EVOLUTION OF WASTE MANAGEMENT TECHNOLOGY IN EGG LAYING OPERATION IN PUERTO RICO

Rafael F. Dávila and Yamil Toro,
Agricultural and Biosystems Engineering Department, University of Puerto Rico, Mayagüez Campus
January 2003

Introduction

During the 1980's most of the layer operations in Puerto Rico changed their structures to high-rise buildings. This change was motivated by the reconstruction that came after hurricane Hugo in 1985 and a government incentive program in which the minimum size of the operation was established at 20,000 birds. In order to qualify for the incentive program, the farmer had to comply with the Environmental Quality Board and Planning Board regulations. These regulations required the approval of waste management plan and compliance with building codes and zoning ordinances. In addition, the loans were not approved until a competent engineer guaranteed the quality of the buildings. The result was that the number of egg operations was reduced from over one hundred (100) to less than seventy (70). Egg production increased by about thirty percent (30%).

The reconstruction process took about three years. Most of the farms changed their manure handling from wood chips or coffee hulks for bedding in buildings with loose hens to dry manure pits under pyramid type cages. For a few farms in which manure was collected in pits under single story cages for twice a year disposal to a lagoon, the change to the new system implied closing of the old manure lagoons. Granja Asomante owned by Robert G. Miller is going through the lagoon closing process. The Agricultural Extension Service of the University of Puerto Rico, has worked with this farmer in the permit acquisition process and adequate disposal of the lagoon material. This wotrk is being done as part of a Regional Water Quality Coordination Project in USEPA Region 2 in which the University of Virgin Islands, Cornell and Rutgers have been sharing technical information with the UPR. Mr. Jeffrey Potent, USEPA Region 2/Cooperative Extension Liaison has kept the group working together and the flow of information. The case is presented here.

The Non Point Source Division of the Puerto Rico Environmental Quality Board regulates all operations in which there are animals in confinement. Once a waste management plan is presented and approved, a certificate is issued which is valid for two years. During these two years the farms are visited by EQB and checked on at least once a year. The waste management plan must be designed by an agronomist or an engineer and must include land application to cropland as the ultimate manure disposal option. At this time EQB accepts nitrogen as the limiting factor for manure disposal to land without munch consideration given to phosphorous and other constituents. It is anticipated that with more attention being given to phosphorous and a phosphorous index (PI) for the Caribbean being worked on, the acceptance of nitrogen as a limiting criteria will change.

Regulations

ESTADO LIBRE ASOCIADO DE PUERTO RICO
OFICINA DE LA GOBERNADORA
JUNTA DE CALIDAD AMBIENTAL

OTORGA

CERTIFICADO DE CUMPLIMIENTO
A

_____ EPA - _____ ubicada en
_____, P.R.

Operado por

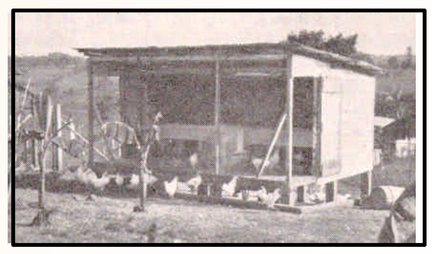
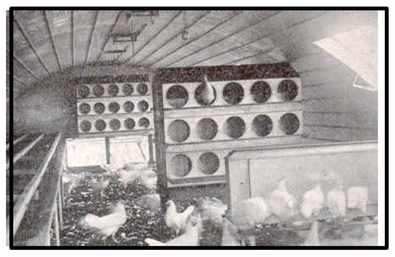
Por haber implantado las medidas necesarias para el control de la contaminación de agua y terreno, según requerido por la JUNTA DE CALIDAD AMBIENTAL.

Por lo cual le otorgamos este certificado que tiene una validez de 24 meses y vence el _____.

Este certificado puede ser revocado de no cumplir con el Plan de Manejo de Desperdicios Fecales de Animales aprobado por la Junta de Calidad Ambiental. Este presente corresponde a Certificado de Renovación.

Ing. Rubén González
Director Interino
Área de Calidad de Agua

Layer Houses – Before 1980

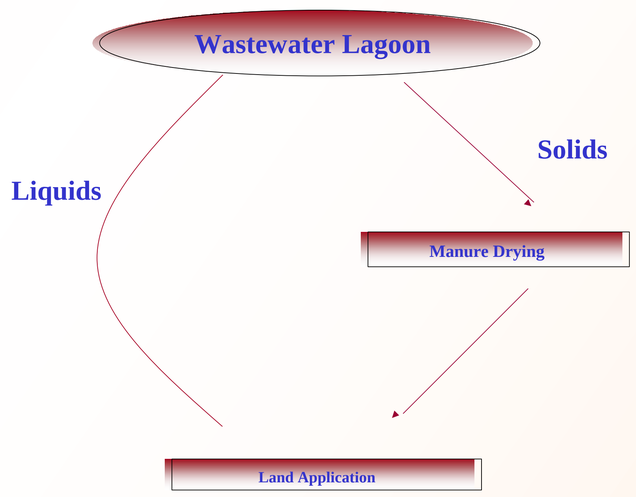



New Farms

Land Treatment of Lagoon Material

Granja Asomante in Aibonito had four buildings in which layers were housed in one level (single story) cages and manure was collected in a concrete pit and flushed twice a year into a one half acre lagoon. The farm had been in operation since the early 1960's. A renovation in which the buildings were changed to two high rise pullet buildings was proposed and accepted by EQB with the restriction that the existing lagoon had to be closed.

The lagoon closure was planned as follows: the solid material was removed with a backhoe and transported to an old concrete slab to be air dried, the liquids were pumped into tank truck which was fitted with an perforated pipe to irrigate the material into a pangola grass field. The air-dried solids were applied using a manure spreader after three weeks of drying. The air-dried solids and liquids were sampled and analyzed for nutrients and application rated adjusted once at the begging of the process. Land application of the solids and liquids was done on a 25-acre field of rolling hills. The applications were done from roads build on the contour. The volume of material being removed from the lagoon is approximately 220,000 cubic feet. The process is about half-way completed yet and to this point has taken four people a total of six working days.



Benefits

- Compliance with environmental regulations.
- Reduced initial investment cost (per bird).
- Reduced egg brekage and a cleaner product..
- More efficient feeding and medicating of the flock.
- Easier manure handling and fly control.
- Creation of a secondary income source from the crop in which manure is used as a fertilizer.

Conclusions

The last two decades transformed the layer industry in puerto rico from a traditional subsistence agricultural enterprise to more technically sophisticate, environmentally conscious and competitive business. The changes from birds on the floor to high rise buildings with pyramid cages and the use of manure as a resource for crop production have brought about a munch more efficient production system.

Farmers have incorporated manure handling into their routines and feel personal pride in complying with environmental regulations. The agricultural extension service of the university of puerto rico is also very satisfied in being a team player with other federal and state agencies in making these changes happen.

This publication was supported by a Subgrant with Cornell University, Cornell Cooperative Extension, under 2001-51130-11380 from the USDA/CSREES. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not neccessarily reflect the views of Cornell University or those of the USDA/CSREES.