# ENVIRONMENTAL MANAGEMENT SYSTEM FOR ORGANIC WASTES MANAGEMENT ARISING FROM INTENSIVE ANIMAL PRODUCTION

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## ABSTRACT

This project sought to develop the elements that should be included in an environmental management system (EMS) for organic wastes management arising at intensive animal production facilities. Although a formal framework (ISO14001) exists for the development of an EMS that is 3rd-party certifiable, few guidelines exist for interpreting this in the context of animal production. A specialist panel of engineers, scientists, practitioners and producers was drawn together to examine the scientific literature and current production practices and identify possible approaches for inclusion in a generic EMS. Limited testing of some elements was conducted. In short, an EMS for organic wastes must contain several elements: a genuine commitment to environmental management from the topmost level of facility management; a comprehensive assessment of possible losses of pollutants to the environment arising from the generation and management of organic wastes; an action plan to address and minimise these emissions that is implemented and monitored for impact; and a formal process of periodic plan review and refinement. To facilitate adoption, an EMS should be considered a *best available technique* under the IPPC Directive.
***Keywords****: ISO14001, manure management.*

## INTRODUCTION

Environmental management systems (EMS) are tools that help businesses address the environmental impacts of their production activities (Higgins, 1998). EMS's serve a variety of other functions, among which are achieving competitive advantage through product differentiation (Corrigan, 1998). The recognition that environmental protection goes hand-in-hand with improved production efficiency has prompted many corporate managers to embrace environmental management as an 'arena of competition rather than as a compliance-driven function' (Lent and Wells, 1994). A formal framework (ISO14001) exists for the development of an EMS that is 3rd-party certifiable, and many value-added food sector industries have adopted these systems. In Europe, over 23,000 ISO14001 certificates had been issued by 2002 (ISO, 2003) In contrast, producers of commodity agricultural products, such as animals, have done little to implement comprehensive EMS's. Instead, such producers have typically relied on voluntary instruments to address environmental concerns associated with the production of animals and management of the resulting organic wastes. These tend to be inferior to 3rd-party certifiable schemes in facilitating both continuous improvement in environmental management (Higgins, 1998) and consumer confidence in food production. Regrettably, few guidelines exist for developing an EMS for organic wastes management from intensive animal production facilities. It is argued here that under the Integrated Pollution Prevention and Control legislation (Council of the European Commission, 1996), best available techniques (BAT) should include a 3rd-party certifiable EMS that is comprehensive and based on continuous improvement principles.

The objective of this study was to establish a structure for an EMS applicable specifically for organic wastes (i.e., manure) arising from intensive pig and poultry production facilities.

## METHODOLOGY

In collaboration with the Irish Environmental Protection Agency, an expert panel of scientists, practitioners and producers was drawn together to identify possible approaches to managing manure from pig and poultry production facilities in Ireland. Limited testing of key elements of the resulting EMS was subsequently conducted before finalising recommendations. More details are available from Magette et al. (2001).

## RESULTS AND DISCUSSION

Fundamental to any EMS is the "Deming" quality improvement cycle, also known as the PDCA (Plan, Do, Check, Act) cycle. As a guiding principle this approach assures that an EMS will be a "living" plan. Regardless of whether the facility is a "one-person operation" or part of a multinational group, it is absolutely essential that "top management" genuinely support the concept of environmental management so as to avoid, or at least rationalise, conflicts that may arise between this and other goals.

An EMS should address the entire production process, beginning with the purchase of raw materials and extending to waste utilisation. An assessment of all aspects of production for possible environmental impacts must be conducted, from which a plan with targets and schedules for addressing the impacts is devised, implemented and reviewed for continual revision / improvement. When addressing the management of organic wastes, core components of an EMS should include, but not be limited to:

*Waste prevention and minimisation*

This involves minimising the volume of manure generated and the nutrients therein through, inter alia, water management (including inspection and metering, and exclusion or minimisation of extraneous water, such as runoff and cleanup water); feed management (including phytase addition and use of low phosphorus feeds); and good animal husbandry.

*Manure storage/inventory*

This includes inspecting and assuring the integrity of manure stores, including periodic depth monitoring (for slurries), as well as the collection and chemical analysis of representative waste samples. Depth monitoring can be accomplished manually or automatically.

*Recording of feed purchases, feed composition, animal numbers, litter substrate, etc.*

Accurate records of inputs that may subsequently become pollutants, as well as the numbers and types of animals producing manure, are essential to formulating a mass balance of potential pollutants and tracking same.

*Tracking the removal and destination of manure*

An inventory approach should be used to record the date, quantity, destination, haulier, and weather conditions existing when manure is moved from the production facility. This can be accomplished effectively and efficiently using electronic identification technology. Only clean,

road-worthy vehicles should be utilised.

*Manure utilisation*

If organic wastes are utilised on land, this must be done according to a nutrient management plan (NMP), following accepted guidance and codes of practice. Applications should be made using annually calibrated equipment in the following order of preference: shallow injector, band spreader, splash plate. In the case of broiler/turkey litter, calibrated moving floor muck spreaders should be used. For layer manure, calibrated muck spreaders should be used.

If manure is going to outlets other than land, this should be accomplished using hauliers and end users committed to environmental protection, who will give receipts to document a change in manure/litter 'ownership'.

Last, but not least, all facility personnel, and particularly those involved in manure management, should be given periodic environmental training.

Although agronomic guidance for the use of nutrients must be an obvious component of an EMS for organic wastes management on land, nutrient use is only one element of comprehensive environmental management.

The project that is the subject of this paper was funded by the Irish Environmental Protection Agency to establish a structure for an EMS applicable to intensive animal producers. In the conduct of this study, an expert panel of Limited testing of key elements of the resulting EMS was subsequently conducted before finalising recommendations. The resulting "template" for development of an EMS for organic waste management is thorough, yet flexible, with a defined framework that will facilitate a producer achieving independent certification.

In this paper, the elements of an EMS for organic wastes management are presented, as well as the advantages and disadvantages of this approach.

Many industries in the value-added food sector have adopted these systems. In contrast, producers of commodity agricultural products, such as animals, have done little to implement comprehensive EMS's. Instead, such producers have typically relied on codes of good agricultural practice and similar voluntary instruments to address environmental concerns associated with the production of animals and management of the resulting organic wastes. Codes of practice, voluntary as they tend to be, are generally inferior to 3rd-party certifiable schemes in facilitating both continuous improvement in environmental management and consumer confidence in food production.

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