How to Write Rice Growing Outlook

Utilization of space agro-meteorological data system JASMIN

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AFSIS

(ASEAN Food Security Information System)

as a subsidiary body under AMAF+3

13 member countries (10 ASEAN countries + China, Japan, Korea)

➢Objective

To strengthen food security in the region through the systematic collection, analysis and dissemination of food security related information.

ASEAN+3 Minister Meeting on Agricultural and Forestry *(AMAF+3)*

ASEAN Food Security Information System *(AFSIS)*

AFSIS Board *(Director General of ASEAN+3 countries)*

AFSIS Focal Point
(Director of ASEAN+3 countries)

AFSIS Secretariat
Bangkok, Thailand

National Center by country

Development of Food Security Information in ASEAN

VISION

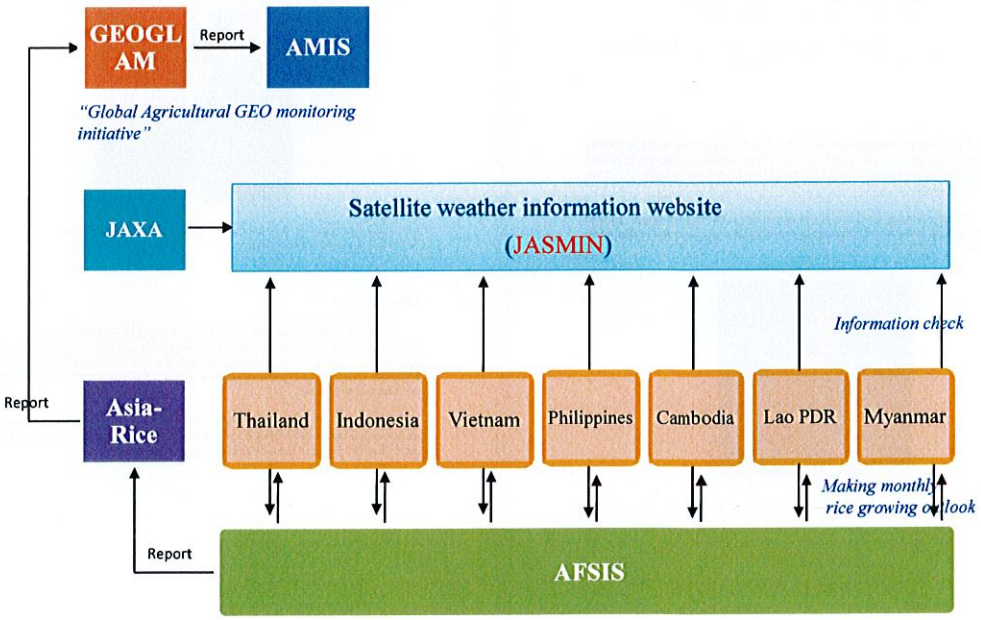
MISSION

Administrative activity	Development of Information network	Development of Human capacity	Development of Agricultural statistics research
• DG –FP Meeting • Management of training and workshop • Annual Report • Accounting • Others	• AFSIS Data base • ACO Report • EWI Report • Others	• Training • Mutual technical cooperation • Seminar, Workshop • Others	• ALIS • Forecasting Model Information • Rice growing outlook • Others

GEOGLAM activity

GEOGLAM, the GEO Global Agricultural Monitoring initiative, was initially launched by the G20 Agriculture Ministers in June 2011, in Paris.
The G20 Ministerial Declaration stated that GEOGLAM will strengthen global agricultural monitoring by improving the use of remote sensing tools for crop production projections and weather forecasting.
The main objective of GEOGLAM is to reinforce the international community's capacity to produce and disseminate relevant, timely and accurate projections of agricultural production at national, regional and global scales by using Earth Observation data.
Monthly delivery of operational crop monitor for the Agricultural Market Information System (AMIS) has started since September 2013.
In addition, the monthly delivery of the crop monitor for Early Warning (EWI) has started since February 2016.

Rice Growing Outlook activity is a on-going activity by AFSIS and Asia-Rice



Rice Growing Outlook Report

September, 2019

Overview

In the Norther side of SE-Asia, the wet season rice is in growing stage. The drought condition that caused damage in Cambodia, northeastern Thailand, northern Laos, and northern Vietnam is being resolved by the rainfall from end of August to beginning of September. However, there is concern that the drought condition during the growing season will affect rice growth and final yield. On the other hand, the rainfall which has resolved the drought condition has caused flood damage in the wide area. In particular, flood in Myanmar, Thailand and the Philippines may have a significant impact on the growth and final yield of wet season rice. The growing condition of wet season rice is generally fair to slightly poor due to unstable weather.

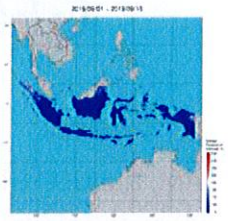
In the Southern side of SE-Asia (Indonesia), the planting of dry season rice is still low level due to less rainfall despite the end of planting season. But, the growing condition of early generative dry season rice is generally good and there is no significant damage.

Cambodia

The planted area of wet season rice reached 2.25 million ha, it's 98 percent of the national plan. Although the drought that has continued since the sowing season is in tendency of recovering due to rainfall in August, from now on the drought and flood were affected around 13 percent of cultivated area North western to lowland areas of Mekong basin and around 1.7 percent of planted area were completely damaged by drought and flood in country. The early planted wet season rice is in maturing stage to harvesting time. The yield is estimated around 3.9t /ha and it is almost normal.

Indonesia

September is usually the last month of planting dry season rice. But the panting is still low level due to less precipitation. This lack of irrigation water condition is made up somewhat due to the creation of irrigation system using pump from water well or irrigation channels. The early generative dry season rice is in a good growing condition. The dryness condition in northern part seems normal and the irregular and moderate rainfall still continue. There are some drought damages in Java and Lesser Sunda Island, but no caused of significant damage to rice growing.



Precipitation Anomaly map by JASMIN. The panting is still low level due to less precipitation

Laos

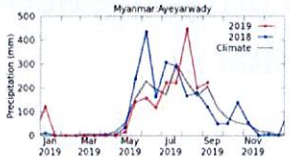
The wet season rice of lowland is in young panicle forming stage, the total planted area of lowland was around 810 thousand ha. In this month, the Southern region was damaged by floods. Total damage area is estimated around 12 thousand ha. On the other hand, the drought situation concerned seems to have been resolved by the rain in late August. (Please check this sentence)

Upland rice is in young panicle forming stage. The total planted area of upland is around 92 thousand ha. The rice growing condition in the Northern region is slightly poor due to drought and damage area is expected to be around 6,700 ha.

Myanmar

Up to September 2019, about 5.5 million hectares of the wet season rice accounting for approximately 90% of the national plan have been planted. The progress of planting work is relatively slow compared to last year. It is expected that the planting wet season rice will complete in next month.

During this August, Myanmar suffered bad climatic conditions, and the delta and river basin areas occurred floods and landslides due to heavy rain. Except Chin state, over 223 thousand hectares of wet season rice were affected by floods in a whole country. Among them, over 92 thousand hectares were damaged and over 10 thousand hectares have been replanted.

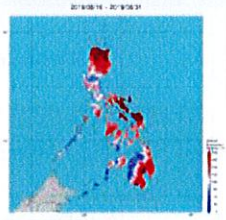


Precipitation time series graph by JASMIN. During this August, Myanmar suffered bad climatic conditions, and the delta and river basin areas occurred floods and landslides due to heavy rain.

Philippines

Wet season rice planted during the period of April – May is currently in the harvesting stage. Compared to last year's harvest, about 4.4% of rice production is expected to decline due to the passage of three tropical cyclones which brought moderate to heavy rains over Luzon and western part of Visayas.

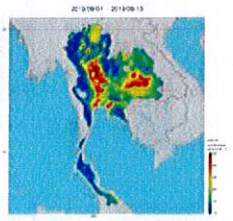
For now, the crop growing condition of wet season rice is fair to good in most parts of the country. Precipitation index is above average to very high in the northern and southern part of Luzon is noted.



Precipitation Anomaly map by JASMIN. Precipitation index is above average to very high in the northern and southern part of Luzon is noted.

Thailand

Thailand wet season rice is in the tillering stage to the Young panicle forming Stage. The growing condition of wet season rice is not good due to less rainfall was observed in the beginning of the cultivation period. It's affected the rice stem dry and poor panicles growing condition. Moreover, in last month by the tropical storm brought exceeding rainfall making flood in the field in Northern, Central and Northeastern region. Some rice fields' areas which full of water for a long time were damaged.



Soil moisture map by JASMIN. The tropical storm brought exceeding rainfall making flood in the field in Northern, Central and Northeastern region.

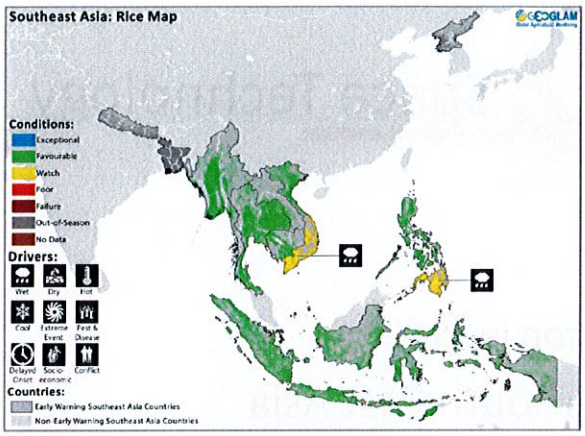
Vietnam

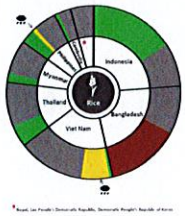
In the North of Vietnam, the wet season rice is in grain filling stage. Although it was concerned the less precipitation during growing season, the total planted area affected by drought was 2.2%, of which the Red River Delta was 0.9%, Northern Midlands and Mountains areas was 1.8% and the Northern Central area was 7.5%. The yield forecasts slight lower than last year due to drought.

In the South, the total sown area of the wet season rice reached 1.83 million ha. The early wet season rice of Mekong River Delta is the harvesting stage. The yield forecasts slight lower than last year due to heavy rain during growing season.

Contribution for GEOGLAM

-Early Warning Crop Monitor-



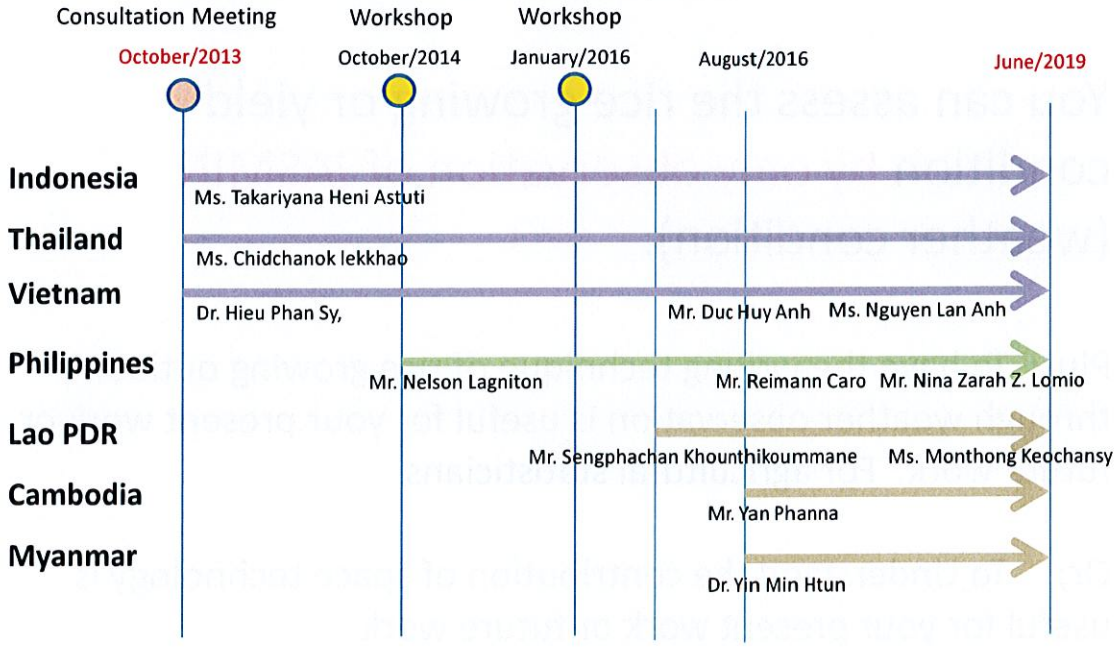


March 2017

Across northern Southeast Asia dry season rice is in the growing stage and conditions are favourable with adequate irrigation water however, there is some concern in the Philippines and South Vietnam due to heavy rains damaging rice crops. In southern Southeast Asia, wet season rice is in the second month of harvesting and yield is higher than earlier harvested rice due to good precipitation and adequate sunlight later in the season. In **Viet Nam**, sowing has begun in the north for dry season rice and is completed in the south with slightly lower total sown area due to heavy rains and flooding which are causing some concern. In **Laos**, dry season rice is in transplanting stage and conditions are favourable. In **Thailand**, dry season rice is in the tillering stage under favourable conditions owing to unseasonable rains supporting irrigation. In **Cambodia**, conditions are favourable for dry season rice and planted area is higher than expected due to adequate supply irrigation water. In **Myanmar**, dry season rice is in vegetative stage and conditions are favourable with good rains and temperatures received however, planted area has decreased from the previous year due to insufficient irrigation. In the **Philippines**, dry season rice is in the vegetative to reproductive stages under generally favourable conditions except in the south where heavy rainfall has caused some crop damage. In **Indonesia**, harvesting is ongoing for the wet season crop with improved yield prospects relative to last month owing to the later planted rice receiving more precipitation and sunlight than the earlier planted crops.

Remote Sensing Technology Center of Japan

Rice Growing Outlook Activity



Agriculture  Space Technology

Target Crop is Rice

Target Area is South East Asia

By using
Satellite weather information web (JASMIN)

Destination of my lecture and hands-on

You can assess the rice growing or yield condition by only observation of JASMIN (weather condition).

Plus; To have the writing technique of rice growing outlook through weather observation is useful for your present work or future work. For agricultural statisticians

Or; To Understand the contribution of space technology is useful for your present work or future work.
For other agricultural officers

Destination of my lecture and hands-on
(Technology transfer)

What do you report as rice growing outlook?
What determines the good and poor of rice yield?
How does precipitation, solar radiation, and temperature affect rice growth?
When and what weather conditions affect rice yield quality and quantity direct or indirect?
How does weather disaster affect rice growth and yield?
How to decipher JASMIN Map for the assessment of rice growth?
How to decipher JASMIN Time Series Graph for the assessment of rice growth?
How to use past weather data accumulated by JASMIN for the current assessment of rice growth?

Rice is a staple food in SEA
Rice is also an important commercial crop

Top 20 rice paddy production (2017)

	Country	Value (ton)
1	China	214430049
2	India	168500000
3	**Indonesia**	81382000
4	Bangladesh	48980000
5	**Viet Nam**	42763682
6	**Thailand**	33383382
7	**Myanmar**	25624866
8	**Philippines**	19276347
9	Brazil	12469516
10	Pakistan	11174700
11	**Cambodia**	10350000
12	Nigeria	9864277
13	**Japan**	9780000
14	United States of America	8084290
15	Egypt	6380000
16	Republic of Korea	5284348
17	Nepal	5230327
18	**Lao People's Democratic Republic**	4039779
19	Madagascar	3100000
20	Peru	3038524

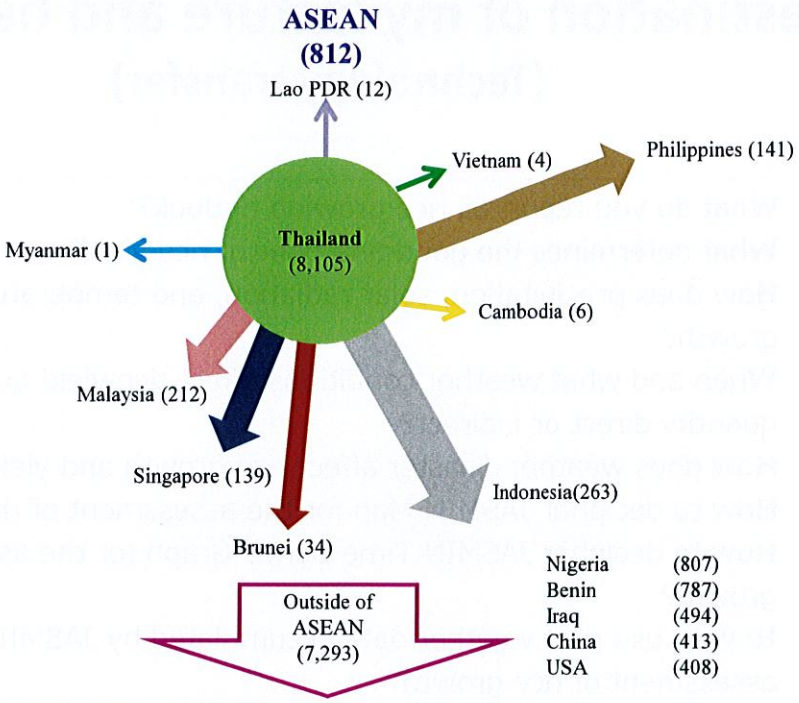
Top 20 rice exported (2016)

	Country	Value (ton)
1	**Thailand**	9870079
2	India	9869281
3	**Viet Nam**	5210843
4	Pakistan	3947365
5	United States of America	3315836
6	Uruguay	899523
7	Italy	651443
8	Brazil	630328
9	China	560406
10	Paraguay	554121
11	**Cambodia**	529888
12	Argentina	527309
13	United Arab Emirates	458077
14	**Myanmar**	280662
15	Spain	269286
16	Belgium	262141
17	Niger	223092
18	Russian Federation	190127
19	Netherlands	168897
20	Australia	166907

Data: FAO Stat

For example

Thailand Rice Export (*1,000t*)

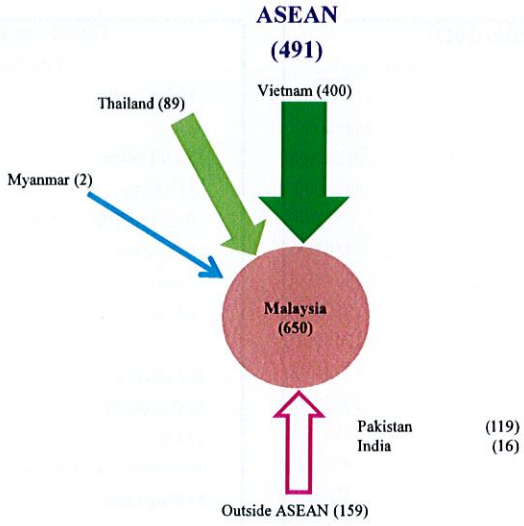


Thailand exports rice to all countries in ASEAN.
But there is about 90% of rice export is directed to other countries outside ASEAN

Data: OAE average 2012-2014

For example

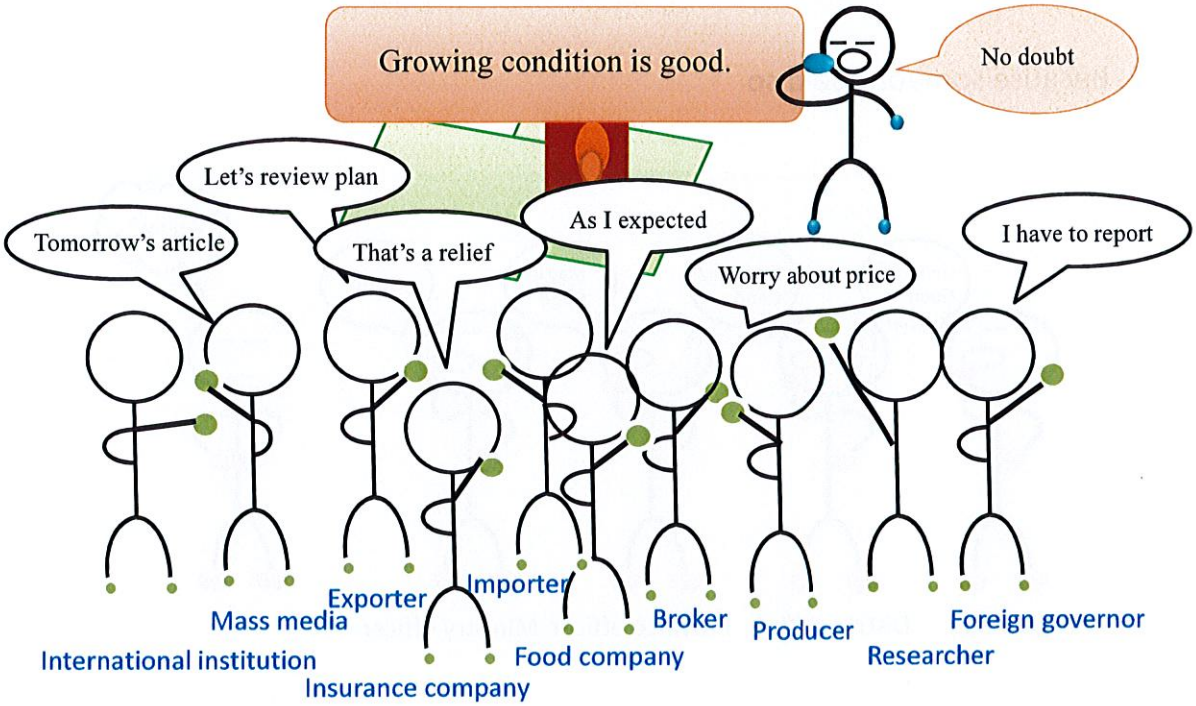
Malaysia Rice Import (*1,000t*)



Malaysia fills in the gap by importing rice mainly from Vietnam.

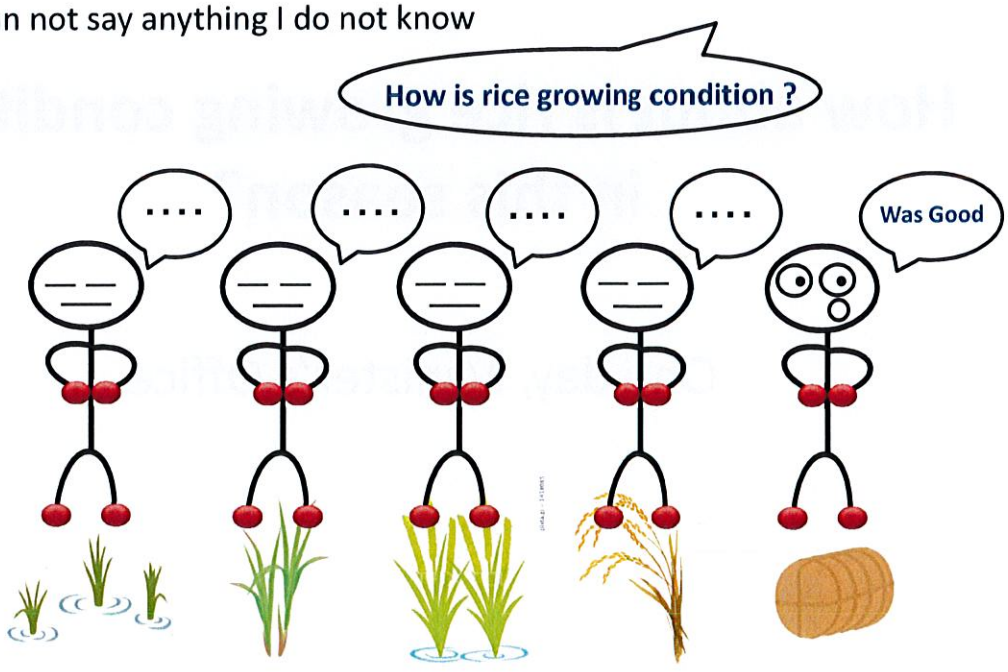
Data: DSM average 2012-2014

Various people are interested in rice growing condition in your country



Current problems in the assessment of rice growth condition

1. I can not say anything I do not know



Current problems in the assessment of rice growth condition

2. Because someone said so

How about is rice growing condition in this season?

One day, Minister's Office

How about is rice growing condition in this season?

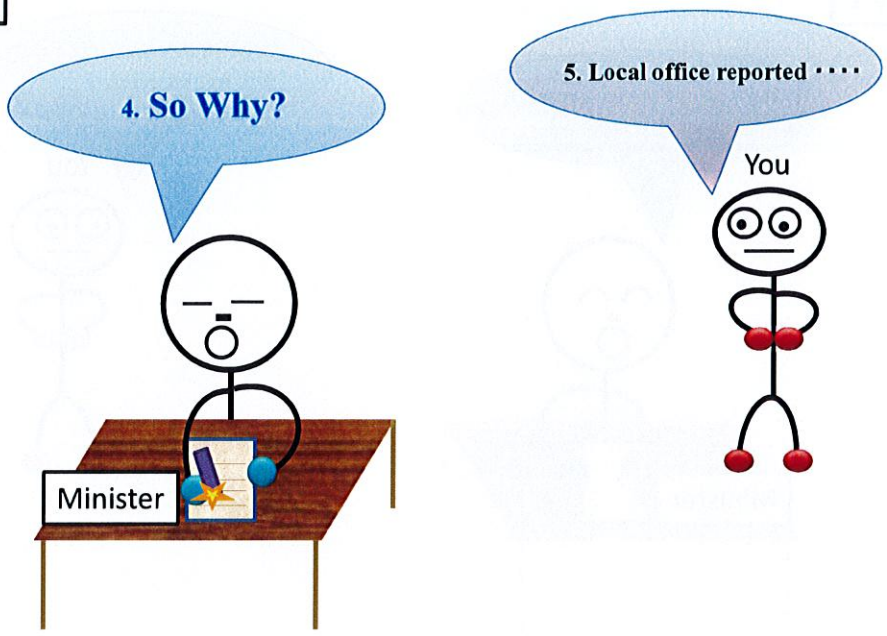
Scene 1

How about is rice growing condition in this season?

Scene 1

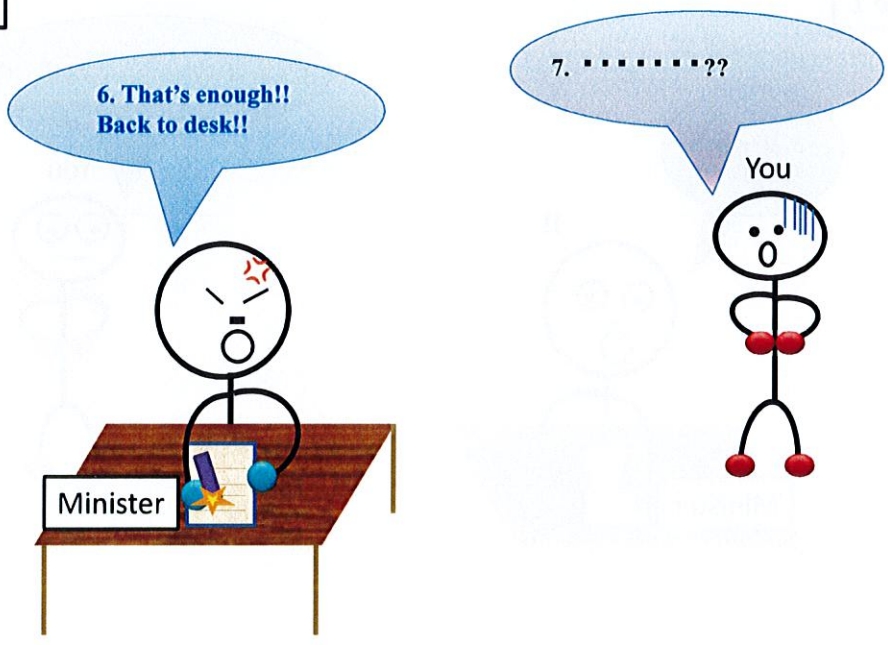
How about is rice growing condition in this season?

Scene 1



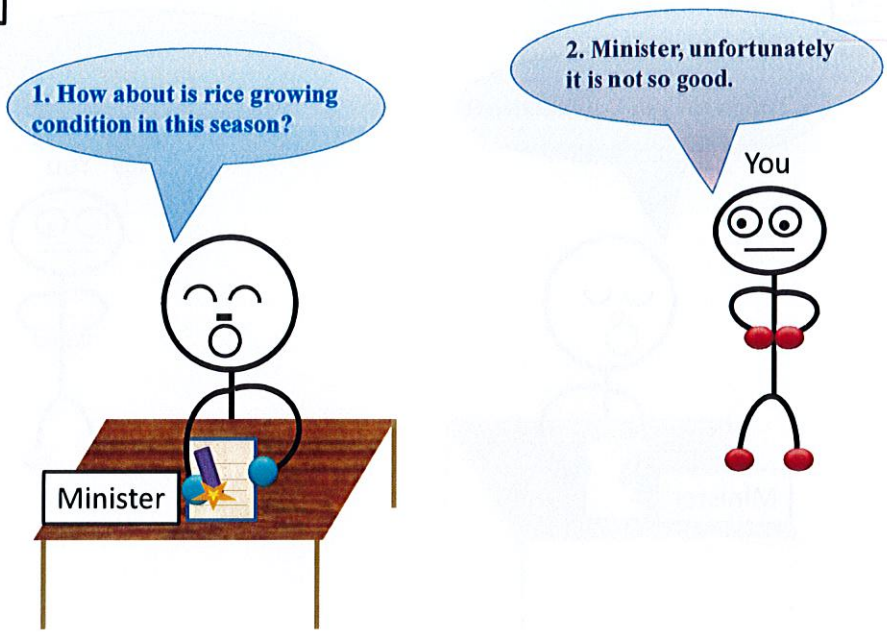
How about is rice growing condition in this season?

Scene 1



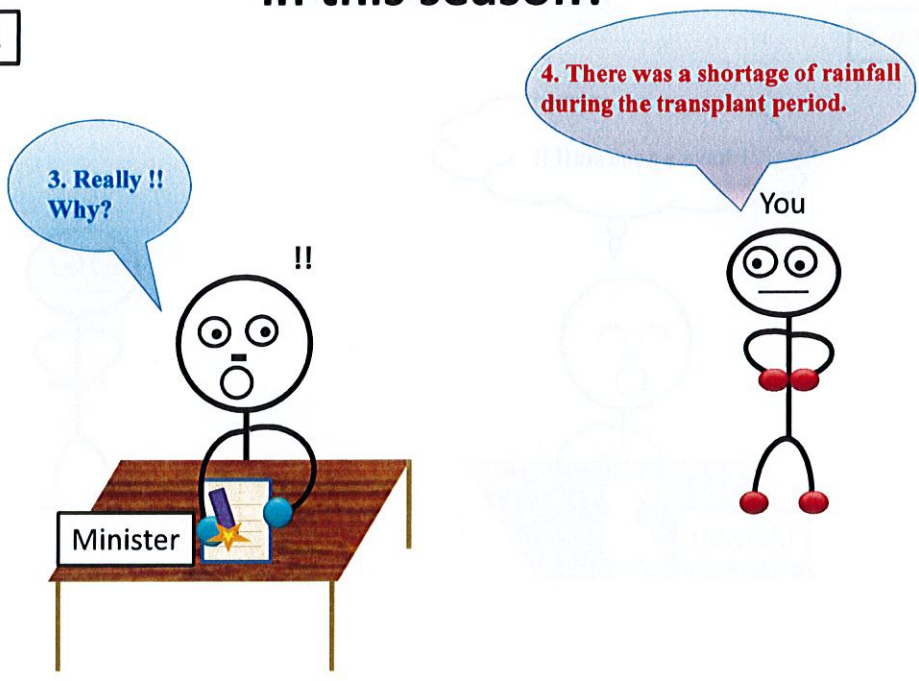
How about is rice growing condition in this season?

Scene 2



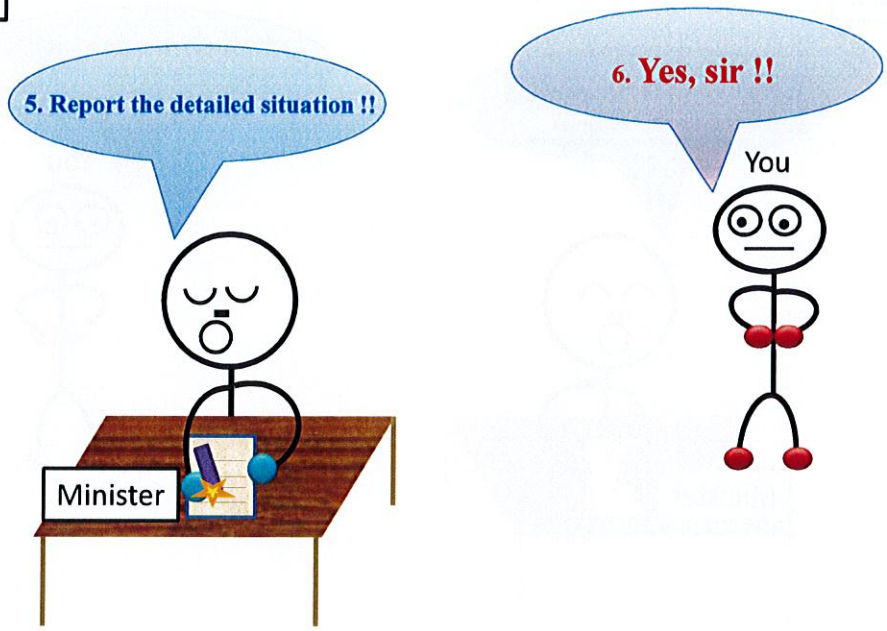
How about is rice growing condition in this season?

Scene 2



How about is rice growing condition in this season?

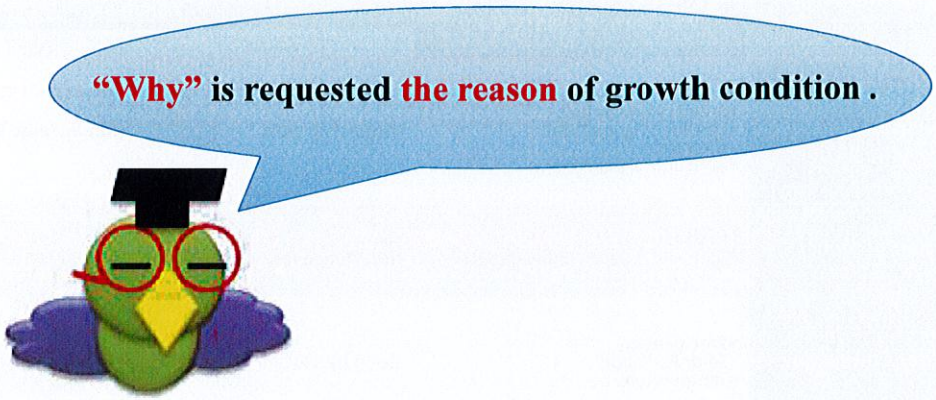
Scene 2



How about is rice growing condition in this season?

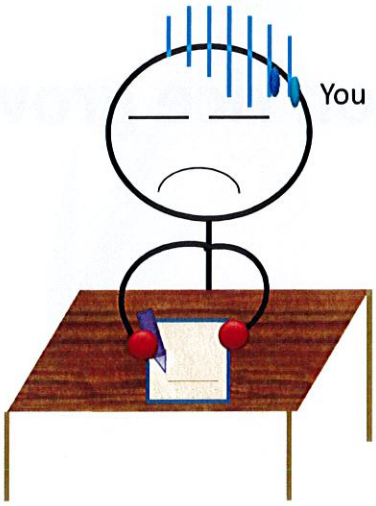
Scene 2

How about is rice growing condition in this season?



But….What is the reason of growth condition?

Maybe Mr. Kimura says that the weather, but it's not only the weather….



The reason of rice growth condition (Why)

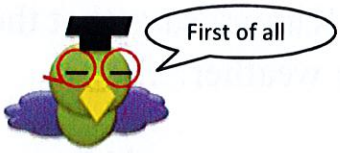
Yield Requisites of RICE

Requisite	Main Phenomenon or Event	Condition	
		Good (High)	Poor (Low)
Agricultural Technology	•Irrigation •Breed improvement •Fertilizer, Agricultural chemical •Agricultural machine	Increase in yield	Non-increase in yield
Motivation of Farmer	•Market price •Agriculture policy (Subsidies)	High fertilization management	Low fertilization management
Weather Condition	•Precipitation •Solar Radiation •Temperature	Good harvest	Poor harvest •Weather disaster •Growth injury •Other damage (disease and insect)
Others	•Field capacity •Field environment	High yield	Low yield

should be considered as a long-term

directly represented by the increase in planted area

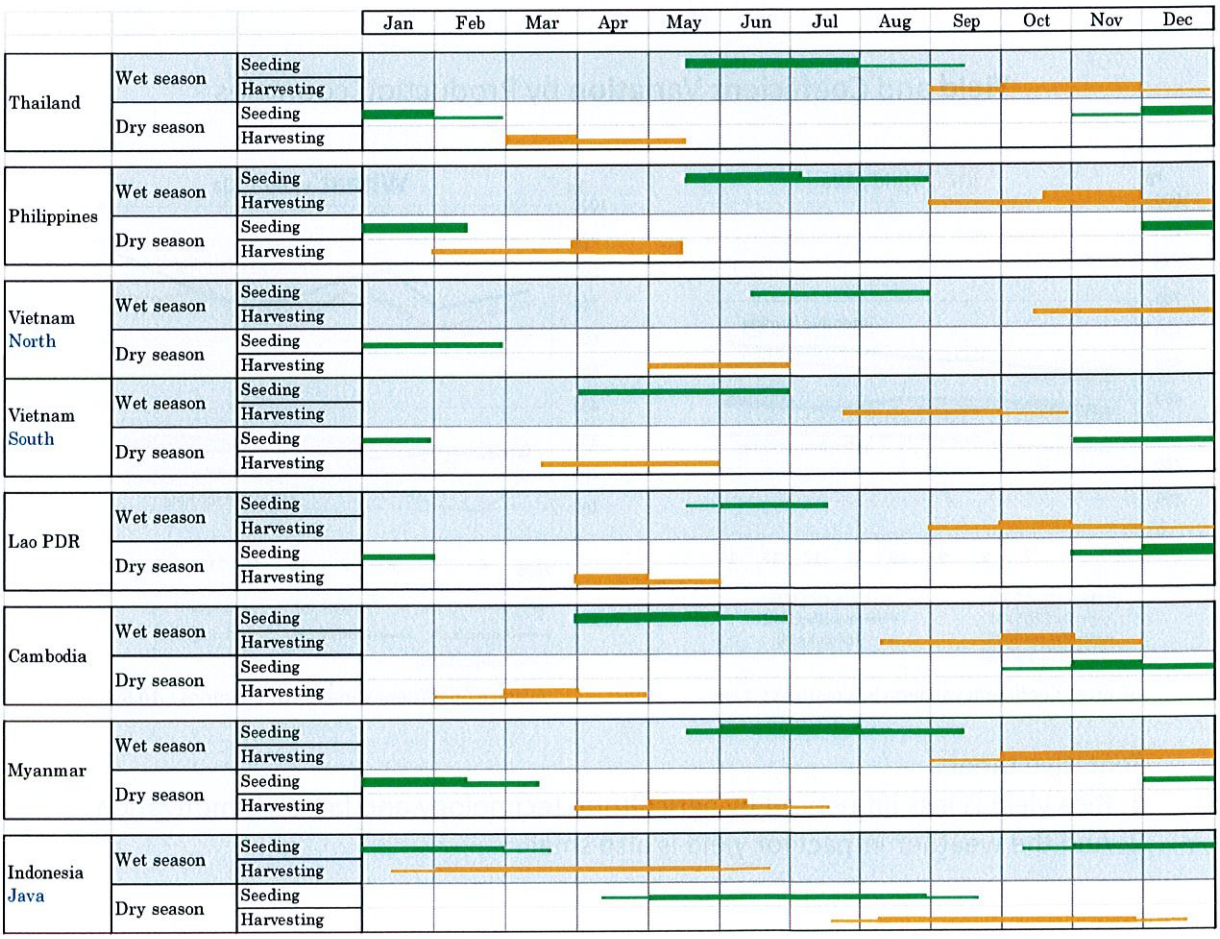
It is not an external factor



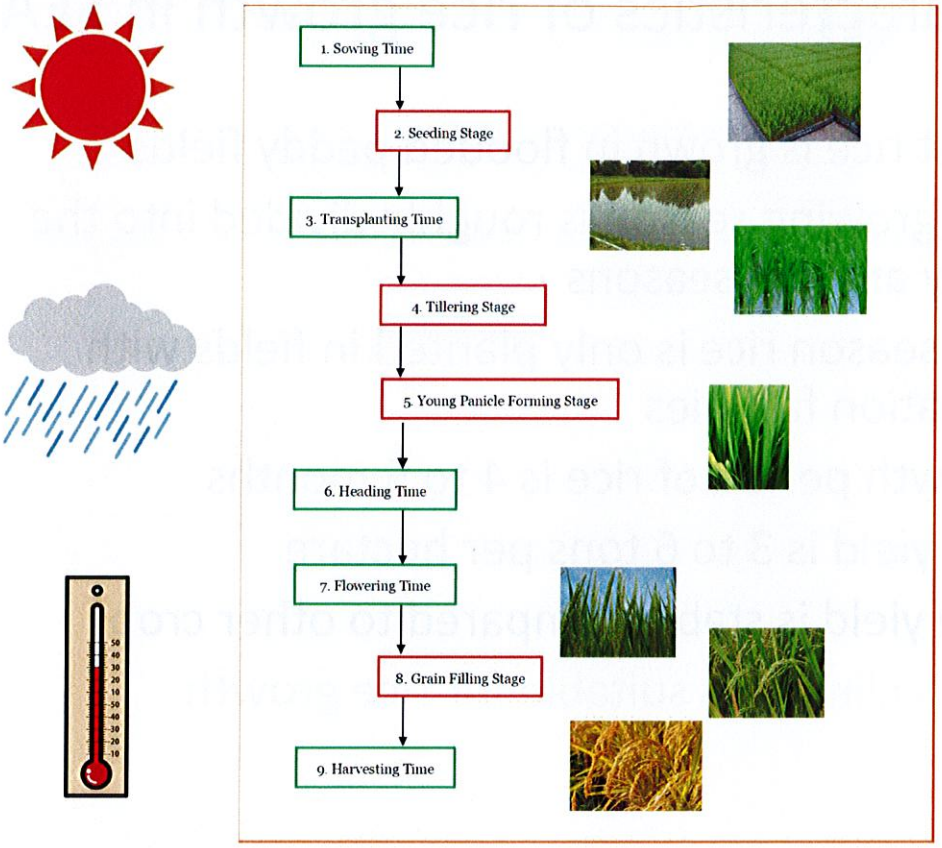
Tips on rice growth

Characteristics of rice growth in SEA

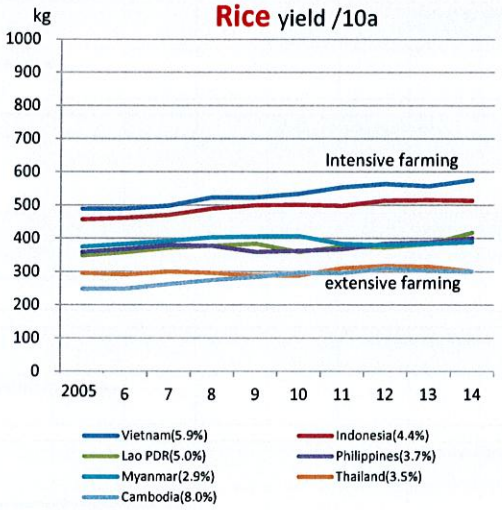
- Most rice is grown in flooded paddy fields
- The growing season is roughly divided into the rainy and dry seasons
- Dry season rice is only planted in fields with irrigation facilities
- Growth period of rice is 4 to 5 months
- The yield is 3 to 6 tons per hectare
- Rice yield is stable compared to other crops
- SEA's climate is suitable for rice growth



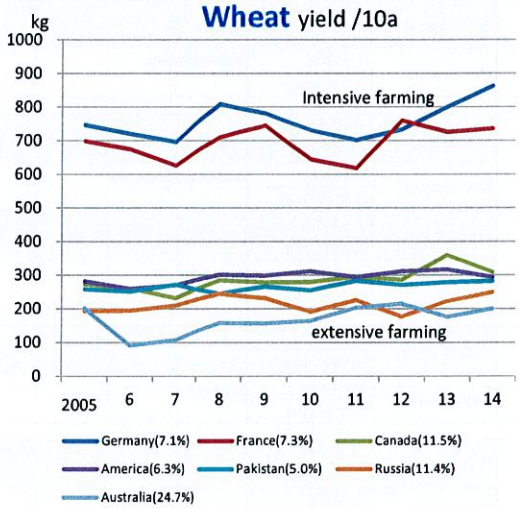
Rice growing stage (AFSIS Outlook Activity version)



Yield and **Coefficient Variation** by Production countries



Average Coefficient Variation by Countries : **4.8%**



Average Coefficient Variation by Countries : **10.5%**

Tentative theory

1. Rice yield is less influenced by agricultural technology and farmer's motivation.
2. And the weather impact for yield is also small.

How to Write Rice Growing Outlook

Utilization of space agro-meteorological data system JASMIN

What is Outlook?

- Outlook is writing information, not numerical value data.
- It supposes you have given the information that "rice growing condition is good".
- This is definitely an outlook since this information is written by writing.
- The reader knows the fact like "rice" "growing condition" "good" by this information.

What is Outlook?

・However, the information that "rice growing condition is good" is too unkind for the reader.
・Considering by 5W2H consisting of "**When, Where, Who, What, Why, How, How much**", the sentence of "Rice growing condition is good" becomes

"The rice growing condition in the northern region of
(who) (what) (where)
June is good than last year due to enough rain."
(when) (how) (how much) (why)

What is Outlook?

・Outlook is necessary to be written under common rules in order to publish (open) this sentence as rice growing outlook.
・The rules (definitions) need to have the proper background based on crop science, statistics and so on.

※Today, I'll present the rule which defined for
"Rice Growing Outlook Activity" conducting by AFSIS.

When

- It is essential to specify the growing stage at the observation time as a component of the growing outlook.
- The names of rice growing stage are known widely for the dissemination of proper cultivation management and so on.
- Four growing stages are described in the outlook, namely the "Seeding stage", the "Tillering stage", the "Young Panicle Forming stage", and the "Grain Filling stage".

Where (GEOGLAM request)

Country	Area	Country	Area
Indonesia	Java	Myanmar	Delta
	Kalimantan		Dry Lands
	Sulawesi		Inland Mountains
	Sumatra		Rakhine
	Lesser Sunda Islands	Philippines	Mindanao
Cambodia	Elephant Mtns		Central Philippines Region
	Eastern		Luzon Urban Beltway
	Mekong Lowlands		North Luzon
	Northwestern	Thailand	Central Plain
Lao PDR	North		Northeastern
	South		Northern Region
		Vietnam	North
			South

Who (Rice)

Rice is here classified into the wet season and dry season rice.
It may be called in the more common name like major rice or summer rice etc, however it indicates the rice classification of wet season or dry season too.

What (Growth condition)

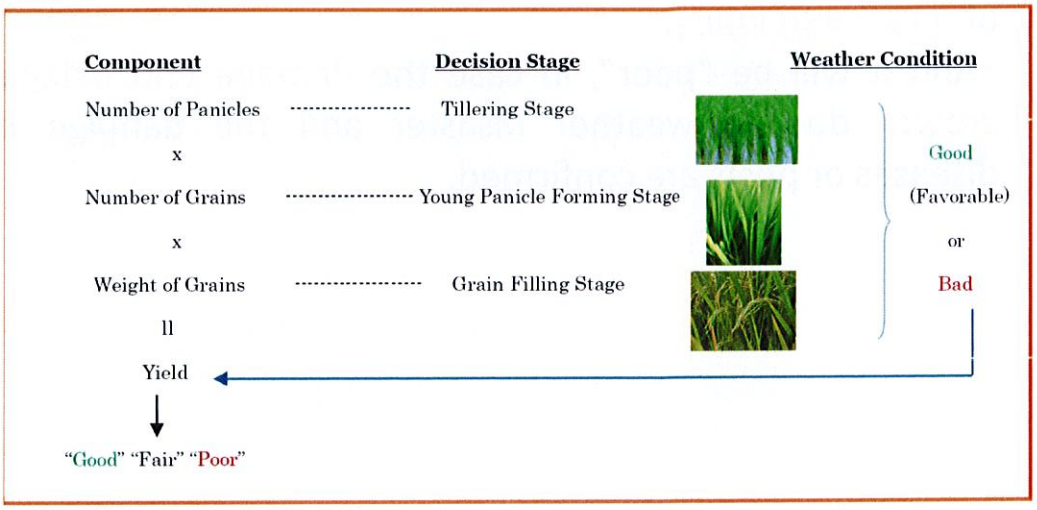
- "Who + What" becomes the growth condition of rice. Outlook writer needs to recognize that the growth condition is different by the growing stage of "When".
- For example, the outlook clears the current growing condition by growing stage of rice.

- Moreover, it's possible to describe "number of panicle", "number of grain" and "weight of grain" of rice yield component as the "What".

→ next sheet

What (Growth condition)

This is a basic yield model



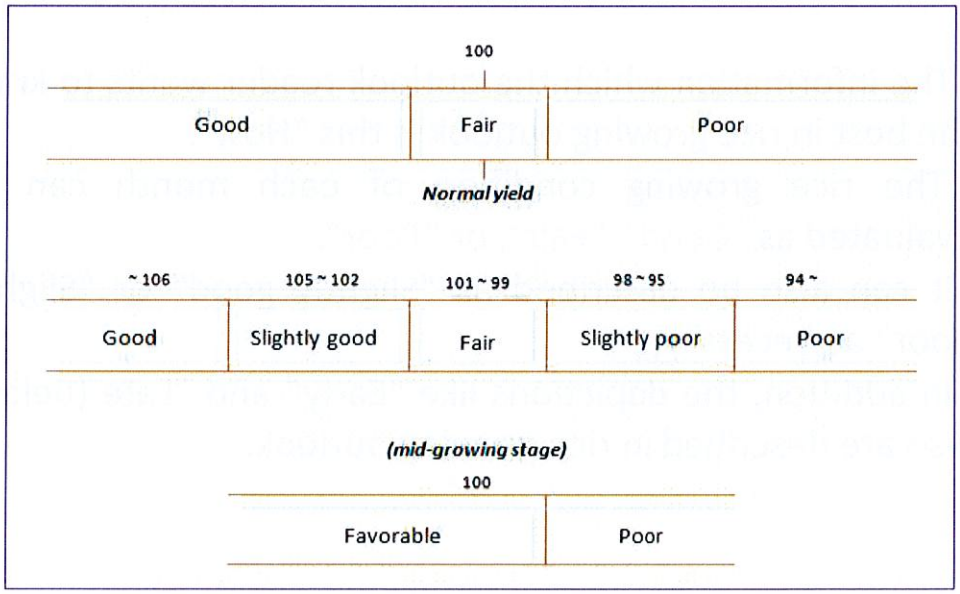
How

- The information which the outlook reader wants to know the best in rice growing outlook is this "How".
- The rice growing condition of each month can be evaluated as "Good", "Fair", or "Poor".
- It can also be described as "Slightly good" or "Slightly poor" as necessary.
- In addition, the depictions like "Early" and "Late (delay)" also are described in rice growing outlook.

How

- In terms of rice growth, it will be "good" or "fair" in case of no growth injury.
- And it will be "poor", in case the damage and delayed growth due to weather disaster and the damage by diseases or pests are confirmed.

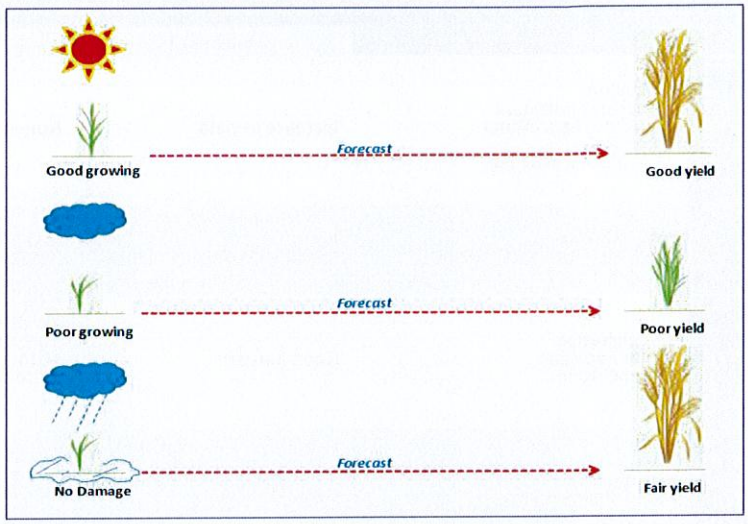
How



This index is used as a rice yield index by Ministry of Agriculture in Japan

How (Important)

- The growing condition in the mid-growing stage is estimated against the final yield.



Why

- "Why" shows the reason of growth condition.
- The outlook writer needs to recognize that the outlook value without "Why" description becomes half.
- As explaining in "How" section, "good growth" means that "high yield is expected".
- Therefore, the trend factors affecting rice yield become the "Why".

Incidentally, the trend factors affecting rice yield are called as "yield requisites of rice".

Why for Outlook

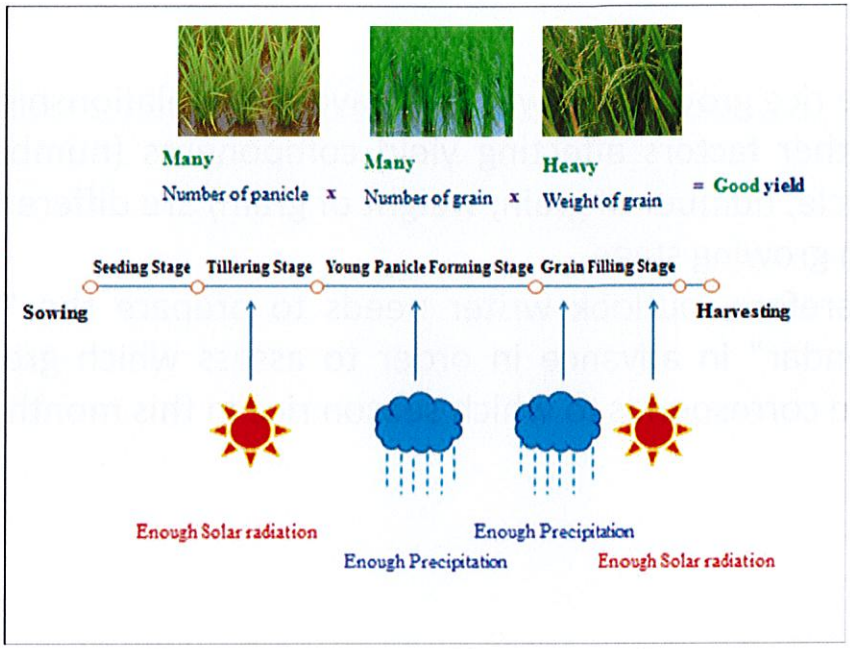
Yield Requisites of RICE

Requisite	Main Phenomenon or Event	Condition	
		Good (High)	Poor (Low)
Agricultural Technology	•Irrigation •Breed improvement •Fertilizer, Agricultural chemical •Agricultural machine	Increase in yield	Non-increase in yield
Motivation of Farmer	•Market price •Agriculture policy (Subsidies)	High fertilization management	Low fertilization management
Weather Condition	•Precipitation •Solar Radiation •Temperature	Good harvest	Poor harvest •Weather disaster •Growth injury •Other damage (disease and insect)
Others	•Field capacity •Field environment	High yield	Low yield

Rice growth and weather condition

- It is difficult to assess "the good weather for rice growing" by any standard.
- The proper precipitation promotes rice growing, but high precipitation is an obstacle.
- The solar radiation and temperature also present a similar problem for assessment.
- On the other hand, it is an undisputed fact that the weather condition has a big impact on rice growing.
- It can imply that "good growing" means "the weather condition is (was) good for rice".
- Based on this principle, the outlook writers have to catch the basic rice growing mechanism by weather condition.

Rice growth and weather condition



Growth injury and weather condition

Growth injury

The lacks of precipitation and solar radiation give indirect impacts on the growing condition and are classified as growth injury.

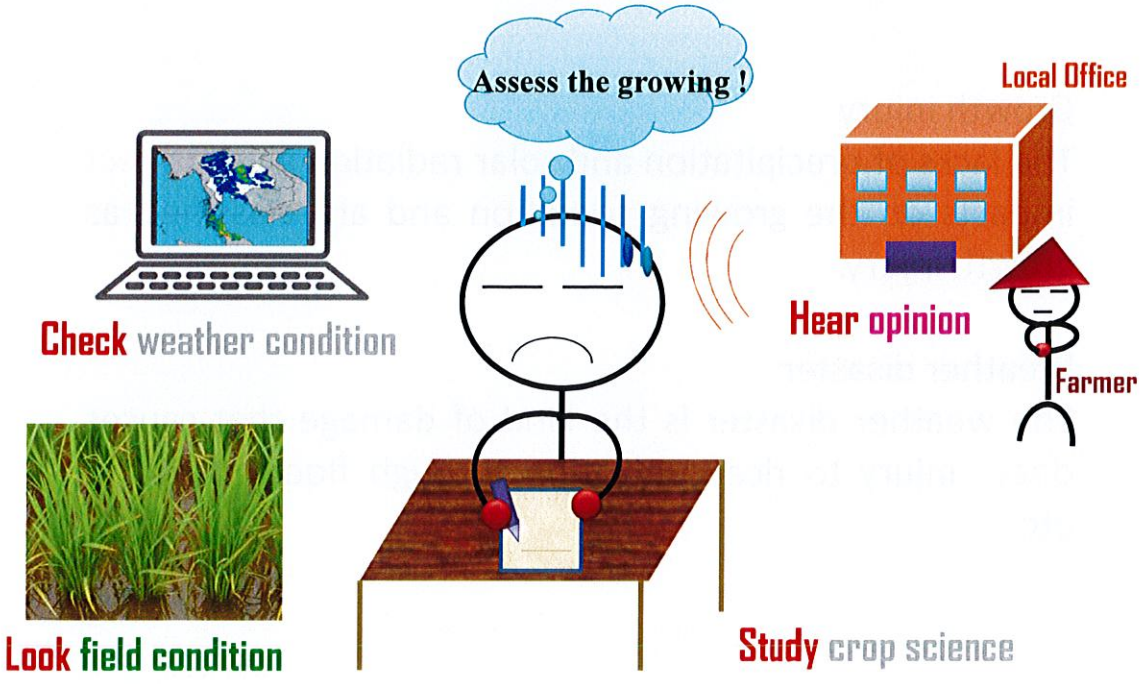
Weather disaster

The weather disaster is the kind of damage that causes direct injury to rice cultivation through flood, drought, etc.

Crop Calendar

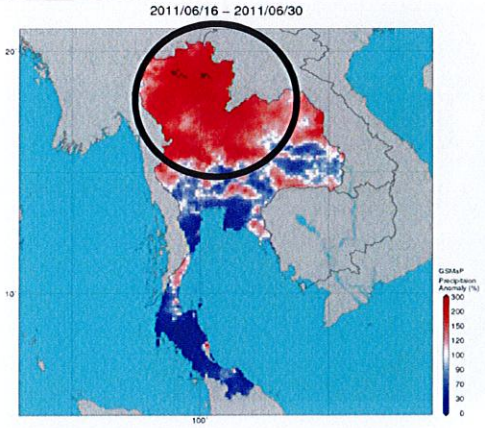
- The rice growth and weather have close relationship and weather factors affecting yield components (number of panicle, number of grain, weight of grain) are different for each growing stage.
- Therefore, outlook writer needs to prepare the "Crop Calendar" in advance in order to assess which growing stage corresponds to which season rice in this month.

Study, Hear, Look, Check for the Rice Growth Assessment



How to decipher JASMIN Map

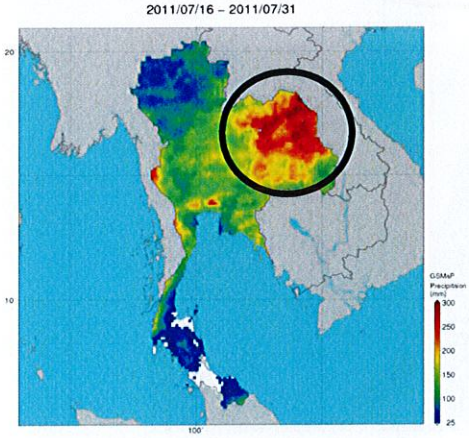
2011 June Second half precipitation Anomaly Map



The flood in 2011 is generally said to be caused by heavy rain in **July** second half brought by Typhoon, but it can be observed that the precipitation in the northern region was already higher than normal year as of **June** second half.

How to decipher JASMIN Map

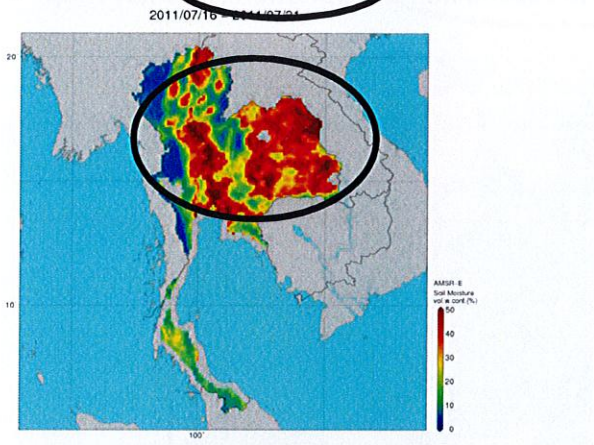
2011 July Second half precipitation Current Map



The heavy rain brought by Typhoon can be observed by "Current Map". The map shows that there was rain mainly in the northeastern region, but not in the northern area that has been widely recognized.

How to decipher JASMIN Map

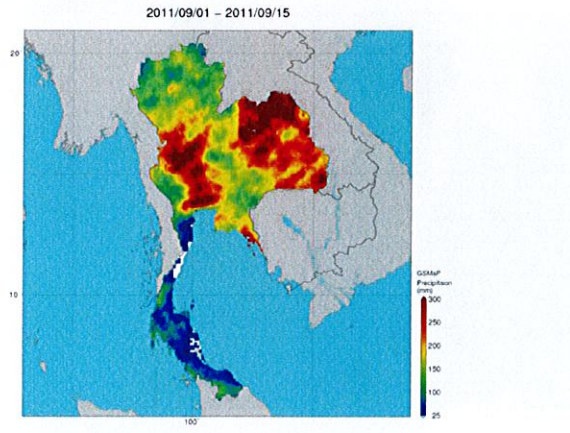
2011 July Second half soil moisture Current Map



The flooded area can be estimated by soil moisture map. Dark red indicates the areas with soil moisture above 50%. The flooding area spreads from northeastern region to central region due to heavy rain in July second half.

How to decipher JASMIN Map

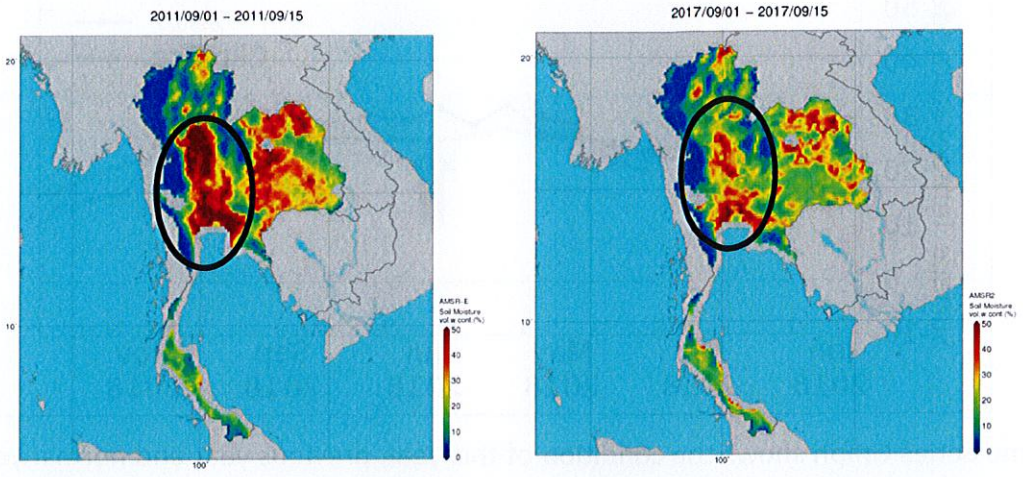
2011 September First half precipitation Current Map



In August, the rain stopped once, but northeastern region and central region were suffered by heavy rain again in September first half. The occurrence of flood was decisive due to this rainfall.

How to decipher JASMIN Map

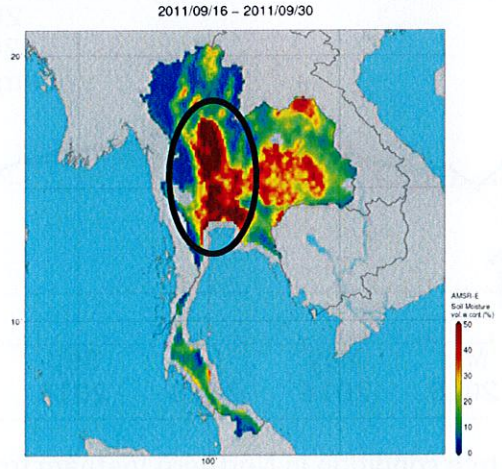
2011, 2017 September First half Soil Moisture Current Map



The difference is obvious when comparing soil moisture map in 2011 and 2017 in September first half.

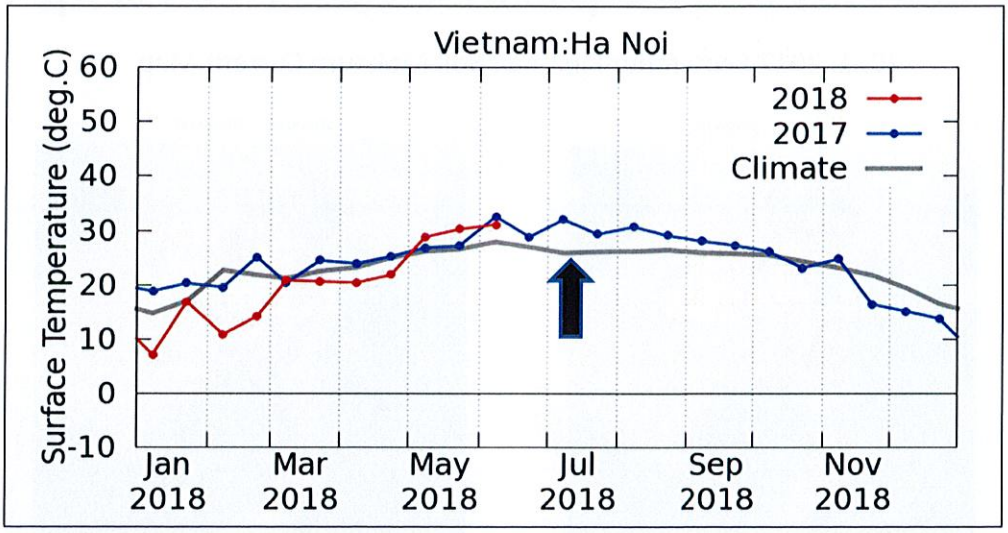
How to decipher JASMIN Map

2011 September Second half Soil Moisture Current Map



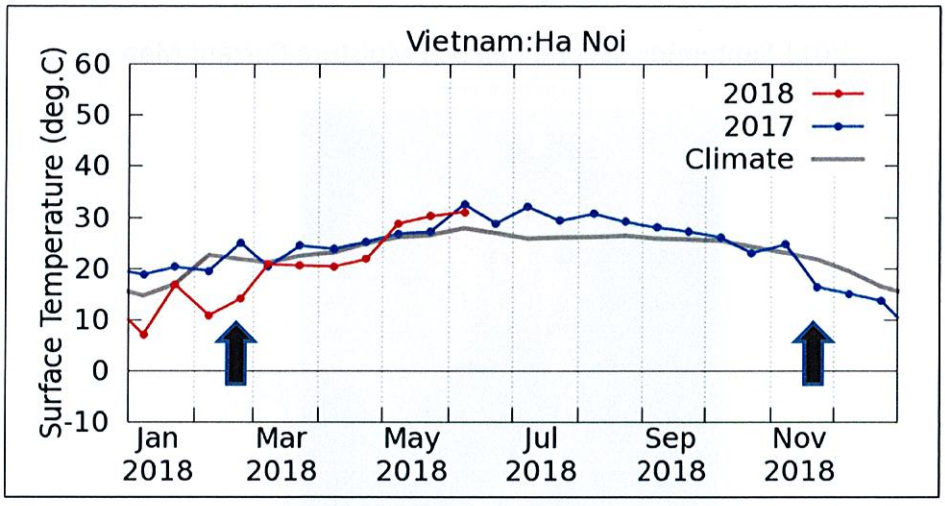
In September second half, the flood condition in northeastern region is recovering, but the central region continues flooded condition still.

How to decipher JASMIN Time Series Graph



Time Series Graph shows the condition of this year, previous year and normal year by each weather index. The first point to pay attention is the trend of Climate (normal value). The weather influencing to rice growth is precipitation, solar radiation, and temperature mainly. For this reason, if this year's precipitation, solar radiation, and temperature trends are exactly the same with the normal, it can be consider that this year's rice yield is normal.

How to decipher JASMIN Time Series Graph



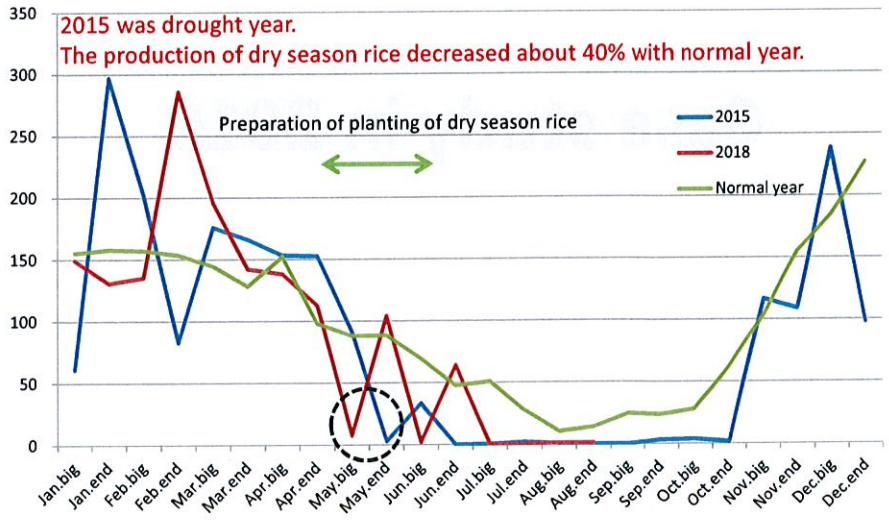
Looking at the low temperature condition in Northern Vietnam from 2017 to 2018. The low temperature trend started since the end of November in 2017, and this trend continued until the end of February in 2018. Meanwhile, the Northern Vietnam during this period is in the planting season of dry season rice, so there was concern about delay of planting work and growth injury of seeding.

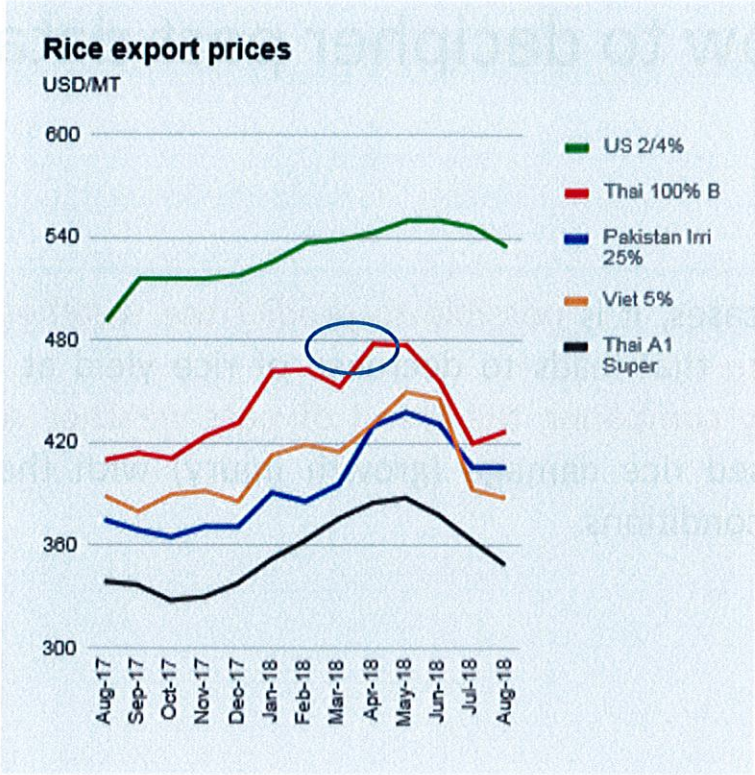
How to decipher past data

In some cases, it is possible to predict the weather damage occurrence that leads to decrease of rice yield at a certain degree by comparing the trend of past weather conditions that caused rice damage (growth injury) with the current weather conditions.

How to decipher past data

Precipitation of West Java province, Indonesia

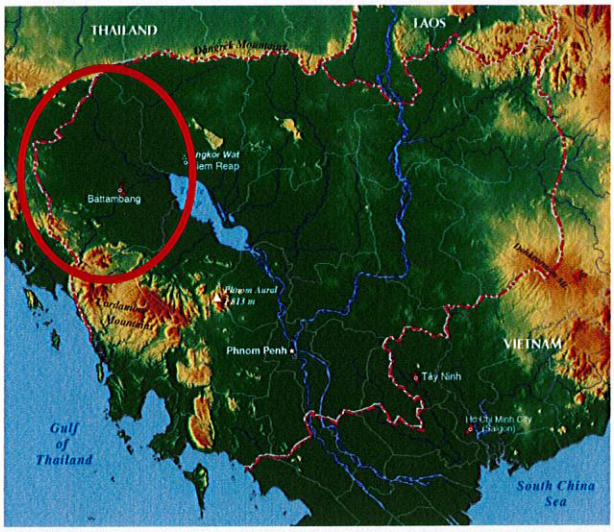




FAO Price data

Case study in 2019

Battambang province



Rice of Battambang province

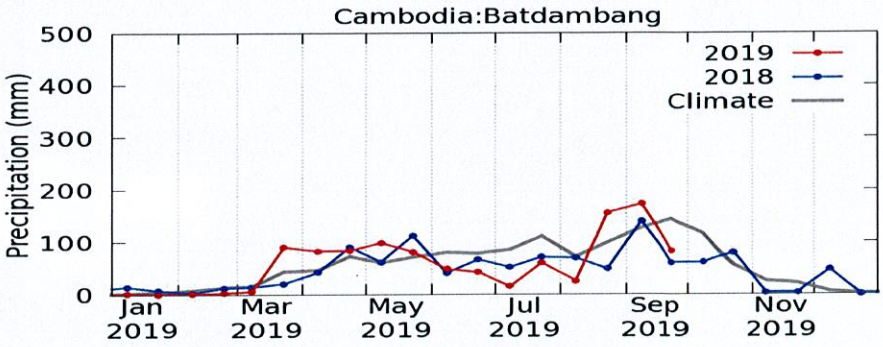
The most rice planting province in Cambodia
Most paddy fields are rainfed field

Wet season rice planted area: 365,900ha (2018)
About 10% of total national planted area
Planted rate for province area: 31.3%
Average yield: 3.1t/ha (2016)

Dry season rice planted area : 21,500ha (2018-19)
Average yield : 4.0t/ha (2016)

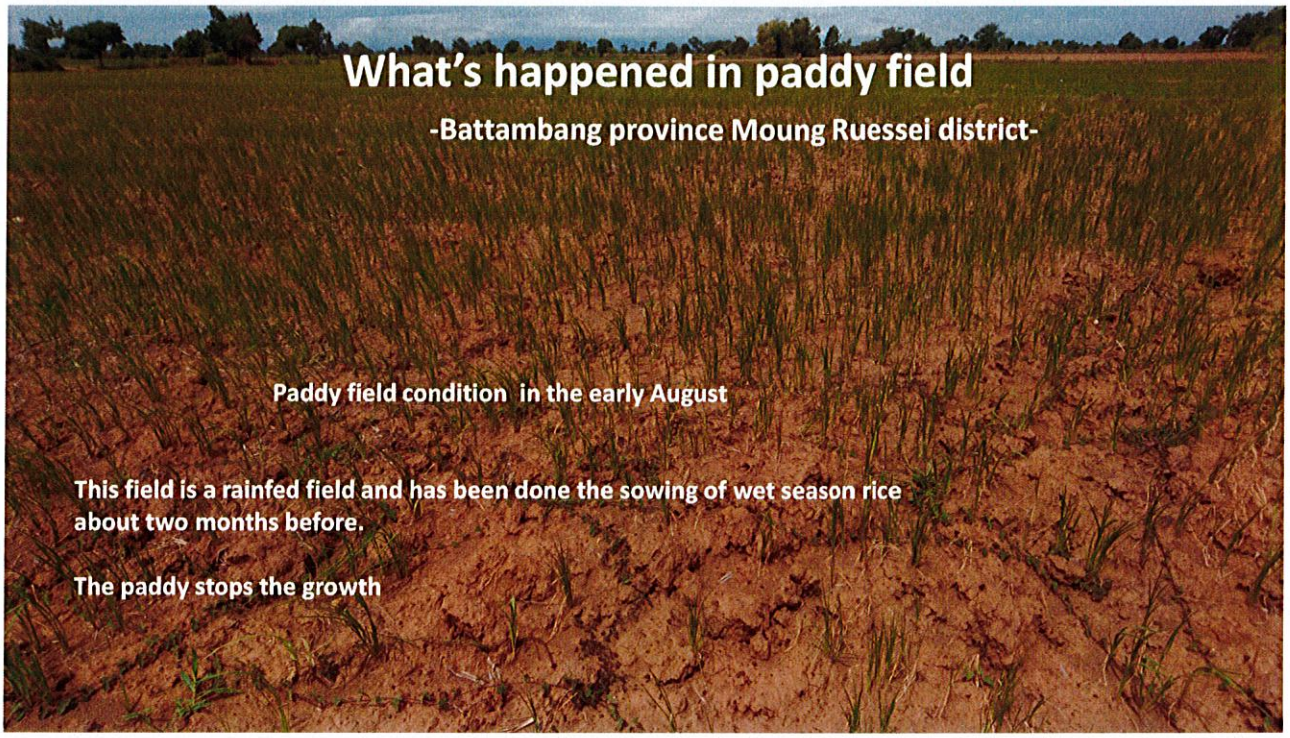
Data source: DPS

Battambang province in 2019 (precipitation)



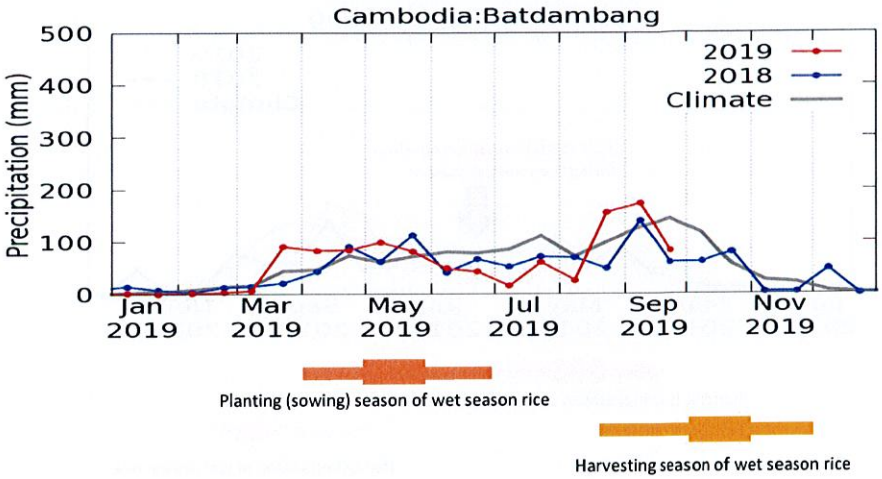
Characteristics of rainfall conditions in 2019

From late March to late May : There was more rainfall than normal
From early June to late August : Little rainfall condition continued
From late August to early September : There was more rainfall than normal


What's happened in paddy field
-Battambang province Moung Ruessei district-
Paddy field condition in the early August
This field is a rainfed field and has been done the sowing of wet season rice about two months before.
The paddy stops the growth


Paddy field condition in the early August
After this, just wait for plant death

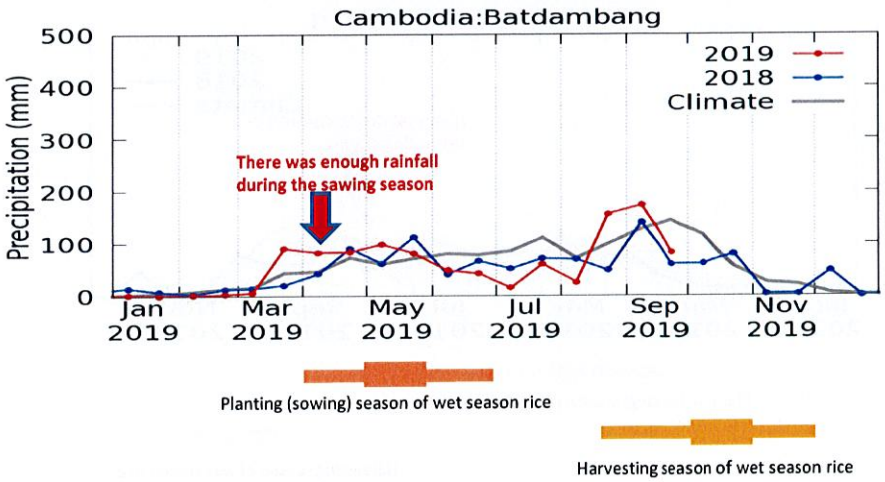
Battambang province in 2019



Planting (sowing) season of wet season rice

Harvesting season of wet season rice

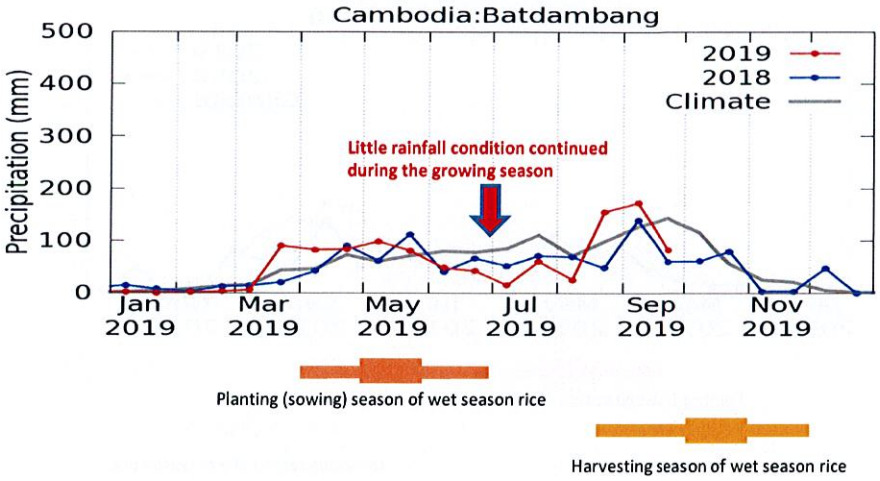
Battambang province in 2019



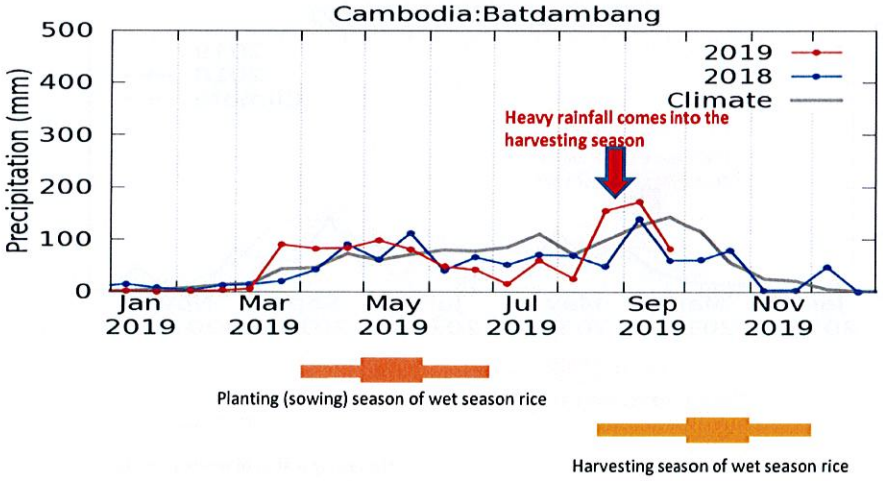
Planting (sowing) season of wet season rice

Harvesting season of wet season rice

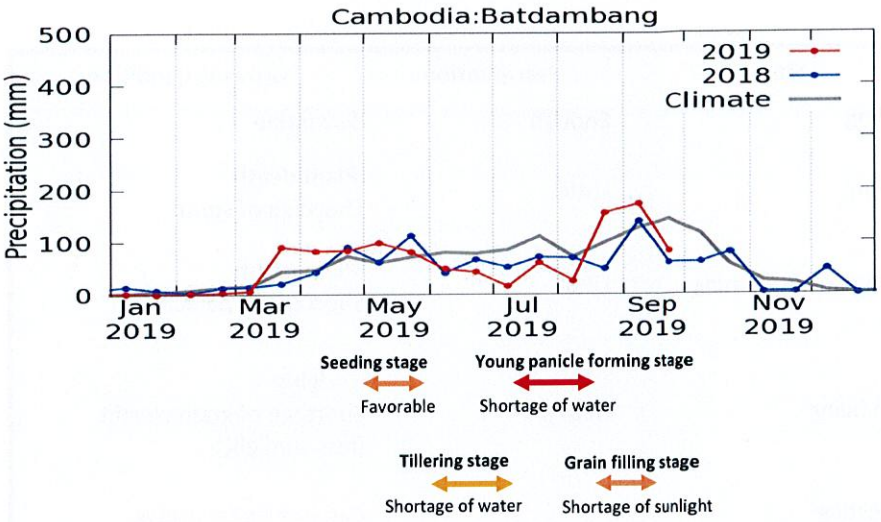
Battambang province in 2019



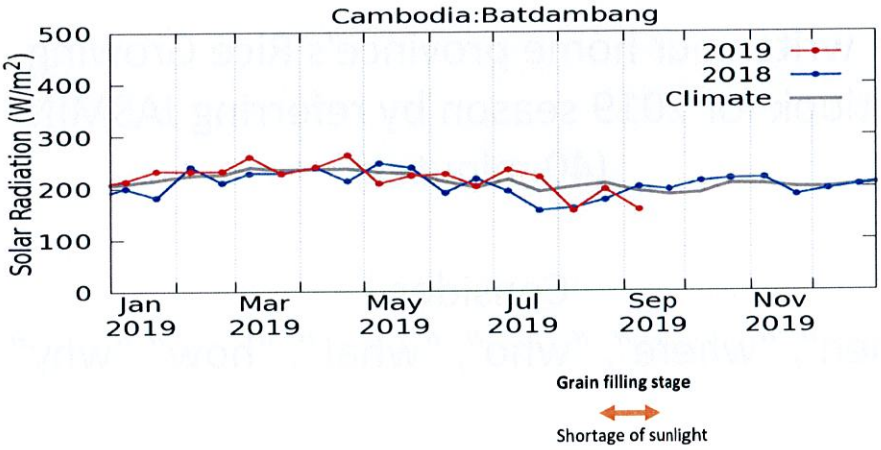
Battambang province in 2019



Battambang province in 2019



Battambang province in 2019



Battambang province in 2019

Stage	Precipitation	Growing condition
Seeding	Enough	Favorable
Tillering	Little	Plant death Shortage of stem
Young panicle forming	Little	Plant death Shortage of panicle
Grain filling	Heavy	Lodging Shortage of grain weight (less sunlight)
Harvesting		**Can not be Favorable**

Practice exercise

Let write your home province's Rice Growing Outlook for 2019 season by referring JASMIN (40 minutes)

Consider
"when", "where", "who", "what", "how" "why"

Let present your outlook!!

The presentation will be allocated 5 minutes for each country

The relation between rice yield (growing condition) and weather condition

The final **rice yield** (Good, Fair and Poor) **can be explained almost 100% by the weather condition** in each yield component stage (Tillering stage, Young panicle forming stage and Grain filling stage) analysis

Conversely,
The weather condition in each yield component stage **can assess at some level** the final **rice yield** (Good, Fair and Poor) forecasting

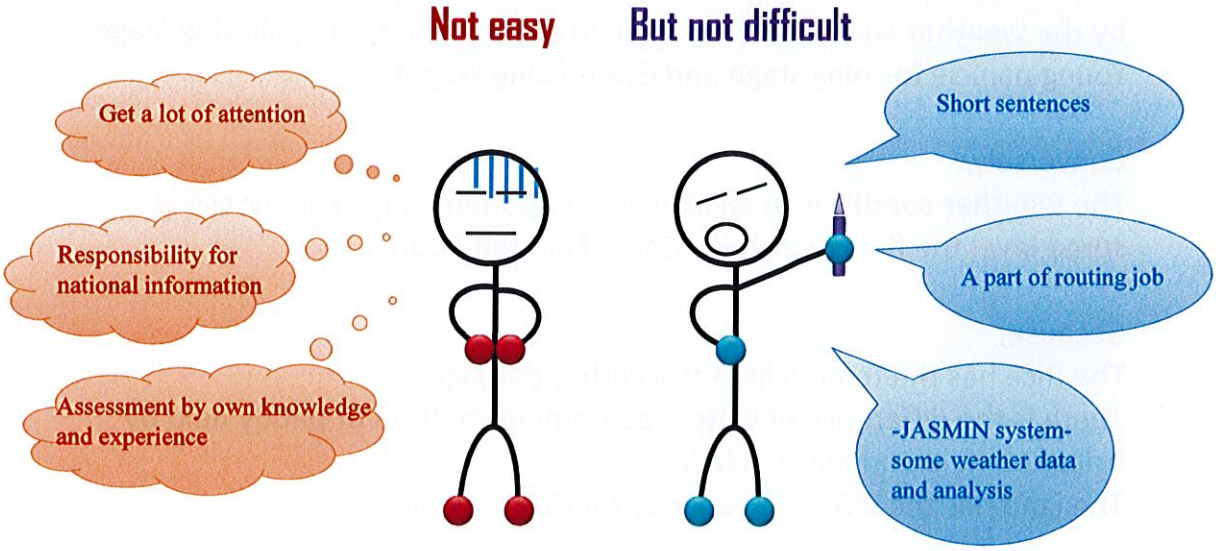
Because,
The Rice has the tolerability for weather damage
There is the difference of water securement method of paddy field by irrigation field and rain-fed field
The land has the different capacity for rice growing

The relation between rice yield (growing condition) and weather condition

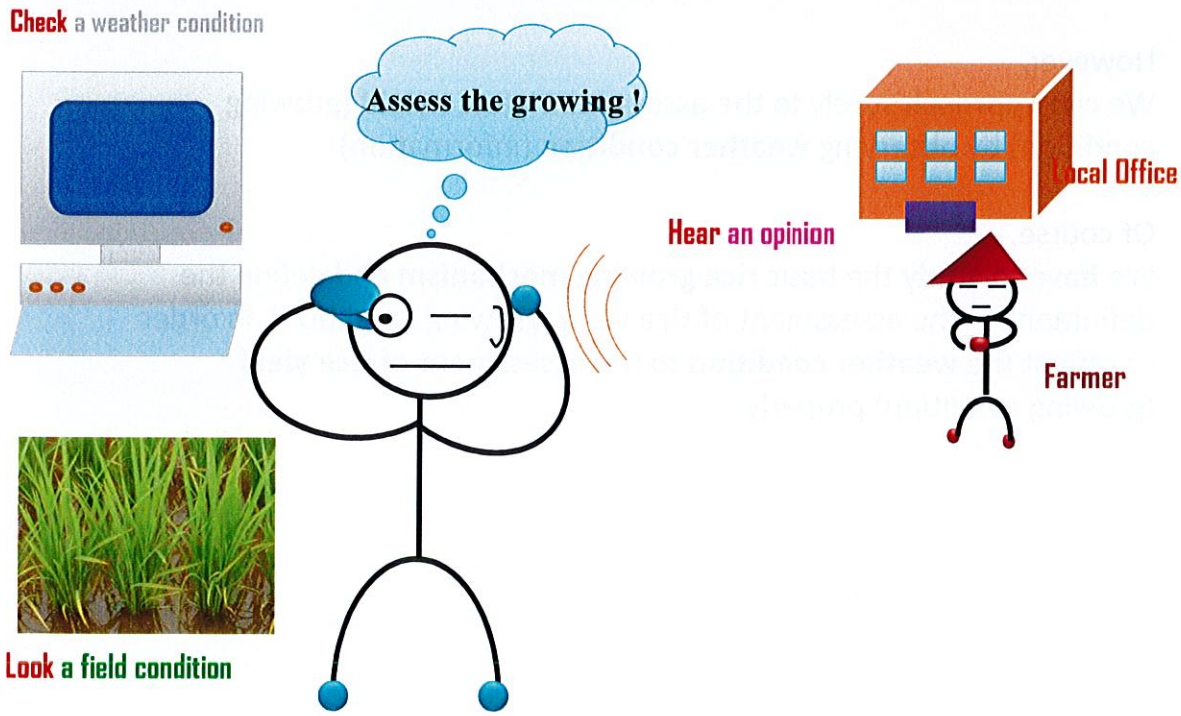
However,
We **can approach** surely to the assessment of **rice yield** (growing condition) by observing **weather condition** (information)

Of course,
We **have to study** the basic **rice growing mechanism** and define the definition for the assessment of rice yield (growing condition) in order to **reflect** the **weather condition** to the assessment of **rice yield** (growing condition) properly

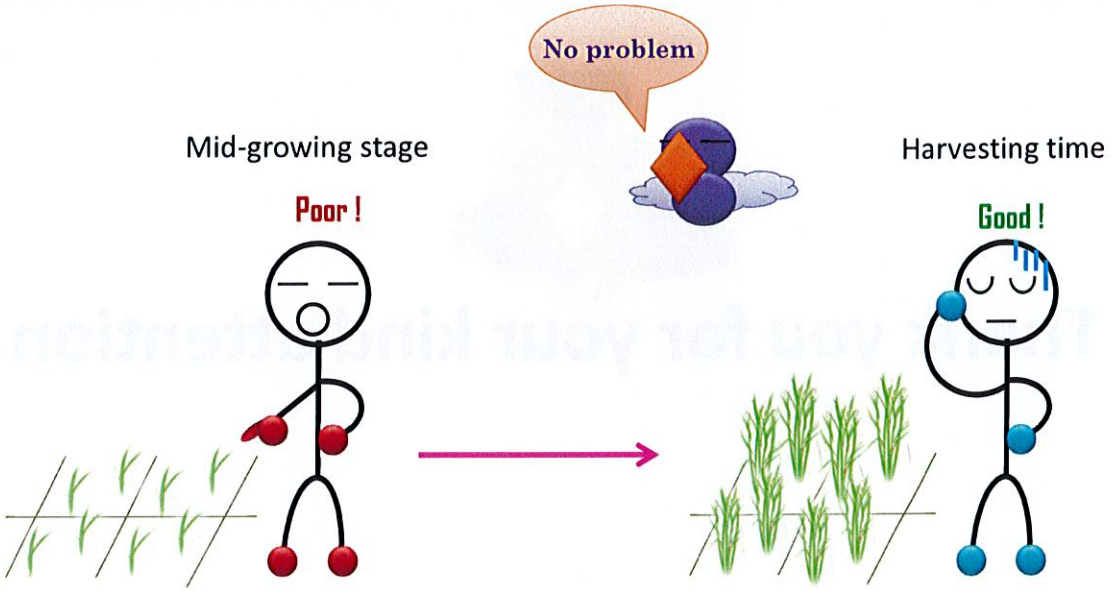
Not easy but not difficult



Look, Check, Hear and Assess

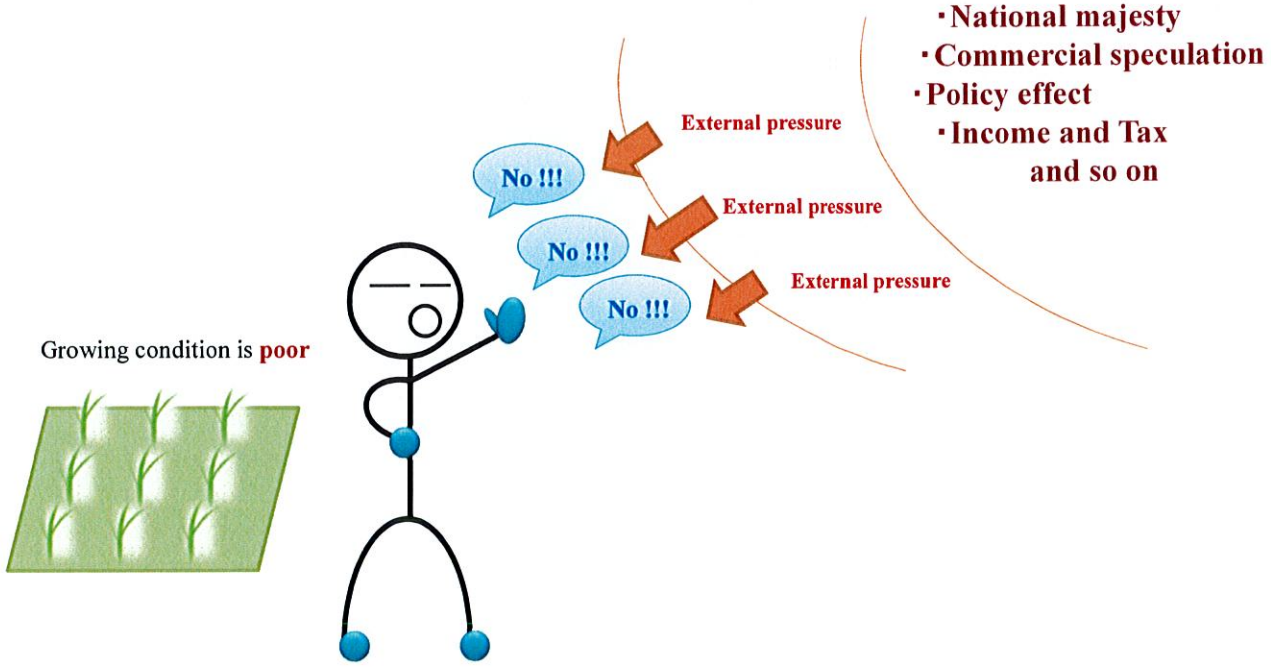


Don't hesitate to assess



Outlook can excuse by any words

Believe and Support own assessment



Thank you for your kind attention