

A NOVEL FRAMEWORK FOR ESTIMATING THE CARBON FOOTPRINT OF BEEF ANIMALS IN A NATIONAL DATABASE BASED ON GENETIC AND PERFORMANCE DATA

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Introduction: The environmental impact of livestock production, particularly the greenhouse gas (GHG) emissions associated with beef production, has become an increasingly pressing issue. GHG emissions from beef production are mainly caused by methane and nitrous oxide, which are produced during digestion and manure management. To address this issue, ICBF has developed a novel framework that estimates the carbon footprint of each beef animal over its lifetime based on genetic evaluation, carcass data, animal-specific information, and metrics describing the typical diet of beef animals.

Methods: The framework employs different parameters to estimate the carbon footprint of each beef animal, including genetic evaluation, carcass data, animal-specific information such as gender, breed, and age at slaughter, and system-specific data on the typical diet of beef animals. The GHGs are totalled and expressed in carbon dioxide equivalents (CO₂e), which is the standard unit used to express carbon footprints. Carbon footprints of the carcass product can also be estimated with information existing in the national database on productivity levels of the dam and as well as animal origin (beef or dairy herd).

Results: The framework provides many metrics to express the carbon footprint but of key interest are: gross CO₂e per animal, CO₂e per kilogram liveweight, and CO₂e per kilogram carcass weight. By incorporating genetic evaluation data and the latest animal performance data, the framework provides a more accurate estimate of the carbon footprint of each individual animal than traditional methods. These are presented to the farmer as part of a web dashboard indicating individual animal metrics and a benchmark report summarising relevant KPIs and allowing the farmer to benchmark their enterprise against the national suckler herd. Initial validation with GreenFeed system data on ICBF's Tully Research herd shows good alignment – further work will be done with additional monitor herds representing different beef production systems. The potential for inclusion of this data in national inventory figures as well as a tool in the estimating of Spoke 3 emissions will also be explored.