# 2nd Targeted Workshop for Asia and the Pacific

***Transforming Good Practices from Demonstration Projects into Scaled-Up Investments and Financing***

# *Nutrient Reduction Program in Songkhla Lake, Thailand*


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IW: LEARN Regional Workshop

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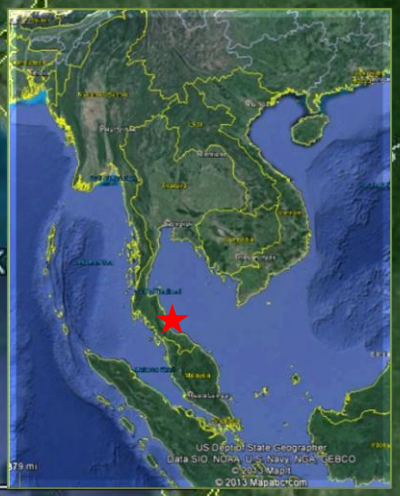
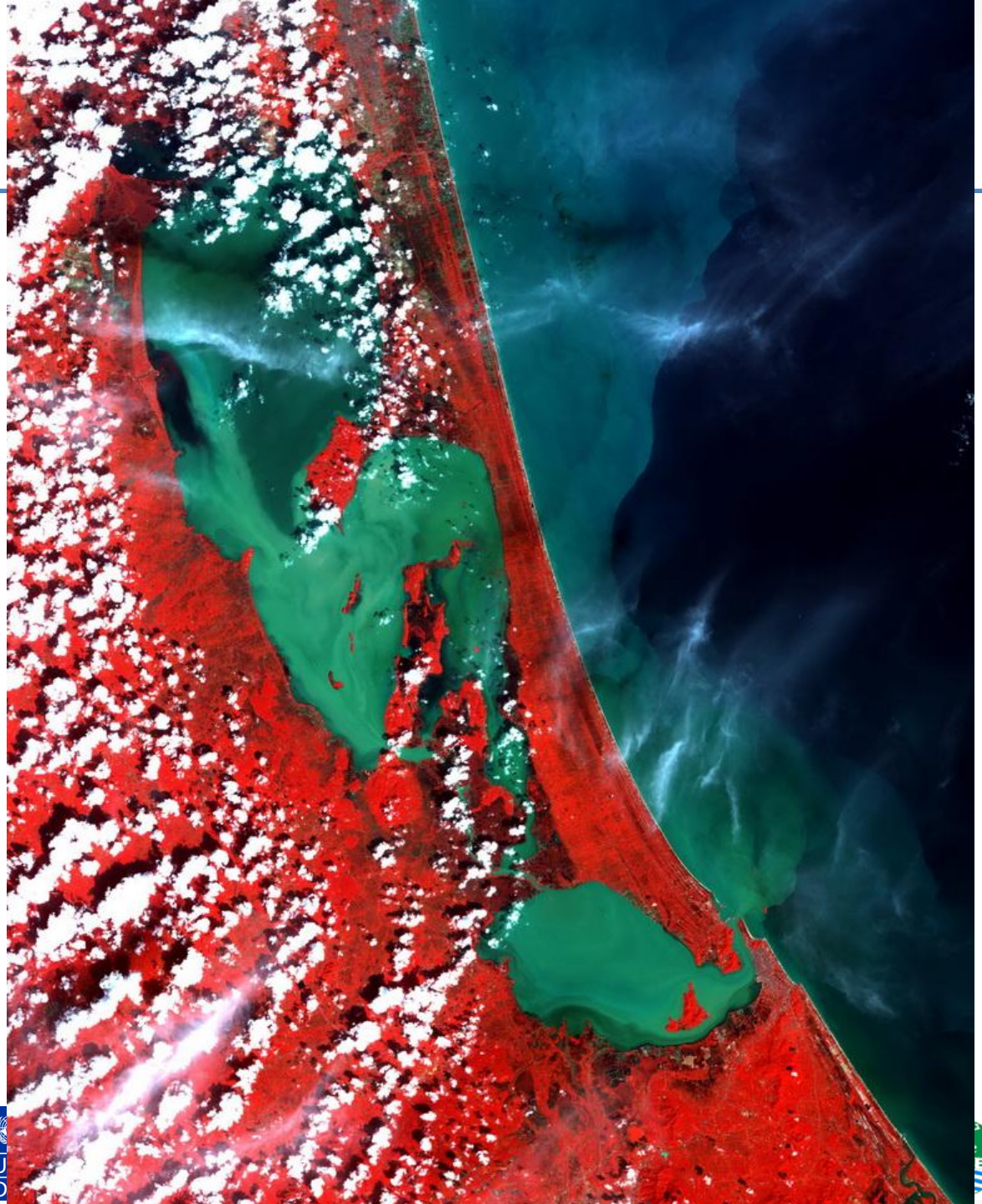
# Topics

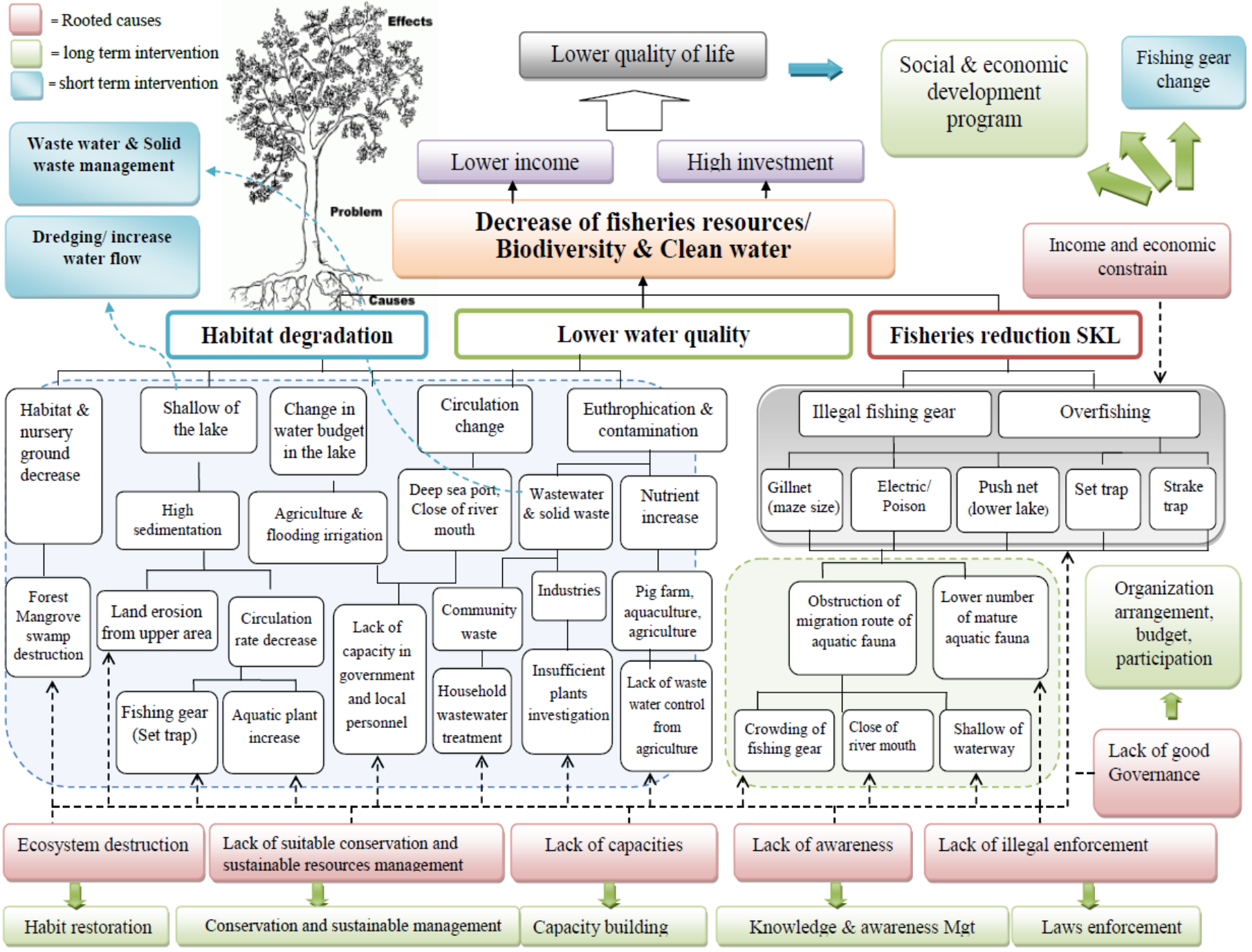
1. Introduction to Songkhla Lake Basin
2. Current situation of wastewater management
3. Problem of wastewater treatment management
4. Master Plan for Wastewater Management
5. Implementation of the Master Plan

# 1. Songkhla Lake Basin (SLB)

- Area: 9,807 km$^2$
- Population : 2 millions
- Cover 3 provinces (Pattalung, Nakorn Si Thammarat and Songkhla)
- Main issues
  - Water quality
  - Fisheries
  - Sedimentation
  - Flooding
  - Habitat & Biodiversity loss
  - Coastal erosion
  - Climate change





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# Waste water

- Discharge wastewater: 22 million m3/day
- BOD loading: 69 tons/day
  - 91% is released directly/via canal to SLB
  - 9% flow to Gulf of Thailand
- Sources of wastewater
  - Communities
  - Industrial plants
  - Pig farms
  - Shrimp farms
  - Agriculture

# 2. Wastewater management

- Water quality in SLB
  - **Upper part was deteriorating**
  - **Central and lower parts was in good condition**
- Fecal coliform bacteria was high in lower part
  - High volume of waste water discharged from communities and pig farms.
- High nutrients (Eutrophication)

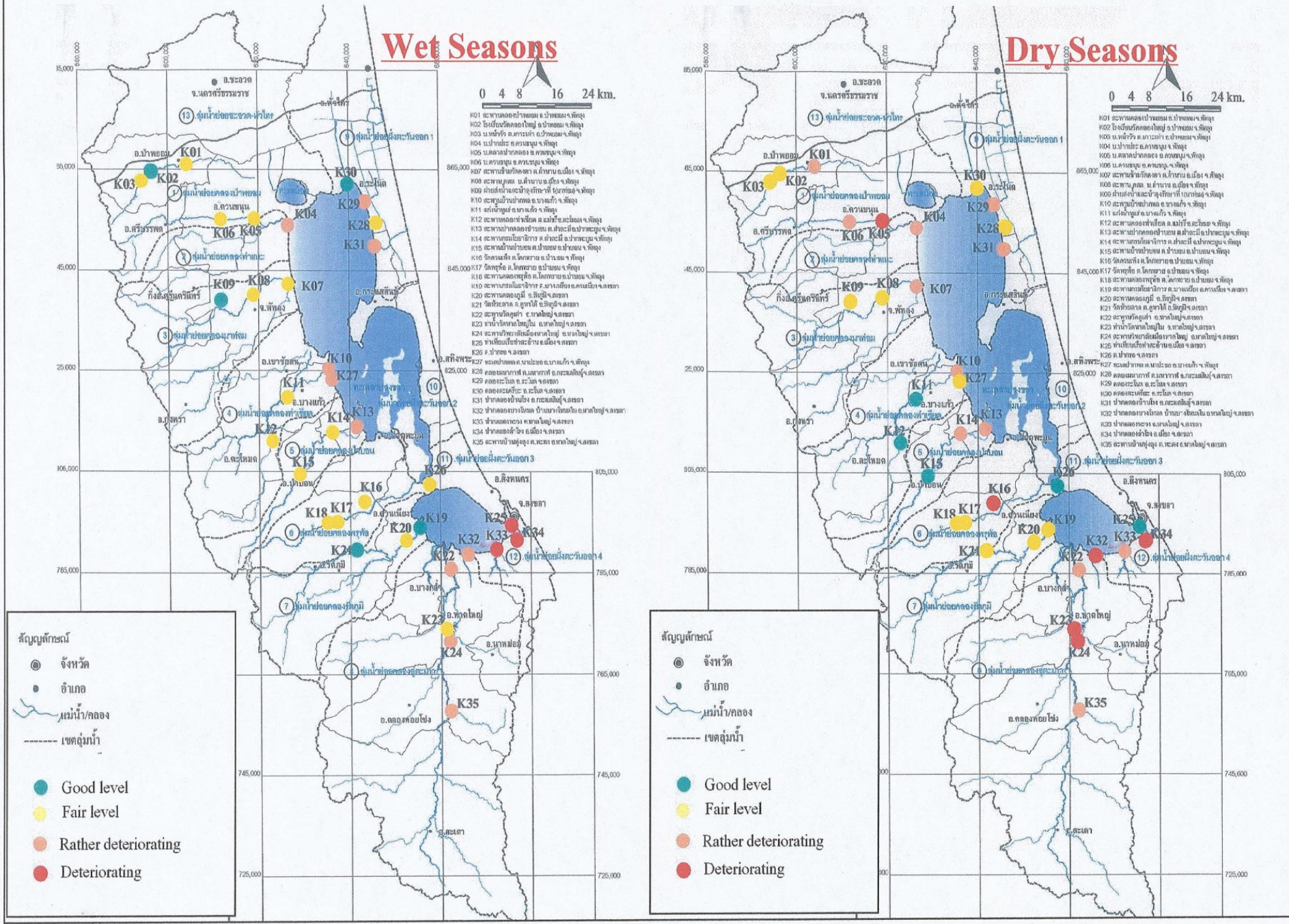



**Fig. 2-1 Water quality in the sub-basins during the wet and dry seasons in 2004.**

# Sources of wastewater and loading

- 2 types of sources
- **Non-point sources:**
  - Agricultural areas (paddy fields, para rubber plantations, vegetable plots, orchards, rural areas)
  - 2-7 times (BOD, nitrogen, phosphorus)

- **Point sources:**
  - Communities, pig farms, shrimp farms, industrial plants
  - Significant impact during dry season

# BOD loading

- 69,355 kg/day
- 82% is released into SLB
- 8% is released into GOT
  - Agriculture: 67%
  - Communities: 16%
  - Pig farms 8%
  - Shrimp farms 8%
  - Industrial plants 1%

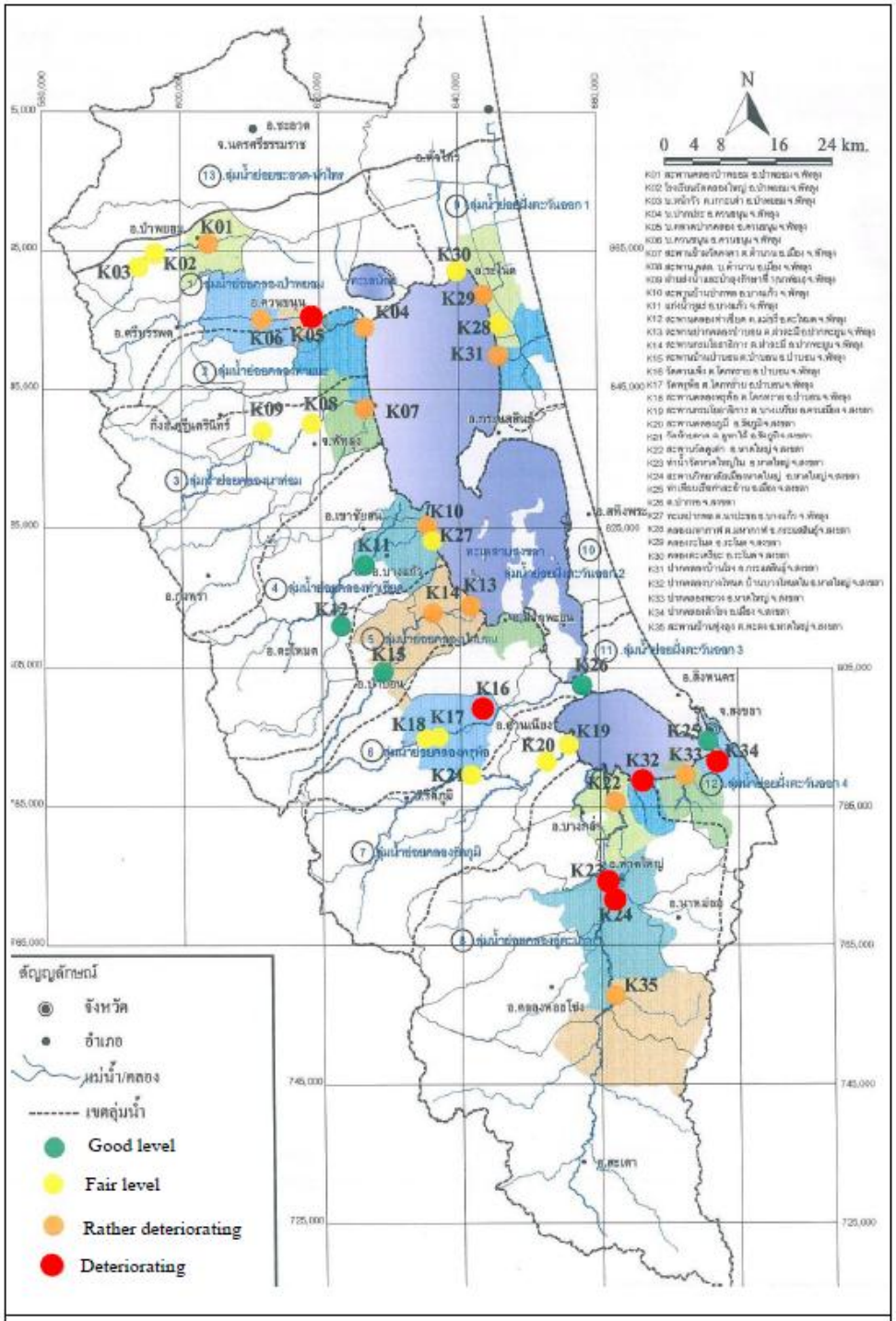
# Nutrients

| | Nitrogen | Phophorus |
|---|---|---|
| Total amount | 82,116 kg/day | 14,485 kg/day |
| Agricultural areas | 88.6 % | 93.6 % |
| Communities | 6.9 % | 5.2 % |
| Shrimp farms | 2.7 % | 0.9 % |
| Pig farms | 1.8 % | 0.3 % |

# 3. Problem

## Wastewater management

- Untreated waster is unwittingly released to water due to lack of understanding
- Weak in enforcement of laws
- Lack of competent personnel in local government
- Lack of willingness to pay
- Laws do not apply to all types and sizes of water pollution sources
- Clean technology practice is still limited.
- Zoning system is not implemented.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จังหวัด
อำเภอ
แม่น้ำ/คลอง
เขตลุ่มน้ำ
Good level
Fair level
Rather deteriorating
Deteriorating

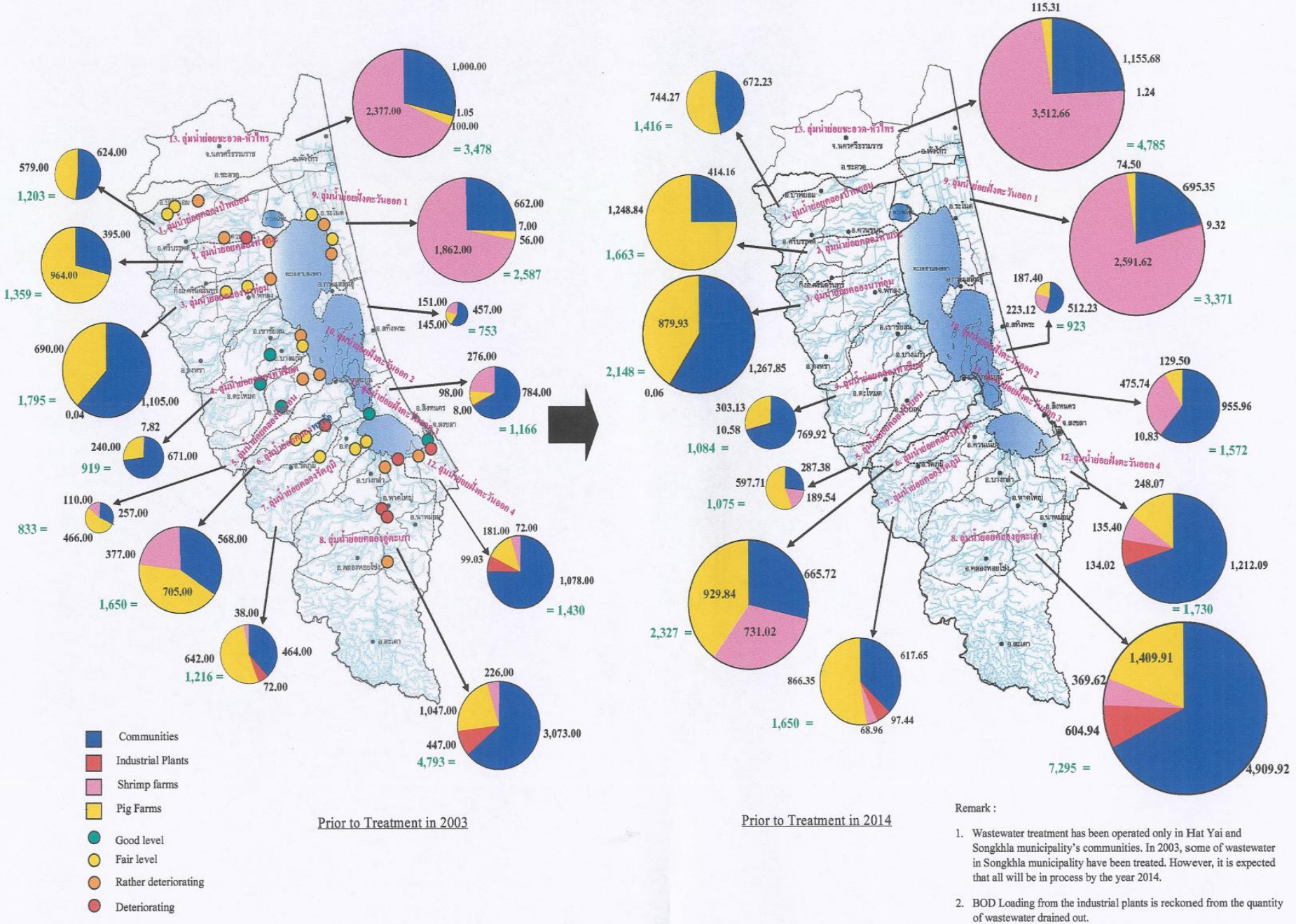



**Fig. 4-2 Comparison of BOD Loading (Kg./Day) from Point Source Discharged into Water Sources in 2003 and 2014**

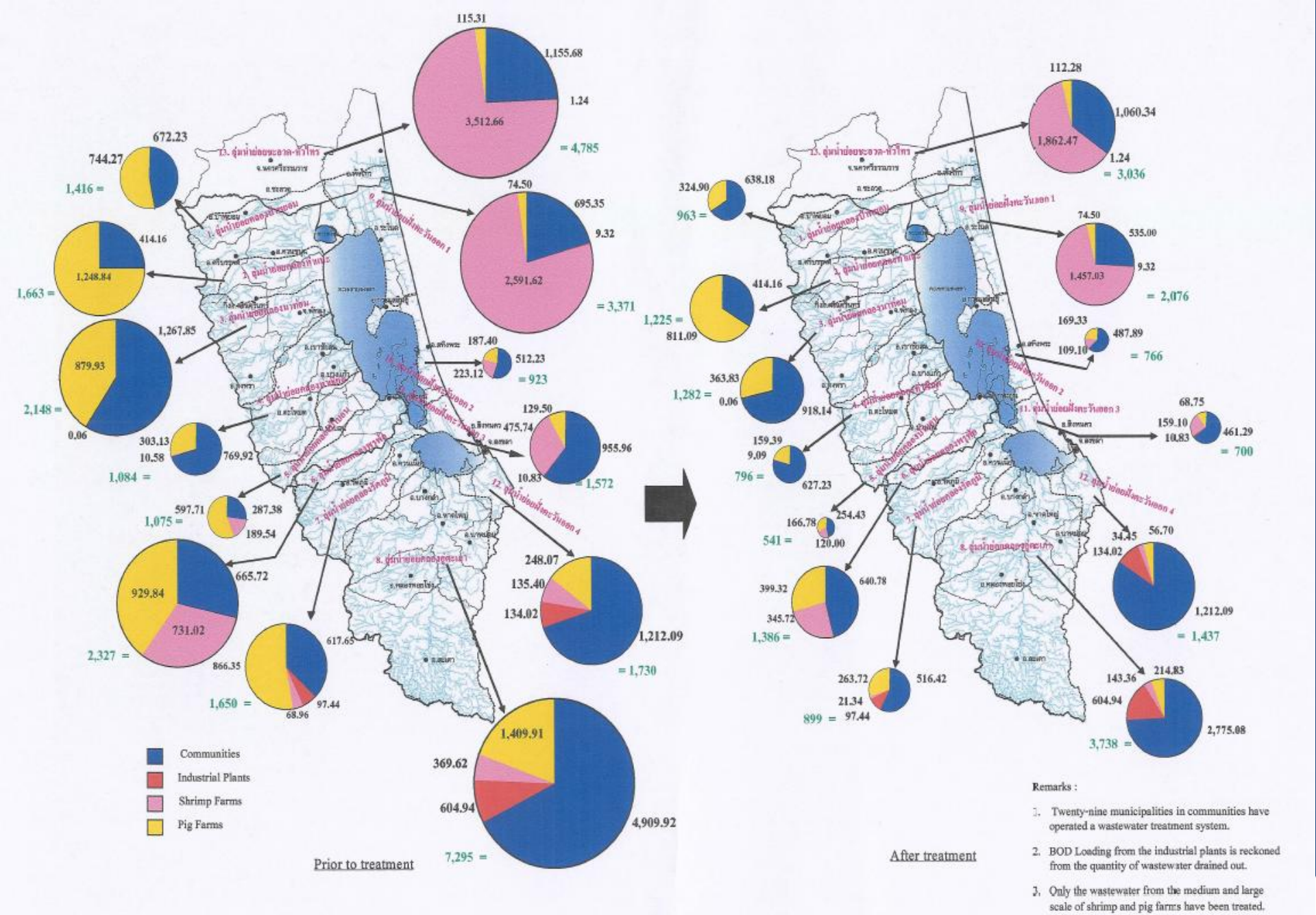



**Fig. 4-3 BOD Loading (Kg./Day) from Point Source after Wastewater Treatment in 29 Municipalities, Pig Farms, and Shrimp Farms in 2014**

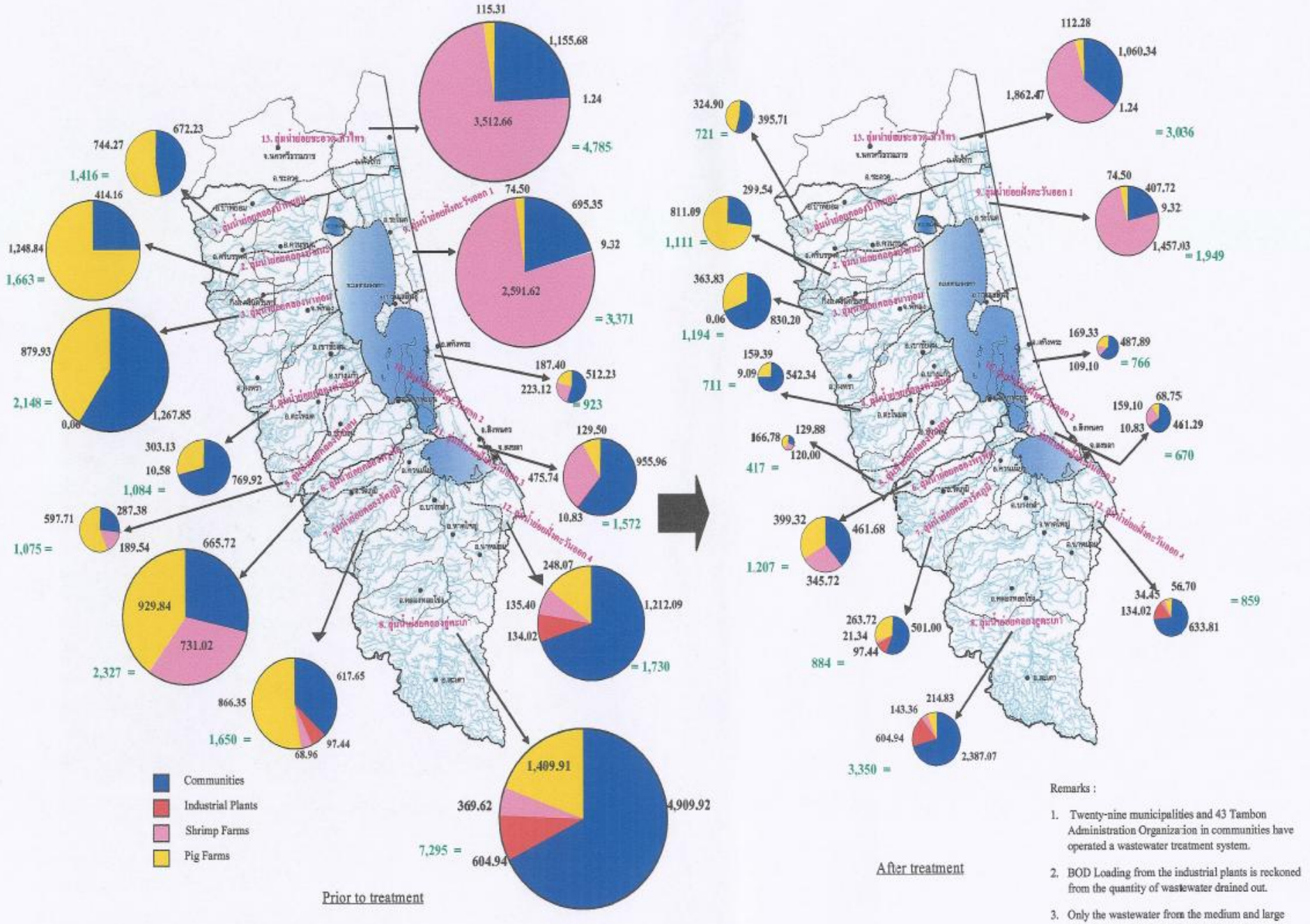



**Fig. 4-4 BOD Loading (Kg./Day) from Point Source after Wastewater Treatment in 29 Municipalities, 43 Tambon Administration Offices, Pig Farms, and Shrimp Farms in 2014**

# 4. Master plan for wastewater management

- Prevention and rehabilitation
- Pollution control at sources
- Management capacities

# 5. Implementation ?

**1. Social measure**

- Public participation / compensation

**2. Investment measures**

- Reduction of waste water & solid waste at source

**3. Legal measures**

- Regulations, standard

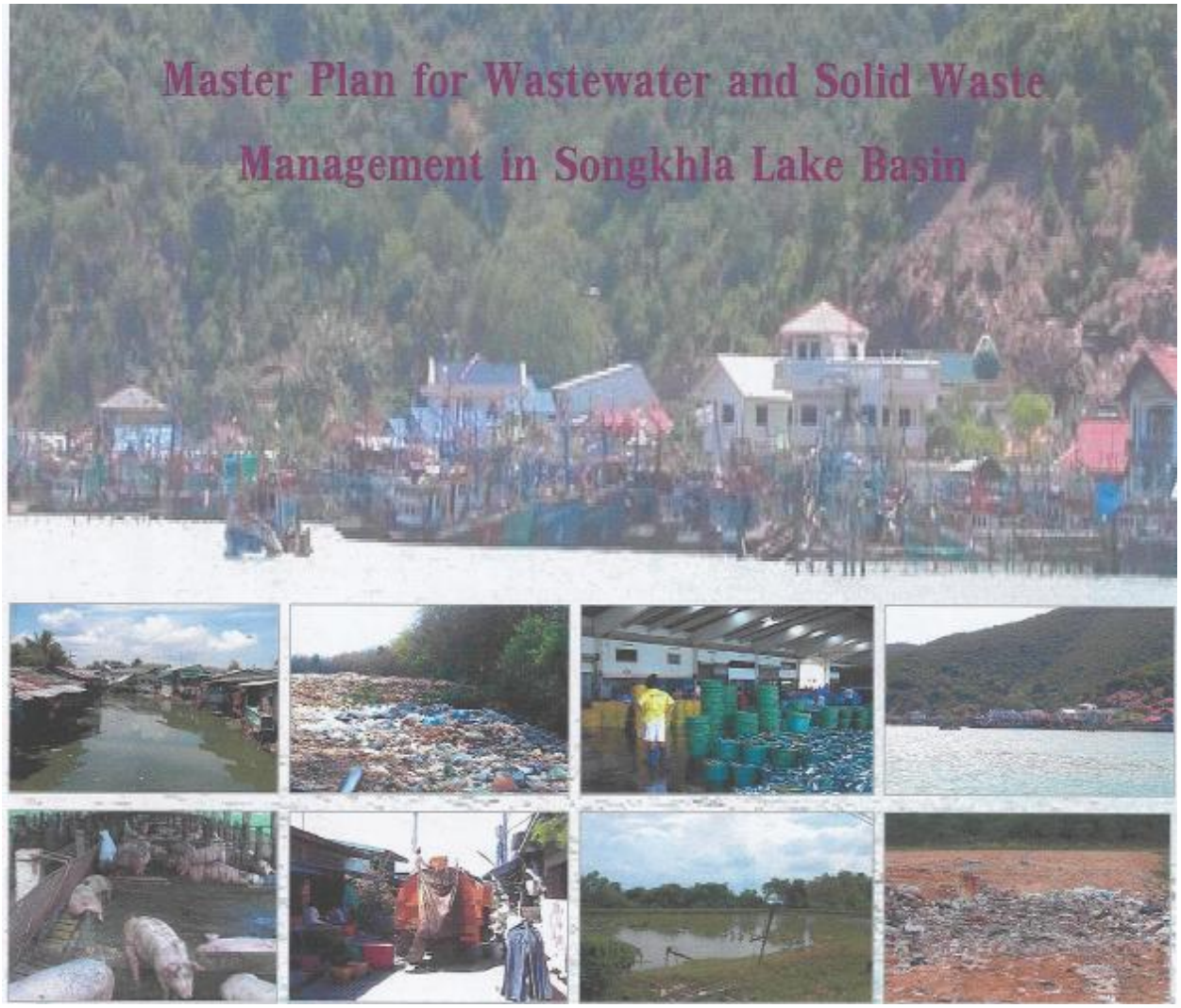
**4. Economic measures**

- Tax incentive, wastewater & solid waste fee

**5. Other measures**

- Provide technique, knowledge, guidelines

# [Thank]


Master Plan for Wastewater and Solid Waste
Management in Songkhla Lake Basin