Production Conditions in Livestock Farms and Consequences on Environmental and Water Quality

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Intensive livestock farming is often criticised by society to be one of the most pollutant sources in the agricultural sector. The problem of manure disposal is related to land restrictions and the uncertainty in the nutrient quality of manure. Instead, commercial fertilisers are used as cheaper and more certain crop nutrient alternatives. As a consequence, local excess surplus of mineral nutrient results in the eutrophication of water sources.

In Sweden the government has enacted environmental policies towards the abatement of nutrient overload from the agricultural sector. Manure storage and applications into fields are seasonal restricted in order to abate nitrogen and phosphorus leakage as well as denitrification. For similar reasons, regulations along with upper limits of nitrogen ration and animal density per hectare have been established to reduce nitrogen and phosphorus stocks.

In a two outputs one input production, farmers are concerned about the maximisation of production net revenues. They conceive the net revenues of two outputs, meat that is directly marketed and manure that is organic nutrient input in croplands, produced by the required amount of feed intake. It is assumed that both outputs bring benefits to farmers. Actually, livestock growth and manure production can be controlled by optimal input decisions in relation to the available production technology set. The technology set regards building designs, feeding systems and managerial practices, requirements related to animal welfare. However, farmers are bounded to their own land restrictions and exogenous environmental policy regulations in association with local conditions, such as geographic concentration, vicinity to water sources, climate and soil conditions.

In this paper optimal production conditions arising from the profit maximisation of two output one input operations are stated, in order to identify animal production and manure management characteristics in livestock farms conditional to land restrictions and environmental policy regulations. The study is in conformance with Swedish slaughter pigs operations with organic manure applications into the own cropland. The empirical framework is an attempt to clarify the particularities of slaughter pig operations and consequences on environmental and water quality. For this, the cluster analysis method is used.

Preliminary results indicate that economic constraints in combination with environmental restrictions form a basis for management guidelines. Farmers with intensive production systems and good productivity performance have less economic incentives to change production in order to consider production externalities typically for livestock farming. However, these farmers have the economic strength to attain a more sustainable manure management in accordance with environmental regulations. Otherwise, farmers are able to improve production productivity by technical efficiency in conformance with environmental policy concerns.