Q&A from GRA I&NDC Network Webinar #2: National Agriculture Inventory Data Collection and Management

Chair: Marta Alfaro (INIA), Speakers: Stephen Ogle (CSU), Andreas Wilkes (NZAGRC), Sekai Ngarize (Senior AFOLU and MRV Specialist). Luanne Stephens (Environmental Consultant)

I am a soil scientist focusing on GHG emissions from soil under different land uses: cropping, animal paddock, plantation, and grass cover, can you help me itemize basic Activity data that are key to each land use?

- There are more data needed to estimate soil GHG emissions than other sources, such as fertilization rates, tillage practices, manure amendment rates, crop production statistics, cover crop practices, irrigation management, residue management, among other practices. I would suggest stepping through the ALU software that my team developed at Colorado State University. You can just enter test data, and the software will give you an idea of the activity data needed for estimating GHG emissions from cropland, grassland/grazing system soils, as well as plantations.

Some agriculture inventory data have very little information to inform estimation decisions, i.e. NPK has variable ratios, therefore at the national scale we cannot estimate. Please comment.

- In this case, you may have to make some assumptions about the most common types and simplify the data analysis. You should be transparent about any assumptions that you are making in the inventory process. Alternatively, do you have information about the sales and/or production of different types? Sales data could be used to weight the various ratios and obtain an accurate estimate of the N input.

Some years ago, the Swiss sent out a questionnaire about manure management. They had a good response because they ran a lottery with the responses, with a holiday in Paris as the prize. Since smart phones seem quite ubiquitous in some developing countries, could one ask farmers to take pictures of their manure management systems, then follow the lead of the Swiss and run a lottery if the pictures are sent to the statistical office.

- This approach could be advantageous for obtaining the data if non-responses are high from standard surveys. One of the key issues will be to evaluate if the participants are representative of the larger population of livestock owners and will require additional information about the respondents as part of the data collection (e.g., type of livestock, size of herd, location of farm, type of grazing, etc.). Some analysis would be needed to evaluate representativeness based on responses relative to other information from past studies or surveys about livestock grazing systems in the country.

Please provide information about improving land use to reduce GHG emission and what type of data required on land use to measure GHG emissions from soil management

- Improving land use to reduce GHG emissions is dependent on current management. Well managed lands are likely to have fewer practice options than poorly managed lands, for example, but regardless, the options for improving management will depend

on current practices. Measuring GHG emissions requires instrumentation such as eddy covariance towers, chambers, and other approaches. It is important to collect management data when measuring emissions so that you can related the emissions data to specific types of anthropogenic activity.

Thanks for the new information regarding GHG inventories from land use, how may we source the IPCC Software for our work?

- The IPCC software is freely available from the GHG Inventory Technical Support Unit website, https://www.ipcc-nggip.iges.or.jp/software/index.html.

In developing countries, institutional arrangements are a challenge with no clear definition of functions. Data collection and management is linked to institutional arrangement, what are the possibilities to reduce data duplication with institutional arrangements?

- Under the Capacity Building Initiative for the implementation of the EFT, there is funding to support developing countries to set up national systems/institutional and legal framework, I can share contacts for UNEP technical assistance. Contact for CBIT UNEP: julien.lheureux@un.org.

Do you think that expert knowledge can fill the data gaps in LMICs? Such as Sub-Sharan Africa.

- "Frances, Yes -expert knowledge can be used to fill the activity data gaps in Sub-Saharan Africa and other regions. However, is it important to integrate this data collection into a census or survey in the future particularly if the source is a key category. Stephen Ogle"

Can you send us the example of web-based platforms for data collection and storage (links)?

- It is difficult to send a link to an example as many countries develop their web-based systems, but these are then accessed with a password due to the confidentiality of the data. Usually only the country inventory compilation team and reviewers are given access to the systems. South Africa did write a paper a while back on their system (https://www.researchgate.net/publication/322294571_A_National_Greenhouse_Gas_Inventory_Management_System_for_South_Africa) but it just explains the system as opposed to showing the system.

Please provide any example of any country that has adopted the web-based inventory already preferably in Africa.

- Most countries estimate emissions using excel based tools or IPCC inventory software but then develop a web-based platform to manage all GHG data
- South Africa has a web-based management system
- Again, the CBIT platform is supporting developing countries to set up national systems to report under the ETF and part of the technical assistance is supporting such initiatives

Andreas, on one of your early slides you referred to LMIC livestock emissions as generating 66% of all livestock emissions worldwide. I missed the source of this figure. Would you be able to provide an indication on this?

- Response to Q&A question from Frances Ryan: 66% referred to Livestock accounts for 66% of total agriculture emissions in developing countries. Data from FAOSTAT.

Andreas, when developing a tier 2 inventory for livestock, how do we decide what number of homogeneous sub-groups of animals is enough? We can always keep disaggregating in even more homogeneous groups.

- Great question: The L-ADG guidance (https://globalresearchalliance.org/wp-content/uploads/2020/03/Final_Livestock-activity-data-guidebook_3-25-20_online.pdf) sets out a process to decide this. In my experience, it depends on (a) what sub-category population data is available, (b) how big the differences between EFs of different sub-categories will be and (c) how to ensure that the number of categories is practical for inventory compilers to manage on an annual basis.

Some data like open burning and incorporation rice straw into soil are highly variable and difficult to estimate and collect data for. This type of data keeps changing within the year depending on people, weather (seasonal and dry / wet conditions). How may we derive the best estimate, all things considered?

- There are remote sensing based fire products that may be used to inform burning of residues. We have used this type of data in the inventory for the US to determine the area of crop residue burning. Returning rice straw to the field is more difficult to determine, and it is likely that surveys with farmers will yield the best information on this practice. Surveys could also be used to collect data on burning and potentially compare the results to remote sensing-based estimates.

Is the data collection issue mostly an issue of data sharing? Most of the necessary data may be available but the problem may be non-technical?

- Response: In some cases, you are correct that the data are collected but not made available. Ministries may collect data that is not freely available to other groups in the government that compile the inventory. In these cases, institutional arrangements are critical to establish data sharing agreements, and these should be set up early in the GHG inventory process.
- It is also a case of making various institutions aware of what data is needed for the inventory for them to make it available.

In the absence of suitable methodological guidance by IPCC on definition of parameters for example for dairy cattle in the local context in Africa, what are the best practice options to adopt?

- There are no 'best practices' yet – best practice is still to be innovated. Some countries have been defining dairy cattle as cattle of specialized dairy breed (mostly exotic or hybrids), and 'dairy cattle' includes cows, heifers, calves etc. Other countries are defining dairy cows as cows in commercial dairy farms, and other age/sex classes are classified as 'other cattle'. It depends on what the production systems are, what data is available, and what factors will make a difference to the estimated EFs.