

Inventory reporting of livestock emissions: the impact of the IPCC 1996 and 2006 Guidelines

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Abstract

Livestock sector is a major contributor to greenhouse gas (GHG) and nitrogen (N) emissions and efforts are being made to reduce these emissions. National emission inventories are the main tool for reporting emissions. They have to be consistent, comparable, complete, accurate and transparent. The quality of emission inventories is affected by the reporting methodology, emission factors and knowledge of individual sources. In this paper, we investigate the effects of moving from the 1996 IPCC Guidelines for National Greenhouse Gas Inventories to the 2006 IPCC Guidelines on the emission estimates from the livestock sector. With Austria as a case study, we estimate the emissions according to the two guidelines, revealing marked changes in emission estimates from different source categories resulting from changes in the applied methodology. We further investigate the implications of these methodology changes for the potential implementation of mitigation measures. We also include an outlook on the 2019 IPCC Refinement and its possible effects on livestock emissions estimates. Emission inventory reports are a potent tool to show the effect of mitigation measures and the methodology prescribed in inventory guidelines will have a distinct effect on the selection of mitigation measures.

Keywords: emissions inventory, livestock, IPCC guidelines

1. Introduction

This study was designed to investigate the effects of moving from the 1996 IPCC Guidelines to the 2006 IPCC guidelines when estimating emissions from the livestock sector, and to assess the relative importance of livestock emissions within the agricultural sector. We took Austria as a case study and estimated the emissions from the livestock sector using the two IPCC guidelines, aiming i) to reveal significant changes in emission estimates from different source categories caused

by the change in the applied methodology, and ii) to investigate the implications of methodological changes on improvement of future guidelines and on implementation of mitigation measures. Investigating the effect of such changes in the IPCC Guidelines is of utmost relevance for inventory compilers, policy makers, farmers and scientific community, as it allows a detailed insight into the effects of inventory guidelines on the apparent relative importance of different emission sources and on the capability of the national inventories to show the effects of different mitigation

measures. Building upon previous studies (Amon and Hörtenhuber, 2008), (Amon and Hörtenhuber, 2010), we focussed on the methodology *per se*, i.e. factors and approaches that have changed from 1996 to 2006 guidelines, as well as on the derived results.

3. Results

The results of this study has shown that overall GHG emissions from the livestock sector decreased when IPCC 2006 methodology was applied, except for the emissions from enteric fermentation. It has further shown the impact of the inventory methods on these estimates and especially on the apparent relative importance of the different sources. Examination of the applied methodology, emission factors and approaches confirm their importance for generating more accurate and transparent emission inventories. It becomes clear that there is a strong relationship between emission inventory methodology and mitigation options as the mitigation measures will only be effective for meeting emission reduction targets if their effectiveness can be demonstrated.

4. Conclusion

This study set out to show the effects of two IPCC methodologies on estimates of GHG emissions from the livestock sector. Austria was used as a case study for this exercise. Moving from the 1996 IPCC guidelines to the 2006 IPCC guidelines revealed prominent changes in livestock GHG emissions from different source categories. We observed an increase in emissions from enteric fermentation, while emissions from manure management and agricultural soils decreased. Examination of the applied methodology, emission factors and approaches confirm their importance for generating more accurate and transparent emission inventories. The study also identified the impact of changes in emissions from different source categories on the effectiveness of mitigation measures. It was shown that there is a strong relationship between emission inventory methodology and mitigation options as the mitigation measures will only be effective for meeting emission reduction targets if their effectiveness can be demonstrated. Therefore, it is very much in the interest of the agricultural sector to report detailed and transparent inventories. An outlook on the 2019 IPCC Refinement revealed that the challenge of future inventory improvement will include the gathering of high resolution data and accurate, country-specific emission factors. Such improvements are worth the effort for policy makers, because inventory reports are a potent tool to implement mitigation measures and for farmers, because high-quality analysis reveals the potential emissions savings and efficiency gains that are easiest to access.

References

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