Environmental User Fee System for Laguna de Bay, Philippines
Laguna de Bay: Overview

- 2nd largest lake in S.E. Asia
  - Volume = 2.25 km³
  - Area = 900 km²
  - Average depth = 2.8 m
- Freshwater lake but connected to Manila Bay by Pasig River (Flow possible in both directions)
- Population in watershed (including Manila) = 12 million
- Managed by Laguna Lake Development Authority (LLDA)
Laguna de Bay: Uses

- Fisheries (47,000 tons of fish in 2000)
- Irrigation water
- Power supply
- Industrial water supply (cooling, etc.)
- Transportation
- Recreation
- Drinking water
- Ecosystem services (home for birds, etc.)
- Receptacle of wastewater
Laguna de Bay: Problems

- Organic pollution
- Eutrophication
- Overfishing/Exotic Species
- Toxic contamination?
Laguna de Bay: Root Causes

- Urbanization
- Industrialization
- Excessive Resource Use
Sources of Organic Pollution (mid-1990s)

- Agriculture (40%)
- Domestic (30%)
- Industry (30%)
  - Food processing
  - Pig farming/Slaughterhouses
  - Beverages
  - Textiles
  - Pulp and Paper
Pre-1997 Industrial Regulation

- Direct Regulation: Industries had to apply for Discharge Permits
- Often rejected by LLDA
- Burden was on LLDA to know the appropriate technologies for treatment
- Cheaper to pay a fine than to treat waste
- Polluters were not responsible for damage done
Environmental User Fee System

- LLDA implemented a EUFS in 1997 to deal with these problems
- Discussed below are:
  - Structure of the fee
  - Phases of system
  - Results
  - Implementation Issues
  - Lessons Learned
Structure of EUFS

Total Annual User Fee =

Fixed Fee + (Variable Fee \times \text{Total Annual BOD Load})
Structure of EUFS

- Fixed fee is based on volumetric flow rate, as follows:
  - $Q < 30 \text{ m}^3/\text{day} = P5,000$
  - $30 < Q < 150 \text{ m}^3/\text{day} = P10,000$
  - $Q > 150 \text{ m}^3/\text{day} = P15,000$

- Variable fee is based on BOD$_5$ loading, as follows:
  - $[\text{BOD}_5] < 50 = P5/\text{kg BOD}_5$
  - $[\text{BOD}_5] > 50 = P30/\text{kg BOD}_5$
Structure of EUFS

- Total Annual BOD Load = $\text{BOD}_5 \times Q \times d \times 10^{-3}$
  - Where:
    - $\text{BOD}_5$ is the average concentration of $\text{BOD}_5$ measured over the year in mg/L
    - $Q$ is the flow rate in m$^3$/day
    - $d$ is the number of days discharging per year
    - $10^{-3}$ is a conversion factor
Structure of EUFS: Example 1

- Assume you are owner of a company that:
  - Operated 300 days per year
  - Flow rate = 100 m$^3$/day
  - Average BOD$_5$ = 70 mg/L
- What is your annual EUFS?
Structure of EUFS: Example 2

• Assume you treat your waste so that your new:
  • Average BOD$_5$ = 35 mg/L
• What is your new annual EUFS?
Phases of EUFS: Phase 1

- In 1997, the EUFS was introduced, but only covered:
  - BOD
  - 5 groups of industry
  - Polluters with BOD loads of 4,000 kg/yr or more
Phases of EUFS: Phase 2

- In 1998, the EUFS was expanded to include:
  - All industries
  - Polluters with BOD loads of 0 kg/yr or more!
Phases of EUFS: Phase 3

- In 1999, the EUFS was expanded to include:
  - Other polluters such as
    - Housing subdivisions
    - Commercial Establishments
    - Restaurants
Phases of EUFS: Phase 4

• LLDA plans to expand the EUFS to include
  • all polluters, including agriculture
  • more pollutants
• This has not been implemented yet.
Results of EUFS

- The fee has led to
  - Increased treatment of organic waste
  - Adoption of cleaner production
  - Voluntary closure
  - Plant relocation
Results of EUFS

• BOD load from industries to the lake has dramatically fallen
  • 1993 = 12.142 million kg BOD
  • 1997 = 5.402 million kg BOD
  • 1998 = 4.102 million kg BOD
  • 1999 = 1.082 million kg/BOD
Implementation Issues

- The EUFS does not replace the previous regulations.
- Polluters must still pay a fine if they are not in compliance with their Discharge Permit.
- Industries must still have a Pollution Control Officer.
- The Public Disclosure system is still used.
Implementation Issues

- A special national act was passed to allow LLDA to administer and collect the fee.
- The revenue is used for
  - Water quality management programs
  - Infrastructure
  - Technical assistance centers
  - Training, etc.
- 20% of the revenue is shared with local governments, especially for sewerage construction.
Lessons Learned

• “Ready, Fire, Aim!”
  • Simple, modest approach
  • Pilot program
  • Pick one of two parameters
  • Revise charges based on monitoring
  • Engage stakeholders
  • Charge all polluters

• The EUFS is not a pure tax but mixed with direct regulation and other policies.