Practice of FOD model with IPCC Inventory Software

Hands-on Training (Waste Sector) on WGIA10

Introductory presentation

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WGIA10
July 10-12 2012, Hanoi, Vietnam

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Overview

Overview
Objective (1)

- This sub-session introduce First Order Decay (FOD) model to estimate emissions from “Solid Waste Disposal on Land (SWDL)”.
  - SWDL is one of the most important source.
  - The estimations should be improved at most country.
  - 2006GLs requires accurate estimations by using FOD model.
  - However, FOD model is hard to approach.
  - New 2006 IPCC software provides basic solution to apply FOD model.

Overview
Objective (2)

- To introduce FOD model in this sub-session;
  1. Introductory presentation
     - Dr. Oda & Dr. Jamsranjav (about 30min.)
  2. Familiarization with basic structure of FOD model
     - Homework (finished)
  3. Actual estimations with IPCC software
     - Try to adopt dummy data (about 80min.)
  4. Discussion among participants on waste sector
     - Findings of potential difficulties to apply FOD model, such as estimation of historical data, adoption of each parameter and etc. (about 20 min.)
  5. Join with another sub-session

Methodological status of each party's inventory

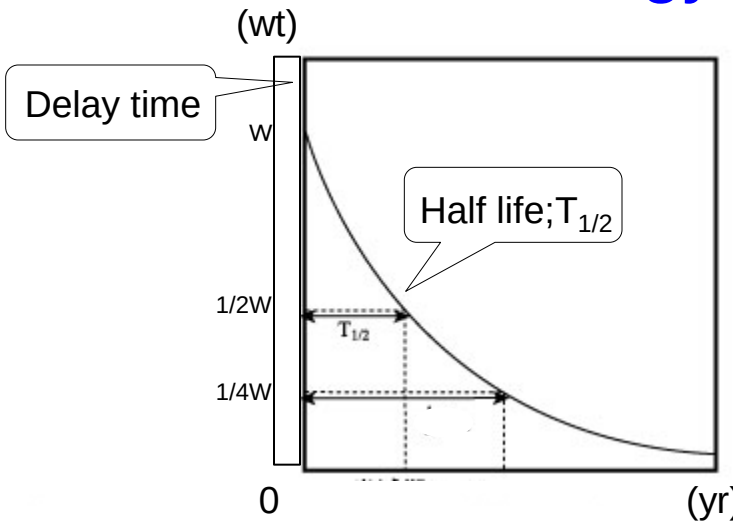
- Parties are divided into two groups based on each methodological level .
  - FOD model installed or not
- In this sub-session, it is necessarily to identify the aims with their inventory status.
  - Parties installed FOD model;

    China, Korea, Philippines, Thailand
    - Try to quest improvement to your methodology on the software
  - Parties not installed FOD model;

    Cambodia, Indonesia, Malaysia, Mongolia, Vietnam
    - Experience of FOD model including estimation of historical data

First Order Decay (FOD) model (1)

- FOD model on waste sector is similar into Radioactive Decay model.
  - Organic waste gradually decay into CH_4.
    - ✓ Organic carbon is halved with the half life.
  - Applying simple assumption of “First Order Decay”
    - ✓ Not considering intermediate product which cause “delay time”
- 2006GLs simply add “delay time” to the methodology of FOD model on prior GLs.



Remaining Carbon in Waste disposed in Year 0

First Order Decay (FOD) model (2)

- FOD model requires historical data of past 50 years .
  - 2006GLs also provide simple methodology for FOD model.
    - ✓ Estimation of historical data by using some drivers (population, GDP)
    - ✓ Reference of parameters

      (Waste generation rate, MSW component, DOC content, Dry matter content, etc.)

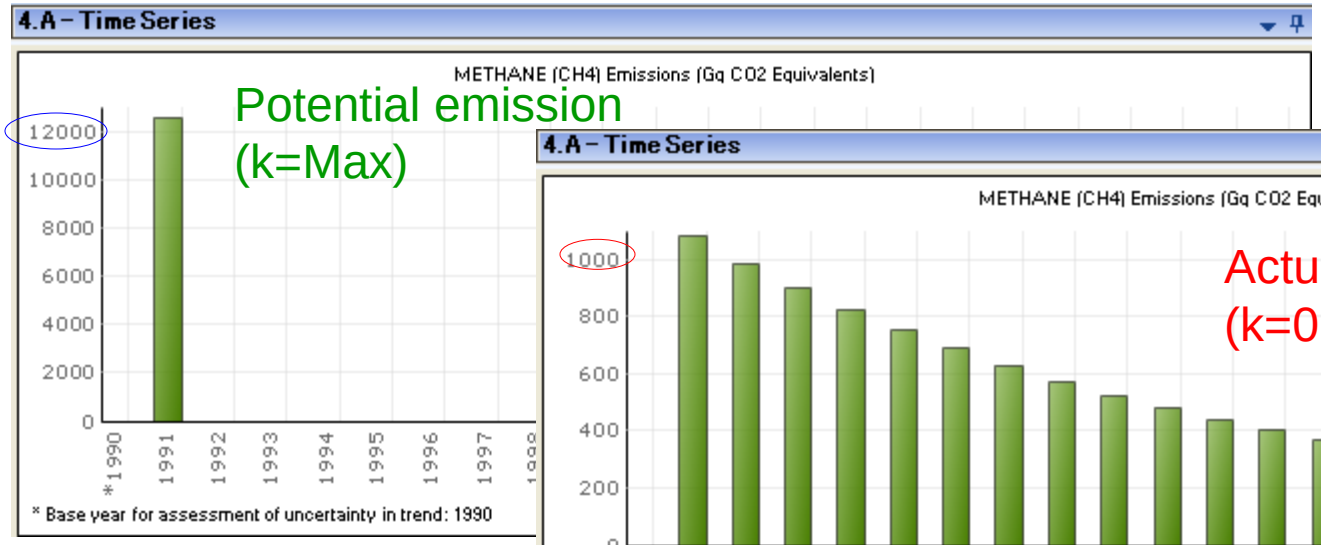
- For details, see the section of SWDS on 2006 GLs.

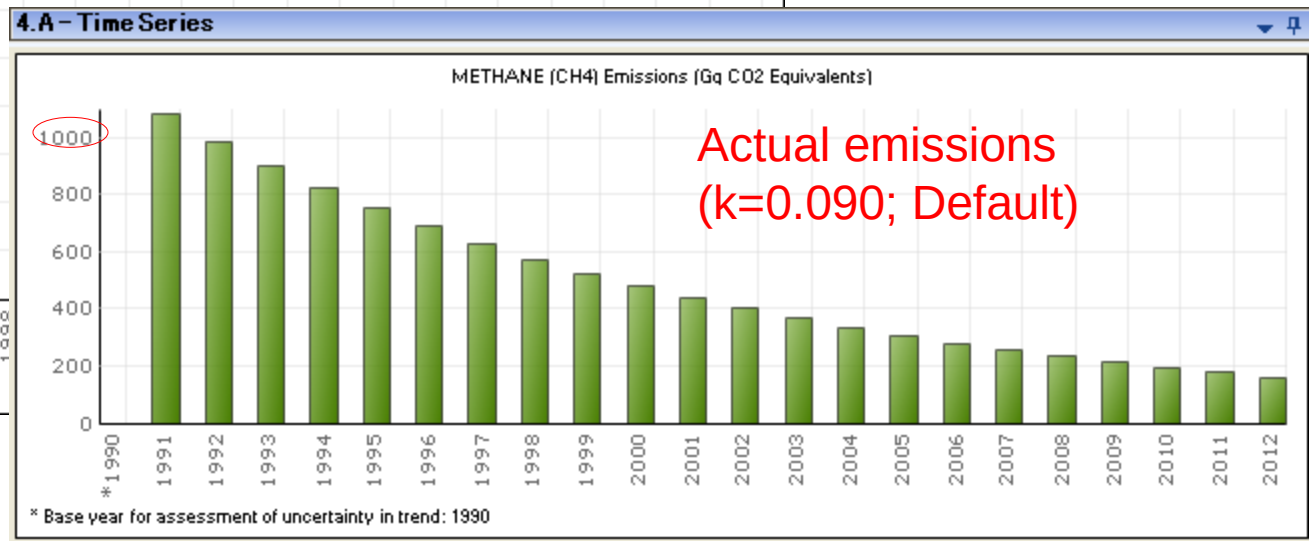
(yr)

Example answers to homework

Example answers to homework
Exercise 1-1

- Comparison of each k (= ln(2)/ half life) value
  - Try to compare potential emission (k=Max) with estimation on FOD model (k=Default value) from 10,000 Gg MSW disposed in 1990.
- Expected results：
  - You find delayed emissions after disposing waste.

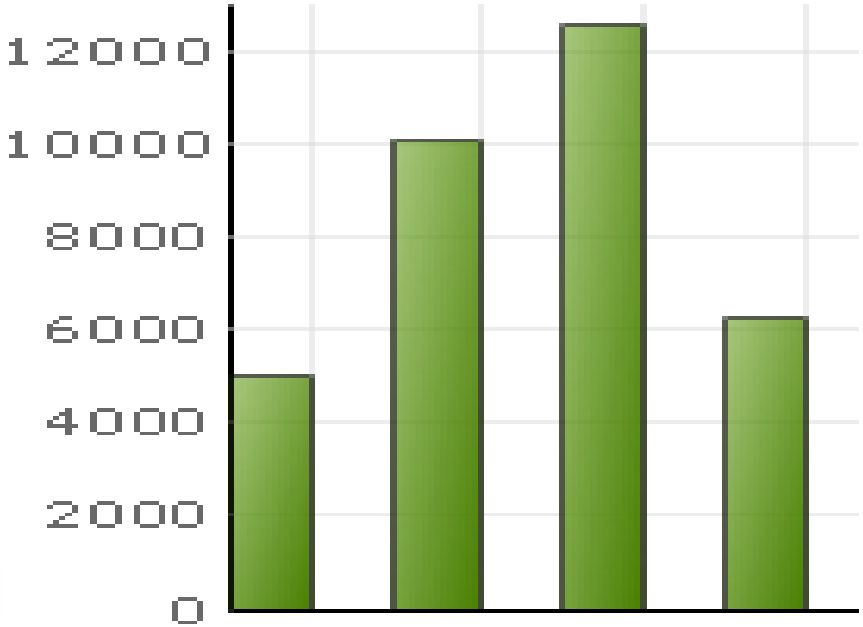




Example answers to homework

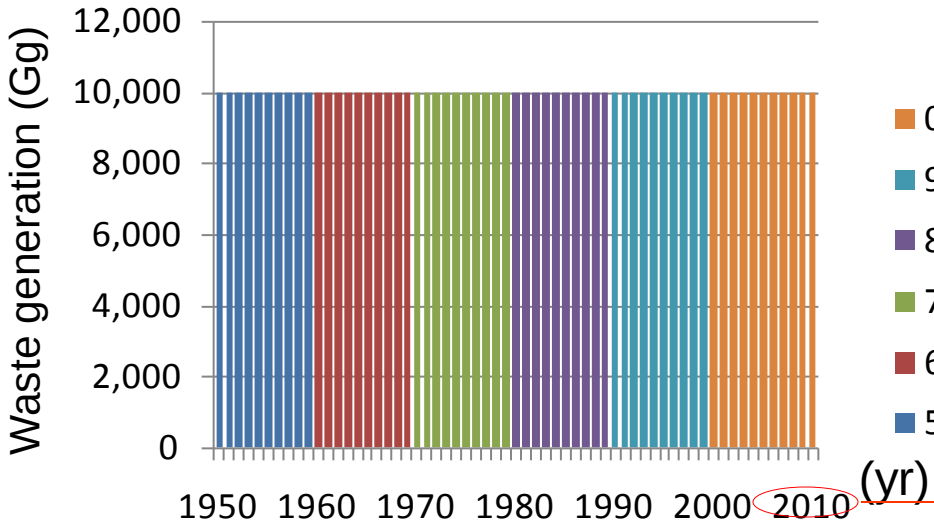
Exercise 1-2

- Comparison of emissions from each disposal site
  - Changing the distribution of each disposal site, try to estimate potential emissions with each MCF (amount of disposal at 1990 = 10,000Gg; k = Max; proportion of each disposal site = 100%).
- Expected result：
  - You find difference of potential emissions estimated by using each MCF.



Example answers to homework
Exercise 1-3

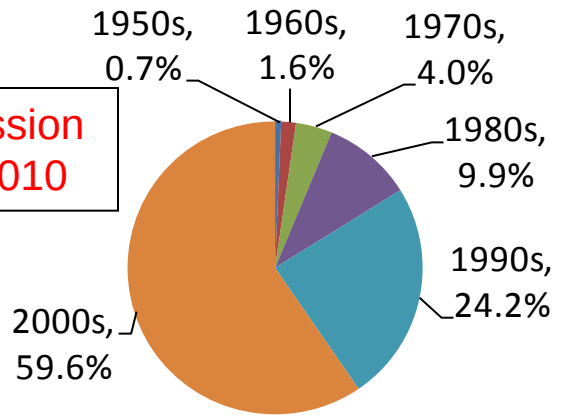
- Contribution of past disposal amount
  - Try to compare effects for 2010 emissions caused by waste constantly generated of each decadal period (`50s, `60s, `70s, `80s, `90s and 2000s).
- Expected result:
  - You find less effective far past disposal.



Time series of dummy waste generation

(k=0.090; $t_{1/2}$=7.7 yr)

Emission in 2010



Contribution of past disposal amount

Thank you for your attention!