FACT CHECK

Livestock and Climate Change

How much does livestock rearing contribute to climate change? And can better management reduce this by up to 30%?

Photo courtesy of the International Livestock Research Institute (ILRI).

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Livestock's negative environmental impact, particularly greenhouse gas (GHG) emissions, is a hot topic of discussion amongst scientists[1], journalists[2, 3] and activists[4]. As reported, livestock production contributes 14.5% to human-induced GHG emissions[5]. This was estimated in 2013 through global modelling by the Food and Agriculture Organization of the United Nations (FAO)[6]. The FAO's modelling also suggested emissions could be reduced by up to 30%, if livestock keepers adopted better management practices already used by their neighbours[5].

Variation behind global emissions

Evidently, modelling suggests the livestock sector contributes significantly to GHG emissions and climate change[1, 6-8]. The magnitude of this contribution depends on the type of livestock product and the efficiency of production.

To understand the impact nuances and find appropriate solutions we must consider different emissions sources, and the variation in the quantity of emissions associated with each kg of milk, meat or egg protein (product emissions intensity).

Humans consume a lot of milk and beef; around 40% of terrestrial animal source protein comes from cows[6]. As a result, when complete supply chains (including land use, feed production, animal production, processing and transportation) are considered, cattle are a key contributor to global emissions (Figure 1). However, we also consume a lot of protein from eggs and chicken meat (around 30% of our animal source protein[6]), but these contribute much less to global emissions. Efficiency of protein production is key to this variation. The more efficiently inputs are converted to human edible protein, the less emissions associated with each unit of product. The quantity of emissions associated with all inputs and processes to produce a kg of beef protein or milk protein is higher than that to produce a kg of chicken meat or egg protein (Figure 2). Still, ruminants (such as cows and sheep) largely convert human inedible feeds to human edible protein.

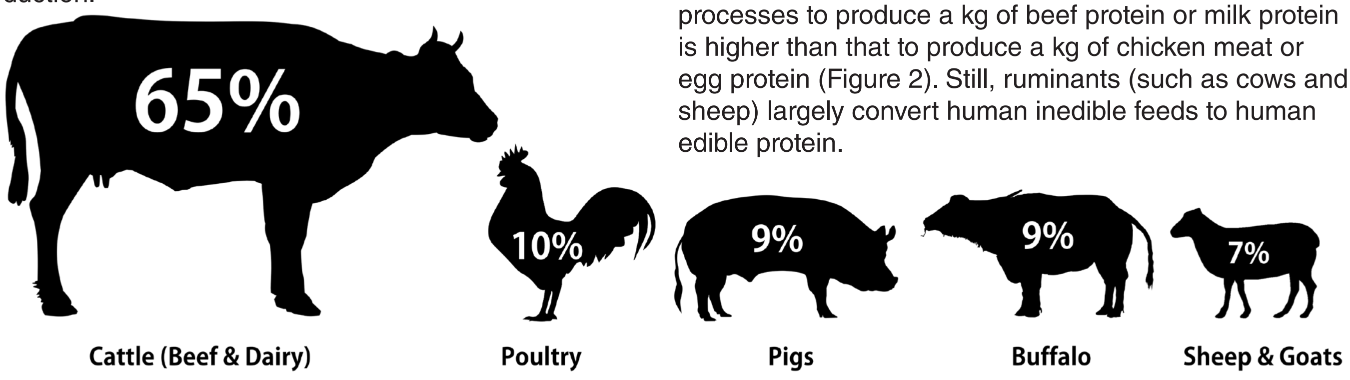

Figure 1. Contribution by species, from cradle to farm gate, to total livestock GHG emissions, from FAO modelling results[6]

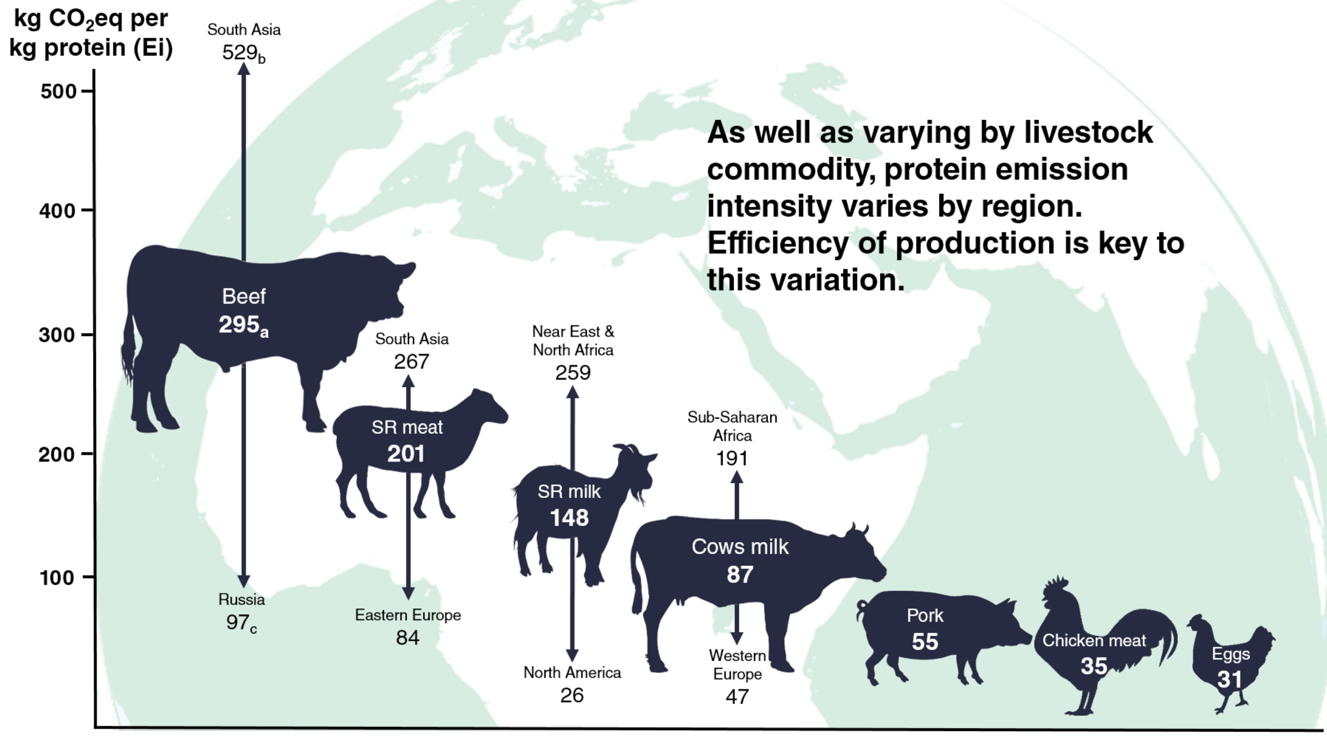

Figure 2. Global average emissions intensities (Ei) for different livestock products (a), and regional variation (b & c). SR = small ruminants. CO_2eq stands for carbon dioxide equivalents; a measure of total GHGs using the functionally equivalent amount of carbon dioxide Data from FAO modelling using GLEAM[15].

Within the modelled global emissions intensities for each type of livestock product there is significant variation, again depending on the efficiency of production system. For instance when modelling different geographies, production systems in low and middle-income countries (LMICs) are generally less efficient (with poorer quality feeds, breeds of lower production potential and significant health challenges) than those in high-income countries, and therefore have higher emissions intensities. There are calls that methods for emissions calculations, largely based on systems in high-income countries, are not entirely appropriate for systems in LMICs[9]. In addition, most current calculations do not allocate emissions to the full variety of uses, beyond protein production, that livestock offer in LMICs (e.g. traction power for crop systems, insurance and savings and socio-cultural roles)[10].

Improved efficiency and emission reductions

The variation in the emissions intensity, or efficiency, of production between systems, and more importantly between producers within the same systems, suggests there is potential for improvement and therefore a reduction in emissions associated with the same level of production [6, 11]. The often-quoted potential for 30% reduction in emissions, by farmers adopting the practices of their most efficient neighbours, is based on a FAO aggregated gap analysis. This was qualified as having many ‘assumptions and simplifications’[6]. However, when we lose trace of such caveats it is easy to become set on 30% as an absolute figure. Instead, this modelling result should illustrate that there is potential to improve the efficiency of livestock production and reduce emissions and associated climate change. This is particularly evident in the low productivity LMIC systems, where it is suggested improvements to animal feed, health and genetic potential, can increase productivity and reduce GHG emissions[11-14].

LD4D Livestock Fact Check Series

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