

**2nd Thematic Workshop
On Water Related Disaster and
Its Management in Asian Countries**



7-10 Oct 2008, The Legend Villas, Manila Philippines

**Water-Related Disaster and It's Management
In Thailand**



Department of Water Resources

Ministry of Natural Resources and Environment, Thailand

Present by : Srisunee Wuthiwongyothin : Water Crisis Prevention Center

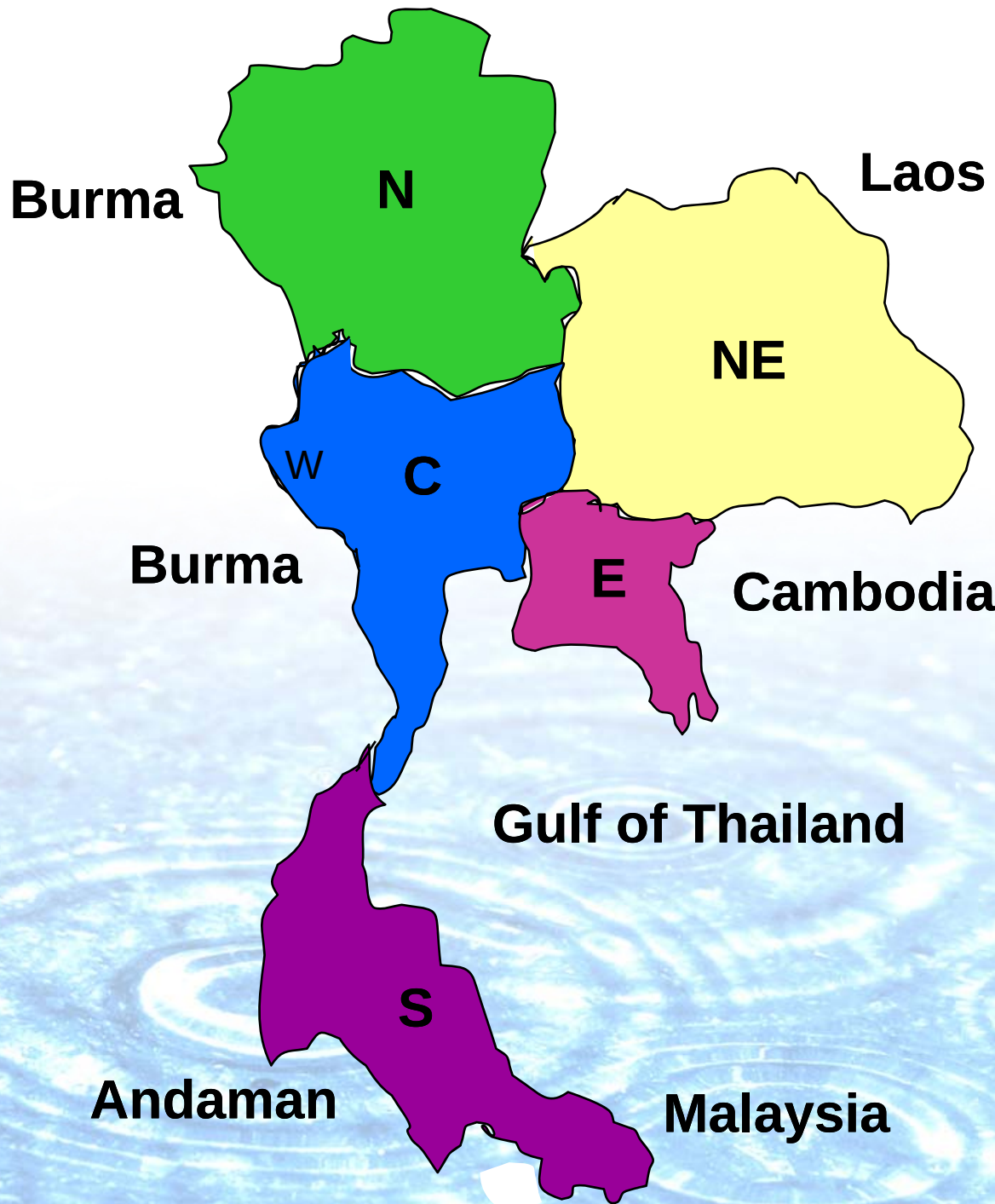
General Information about Thailand



- bordered on the north by Lao PDR
- on the east by the Laos PDR and Cambodia
- on the south by the Gulf of Thailand and Malaysia
- on the west by Union of Myanmar and the Andaman Sea

Fact about Thailand

- The total area 512,000 sq.km
- population 63 millions
- 5.8 million people living high concentration in the capital (Bangkok)
- total agricultural area 265,200sq.km(52%)
- more than 60 percent of the population are in agricultural.



**Divided into 76
provinces which
further divided into
district, sub-
district and village
consecutively.**

**Total area
512,000 km²**

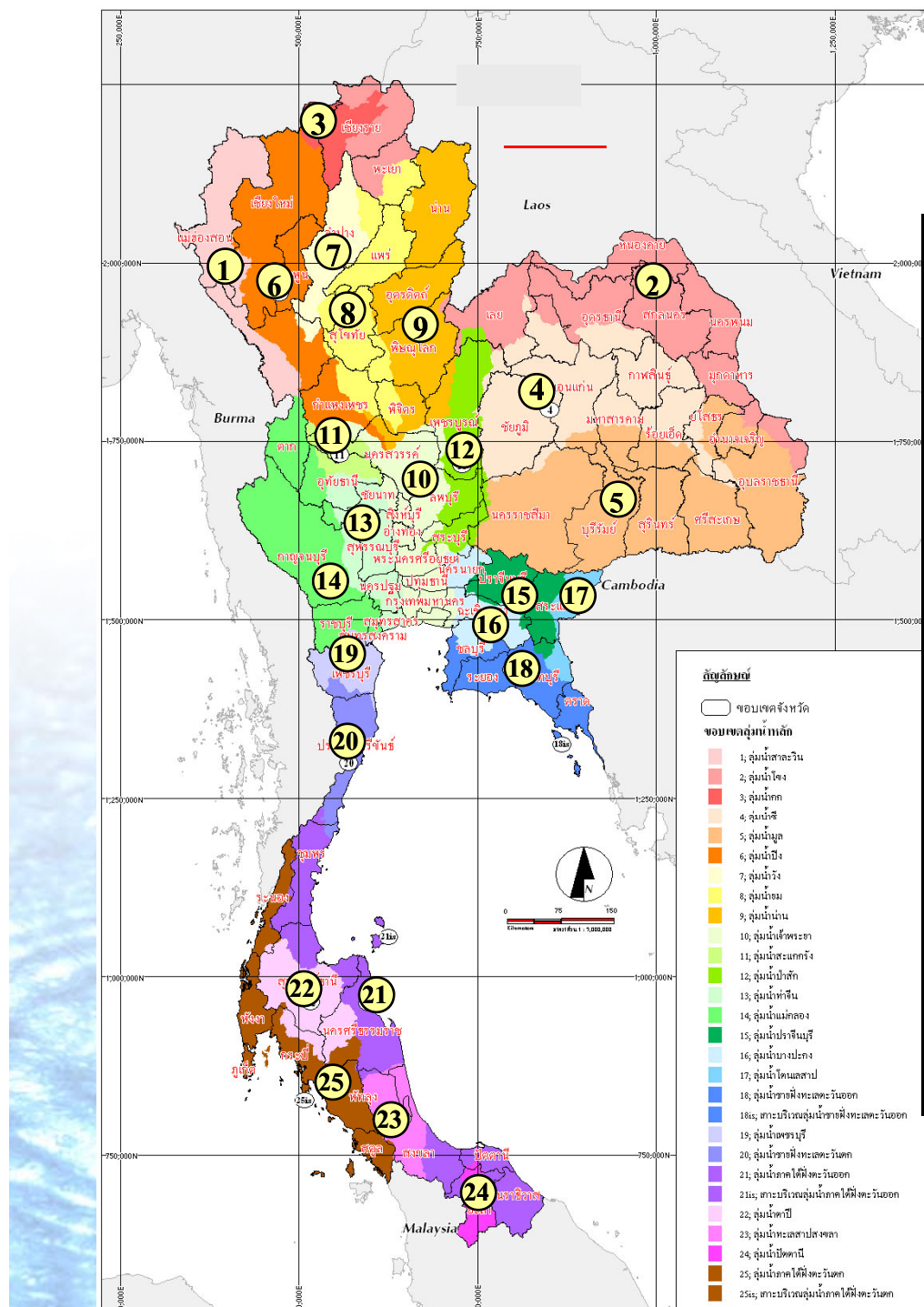


Mainstream of each main basin

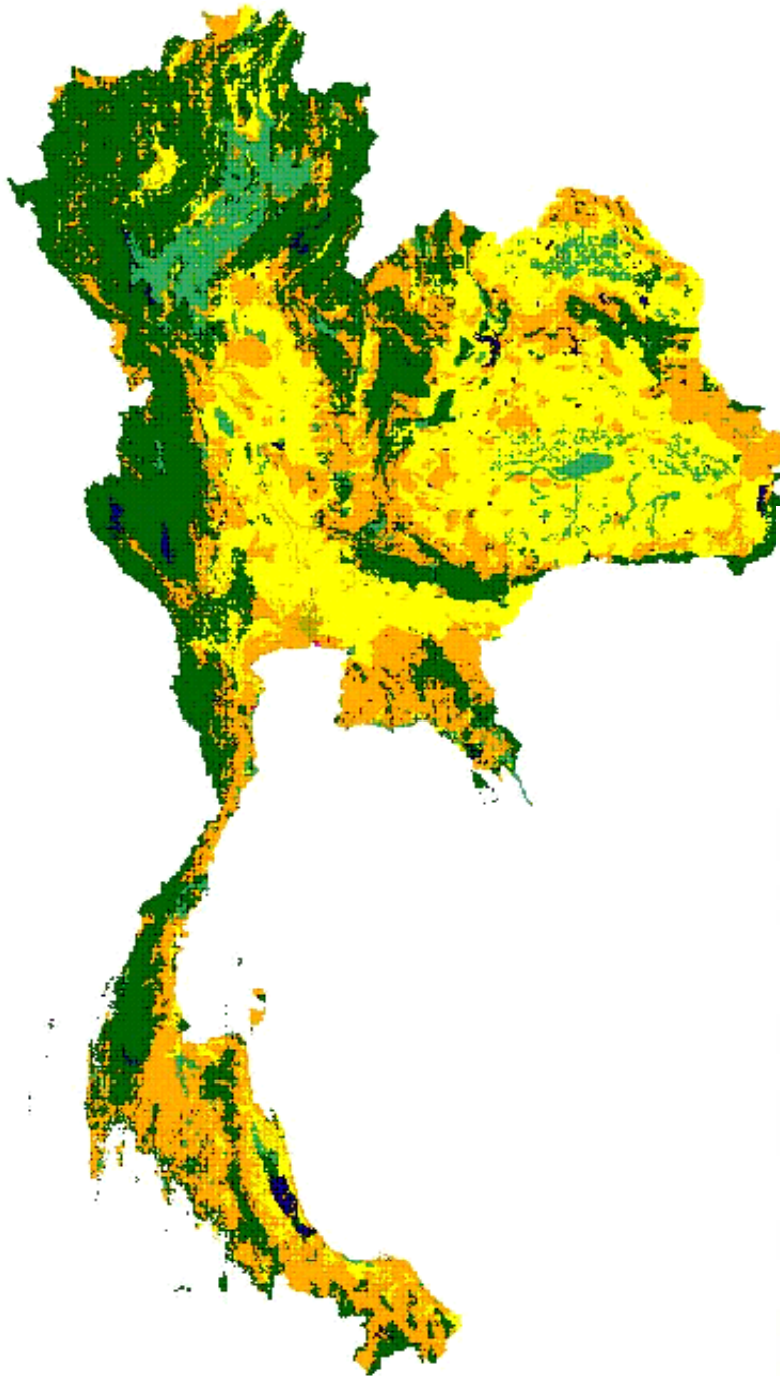
Total length of mainstream 87,200 km.

25 Main Basins

1.Salawin	14.Mae Klong
2.Mae Khong	15.Prachin
3.Kok	16.Bangpakong
4.Chi	17.Tonle Sap
5.Mun	18.East Coast
6.Ping	19.Phetchaburi
7.Wang	20.West Coast
8.Yom	21.South East Coast
9.Nan	22.Ta Pi
10.Chaopraya	23.Songkhla Lake
11.Sakaekrang	24.Pattani
12.Pasak	25.South West COast
13.Thachin	



Land Use in Thailand



Rice Area

Others



Cultivated Area



Forest Area



Tourist Attraction & Golf



Industry



Wet Land



Urban/Village



Water Sources

JULY

ลาวตงไทย

เกาะโตทล้า

AUGUST

VIETNAM

SEPTEMBER

GAMBODIA

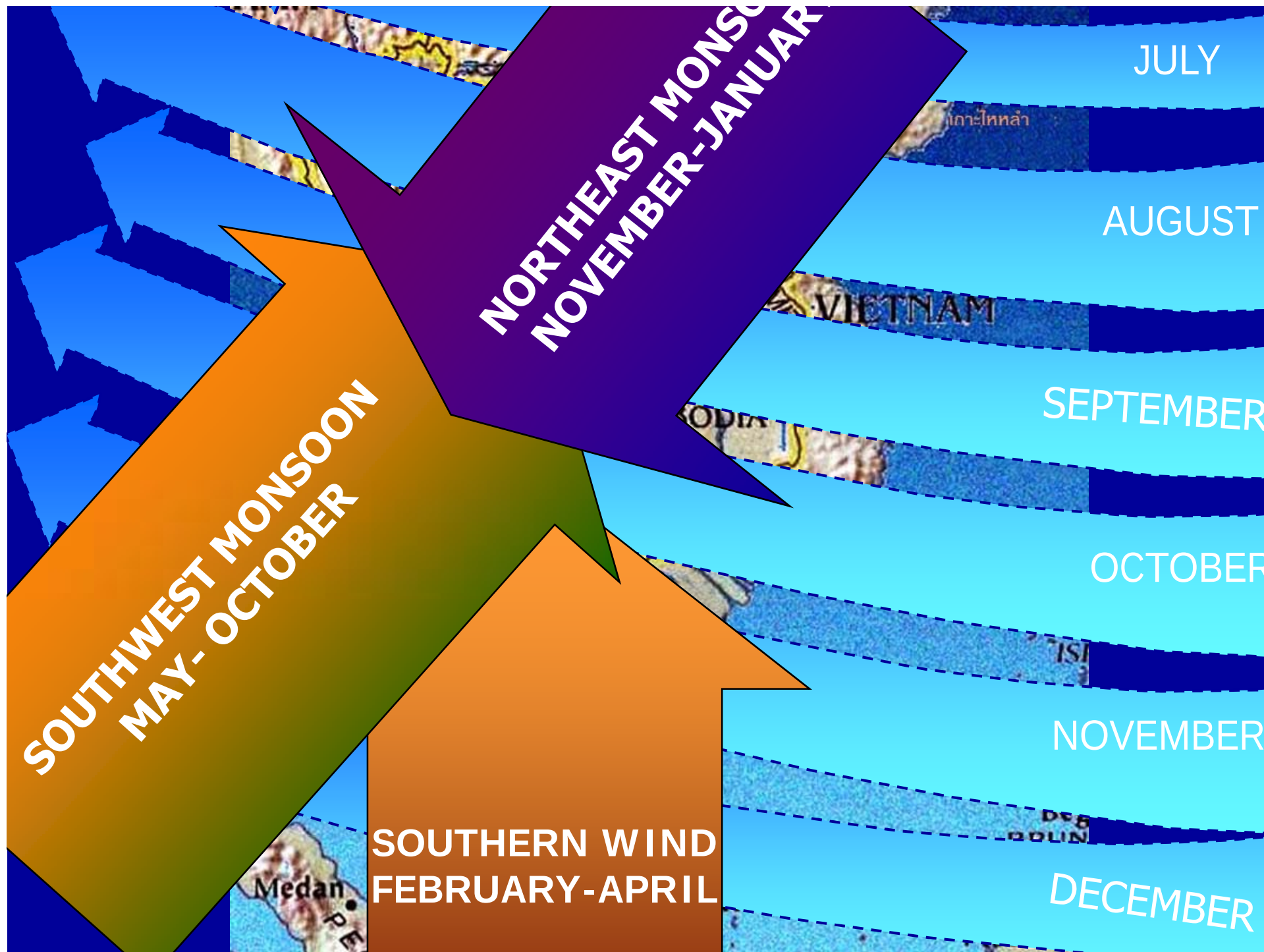
OCTOBER

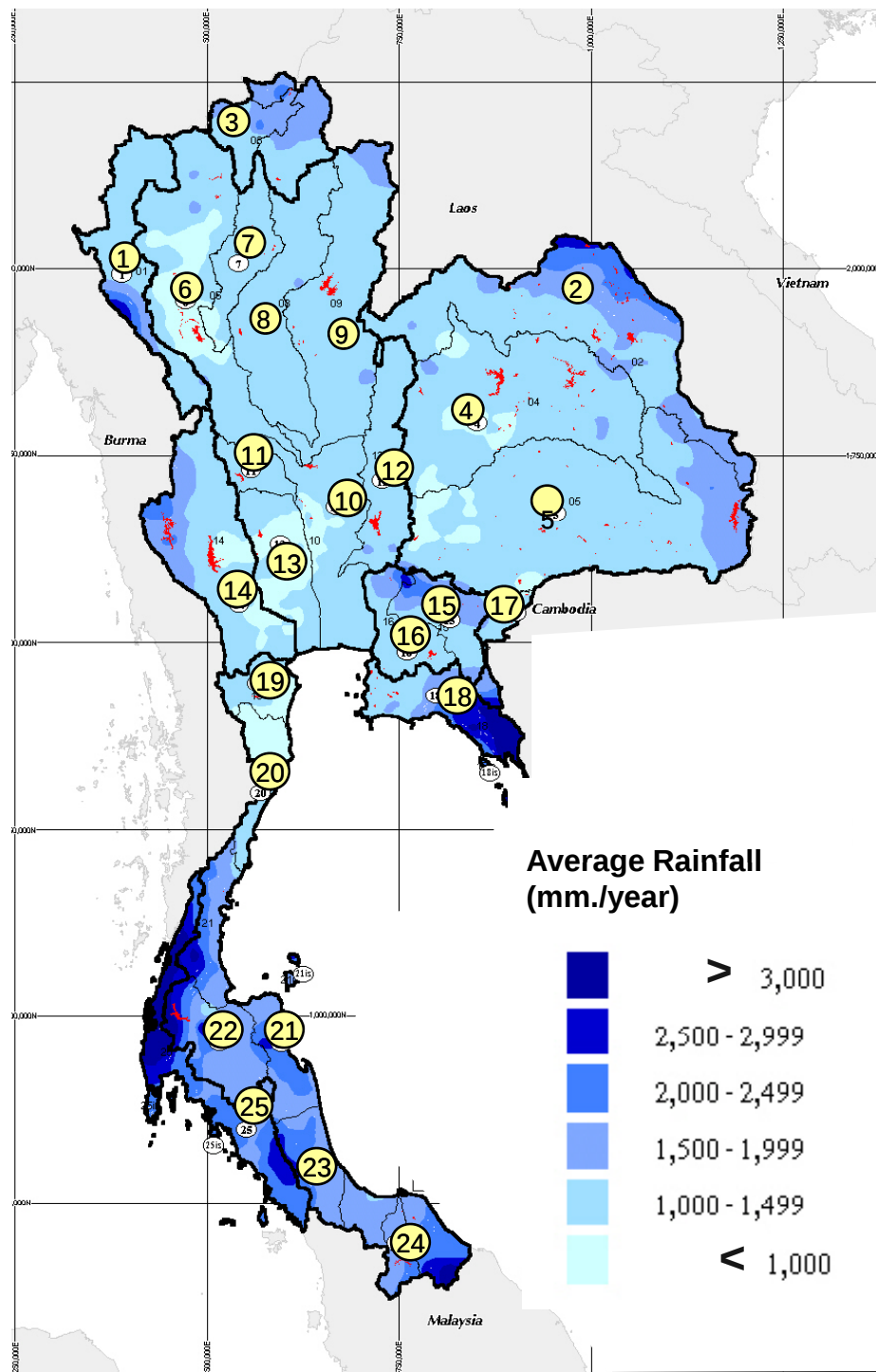
NOVEMBER

DECEMBER

SOUTHERN WIND
FEBRUARY-APRIL

Medan



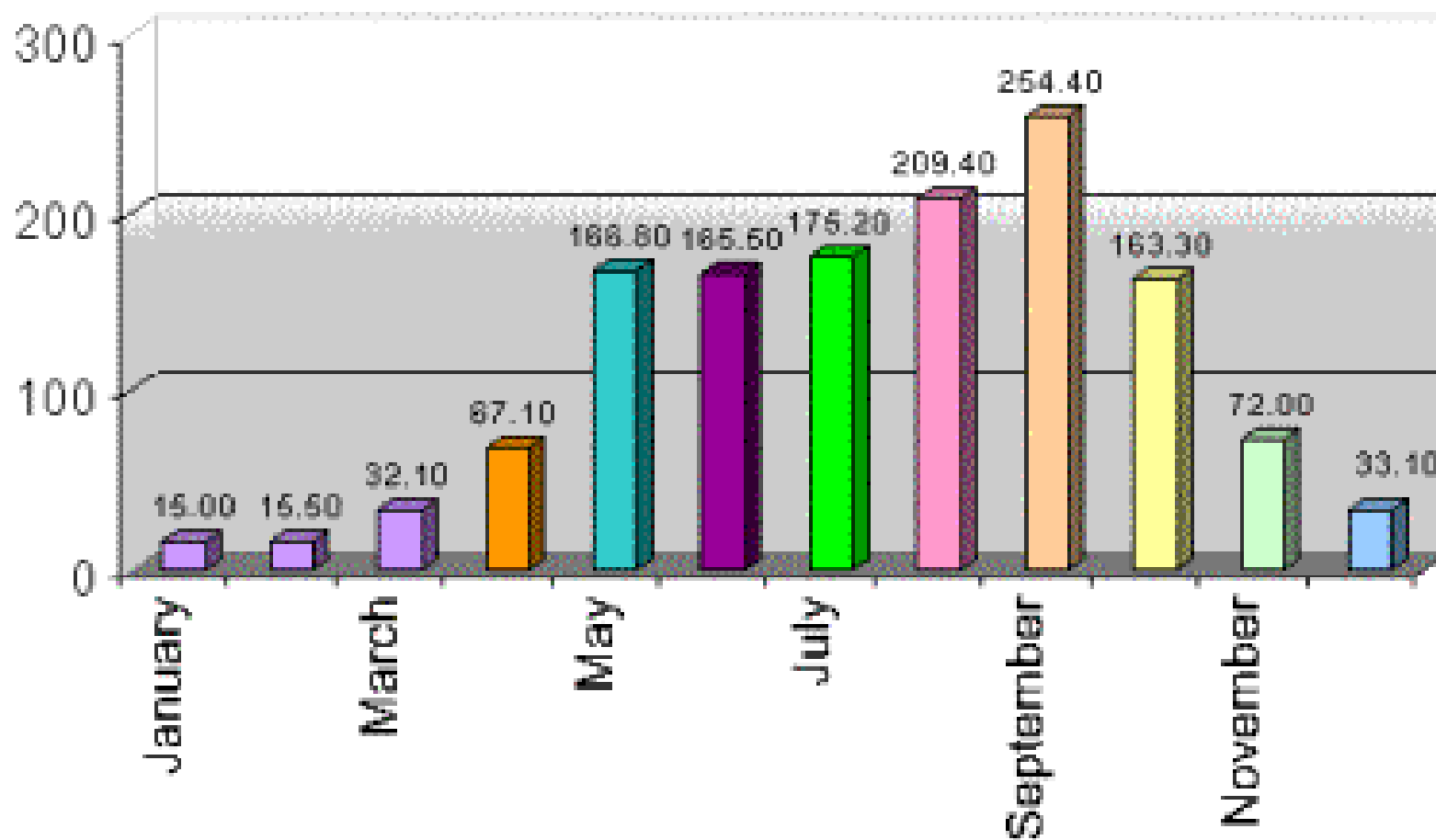


Annual Average Rainfall
1,426 mm./year

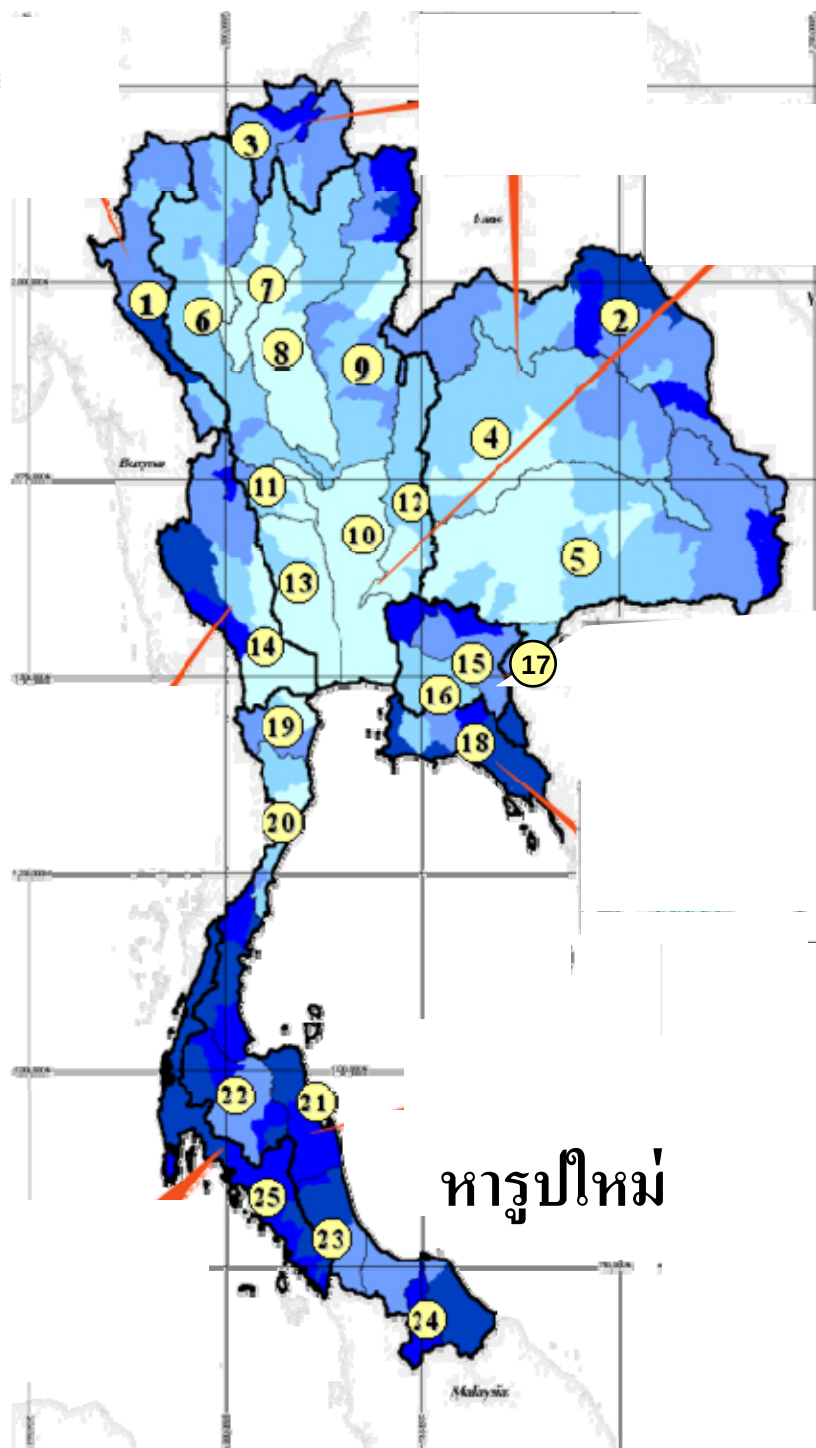
25 Main Basins

1.Salawin	14.Mae Klong
2.Mae Khong	15.Prachin
3.Kok	16.Bangpakong
4.Chi	17.Tonle Sap
5.Mun	18.East Coast
6.Ping	19.Phetchaburi
7.Wang	20.West Coast
8.Yom	21.South East Coast
9.Nan	22.Ta Pi
10.Chaopraya	23.Songkhla Lake
11.Sakaekrang	24.Pattani
12.Pasak	25.South West COast
13.Thachin	

Average Monthly Rainfall in Thailand (mm.)



Average annual rainfall 1,426 mm./yr



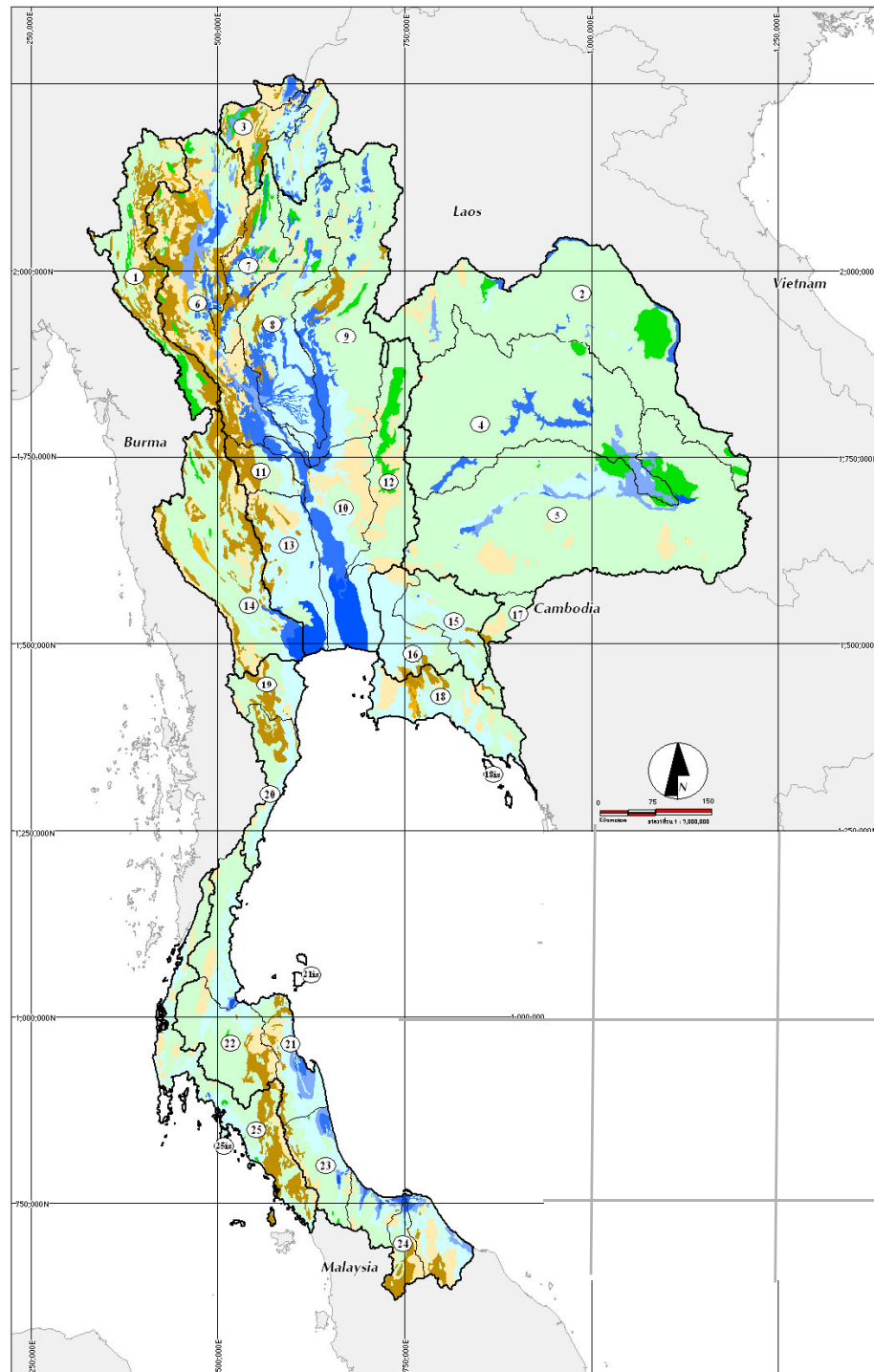
Runoff Yield Distribution in the Basins

25 Main Basins

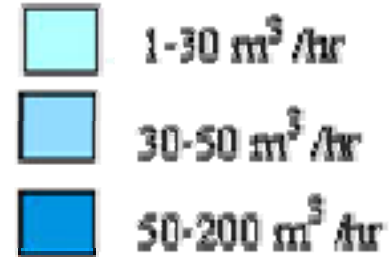
1.Salawin	14.Mae Klong
2.Mae Khong	15.Prachin
3.Kok	16.Bangpakong
4.Chi	17.Tonle Sap
5.Mun	18.East Coast
6.Ping	19.Phetchaburi
7.Wang	20.West Coast
8.Yom	21.South East Coast
9.Nan	22.Ta Pi
10.Chaopraya	23.Songkhla Lake
11.Sakaekrang	24.Pattani
12.Pasak	25.South West COast
13.Thachin	



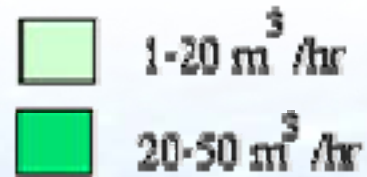
Yield of Groundwater



Ground Water In Porous Rock



Ground Water In Jointed Massive Rocks



Regions Generally With Or Without Ground Water:



Water Cycle of Thailand



Average Rainfall
1,426 mm./year

Total Catchment Area
514,008 sq.km.
(321 Million rai)

Runoff
732,975 MCM./year

Storage 76,131 MCM

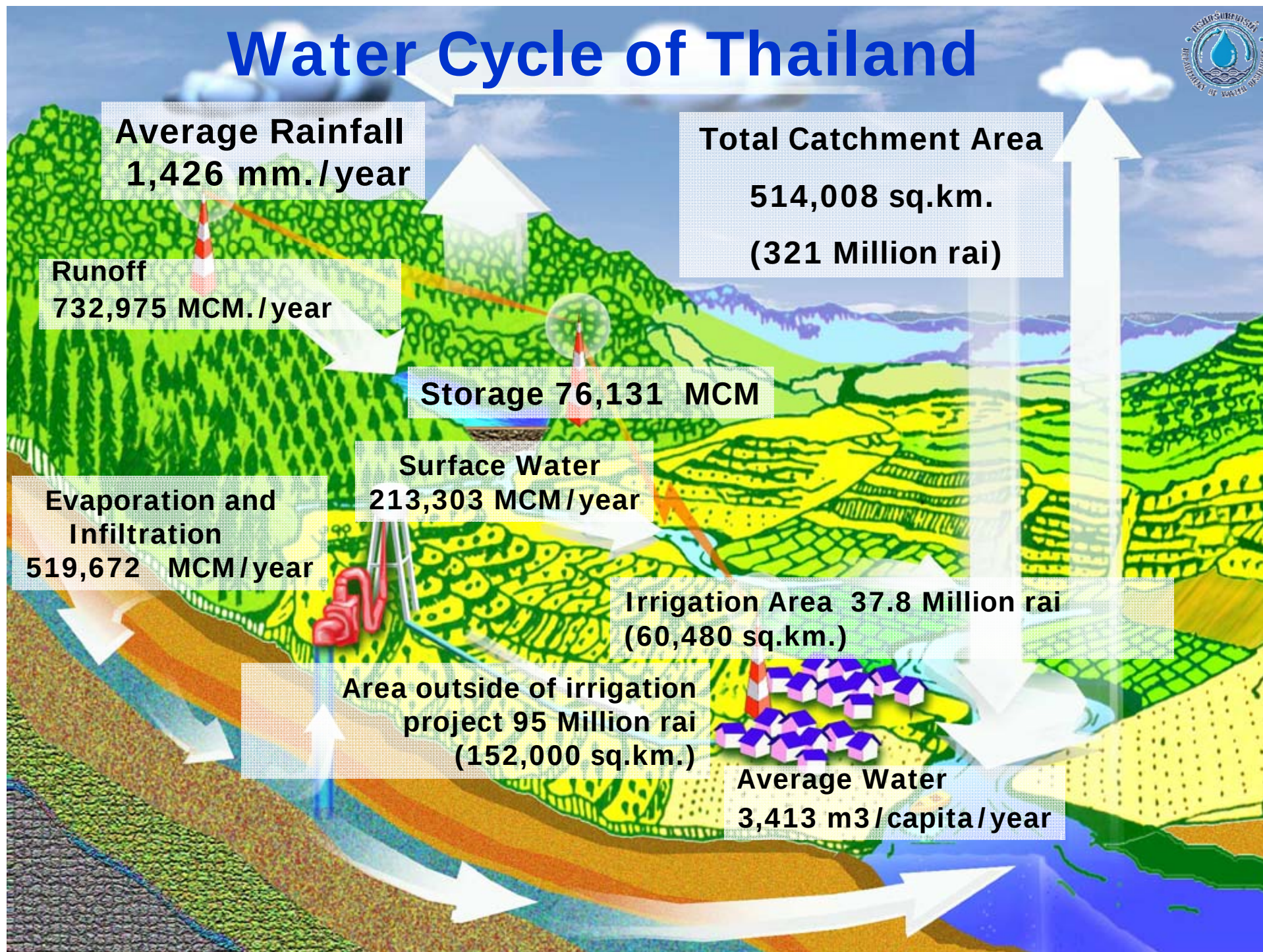
Evaporation and Infiltration
519,672 MCM/year

Surface Water
213,303 MCM/year

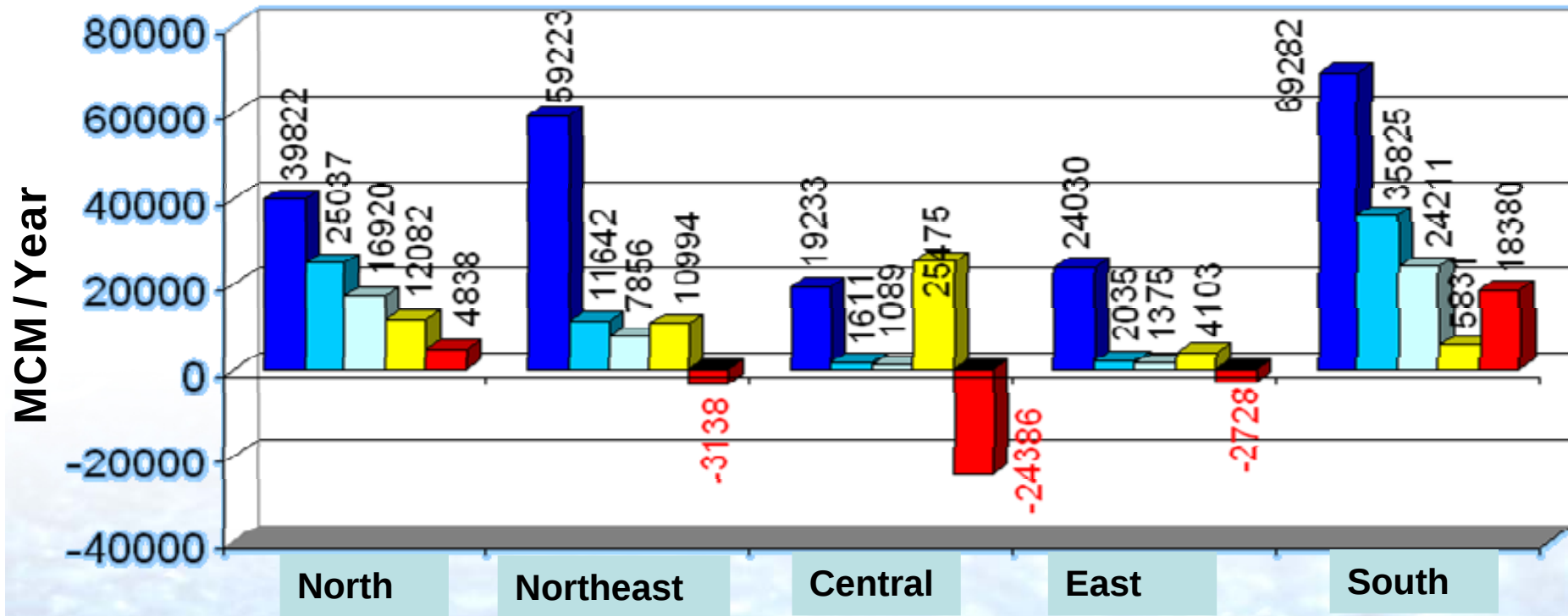
Irrigation Area 37.8 Million rai
(60,480 sq.km.)

Area outside of irrigation project 95 Million rai
(152,000 sq.km.)

Average Water
3,413 m³/capita/year

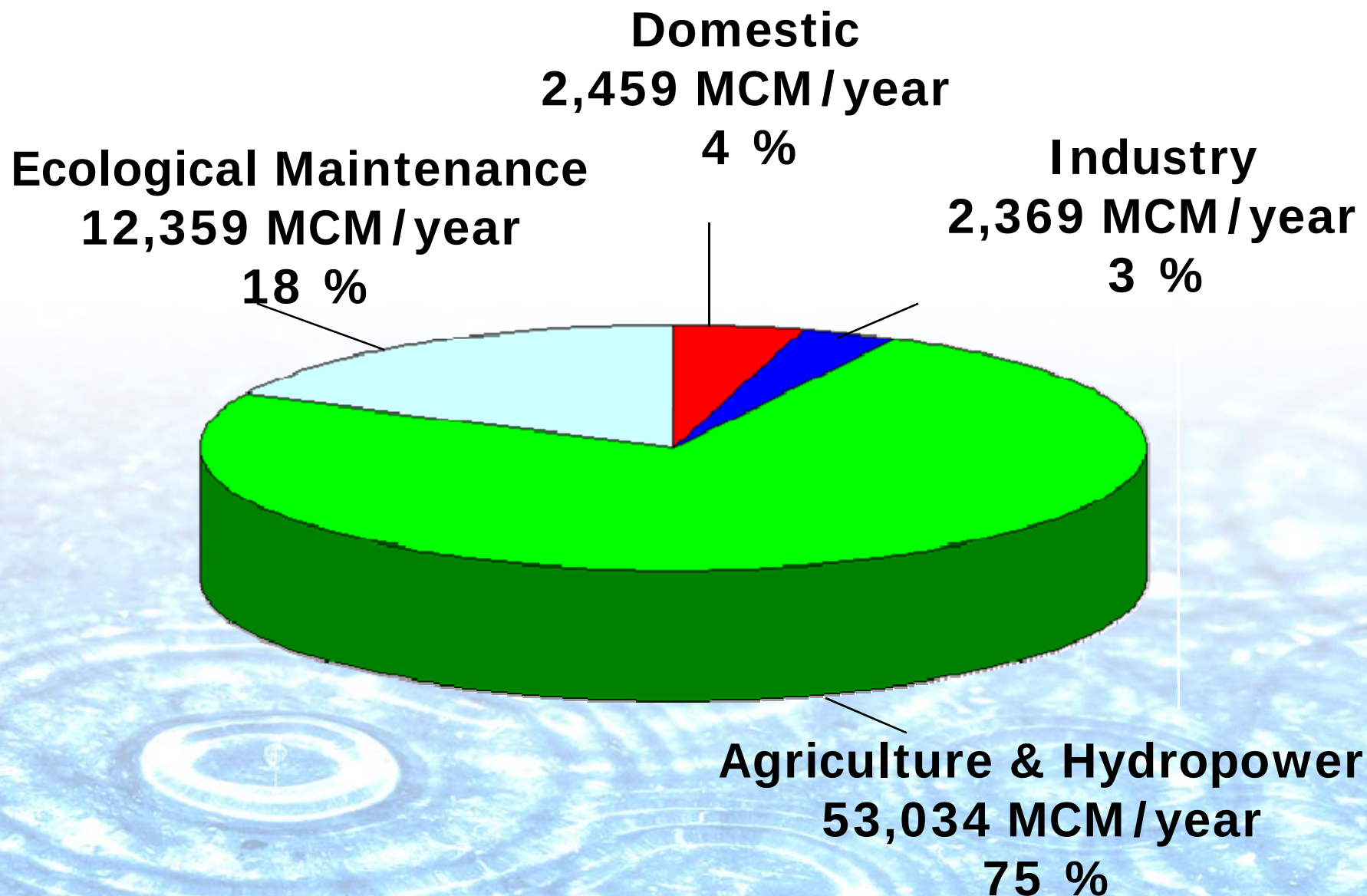


Present Water Situation in Thailand



- Surface runoff 213,303 MCM/year
- Maximum Storage in medium to large dam scale 76,132 MCM/year
- Normal Storage operate to use in all sector 45,434 MCM/year
- Water demand 57,890 MCM/year
- Shortage 12,456 MCM / year

Present Water Demand

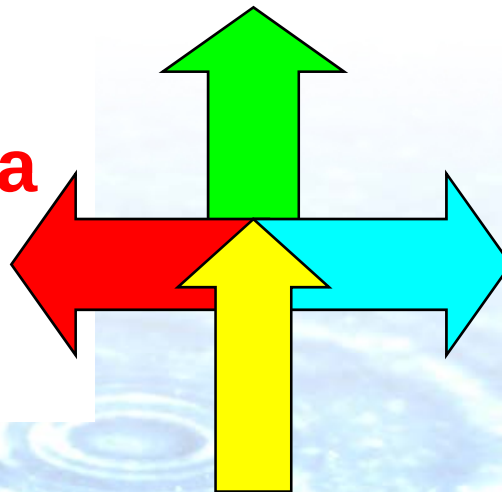


2. Current Agricultural Area

+ Increased Water Demand for
Domestic Use, Tourism, &
Industry,
Water Shortage 17,368 MCM

1. Expand Agricultural Area

to 53 Million rai,
Water Shortage
33,982 MCM



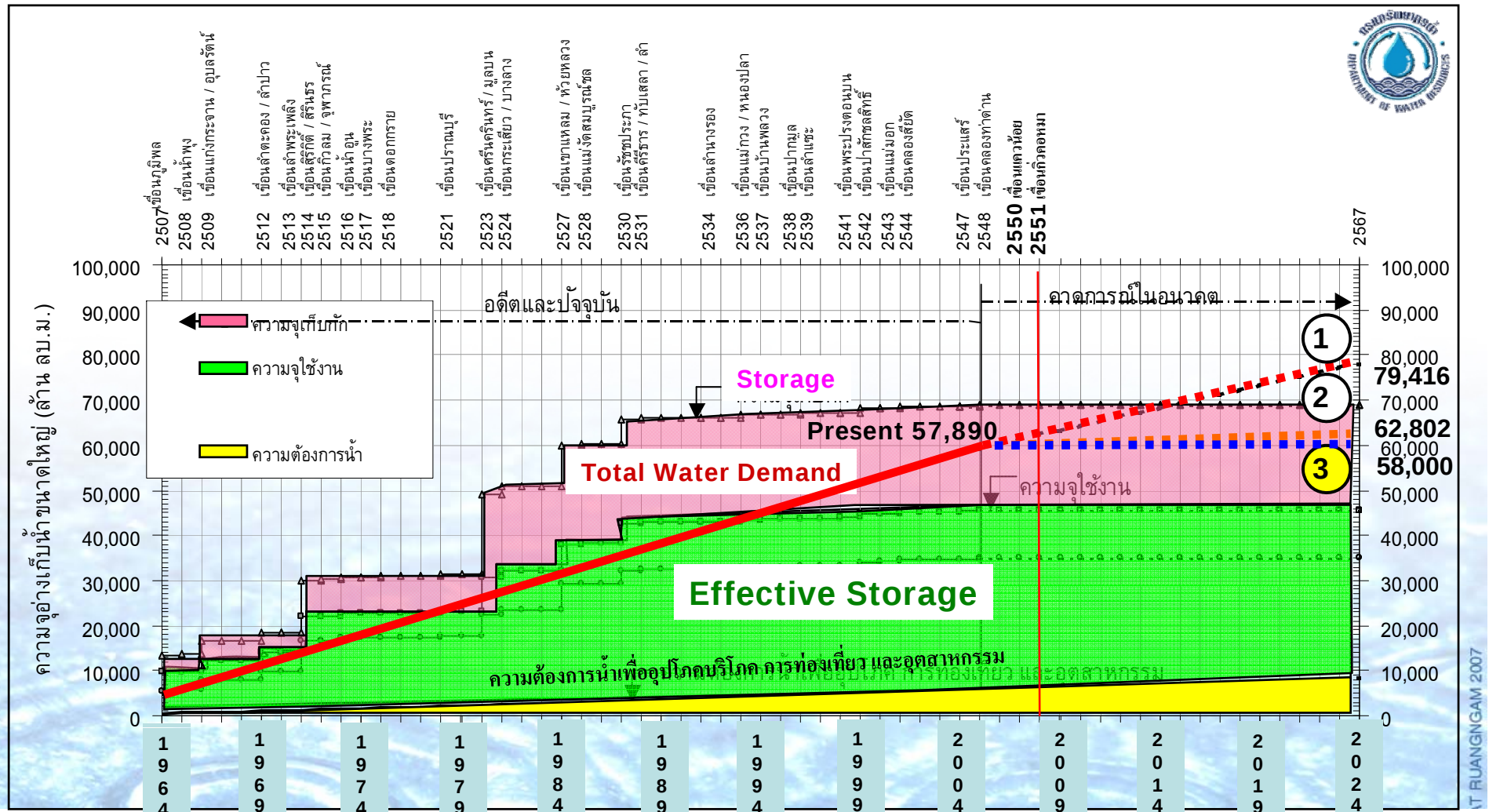
3. Case 2 but

Increased Water Use
Efficiency 10 %, Water
Shortage 12,566 MCM

3 Options in Future (year 2024)

Present Water Shortage (year 2005) 12,456 MCM

Water Balance in the Future





Water resources problem and disaster in Thailand





Flash Flood-Land Slide Events

May, 2004

อ.อมก๋อย เชียงใหม่

Oct, 2002

อ.แม่สะเรียง แม่ฮ่องสอน

May, 2004

อ.สบเมย แม่ฮ่องสอน

Sep, 2004

อ.เมืองแม่ฮ่องสอน

Sep, 2004

อ.แม่สะเรียง แม่ฮ่องสอน

Sep, 2005

อ.ปางมะผ้า แม่ฮ่องสอน

May, 2004

อ.แม่ระมาด อ.แม่ตื่น ตาก

May, 2001

อ.วังชิ้น แพร่

Sep, 2004

อ.ลอง แพร่

May, 2006

แพร่

May, 1970

อ.ทับสะแก
ประจวบคีรีขันธ์

Oct, 2004

อ.เมือง กระบี่

Oct, 2001

อ.กะทู้ จ.ภูเก็ต

Dec, 1982

อ.ศรีบรรพต พัทลุง

Jan, 1975

อ.ร่อนพิบูลย์ นครศรีธรรมราช

Nov, 1988

อ.พิปูน อ.ลานสกา นครศรีธรรมราช

May, 2004

อ.ธารโต จ.ยะลา

Dec, 2005

อ.บันนังสตา จ.ยะลา

พค., กย. 47

อ.แม่แจ่ม เชียงใหม่

Sep, 2004

อ.ฝาง เชียงใหม่

May, 2006

อ.ลี้แล, อุดรดิตย

พค 49 อุทัย

Sep, 2000

อ.หล่มสัก, อ.เมือง เพชรบูรณ์

Aug, 2001

อ.หล่มสัก เพชรบูรณ์

Aug, 1999, 2001

อ.เขาคิชฌกูฏ จันทบุรี

Jul, Sep, 2004

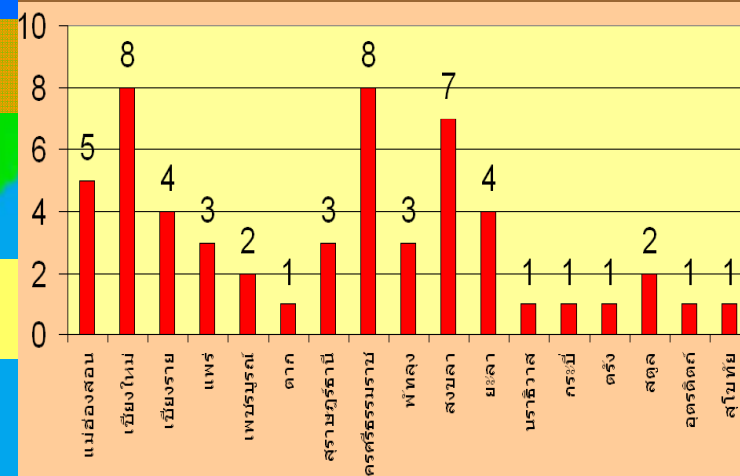
อ.แม่สาย เชียงใหม่

Sep, 2002

อ.แม่แจ่ม เชียงใหม่



No. of Land Slide











Risk Area for Flash Flood & Land Slide

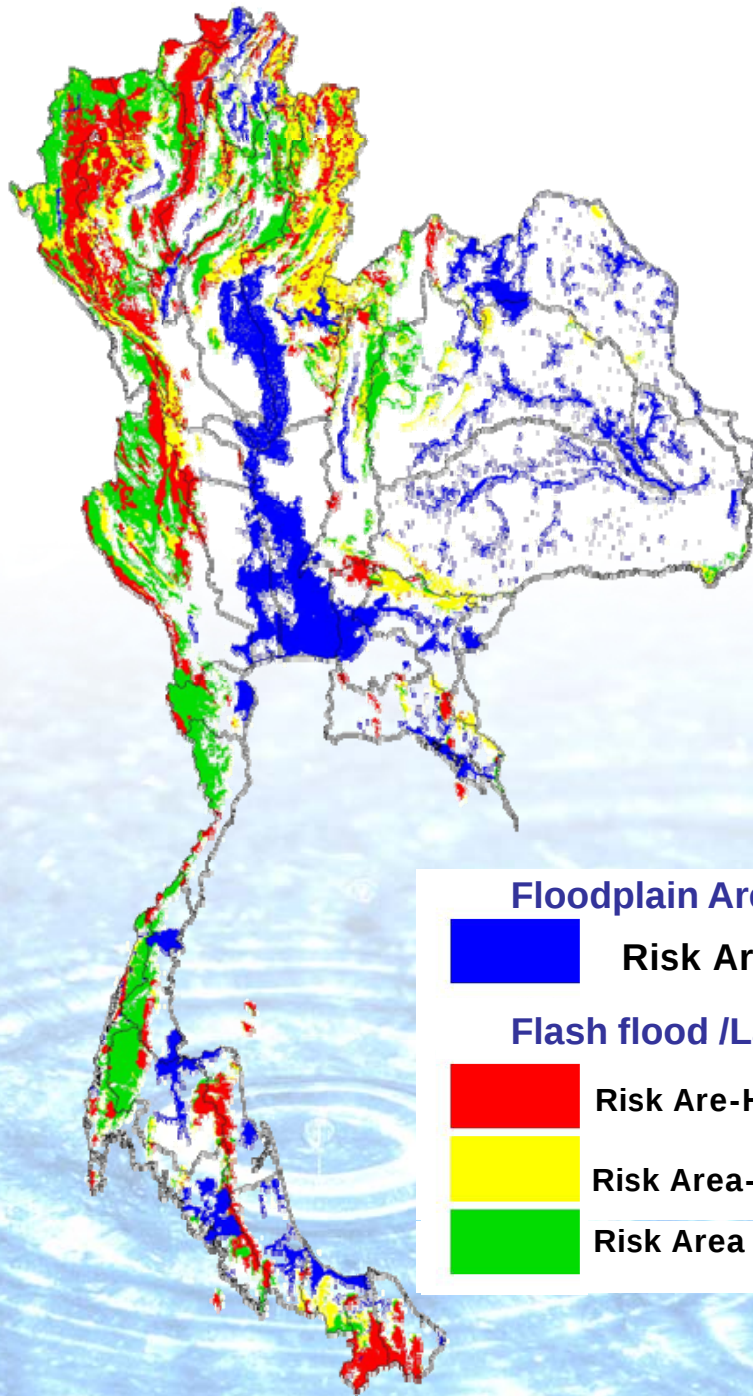
High Risk Villages

= 2,370 Villages

- Risk Villages Installed Early Warning System 251 station (in 2008)
- & covering in 598 Villages

Flood Risk Map

- Flood events from satellite images 13 years (1993–2005)
- Hydrological data
- Data information from other Department



Floodplain Area



Risk Area for Inundation

Flash flood /Land slide Risk Map



Risk Area-High Flood & Land Slide



Risk Area-Medium Flood & Land Slide



Risk Area for Low Flood & Land Slide

Flood Risk Area in Urban Community and Economic Area

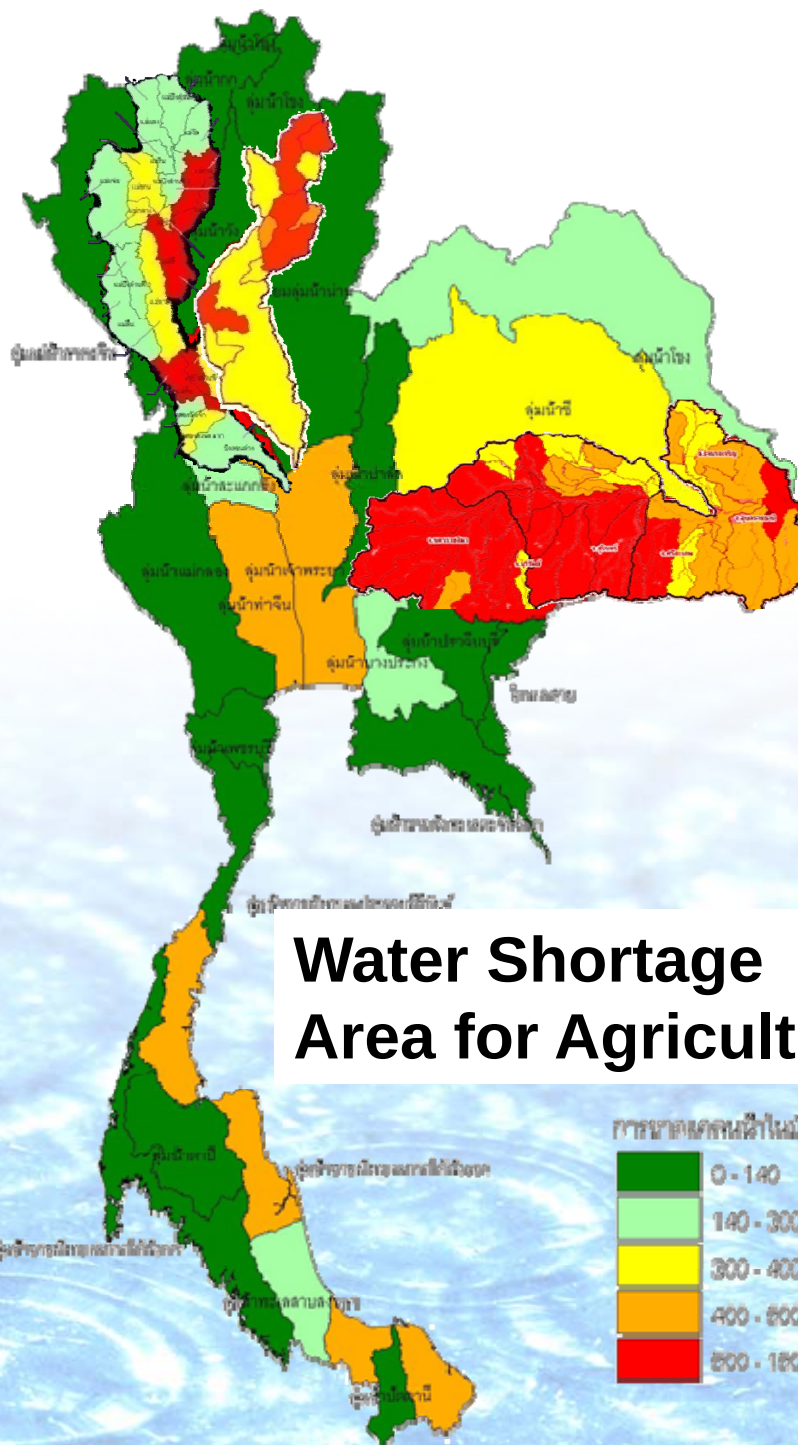
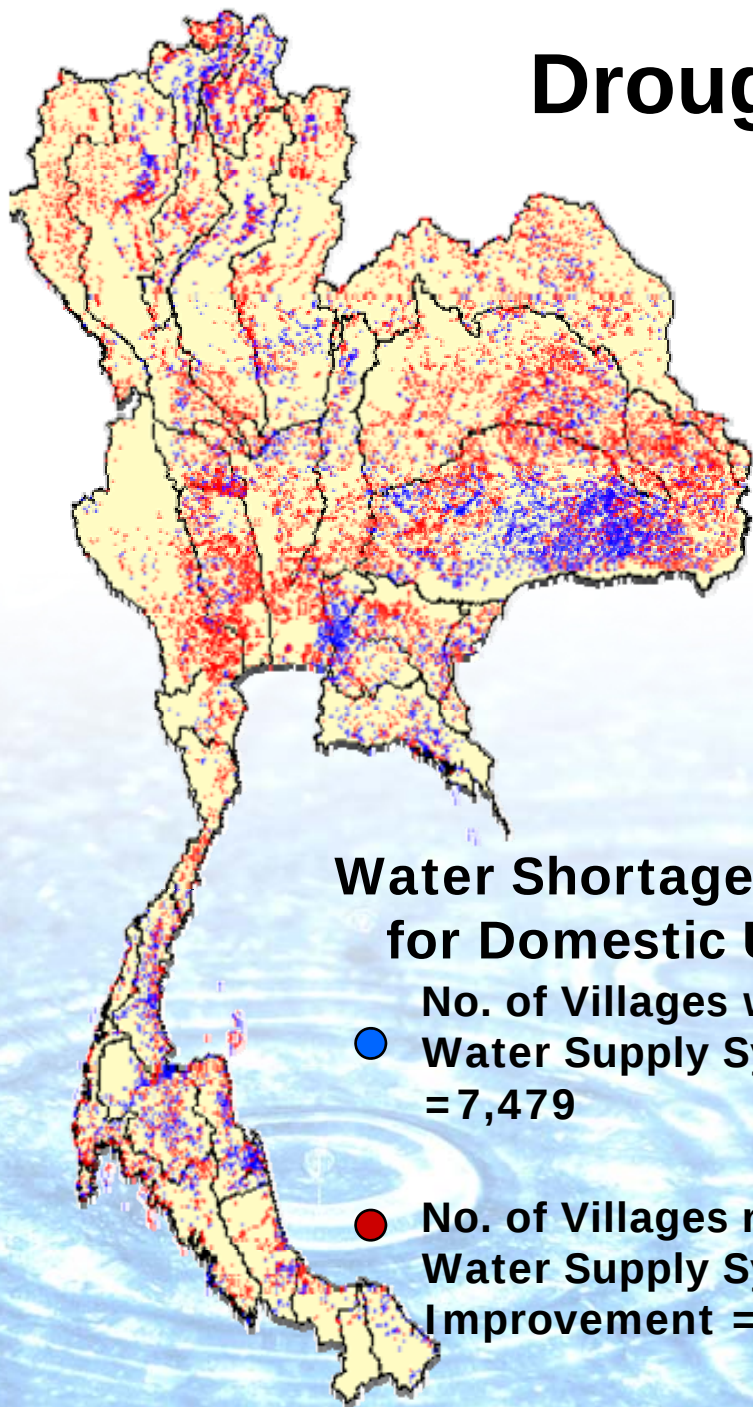
● 32 Cities (15 Groups)

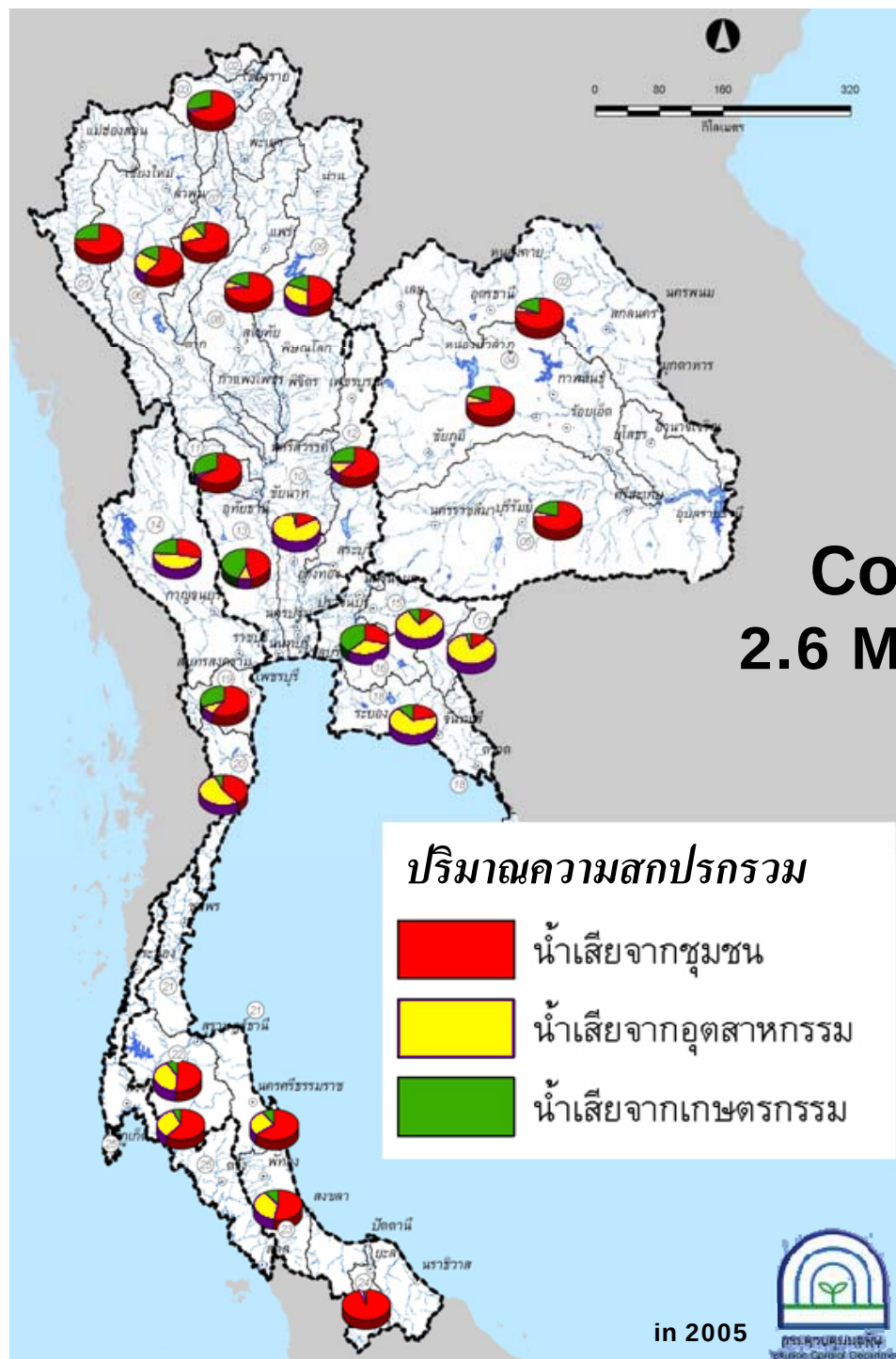
- | | |
|-------------------------|-------------------|
| 1) Ping | 9) Surat THani |
| 2) Nan-Yom | 10) Chumporn |
| 3) Chiang Rai | 11) Nakonsitamrat |
| 4) Chaopaya-
Thachin | 12) Had Yai |
| 5) Chanthaburi | 13) Yala |
| 6) Bangsapan | 14) Takuapa |
| 7) Mae Kong | 15) Trang |
| 8) Mun | |

Inundation Area / Flood Plain
27.2 Million rai
(43,520 sq.km.)



Drought



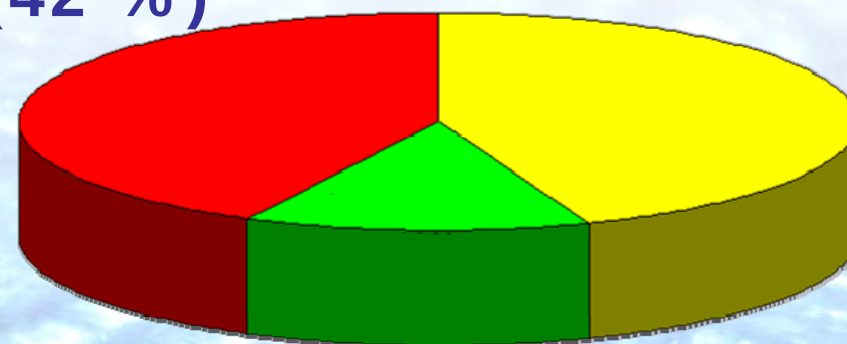


Total BOD Load

Total BOD Load
6.19 M kg BOD/day

Community
2.6 M kg BOD/day
(42 %)

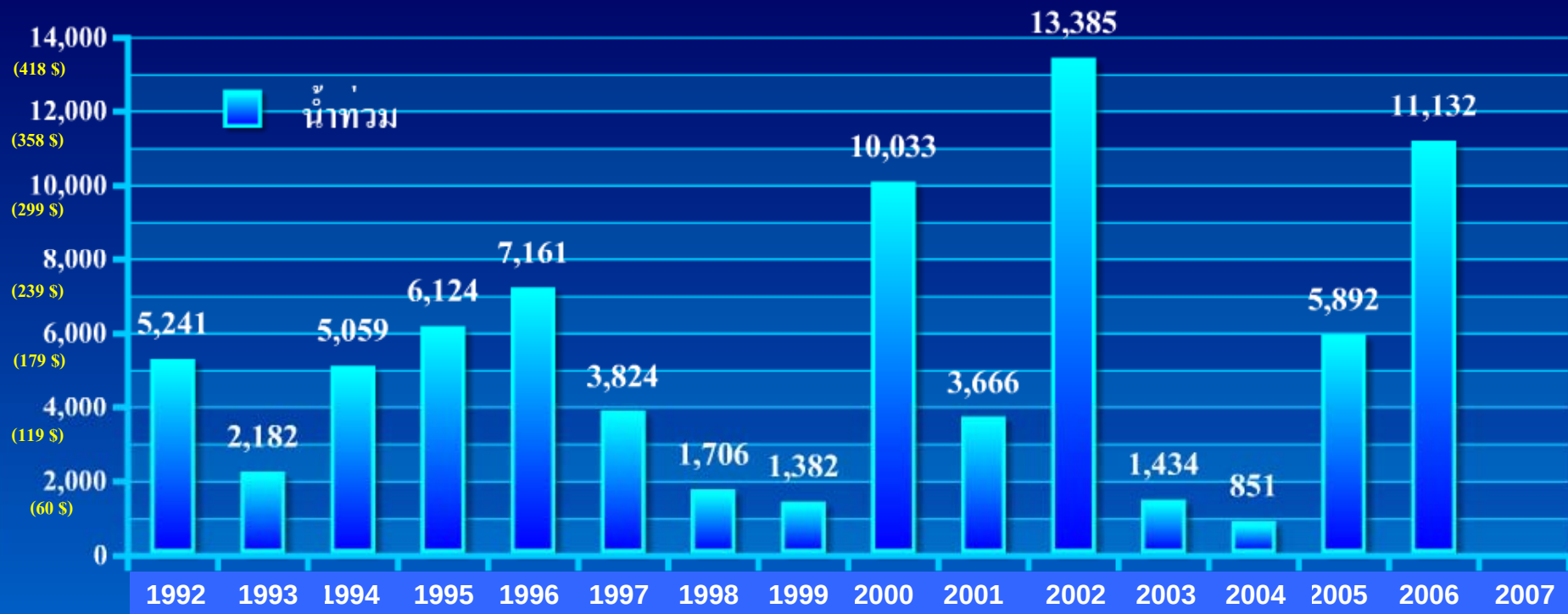
Industry
2.7 M kg BOD/day
(44 %)



Agriculture
0.8M kg BOD/day
(14 %)

Budget to relief in Flash flood/Land slid & Flood disaster

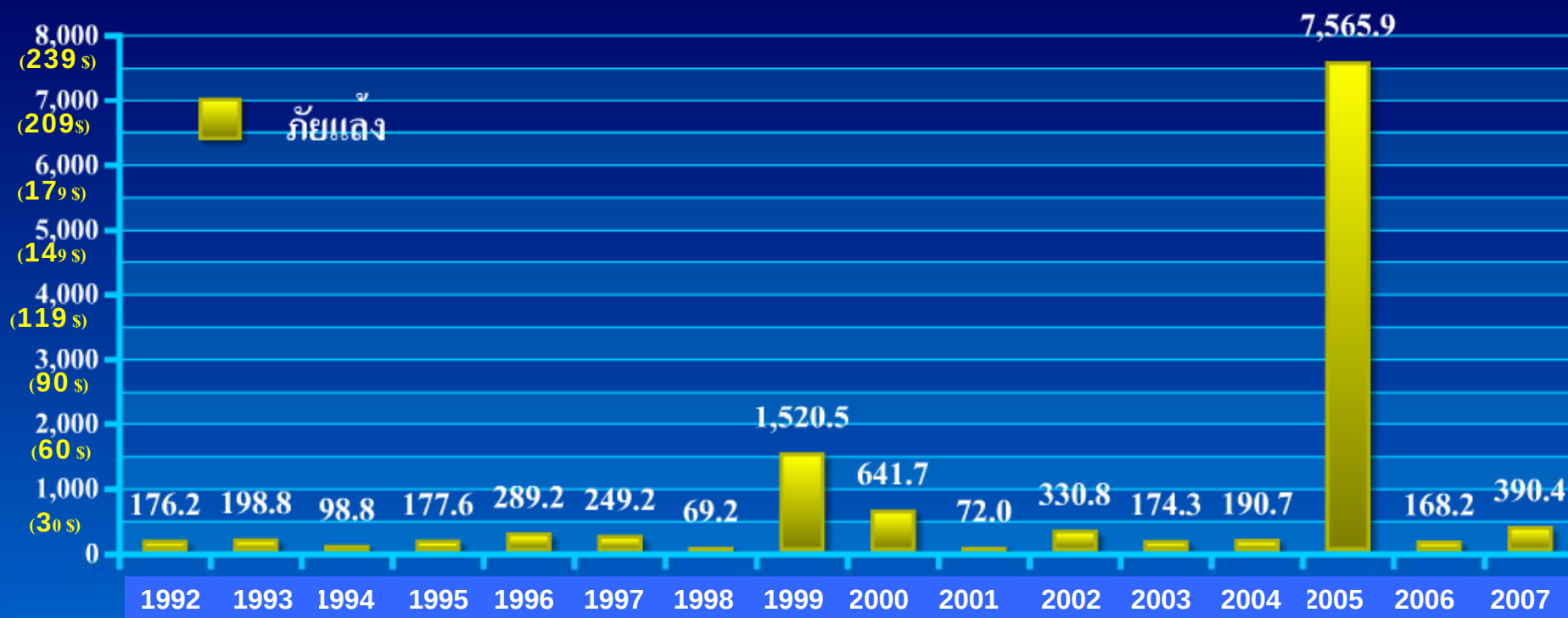
งบประมาณช่วยเหลือนาทวม
(ล้านบาท)
(Million U.S. \$)



ที่มา : กรมป้องกันและบรรเทาสาธารณภัย

Budget to relief in Drought disaster

งบประมาณช่วยเหลือด้านภัยแล้ง
(ล้านบาท)
(Million U.S. \$)

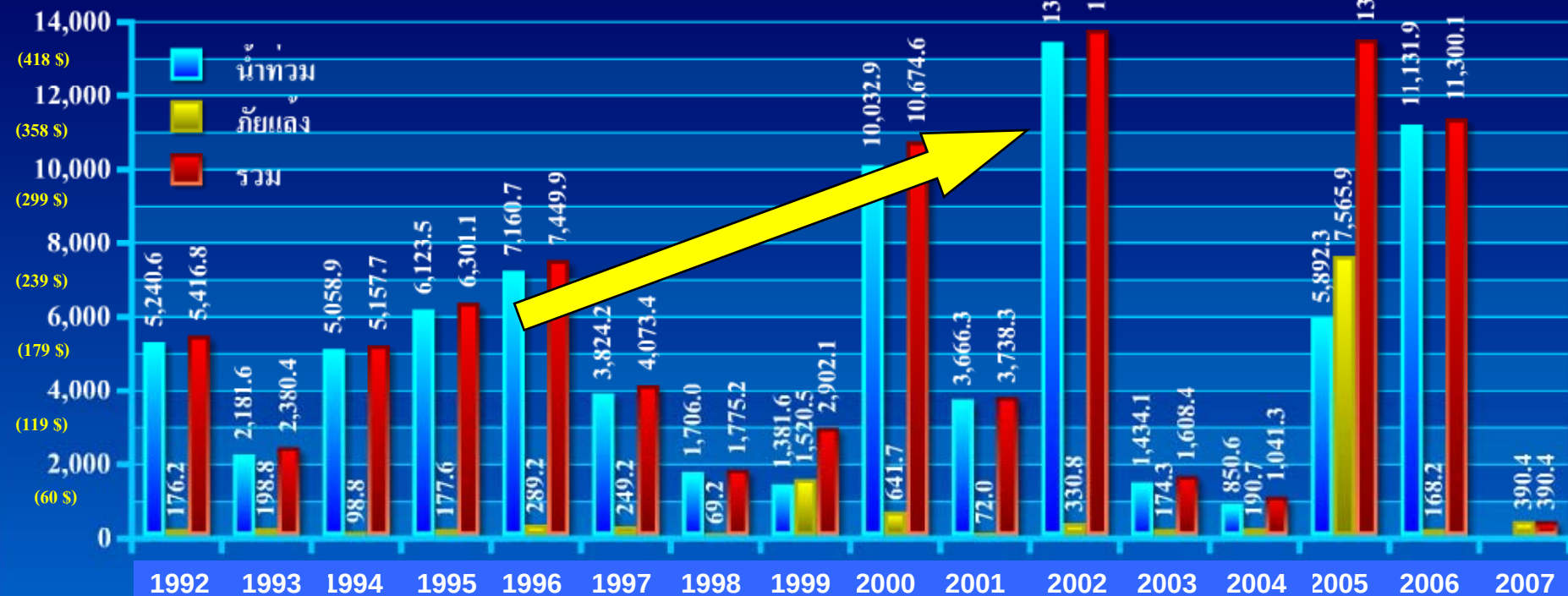


ที่มา : กรมป้องกันและบรรเทาสาธารณภัย

Drought & Flood Mitigation Budget

งบประมาณช่วยเหลือน้ำท่วมและภัยแล้ง
(ล้านบาท)

(Million U.S. \$)



ที่มา : กรมป้องกันและบรรเทาสาธารณภัย