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## Greenhouse Gases Dynamics in Brazilian Livestock Production Systems

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### Background

The increase in greenhouse gases (GHG) in the atmosphere and consequent global warming are of great concern to the world population. Brazil has voluntarily compromised to reduce GHG emissions by the livestock-raising sector by 2020.

The volume of animal production in Brazil has consistently increased in recent years, through better farm management and overall increase in productivity, rather than through expansion of pasture area, contributing to reduction of deforestation rates and increased sustainability of agricultural systems. Nonetheless, most pastures in Brazil present some degree of degradation and GHG emission by cattle is considered excessive, due to poor forage quality and lower than optimum animal performance.

There is a lack of scientific information about the actual contribution of Brazilian livestock industry to total GHG emission. Scientific evidences indicate intensification of pasture management and implementation of crop-livestock and crop-livestock-forest integrated systems as viable tools for reducing GHG emission by cattle raising enterprises.

### Methods

PECUS Network was conceived considering the diversity of Brazilian biomes and production systems, the complexity of components to be evaluated and the necessity of evaluations to be made for extended periods. PECUS is multi-institutional, involving interdisciplinary research teams devoted to long-term experiments distributed throughout the most important Brazilian biomes: Cerrado ("savanna"), Mata Atlântica (Atlantic forest), Amazônia (Amazon forest), Caatinga (semi-arid), Pantanal (lowlands) and Pampa (grassy plains). Coordinated research, state and privately financed, will involve several Embrapa Research Centers, universities and other national and international research institutions.

PECUS component-projects aim at evaluating carbon balance between GHG emission and carbon sequestration in cattle (on pasture and feedlots), buffalo, sheep, goat, swine and poultry production systems. Trials will be repeated in time and space. Evaluations will cover intensive and extensive cattle production, using degraded pastures as negative and natural forests as positive control. Specific projects have been delineated to store and process data, bio-physic modeling, evaluation of socio-economic impacts and geophysics. New methodologies for the estimation and nutritional strategies for reducing enteric methane emission by cattle will also be evaluated.

### Main Results

The main expected results from this project are: estimation of the contribution of different Brazilian animal production systems to GHG dynamics; determination of the mitigation potential of improved pastures and integrated systems; indication of management practices necessary to higher competitiveness and sustainability of livestock production in Brazil; provision of the scientific community, government and society with GHG data, collected using adequate tiers and avoiding extrapolation of default indexes (mostly obtained in temperate areas) to Brazilian conditions.