The Key Category Analysis

Africa Regional Workshop on the Building of Sustainable National Greenhouse Gas Inventory Management Systems, and the Use of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

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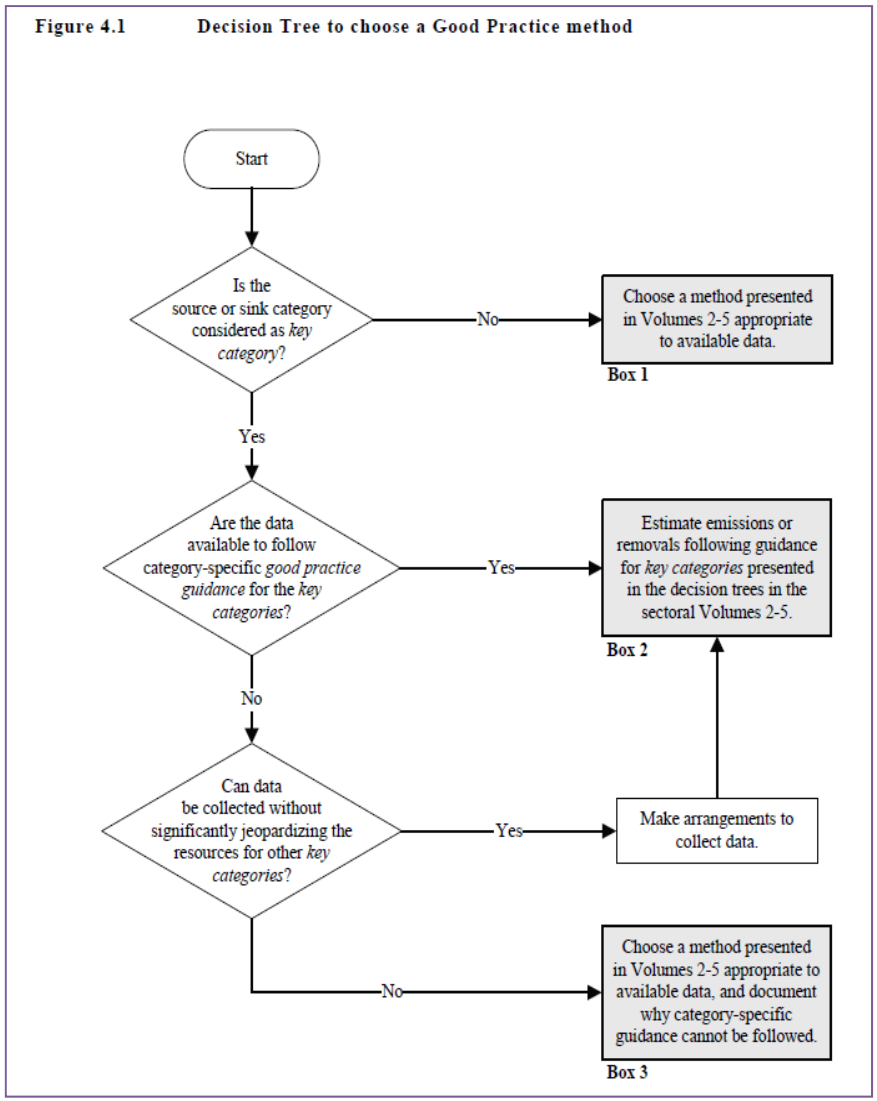
Why Do a Key Category Analysis?

Conduct Key Category Analysis
IPCC Good Practice (Chapter 7); IPCC 2006 GL (Vol. 1, Ch. 4)

Identifies Key Categories and informs priorities for National GHG Inventory preparation and improvement

- **Focus resources on Key Categories**
- Inform methodological choice, e.g. choose more advanced methods (Tier 2, 3)
  - Obtaining better Activity Data, developing country-specific EFs
- Focus QA/QC, strengthen Institutional Arrangements, etc.

Approaches for Conducting a Key Category Analysis



IPCC defines a Key Category as:

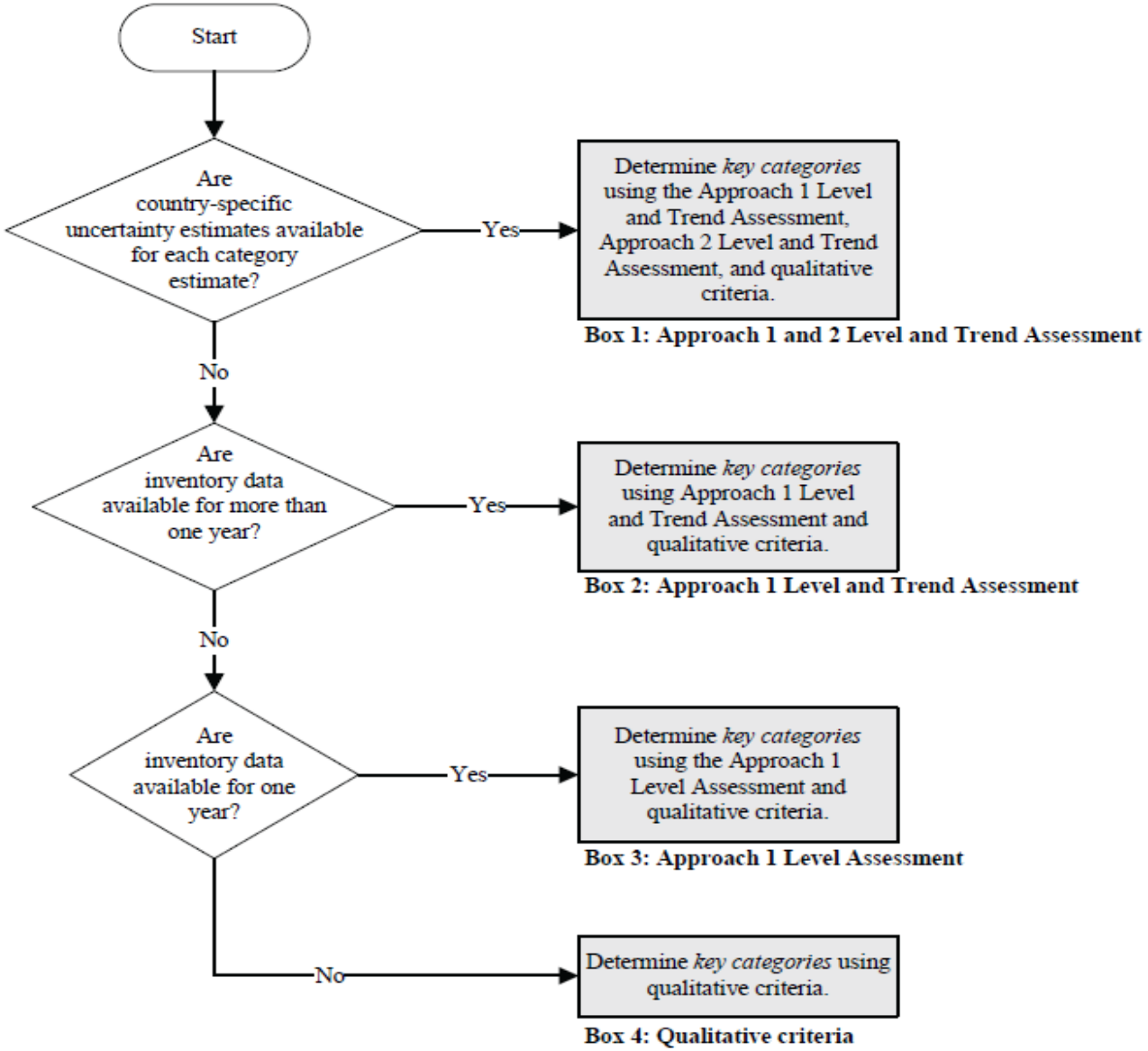
"a category that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals. Whenever the term Key Category is used, it includes both source ("emission") and sink ("removal") categories."

✓ **Quantitative Approaches**

✓ **Qualitative Criteria**

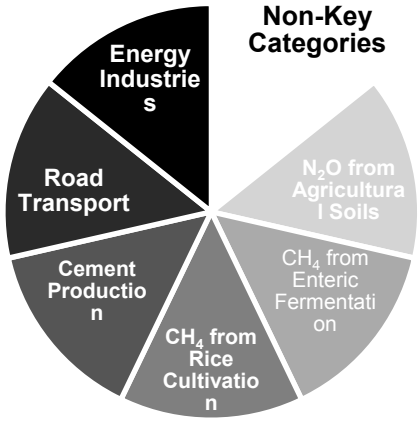
Identifying Appropriate Approach for Key Category Analysis

Figure 4.2 Decision Tree to identify key categories



I. Level Assessment

- ✓ **Identify** categories that contribute at least 95% of national emissions in the current GHG inventory



- ✓ **Tier 1** – sources/sinks are sorted and ranked according to their contribution to total emissions.
- ✓ **Tier 2** – same as Tier 1; but accounts for uncertainty.

Understanding the Mechanics of the Key Category Analysis

Step 1) List all Inventory categories

Emission Category-CO_2	X Tonnes
Emission Category-CO_2	Y Tonnes
Emission Category-CH_4	Z Tonnes
Removal Category-CO_2	A Tonnes
Emission Category-N_2O	B Tonnes
….Emission Category…	

Step 2) Sort in descending order by contribution to total (absolute)

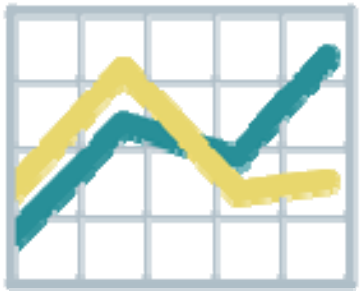
Emission Category-CO_2	**Y** Tonnes	40%
Emission Category-N_2O	**B** Tonnes	25%
Emission Category-CH_4	**Z** Tonnes	15%
Emission Category-CO_2	**X** Tonnes	15%
Removal Category-CO_2	**A** Tonnes	4%
….Emission Category…		

Step 3) Sum cumulative contribution of sources/ sinks (absolute in descending order) until you reach 95%

Emission Category-CO_2	**Y** Tonnes	40%	Key Categories
Emission Category-N_2O	**B** Tonnes	25%	
Emission Category-CH_4	**Z** Tonnes	15%	
Emission Category-CO_2	**X** Tonnes	15%	
Removal Category-CO_2	**A** Tonnes	4%	Sum 95%
…Emission Category…			

II. Trend Assessment

- ✓ **Identify** categories that have trend that is significantly different from the trend of the overall inventory, these categories may not be large enough to be identified by the level assessment.



- ✓ **Tier 1**– sources and sinks are sorted and ranked according to contribution to the inventory trend.
- ✓ **Tier 2** – same as Tier 1, but accounts for uncertainty.

Qualitative Criteria include indentifying categories where:

- Mitigation techniques and technologies applied
- Expected emission growth
- Uncertainties not yet quantified, but presumed high
- Not yet included in inventory (completeness)
- Other criteria

  a) UNFCCC CGE training materials

  b) UNDP Managing the GHG Inventory Process

Other General Consideration for Conducting Key Category Analysis

With appropriate disaggregation, the KCA can highlight important source and sink subcategories:

- Use subcategory disaggregation suggested by IPCC
  a) IPCC Good Practice Guidance, Ch. 7, Table 7.1
  b) IPCC 2006 Vol. 1, Ch. 4 Table 4.1

- Evaluate GHGs from a single category separately
  a) CO_2 from Road Transportation
  b) CH_4 from Road Transportation
  c) N_2O from Road Transportation

- Important to include sub-categories for larger emissions sources:
  a) Ag/LULUCF
     - Land converted to Cropland
     - Land Converted to Grassland
     - Etc.
  b) Fossil Fuel Combustion (FFC) in the Energy Sector
     - Splitting Stationary FFC into Energy vs. Manufacturing vs. Residential
     - Disaggregate further by fuel types
     - Splitting Transport into Road Transport vs. Aviation vs. Water-borne

Preparing to Conduct Key Category Analysis: Sample Inventory

Sector	Category	Gas	Base year (1990)	Current year (2000)	Activity Data Uncertainty	Emission factor uncertainty
Energy			**Gg**	**Gg**	**%**	**%**
1A1	Energy Industries	CO2	11,458	16,000	10%	5%
1A1	Energy Industries	N2O	0	0	10%	5%
1A1	Energy Industries	CH4	0	0	10%	5%
1A2	Manufacturing Industries and Construction	CO2	6,537	8,200	10%	5%
1A2	Manufacturing Industries and Construction	N2O	1	1	10%	5%
1A2	Manufacturing Industries and Construction	CH4	1	11	10%	5%
1A3b	Road transportation	CO2	13,257	15,057	15%	10%
1A3b	Road transportation	N2O	0	0	15%	10%
1A3b	Road transportation	CH4	1	2	15%	10%
1	Residential	CO2	2,999	3,344	3%	5%
1	Residential	N2O	0	0	3%	5%
1	Residential	CH4	70	73	3%	5%
Industrial Processes and Product Use						
2A1	Cement Production	CO2	4,500	4,699	15%	15%
2B5	Carbide Production	CH4	1	1	15%	15%
2C1	Iron and Steel Production	CO2	4,973	4,831	10%	5%
2C4	Magnesium Production	CO2	1,355	1,500	7%	5%
2	Aluminum	CO2	924	1,025	12%	10%
2	Aluminum	**CF4**	-	1	12%	10%
2	Aluminum	**C2F6**	-	0	12%	10%
Agriculture, Forestry and Other Land Use						
3A1	Enteric Fermentation	CH4	371	368	50%	50%
3A2	Manure Management	CH4	155	164	50%	120%
3A2	Manure Management	N2O	6	11	50%	120%
3B1a	Forest Land Remaining Forest Land (Emissions)	CO2	57,549	65,450	20%	25%
3B1a	Forest Land Remaining Forest Land (Removals)	CO2	-85,361	-69,323	20%	25%
3B3b	Forest Land Converted to Grassland (Emissions)	CO2	37,373	40,655	20%	25%
Waste						
4A	Solid Waste Disposal	CH4	155	232	15%	15%
4b	Biological Treatment of Solid Waste	N2O	4	4	10%	10%
4D	Wastewater Treatment and Discharge: Domestic	CH4	65	40	27%	35%

Filling in the Key Categories Table

Template 5: Key Category Analysis

Table 5.1: Key Categories Based on Contribution to Total National Emissions in XXXX (e.g., 1994)*

IPCC Category Code	IPCC Category	Gas	Current Year Emissions (Gg CO_2 Eq.)	Contribution to National Emissions	Cumulative Percent of National Emissions

*Represents results from the "Tier 1 Current Year Level" tab.

5.4. Tier 1 Base Year Level and Trend Analyses

- *STEP 3 should be completed by those countries that have GHG inventories for more than one year (most countries now have two or more inventories). If a GHG inventory is only available for a single year, countries should proceed to the next step and skip this section. Complete Table 5.2 using the results from the "Tier 1 Base Year Level" tab in the key category software provided in the U.S. EPA software. Enter the first inventory category identified as a key category (highlighted in green in the table on this tab in the software) and include its greenhouse gas type, emission estimate, and "Level assessment" (or contribution to national emissions), and cumulative percentage. Continue to add the next inventory category until all categories that are highlighted in green (identified as key) are entered. The cumulative total of the level assessment amounts for these categories should account for at least 95% of national emissions.*
- *Insert as many rows within the table below as necessary to provide the detailed information for each category.*

When inventory categories are sorted in order of decreasing GHG magnitude, those that fall at the top of the list and cumulatively account for 95% of emissions are considered key categories. They are those inventory categories that contribute the most to overall national total emissions.

Table 5.2 presents the base year level results of the IPCC Tier 1 key category level analysis for the base year XXXX (e.g., 1990). There are a total of X key categories based on the Tier 1 level assessment.

How this Template Will Help!

The 2006 inventory software and template:

- Identify all key categories of GHG emissions
- Rank emissions sources
- Describe and document how you completed the key category analysis (KCA)

Help the inventory team:

- Conduct a KCA
- Perform an optional uncertainty analysis
- Identify the most important GHG categories
- Communicate key categories to the UN
- Identify areas for improving estimates

Thank you !

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