

# CLIMATE INFORMATION APPLICATION IN VIET NAM

**Dr. Hoang Duc Cuong**  
**Institute of Meteorology and Hydrology**

# I. INTRODUCTION

- The **agricultural** production plays an important role in socio-economic development of Viet Nam. However, the agricultural production depends much on the weather and climate conditions.
- Viet Nam is one of the **natural disaster-prone countries**. The climatic information, warnings and prediction will be helpful for policy-makers/decision-makers in planning and taking appropriate adaptation measures to the climate variability to minimize damages caused by the natural disasters.
- Recently, thanks to the improvement of the weather/climatic prediction technology, good telecommunication means, favorable international/ regional cooperation as well as the successful progress of modernization process of hydro-meteorological activities, the quality of the climatic information and prediction services is gradually getting higher. However, the applications of climatic information and prediction are **still limited**.

## II. THE CURRENT STATUS OF CLIMATE INFORMATION PRODUCT

Institute of Meteorology and Hydrology – **IMH**:

N°	Name of products	Units (year)	Provided by
1	Climatic Information		Institute of Meteorology and Hydrology - IMH <a href="http://www.imh.ac.vn">http://www.imh.ac.vn</a>
1.1	Seasonal Climate Bulletin	12	Center for Meteorology and Climatology - CMETC
1.2	Seasonal Climate Outlook	12	CMETC
1.3	Annual Climate Bulletin	1	CMETC

## Institute of Meteorology and Hydrology – **IMH**:

N°	Name of products	Units (year)	Provided by
2	Agrometeorological Information		Institute of Meteorology and Hydrology - IMH <a href="http://www.imh.ac.vn">http://www.imh.ac.vn</a>
2.1	Agrometeorological Bulletin	12	Center for Agricultural Meteorology – CAMET
2.2	Agrometeorological Warning on Natural Disaster	12	CAMET
2.3	Agrometeorological Forecasts	6	CAMET
2.4	Agrometeorological Crop Summary	2	CAMET

# National Center for Hydrometeorological Forecasting – **NCHMF:**

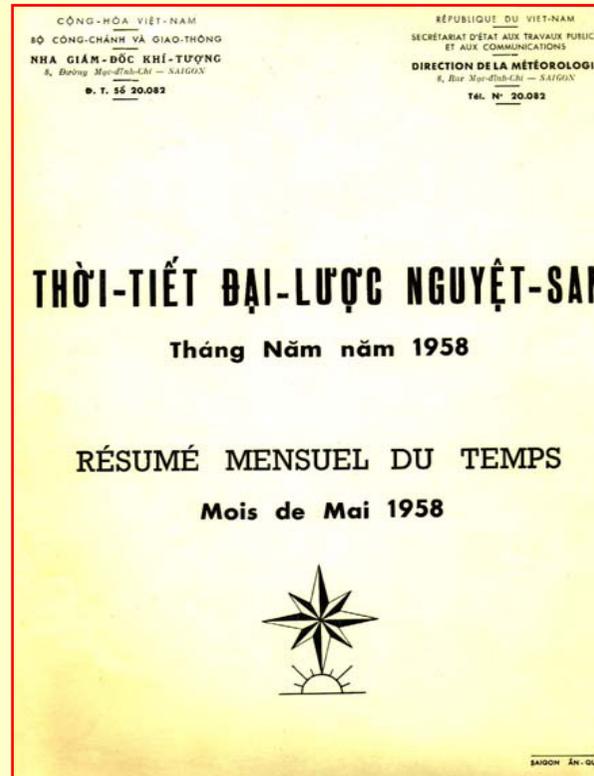
<b>N°</b>	<b>Name of products</b>	<b>Units (year)</b>	<b>Provided by</b>
<b>1.</b>	<b>Meteorological forecasting</b>		<b>NCHMF</b>
1.1	Weather forecasting	Every day	NCHMF
1.2	Typhoon and cold weather forecasting	any	NCHMF
1.3	10 days weather forecasting	36	NCHMF
1.4	Monthly weather forecasting	12	NCHMF
1.5	Seasonal weather forecasting for winter-spring and summer crops	2	NCHMF

# Climate bulletin and outlook

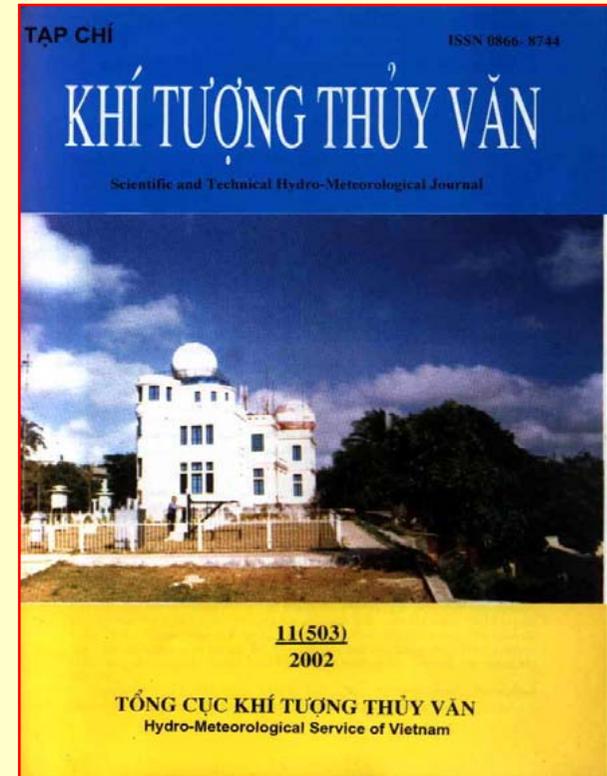
## History:



Before 1954



1954-1975



1954-1998

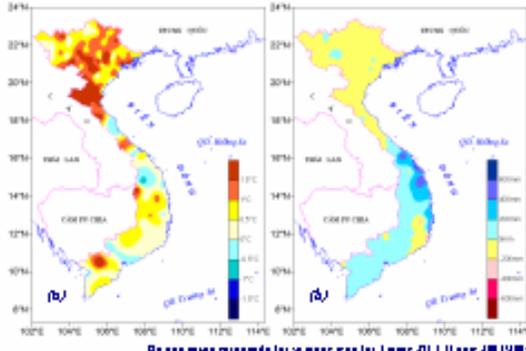
No climate forecast

# Climate bulletin and outlook

1999-present:

**BỘ TÀI NGUYÊN VÀ MÔI TRƯỜNG**  
**VIỆN KHÍ TƯỢNG THỦY VĂN**

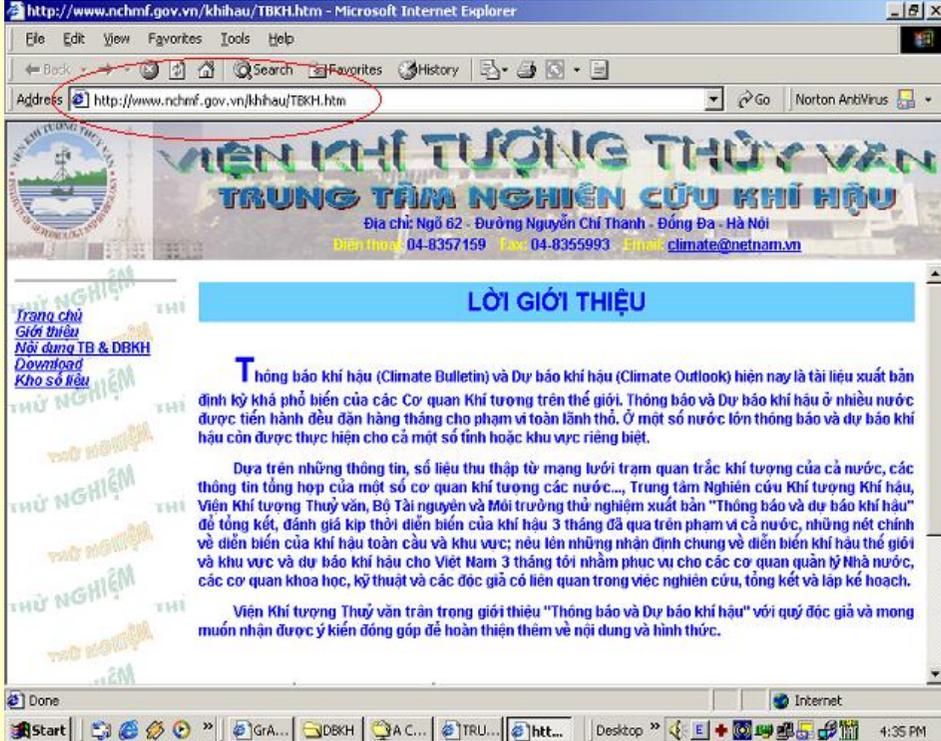
**THÔNG BÁO VÀ DỰ BÁO KHÍ HẬU**  
**THÁNG XII, I, II NĂM 2003 / 2004**



**Seasonal Climatic Bulletin  
and Outlook  
(DJF 2002/2003)**

Hà Nội, tháng XI - 2003

Paper



**VIỆN KHÍ TƯỢNG THỦY VĂN**  
**TRUNG TÂM NGHIÊN CỨU KHÍ HẬU**  
Địa chỉ: Ngõ 62 - Đường Nguyễn Chí Thanh - Đống Đa - Hà Nội  
Điện thoại: 04-8357159 Fax: 04-8355993 Email: climate@netnam.vn

**LỜI GIỚI THIỆU**

**T**hông báo khí hậu (Climate Bulletin) và Dự báo khí hậu (Climate Outlook) hiện nay là tài liệu xuất bản định kỳ khá phổ biến của các Cơ quan Khí tượng trên thế giới. Thông báo và Dự báo khí hậu ở nhiều nước được tiến hành đều đặn hàng tháng cho phạm vi toàn lãnh thổ. Ở một số nước lớn thông báo và dự báo khí hậu còn được thực hiện cho cả một số tỉnh hoặc khu vực riêng biệt.

Dựa trên những thông tin, số liệu thu thập từ mạng lưới trạm quan trắc Khí tượng của cả nước, các thông tin tổng hợp của một số cơ quan khí tượng các nước..., Trung tâm Nghiên cứu Khí tượng Khí hậu, Viện Khí tượng Thủy văn, Bộ Tài nguyên và Môi trường thử nghiệm xuất bản "Thông báo và dự báo khí hậu" để tổng kết, đánh giá kịp thời diễn biến của khí hậu 3 tháng đã qua trên phạm vi cả nước, những nét chính về diễn biến của khí hậu toàn cầu và khu vực; nêu lên những nhân định chung về diễn biến khí hậu thế giới và khu vực và dự báo khí hậu cho Việt Nam 3 tháng tới nhằm phục vụ cho các cơ quan quản lý Nhà nước, các cơ quan khoa học, kỹ thuật và các độc giả có liên quan trong việc nghiên cứu, tổng kết và lập kế hoạch.

Viện Khí tượng Thủy văn trân trọng giới thiệu "Thông báo và Dự báo khí hậu" với quý độc giả và mong muốn nhận được ý kiến đóng góp để hoàn thiện thêm về nội dung và hình thức.

Website

# **The main climate information in Seasonal Climatic Bulletin and Outlook:**

## **1. Climatic variation of the past 3 months**

1.1. Climatic variation on the Southeast Asia and the World (ENSO phenomenon, monsoon and trade activities)

1.2. Climatic variation in Viet Nam (Temperature; Rainfall; Sunshine; Evaporation and Wet index; Some other climatic phenomenons; Hydrometeorological calamity and losses).

## **2. Seasonal climate outlook for the next 3 months**

2.1. Overview on climatic variation on the Southeast Asia and the World (ENSO phenomenon, seasonal temperature and rainfall forecast from IRI, ECMWF)

2.2. Seasonal climate forecast for Viet Nam (seasonal temperature, rainfall, number of cold fronts and cyclones).

# Seasonal Climate Prediction Models

## 1. Predictants and predictors

### 1.1. Predictants:

- Seasonal total rainfall
- Seasonal mean temperature

Season = 3 continuous months

Normal period: 1971-2000

### 1.2. Predictors:

- Sea Surface Temperature anomalies in NINO regions (12 months before forecast season).
- Southern Oscillation Index (12 months before forecast season).
- Twelve SSTA principal components (from BoM).

# Seasonal Climate Prediction Models

## 2. Methods

### 2.1. For model developing

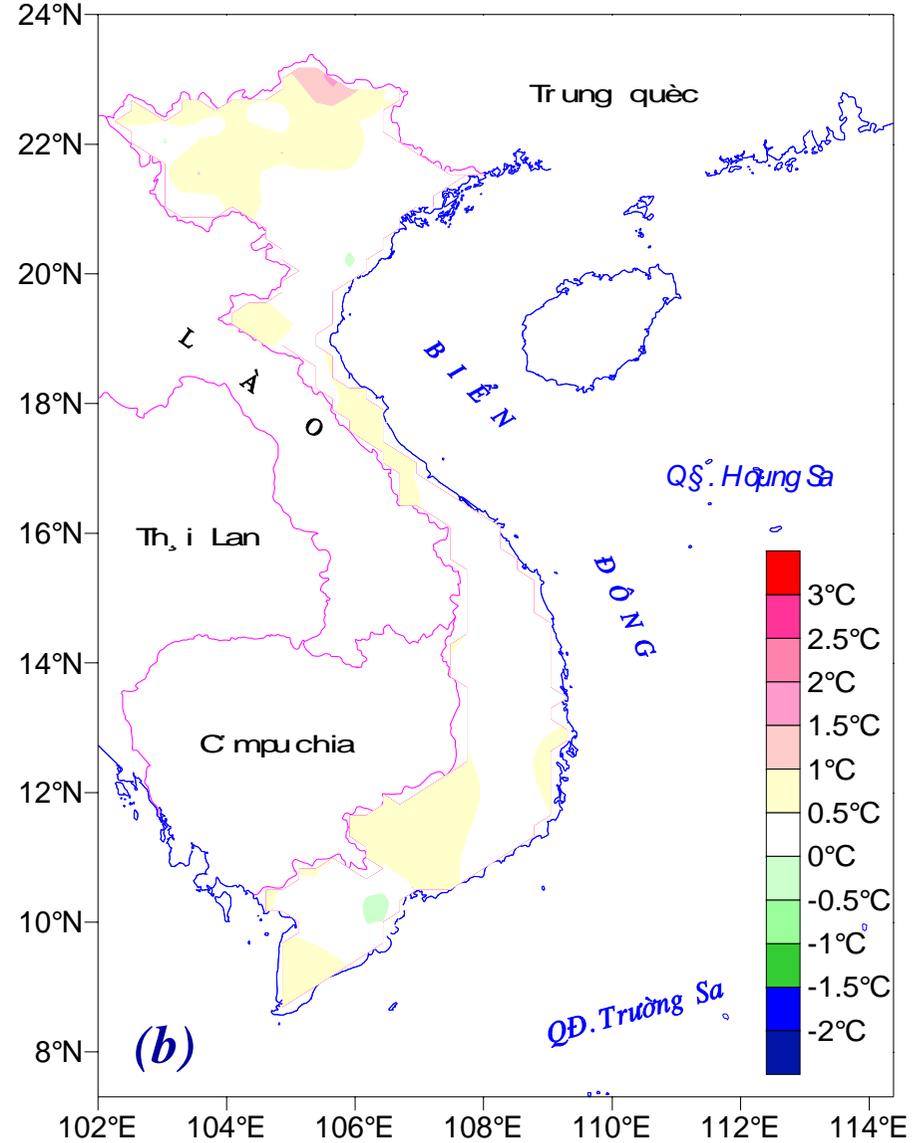
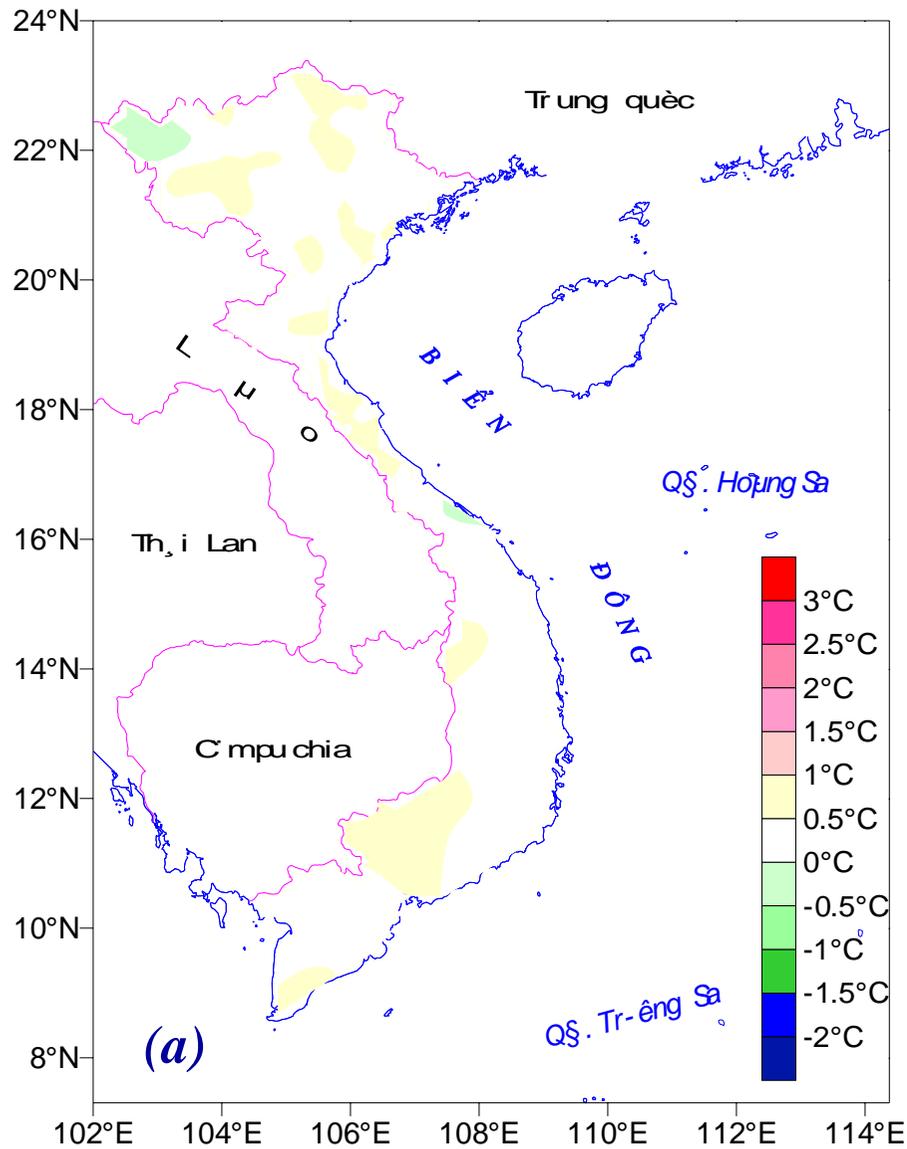
- Multiple regression
- Step-wise regression
- Discriminant analysis
- Statistical Downscaling
- Other (CPT/IRI, ...)

### 2.2. For model verification

- Variance analysis
- Contingency table
- Cross-Validation method
- Other (LEPS,...)

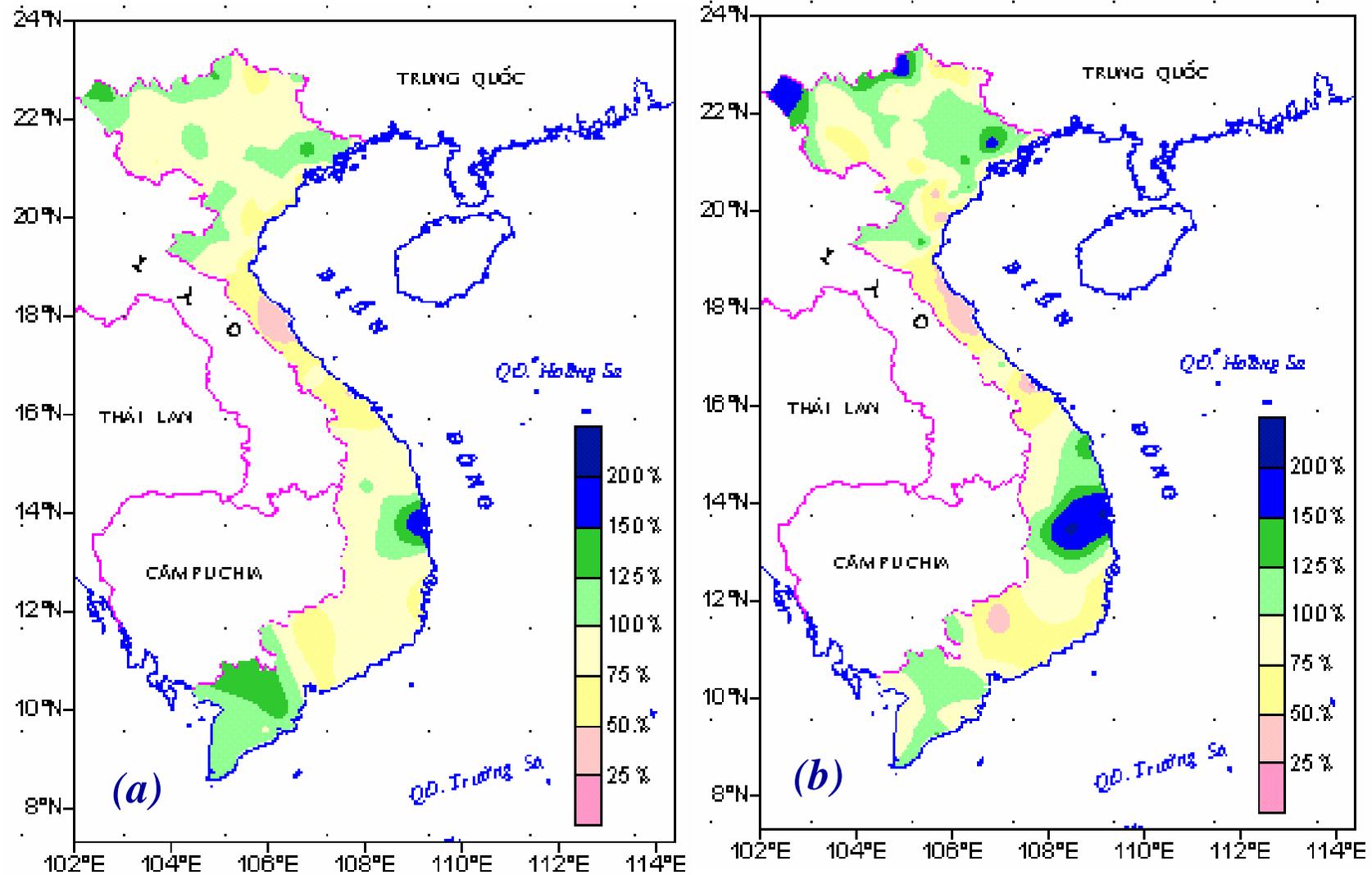
# Seasonal Climatic Bulletin (example)

## Temperature anomalies for past 3 months (a) and past months (b)



# Seasonal Climatic Bulletin (example)

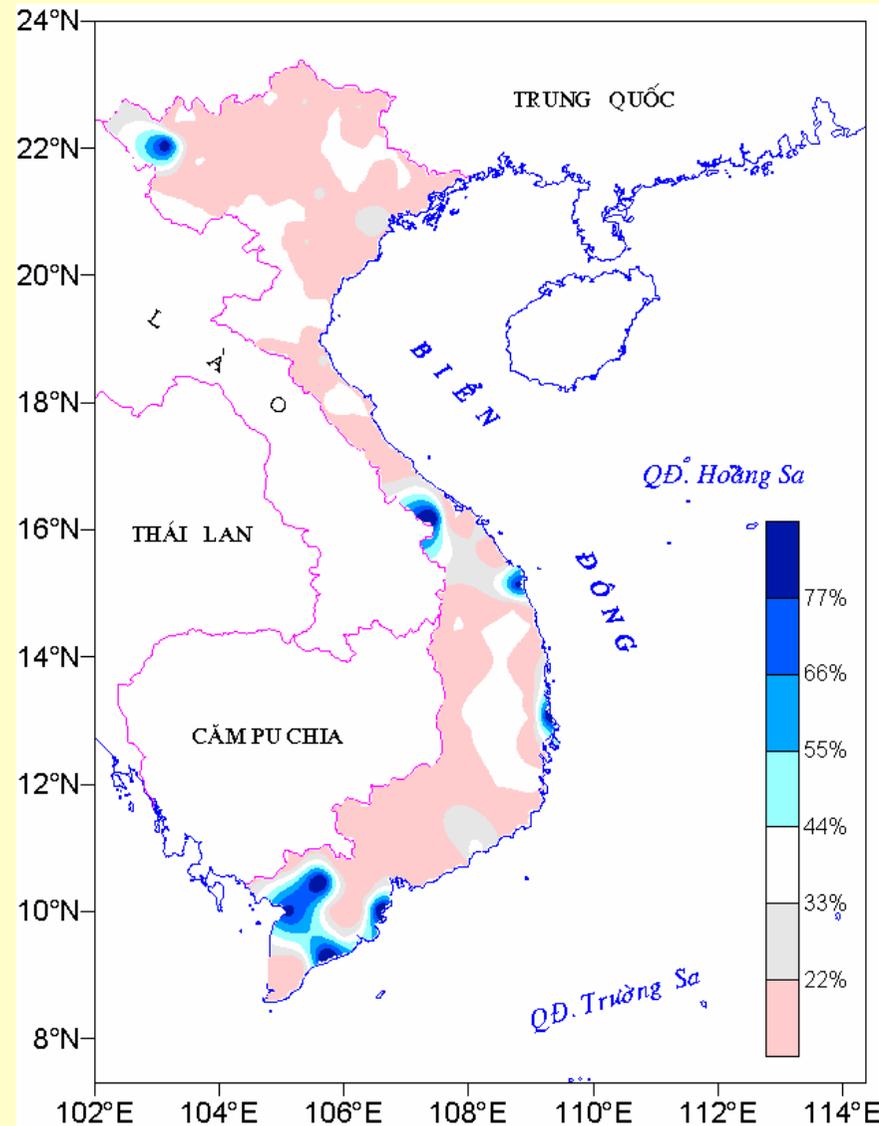
Percent of normal precipitation for past 3 months (a) and past months (b)



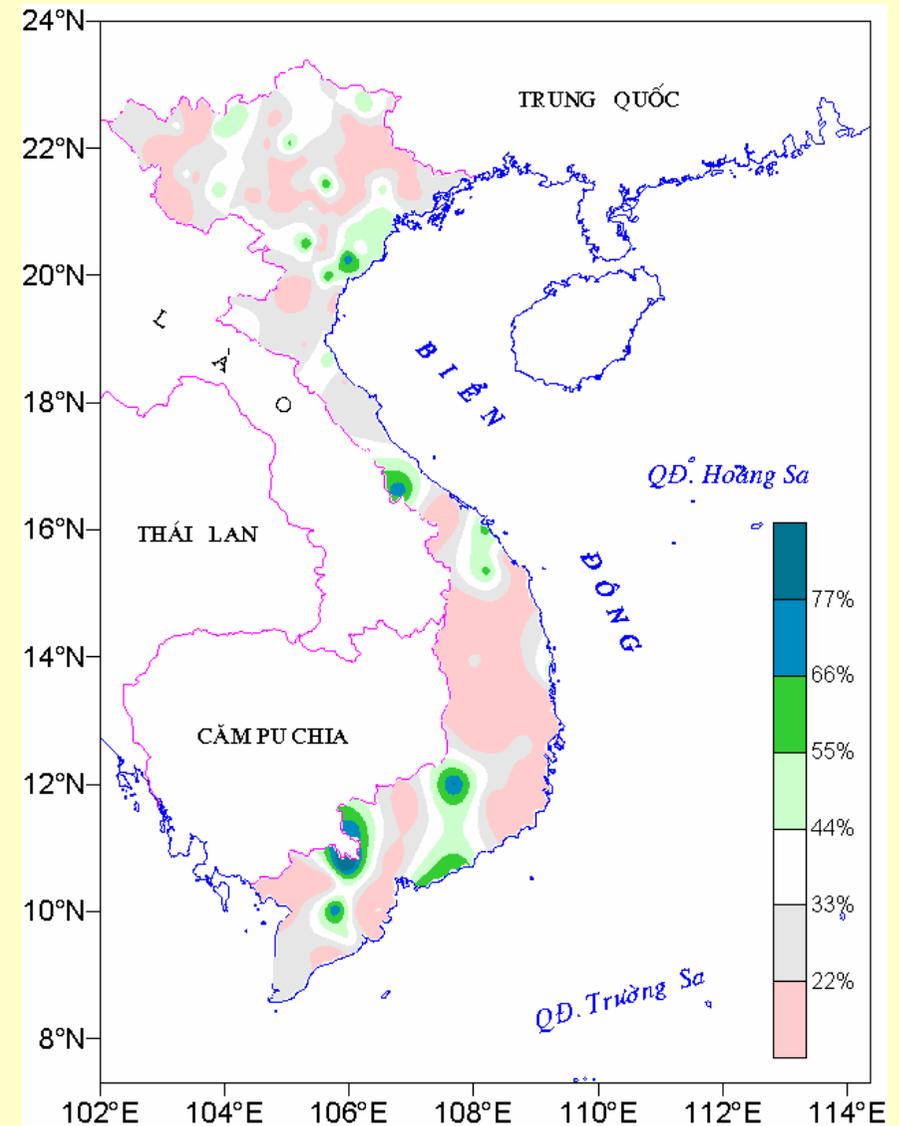
# Seasonal Climatic Outlook (example)

Temperature Probabilities (a,b,c) and Anomaly (d) for next 3 months

a- Probability of Below normal (%)

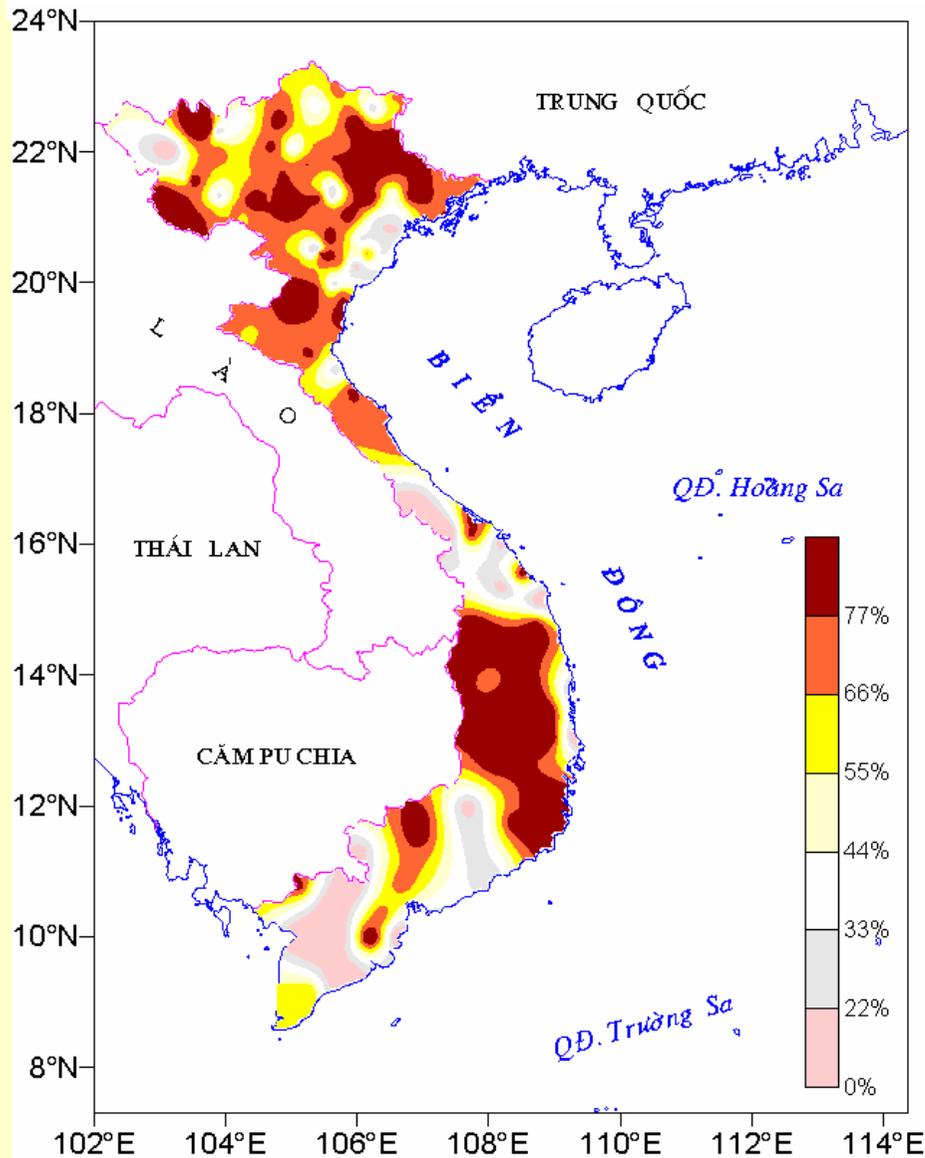


b- Probability of Near normal (%)

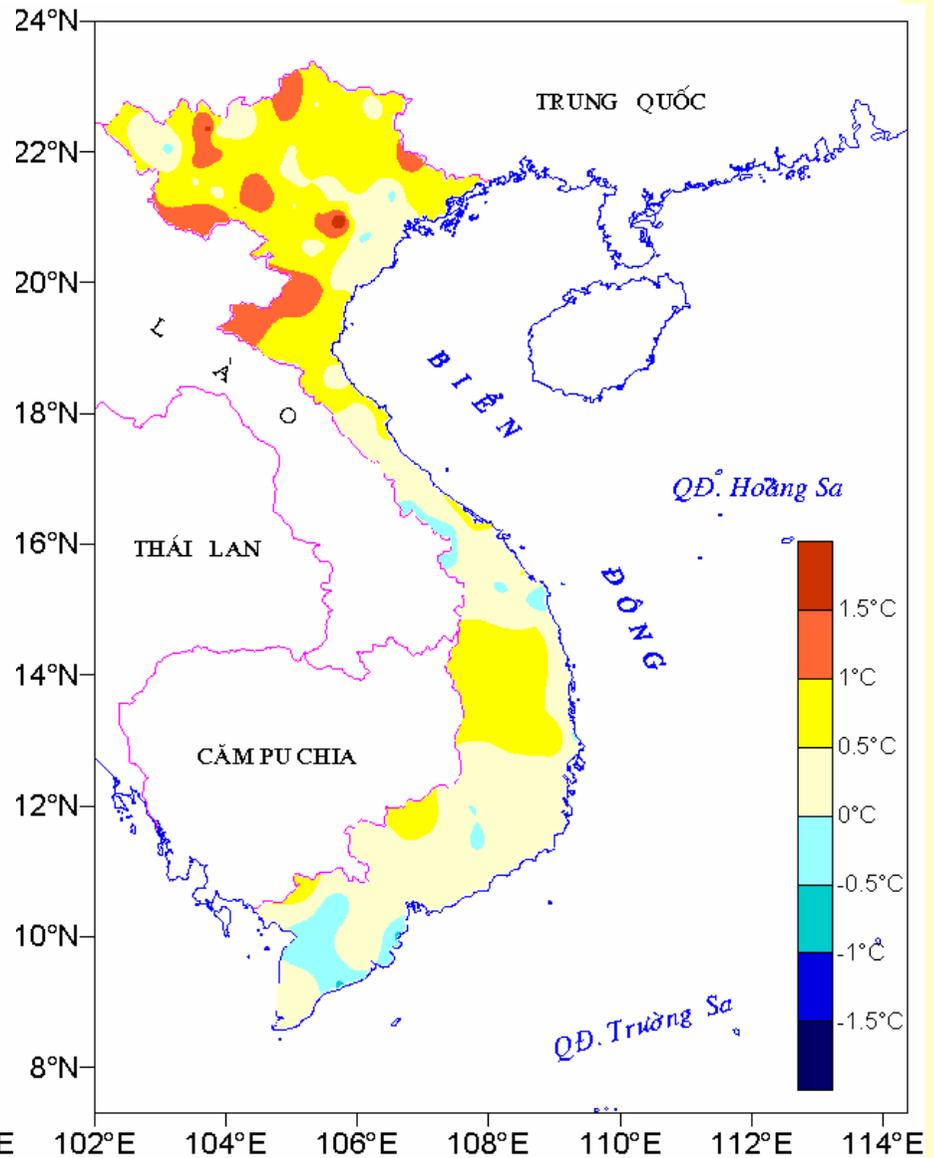


# Seasonal Climatic Outlook (example)

c- Probability of Above normal (%)



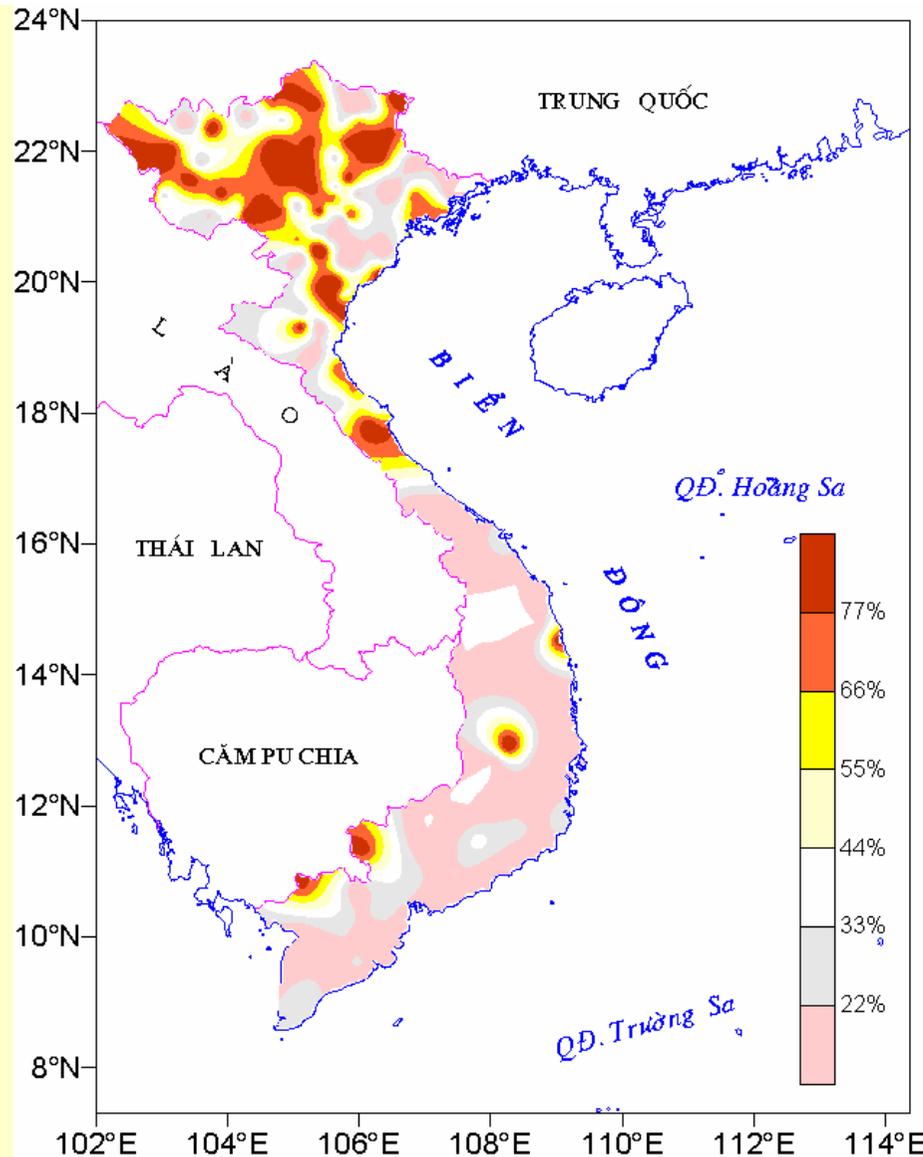
d- Anomaly (°C)



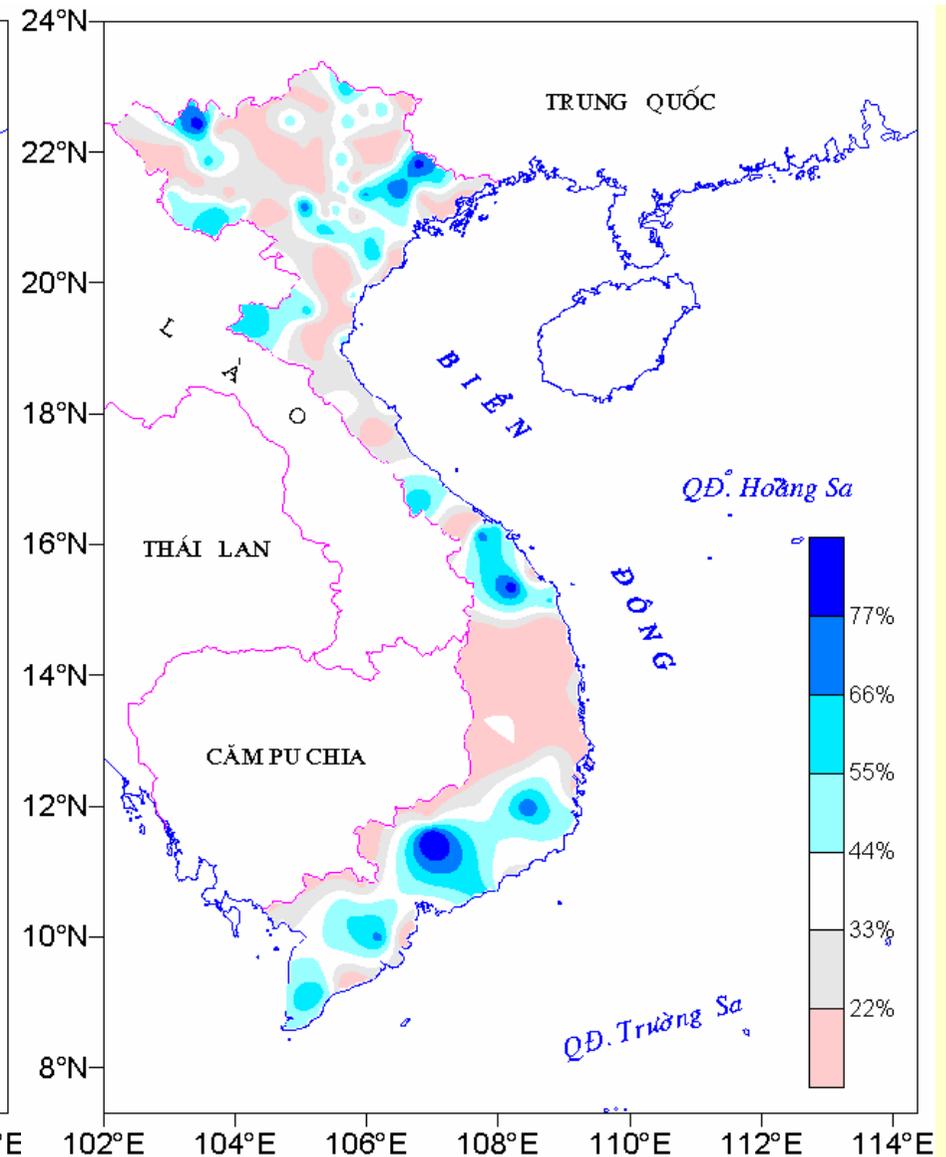
# Seasonal Climatic Outlook (example)

Rainfall Probabilities (a,b,c) and Anomaly (d) for next 3 months

a- Probability of Below normal (%)



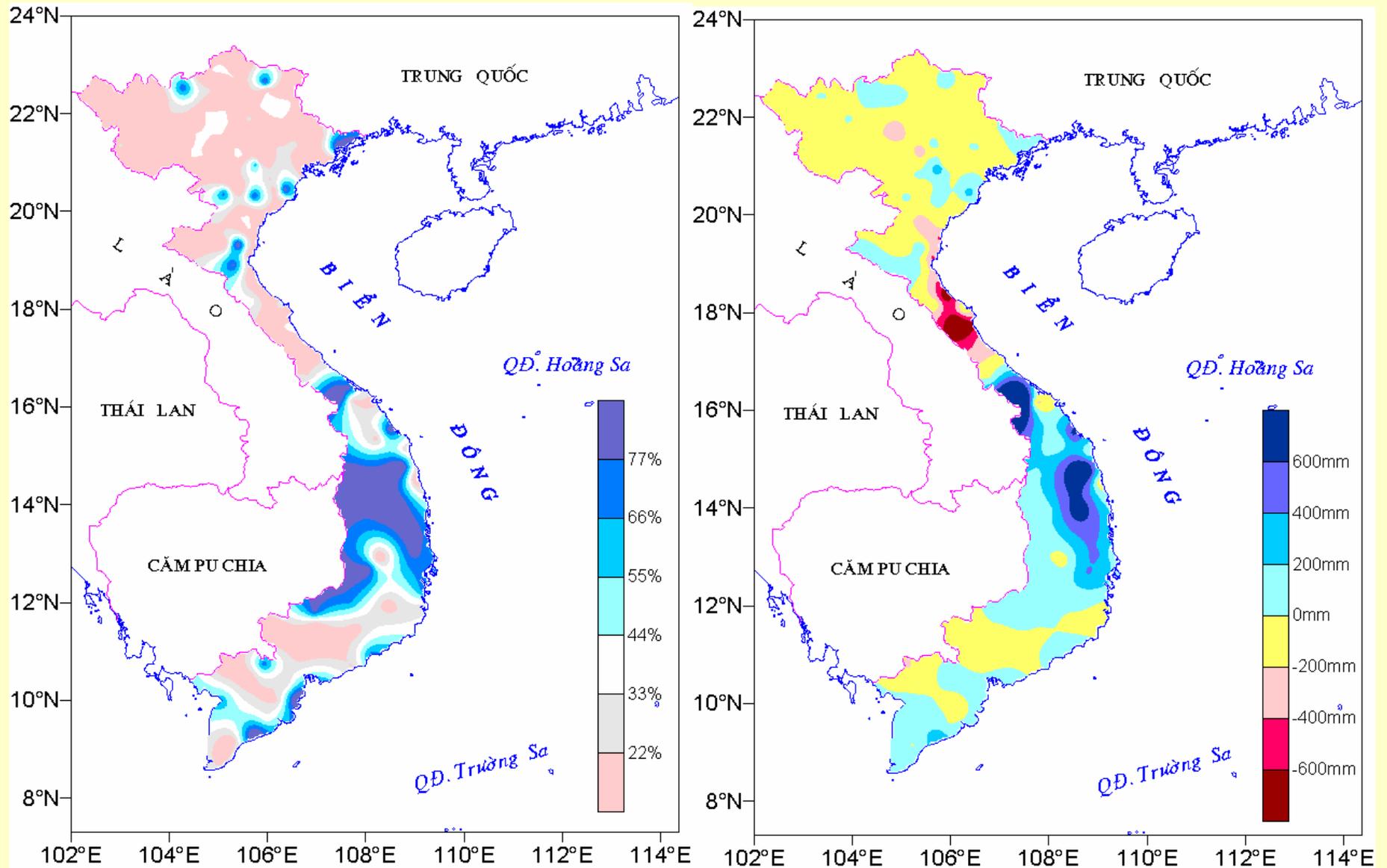
b- Probability of Near normal (%)



# Seasonal Climatic Outlook (example)

c- Probability of Above normal (%)

d- Anomaly (mm)



## **Main contents of Agrometeorological bulletin:**

1. Assessment of weather condition in the past month (temperature, rainfall, sunshine, air humidity) in 9 agricultural regions.
2. Assessment of influences of agrometeorological condition to growth, development and yield formation of crops in the past month in 9 agricultural regions.

## Agrometeorological bulletin (example)

Table 1. Meteorological data for IX/2004 in the Western-Eastern region

19 stations	Air temperatures (°C)					Rainfall (mm)			Air humidity	Evaporation	Sunshine duration	Special weather events	
	Ttb	Txtb	Tx	Tmtb	Tm	R	Rx	N	Utb	e	S	Gl	Dông
1. Lai Châu	25.4	31.5	35.2	22.4	20.6	100	34	12	83	59.3	126	0	5
2. Mường Tè	25.7	31.8	35.6	22.7	21.4	215	84	12	88	51.2	140	2	7
3. Sơn Hồ	18.7	22.5	26.2	16.5	13.8	214	43	18	84	38.3	100	0	2
4. Điện Biên	24.7	30.3	34.5	21.8	19.4	126	58	13	88	55	138	0	6
Tuần Giáo	24.8	30.0	34.5	22.1	19.4	92	50	12	82	44.7	126	0	3
19. Lạc Sơn	26.5	31.9	34.9	23.6	21.5	433	101	10	89	42.8	133	0	9

Table 9. Meteorological data for IX/2004 in the South region

15 stations	Air temperatures (°C)					Rainfall (mm)			Air humidity	Evaporation	Sunshine duration	Special weather events	
	Ttb	Txtb	Tx	Tmtb	Tm	R	Rx	N	Utb	e	S	Gl	Dông
1. Tân Sơn Nhất	28.1	32.7	35.6	25.5	23.8	284	55	20	81	78.7	162	5	15
Vũng Tàu	28.0	31.4	33.5	25.4	23.2	254	75	16	82	99	209	0	6
Tây Ninh	27.0	31.9	33.1	24.1	22.7	172	33	21	79	61.4	182	0	20
Rạch Giá	27.8	31.2	32.8	25.1	23.8	184	41	22	84	100.9	212	0	19
15. Cần Long	26.6	31.9	33.3	24.3	23.2	365	64	20	89	50	161	0	18

## Agrometeorological bulletin (example)

### 2. Forecast on the time of rice flowering in 2004 Summer-Autumn crop in the North of Vietnam.

Table 11: The time of rice flowering in 2004 Summer-Autumn crop in the North of Vietnam.

Agro-ecological zones	Transplanted time	Forecasted Flowering time
The North-Eastern and North-Western mountain regions	15/VII - 20/VII	25/IX - 30/IX
	15/VII - 31/VII	05/X - 10/X
	05/VIII - 20/VIII	20/X - 25/X
The North Midland and delta region	14/VII - 20/VII	15/IX - 25/IX
	26/VII - 31/VII	15/IX - 05/X
	02/VIII - 07/VIII	01/X - 10/X
	10/VIII - 15/VIII	10/X - 15/X

## The ways of transferring climate and agrometeorological information to the users

- Some kinds of information via Email, Website;
- Some kinds are provided on paper to users;
- Almost information are broadcasted through the mass media in radio, television.

### III. DISCUSSION

- It is necessary and useful to have climate prediction. However, the knowledge of the farmers about climate prediction is still limited.
- The accuracy of climate outlook is still low and should be improved
- At present, climate outlook does not reach to farmers. A rational institutional arrangement should be made.

## IV. FUTURE PLAN

### *Immediate plans*

1. Operating Seasonal Climate Prediction (seasonal temperature, rainfall, numbers of cold fronts, long consecutive hot, dry spells, heavy rainfall and cyclones);
2. Providing Operational Climate Bulletin and Outlook (monthly);
3. Applying Statistical Transformation of Dynamical Model Output (Statistical Downscaling Method):

## ***Long-term plans***

1. Continuing survey and study on dynamic models (GCMs and RCMs);
2. Developing Regional Climate Model for Southeast Asia and Viet Nam (Dynamical Downscaling Method);
3. Establishing and implementing a Project: “Climate Information and Prediction Services (CLIPS) for Sustainable Socio-Economic Development, Natural Disasters Mitigation and Environmental Protection in Viet Nam”.

**Thank you for your attention !**