



# Agriculture and Air Pollution

## Key Points

- Recent research indicates that the contribution of global agriculture to greenhouse gas emissions, including livestock production and the grains required for this sector, is even higher than the 30% figure previously cited by the U.S. Department of Agriculture (USDA).
- It is high time that agricultural corporations were held responsible for their environmental impacts. Tough regulatory systems are needed to prevent such impacts and should be underpinned by the precautionary principle. Regulations should include action to ensure that products reflect the full costs of production, including fees for any allowable air pollution and greenhouse gas impacts, plus disincentives/penalties for deleterious actions, and incentives for agro-ecological agriculture).
- Food policy and agricultural strategies must be reviewed and strengthened in order to move away from polluting and unsustainable foods and towards healthier and more environmentally-friendly options.

## Background

### Greenhouse Gases

Most cited figures from the U.S. Department of Agriculture (USDA) state that global agriculture, including livestock production and the grains required for this sector, account for 30% of greenhouse gas emissions. The USDA also indicates that management of nitrous oxide and methane emissions from animal production and nutrient management “is of particular importance given their potential for contributing to global warming.”<sup>i</sup> A 2006 study by the FAO found that 18% of global greenhouse gas emissions is directly attributable to livestock production, more than the emissions attributable to the entire transportation sector.<sup>ii</sup>

Greenhouse gases, primarily methane, carbon dioxide, and nitrous oxide, are produced by animals during the digestion process. Additional emissions result from degradation processes occurring in uncovered waste lagoons and digesters.<sup>iii</sup> When emissions from land use and land use change are included, the livestock sector is said to account for nine percent of CO<sub>2</sub> deriving from human-related activities. However, the sector produces an even larger share of more powerful greenhouse gases, generating 65 percent of human-related nitrous oxide, (which has 296 times the Global Warming Potential of CO<sub>2</sub>), 37 percent of all human-induced methane (23 times the potential as CO<sub>2</sub>), and 64 percent of ammonia (which contributes significantly to acid rain).<sup>iv</sup>

More recent research indicates that global methane emissions from agriculture are larger than estimated due to the previous use of out-of-date data on carbon emissions generated by livestock, according to a study published in the open access journal Carbon Balance and Management. In a project sponsored by the U.S. National Aeronautics and Space Administration's (NASA) Carbon Monitoring System research initiative, researchers from the Joint Global Change Research Institute (JGCRI) found that global livestock methane emissions for 2011 are 11% higher than the estimates based on guidelines provided by the Intergovernmental Panel on Climate Change (IPCC) in 2006.<sup>v</sup>

Dr. Julie Wolf, U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), senior author of the study said: "In many regions of the world, livestock numbers are changing, and breeding has resulted in larger animals with higher intakes of food. This, along with changes in livestock management, can lead to higher methane emissions. Methane is an important moderator of the Earth's atmospheric temperature. It has about four times the atmospheric warming potential of carbon dioxide."

## Air Pollution

Air quality degradation is another problem in and around intensive animal production facilities, due to localized releases of toxic gases, odorous substances, particulates, and bioaerosols containing a variety of microorganisms and human pathogens.<sup>vi</sup> These emissions can have moderate to severe health implications for surrounding communities and for farm workers, which disproportionately affects low-income areas where industrialized animal production facilities are typically located.<sup>vii</sup>

Despite these already dire implications, agricultural emissions are only going to increase as rising incomes and urbanisation drive a global dietary transition towards increased consumption of meat and dairy products.<sup>viii</sup> Unless decisive action is taken, the growing demand for animal products is expected to be a major contributor to a roughly 80% increase in global greenhouse gas emissions from the agricultural sector alone.<sup>ix</sup>

## References

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<sup>i</sup> USDA. USDA Climate Change Science Plan 4 (2010), available

at [http://www.usda.gov/oce/climate\\_change/science\\_plan2010/USDA\\_CCSPlan\\_120810.pdf](http://www.usda.gov/oce/climate_change/science_plan2010/USDA_CCSPlan_120810.pdf). These figures include contributions from land use change and deforestation for the purpose of agriculture—primarily to make land available for grazing.

<sup>ii</sup> Henning Steinfeld et al., FAO, *Livestock's Long Shadow: Environmental Issues and Options* (2006).

<http://www.fao.org/docrep/010/a0701e/a0701e00.htm>. A more recent and comprehensive study published by Worldwatch Institute, however, finds that livestock and their by-products actually account for 51% of worldwide human-related greenhouse gas emissions annually. Robert Goodland & Jeff Anhang, *Livestock and Climate Change*, *World Watch Magazine*, November/December 2009, at 11.

<sup>iii</sup> Pew Commission. *Putting Meat on the Table*. 2008. <https://www.ncifap.org/reports/>

<sup>iv</sup> Henning Steinfeld et al., FAO, *Livestock's Long Shadow: Environmental Issues and Options* (2006).

<http://www.fao.org/docrep/010/a0701e/a0701e00.htm>.

<sup>v</sup> BioMed Central. (2017, September 29). Global methane emissions from agriculture larger than reported, according to new estimates. *ScienceDaily*. Retrieved October 4, 2017 from [www.sciencedaily.com/releases/2017/09/170929093248.htm](http://www.sciencedaily.com/releases/2017/09/170929093248.htm)

<sup>vi</sup> Pew Commission. *Putting Meat on the Table*. 2008. <https://www.ncifap.org/reports/>

<sup>vii</sup> Humane Society International (HSI). *An HSI Report: The Public Health Implications of Intensive Farm Animal Production in South Asia*. July 2013. [http://www.hsi.org/assets/pdfs/hsi-fa-white-papers/public\\_health\\_impacts\\_of.pdf](http://www.hsi.org/assets/pdfs/hsi-fa-white-papers/public_health_impacts_of.pdf)

<sup>viii</sup> David Tilman & Michael Clark, *Global Diets Link Environmental Sustainability and Human Health*, 515 *Nature* 518, 520 (2014). <http://www.nature.com/nature/journal/v515/n7528/abs/nature13959.html?foxtrotcallback=true>.

<sup>ix</sup> David Tilman & Michael Clark, *Global Diets Link Environmental Sustainability and Human Health*, 515 *Nature* 518, 520 (2014). <http://www.nature.com/nature/journal/v515/n7528/abs/nature13959.html?foxtrotcallback=true>.