Data collection for agricultural soils
Challenges in developing countries

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Presentation content

• Importance of agriculture soil emissions
• Current data sources and data collection processes
• Data collection challenges
• Way forward
Contribution to non-CO$_2$ emissions

Contribution of crops and livestock activities to total global non-CO$_2$ emissions from agriculture in 2018 (5.3 Gt CO$_2$eq)

Source: FAOSTAT 2020.
Importance of agricultural soils data

Changes in non-CO$_2$ emissions from crops and livestock activities between 2000–2018 show a >35% increase from synthetic fertilizers and crop residue incorporation.
Synthetic fertilizers

- Activity data: Amount of fertilizer applied
- Common data sources:
  - FAO
  - Survey data (SD)
  - Customs data (CD)
- Data collection process:
  - Agriculture extension offices
  - Customs departments
  - No formal arrangements
- Alternate data sources and methods:
  - Umbrella organisations
  - Example: Fertilizer Association of South Africa
  - Modelling and forecasting

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Organic fertilizers

• Activity data: Amount of fertilizer applied
• Usually only animal manure inputs are included here due to lack of data on other organic inputs
• Amount of manure applied is based on data from livestock section
• Challenge is the collection of manure management data.
Urine and dung inputs

- Activity data: Amount of urine and dung deposited in fields
- As with organic fertilizers this is based on data from livestock section
- Improved livestock data can lead to improved agriculture soil emission estimates
Crop residues

- Activity data: Amount of crop residues applied
- Data is either not included (NI) or is estimated from crop area/harvest/yield data from:
  - FAO
  - Country specific data (CS) – agricultural statistics, remote sensing
- Challenge is crop residue management data which is either obtained from:
  - Expert opinion (EO)
  - Surveys/Research studies

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Mineral and drained organic soils

• Activity data: Soil carbon loss due to land use change and extent of organic soils
• Many developing countries do not include these emissions due to lack of data
• Relies on data from the LULUCF component of the inventory
• Data challenges are:
  o Land management data
  o Land use change data
• Improved land use change data through Collect Earth
Agricultural soils data collection challenges

• Subsistence farmers don’t keep records
• Extension officers/data providers are not aware of the data requirements
• No formalised data collection processes
• Infrequent agriculture census
• Time-series data gaps
• Lack of land use change and management data
• Lack of capacity and resources
Agricultural soils data collection: Moving forward

- Awareness and capacity building for agriculture extension officers and data providers on data requirements
- Build relationships with data providers - highlight benefits and consider incentives
- Incorporate inventory relevant data into surveys and census – consider existing systems
- Setup formalised data collection systems - consider regulations
- Partner with research organisations to undertake project based studies
- Make use of data from umbrella organisations
- Make use of technology (software or Apps)
- Capacity building
Take-away messages

• Build awareness around data requirements

• Need good quality, annual activity data, particularly for:
  o Synthetic fertilizers
  o Crop residues

• Improve ways to collect management data

• Get creative and make use of technology