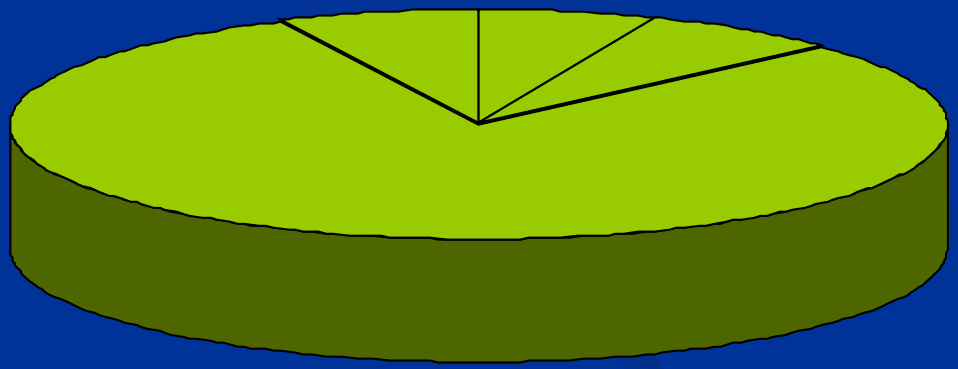
ECONOMY REPORT

Human Capacity Building for Natural Resources Development and its Environmental Impacts in APEC Region

Ms Patchara Sangoen
Department of mineral Resources
Thailand

Department of Mineral

Before 3 October 2002



Department of Mineral Resources

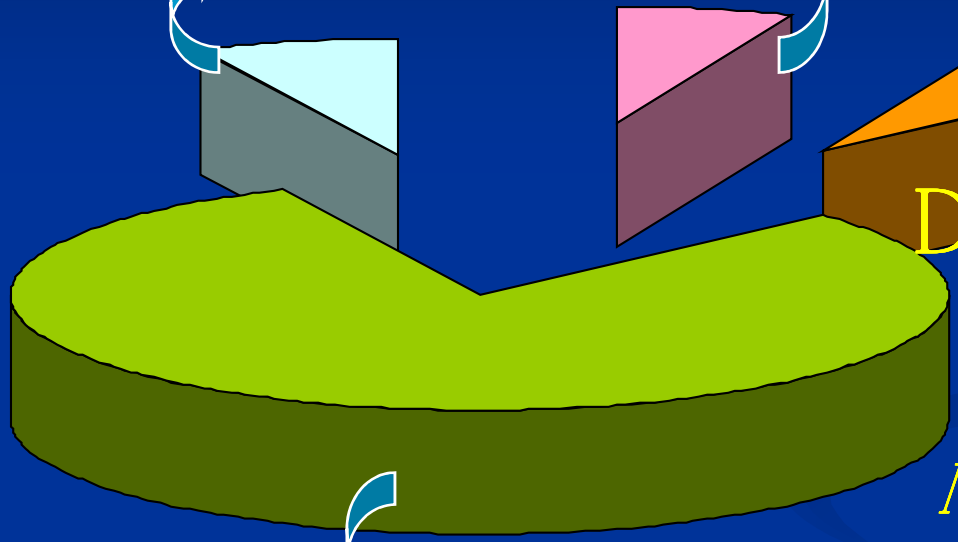
Ministry of Industry

Dept. of Mineral Fuels,

Ministry of Energy

Dept. of Groundwater Resources,

Ministry of Natural Resources and Environment



Dept. of Primary Industries and Mines,

Ministry of Industry

Dept. of Mineral Resources,

Ministry of Natural Resources and Environment

DEPARTMENT OF MINERAL RESOURCES

MISSION

Manage geological resources and geology-related activities efficiently with participation of all stakeholders in order to contribute to sustainable use and an improved quality of life.

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

1. Submit opinions for the designation of areas, the formulation of policies and plans for preservation, conservation and rehabilitation of geological resources, and the management of geological resources and geology-related activities.

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

2. Submit opinions for the formulation or amendment of laws, regulations and measures of preservation, conservation and rehabilitation of geological resources, and the management of geological resources and geology-related activities,

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

as well as perform monitoring, evaluating and regulating in compliance with the laws, regulations and measures.

3. Perform functions as specified by the related Sections of the Mineral Law.

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

4. Perform surveying, inspecting, studying, researching, knowledge developing, data providing, knowledge disseminating, technical servicing and international cooperating in geology and geological resources.

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

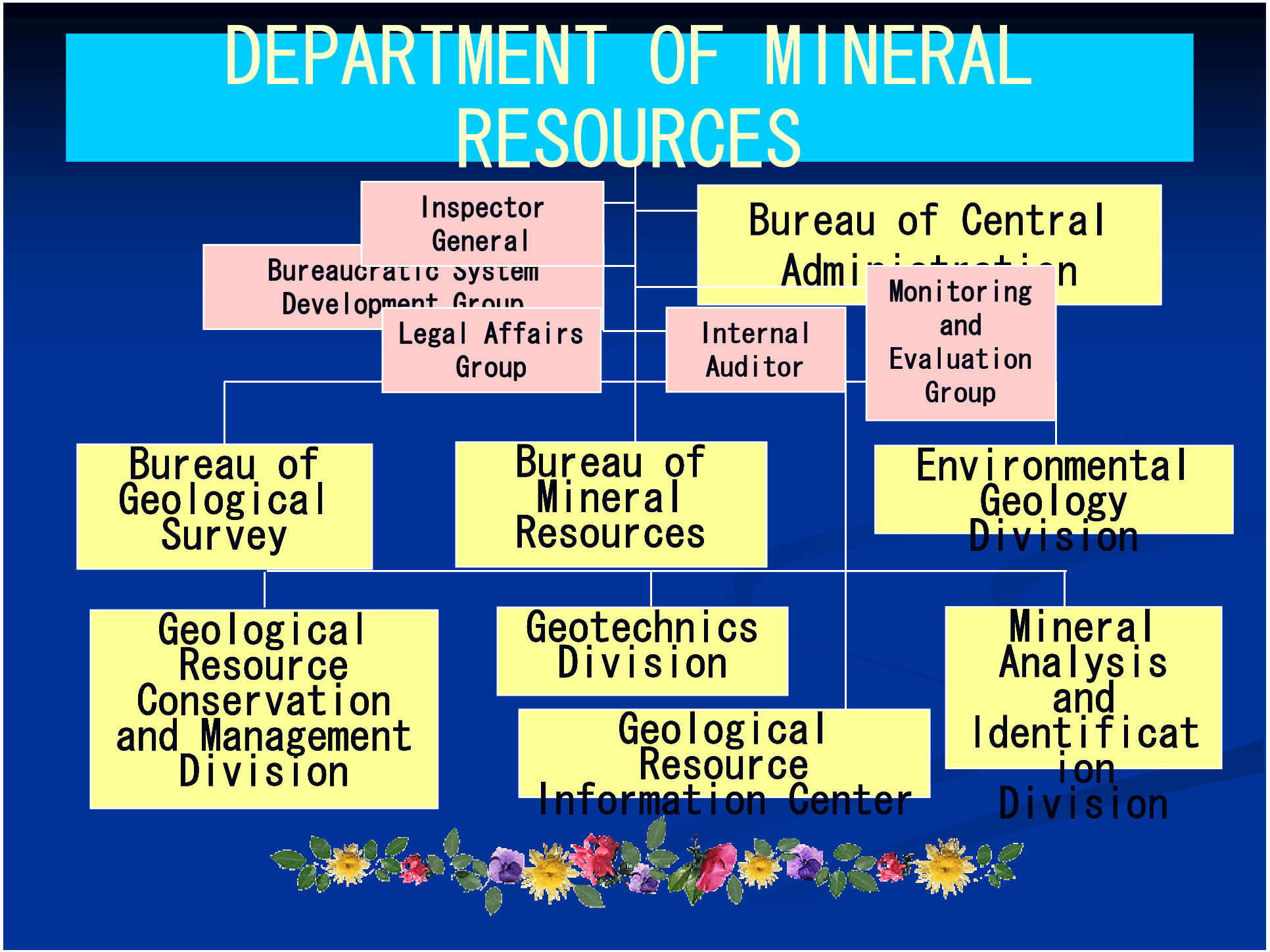
5. Set the geological and mineral standards, collect and preserve the geological and mineral samples for the national reference.

DEPARTMENT OF MINERAL RESOURCES

Authorized Functions

6. And to perform other functions as specified by the related laws to be the functional authorities of the Department, or by the assignment of the Ministry or the Cabinet.

DEPARTMENT OF MINERAL RESOURCES



OUTLINE OF COUNTRY REPORT

I. Mineral Resources

II. Groundwater Resources

III. Energy Resources

OUTLINE OF PRESENTATION

I. Mineral Resources

1. Production
2. Environmental Impacts
3. Geological conservation sites
4. Mineral Resources management
5. A selected case of environmental impact from mining activity

OUTLINE OF PRESENTATION

II. Groundwater Resources

1. Department of Groundwater Resources (DGR)
2. Recent and on-going projects
3. Department of Groundwater Resources' present key roles

OUTLINE OF PRESENTATION

III. Energy Resources

1. Energy in Thailand
2. Gasohol
3. Bio-diesel
4. Natural Gas for Vehicles (NGV)
5. Campaign on energy saving program

I. Mineral Resources

1. Production

- 40 kinds of mineral ores produced in 2006
- The production value increased from that of 2005 by 11.67%
- Export and import values slightly increased from those of 2006 by 2.79% and 1.33% respectively

I. Mineral Resources

2. Environmental Impacts

- Mae Moh coal-fired power plant in Lampang Province
- Saline soil in the northeast region caused by rock salt production
- Cadmium problem from zinc mining in Tak Province

I. Mineral Resources

2. Environmental Impacts

- High concentration of dust from stone crushing mills in Saraburi Province
- The protest against potash mining in Udonthani Province
- Physical impacts on archeological sites, ancient cities, and cultural environment
- Landslides and land subsidence

I. Mineral Resources

3. Geological conservation sites

- Mineral resource museum, fossil sites, geo-tourism sites and geological and ancient biological evidences
- Places for seeking geological knowledge
- Finished the draft act to protect the fossil

I. Mineral Resources

4. Mineral resources management

- Acceleration of enforcement on control measures to prevent illegal mining, improvement of mining process
- Effective enforcement on environmental rehabilitation during and after mining

I. Mineral Resources

4. Mineral resources management

- Promotion of geological education and survey to support the protection and remedial guidelines for solving geological related disasters,
- Promotion of survey and development of geo-tourism

I. Mineral Resources

5. A selected case of environmental impact from mining activity:

- Sulfur dioxide emission from Mae Moh coal-fired power plant in Lampang Province, Northern Thailand

I. Mineral Resources

- **Mae Moh coal-fired power plant**

  - ***Lampang Province, Northern Thailand***
  - ***Electricity Generating Authority of Thailand (EGAT)***
  - ***13 generating units***
  - ***Capacity: (3x75)+(4x150)+(6x300)***

    = 2,625 MW

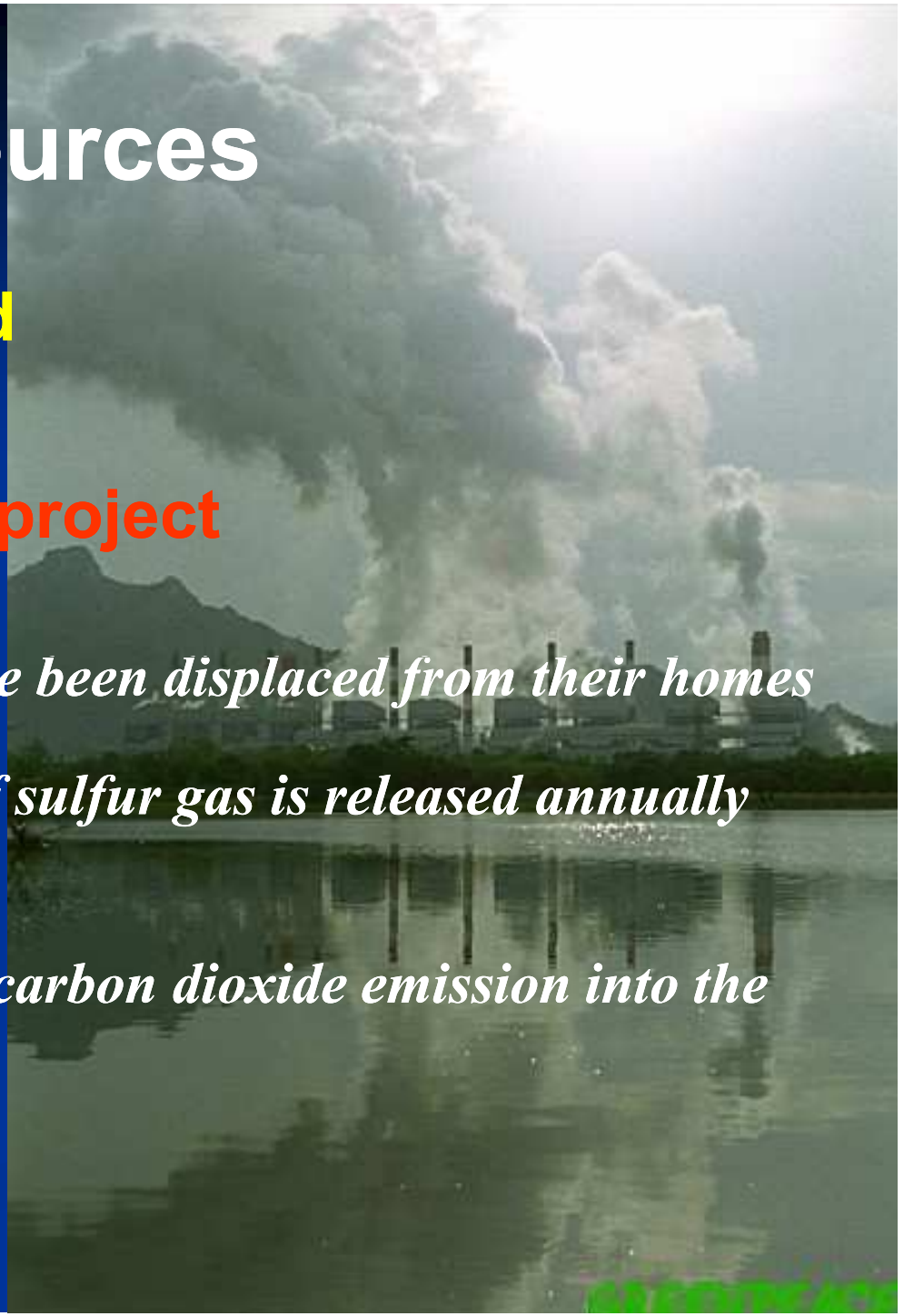
I. Mineral Resources

- **Mae Moh coal-fired power plant**

  - ***Year of commission : 1978 - present***
  - ***Fuel : an open-pit lignite mine covering an area of 135 square kilometers, the largest of its kind in Thailand.***
  - ***Production in 2006: 43,000 Tons per day***
  - ***Southeast Asia's largest coal-fired power plant***

I. Mineral Resources

- **Mae Moh coal-fired power plant**
  - ❖ **Impacts of this project**
    - ➢ *30,000 people have been displaced from their homes*
    - ➢ *1.6 million tons of sulfur gas is released annually into the air*
    - ➢ *4,033,932 tons of carbon dioxide emission into the atmosphere per year*



I. Mineral Resources

- **Mae Moh coal-fired power plant**
  - ❖ **Impacts of this project**
    - ➢ *Coal dust consisting of toxic chemicals has been carried by winds into rivers, reservoirs and nearby communities in the Mae Moh valley, including the reservoir that supplies drinking water for the local people*
    - ➢ *In 1992, Thousands have experienced severe health and respiratory problems*

I. Mineral Resources

- **Mae Moh coal-fired power plant**
  - ❖ **Solutions**
    - ➢ *EGAT has set up the Flue Gas Desulphurization (FGD) system to eliminate sulfur dioxide emitted from the mine*
    - ➢ *The emissions became lower than the standard set by the National Environment Board (NEB), being safe for human beings and the environment*

I. Mineral Resources

- **Mae Moh coal-fired power plant**
  - ❖ **Solutions**
    - ➢ *Since 1992, the Pollution Control Department (PCD) set up the measure for solution of the pollutions with related organizations.*
    - ➢ *87 % villagers acknowledged the process of solving pollution problems*
    - ➢ *59 % being satisfied with such problems solving performance.*

I. Mineral Resources

- **Mae Moh coal-fired power plant**
  - ❖ **Solutions**
    - ➢ *55 % villagers realized that sulfur dioxide is lower than in the past.*
    - ➢ *Local people requested serious and continuous process of solving pollution problems in Mae Moh area from related governmental organizations in order to solve these environmental problems permanently.*

II. Groundwater Resources

1. Department of Groundwater resources (DGR)

- Established in 2002 under the Ministry of Natural Resources and Environment
- Controlling and inspecting of groundwater activities all over the country

II. Groundwater Resources

1. Department of Groundwater resources (DGR)

- The Department's mandates concern research, investigation and development managing the country's groundwater resources.

II. Groundwater Resources

2. Recent and on-going projects

- Study and research on groundwater potential assessment in order to support the Royal development projects in the mountainous areas.
- Groundwater potential assessment and development in tsunami affected areas, Southern Thailand.

II. Groundwater Resources

2. Recent and on-going projects

- Groundwater contamination from domesticated aquatic animals at Sating Phra Basin, Songkhla Province, Southern Thailand.
- Development and conservation of groundwater at Songkhla Basin.

II. Groundwater Resources

2. Recent and on-going projects

- The study of groundwater potential assessment in Moon-Chii river basin
- Feasibility and detailed design artificial recharge into aquifer at Eastern Coastal Area.

II. Groundwater Resources

2. Recent and on-going projects

- Feasibility and detailed design underground dam at Samui Island.
- National groundwater quality analysis.
- And training and disseminating in groundwater development local authorities.

II. Groundwater Resources

3. Department of Groundwater Resources' present key roles

- Groundwater supply system for rural areas all over the country
- The research and control of groundwater usage in Bangkok metropolitan and suburban areas where the environmental impact has occurred in terms of land subsidence.

III. Energy Resources

1. Energy in Thailand

- Reserved energy has been decreased due to the demand of energy has markedly been increased especially for transportation and industrial sectors
- Import energy from other countries and develop alternative fuels to compensate the use of fossil fuels.

III. Energy Resources

1. Energy in Thailand

- Nowadays, the government gives priority to the utilization of alternative fuels especially bio-fuels such as gasohol, bio-diesel, and natural gas for vehicle (NGV).

III. Energy Resources

2. Gasohol

- Gasohol is widely recognized and the gasohol stations are rapidly increased.
- In 2007, the average sale per day was around one million liters.
- The use of gasohol instead of fossil fuel will reduce air pollutants since gasohol is more environmentally friendly than gasoline.

III. Energy Resources

3. Bio-diesel

- The government has supported the use and production of bio-diesel by setting the goal for 2011 in which the use of bio-diesel will reach 720 million liters per year.

III. Energy Resources

4. Natural gas for vehicles (NGV)

- NGV is less widely used as compared to gasohol due to limitation of gas stations and requirement for gas containers.
- The government has launched projects to promote the use of NGV, such as installment of NGV equipment for 10,000 volunteered taxis, and increase stations for service of NGV.

III. Energy Resources

5. Campaign on energy saving program

- The campaign on “turning off air conditions for one hour and turning off at least one light for five minutes” on the first of June achieved the energy saving up to 822 MW and 702 MW.
- Ten energy saving measures were set as guidelines for practice in households as well as other regulations to help solving energy crisis of the country.

Thank You

ECONOMY REPORT

Human Capacity Building for Natural Resources Development and its Environmental Impacts in APEC Region

Ms Patchara Sangoen
Department of Mineral Resources
Thailand

1. MINERAL RESOURCES

Overview

The production of Mineral Resources has been increasing to serve demand in the country. There were more than 40 kinds of mineral ores produced in 2006. The production value increased from that of 2005 by 11.67%. The highest production value was from mineral of fuel or energy group with was followed by minerals of cement industry group and industrial stone group respectively. With regard to export and import of mineral production, the increasing trend was observed in 2006. The export and import values slightly increased from those of 2006 by 2.79% and 1.33% respectively.

Production process of mineral resources may cause serious problems and impacts on environment and human health. The evidence of impacts are such as air pollution from Mae Moh coal-fired power plant in Lampang Province, saline soil in the northeast region caused by rock salt production, cadmium problem from zinc mining in Tak province, high concentration of dust from stone crushing mills in Saraburi province, the protest against potash mining in Udonthani province, physical impacts on archeological sites, ancient cities, and cultural environment, as well as problems of land slides and land subsidence.

With regard to geological conservation sites such as mineral resource museum, fossil sites, and geo-tourism sites, Department of Mineral Resources has considered them as the places for seeking geological knowledge, as well as geological and ancient biological evidences. The Department has finished the draft act to protect the fossil. At present, it is in the process of consideration by concerned agencies.

Recommendations for mineral resources management consist of the followings: acceleration of enforcement on control measures to prevent illegal mining, improvement of mining process and effective enforcement on environmental rehabilitation during and after mining, promotion of geological education and survey to support the protection and remedial guidelines for solving geological related disasters, and promotion of survey and development of geo-tourism.

- A selected case of environmental impact from mining activity: Sulfur dioxide emission from Mae Moh coal-fired power plant in Lampang Province, Northern Thailand

Secluded in the mountains of northern Thailand lies a massive lignite coal-fired power plant equipped with 13 generating units with a total capacity of 2,625 Megawatts. Mae Moh, Thailand's largest mine, is located in Mae Moh district, Lampang Province of northern Thailand. It began operating on a small scale in the 1960s and was significantly expanded in

the 1978s. Owned and operated by the Electricity Generating Authority of Thailand (EGAT), the Mae Moh Power Plant is Southeast Asia's largest coal-fired power plant. The fuel of the power station is supplied by an open-pit lignite mine covering an area of 135 square kilometers, the largest of its kind in Thailand. The current production from the mine is 40,000 tons per day.

Every year approximately 1.6 million tons of sulfur gas is released into the air from this power plant, resulting in severe health problems for local people and irreversible damage to the natural environment. It has been estimated that the Mae Moh power plant has annually contributed approximately 4,033,932 tons of carbon dioxide emission into the atmosphere, making the biggest regional contributor to climate change.

Since the inception of the Mae Moh coal-fired power plant, more than 30,000 people have been displaced from their homes. In 1992 thousands have experienced severe respiratory problems and four law suits have been filed against the Electricity Generating Authority of Thailand (EGAT). More than 600 villagers continue to suffer from acute respiratory problems caused by the inhalation and exposure to sulfur dioxide emitted from the mine. Coal dust consisting of toxic chemicals has been carried by winds into rivers, reservoirs and nearby communities in the Mae Moh valley, including the reservoir that supplies drinking water for the local people. The lignite burnt at Mae Moh continues to release massive amounts of sulfur gas which has blackened streams, burnt rice fields and resulted in severe health problems for local communities.

As a result of the air pollution from the power plant in 1992, EGAT has set up the Flue Gas Desulphurization (FGD) system to eliminate sulfur dioxide emitted from the mine. The emissions became lower than the standard set by the National Environment Board (NEB), being safe for human beings and the environment. Pollution problems recurred in 1996, but less severe than the problems in 1992. Since 1992, the Pollution Control Department (PCD) has been the main organization to set up the measure for solution of the pollutions from the power plant and environmental rehabilitation in Mae Moh power plant with related organizations.

According to the opinion survey conducted by PCD in Mae Moh local people, 87 percents of villagers acknowledged the process of solving pollution problems in Mae Moh power plant with 59 percents being satisfied with such problems solving performance. 55 percents of villagers realized that sulfur dioxide emitted from the mine is lower than in the past. However, the local people requested serious and continuous process of solving pollution problems in Mae Moh area from related governmental organizations in order to solve these environmental problems permanently.

2. GROUNDWATER RESOURCES

Overview

In Thailand, main groundwater activities are under provision of the Department of Groundwater resources (DGR) which was established in 2002 under the Ministry of Natural Resources and Environment. The Department of Groundwater Resources has the key functions in controlling and inspecting of groundwater activities all over the country. The

Department's mandates concern research, investigation and development managing the country's groundwater resources.

The list of recent and on-going projects are as follows:

1. Study and research on groundwater potential assessment in order to support the Royal development projects in the mountainous areas.
2. Groundwater potential assessment and development in tsunami affected areas, Southern Thailand.
3. Groundwater contamination from domesticated aquatic animals at Sating Phra Basin, Songkhla Province, Southern Thailand.
4. Development and conservation of groundwater at Songkhla Basin.
5. The study of groundwater potential assessment in Moon-Chii river basin.
6. Feasibility and detailed design artificial recharge into aquifer at Eastern Coastal Area.
7. Feasibility and detailed design underground dam at Samui Island.
8. National groundwater quality analysis.
9. Training and disseminating in groundwater development local authorities.

The Department of Groundwater Resources' present key roles are such as groundwater supply system for rural areas all over the country, the research and control of groundwater usage in Bangkok metropolitan and suburban areas where the environmental impact has occurred in terms of land subsidence.

- A selected case of environmental impact from groundwater development : A cause of Bangkok land subsidence

The Lower Chao Phraya Basin has a very flat topography with elevations as low as 2 meters above mean seal level even at a distance of 80 km north of the present-day coastline. Due to this the plain is frequently flooded. The basin filling consists of thick, unconsolidated Quaternary sediments. Sandy deposits, forming major aquifers, are intercalated with clayey deposits, which act as aquitards. Some of these clays have been deposited during marine ingressions, e.g. the topmost sediment, the 'Bangkok clay'. This most recent marine ingression reached up to the area around Ayuthaya. The thickness and distribution of these clays varies considerably.

These clays have a high water and organic compounds content, and are not very well compacted, whereas the sandy sediments are already compacted to a higher degree. Compaction generally increases with depth, so that the compaction rate (or rate of subsidence), i.e. the rate at which the thickness of a sediment layer decreases with time (because water is squeezed out due to the weight of the sediment resting on it), is lower in the lower part of the system.

The effects of land subsidence are clearly visible at the land surface and cause substantial damages to buildings and infrastructure. Most of these effects however are related to compaction in the Bangkok clay, since the foundations of most buildings and infrastructures rest on sands of the Bangkok aquifer. In this context it has to be mentioned that many of these damages are due to faulty construction of the foundations (e.g. broken or too short concrete pillars).

However, compaction affects also the other underlying young sediments, especially the clays. A network of around 500 benchmarks has been installed in Bangkok and its surrounding provinces to monitor the land subsidence at different depths.

Land subsidence in the lower part of the sedimentary sequence is mostly due to groundwater over-exploitation. In Bangkok an estimated 2 million cubic meters are extracted daily from the groundwater system. Most of this amount is used by private enterprises. As a result the groundwater level in the Nakhon Luang (NL) and Nonthaburi aquifer (NB) have declined to around 70 m below sea level. There are two main centers of depression, one in eastern Bangkok, extending in a north-south direction, about 15-20 km east of the Chao Phraya River. The other one is located slightly west and north of Samut Sakhon.

The lowered hydraulic heads in these aquifers lead to downward leakage of water from the interbedded aquitards, so that the clays are dewatered. This leads to an irreversible compaction of the clays. Land subsidence caused by groundwater over-exploitation is thus mainly a result of compaction in the aquitards.

3. ENERGY RESOURCES

Overview

At present, reserved energy in Thailand has been decreased due to the demand of energy has markedly been increased especially for transportation and industrial sectors. Consequently, Thailand needs to import energy from other countries and develop alternative fuels to compensate the use of fossil fuels. Nowadays, the government gives priority to the utilization of alternative fuels especially bio-fuels such as gasohol, bio-diesel, and natural gas for vehicle (NGV).

Gasohol is widely recognized and the gasohol stations are rapidly increased. In 2007, the average sale per day was around one million liters. The use of gasohol instead of fossil fuel will reduce air pollutants since gasohol is more environmentally friendly than gasoline.

Bio-diesel is another alternative fuel. The government has supported the use and production of bio-diesel by setting the goal for 2011 in which the use of bio-diesel will reach 720 million liters per year.

Natural gas for vehicles or NGV is less widely used as compared to gasohol due to limitation of gas stations and requirement for gas containers. The government has launched projects to promote the use of NGV, such as installment of NGV equipment for 10,000 volunteered taxis, and increase stations for service of NGV.

In 2007, the government has actively campaigned on several energy saving programs. The campaign on “turning off air conditions for one hour and turning off at least one light for five minutes” on the first of June achieved the energy saving up to 822 megawatts and 702 megawatts respectively. In addition, ten energy saving measures were set as guidelines for practice in households as well as other regulations to help solving energy crisis of the country.

Mr. Supachai Skawsang

Thailand Economy Report: Course on Human Capacity Building for Natural Resources Development and Its Environmental Impacts in APEC Region

27 November – 14 December 2007

Tsukuba, Japan

Geo-Informatics and Space Technology Development Agency (Public Organization)

Content

- Overview Thailand
- Natural Resources and its Environmental Impacts
- About GISTDA
- GISTDA and Natural Resources and its Environmental Impacts

Overview :Thailand

- Formal Name : Kingdom of Thailand
- Short Name : Thailand
- Area : ≈ 514,000 sq.km.
- Population : ≈ 64 million
- Capital : Bangkok

  (≈ 6.9 million)

Overview :Thailand

Geographical

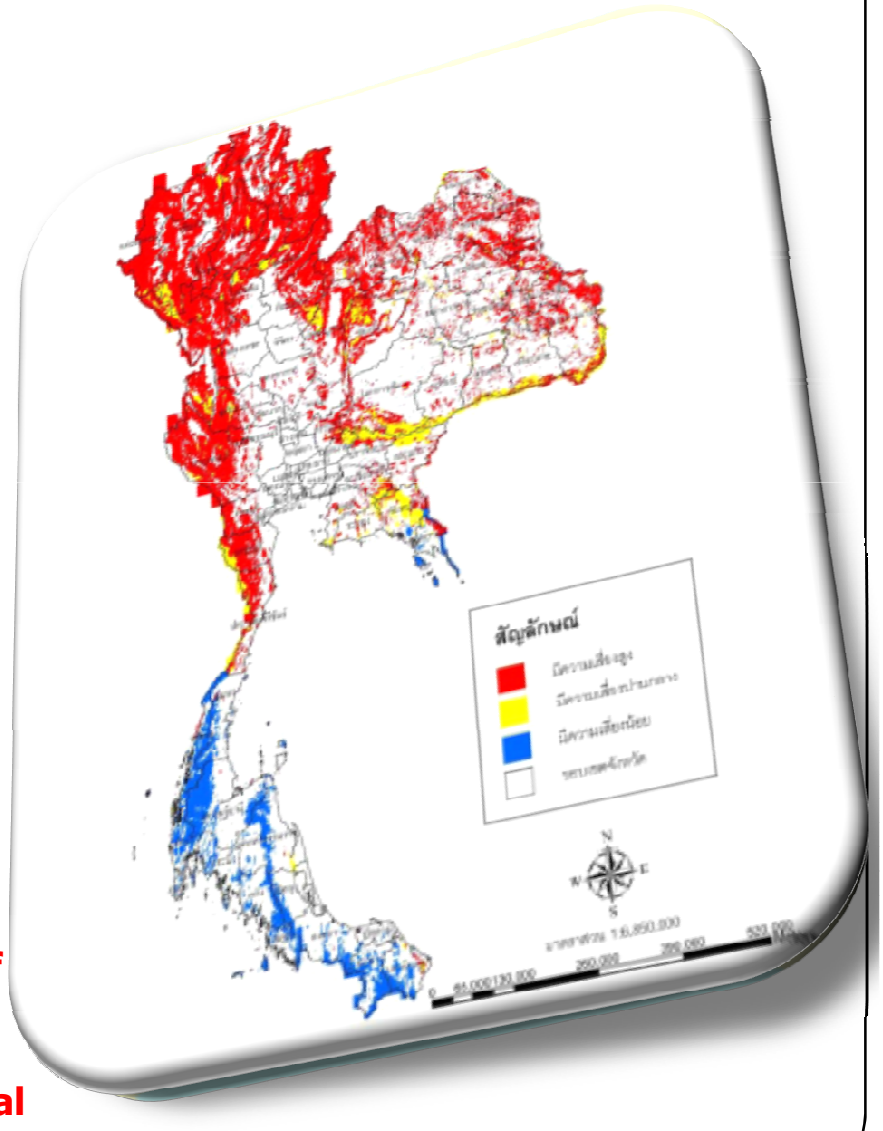
- It is located from 5° to 21° N and 96° to 106° E
- Neighbors boundary
  - North : Myanmar and Laos
  - East : Cambodia and Laos
  - West : Myanmar
  - South : Malaysia
- Length of Coastline
  - 860 kilometers
  - on the Andaman Sea
  - 1,840 kilometers
  - on the Gulf of Thailand.

Natural Resources and its Environmental Impacts

Forest Resources

Evergreen forest
- Tropical rain forest
- Dry evergreen forest
- Hill evergreen forest
- Coniferous forest
- Mangrove forest
- Swamp forest
- Beach forest

Deciduous forest
- Mix deciduous forest
- Dry dipterocarp forest

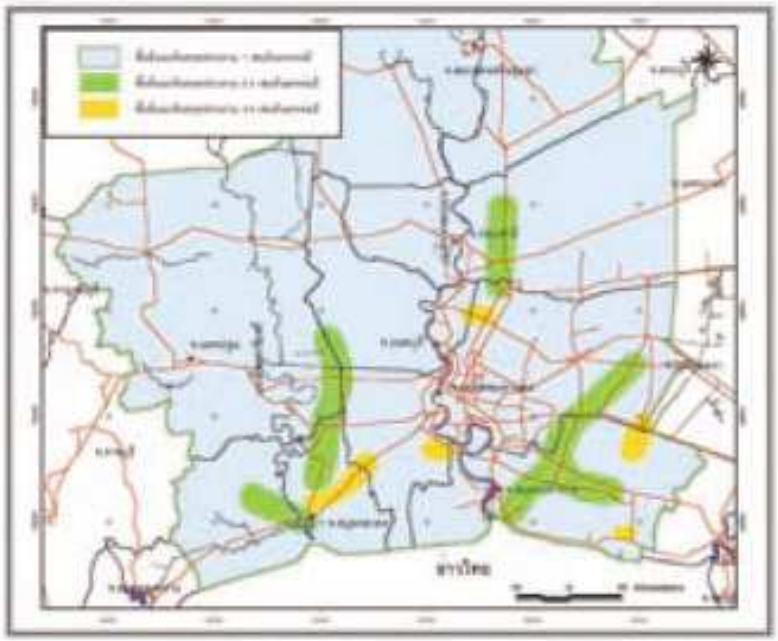


During the past four decades, the reduction on acreage is about 107,200 sqkm. From satellite data, with scale of 1:50,000 in 2000 the forest was 1/3 of the total country area or 33.15% of total country area. However, in 2004 the number had been diminished more than 6,000 sqkm mostly from illegal logging, habitat and agriculture.

Natural Resources and its Environmental Impacts

Groundwater Resources

- The number of wells are 998,539 wells in 2006
- In the present, groundwater usage are estimated 2.2 mcm/day
- effected on Land subsidence in some area such as bangkok and circumference



Natural Resources and its Environmental Impacts

Mineral Resources

- Thailand's major minerals include fluorite, gypsum, lead, lignite, natural gas, tantalum, tin, and tungsten.
- In 2003 Thailand produced more than 40 types of minerals with an annual value of about US$740 million.
- However, more than 80 percent of these minerals were consumed domestically.

Sources : Library of Congress – Federal Research Division
Country Profile: Thailand, July 2007

Natural Resources and its Environmental Impacts

Without any appropriated in mineral management, this will lead to the depletion of natural resource and pollution as well.

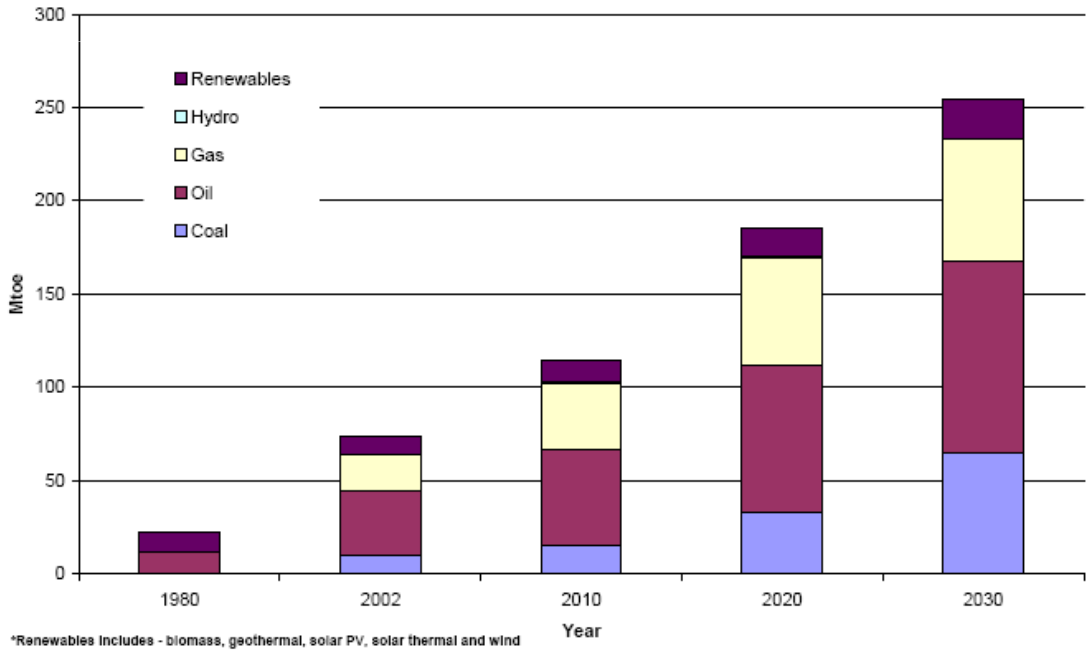
- contamination of cadmium, lead, arsenic in the nature
- Lack of the rehabilitation of waste mining land
- Soil erosion
- Soil contamination
- fugitive dust concentration from stone-processing plants

Natural Resources and its Environmental Impacts

Energy Resources

Thailand's total primary energy demand is projected to grow at an annual rate of 4.6 percent over the analysis period, from 74 Mtoe in 2002 to 258 Mtoe in 2030. Among the fossil fuels, coal is projected to grow fastest (7.0 percent per year), followed by natural gas (4.5 percent) and oil (3.9 percent).

FIGURE 1.1: THAILAND PRIMARY ENERGY DEMAND BY SOURCES



*Renewables includes - biomass, geothermal, solar PV, solar thermal and wind

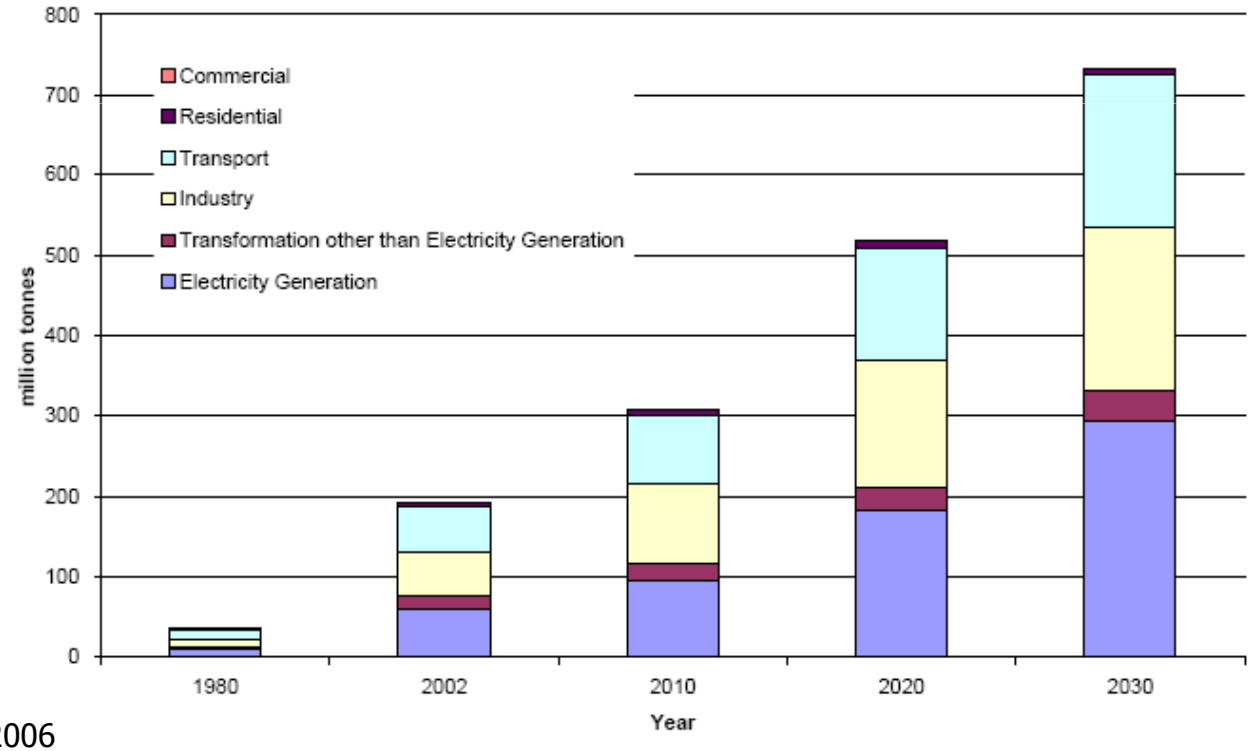
Source: APERC, 2006.

Natural Resources and its Environmental Impacts

Impact of energy use

Emissions of CO2 from the energy sector are expected to increase from about 192.6 million metric tons (Mt) in 2002, to 516.7 Mt in 2020, and more than 700 Mt in 2030

FIGURE 1.2: SHARE OF ENERGY-RELATED CO2 EMISSIONS BY SECTOR



Source: APERC, 2006

Natural Resources and its Environmental Impacts

Geo-hazard and Geology environmental

- Finding suitable area for sanitary landfill
- Researching of high salinity degree area
- Land slide
- Earthquake
- Tsunami

Thailand has a number of activities in geo-hazard and geo-environmental, such as finding suitable area for sanitary landfill and researching of high salinity degree area. Geo-hazard in the country includes, among others, land slide, earthquake, land settlement, shoreline and bank erosion. These cause damages to the human being and property, which higher degree in each year. Fortunately, earthquake in the country is minimal, except the quake from Sumatra Island of Indonesia in 2004, that made a large number of casualties, both human and property.

About GISTDA

- a public organization under the supervision of the Ministry of Science and Technology

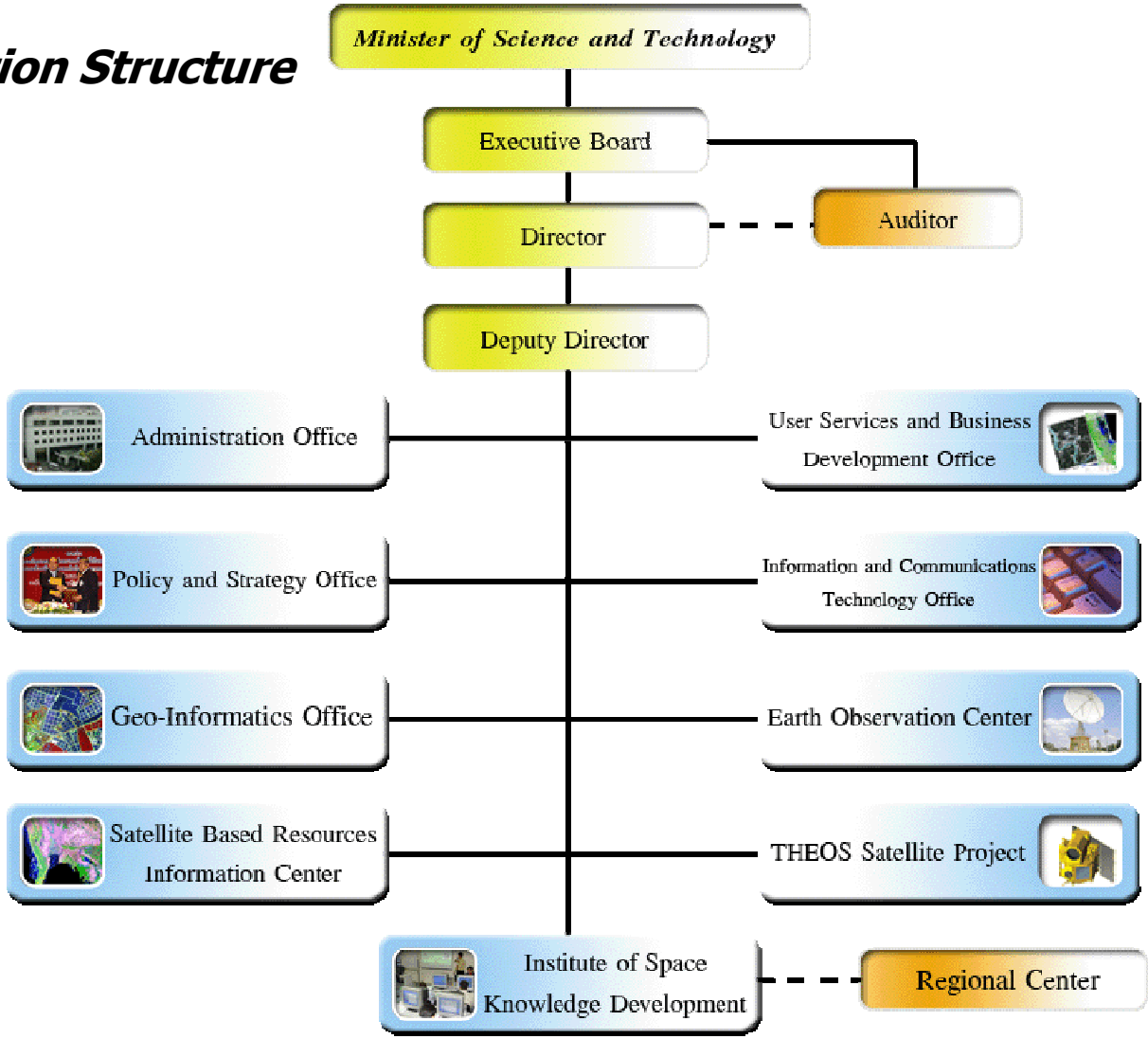
- The objectives are to develop space technology and geo-informatics applications to be beneficial to the general public and to provide technical services and develop human resource in satellite remote sensing and geo-informatics

- The main strategies of GISTDA include: investment, services, research and development, technology transfer and data exchange in space technology and its applications and geo-informatics with relevant national and international agencies/institutes in both public and private sectors

About GISTDA

About GISTDA

Organization Structure



About GISTDA

ISKD, under GISTDA, has main mission in promoting, supporting and operating in capacity building in the fields of space technology and geo-informatics. ISKD organizes various training in geo-informatics, both general and specific, from introduction to advanced, for public and private agencies. Furthermore, ISKD also distributes knowledge of space technology and geo-informatics, via conference and workshop in national and international forum.

GISTDA and Natural resources and Environmental Impact Management

GISTDA service includes satellite data providing and its applications, altogether with GIS for Natural resource and Environmental management and Natural disaster. The services provided through various channels, by research project with domestic and international agencies, these are some of the applications :

Forestry

Land use

Coastal

Geology and Geo-Morphology

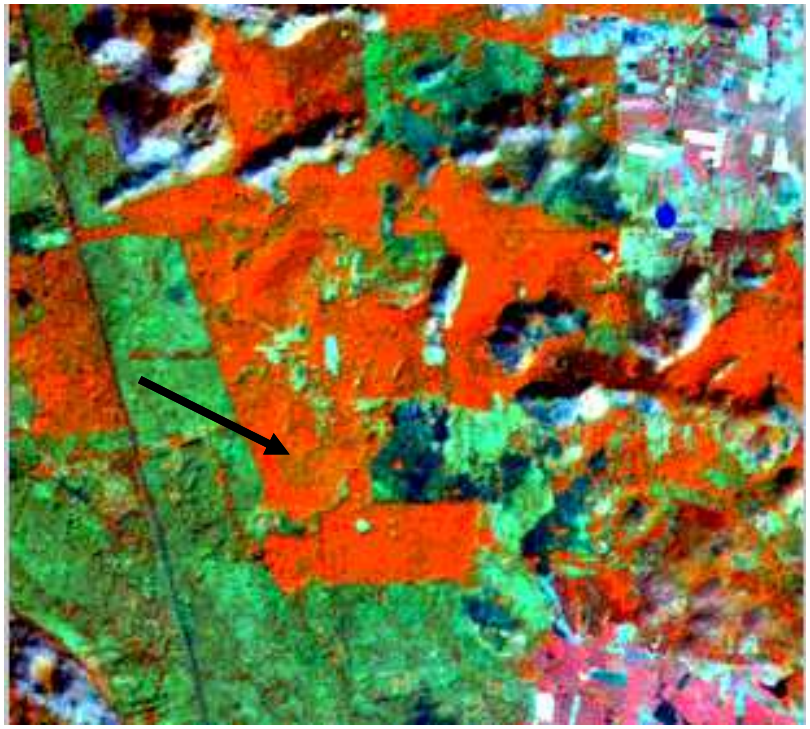
Environment

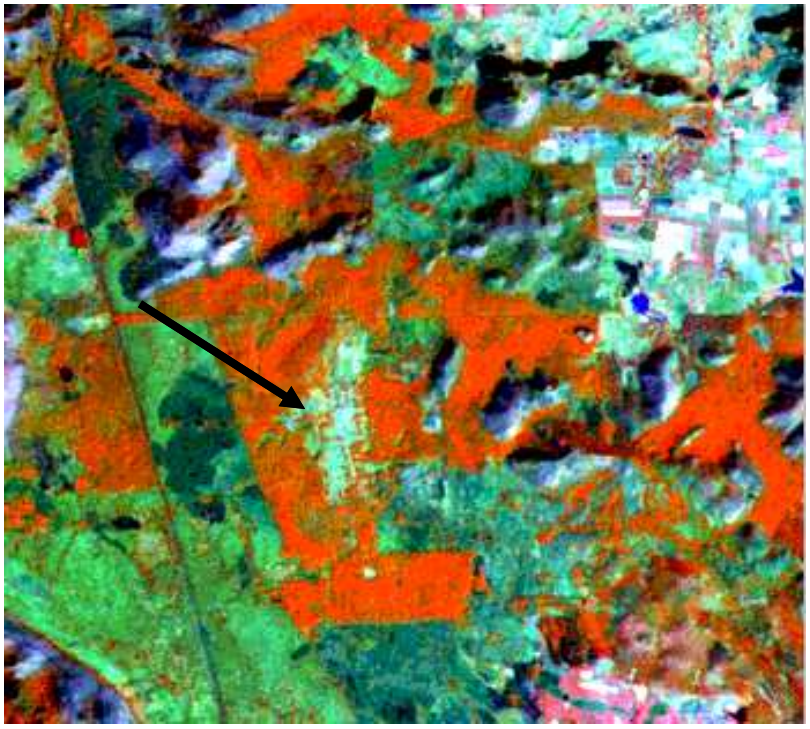
Natural Disaster

GISTDA and Natural resources and Environmental Impact Management

Forestry

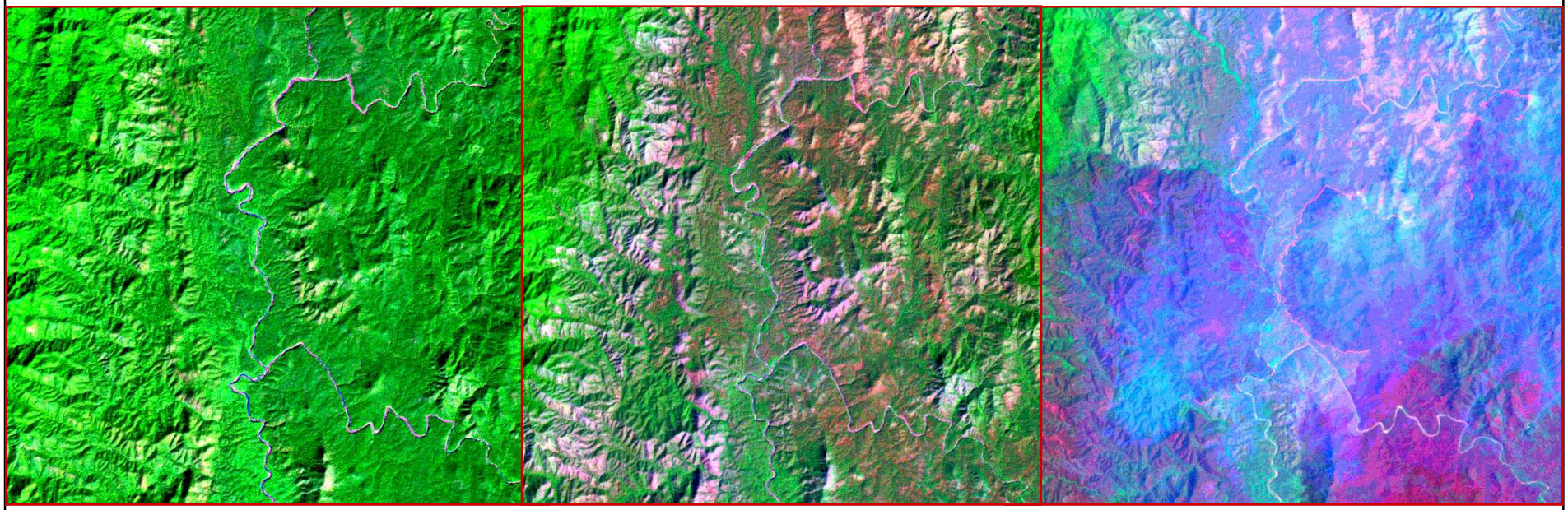
Deforestation





GISTDA and Natural resources and Environmental Impact Management

Forestry ***Forest fire***



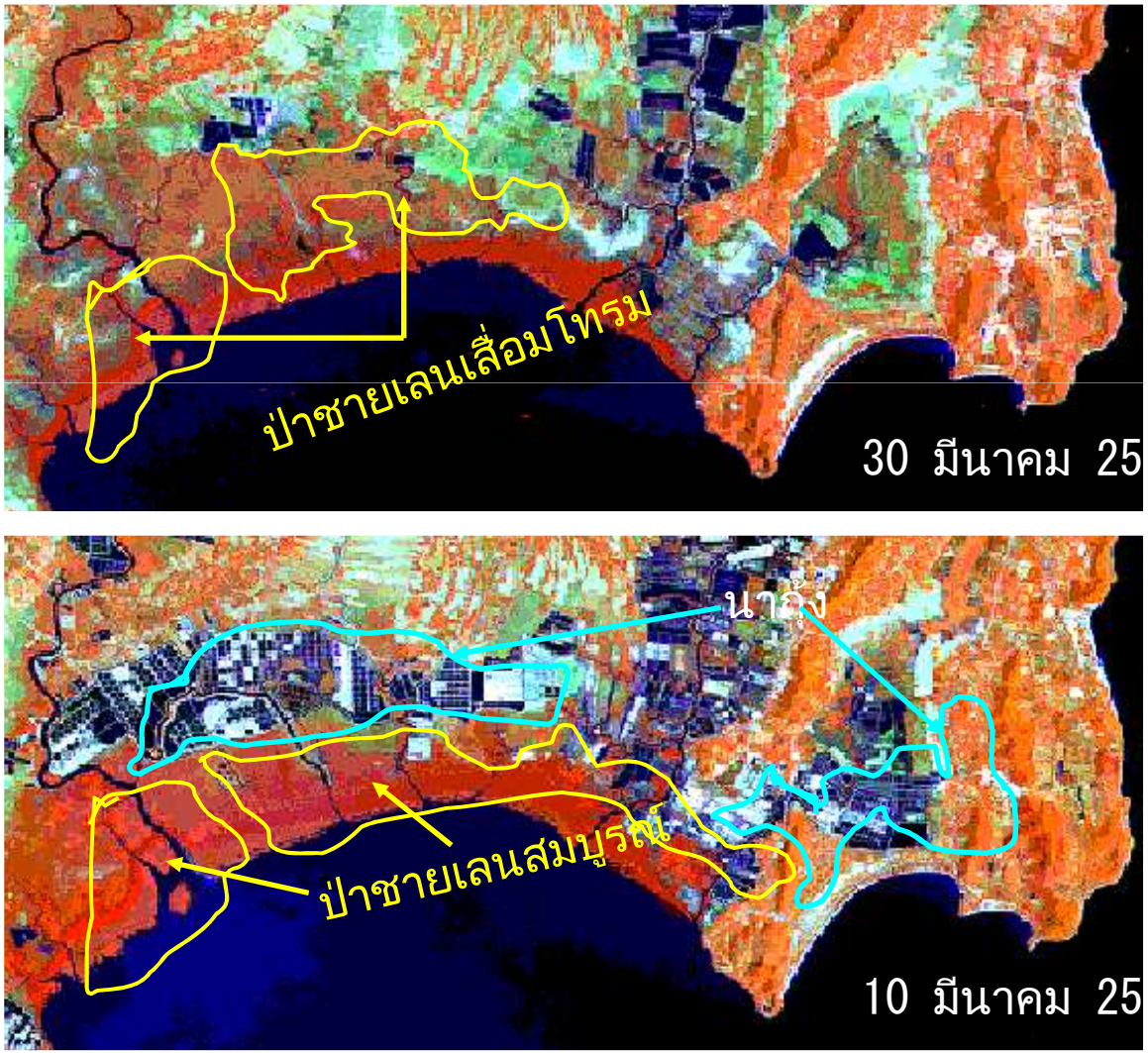
LS-5 TM 11 Dec 1997 B742 LS-5 TM 25 Jan 2001 B742 LS-5 TM 17 Mar 2001 B742

Huai Khakaeng Wildlife Sanctuary, Uthai Thani province

GISTDA and Natural resources and Environmental Impact Management

Landuse

Landuse change monitoring

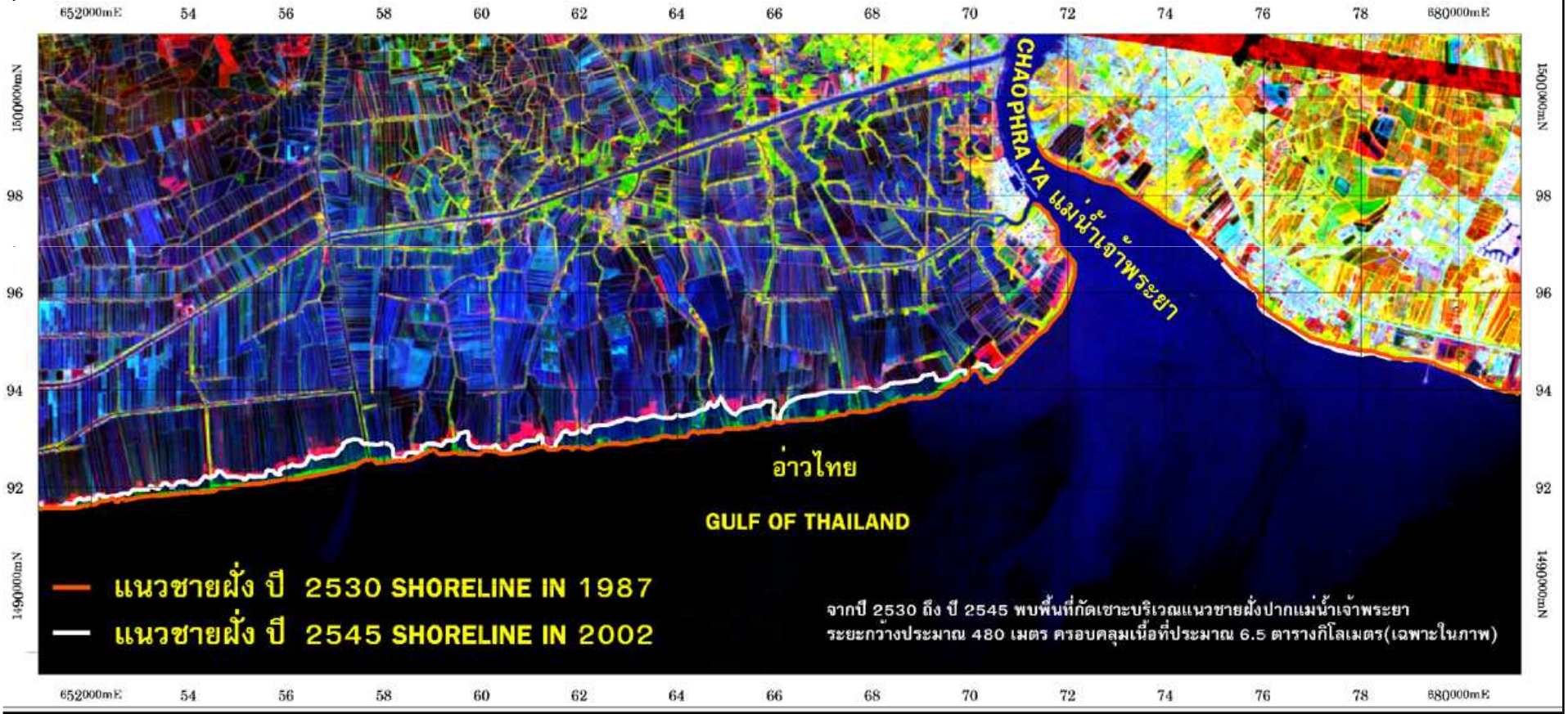


GISTDA and Natural resources and Environmental Impact Management

Coastal

Coastal Erosion

LS-5 25 Dec 1997 and LS-5 10 Dec 2002



Kilometre
N
0
2
4

ข้อมูลดาวเทียม LANDSAT-5 วันที่ 25 ธันวาคม
และ LANDSAT-7 วันที่ 10 ธันวาคม 2545

BAND 4_2545 BAND 4_2530 BAND 3_25

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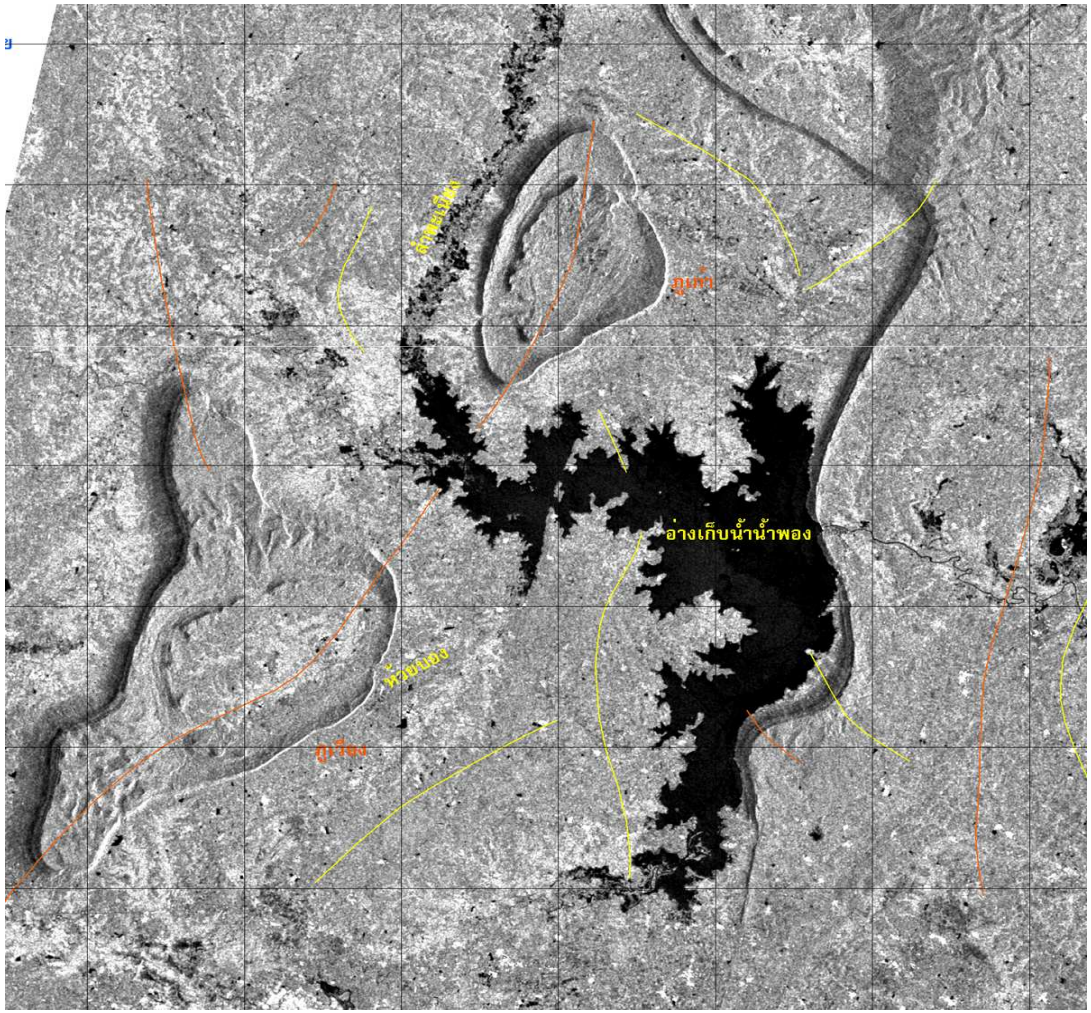
Geology and Geo-Morphology



Geomorphology study

RADARSAT-1

14 September 2(

Khonkan province

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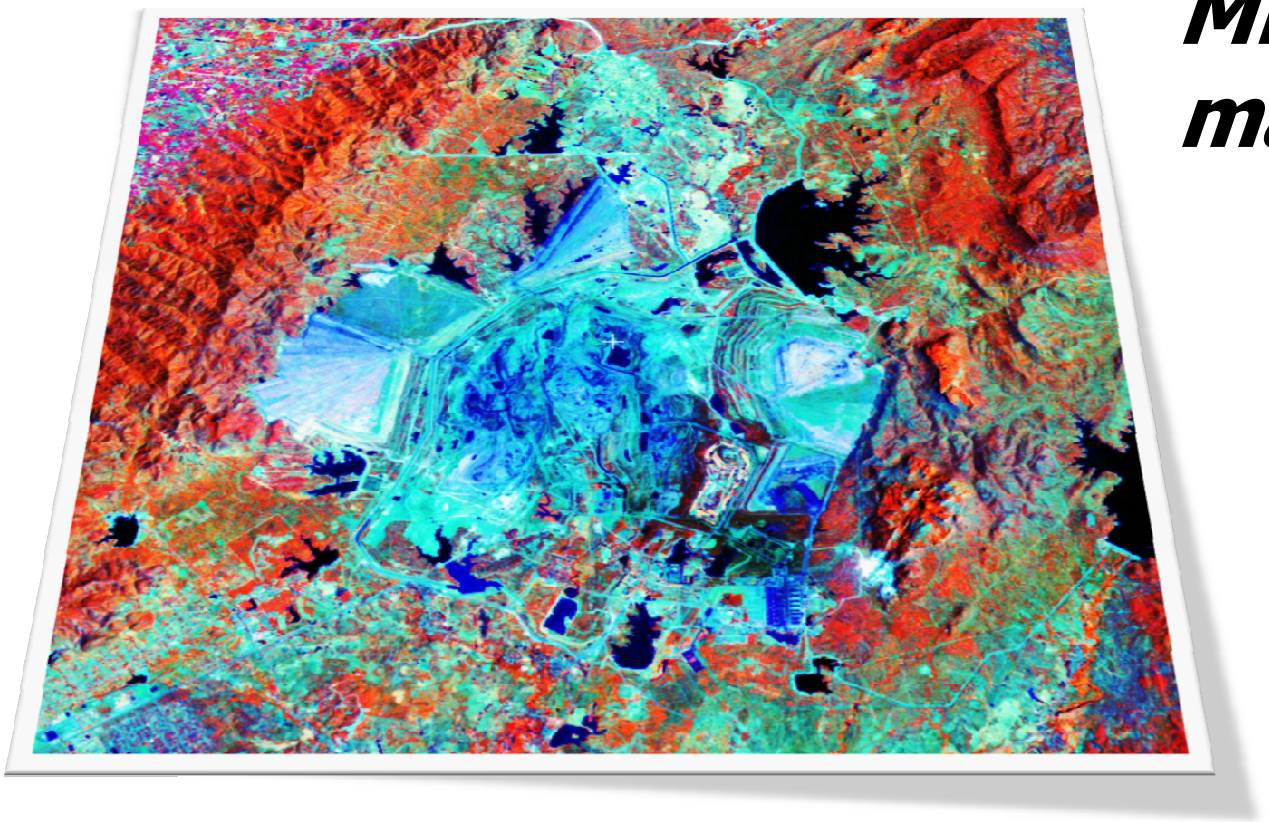
Geology and Geo-Morphology



Mine management

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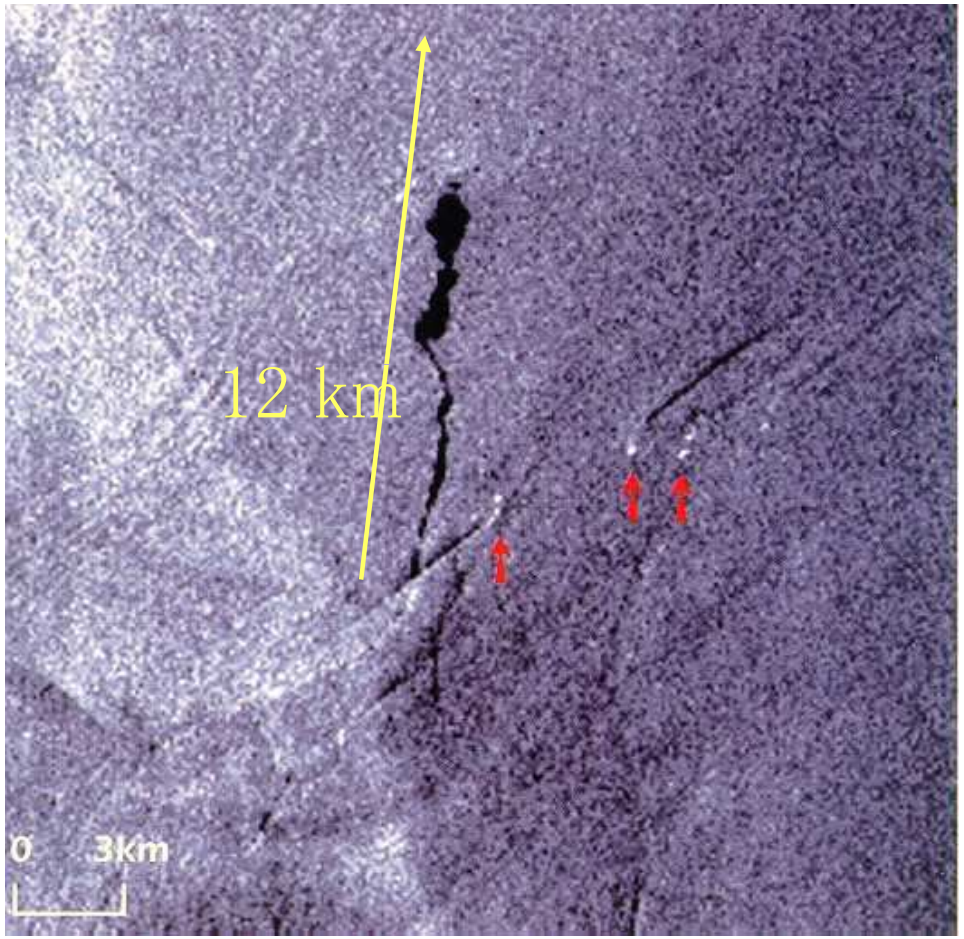
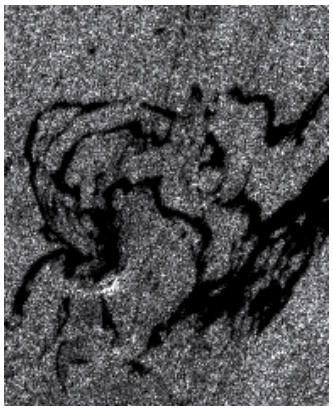
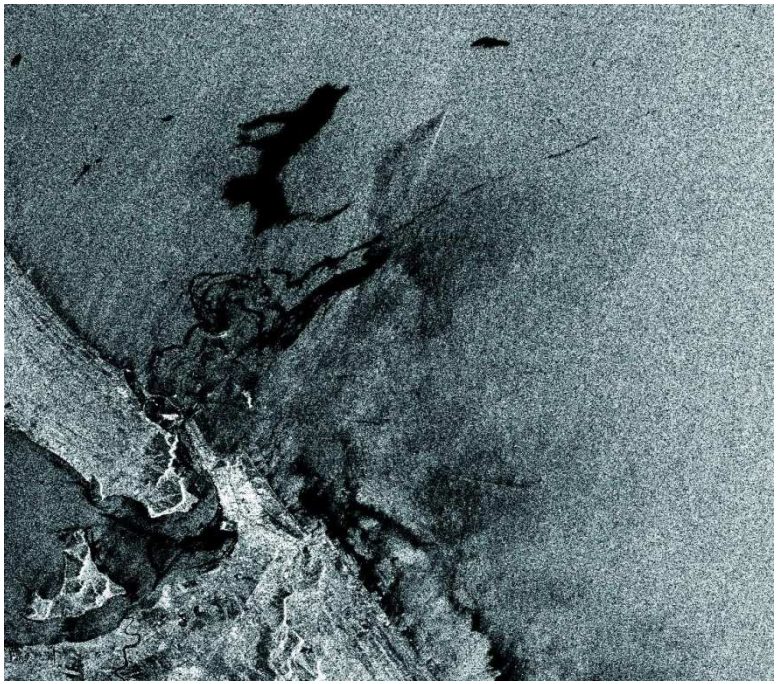
Environment



Songkhla Deep Seaport
ERS-1 acquired on 21 Jul 1994



Oil pollution



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Environment

Air pollution

QuickBird, 2.8-meter multispectral imagery, sharpened with 70-centimeter panchromatic, will be capable of detecting and monitoring various types of airborne pollutants.

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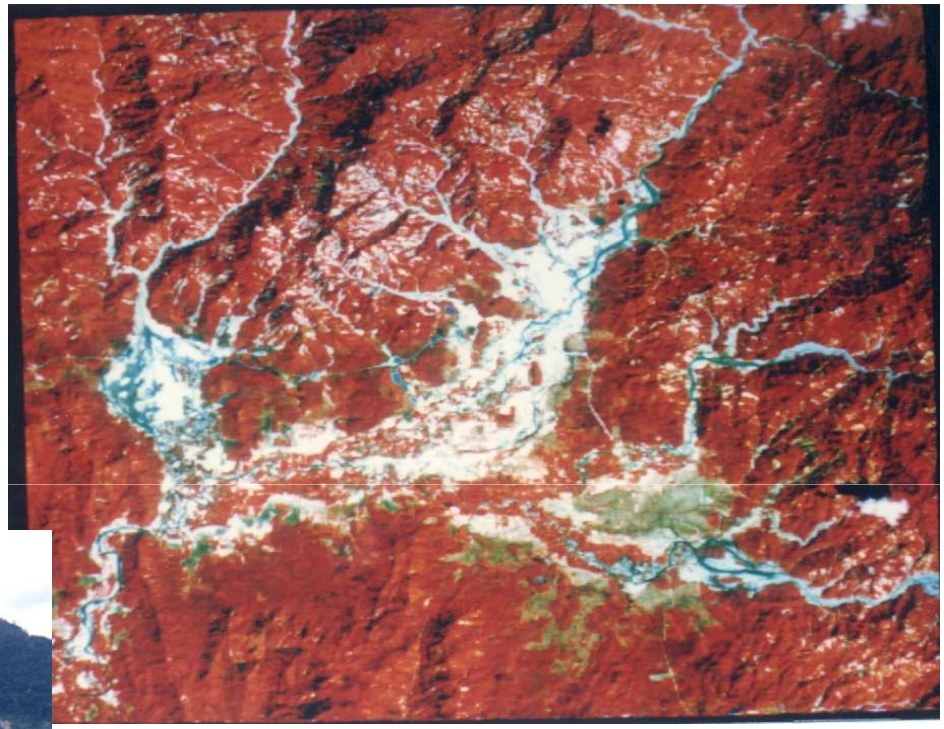
Natural Disaster

Landslide



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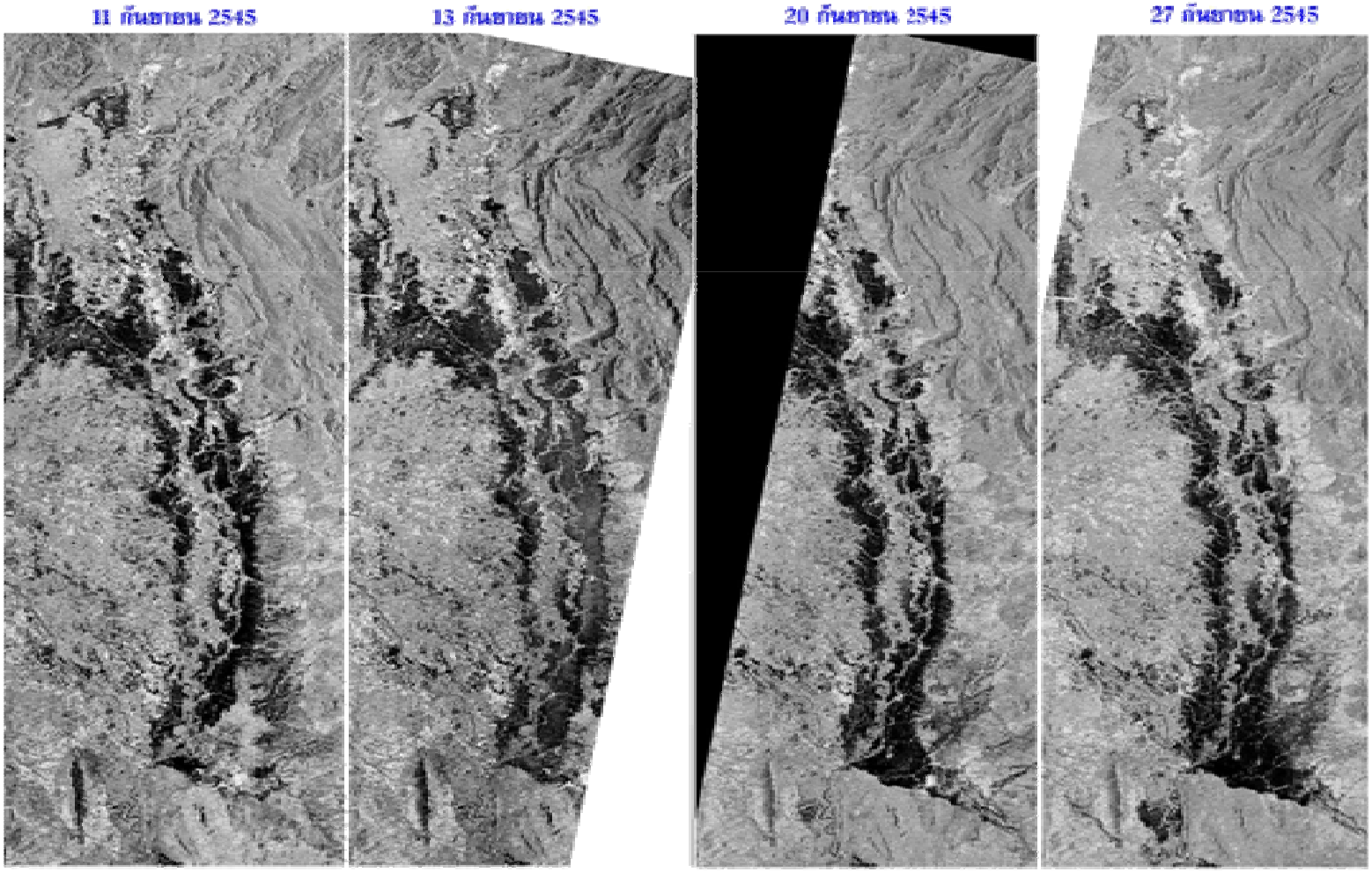
Natural Disaster

Flooding



GISTDA and Natural resources and Environmental Impact Management

Natural Disaster Phangnga province ***Tsunami***

Before IKONOS 30 January 2003 | After IKONOS 29 December 2004

Thank you for your attention

Thailand Economy Report

Introduction

Nestled in the heart of Southeast Asia, Neighbored by Cambodia, Lao PDR, Myanmar and Malaysia, Thailand spreads out over 514,000 square kilometres of land and stretches some 1,620 kilometres from north to south and 775 kilometres from east to west, with a coastline of approximately 1,840 kilometres on the Gulf of Thailand and 750 kilometres along the Indian Ocean. In geographically coordinate, It is located between N 5° 40’ - 20° 35’ latitude and W 93° 30’ - 105° 40’ longitude.

Thailand is governed by a constitutional monarchy and is administratively divided into 76 provinces which further divided into district, sub-district or Tambon and village consecutively. Province is the local administration unit headed by provincial governor. The provincial governor is appointed by the central government, excluding Bangkok, whose governor is directly elected by Bangkokians. The population of Thailand consists of over 30 ethnic groups of people making up approximately 64 millions. About 6.9 million people are registered in the capital city of Bangkok.

Geographically, Thailand is divided into six regions; the North, the Central or the Chao Phraya River Basin, the Northeast or the Korat Pleateau, the East, the West and the south or the Southern Peninsula. The northern region terrain is mountainous which render this region to be proned to water-related disasters such as flashflood, landslide and debris flow. The northeastern region is an arid area on Korat Plateau and frequently suffers flashflood and inundation during rainy season, severe drought and cold spell during summer and cool season. The central region, the vast fertile land which is dubbed as the “Rice Bowl” of the country often encounters the repeated riverine flood and urban inundation during the rainy season. The southern region terrain is hilly on the west coast and the coastal plain on the east. This part of Thailand has occasionally frequented flashflood, mudslide, tropical storm and forest fire.

The climate, Thailand is a warm and rather humid tropical country with an average high temperature of 34.1◦c and the low of 22.6◦c. There are three overlapping seasons: the monsoon that lasts from July to October, from when it turns moderate to cool until February and warms up to sweltering heat until June.

Natural Resources and its Environmental Impacts

In the past, Thailand natural resources are fertility of forest, wildfire, land, water, mineral, coastal and fishery. Now, natural resource and environmental in Thailand have faced degrading problem as a result of economic development and confliction between environmental policy and development policy. Many development projects were pursued without careful consideration given to the natural and cultural environment.

Forest Resources

One of the main natural resource in the country, forest in Thailand can be classified into 2 types : Evergreen and Deciduous. The first can be divided into 7 types, they are Mangrove forest, Swamp forest, Beach forest, Tropical rain forest, Dry evergreen forest, Coniferous forest and Hill evergreen forest and the later can be divided into 2 types, they are Mix deciduous forest and Dry dipterocarp forest.

During the past four decades, the reduction on acreage is about 107,200 sqkm. From satellite data, with scale of 1:50,000 in 2000 the forest was 1/3 of the total country area or 33.15% of total country area. However, in 2004 the number had been diminished more than 6,000 sqkm mostly from illegal logging, habitat and agriculture.

Water Resources

With plenty of water resource but inappropriate managing, Thailand faces water shortage during dry season and floods in rainy season. In the past decade, the drought causes adversely affect to the community and agriculture, some 200 million USD per annum. Floods also causes damage up to 4 billion USD in each year. The increasing number of population will, then, increase in the number of water consumption. At present the number of reserved water is only 73 million cubic meters, however, this will alarming increase to 126.3 mcm in 2011.

In addition, water consumption in metro, most from deep well source, is up to 1.54 mcm/day, ironically, the number of water resource is only 1.25 mcm/day, hence, the more consumption the higher in metro land settlement and the more invasion of brackish water to the gulf. However, since 1998, the authority has a number of plan to mitigate the deep well water problem, then the shortage of metro water has declined respectively, but deep well water still plays the major role in supplying to the metro area for consumption.

Mineral Resources

Utilization of mineral resources of the country mostly from continuously the import and the export of mineral. The mineral contributes to the value added of various industry, like construction, cement, ceramic, glass and mirror.

Thailand has a number of mineral such as fluorite, gypsum, lead, lignite, natural gas, tin, rubber, tantalum and tungsten.

Without any appropriated in mineral management, this will lead to the depletion of natural resource and pollution as well. It will also adversely effect from the exploration, particularly to the other resources and human being, for example, from arsenic to dust in gravel industry, contamination of cadmium in the nature, and the rehabilitation of waste mining land.

Geo-hazard and Geo-Environmental

Thailand has a number of activities in geo-hazard and geo-environmental, such as finding appropriated land for waste filling and researching of high salinity degree area. Geo-hazard in the country includes, among others, land slide, earthquake, land settlement, shoreline and bank erosion. These cause damages to the human being and property, which higher degree in each year. Fortunately, earthquake in the country is minimal, except the quake from Sumatra Island of Indonesia in 2004, that made a large number of casualties, both human and property.

Energy Resources

Energy is one of the major factor in both socio-economic and security of any country. The higher degree of economic development, the higher number of energy importing. However, more than half of the energy depends on the importation, then, the authority is trying to use alternate energy such as from water resource, solar, biological gas and wind.

Energy resources in the country mostly from natural gas and lignite, but there is a number of controversy between the conservation and the development. One of the main contribution is the lack of participation of stake holders, in addition, pollution from producing and using energy, including toxic gas emission, causes effects on the climate, especially the higher density of carbon dioxide gas.

Overview of GISTDA

Geo-Informatics and Space Technology Development Agency (Public Organization) – GISTDA is a public organization under the supervision of the Ministry of Science and Technology.

The objectives are to develop space technology and geo-informatics applications to be beneficial to the general public and to provide technical services and develop human resource in satellite remote sensing and geo-informatics.

The main strategies of GISTDA include: investment, services, research and development, technology transfer and data exchange in space technology and its applications and geo-informatics with relevant national and international agencies/institutes in both public and private sectors. Now, the master plan on earth observation satellite is established for the development of Thailand Earth Observation Satellite (THEOS) which will be own and operated by GISTDA under cooperation between Thailand and France and will be launched in 2007. It will provide worldwide geo-referenced image products and Geo-Informatics application.

GISTDA and Natural resources and Environmental Impact Management

GISTDA service includes satellite data providing and its applications, altogether with GIS for natural resource, environmental management and natural disaster. The services provided through various channels, by research project with domestic and international agencies, these are some of the cooperation :

Forestry

The applications are used in the study and monitor the forest change in the country, for example surveying of deforestation, forest fire damage assessment, shoreline change from mangrove to shrimp farm

Geology and Geo-Morphology

Geology structure data, particularly on geographic scene, and geo-morphology are appraised by satellite data. There type of data can be used in the study on geology such as country geo-structure to find the sources of minerals like ore, natural petroleum, deep well water and planning for dam construction.

Environment

Satellite data can be used in the study area of environment which has some adversely effect, for example air pollution from fog and forest fire smoke and pollution / chemical substance in the sea like oil spill from tankers

Natural Disaster

Satellite data can be used in monitoring the circumstance of mother nature in order to prevent or to mitigate the after match such as floods and land slide.

GISTDA, then, establishes the Institute of Space Knowledge Development (ISKD) as a centre of knowledge-base and technology transfer in the area of space technology and geo-informatics for local, regional, national and international as well, in order to keep pace with the advancement of space technology and geo-informatics.

About ISKD

ISKD, under GISTDA, has main mission in promoting, supporting and operating in capacity building in the fields of space technology and geo-informatics. ISKD organizes various training in geo-informatics, both general and specific, from introduction to advanced, for public and private agencies. Furthermore, ISKD also distributes knowledge of space technology and geo-informatics, via conference and workshop in national and international forum. The Institute has R&D in those particular fields and provides fund for public agencies, including educational institutions in the R&D of geo-informatics. In addition, course curriculum and textbook, including multi-media in training also are being developed for the training. Lastly, the Institute has cooperated with various agencies, both national and international, in academic consortium as well.