Greenhouse gas mitigation and offset options for beef cattle production under contrasting pasture management systems in Brazil

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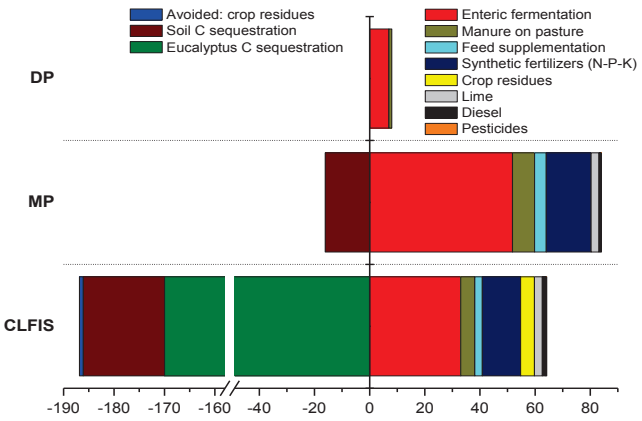
Introduction This study estimates the GHG balance (emissions and sinks) related to the beef cattle production in three contrasting production scenarios on *Brachiaria* pasture in Brazil: 1) Degraded pasture (DP), 2) Managed pasture (MP), and 3) Crop–livestock–forest integration system (CLFIS).

Material and Methods
The calculation of GHG balance was performed using the IPCC (2006) methodology combined with Brazil specific database of several scenarios of Brazilian pasture management systems, considering inputs and outputs from 1 hectare of land within the farm for each scenario over a 10-yr time span, taking into account only fattening phase of cattle.

Results and Conclusions
Figure 1 presents emissions (positive) and sinks (negative) distinguishing sources for each of the production scenarios. Carbon footprint of beef cattle estimated was 19.2 kg CO_2eq per kg LW (Live weight) in DP, followed by 14.7 kg CO_2eq per kg LW in CLFIS and 9.3 kg CO_2eq per kg LW in MP. Taking into account the technical potential for C sequestration to offset related emissions in MP (soil C) and CLFIS (soil and *Eucalyptus* C), C footprint from beef cattle could be reduced to 7.5 and -28.1 kg CO_2eq per kg LW respectively.

Fig. 1. GHG emission per source (right bars) and potential for C sink (left bars) (Mg CO_2eq ha^{-1}) accumulated over the 10-year period for each pasture management system: Degraded Pasture (DP), Managed Pasture (MP) and Crop-Livestock-Forest-Integration system (CLFIS) in Brazil.



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