction and motivations

2. Pilot Project to Develop Climate Risk Management Techniques for Agriculture

3. Developed Products

4. Summary and Future issues for practical use

JMA Weather/Climate information

Today　　　Tomorrow　　　One week　　　One month　　　Three month

Nowcasts

Warnings/
Advisories

Weather forecasts
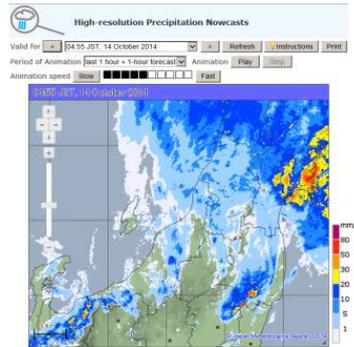
One-week forecasts

JMA forecasting services cover a wide range of meteorological information.
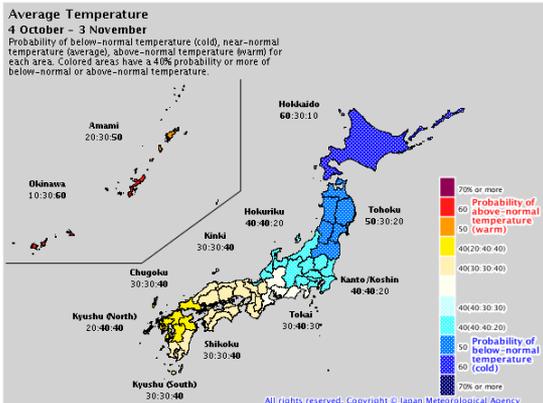
Early warning information on extreme weather

One-month forecasts

Over two-week prediction

Seasonal forecasts/
El Niño outlook

Introduction and motivations

   JMA expect its climate information to be used practically in agricultural sector for **assessment** the influence of extreme weather and climate for the **adaptation**.

Climate risk management process

   JMA takes activities to develop best practices of the use of long-range forecasting in collaboration with user-sector organizations.

   JMA and the Agricultural Research Institute (National Agricultural and Food Research Organization:NARO) have Pilot Project to "Develop Climate Risk Management Techniques for Agriculture" from 2011 to 2016※.

※ In 2016 the summary of the detailed report of these activities were published (in Japanese).
   http://www.data.jma.go.jp/gmd/risk/nogyo_hokoku.html

Outline

1. Introduction and motivations

2. Pilot Project to Develop Climate Risk Management Techniques for Agriculture

3. Developed Products

4. Summary and Future issues for practical use

Key processes of Pilot Project

Goal

Start

1

2

3
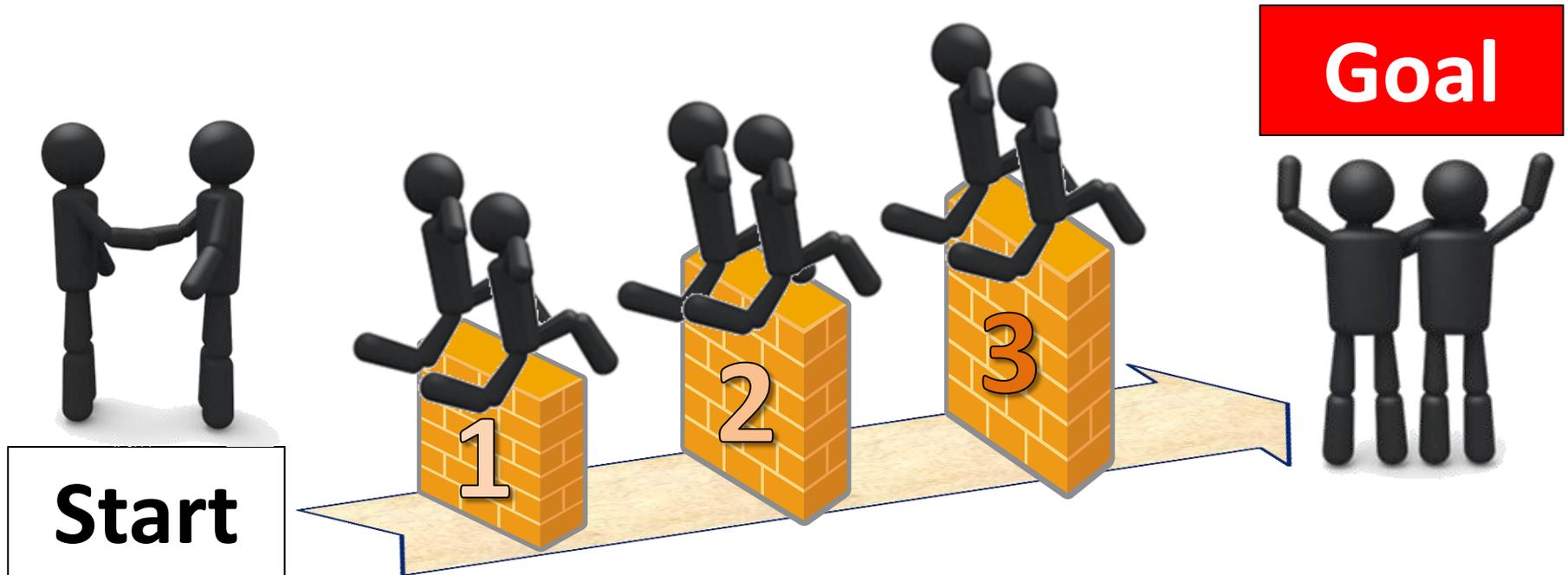
1. Dialogue & Sharing knowledge

2. Joint technology development

3. Expansion of best practices

Wheat Calendar in Japan

dry season | wet season

| Nov. | · · · | Apr. | May | June |

plant

heading
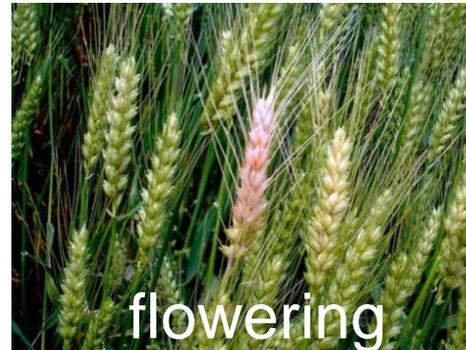
flowering

harvest

・In Japan the wet season gradually begins in May.

・Wheat come into flower in around May.

・Farmer have to reserve a herbicide duster over two weeks before.

Risk of red mold disease of wheat raise

weed control using a herbicide duster

Dialogue & Sharing knowledge

JMA Weather/Climate information
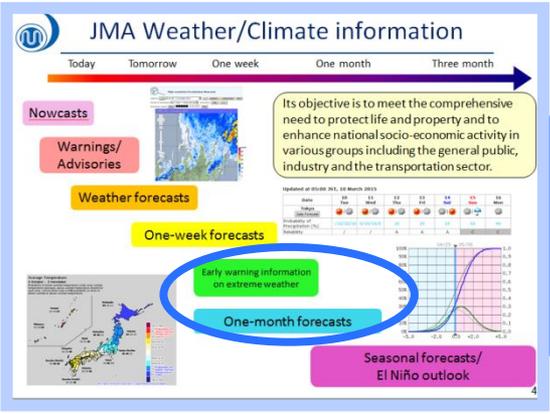
Matching

over two weeks

reserve a herbicide duster

prediction
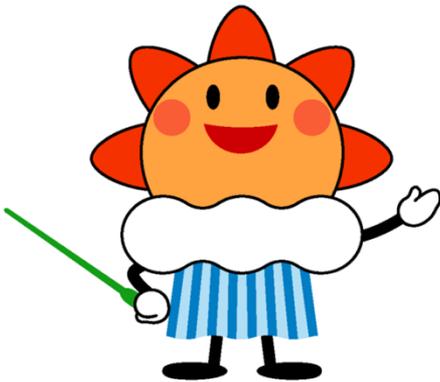
Provider

JMA

Collaboration!

To predict the day
of flower of wheat

User/Intermediary

Agricultural
Research Institute
(NARO*)

* National Agriculture and Food Research Organization Agricultural Research Center

Joint technology development

		March	April	May

Conventional Method

Initial Date	Normal Data※	flower

Developed Technique

Initial Date	Prediction Data			Normal Data	flower
	1st week	2nd week	3rd -4th week		

to predict the day of flower of wheat

The day of flower of wheat

2days
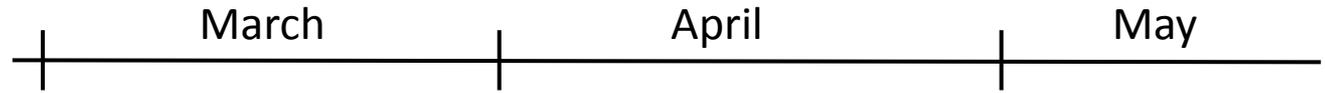
- Conventional Method
- Developed Technique
- Actual
- Simulation with observed temperature
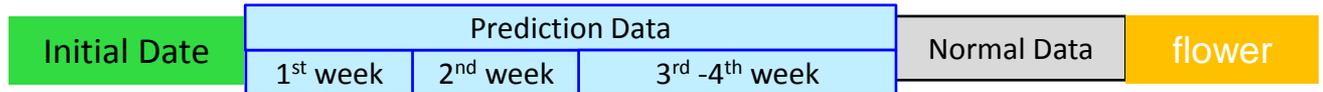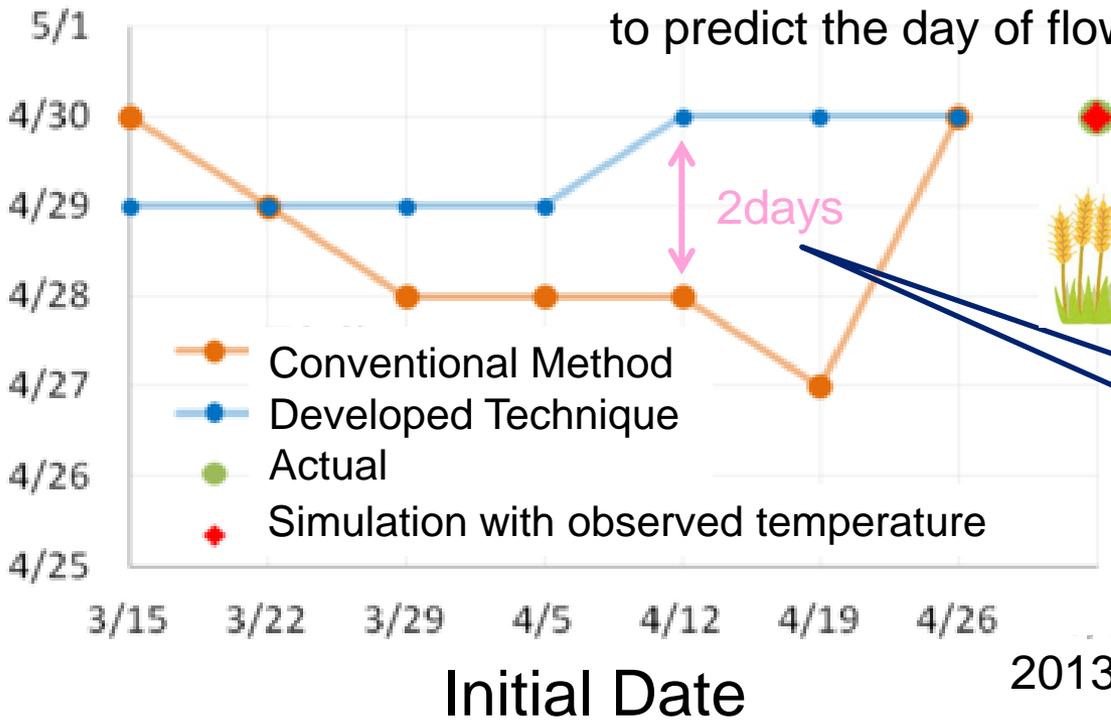
accurately predict

Initial Date   2013

Comparison of Conventional Method and Developed Technique

※ Normal data is based on the cumulative annual average over 30 years between 1981 and 2010

Outline

1. Introduction and motivations

2. Pilot Project to Develop Climate Risk Management Techniques for Agriculture

3. Developed Products

4. Summary and Future issues for practical use

Developed Products

Website

品　種：チクゴイズミ
地点名：福山

予測に用いた気温は、2016年10月26日までは観測値（下図）、　11月6日までは予報値、　その後は平年値

最終更新日 2016 年 10 月 26 日　　アメダス気象図　福山
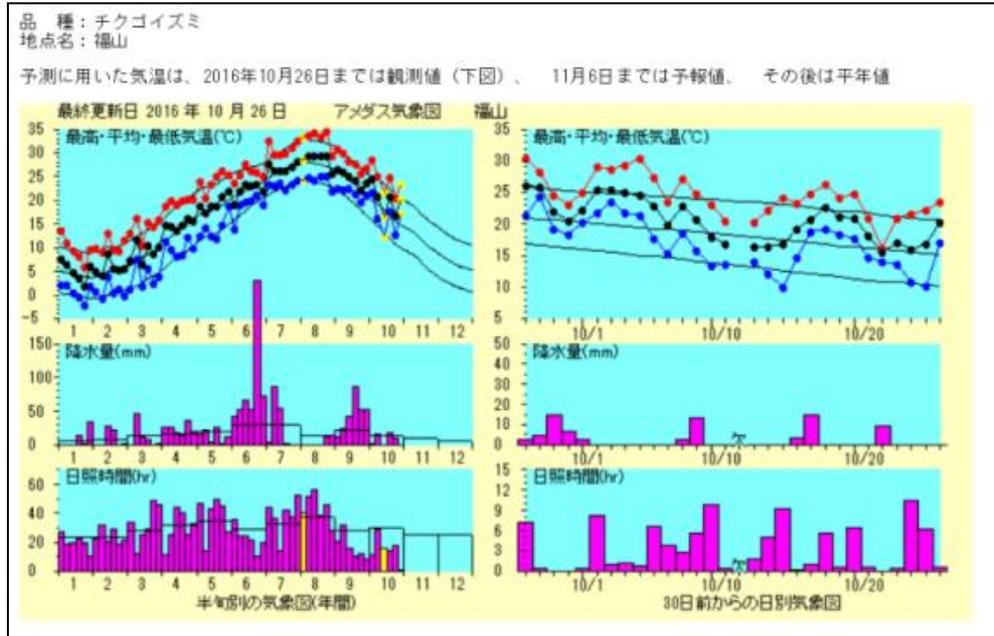
http://www.naro.affrc.go.jp/org/warc/meteo_fukuyama/WEB/wheat/index_mugi.html

Agricultural Research Institute
(NARO)

Tailored climate information
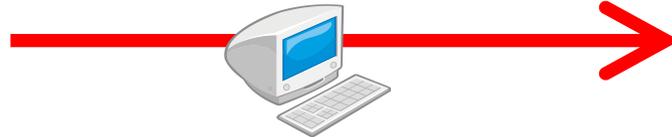
Farmers

Action!

Farmers can obtain the information at their desired points through the Internet.

Outline

1. Introduction and motivations

2. Pilot Project to Develop Climate Risk Management Techniques for Agriculture

3. Developed Products

4. Summary and Future issues for practical use

Summary

In addition to this project, there were various other technical developments.

JMA conducted joint researches with agricultural research Institutes（NARO） all over Japan.

Hokkaido
Beating potatoes harmful for field condition

Create a variety of success cases of climate information usage

Tohoku
2-weeks ahead Temperature prediction for rice crops .etc

Kinki-Chugoku-Shikoku
Prediction of Red mold disease of wheat

Kanto (Central)
Making data set of weather information for agriculture .etc

Kyushu-Okinawa
Prediction of High-Temperature Damage Rice Grain

NARO are planning to launch the cultivation management systems for whole regions in Japan, to supply stable farm products.

Future issues for practical use

Expansion is one of future issues for practical use

JMA makes effort to continue dialogue with local agricultural organization to promote a use of climate information in agricultural decision-making.

Meteorological Office

Climate Services

- Dialogue & Sharing knowledge
- Joint technology development
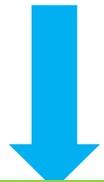
local agricultural organization （research center and government agricultural association)

They usually have close contact with farmers in their territory

Farming information with agromet Advisories

Farmers