

Animal manure - a huge and growing problem.

The volume of livestock manure is mind-bogglingly huge. In many parts of the world, the problems caused by human waste is very substantial, causing significant environmental degradation. Add to this an even greater amount from animals raised for food. On a weight basis, the mass of cattle exceeds that of the whole human race.

As a consequence the volume of manure produced by these animals also exceeds that produced by the human race. While many of these cattle are widely distributed over range lands, a growing and significant proportion of them are kept in intensive feedlots. Add to this 19 billion chickens and pigs, the majority of which are kept in intensive production facilities, the amount of manure is gargantuan and concentrated in relatively small areas of land. It has to go somewhere: some is dried and used for fuel, much is spread on farming land as fertilizer and some escapes directly into water run off. Which ever way it goes within two years or so, it ends up by adding huge amounts of nutrients to rivers which along with the run off of fertilizer residues causes major problems with eutrophication (excessive nutrient).

1.5 billion cattle/ buffalo	+	17.5 billion poultry	+	1.8 billion sheep/ goats	+	1 billion pigs	+	6.5 billion humans
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A vast amount of excreta								

The estimated volume of animal waste is in the order of 13 billion tonnes per annum. In intensively raised livestock, dairy cows retain only about 20% of nitrogen (N) and 25% of phosphorus (P), pigs about 35% N and 33% P, and broilers 45% N and 20% P from their feed (Steinfeld 06). The rest ends up in the environment. A substantial amount of the nitrogen comes from chemical fertilizers and the phosphorous from mineral sources and is added to rather than recycled from the world's ecosystems. On a world scale nitrogen losses from manured agricultural lands into fresh water amounts to more than 12 million tonnes. Phosphorus leaching is in the order of 1.5 million tonnes (Steinfeld 06).

The effect of eutrophication on a massive industrial scale is frightening.

Water contamination by nitrates and phosphates from intensive animal production is now a world wide problem. It is most noticeable in the US where intensive animal production has been going on the longest but this is also a world wide problem. Chesapeake Bay on the eastern coast of the US is a prime example. The catchment area contains large numbers of piggeries and other intensive animal units, with animals outnumbering humans 11 to 1, amounting to 185 million in 2004! Eutrophication in the bay caused a rapid expansion of algae blooms and subsequent bacterial overgrowth which consumes the oxygen creating extensive dead zones with serious reduction in marine creatures (Chesapeake Bay 04). There was also an explosion of the dinoflagellate *Pfiesteria* which is toxic to fish as well as humans, resulting in further reduction of fish numbers.



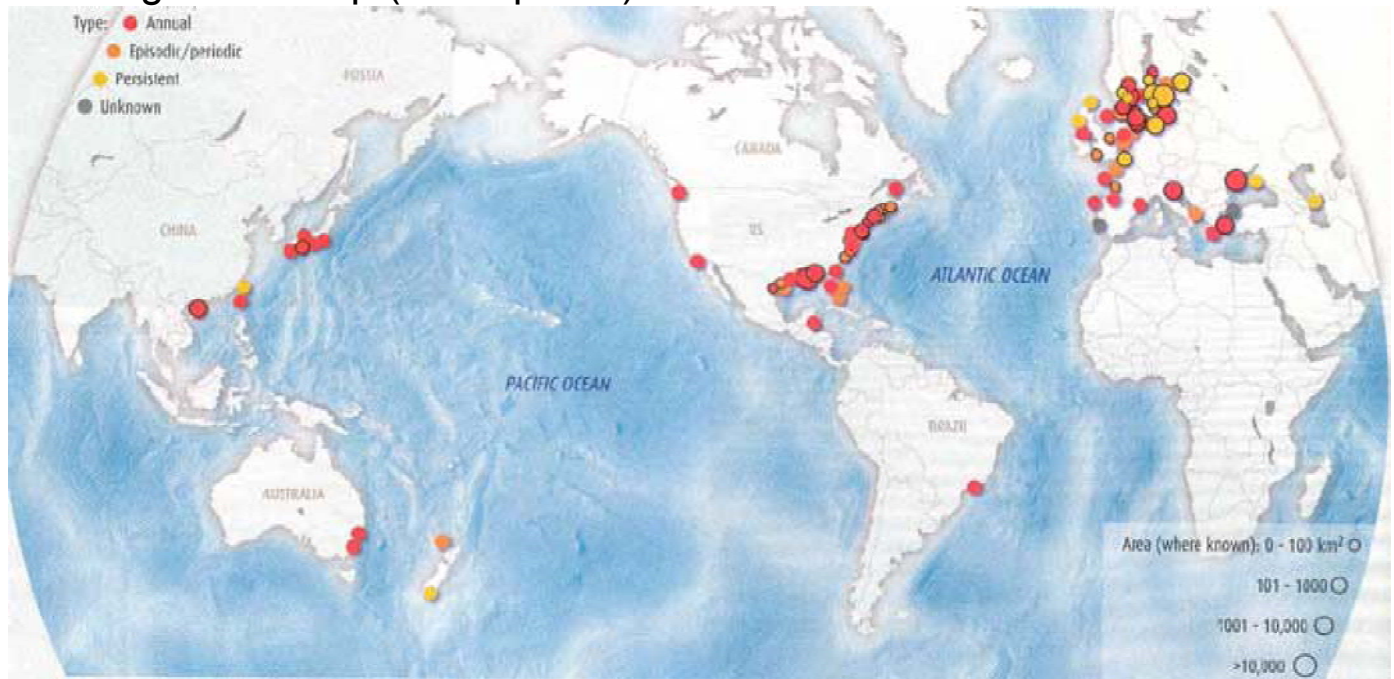
Pollution from agricultural waste.

Picture by
K.Hudson from
www.factoryfarm.org

After very significant local activism and the application of federal and local laws, nutrient levels fell from their peak to 2004 by 15%, but they have a long way to go. To reach the goal of the Clean Water Act, a further reduction of 39 and 33% in nitrogen and phosphorous run off respectively would be required. Of even greater concern are the growing dead zones in off-shore areas.

Marine dead zones are a growing world wide problem. A huge dead zone has been created in the Gulf of Mexico from excessive nutrient

from the Mississippi River. Such nutrients cause a rapid growth of microorganisms and algae. When they die they sink to the bottom to be consumed by bacteria which in turn use up most of the dissolved oxygen, with levels dropping below that needed to support the vast majority of living organisms. The number of dead zones has been increasing rapidly each year and is now estimated by Robert Diaz at the Virginia Institute of Marine Science at more than 200 as shown in the following world map (Schrope 06).



Industrial livestock production in China, Thailand and Vietnam has polluted the extensive shallow water areas of the South China Sea, causing red tides of toxic algae (Naylor 05). Europe has not escaped. The problem in the Netherlands is huge with nitrate levels in groundwater double allowable levels, prompting a major government initiative especially the reduction of pig numbers.

Land degradation from animal waste is also a major problem. Much of the waste is spread on surrounding lands at rates vastly exceeding its capacity to use the nutrients, which has been assessed as high as 1000 kilograms of nitrogen per hectare (Gold 04). Also see section on [water pollution](#).

References:

- (Chesapeake Bay 04)** Chesapeake Bay Foundation Report. Keeping Manure Out of the Water. 2004
- (Gold 04)** Mark Gold. The global benefits of eating less meat. Compassion in World Farming Trust. 2004. Downloadable from www.eatlessmeat.org

(Naylor 05) Rosamond Naylor, Henning Steinfeld, Walter Falcon, James Galloway, Vaclav Smil, Eric Bradford, Jackie Alder, Harold Mooney. Losing the Links Between Livestock and Land. Science 2005;310:1621-1622.

(Schrope 06) Mark Schrope. The dead zones. New Scientist 2006; December 9: 38-42

(Steinfeld 06) Henning Steinfeld, Pierre Gerber, Tom Wassenaar, Vincent Castel, Mauricio Rosales, Cess de Haan. Livestock's long shadow: environmental issues and options. LEAD/FAO publication 2006. Downloadable from www.virtualcentre.org/en/library/key_pub/longshad/A0701E00.pdf