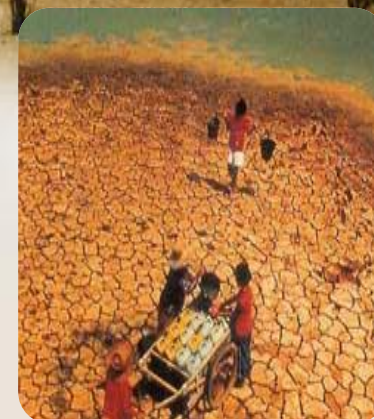
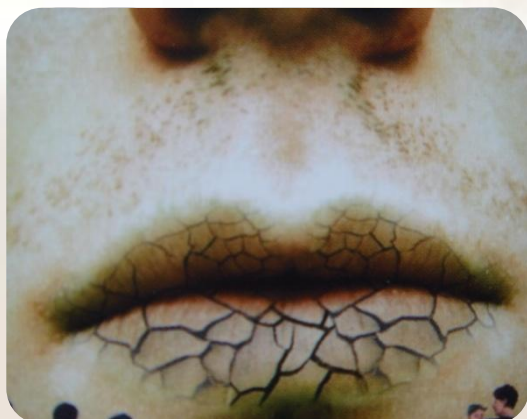


Drought conditions and management strategies in Thailand



Background

Thailand Climate and Geography

Meteorological Condition

Water Resources and Water Requirement



Background

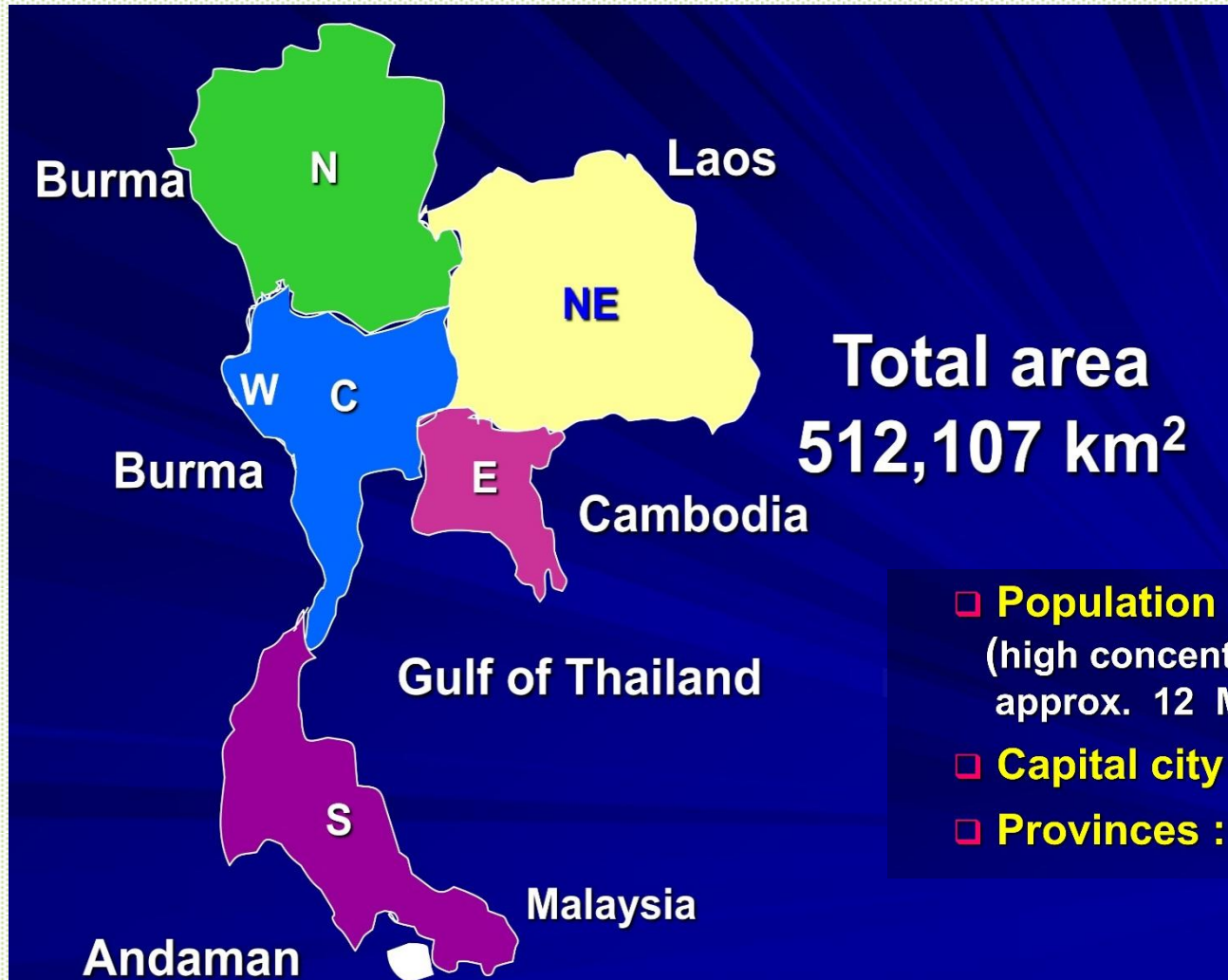


❑ **Located** : Southeast Asia

Thailand Bordered:

- ❑ the Lao PDR and the Union of Myanmar to the North,
- ❑ the Kingdom of Cambodia and the Gulf of Thailand to the East,
- ❑ the Union of Myanmar and the Indian Ocean to the West,
- ❑ and Malaysia to the south

Background



Total area
512,107 km²

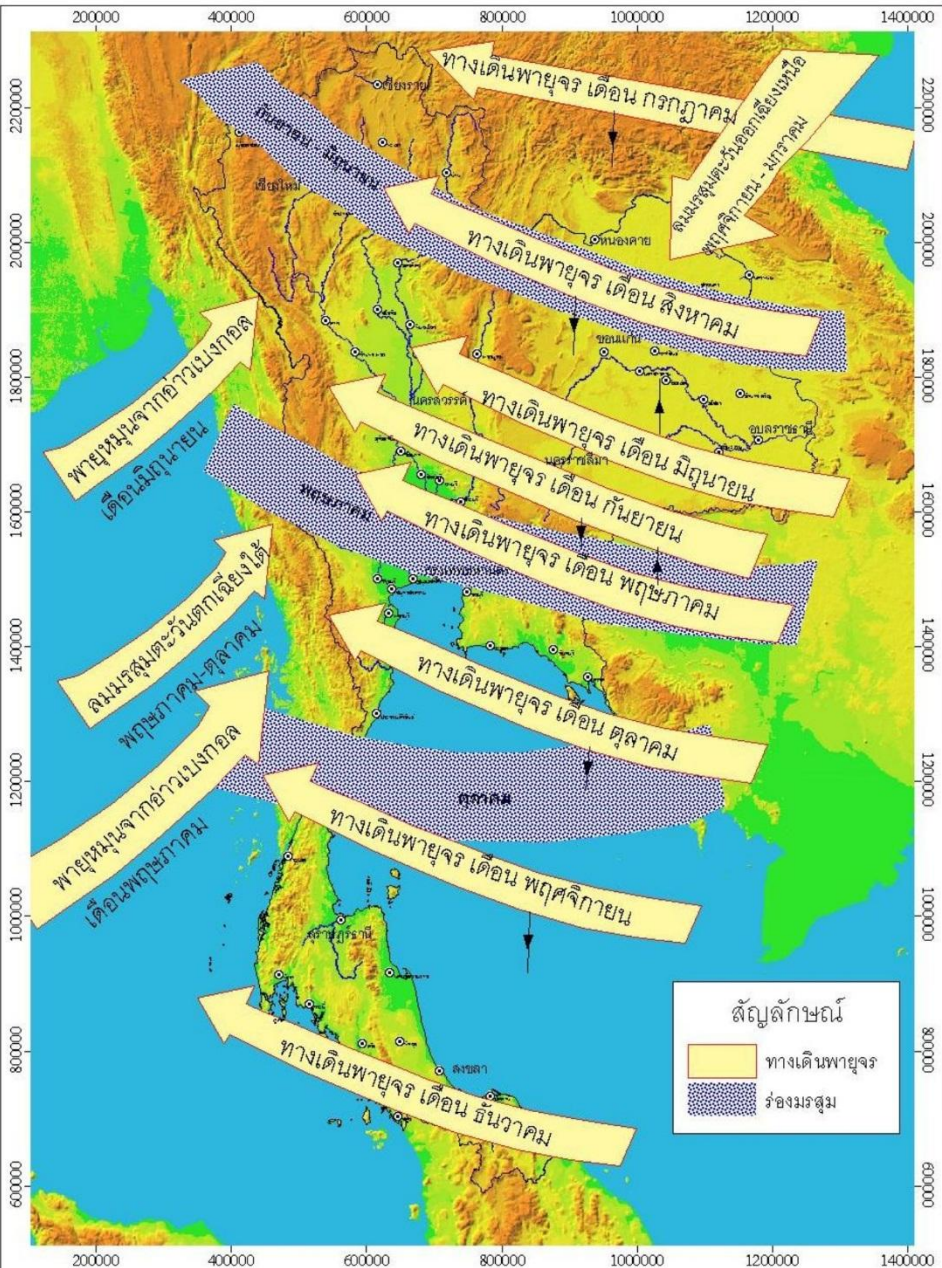
- **Population** : 63 million
(high concentration in the capital (BKK)
approx. 12 M. people)
- **Capital city** : Bangkok
- **Provinces** : 76 Provinces

Climate and Rainfall

- ✓ **Temperature** : 23.2 - 32.4° C.
- ✓ **Relative humidity** : 67- 82 %
- ✓ **Annual rainfall** : 1,426 mm.

sources : Department of Water Resources

Background



Wind Direction and Monsoon Through Lay across Thailand

season

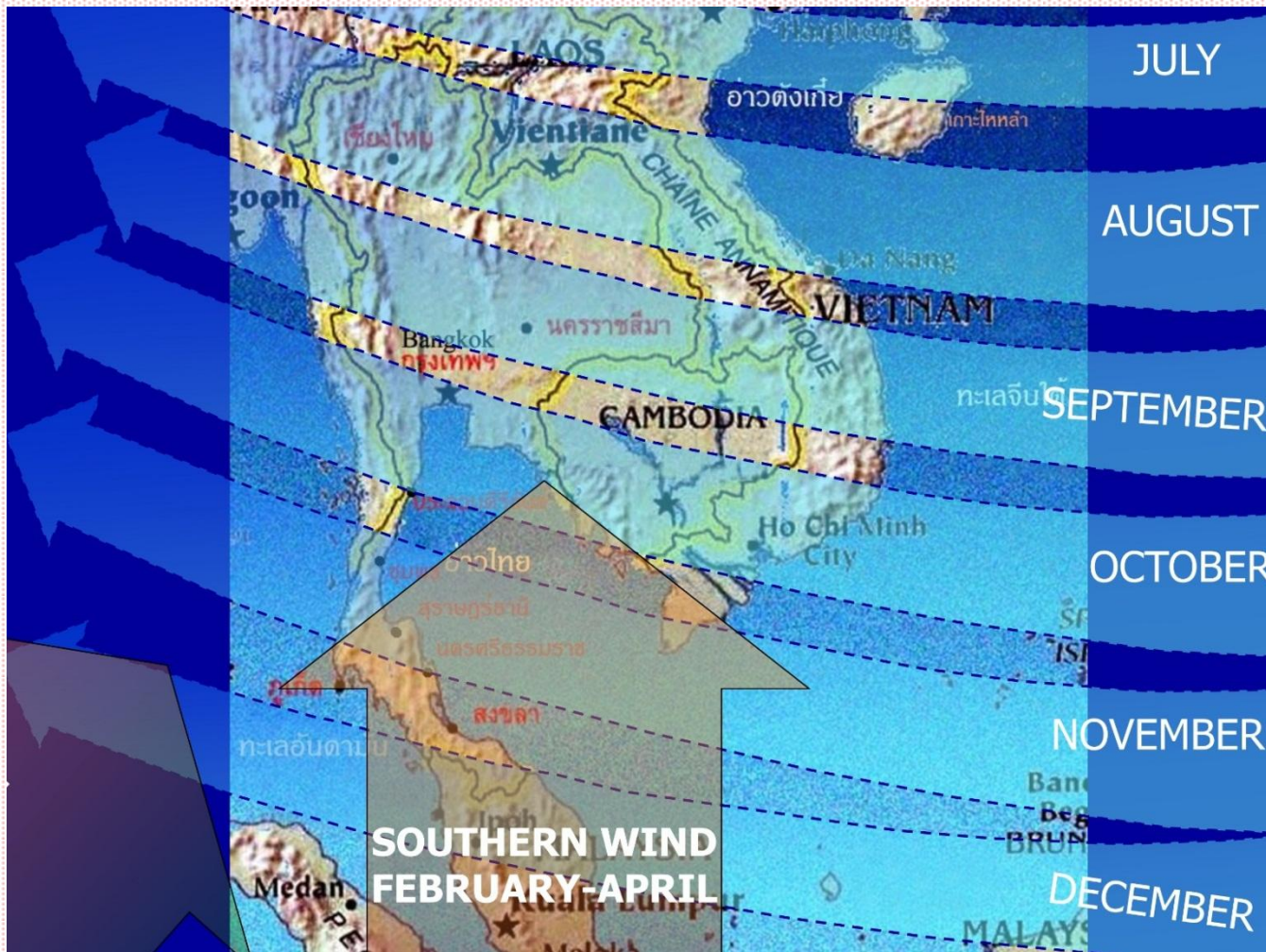
Winter	November - February
Summer	March - mid May
Rainy	mid May - October



sources : Department of Water Resources

Meteorological Condition

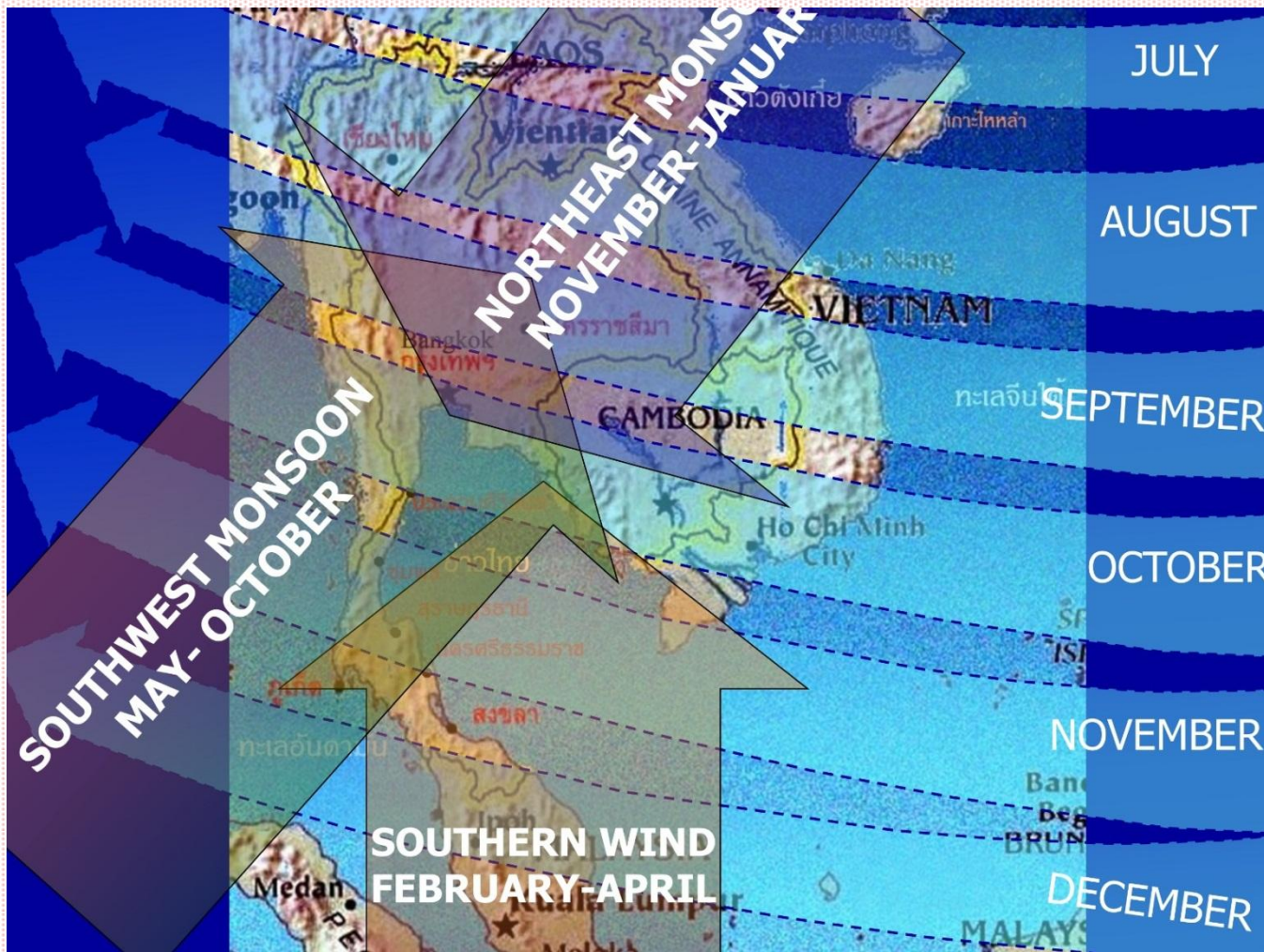
Background



sources : Department of Water Resources

Meteorological Condition

Background

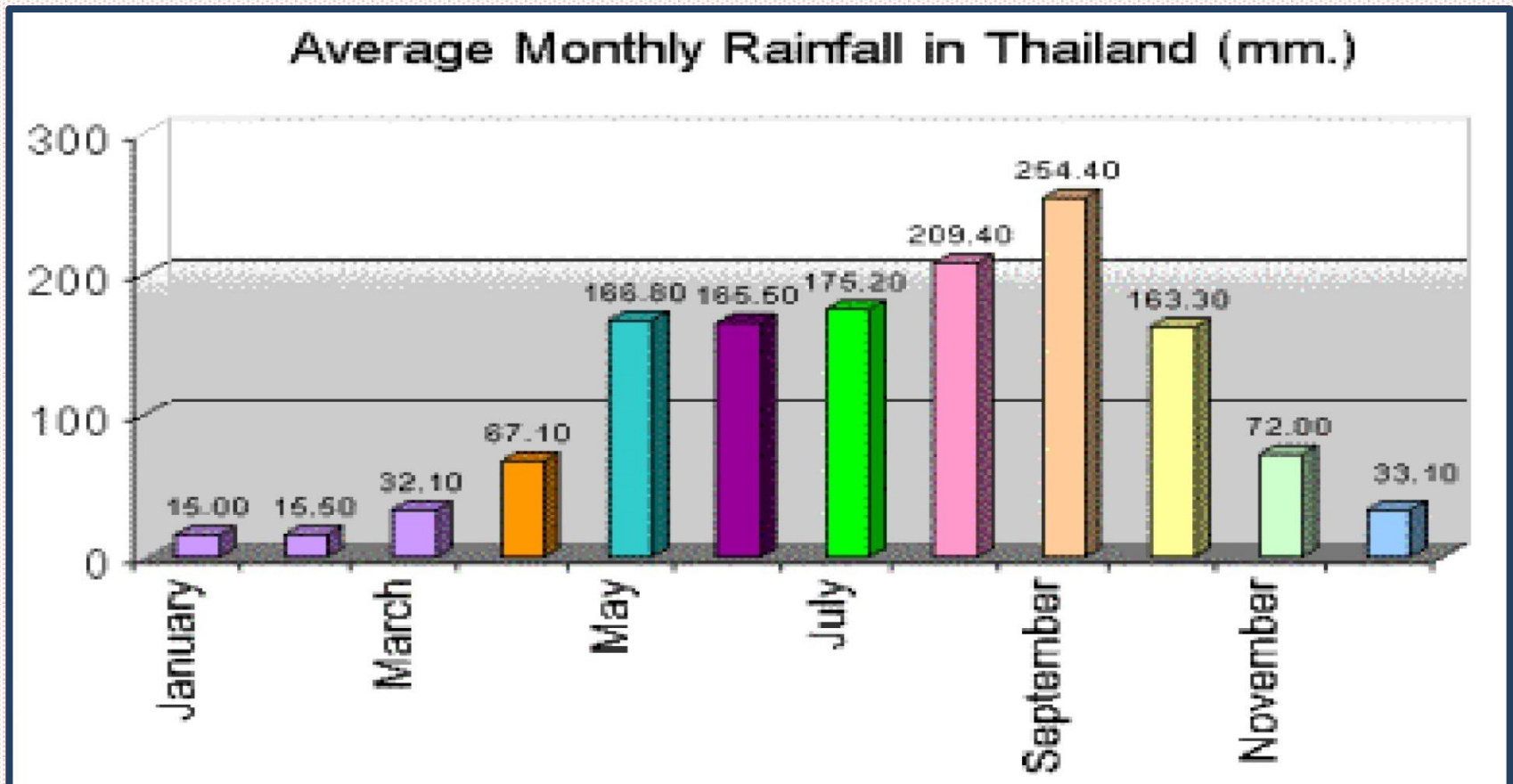


sources : Department of Water Resources

Meteorological Condition

Background

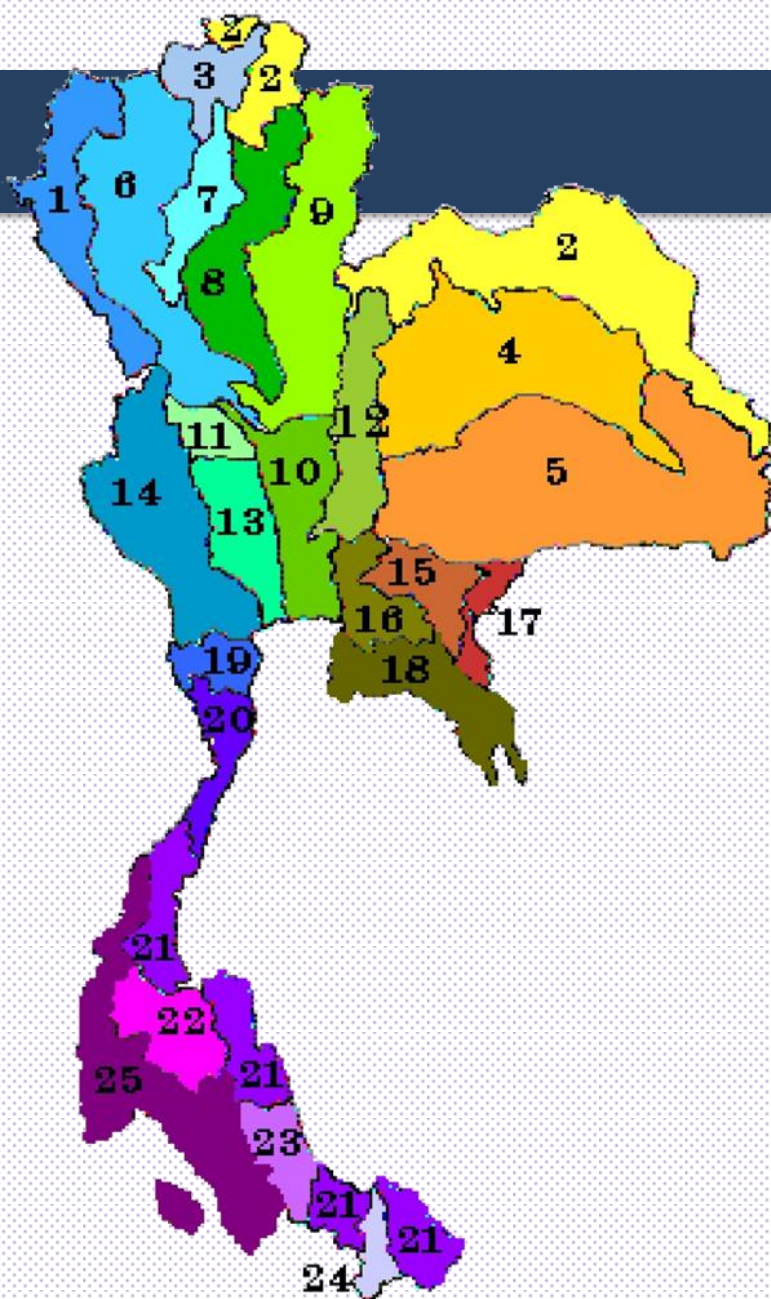
Average annual rainfall 1,426 mm./yr



sources : Department of Water Resources

Meteorological Condition

Background

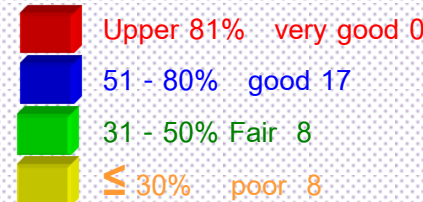
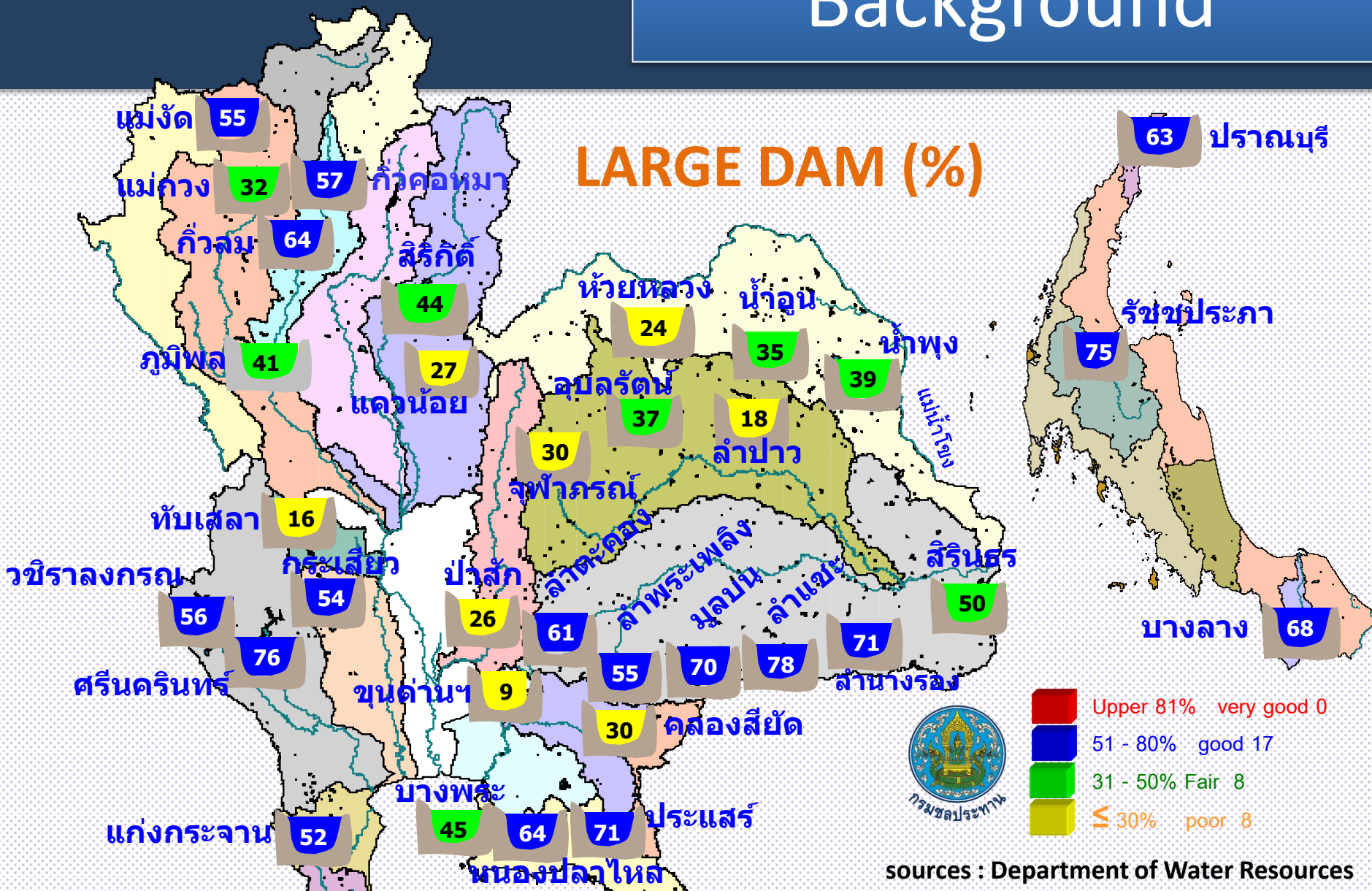


River Basin Area 1-25

- | | |
|----------------|---------------------|
| 1 Salaween | 14 Mae Klong |
| 2 Khong | 15 Prachinburi |
| 3 Kok | 16 Bang Pakong |
| 4 Chi | 17 Tonele Sap |
| 5 Mun | 18 Eastern Coast |
| 6 Ping | 19 Phetchaburi |
| 7 Wang | 20 Western Coast |
| 8 Yom | 21 South-East Coast |
| 9 Nan | 22 Tapi |
| 10 Chao Phraya | 23 Songkhla Lake |
| 11 Sakae Krang | 24 Pattani |
| 12 Pasak | 25 South-West Coast |
| 13 Tha Chin | |

sources : Department of Water Resources

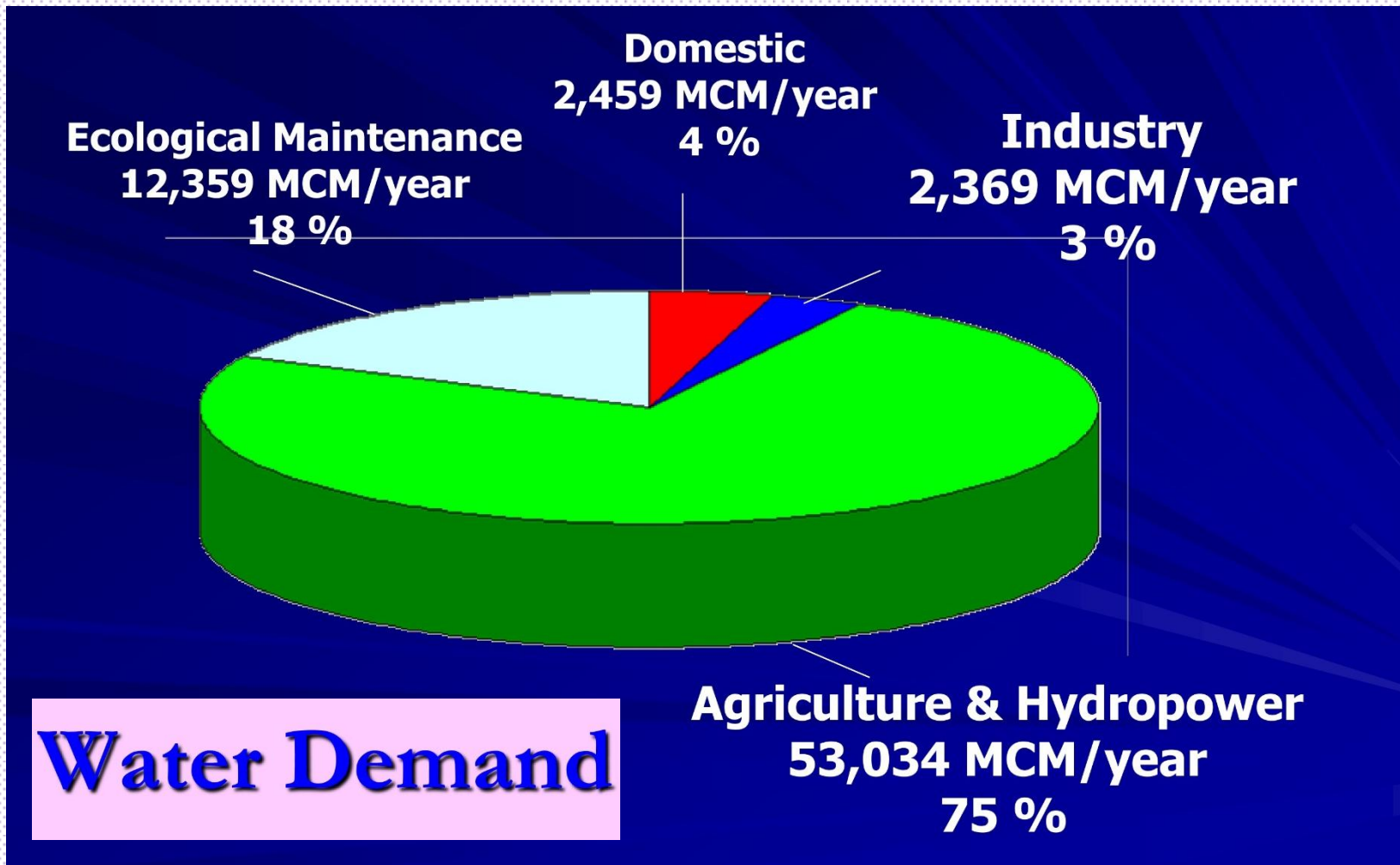
Background



sources : Department of Water Resources

Water Resources and Water Requirement

Background



sources : Department of Water Resources

Background



Water Resources and Water Requirement

Statistic of drought between 2007-2013

Year	Area of drought (Province)	Vulnerability		
		People	Agricultural area (acre)	Value (US.\$)
2007	66	16,754,980	540,047.2	6,109,203.1
2008	61	13,298,895	209,999.6	3,200,888.5
2009	62	17,353,358	237,773.6	3,337,853.2
2010	64	15,740,824	686,741.2	43,598,997.7
2011	55	16,560,561	324,672.0	4,062,376.2
2012	52	15,234,597	594,604.8	12,297,552.2
2013	58	9,066,185	1,708,918.8	89,802,429.3



sources : DDPM

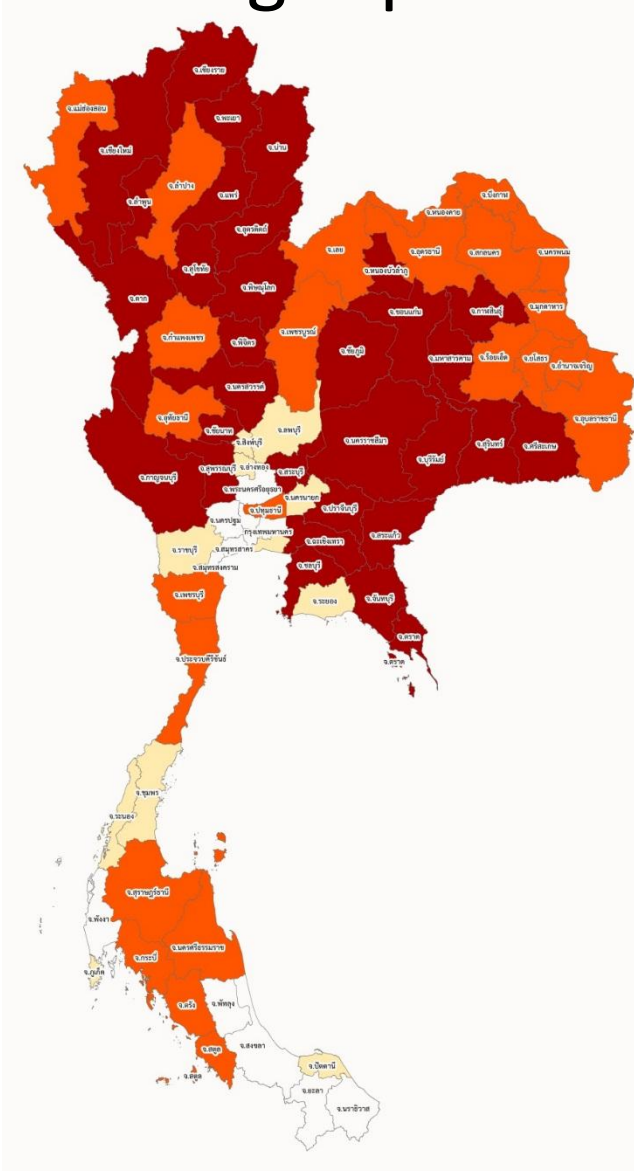
Drought monitoring and early warning systems

- Drought problem and affected areas
- Definition of Drought
- Affected Factors to drought severity
- Criteria and Analysis System
- Drought affected areas
- Drought Mitigation and Preparedness

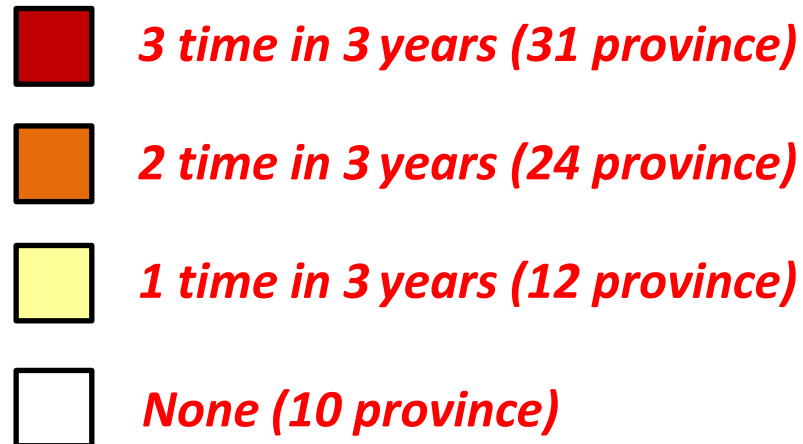


Drought monitoring and early warning systems

- Drought problem and affected areas



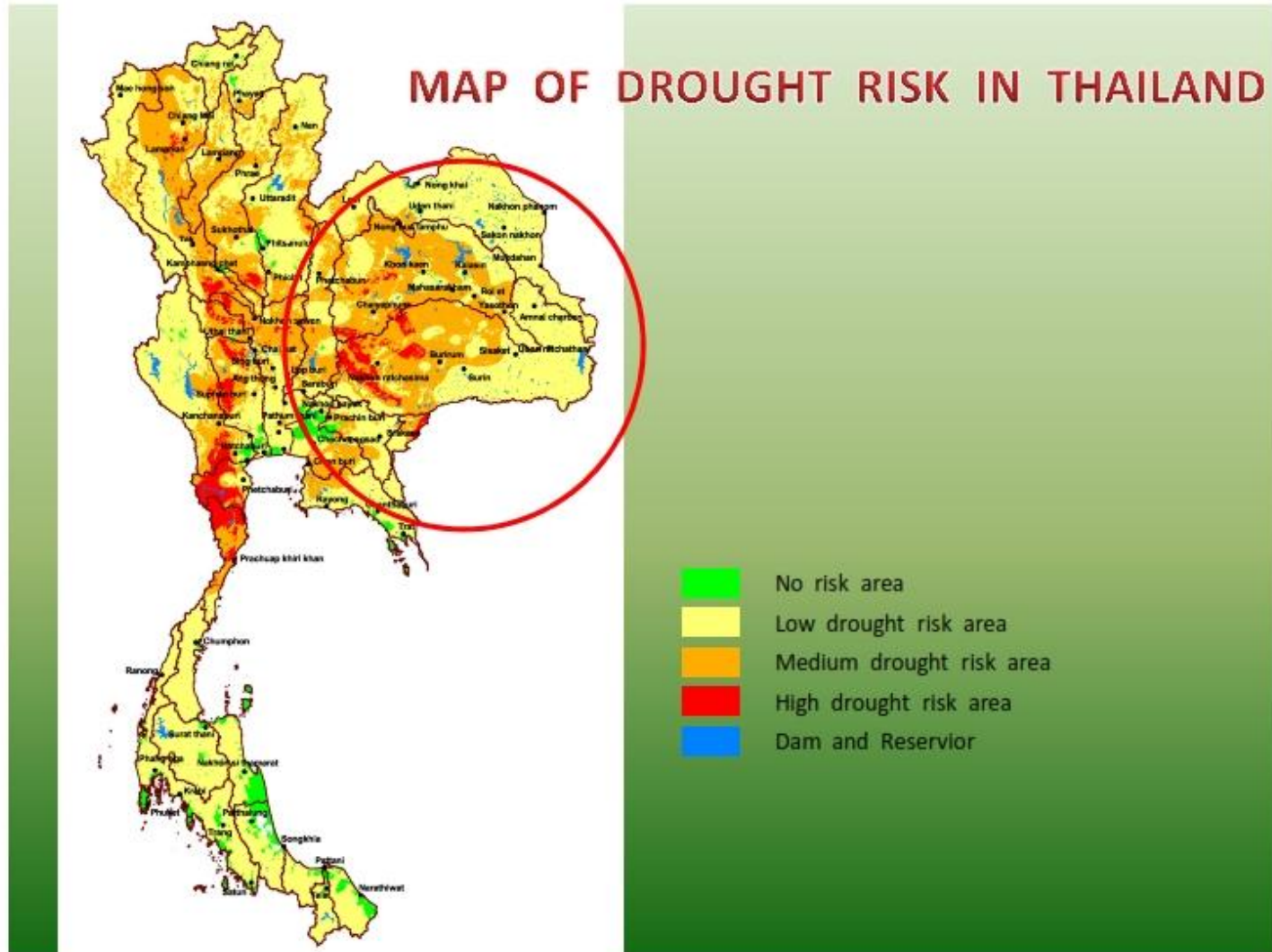
Repetitive droughts area *3 years (2011 – 2013)*



sources : DDPM

Drought monitoring and early warning systems

- Drought problem and affected areas



sources : Department of Water Resources

Drought monitoring and early warning systems

- Definition of Drought

➤ The lacking of drinking water, water for consumption, water for plantation in some areas for long period causing losses and large affects to communities.

➤ Derived from natural phenomenal or man- made disaster.



Drought monitoring and early warning systems

- Affected Factors to drought severity

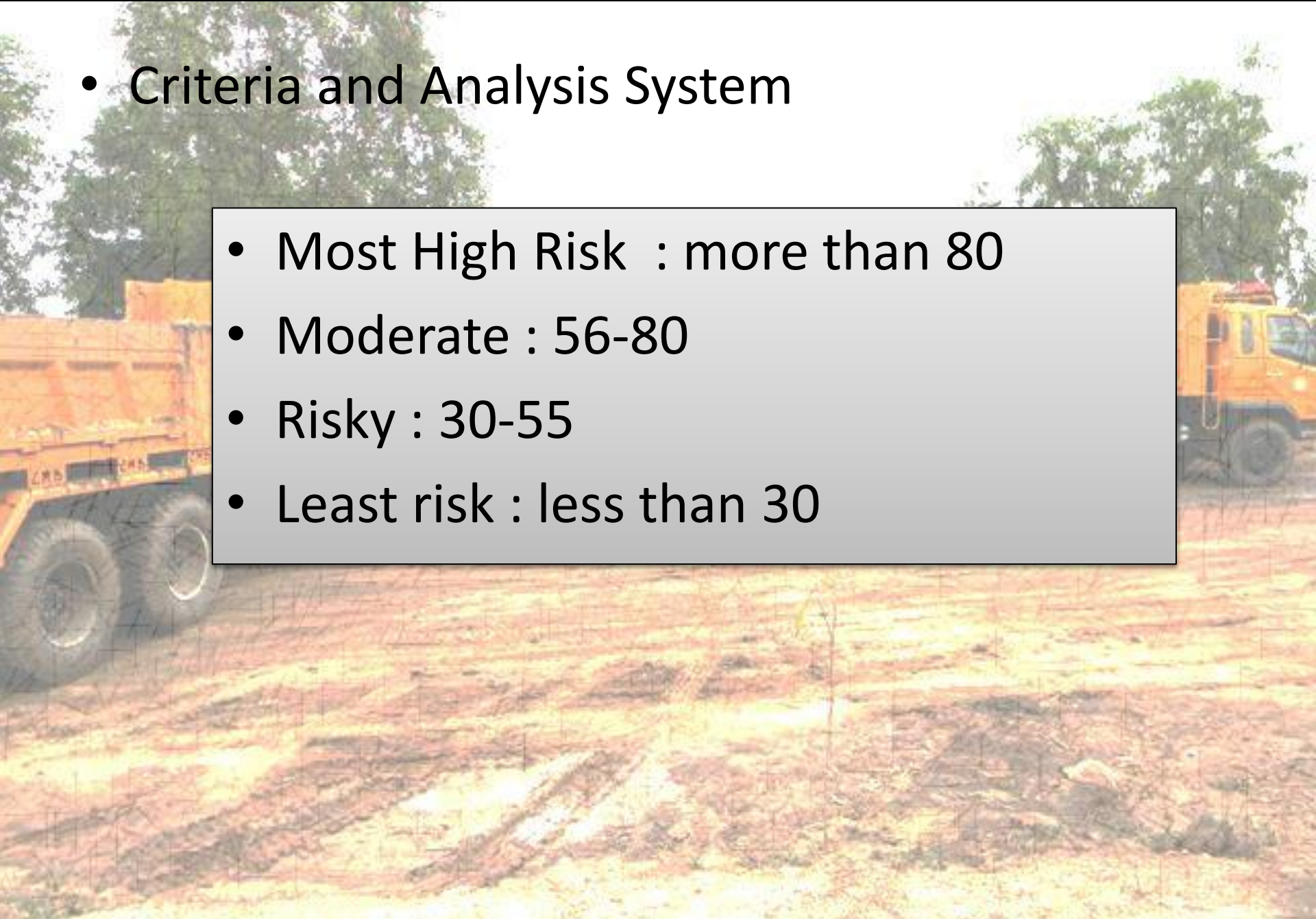
1. Average annual precipitation rate
2. Irrigated areas and water sources
3. Cover cropping
4. Drainage Soil
5. Land Using
6. Density of river basin and branches
7. Drought Statistics



Drought monitoring and early warning systems

- Criteria and Analysis System

- Most High Risk : more than 80
- Moderate : 56-80
- Risky : 30-55
- Least risk : less than 30



Drought monitoring and early warning systems

- Drought affected areas

October 2012 - May 2013

**56 provinces (77)
588 districts (878)
3,958 sub-districts (7,255)
37,820 villages (74,964)
affected by drought**



Drought monitoring and early warning systems

- Drought Mitigation and Preparedness
 - Conduct Drought Risk Assessment
 - Update Drought Database and Hazard Mapping
 - Mobilize human Resource and equipment for drought
 - Develop Drought Database and GIS System
 - Develop Drought Monitoring and forecasting System
 - Promote and Raise Public Awareness
 - Arrange Lesson Learned



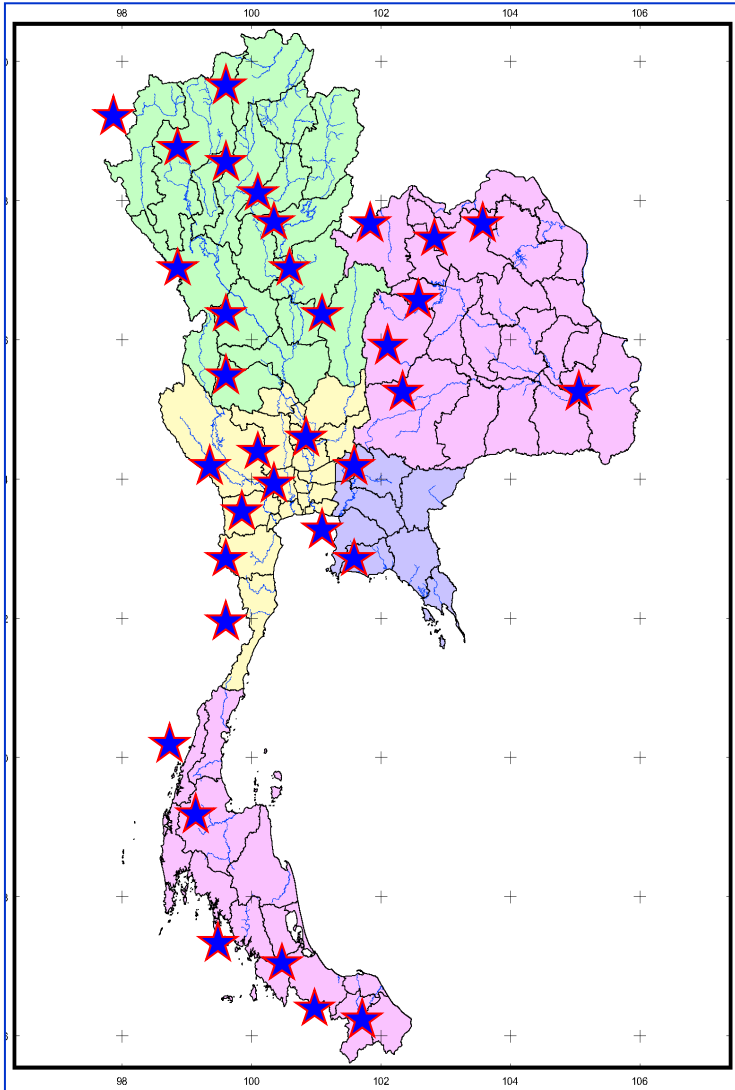
Drought monitoring and early warning systems

The main agencies for mitigation and preparedness

- Thai Meteorological Department
- Department of Royal Irrigation
- Department of Water Resources
- Department of Land Development and Department of Agricultural Extension
- National Disaster Warning Centre
- Department of Groundwater Resources
- Department of Disaster prevention and Mitigation
- Provincial Office
- District Office
- Local Administration
- Geo-Informatics and Space Technology Development Agency (Public Organization)
- hydro and agro informatics institute (Public Organization)



The Equipment for drought 2013



Department \ List	water truck	feed pump	water supply machine	underground water digging truck
Department of Water Resources	48	411	8	-
Provincial Electricity Authority	25	-	-	-
Department of Groundwater Resources	129	612	18	88
Department of Disaster Prevention and Mitigation	218	123	17	-
Department of Royal Irrigation	286	1877	-	-
total	706	3023	43	88







Drought monitoring and early warning systems

After Drought

1. Survey and Prepare List of Victim
2. Conduct Livelihood and Occupation Rehabilitation
3. Conduct Initial Rehabilitation



Drought monitoring and early warning systems

Emergency advance payment for disaster victim relief

Department	Financial Amount (US. \$)	Authority
Secretariat of the Prime Minister.	3,080,714.7	Prime Minister
Office of the Permanent Secretary, Ministry of Defense.	1,540,357.4	Permanent Secretary
Office of the Permanent Secretary, Ministry of Social Development and Human Security.	308,071.5	Permanent Secretary
Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives.	1,540,357.4	Permanent Secretary
Office of the Permanent Secretary, Ministry of Interior	1,540,357.4	Permanent Secretary
Office of the Permanent Secretary, Ministry of Public Health	308,071.5	Permanent Secretary
Department of Disaster Prevention and Mitigation	1,540,357.4	General Director
Department of Disaster Prevention and Mitigation, Provincial Office	616,142.9	Governor
District	15,403.6	Chief of District

Vulnerability assessment

The main cause of drought is low level of water source in the reservoirs

❖ **Agricultural Sector**

- The paddy field in Thailand is considered main land using as 70 %, farm crops 20 % and other 10 %.
- Always happens in the northeast especially outside irrigated area

❖ **Water for Consumption**

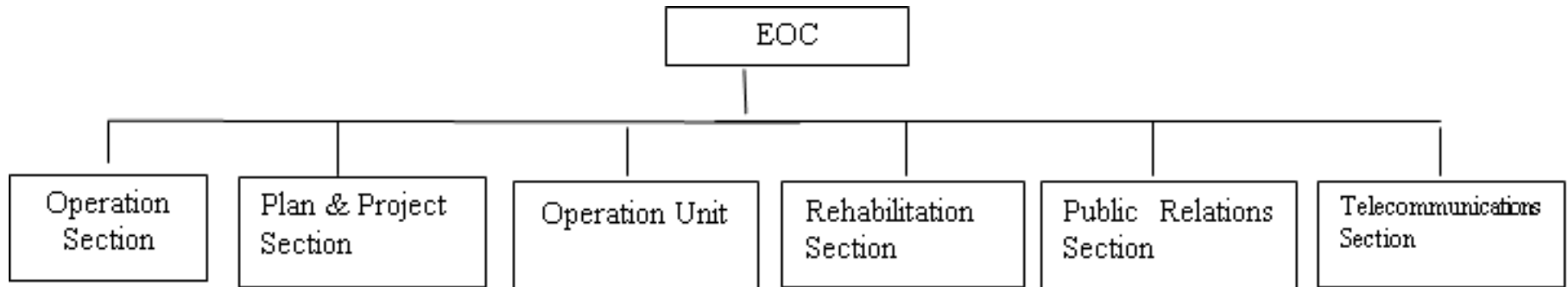
- problem in the rural areas such as mountainous or island areas
- The affected group is farmer family in remote areas.

Vulnerability assessment

Level of Disaster Intensity, Vulnerability Managing Competency and Risk Levels

Type of Disaster	Intensity Level	Vulnerability Level	Risk Level
Flood	High	Moderate	High
Tropical Cyclone	High	High	Moderate
Earthquake	Low	Low	Moderate
Land slide	Moderate	Low	Moderate
Drought	High	Moderate	Moderate
Fire	High	Moderate	Moderate
Explosives	High	Moderate	High
Accident	High	Moderate	High

Emergency relief and drought response



1. Provide Public Relations and update drought situation of water saving measures for agricultural sector and consumption.
2. Mobilize Emergency Response Team for providing assistance and surveying initial damage assessment
3. Support and mobilize Tools& Equipment such as water pumps, water trucks and food for cattle.
4. Request assistance from the other government sectors such as artificial rain for farmer, water container.
5. Survey initial damages and provide victim compensation budget, in case it is beyond the capacity of the provincial level it will provide support under Ministry of Finance's Regulation

Emergency relief and drought response

Provincial Level

Emergency Operations Center

Supporting Agencies

Consultant Committee
Specialists, Scholars,
Representative of Local Inhabitants

On Site EOC

- Nearly Provinces
- Foundation and Private Enterprises
- DPMRC 1-18
- Other Agencies

Admin & Information Management Section
- General Affairs Sub-Section
- Intelligence and Information Analysis
- Logistics Management Sub-Section
- Command Center Sub-Section

Warning Section
-Monitoring and Situation Assessment
-Vigilance and Warning Sub – Section.

Prevention and Operations Section
- Search and Rescue Operations Sub-Section
- Evacuation Sub-Section
- Emergency Medical Service Sub-Section
- Dead body Management Sub-Bureau, etc.

Public Relations Section
-Public, Information Affairs Sub-Section
- Counter-intelligence Sub - Section, etc.

- Field Inspection Sub-Section
Communication Section
- Communication System Establishment
-IT Establishment

Donation Section
- Donation Center Sub-Section
- Donated Cash and Items Allocation Sub-Section
- Donated Cash and Items Accounting

Peace Order keeping Section
- Theft Prevention Sub-Section
- Security Affairs Sub-Section
- Traffic Management Sub-

Relief Rehabilitation Section
- Damage and Need Assessment Sub-Section
- Victim Assistant Sub-Section
- Basic Necessities Procurement Sub-

Other Section
(As Appropriate and Needed)

Emergency relief and drought response

National Command Center (NCC)

Planning Section

Level 4 : Minister

Level 3 : Permanent Secretary

- Analyze, monitor, assess disaster situation and propose options
- Supervise, follow up and evaluate incidents
- Resources Mobilization and tracking
- Integrate Operations Plan
- Support Technical Assistant and experts

Admin and Operations Section

Level 4 : Minister

Level 3 : Permanent Secretary

- Command and Order
- Integrate Operations with Military Relief Center
- Integrate Operations with EMS Team of Ministry of Public Health
- Provide Security during Emergency Situation
- Provide peace keeping order for the public
- Collaborate with National Royal Thai Police
- Coordinate with relevant agencies
- Set up Communication System during Emergency Crisis
- Conduct Search and Rescue

Logistics Section

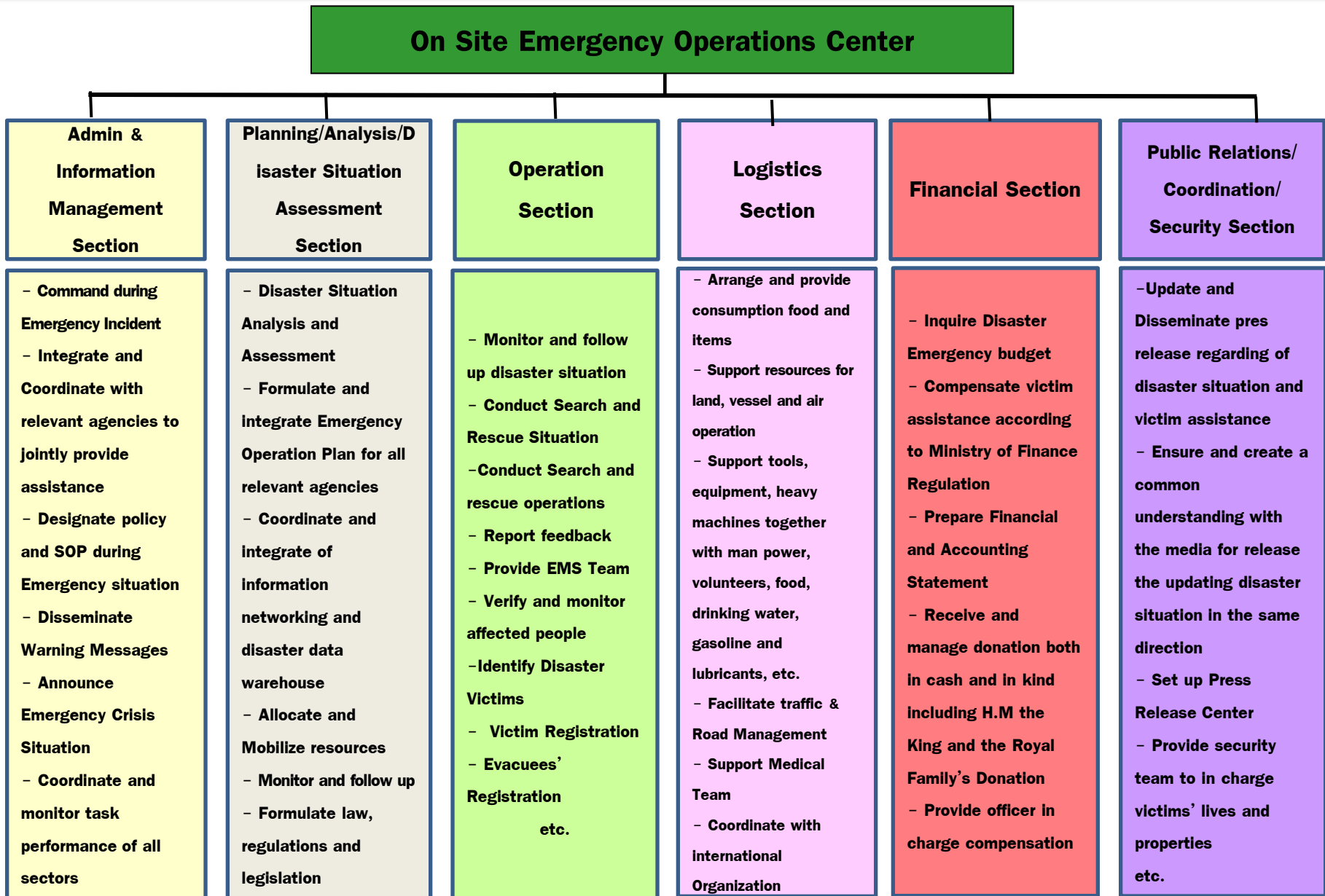
Level 4 : Minister

Level 3 : Permanent Secretary

- Facilitate Transportation and Logistics
- Collaborate with Foreign Countries and International Organization
- Support IT and Communication System
- Receive Complaints
- Coordinate and Collaborate with Charity Foundation and Volunteers
- Repair and Rehabilitate Infrastructure
- Provide assistant and compensate to the victims
- Coordinate media and press release
etc.

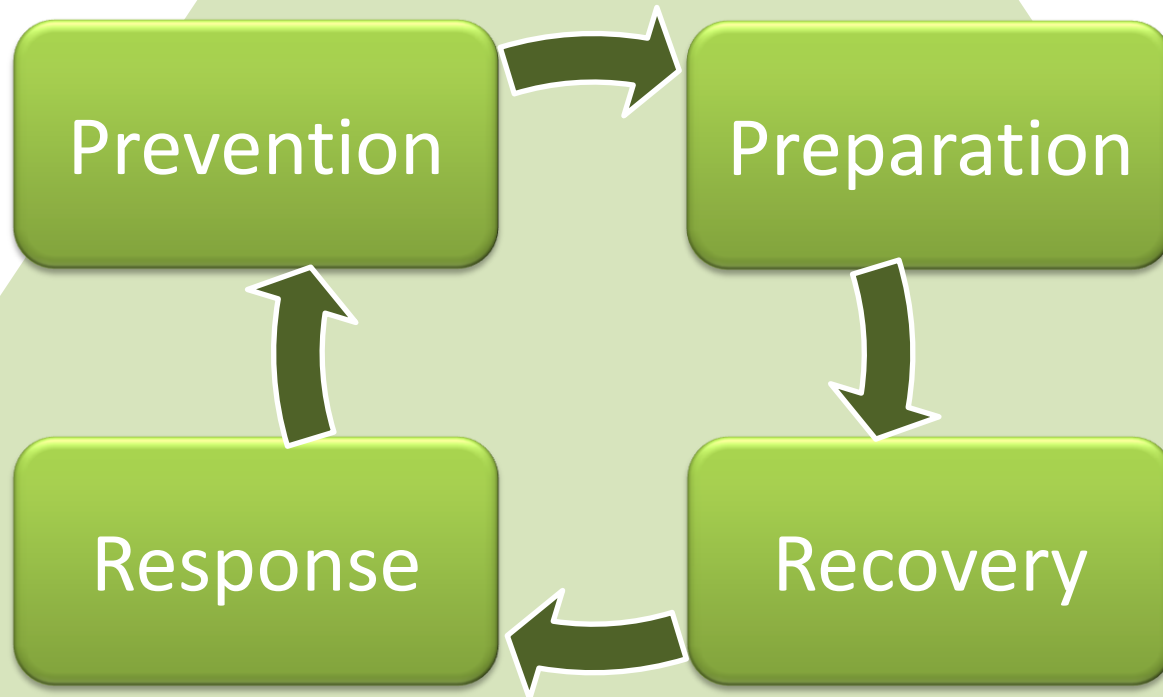
National Level

Emergency relief and drought response



Practices to alleviate drought impacts

single command system by 2P and 2R



Practices to alleviate drought impacts

Measures for Drought response

1. Maximum Water Utilization especially for consumption
2. Water Accessibility such as groundwater and water distribution
3. Operation system under the 2P2R measures
4. The Provincial Governor is in charge as the commander under single command system

Practices to alleviate drought impacts

In short term (90 days)

- ❖ Approved 21 million dollars
- ❖ Collaborated with private sector for water distribution in remote areas
- ❖ Established the data warehouse of water management

The need for knowledge and skills on drought management

The database for
drought
management

Standard
warning about
drought

Making
awareness of
the people
about important
factor for
drought

*Thank you
for your attention*



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