Data collection for Climate Change Mitigation Potential Analysis and Scenario Development in Uganda’s Transport Sector
How to identify data needs for MRV

GHG Emission Model (Bottom-Up Method)

**Basic GHG Emissions Equation**

Activity \( \times \) Emissions factor \( = \) GHG Emissions

**Mode Specific**

Activity:
The cumulative sum of distances traveled by passengers or freight

**Emission factor:** Rate at which an activity produces GHG (or any other pollutant releases) to the atmosphere

**Vehicle kilometres travelled**

- **Low accuracy**

**Persons/tonnes per vehicle**

- **Medium accuracy**

**Litres of fuel/100km**

- **Medium accuracy**

**(Sheldon et al., 2022)**

**CO2 per fuel consumed**

- **Medium accuracy**
How to identify data needs for MRV

GHG Emission model (Top-Down method)

Basic GHG Emissions Equation

\[
\text{Activity} \times \frac{\text{Total energy}}{\text{Total fuel consumption}} \times \frac{\text{CO}_2 \text{ per fuel consumed}}{\text{Emissions factor}} = \text{GHG Emissions}
\]

(Sheldon et al., 2022)
How to identify data needs for MRV

Mitigation Potential Analysis - Data

How is the sector developing/changing?
✓ Vehicle ownership/usage growth rates
✓ Expected changes in the vehicle fleet characteristics
✓ Expected developments in the different transportation sub-sectors
✓ Policies in transport, energy, environment?

What is the accounting period?
✓ e.g., In Uganda: historic (2003 – 2019), baseline (2019), future (2020-2050)

ASIF Framework (Schipper et al 2000)

<table>
<thead>
<tr>
<th>Measure category</th>
<th>Measure description</th>
<th>Effect of measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Avoid</td>
<td>Avoiding journeys where possible</td>
<td>Reduction in total vehicle kilometres travelled (VKM)</td>
</tr>
<tr>
<td>S – Shift</td>
<td>Modal shift to lower-carbon transport systems</td>
<td>Shift of VKM from higher to lower emission modes</td>
</tr>
<tr>
<td>I – Improve</td>
<td>Improving the energy intensity of travel</td>
<td>Increase in fuel economy (distance travelled per litre of fuel)</td>
</tr>
<tr>
<td>F – Fuel</td>
<td>Reducing carbon intensity of fuel consumed</td>
<td>Reducing carbon intensity of fuels, so lowering emissions per litre of fuel consumed</td>
</tr>
</tbody>
</table>
## Data Challenges

<table>
<thead>
<tr>
<th>CHALLENGE</th>
<th>‘WORKAROUND’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel economy, emission factors, carbon content data was not readily available</td>
<td>Secondary data</td>
</tr>
<tr>
<td></td>
<td>• Mutenyo et al. (2015) Baseline survey on Uganda’s National Average Automotive Fuel Economy</td>
</tr>
<tr>
<td></td>
<td>• IPCC default CO₂ emission factors for the various fuel types (Source: IPCC, 2006)</td>
</tr>
<tr>
<td>Vehicle Kilometers Travelled (Road sector), Missing</td>
<td>Estimation based [Mode Share (MCC) X Total Travel Demand Estimate (VKM)] on Secondary data/ previous studies/reports</td>
</tr>
<tr>
<td></td>
<td>• Expressway Development Master Plan Travel Demand Modelling Report (UNRA,2020)</td>
</tr>
<tr>
<td></td>
<td>• National Integrated Transport Master Plan (MoWT , 2021)</td>
</tr>
<tr>
<td>Data aggregated at a much higher level</td>
<td>Not used/eliminated</td>
</tr>
<tr>
<td>Decentralisation of data</td>
<td>Joint stakeholder consultation meetings</td>
</tr>
<tr>
<td>Bureaucracy in government processes</td>
<td>Liaison/coordinating government body :</td>
</tr>
<tr>
<td></td>
<td>• Climate Change Department (CCD) in the Ministry of Water and Environment &amp;</td>
</tr>
<tr>
<td></td>
<td>• Environment Liaison Office, Ministry of Works and Transport</td>
</tr>
</tbody>
</table>
Transportation MRV Data Management

RECOMMENDATIONS

✓ Mandatory periodic vehicle inspection

✓ Create a function for MRV in Transportation ministries with full mandate to collect this data + policy demanding transport operators / fuel import companies to remit relevant data (ref. EPDs) + training

✓ Traditional infrastructure-based data sources along major transport networks e.g., pneumatic loops, traffic surveillance

✓ Multi-sectoral transportation database (Open Source – within limit)

✓ Legislation supporting innovative ways for the continuous data collection on both passenger and freight vehicles
  ▪ Mandatory capturing of vehicle mileage data whenever paying for annual third-party insurance
  ▪ Vehicles individual identifiers that are captured/registered at every gas re-fill
Thankyou