



## GHG Inventory in the Philippines

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## Agriculture National Data

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- Population of Domestic Livestock
- Percentage of manure treated in different animal waste management systems
- Harvested area of rice - irrigated and rainfed types
- Total area of grassland burned annually
- Bureau of Agricultural Statistics, Dept. of Agriculture
- Bureau of Animal Industry, Dept. of Agriculture
- Bureau of Agricultural Statistics, Dept. of Agriculture
- Reforestation Division of Forestry Management Bureau, Dept. of Environment and Natural Resources



## Agriculture National Data

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- Aboveground biomass density
- Annual major crop production (corn, rice, etc.)
- Production statistics for nitrogen-fixing crops – dry pulses and soybeans
- Area of cultivated organic soils (ha of histosols)
- local studies
- Bureau of Agricultural Statistics, Dept. of Agriculture
- Bureau of Agricultural Statistics, Dept. of Agriculture)
- Bureau of Soil and Water Management

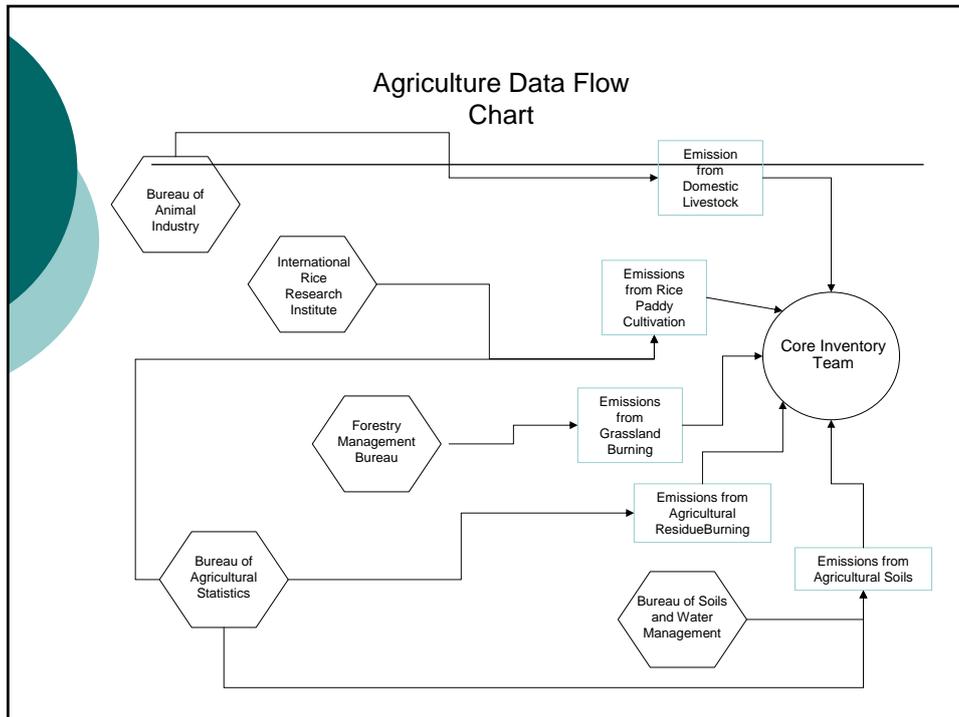


## Agriculture International Data

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- Ratio of dairy cattle to cattle population
- Number of cropping seasons per year
- methane emission factor integrated over cropping season in g/m<sup>2</sup>
- FAO
- developed by IRRI
- developed by IRRI

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## Energy National Data

- Apparent fuel consumption
- Overall Energy Balance Sheet, Dept. of Energy
- Number of motor vehicles registered by type of vehicle and fuel used
- Land Transportation Office



## Energy (National Data): Fugitive Emissions

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- Coal production – mining
- Coal Division, Dept. of Energy
- Gas
- Consumption data in PJ units
- data available as *electricity generated MWhr*



## Energy (National Data): Fugitive Emissions

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- Oil refining
- crude refinery and catalytic cracker throughput and type of storage
- private oil companies
- Crude oil production statistics
- Oil and Gas Division, Dept. of Energy
- Amount of oil transported
- data collected from a private contractor

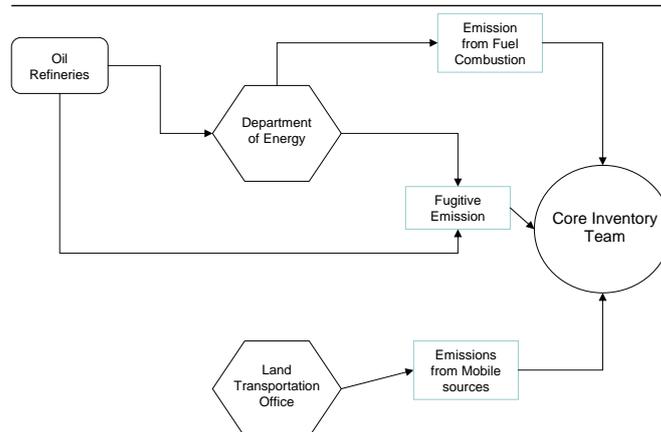
## Energy International Data

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- Default IPCC emission factors for most computations

## Energy Data Flow Chart

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## Industry National Data

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- Food Balance Sheet
  - released by the National Statistics Coordination Board
- Import data on halocarbons
  - from the Philippine Ozone Desk of the DENR)
- Other references:
  - Data released by industry associations
  - *Philippine Statistical Yearbook, Philippine Yearbook, Annual Economic Indicators*



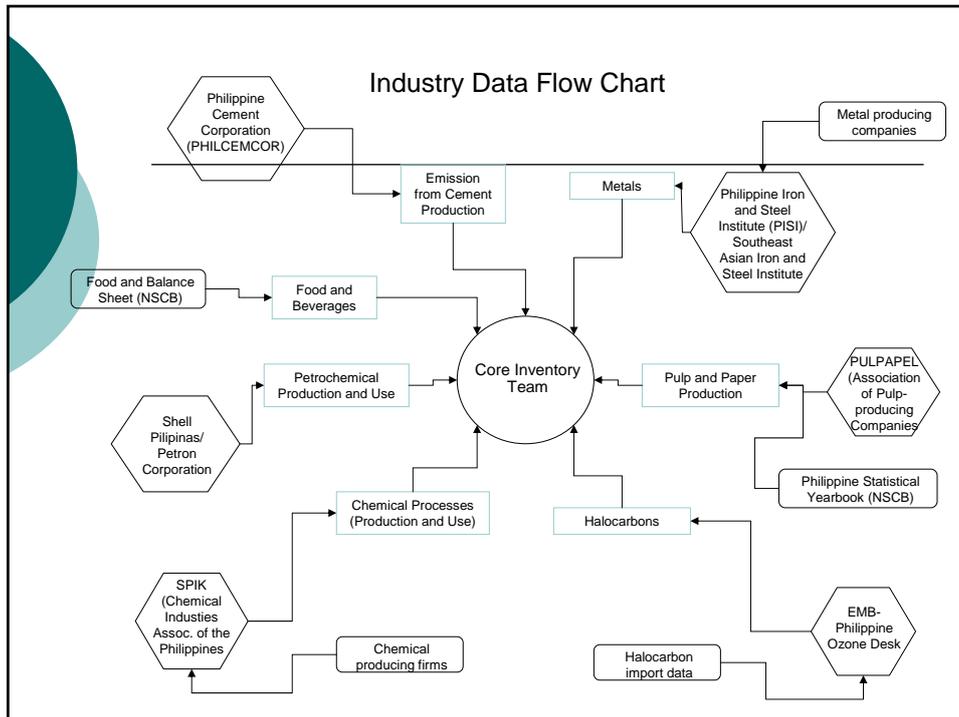
## Industry International Data

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- Default IPCC emissions factors for most computations
- Additional data on food and alcoholic beverages production
  - Food and Agriculture Organization food balance sheet
- Additional information for halocarbons
  - UNEP Ozone Action website
- Annual rated capacity for pulp
  - FAO forestry database

# Philippines

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## Waste National Data

- Degradable organic component indicators
- Fraction of domestic/commercial organic compound removed as sludge
- Local values for fraction of wastewater or sludge treated by the handling systems
- *Industrial Efficiency and Pollution Control/Environmental Management Strategy*
- (kg BOD/1,000 persons/year)
- (*F<sub>s,dom</sub>*)
- (*W* or *S*)
- prepared by UNDP-World Bank, 1992, for Metro Manila





## Data Gaps

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## Data Gaps Agriculture

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- Ratio of residue to crop product
- Synthetic nitrogen fertilizer consumption data



## Data Gaps Energy

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- Consumption data for biomass fuels (wood/woodwaste, charcoal and other biomass wastes) – Energy Balance sheet of the DOE only covered the Industrial subsector. The inventory also used the UNDP-ESMAP and HECS data of DOE. The residential data was available.
- Gas production data from the Oil and Gas Division of DOE.



## Data Gaps Energy

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- Statistics on leakage of gas and venting and flaring data locations unknown
- Number of motor vehicles registered by type and kilometers traveled and fuel consumed per vehicle type



## Data Gaps Industry

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- Itemized chemical production data (only aggregate data provided)
- Production data from smaller pulp producing firms
- Itemized production data of specified types of alcoholic beverages
- Production data of alcoholic beverages



## Data Gaps Industry

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- Production data of ferroalloys according to base metals used
- NMVOC, CO, NO<sub>x</sub>, SO<sub>2</sub> emissions from manufacturing processes not registered with SPIK (Chemical Industries Association of the Philippines)
- Actual emissions from the use of halocarbons and SF<sub>6</sub> (currently, only potential emissions estimated)
- Activity data for products containing HFC-134a



## Data Gaps Waste

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- Municipal solid waste per capita generation rate for most rural areas
- Philippine industrial wastewater COD loads
- Sludge treatment



## Data Gaps Waste

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- Efficiency of solid waste collection outside Metro Manila
- Wastewater and wastewater handling systems (especially for areas outside Metro Manila)
- Amount of CH<sub>4</sub> recovered or flared from industrial wastewater



## GHG Inventory Sectoral Issues and Concerns

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- Problems/Issues/Concerns
- Recommendations



## Energy

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- No country specific data; specifically No local emission factors
- Institutionalization of the Overall Energy Balance (OEB) Sheet
- Study local fuel types: composition of fuels and develop local emission factors.
- OEB adapted in such a way that it will contain all the information necessary for the computation of GHG emissions in the energy sector.



## Energy

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- Data readily available from DOE but are highly variable due to continuous updates in fuel consumption and allocations.
- Link data in the OEB with the GHG emissions calculations to reflect instantaneously any changes resulting from the new set of values.



## Energy

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- Incomplete database on household consumption of biomass fuels such as wood/woodwaste, charcoal, agriwaste and other biomass/waste.
- Institutionalize/regularize surveys and studies on household fuel consumption – not only biomass fuels, but all other conventional and nonconventional fuel types.

## Energy

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- Major data gaps in the transportation sub-sector prevent a more accurate GHG emission computation:
  - ❖ Type and technology of registered vehicles: VTEC, fuel injection, etc.
  - ❖ Number of kilometers traveled per year
  - ❖ Year and make of car.
- Institutionalize a complete and comprehensive registration process containing all the necessary and important information for each registered vehicle in every LTO registration branch.

## Energy

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- Institutionalization of data flow and information systems within DOE
- Develop structured linkages within the DOE specifically with the Demand Analysis and Planning Division (DAPD), main data center of the department, and the Environment Division which computes and projects national CO<sub>2</sub> emissions from the energy sector.

## Industry

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- Availability of data, this being highly dependent on what industrial firms, estates, or associations choose to provide for regulatory purposes (especially to the DENR or EMB or any such regulatory body as well as any indirectly related purpose)
- More reliable data sources: DTI and PEZA- - non regulatory bodies which issue annual permits
- UNDP may also be another repository data

## Industry

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- Reliability of data
  - Involve NGO's like the Philippine Business for Environment (PBE) which are pro-active in the environment awareness circles.
  - Involve industrial associations, e.g., PISI, SPIK, PHILCEMCOR, PHINMA, etc. to increase cooperation within sectors.



## Industry

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- Reliability of data
- Institutionalize inventory methodologies within DTI, NSCB, and EMB all of which already have most of the requisite data available.
- Possibly create local emission factors for highly emissive sectors like cement, iron and steel.



## Agriculture

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- Deficiency of country-specific factors and data.
- Default factors not representative of country's actual situation.
- Generate local statistics by conducting researches and surveys to be conducted by the involved agencies such as BAS, BAI, IRRI, PhilRice, etc.



## Agriculture

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- Institutionalization of data flow and information system within BAS, DA
- Establish a statistical framework and a database information system for the inventory.



## Agriculture *Domestic Livestock*

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- Current data on distribution of animal manure among animal wastes management systems are estimates only.
- Ascertain ACTUAL distribution of animal manure among the animal wastes management systems.



## Agriculture

### *Prescribed Burning of Savanna*

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- Lack country-specific statistics (biomass density of savanna, fraction of exposed biomass that is burned, etc.) necessary for the estimation of emissions.
- Do research and study. Lead agency: DA/FMB



## Agriculture

### *Burning of Agricultural Residues*

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- Lack country-specific statistics
- Conduct research/survey on cultural practices of local farmers in order to generate data regarding crop residues



## Agriculture

### *Agricultural Soils Management*

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- No country-specific data and factors
- Do research and study. Lead agency: DA/FMB



## Waste

### *Solid Waste*

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- Need for a more comprehensive dataset
- Data for other regions (besides the NCR) – data may be acquired from the LGU's
- Provisions for categorizing waste disposal by economic class, region, etc. to see the impact of these specific categories.



## Waste *Domestic/Commercial Wastewater Treatment*

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- Need to acquire sludge data.
- Need to acquire new/accurate data regarding wastewater treatment plants and volume of wastewater treated and processed; treatment efficiency, for all regions
- More comprehensive data on sludge. May be quantified by the local sewers Maynilad Waters, LWUA



## Waste *Domestic/Commercial Wastewater Treatment*

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- Data on wastewater: no local BOD levels.
- Untreated wastewater
- Scientific and experimental determination of local BOD levels.
- Study effects of untreated waste water – no methane generated in this case but the repercussions arising from non-treatment are not known.

## Waste

### *Industrial Wastewater*

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- No readily available data regarding industrial wastewater except for 1992 IEPC
- Data coverage is not entire nation
  - Data are in BOD and not COD – thus need for proper conversion
1. Conduct regular survey/study on national wastewater treatment systems. (DENR/DTI)
- Scientific study for COD levels in WW treatment systems.

## LAND USE CHANGE AND FORESTRY

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- Significant variability among existing data (e.g. Lasco, Franscisco, ESMAP, etc.)
- Conduct actual field studies
- Validate default data

## LAND USE CHANGE AND FORESTRY

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- Lack of country specific data (data gaps) – IPCC default values used
- Unreliable data on forest area and eventual fates of woody biomass after land conversion
- Conduct actual field studies
- Determine carbon sequestration values
- Determine actual forest area and conversion by reliable party using precise methods – key government institution: FMB

## LAND USE CHANGE AND FORESTRY

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- Need to enhance capability and credibility of some government agencies involved in collecting relevant forest data.
- Need to systematize scheme for data collection
- Coordination between relevant agencies such as FMB and NAMRIA regarding LUCF data collection
- Review and update existing information management structures in DENR and other groups involved in LUCF issues





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