GHG Platform INDIA

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Briefing Paper

Road Map to Tier III

Livestock Sub-sector

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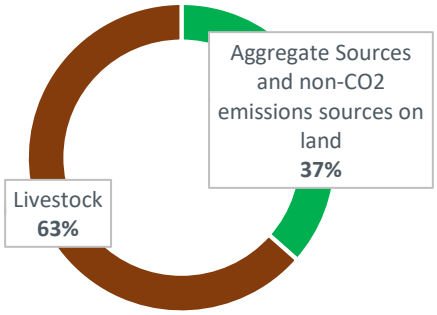
Importance of Livestock Sub-sector in GHG emissions:

The agricultural sector is the backbone of the Indian economy. It employs approximately 44% of the total workforce (World Bank 2019). Livestock sub-sector forms a crucial component of the Agriculture sector and it was estimated that livestock contributed to about 25.76% of Indian agriculture gross domestic product (GDP) in 2017-18 (Central Statistics Office 2019). The impact of livestock on the environment in India is significant and it is estimated that almost 63%[1] of Indian agricultural greenhouse gas (GHG) emissions in 2015 were due to livestock, dominated by CH_4 emissions from enteric fermentation.

Figure 1. Sub-sector wise GHG emissions from AFOLU (without land) in 2015



Whilst an accurate picture of GHG emissions from livestock is required for inventory processes, there is also a pressing need to ensure that estimates of livestock GHG emissions are as accurate as possible both for national inventory reporting as well as of measuring, reporting and verification (MRV) of nationally determined contributions (NDC) on mitigation of GHG emissions from the livestock sector that may be a part of India's future commitments at the UNFCCC (Bodansky, et al. 2016) (Goopy, et al. 2018).

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[1] Provisional results based on the GHG Platform India results. Source:

The Intergovernmental Panel on Climate Change (IPCC) has developed three different approaches for estimating methane (CH_4) and nitrous oxide (N_2O) emissions from livestock sub-sector (Spurlock, et al. 2012). Monitoring systems for determining and monitoring changes in GHG emissions are undergoing a process of evolution in India. A mix of Tier II/III approaches are used for estimating emissions from the bovines (cattle & buffaloes) at present, while for the remaining categories, such as sheep, goat, donkeys, camel etc, default IPCC 2006 emission factors are used (Tier I approach). However, there is a need for more accurate and robust information on livestock GHG emissions and productivity, captured through an advanced inventory system.

Therefore, the objective of this paper is to analyse the additional data required for moving towards the Tier III approach and to further enhance the Tier III process (applicable in case of Bovines) in India for a more robust inventorization process. This is because the bulk of emissions from the livestock sector emanate from bovines (see figure 1 below). Tier III approach is necessary as it also reflects changes in emissions that result from improvements in the productivity and efficiency of those systems over time (CCAFS n.d.).

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Setting up Tier III Inventory:

As per IPCC 2006 Guidelines on Livestock, specific data on animal's typical diet and performance is required. This is essential for estimating animal's feed intake and gross energy intake. As of now, there is a single study available in India that analyses the above feed intake, animal body weight and gross energy intake for various categories of bovines. The study was done by (Swamy and Bhattacharya 2006) and it dates back to the year 2006 and does not account the diversity of cattle sizes and fodder in India. For example, the body weight of a North Eastern cattle is much less than that of a Northern region cattle. Similarly, due to topography differences, diet offered to an animal is much different in different regions of India. Such factors are not accounted for in any studies which further leads to discrepancy of results. Using a single emission factor across the country does not account the diversity of livestock and thus, might under/overestimate emissions.

Figure 2. Percentage Contribution of Livestock categories

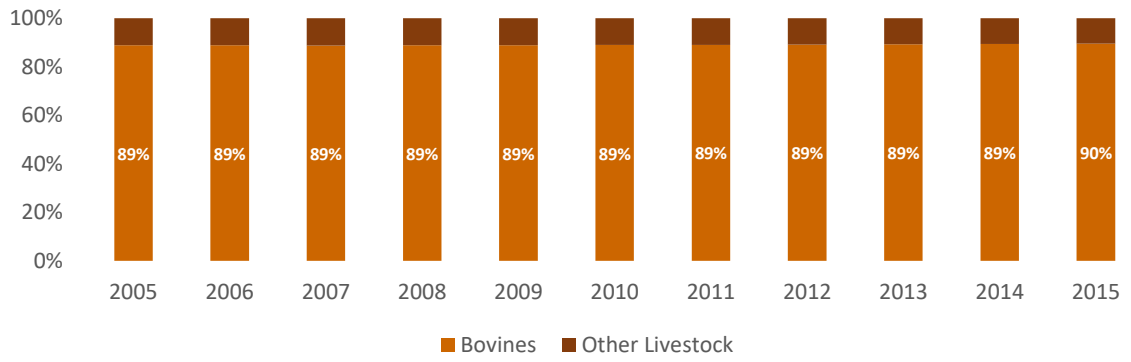
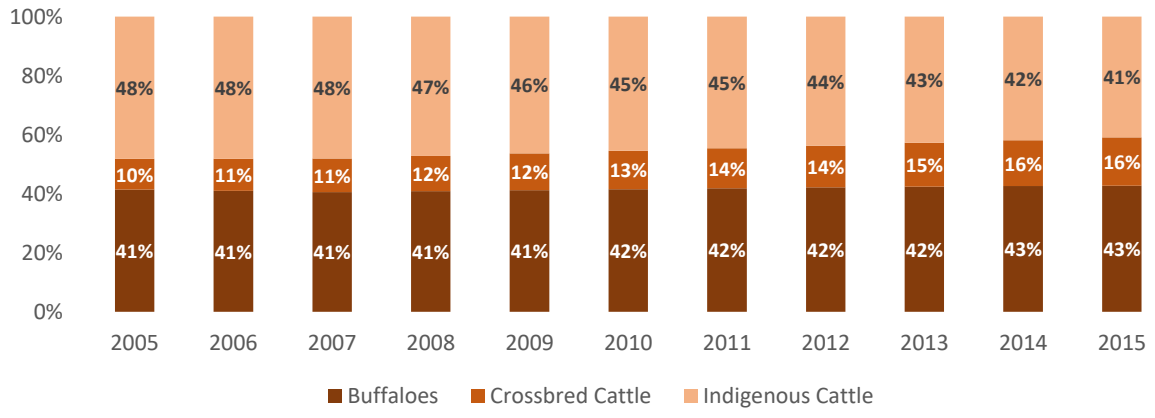


Figure 1 describes that almost 90% of emissions from the Livestock sector are due to bovines. Now using a single emission factor for various type of bovines each does not give a clear picture of the entire emissions scenario. Out these 90% emissions from bovines, on an average 45% emissions are due to indigenous cattle, 42% due to buffaloes and the remaining 13% due to crossbred cattle from 2005 to 2015 (see figure 2 below). Therefore, knowing the emission factor as per the diversity of livestock and topography is important for better and a robust inventory process.

Figure 3. GHG emissions profile of bovines in India (2005 to 2015)



Further, improved data on livestock population is required. The livestock census in India is prepared every five years. However, there is no new census on livestock post 2012. As the livestock population is another important factor in estimating emissions, it is necessary that the animal population is reported every year or biannually. Projections regarding the animal population are made for the intermediate years and the future years in this case (after 2012 the population has been projected using the CAGR for years 2007 to 2012. Therefore, there is an urgent need for improving the characterization of livestock population and production system and reporting.

Conclusions and Recommendations

Tracking changes in livestock performance is an important indicator to account for a higher Tier inventory. This is important to account as livestock performance is dependent on the care, dietary habits and feed intake of the animal. Tracking these indicators would mean that we could assign the emission factors more accurately based on the animal performance which would further help us report the emissions in a robust way. Further, better tracking of the performance would also help in bringing policy changes that can effectively enhance the livestock scenario in India by giving us improved data on feed intake and digestibility.

Similarly, there are tweaks required in data gathering for monitoring of policies and schemes. Currently, the concerned departments of the government do not monitor and report the data related to livestock/animal husbandry practises. Therefore, the impacts of the policies remain uncertain. To carry out an effective impact evaluation of the policy, it is important that the data is collected year on year for climate mitigation related aspects. This will not only make it easy to move towards a higher tier GHG inventory estimation process but also inform policymakers on prioritization of issues dealing with livestock management in the country.

Finally, as mentioned in the earlier sections, the immediate data barriers for moving towards a Tier III approach lie in the lack of region-specific data in the country. There is an urgent need to improve the emission factors based on the diversity of livestock and topography. Similarly, more information is required on animal manure management. Currently, we use IPCC default emission factors for nitrous oxide emissions. We can move towards a Tier III approach for doing so if we have nitrogen excretion rates available for different types of animals along with state wise animal weights and energy intake information.

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