



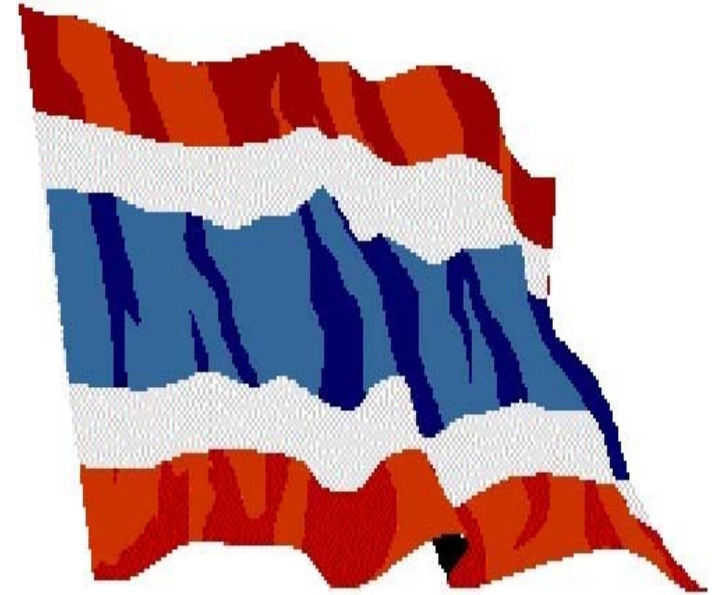
Solid Waste Management In Bangkok



**Department of Environment
Bangkok Metropolitan Administration
(BMA)**

General Information Brief

- Climate is like humid tropical country
- The average temperature is 28.1 O °C.
- Population: 63,121,000
 - Government Administration system:
is constitutional monarchy and
divided into 78 provinces



THAILAND

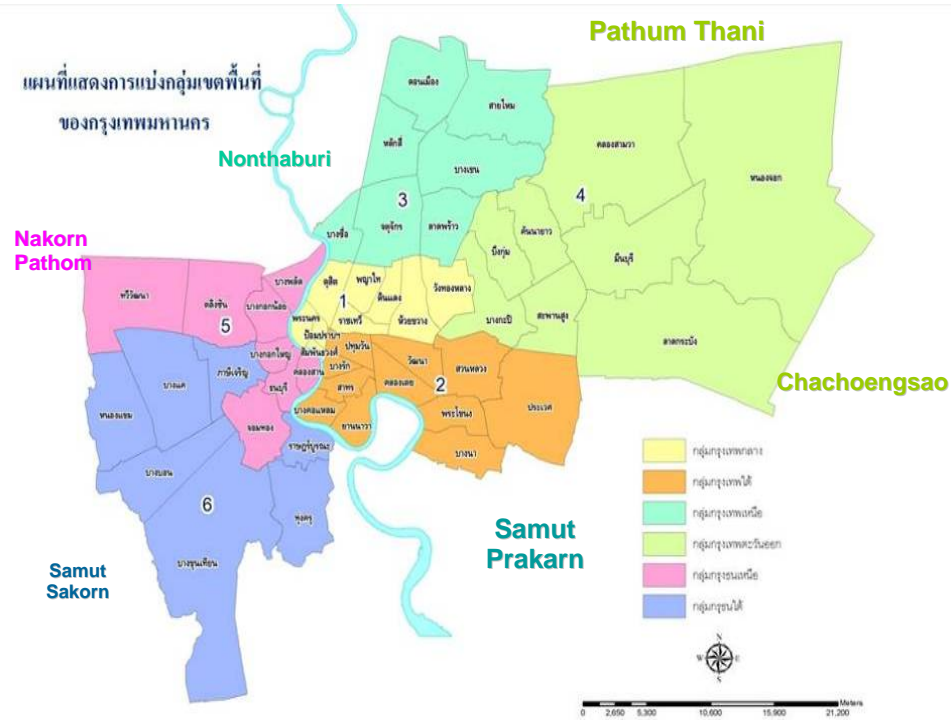
Quick Facts about Bangkok

Area: 1,568,737 sq. km.

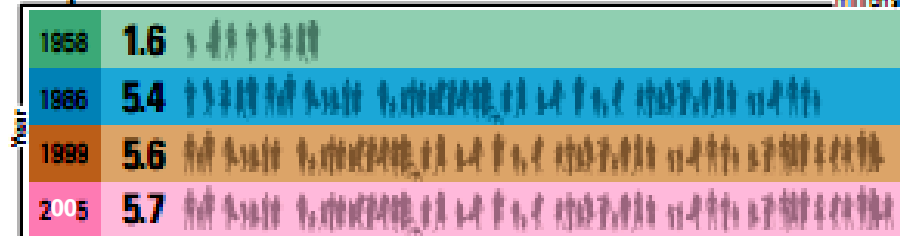
Location: Central Plain, Thailand

Quick Facts About Bangkok

Location:	Central Plain, Thailand
Established:	A.D. 1782
Area:	1,568.737 sq. km.
Population:	5,707,153 (2009)
Population Density:	3,640 persons/sq. km. (2008)
No. of Districts:	50 districts
Ethnic Mix:	80% Thai, 10% Chinese, 10%Others
Average Maximum Temp:	38.8 c° (2009)
Average Minimum Temp:	14.7 c° (2009)
Annual Rainfall:	1,600 mm.(2009) 1,482 mm.(2006)
Administration:	Special Administration Zone
Head of City:	Governor (Elected)



Population



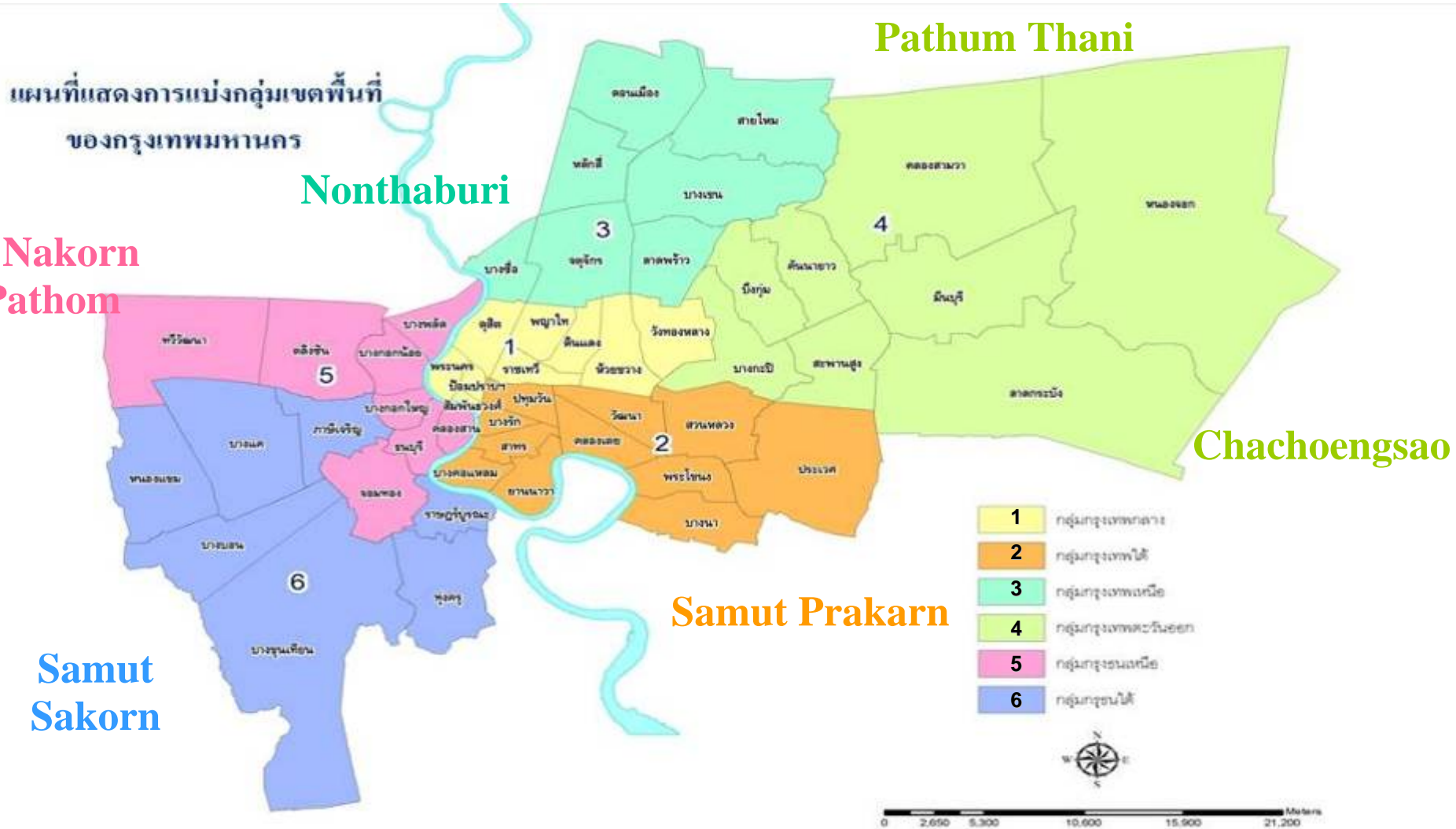
Registered population in 2009 ~ 5.7 million
Total population ~10 million

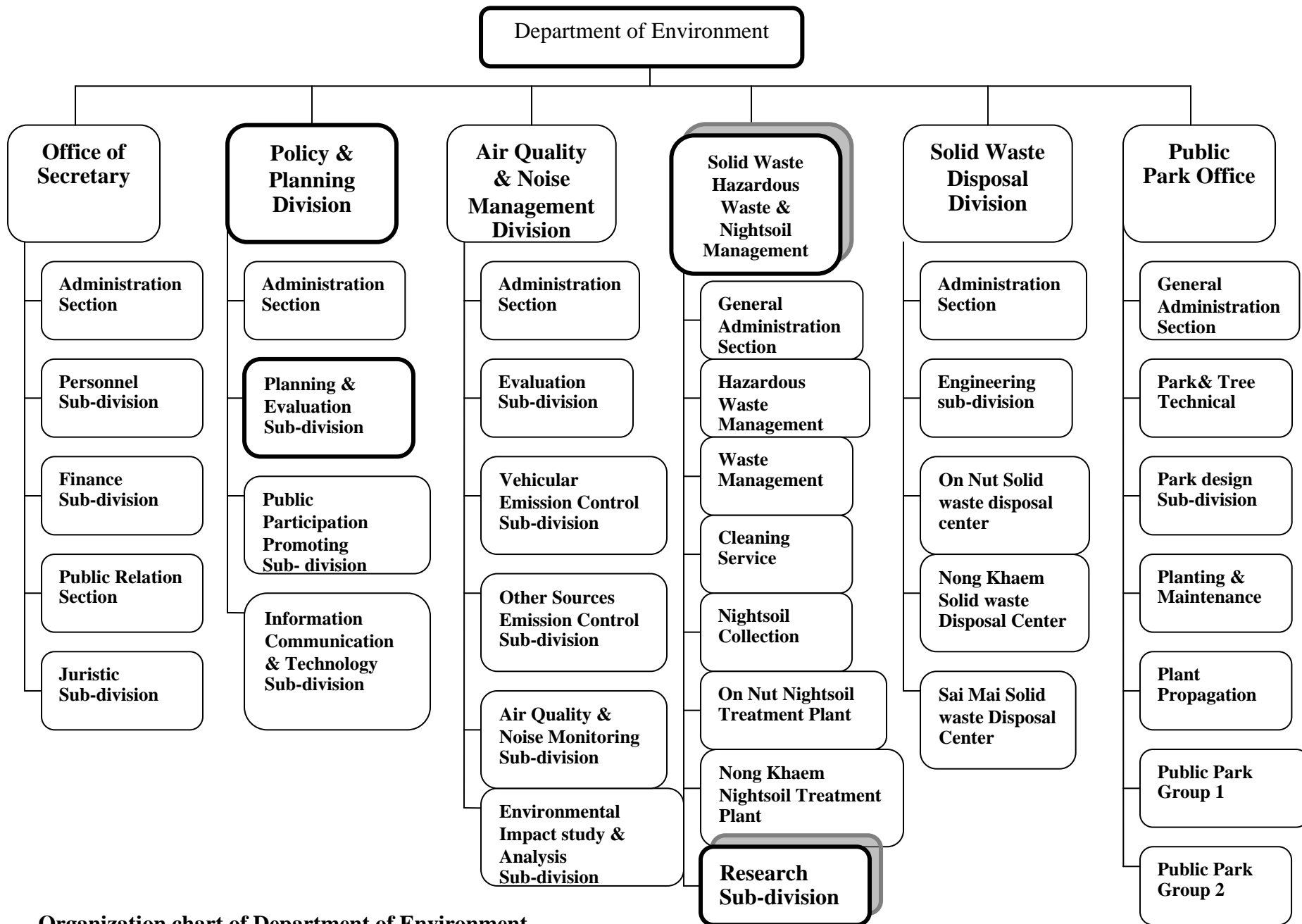


- **Population density in the inner areas decreased from 15,270 persons/sq.km. in 1978 to 11,400 persons/sq.km in 2008**
- **In the outer areas of Bangkok, population density increased during the same period from 770 persons/sq.km. to 2,400 persons/sq.km. in 2008**
- **However number of non-registered population are still the important factor of increasing population density in Bangkok**
 - **It reflects that people now trend to live away from the inner and core city area**

The Bangkok Metropolitan Region (BMR)

Urban development of BMA has outgrown the administrative boundaries of the BMA





Organization chart of Department of Environment

Vision of Environment Department, BMA

The key organization on environmental management and energy conservation to keep Bangkok admirable ,clean and sound environment



Goal

- 1. Maintaining air quality and noise level to meet the standard.**
- 2. Expanding green areas target for 4 m² per capita.**
- 3. Solid waste , nightsoil and hazardous waste management not impact on environment.**
- 4. Encouragement of participation from all sectors on environmental maintenance and energy conservation.**



Solid Waste Management



Solid Waste Quantity

❖ Amount of Waste ~ 8,800 ton/day (2009)

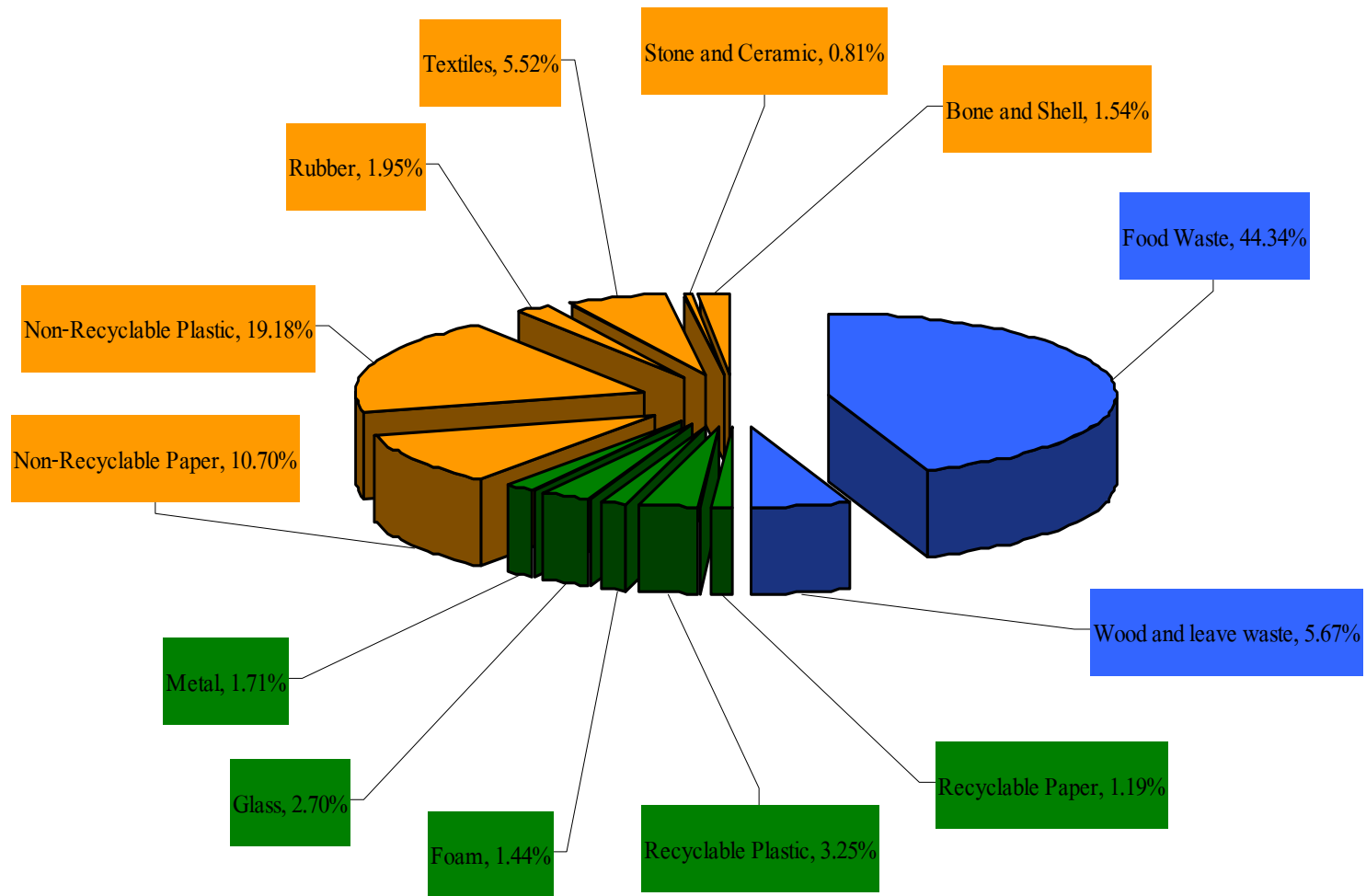
➤ Generated rate of solid waste in BMA around 1 kg/capita/day

❖ Infectious waste ~ 15 ton/day

❖ Household Hazardous Waste ~ 600 kg/day



Waste Composition at Transfer Stations (2009)

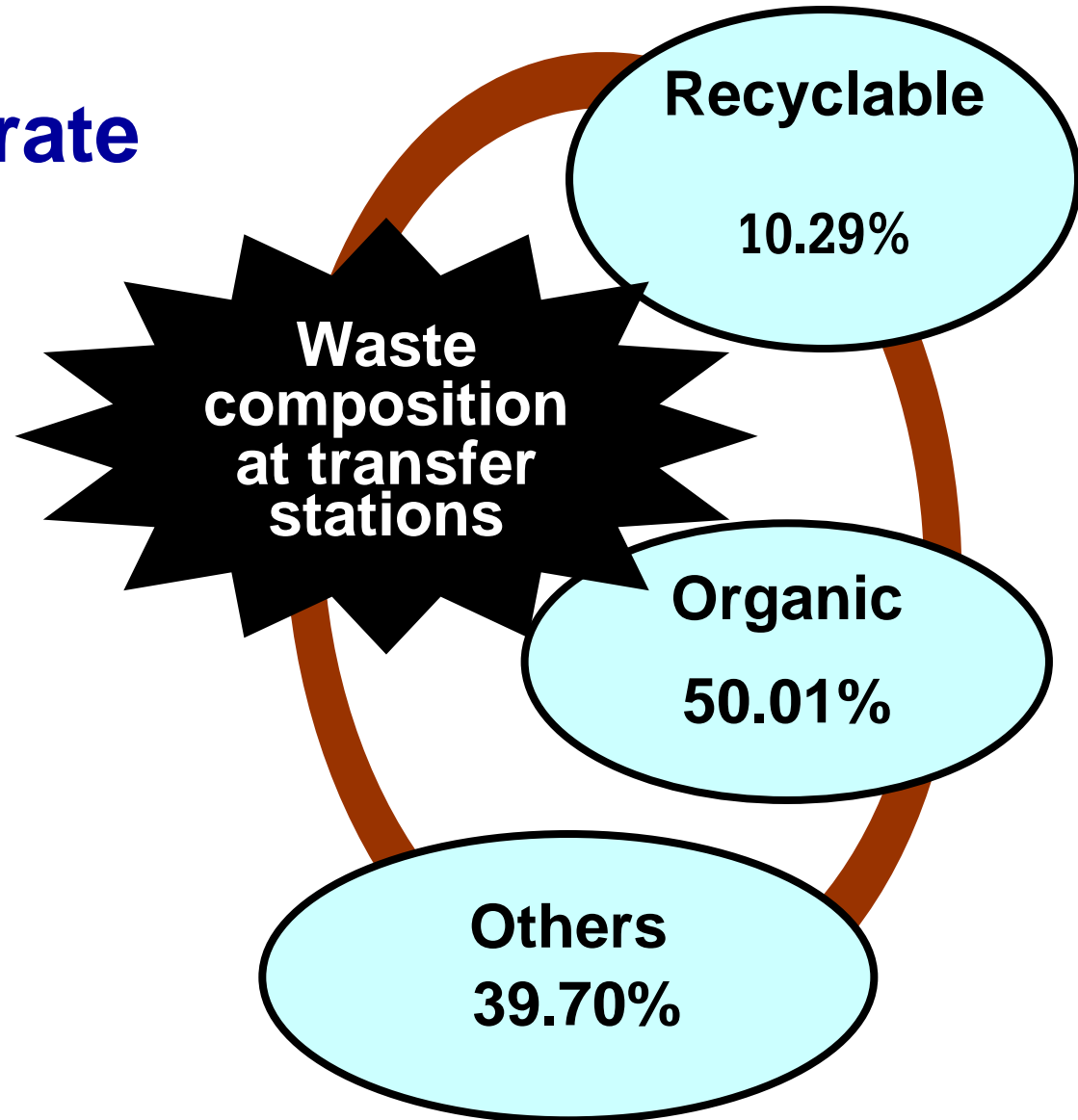


- Composting waste (50.01%)**
- Recycle Waste (10.29%)**
- Disposable Waste (39.70%)**

Solid Wastes Management in Bangkok

Waste generation rate
~ 1 kg/person/day

Collected waste
~ 8,800 tons/day



Solid Waste Management

- ❖ **Waste Reduction at Source**
- ❖ **Waste Collection**
- ❖ **Waste Treatment & Disposal**



Waste Reduction at Source

Reduce

Recycle

Reuse



Waste Reduction by 3R

Waste Reduction at Source

Cooperation with The Federation of Thai Industry

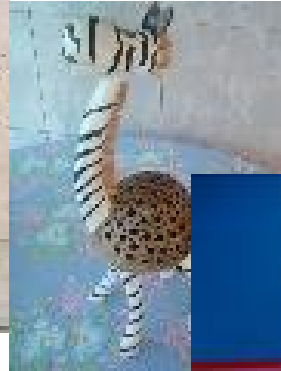


- Waste recycling system in universities (recycling waste 46,047.4 kg.)
- Drop Off Station in department stores and convenient stores (recycling waste 21,146.70 kg.)
- Formalization of scavenger (Saleng) groups
- Recycling handicrafts competition and marketing
- Collection recyclable waste in village (recycling waste 1,839.10 kg.)
- Project on cooperation with convenient stores on waste separation



Waste Reduction at Source

Project on conversion of recyclable waste into new products contest



Activity of tricycle helping environmental conservation

ปีระประจักษ์ 401 จากโรงเรียนปิยะมหาราชาลัย	ปีระประจักษ์ 402 จากโรงเรียนปิยะมหาราชาลัย	ปีระประจักษ์ 403 จากโรงเรียนปิยะมหาราชาลัย
 <p>นางสาวศิวะพร สิงห์ขันธ์</p>	 <p>นางสาวศิวะพร สิงห์ขันธ์</p>	 <p>นางสาวศิวะพร สิงห์ขันธ์</p>
พ.ศ. ๖ ตุลาคม ๖๒๕๖๑ ตำบลนาโพธิ์ ๓ อำเภอเมือง จังหวัดขอนแก่น	พ.ศ. ๖ ตุลาคม ๖๒๕๖๑ ตำบลนาโพธิ์ ๓ อำเภอเมือง จังหวัดขอนแก่น	พ.ศ. ๖ ตุลาคม ๖๒๕๖๑ ตำบลนาโพธิ์ ๓ อำเภอเมือง จังหวัดขอนแก่น



Projects and Activities in Reducing Waste

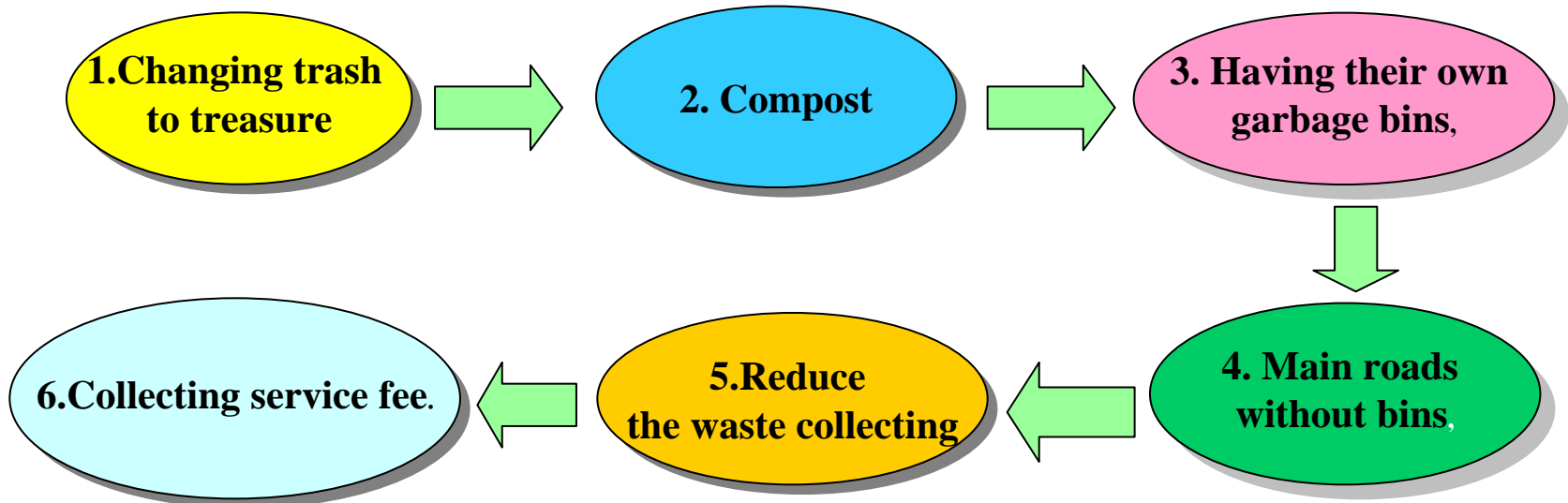


Launching the project "No Bag, No Baht"

Campaign of using cloth bags instead of plastic bags

Community Based Solid Waste Management :CBM

12 communities cooperate in this year and will extend to more than 100 communities in next year



เจ้าหน้าที่เขตลงพื้นที่พบปะประชาชน และแนะนำแนวคิดการจัดการขยะ โดยแนะนำให้คัดแยกขยะและนำกลับไปใช้ประโยชน์ทั้งวัสดุรีไซเคิล และเศษอาหาร ให้เหลือขยะไปฝังกลบเฉพาะขยะที่นำไปแปรรูปใหม่ไม่ได้ รวมถึงแนะนำให้จัดการถังขยะของตนเองในบ้าน ไม่ต้องตั้งถังขยะหน้าบ้าน ทำให้ถนนปลอดถัง เมื่อขยะน้อยลงและไม่มีการหมักเศษอาหารในถัง จึงสามารถลดความถี่ในการจัดเก็บได้ ส่วนค่าธรรมเนียมสามารถนำเงินที่ขายรีไซเคิลมาชำระได้ หรือในรายที่มีขยะมากกว่า 20 กิโลกรัม/เดือน เมื่อขยะลดลงก็สามารถประเมินค่าธรรมเนียมได้ต่ำลง

Waste Reduction at Source

Organic waste

Converting organic waste as fertilizer by implementing at source of waste.

❖ Compost

- Takakura Home Method Liquid
- Liquid Organic Fertilizer
- Food waste and Yard waste to Produce Fertilizer

❖ Biogas in BMA's school



Biogas in BMA's School

Cooperate with Ministry of Energy

- ❖ 2006 installed another Biogas Tanks in 40 schools
- ❖ 2009 installed another Biogas Tanks in 40 schools



Biogas in BMA's School

Enhancing food Waste Separation and Renewable Energy

- Capacity Tank 2.5 m^3
- Food Waste 40 Kg/day
- Biogas $2.5 \text{ m}^3 = \text{LPG } 1 \text{ Kg}$



Waste Collection



Providing Collection Trucks to Replace the Old ones

1. Compaction Truck

- capacity 5 ton : 1,417 trucks
- capacity 2 ton : 287 trucks
- capacity 8 m³ : 172 trucks

2. Side loading Truck capacity 1.5 ton : 101 trucks

3. Loading container Truck capacity 6 ton : 170 trucks



Total 2,147 Trucks



ช่องนี้

เก็บขยะรีไซเคิล
ทุกวันอาทิตย์



เก็บขยะอันตราย
ทุกวัน 1 และ 15



Waste Collection Truck

Collection Time & Places

- Main streets and minor streets 8.00 pm. to 03.00 am.
- Collection completed by 06.00 am.
- Small roads, lanes, communities daily or every other day based on location
- **Type of waste collection**
 - - Food waste - Daily or every other day based on location
 - -Recyclable waste - Every Sunday (or once a week)
 - -Hazardous waste - 1st and 15th of month

Food waste

Recyclable waste

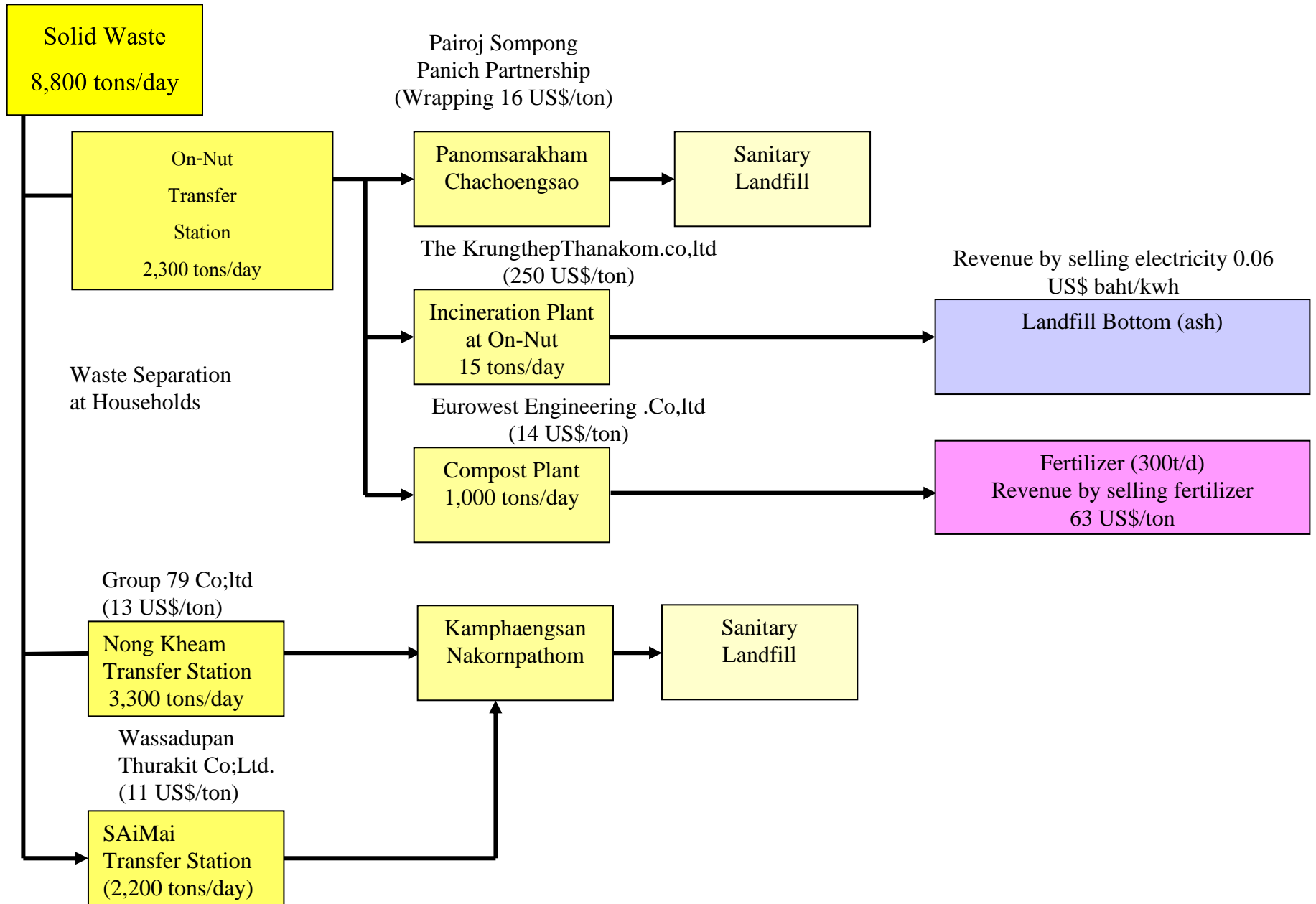
Hazardous waste





Hazardous Waste Collection Truck

Solid Waste Management in Bangkok



Tharaeng Transfer Station

2,200 tons/day

3,300 tons/day

1,000 tons/day

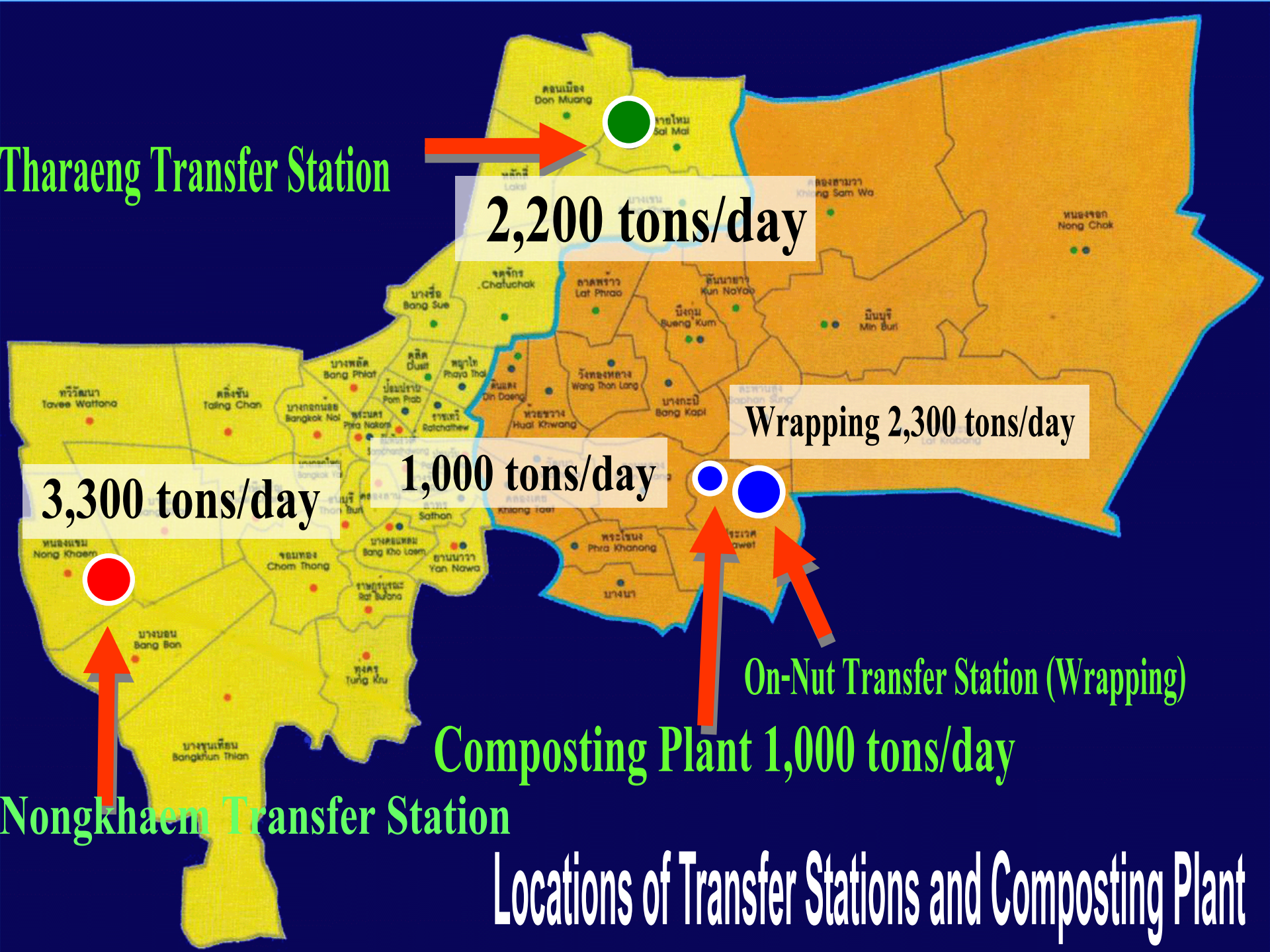
Wrapping 2,300 tons/day

Nongkhaem Transfer Station

On-Nut Transfer Station (Wrapping)

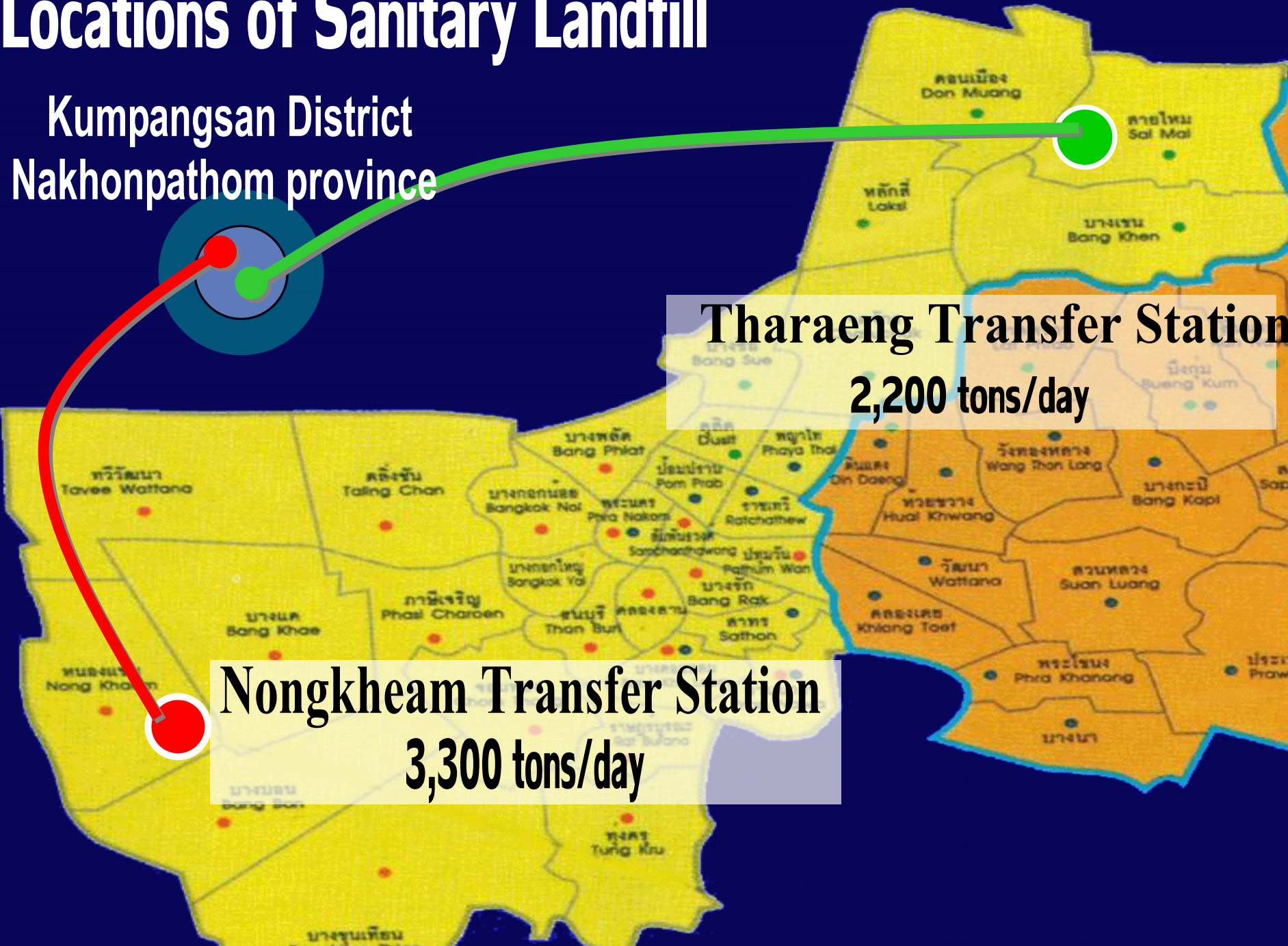
Composting Plant 1,000 tons/day

Locations of Transfer Stations and Composting Plant



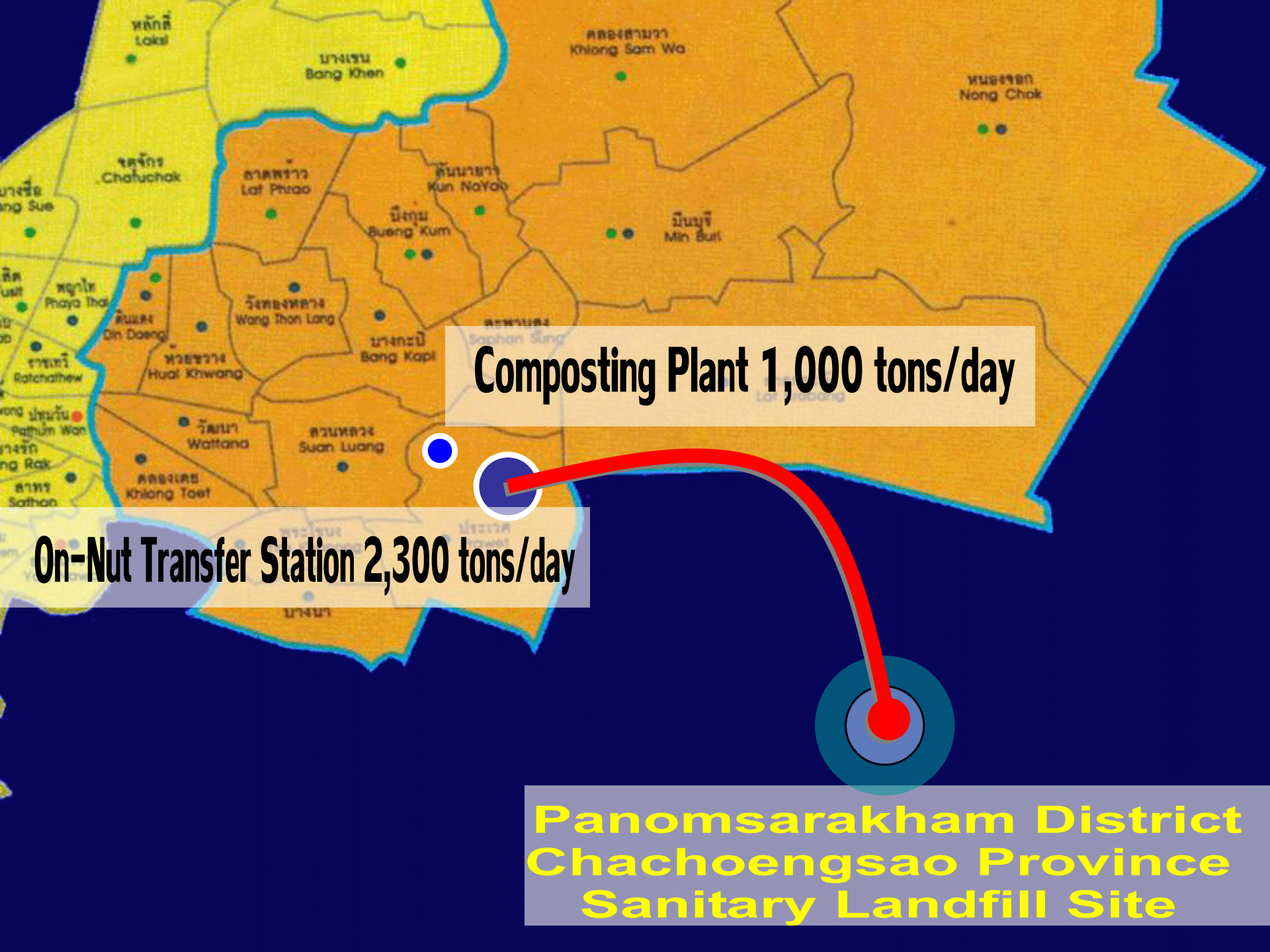
Locations of Sanitary Landfill

Kumpangsans District
Nakhonpathom province



Nongkheam Transfer Station
3,300 tons/day

Tharaeng Transfer Station
2,200 tons/day



Composting Plant 1,000 tons/day

On-Nut Transfer Station 2,300 tons/day

**Panomsarakham District
Chachoengsao Province
Sanitary Landfill Site**

Waste Treatment and Disposal

1. Sanitary landfill

7,800

Tons/day



Waste Treatment and Disposal

2. Composting

1,000

Tons/day



Compost ~ 300 tons/day

Waste Treatment and Disposal

3. Infectious Waste Treatment



Incinerator 15 tons/day x 2 unit

Waste Treatment and Disposal

4. Household Hazardous Waste

- **Separate: fluorescent lamps, batteries, etc. ~ 600 kg. /day**
- **Hire Professional Waste Technology (1999) Ltd.**



Future Challenges

Waste Collection

1. Improve the efficiency of waste collection services.
2. Designate time for general waste discarding and collection.
3. Waste collection services for narrow road especially in the congested communities.
4. Improve collection routes by using GPS (Global Positioning System)
5. Preparation of a preliminary hazardous waste storage and treatment system.

Waste Disposal

1. Waste to Energy project.
2. Upgrading sanitary landfills to meet international standards.
3. Integrated solid waste disposal management.
4. Master Plan of Solid Waste treatment in Bangkok.

Future Challenges

Public participation

1. **Establish social network on waste management**
 2. **Develop tricycle group to help BMA on waste separation**
 3. **Expand the project of biogas production from organic waste to cover more target groups.**
-

THANK YOU



<http://office.bangkok.go.th/environment>