Workshop on
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Theme 15:
Environment/greenhouse gas (GHG) emissions

Technical session 15

Oleg Cara
Agricultural Census and Survey Team
FAO Statistics Division
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Background

Under the UN Framework Convention on Climate Change (UNFCCC), countries should produce and regularly report their GHG emissions from all sectors, including agriculture to monitor the achievement of their targets.

In response to the growing demand for basic agro-environmental data on GHG and ammonia emissions, the WCA 2020 introduced this new theme with items covering relevant crop and livestock production subsectors.

The theme gives possibility for countries to establish the baseline for reports and provide a frame for periodic sample surveys. Some of the items are already covered in other themes of the WCA 2020.
Sources of GHG emissions in agriculture

<table>
<thead>
<tr>
<th>• Enteric Fermentation</th>
<th>• Crop Residues</th>
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<tbody>
<tr>
<td>• Manure Management</td>
<td>• Cultivation of Organic Soils</td>
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<td>• Rice Cultivation</td>
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<td>• Manure applied to Soils</td>
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<td>• Manure left on Pasture</td>
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GHG items on livestock production subsector

Relevant existing items (explained in Theme 5):

- Item 0501: Type of livestock system
- Item 0504: Number of animals: age and sex (for each livestock type)
- Item 0505: Number of animals according to purpose (for each livestock type).

New items (Theme 15):

- 1501 Type of animal grazing practices
- 1502 Manure application
- 1503 Manure management system
- 1504 Final use of the treated manure.
Item 1501: Type of animal grazing practices

**Type:** Additional item

**Reference period:** Census reference year

**Concept:** Animal grazing has a significant impact on the quality of pastures. Combining the information from the livestock theme with types grazing improves estimation of the status of pastures – non-degraded, moderately degraded or severely degraded. Importantly, this item allows for more accurate estimation of the area in which manure is left on pasture.
Item 1501: Type of animal grazing practices (contd.)

Types of animal grazing:

*Grazing on the holding:*
- Area grazed during the year
- Number of animals
- Fraction of the year with animals on pasture

*Common pasture grazing:*
- Number of animals
- Fraction of the year with animals on pasture (e.g. <3; 3-6; 6-9; 9> months).
Item 1502: Manure application

Type: Additional item

Reference period: Census reference year

Note: This item is relevant for the calculation of agro-environmental indicators and particularly for GHG and ammonia emissions. Not applicable to holdings with a nomadic livestock system.

Categories for manure application:

• Percentage of holding’s pastures on which the manure is left on pasture
• Fraction of manure left on pasture that is removed for use as fuel (0; 50% or less; more than 50%; all manure removed)
• Agricultural area on which solid/farmyard manure is applied (spread)
• Agricultural area on which slurry is applied (spread)
• Manure directly daily spread on the field.
Item 1503: Manure management system

Type: Additional item

Reference period: Census reference year

Note: This item is relevant for the calculation of agro-environmental indicators and particularly for GHG and ammonia emissions. Not applicable to holdings with a nomadic livestock system.
**Item 1503: Manure management system (contd.)**

**Categories:**

<table>
<thead>
<tr>
<th>Availability of storage facilities for:</th>
<th>Type of storage facilities used:</th>
<th>Covered or open storage facilities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid/farmyard manure</td>
<td><em>For all manure:</em></td>
<td>Solid/farmyard manure</td>
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<td>Liquid manure</td>
<td>• Digestors (biogas reactors)</td>
<td>Liquid manure</td>
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<tr>
<td>Slurry</td>
<td><em>For slurry:</em></td>
<td>Slurry</td>
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<td></td>
<td>• Slurry tank</td>
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<td></td>
<td>• Anaerobic lagoon</td>
<td></td>
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<td></td>
<td>• Aerobic treatment</td>
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</tr>
</tbody>
</table>
Item 1504: Final use of the treated manure

Type: Additional item

Reference period: Census reference year

Concept: This item refers to percentage use of manure exiting the manure management system, and applicable to all holdings with a non-nomadic type of livestock system.

Categories:

• Applied as fertilizers
• Used for fuel (manure used for production of energy, it does not include manure left on pasture, collected and dried for dung cakes already reported in item 1502)
• Used for construction (used as component of construction materials)
• Used as feed
• Other uses (e.g. manure delivered to others for fertilizer).
GHG items on crop production subsector

Relevant existing items (explained in Themes 4 and 6):

• Item 0411: Use of each type of fertilizer
• Item 0412: Area fertilized for each type of fertilizer and major crop type
• Item 0610: Type of tillage practices.

New items (Theme 15):

• Submodule on rice cultivation (Rice cultivation accounts for 10% of global GHG emissions in agriculture, but is significantly higher in rice-producing countries).
  ➢ 1505 Length of the growing period for rice cultivation
  ➢ 1506 Rice cultivation – irrigation and water regimes
  ➢ 1507 Organic amendments to soils used for rice cultivation
• 1508 Crop residues
• 1509 Permanent crops – age of plantations.
Item 1505: Length of the growing period of the rice cultivation

**Type:** Additional item

**Reference period:** Census reference year

**Concept:** Length of the growing period means number of months between crop planting and harvest.
Item 1506: Rice cultivation – irrigation and water regimes

**Type:** Additional item

**Reference period:** Census reference year

**Concept:** This item complements the information collected in Theme 3: Irrigation, specifically for rice irrigation and water regimes.

**Water regimes before** the growing period:

- *Flooded pre-season:* the land has been flooded for 30 consecutive days or more just prior to planting;
- *Non-flooded pre-season:* the land has been flooded for less than 30 consecutive days or has not been flooded prior to planting.

**Water regimes during** the growing period:

- *Irrigated – continuously flooded:* field with standing water throughout the rice growing period;
- *Irrigated – intermittently flooded:* field that has at least one aeration period of more than three days during the growing period;
- *Rice cultivation in rainfed and deep-water area:* rice grown of flooded surface, in areas depending entirely on rain for water supply.
Item 1507: Organic amendments of soils used for rice cultivation

Type: Additional item

Reference period: Census reference year

Concept: Additionally to information on fertilizers (Theme 4 “Crops”), the following breakdown of organic fertilizers gives important information on rice cultivation practices:

- Straw incorporated shortly before cultivation (30 days or less)
- Straw incorporated long before cultivation (more than 30 days)
- Compost
- Farmyard manure
- Green manure
Item 1508: Crop residues

Type: Additional item

Reference period: Census reference year

Concept: Management and use of crop residues may affect the environment. This item is applicable to all holdings.

Handling of crop residues includes the following:

- **Crop/pasture area burnt on the holding**: refers to the area of crop/pasture where crop residues/grass are burned during the reference year.

- **Crop residues removed from field**: describes the fraction of crop residues (such as straw, stubble or other plant parts) which is not left on the field.

- **Pastures on the holding renewed during the crop year**: refers to the area of pasture that is ploughed and seeded to produce a new grass cover.
Item 1509: Permanent crops – age of plantations

**Type:** Additional item

**Reference period:** Day of enumeration

**Note:** In addition to information on permanent crops (Theme 4 “Crops”), for improving estimates of GHG emissions by sources or removals by sink, the following information from holdings with commercial orchards is needed:

- **Age of plantations** (productive and non-productive)
- **Age at which the permanent crops are renewed.**
Country experiences

Australia: Agricultural Census 2010-11

Different parts of the census questionnaire included a range of items relevant for Theme 15*:

Part 2: Land use:

Q.7(c): Area of holding’s land mainly used for grazing (including land spelled between stock rotations):

• grazing on improved pastures
• grazing on other land (including natural pastures/grasslands, rangelands, woodland/shrubland, forested areas and swamps/wetland)

Part 10: Fruit trees, nut trees, plantation or berry fruit

Q.30: Number of trees:

• under 6 years
• 6 years and above

* Note: The reference period for flow items was the period between 1 July 2010 and 30 June 2011
Country experiences (contd.)

Australia: Agricultural Census 2010-11 (contd.)
Parts 11 and 12: Land preparation and management for crops and pastures

Q.35: Area of land prepared and maintained for crops/pastures using:
- no cultivation
- one or two cultivations only
- three or more cultivations.

Q 36: During the driest months between 1 July 2010 and 30 June 2011, did the holding have “a ground cover management target for cropping land”*?

*Note: “Ground cover management target is the desired percentage of the soil surface covered by living or dead vegetation and aims to control soil erosion on the holding.”
Q. 38: What crop residue (stubble or trash) management practices were used on crops between 1 July 2010 and 30 June 2011?

- Stubble was left intact (no cultivation, crops direct drilled)
- Most stubble or trash removed by baling or heavy grazing
- Stubble or trash removed by a hot burn (early season, summer)
- Stubble or trash removed by a cool burn (late season, autumn)
- Stubble or trash was ploughed into the soil
- Stubble or trash was mulched (i.e. spread on surface)

Part 13 : Livestock

- Number of animals by each type: age and sex
- Number of animals according to purpose

Q.45: Did the holding operate a cattle feedlot (intensive farming of beef cattle for fattening/production)?
Country experiences (contd.)

Italy: General agricultural census (GAC) 2010

New queries useful for environment/climate change issues were included in the GAC 2010 questionnaire aimed in particular at improving the preparation of the national GHG inventory:

Q39: Type of animal grazing practices (with the specification of: i) total number of grazing animals; ii) utilized area and iii) number of months):

- Grazing on the holding
- Grazing on other holdings land
- Common land grazing

Q.41: Storage method by type of animal manure generated in the holding (three types of manure were specified: i) dung manure; ii) urine and iii) slurry):

- Pit (covered; uncovered)
- Tank (covered; uncovered)
- Lagoon covered; uncovered).
Country experiences (contd.)

Italy: General agricultural census 2010 (contd.)

Q.42: Manure application:

A. Utilised agricultural area treated with manure:

1. Application of dung manure
   - of which with immediate incorporation (within 4 hours)

2. Application of urine and slurry (*fertigation* included), of which:
   2.1 Application and immediate incorporation of urine and slurry (within 4 hours) or injection
   2.2 Incorporation of manure and slurry within 24 hours
   2.3 Incorporation of manure or slurry in strips, or by injection, or fertigation.

Note: *Fertigation is the application of fertilizer with irrigation water*
Q.42:B. The percentage of animal manure taken outside the holding in relation to the total produced by the holding (sold or removed for direct use as fertiliser or for treatment processes):

1. Percentage of solid dung taken off the holding in relation to the total dung produced
2. Percentage of slurry taken off the holding in relation to the manure produced.
MANY THANKS