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RESEARCH REVIEW

Co-benefits, trade-offs, barriers and policies for greenhouse gas mitigation in the agriculture, forestry and other land use (AFOLU) sector

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Abstract

The agriculture, forestry and other land use (AFOLU) sector is responsible for approximately 25% of anthropogenic GHG emissions mainly from deforestation and agricultural emissions from livestock, soil and nutrient management. Mitigation from the sector is thus extremely important in meeting emission reduction targets. The sector offers a variety of cost-competitive mitigation options with most analyses indicating a decline in emissions largely due to decreasing deforestation rates. Sustainability criteria are needed to guide development and implementation of AFOLU mitigation measures with particular focus on multifunctional systems that allow the delivery of multiple services from land. It is striking that almost all of the positive and negative impacts, opportunities and barriers are context specific, precluding generic statements about which AFOLU mitigation measures have the greatest promise at a global scale. This finding underlines the importance of considering each mitigation strategy on a case-by-case basis, systemic effects when implementing mitigation options on the national scale, and suggests that policies need to be flexible enough to allow such assessments. National and international agricultural and forest (climate) policies have the potential to alter the opportunity costs of specific land uses in ways that increase opportunities or barriers for attaining climate change mitigation goals. Policies governing practices in agriculture and in forest conservation and management need to account for both effective mitigation and adaptation and can help to orient practices in agriculture and in forestry towards global sharing of innovative technologies for the efficient use of land resources. Different policy instruments, especially economic incentives and regulatory approaches, are currently being applied however, for its successful implementation it is critical to understand how land-use decisions are made and how new social, political and economic forces in the future will influence this process.

Keywords: AFOLU, agriculture, climate, ecosystem service, food security, forestry, GHG, mitigation

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Introduction

The agriculture, forestry and other land use sector (AFOLU) includes mitigation activities in agriculture and livestock, as well as in forestry. Mitigation options in the sector can be seen from the supply side (see Table 1); as well as from the demand side (e.g. changes in human behaviour towards less emission-intensive products or reduced losses in the food supply chain) (Smith *et al.*, 2013b). Since the publication of the IPCC Fourth Assessment Report (AR4), there have been a few new estimates of the greenhouse gas mitigation

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