

## Environmental Impacts of Poultry Production

**Shashank Maheshwari\***

*Mahe's Biotech Pvt. Ltd, India*

### Introduction

Over recent decades the poultry industry has made tremendous adjustments to meet the increasing demand for inexpensive and safe supply of meat and eggs and this growth has been accompanied by structural changes within the sector, characterized by the emergence and growth of "land-independent" (industrial) farming establishments, and the intensification and concentration of poultry operations. The driving forces behind structural change in poultry production are no different than those that affect other livestock commodities: market pull, innovation and economies of scale.

This article adopts the analyzing the environmental impacts arising from poultry production, and evaluating such impacts all the way from feed production to animal production and slaughtering. It considers impacts on all environmental media – air, water and land, at local, regional and global scales.

### Impacts on local and regional environment

Local disturbances and landscape degradation are typical local negative amenities in the surroundings of poultry farms.

Pollution of soil and water with nutrients, pathogens and heavy metals is generally caused by poor manure-management and occurs where manure is stored. Manure is either recycled on cropland belonging to the animal farm or marketed.

Poultry facilities are a source of odor and attract flies, rodents and other pests that create local nuisances and carry disease. Odor emissions, caused by a large number of contributing compounds including ammonia (NH<sub>3</sub>), volatile organic compounds (VOCs), and hydrogen sulphide (H<sub>2</sub>S), from poultry farms adversely affect the life of people living in the vicinity.

Flies are an additional concern for residents living near poultry facilities. Research conducted by the Ohio Department of Health indicated that residences that were located in close proximity to poultry facilities (within half a mile) had 83 times the average number of flies and mosquitoes which can transmit diseases, such as cholera, dysentery, typhoid, malaria, filaria and dengue fever. Their presence is mainly related to animal-feed management and especially to storage and losses from feeding systems.

Water pollution; pesticides used to control pests (e.g. parasites and disease vectors) and predators have been reported to cause pollution when they enter groundwater and surface water. Improper disposal of poultry carcasses can contribute to water-quality problems especially in areas prone to flooding or where there is a shallow water table.

The most significant environmental issue resulting from slaughterhouse operations is the discharge of wastewater into the environment. Like many other food-processing activities, the necessity for hygiene and quality control in meat processing results in high water usage and consequently high levels of wastewater generation, having high biochemical and chemical oxygen demand (BOD and COD) due to the presence of organic materials such as blood, fat, flesh, and excreta which in turn may lead to reduced levels of activity or even death of aquatic life. Residues of chemicals such as chlorine, used for washing

and disinfection, as well as various pathogens including Salmonella and Campylobacter may also present in the water. In addition, process wastewater may contain high levels of nitrogen and phosphorus which may cause eutrophication of the affected water bodies.

### Impacts on the global environment

Environmental impacts of poultry production are not always confined to specific areas; they also include impacts of a global dimension. Two issues are of relevance: the production of concentrate feed and greenhouse gas production related to energy use in animal production processes and in the transport of processed products.

The extraordinary performance of the poultry sector over the past three decades has partially been achieved through soaring use of concentrate feed, particularly cereals and soybean meal estimated that in 2004 the poultry sector utilized a total of 294 million tons of feed.

Intensification of feed production resulted in expansion of cropland at the expense of forested land (deforestation), pollution in water resources through pollution caused by the intensive use of mineral fertilizer, pesticides and herbicides to maintain high crop yields and it also contributes to air pollution from nitrogen fertilizer through the volatilization of ammonia.

Greenhouse gases emission got increased up. i.e.- Carbon dioxide, produced by the burning of fossil fuels during animal production, slaughter, transportation of processed and refrigerated products and importantly from deforestation. Nitrous oxide, produced from nitrogen fertilizer. FAO-IFA (2001) reported a 1 percent N<sub>2</sub>O-N (nitrogen in nitrous oxide).

### Control

The magnitude of environmental impacts is highly dependent on production practices and especially on manure management practices. A number of techniques and different management practices are available to control the environmental effects mentioned above.

Odor and flies can be controlled by minimizing the surface of manure in contact with air – frequent collection of litter (once a week in dry seasons and twice a week in rainy seasons), closed storage (bags or closed sheds).

Water and food borne disease propagation can be prevented by: storing manure in closed buildings or bags – a storage system allows producers to hold manure until a convenient and optimum time for

\*Corresponding author: Shashank Maheshwari, Director, Mahe'S Biotech Pvt. Ltd, India, E-mail: [shashankmahe@gmail.com](mailto:shashankmahe@gmail.com)

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use storing poultry manure in closed buildings reduces the emissions of gaseous compounds to the air and the risk of environmental contamination as compared to the risk associated with leaving manure exposed.

Dead-bird management and disposal, which must comply with legally accepted practices including rendering, composting, incineration and burial; a contingency plan should be in place for disposal of large numbers of dead birds in the event of disease outbreaks; in addition, consideration should be given to impacts on the physical environment – e.g. burial pits should be at least 3 meters above the maximum groundwater table.

## Conclusion

This article has focused on poultry production in intensive systems and its impacts on the environment. The assessment captures most of the issues associated with poultry production, as environmental impacts related to backyard or mixed extensive systems are marginal because of the limited concentration of wastes and reliance on locally available sources of feed, such as food residues, crop residues or feed collected by free-ranging birds. The review has also demonstrated the need to look beyond the farm level in order to understand the sector's impacts on the environment, as many of the impacts of production are felt beyond the point of production.