TIF - Is it a Case of 'Meat-versus-Planet'? Lessons for the Global South

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Not a culprit: A meat shop in Nashik | Adam Cohn (CC BY-NC-ND 2.0)

Claims that the livestock sector is a high emitter of greenhouse gases have led to calls for moving towards plant-based diets. These prescriptions rest on flawed assumptions; they also ignore the nutritional needs of the working poor in the Global South.

The livestock sector has widely been reported to be a high emitter of Green House Gases (GHGs). International media outlets have — wrongly — claimed that 'cows emit more than cars.' An open letter published by scientists in the *Lancet Planetary Health Journal* has warned that "If the livestock sector were to continue with business as usual, this sector alone would account for 49% of the emissions budget for 1·5°C by 2030, requiring other sectors to reduce emissions beyond a realistic or planned level." (Harwatt, et al 2020).

Reducing the consumption of meat and dairy is now seen as an important action to achieve climate mitigation. At the same time, these products are an important source of nutrition and protein for the world. More importantly, food supply from livestock acts as a safeguard against hunger and nutritional poverty in the developing world, as well as a source of income for millions of small farmers. As the crudely framed meat-versus-planet debate takes root in India, it is pertinent to examine the lessons from this debate for the Global South.

A sleight of hand

How did the narrative that cows emit more than cars come about? The answer lies in a statistical sleight of hand used to improperly make comparisons across the two sectors.

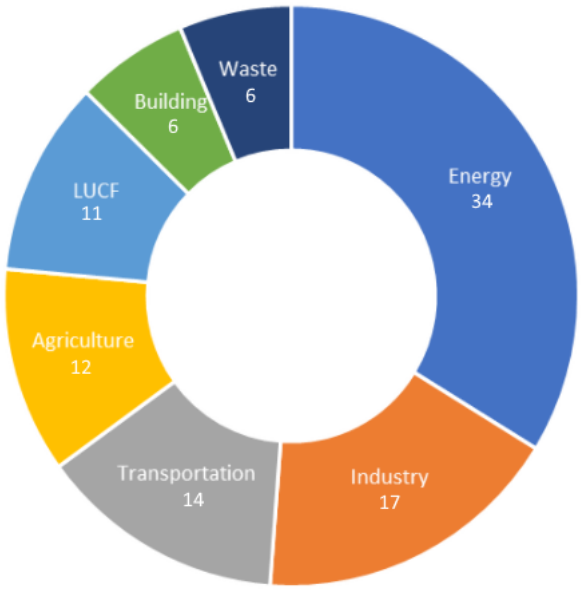
The livestock sector got the label of being a climate polluter from the Food and Agricultural Organisation's (FAO) 2006 special report *Livestock's Long Shadow*. The first global study to estimate GHG emissions in the livestock sector, the report estimated livestock emissions at 7.1 gigatonnes of carbon dioxide equivalent (GtCO2e) or 18% of annual global GHG emissions. This figure appeared to top that of emissions from the global transportation sector (6.9 GtCO2e or 14% of annual GHG emissions). Over the next decade and a half, several other reports estimated livestock's contribution between 14% and 14.5% of annual GHG emissions (Steinfeld et al, 2006; Mbow et al, 2017).[1]

> *A comparison of lifecycle emissions from livestock with direct emissions from transportation [is] not only incorrect but also misleading.*

To arrive at its estimate, the FAO used a life cycle analysis (LCA), a method that accounts for emissions throughout the lifecycle of an activity. For livestock, lifecycle emissions include not just direct emissions from the animal's digestive processes and the storage and transport of manure, but also indirect emissions from land-use change for pasture, pasture management, manure application and decomposition, processes of meat production, packaging, and eventual transportation of meat. By including CO2 emissions from the total use of fossil fuels in the production chain, this LCA method pegs emissions from livestock for 2005 to range between 7.1 and 7.5 GtCO2e (Steinfeld et al, 2006; Herrero et al, 2016).[2]

Yet, as explicitly acknowledged by experts of the FAO later in 2018, there are as yet no comparable global LCA estimates for other sectors of the global economy. This makes a comparison of lifecycle emissions from livestock with direct emissions from transportation not only incorrect but also misleading.

Figure 1: Emissions from sectors of the global economy (2010, in %)



Source: IPCC (2014), Report of Working Group III

To illustrate: in 2005, estimates of direct emissions from livestock ranged from 2.3 to 4.58 GtCO2e (FAOSTAT, 2020; CAIT-WRI 2010; Steinfeld, et al 2006; O'Mara, 2011; US EPA, 2006). If these direct emissions alone were considered, livestock contributed only 4.5-10.5% of that year's annual GHG emissions, lower than that of the transportation sector.[3] Similarly, data from the IPCC's Fifth Assessment Report (AR 5) in 2014 showed (Figure 1) that in 2010 transportation contributed 14% of total emissions, higher than emissions from agriculture, which made up 10.2-11.8% of annual emissions (5-5.8 GtCO2e).

The burden of the developing world

For the developing world, the implications of such misleading comparisons are two-fold.

First, it shifts the emphasis of climate mitigation to the livestock and agricultural sector. It ignores that emissions in energy and industry from the developed world are a leading contributor to emissions, accounting for 60% of the rise in global GHG emissions between 2000 and 2010 (IPCC 2014). The IPCC's AR 5 estimated that in 2010 the energy and industry sectors contributed a third (17.1GtCO2e) and a fifth of (8.8 GtCO2e) of annual GHG emissions, respectively. Emissions in the livestock sector are significantly lower than emissions from electricity and heat, transportation, industry, buildings, and commercial energy use.

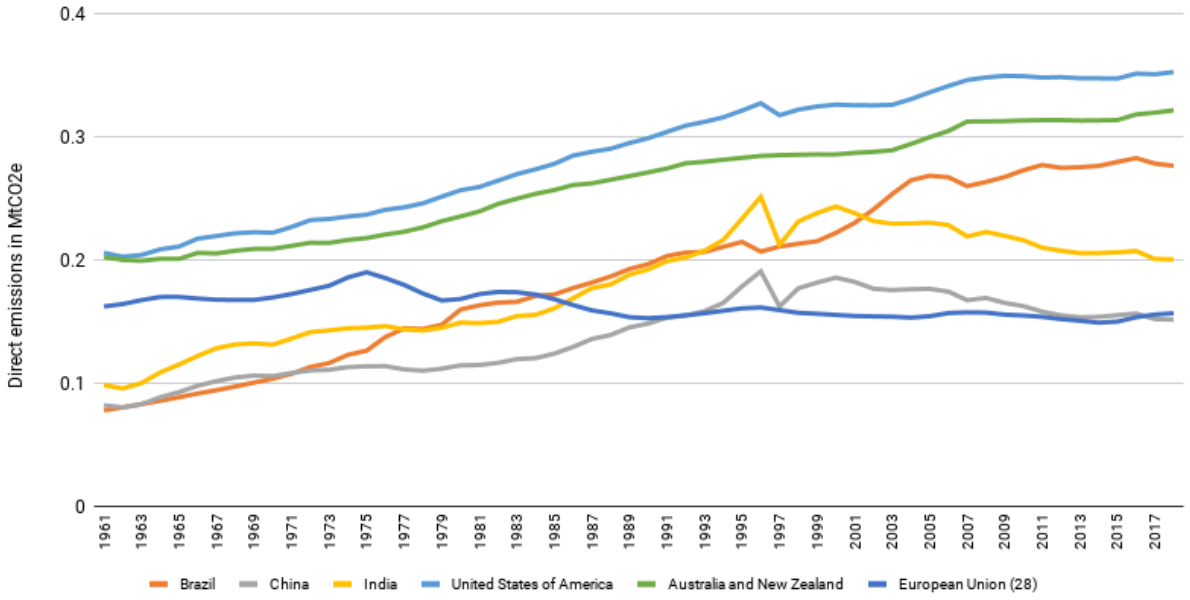
Second, it shifts the burden of reducing these emissions onto the developing world. Consequently, it identifies demand for meat in developing countries as the primary driver for emissions within the livestock sector.

Representing aggregate emissions from livestock in a region ignores differences in livestock production and consumption patterns across the world.

The FAO's 2013 estimation of direct and indirect livestock emissions assesses that Latin America and the Caribbean are the biggest emitters (1.3 GtCO2e), driven by Amazon, or rainforest, beef. This is followed by East Asia where emissions are arise largely from industrial beef and pork production (1 GtCO2e). Northern America and Western Europe have the same level of absolute emissions (approximately 0.6GtCO2e), with beef production and dairy being the main drivers. South Asia's and Africa's livestock sector emissions are on par with North America but are driven by the large number of cattle and sheep held by pastoralists and small landholders (with a significant contribution from India).

Representing aggregate emissions from livestock in each region ignores differences in livestock production and consumption patterns across the world. What also needs to be paid attention to are long-term trends and patterns in meat production and direct emissions from livestock across countries (Figure 2).

Figure 2: Direct emissions from livestock (MtCO2e)



Source: FAOSTAT (2020). Note: Emission figures are in megatonnoes of CO2 equivalent (MtCO2e). They combine direct GHG emissions from enteric fermentation and Manure Management as per the IPCC GHG inventory accounting method.

As Figure 2 shows, over time, emissions from the livestock sector in the developed world stabilise or decline. This is true particularly for the EU and even China more recently. Simultaneously, across the board, countries have managed to increase their per capita food supply from meat. At the same time, countries such as India have higher aggregate emissions despite lower per capita meat production levels (Figure 3).

Figure 3: Food supply from meat (kg/capita/yr)

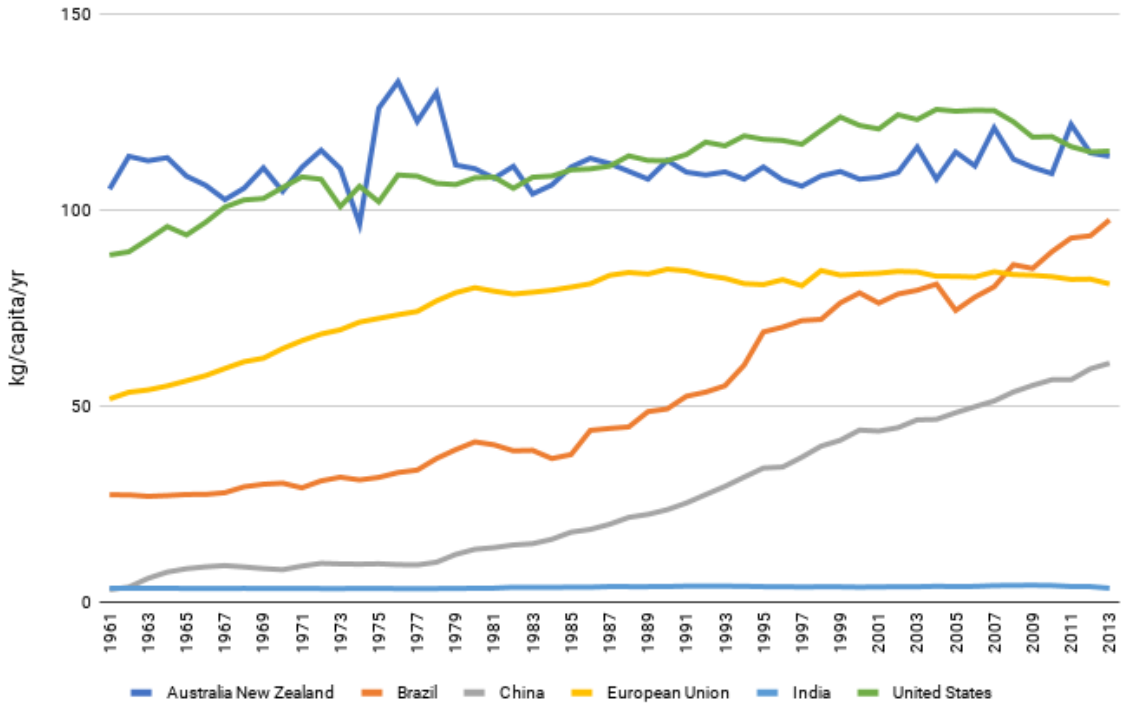


Figure 3: Source: FAOSTAT (2020). Note: Food supply is in kg/capita/year. They combine food from major and minor sources of meat.

These figures correspond to assessments made by global studies that differences in livestock production and management at the farm level are an important contributor to differences in emissions from livestock across regions (Thornton et al 2002; Kruska et al 2003; Rivera-Ferre et al 2016; Herrero, et al 2013a). More specifically, these studies identify that in comparison with the developing world, farm-level practices in the developed world consist of improved livestock breeding techniques, the use of better quality manure and feed, and more resource-efficient (land, water, and energy) practices. In line with these observations, the IPCC's AR5 comments that "a reduction in emissions intensity has long been a feature of agricultural emissions reduction and is one component of a process more broadly referred to as sustainable intensification."

In sum, despite stark differences in meat production and consumption patterns, improving the efficiency of production processes has a significant role to play in lowering emissions in the livestock sector (Herrero et al 2013a; O'Mara 2011). An emphasis on production processes and efficiency is particularly important for a country such as India, where meat and dairy production is dominated by small herd sizes and low yields of dairy and meat products.

Animal protein and nutritional security

Following the *Long Shadow* report, once the livestock sector was labelled as a high emitting sector, a comparison between animal and crop-based food production followed. Viewed through this narrow lens, the consumption of meat and dairy products was estimated to have a higher carbon footprint than plant-based foods (Poore & Nemecek, 2018). As a consequence, over the past decade and a half, the livestock sector has been firmly included within the ambit of climate mitigation action.

This has constituted a significant shift in climate change policy concerning agriculture and the developing world. Policy recommendations to reduce livestock emissions include providing subsidies for plant-based diets, imposing a proposed "sin" tax on meat consumption (as seen in the EU), and a demand that countries declare a "peaking year" for meat consumption. More recently, the IPCC AR5 provided a detailed assessment of demand-side measures to reduce emissions from the livestock sector which included shifts in dietary patterns (IPCC 2007; 2014).

Protein from meat forms a small but important part of the nutrition of the more disadvantaged classes and castes in India.

India's annual meat consumption per person (from various livestock animals), at 4.38 kg in 2010, is far below the world average of 42.1 kg. Nevertheless, studies seek to model for India a transition to plant-based diets to tackle climate change (Aleksandrowicz, L et al 2019). There is also an emerging public discourse on the need to reduce meat consumption and therefore emissions from the livestock sector. These calls to reduce meat consumption have added to the pitched debate on animal cruelty, inefficient resource use, and claims on the benefits of vegetarian diets.

Calls for such dietary shifts ignore class and caste differences in meat consumption. Food choices, availability, and affordability are marked by notions of purity, as well as discrimination against marginalised communities, both religious and caste-based. Protein from meat forms a small but important part of the nutrition of the more disadvantaged classes and castes in India. On average, persons who formed the poorest quarter of rural Indians consumed 2.81g of animal protein and 14.04g of milk protein a day in 2011–2012, significantly higher than that

consumed by those in the richest quarter: 0.68g and 3.2g respectively, according to Rampal (2018), based on the results of the 68th NSSO round on household expenditure. (The figures for urban consumption follow a similar pattern.) Members of urban Scheduled Tribe populations consumed 2.86g of animal protein daily compared with the all-India daily average of 1.68g. Rural OBC, Scheduled Caste, and Scheduled Tribe populations consumed less milk per person than other groups. (8.21g, 6.88g and 4.1g, respectively, versus the national daily average of 8.52g.)

Assumptions and consequences of plant-based diets

Increased consumption of milk and meat has been a long-established marker of development transition, representing better nutrition and food intake. Developing regions consume far less meat and milk as compared with developed regions (Figures 4 and 5). The whole of Africa and most countries in Asia consume less than half the world's average and East Asia surpassed the average global level for meat consumption only in 1996 (with China being the main driver).

Figure 4: Meat supply per person (1961-2017). Source: Our World in Data.

Figure 5: Per capita milk consumption (1961-2017). Source: Our World in Data.

Existing policy recommendations that advocate plant-based diets fail to accept the poor levels of protein and nutritional intake in the Global South. Increasing protein intake from meat is a vital component of health and nutrition programmes across the developing world.[4] Any dietary shift will affect food nutrition and security as well as reduce incomes and employment opportunities for small producers.

Even at their current low levels in the developing world, food supply from meat cannot be replaced by plant-based diets (Stehfest et al 2009), unless there is a massive increase in intensified agriculture. The assumption that such food substitution is possible contradicts available evidence on low crop productivity levels and significant yield gaps of crops in the developing world. Further, livestock in South Asia and Africa are often fed on crops unfit for human consumption and grown on land that is not available for cropping. In sum, "[f]ood production by grazing animals contributes to food security in many regions of the world" (IPCC 2014).

Food is intricately linked to class (food affordability and availability) and socio-cultural practices.

Scenarios that assume food consumption across countries can be reduced to average between 2,500-2,800 kcal per capita per day by 2050 (Bajželj et al. 2014; Smith et al. 2013) grossly underestimate conditions of work and physical activity in the developing world. To put this into perspective, the current daily calorie requirement for people undertaking physical work and strenuous activity (between the ages of 18-60) stands between 2,550 to 3,900 kcal per capita per day for men and between 1,850 and 2,900 kcal per capita per day for women. The assumption of calorie convergence implies that there will be a sudden shift towards urban sedentary lifestyles in the next 30 years.

Other models, which assume increased intake of fruits, vegetables, and nuts (Hedenus et al. 2014; Tilman and Clark 2014) completely miss the point of how food is intricately linked to class (food affordability and availability) and socio-cultural practices. They also fail to learn lessons from the past. For instance, the EAT-Lancet Commission recommended a low-meat "healthy and sustainable diet" of 2,500 kcal/day in 2011. A study by IFPRI (Hirvonen et al. 2020) found that the cost of achieving such a diet (composed primarily of vegetables and fruits) was unaffordable to 1.58 billion people of the world (particularly in sub-Saharan Africa and South

Asia). Most households in the developing world would have to spend nearly all their income to maintain this diet.

A move towards implementing such plant-based diets without recognising these issues would increase the vulnerability of the working poor in the developing world.

Conclusions

From estimating emissions from the livestock sector to recommending reduced meat intake, the neglect of differentiation between the Global North and South leads us further into the rabbit hole of the meat-versus-climate debate. This emphasis on mitigation in the livestock sector takes away from climate adaptation and development concerns. The latter includes the need for improving food production and raising farm-level incomes, in the face of extreme events, climate variability, and future climate change.

> *Under the premise of climate mitigation, dietary shifts towards plant-based diets could very well act as an infringement of the freedom and well-being of our population.*

Calls for reduced meat consumption ignore that developing countries are characterised by low food intake, and suffer from various inequalities in food consumption. Meat and dairy consumption in India is poor as compared to the global average, and a balanced food diet (plant and/or meat-based) is unaffordable for most Indian households.

Shifting away from meat-based diets is as much a socio-economic and political question as it is an environmental one. There exist various examples of political pressure in India to shift away from these important sources of protein, which would have an impact on marginalised communities. These include the removal of eggs from mid-day meal schemes and the squeezing of beef and buffalo meat supply. Under the premise of climate mitigation, dietary shifts towards plant-based diets could very well act as an infringement of the freedom and well-being of our population.

At the heart of this debate on climate change and meat consumption is the failure to recognise differentiation at international and national spheres. The developing world must be afforded the space to enhance the level of wellbeing of their populations while moving towards fewer emission-intensive production processes. Policy recommendations that do not sufficiently acknowledge these differences stand to exacerbate global and local inequities.

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References:

Aleksandrowicz, L et al. 2019. “Environmental impacts of dietary shifts in India: A modelling study using nationally-representative data.” *Environment International* 126: 207-215.

Bajželj, B., Richards, K.S., Allwood, J.M., et al. 2014. “Importance of food-demand management for climate mitigation”. *Nature Climate Change* 4: 924–929

Boswell, M. R, A. I Greve, and T. L Seale. 2010. "An assessment of the link between greenhouse gas emissions inventories and climate action plans." *Journal of the American Planning Association* 76, no. 4: 451-462.

WRI. [World Resources Institute]. 2010. Climate Analysis Indicators Tool: WRI's Climate Data Explorer.

FAOSTAT. 2020. FAO Statistical Database.

Gerber, Pierre J, Henning Steinfeld, Benjamin Henderson, Anne Mottet, Carolyn Opio, Jeroen Dijkman, Allessandra Falcucci, and Giuseppe Tempio. 2013. "Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities". Rome: Food and Agriculture Organization of the United Nations (FAO).

Harwatt, H, W. J Ripple, A Chaudhary, M. G Betts, and M. N Hayek. 2020. "Scientists call for renewed Paris pledges to transform agriculture." *The Lancet Planetary Health* 4, no. 1: e9-e10.

Hedenus, F., Wirsenius, S., & Johansson, D. J. 2014. The importance of reduced meat and dairy consumption for meeting stringent climate change targets. Climatic change, 124, no. 1: 79-91.

Herrero, M, D Grace, J Njuki, N Johnson, D Enahoro, S Silvestri, and M.C. Rufino. 2013. "The roles of livestock in developing countries." *Animal* 7, no. 1: 3-18.

Herrero, Mario, Benjamin Henderson, Petr Havlík, Philip K. Thornton, Richard T Conant, Pete Smith, Stefan Wirsenius, et al. 2016. "Greenhouse gas mitigation potentials in the livestock sector." *Nature Climate Change* 6, no.5: 452-461.

Herrero, Mario, Petr Havlík, Hugo Valin, Mariana C Rufino, Philip K Thornton, Michael Blümmel, Franz Weiss, Delia Grace, Obersteiner, and Michael. 2013. ""Biomass use, production, feed efficiencies, and greenhouse gas emissions from global livestock systems." *Proceedings of the National Academy of Sciences* 110, no. 2: 20888-20893.

Hirvonen, Kalle, Yan Bai, Derek Headey, and William A. Masters. 2020. "Affordability of the EAT–Lancet reference diet: a global analysis." *The Lancet Global Health* 8, no. 1: e59-e66.

IPCC [Intergovernmental Panel on Climate Change]. 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate.*Cambridge: Cambridge University Press

IPCC. 2007. *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC.

Kruska, RL, RS Reid, PK Thornton, N Henninger, and PM Kristjanson. 2003. "Mapping livestockorientated agricultural production systems for the developing world." *Agricultural Systems* 77: 39-63.

Mbow, H. O. P, A Reisinger, J Canadell, and P. O'Brien. 2017. *Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems.* Geneva: IPCC.

Moran, Dominic, and Eileen Wall. 2011. "Livestock production and greenhouse gas emissions: Defining the problem and specifying solutions." *Animal Frontiers* 1, no. 1: 19-25. doi:

O'Mara, F. P. 2011. "The significance of livestock as a contributor to global greenhouse gas emissions today and in the near future." *Animal Feed Science and Technology*, 166, 7-15.

Poore, J, and T. Nemecek. 2018. "Reducing food's environmental impacts through producers and consumers." *Science*360, no. 6392: 987-992.

Rampal, Priya. 2018. "An analysis of protein consumption in India through plant and animal sources." *Food and Nutrition Bulletin* 39, no. 4: 564-580.

Ritchie, Hannah. 2017. "Meat and Dairy Production." OurWorldInData.org.

Rivera□Ferre, M. G, F López□i□Gelats, M Howden, P Smith, J. F Morton, and M Herrero. 2016. "Re□framing the climate change debate in the livestock sector: Mitigation and adaptation options." *Wiley Interdisciplinary Reviews: Climate Change* 7, no. 6: 869-892.

Smith, P., Haberl, H., Popp, A., et al. 2012. "How much land-based greenhouse gas mitigation can be achieved without compromising food security and environmental goals?" *Global Change Biology* 19: 2285– 2302 (2013).

Steinfeld, H., Gerber, P., Wassenaar, T. D., Castel, V., Rosales, M., Rosales, M., and de Haan, C. 2006. *Livestock's Long Shadow: Environmental Issues and Options*. Rome: Food and Agriculture Organization.

Thornton, PK, RL Kruska, Henninger, N, PM Kristjanson, RS Reid, F Atieno, A Odero, and T Ndegwa. 2002. Mapping Poverty and Livestock in the Developing World. International Livestock Research Institute., 124.

Tilman, D., and Clark, M. 2014. "Global diets link environmental sustainability and human health." *Nature*, 515, no. 7528: 518-522.

US-EPA [United States Environmental Protection Agency]. 2006. *Global Anthropogenic Non-CO2 Greenhouse Gas Emissions: 1990-2020*. Washington, DC: US-EPA.

Tags: Meat diet
Plant diet
Climate
Poverty

Footnotes:

1. These include the FAO's 2013 report on mitigation potential of livestock, and the IPCC's *Special Report on Climate Change and Land* in 2017.

2. The range of values are also on account of what constitutes manure management as some studies also include N2O emissions from manure decomposition and application to this category. There also several several data reporting issues and uncertainties for estimating LUCF (land use change and forestry) emissions (Boswell & Seale 2010).

3. In 2005, global annual GHG emissions ranged between 43.4 and 48.9 GtCO2e (O'Mara 2011). For the year 2005, the FAOSTAT database used the figure of 40 GtCO2e for global emissions and is considered to be an underestimate by most studies (O'Mara 2011). The IPCC AR5 estimates this figure to be 48.9 GtCO2e and the WRI-CAIT database estimates emissions to be 43.4 GtCO2e.

4. Ritchie (2013) provides publicly available data on meat consumption per capita as well as examines the relation between meat consumption and income.