

**SIMULATION MODEL TO IMPROVE FARM
ECONOMICS UNDER MIXED FARMING
SYSTEM (CROP-LIVESTOCK)**

By

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**A Thesis Submitted in Partial Fulfillment
Of
The Requirements for the Degree of**

**DOCTOR OF PHILOSOPHY
in
Agricultural Sciences
(Animal Breeding)**

**Department of Animal Production
Faculty of Agriculture
Ain Shams University**

2020

ABSTRACT

Hatem Mohamed Ismail. Simulation Model to Improve Farm Economics under Mixed Farming System (Crop-Livestock). Unpublished Ph.D. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2020.

In Egypt, mixed (crop-livestock) farming system is considered as the dominant livestock system. In order to increase productivity there is a crucial need to meet the animal daily requirements. However, there is a great challenge with the current situation of inadequate cultivated area, limited availability and quality of feed, especially during the summer season.

The aim of the current study was to characterize existing mixed farming system and find out the optimum combination of inputs from farm forage and cash crops to minimize animal feeding costs and consequently increase farm profitability. The data were collected through interviews with semi-structured questionnaire. A cross sectional survey covered a total of 100 householders located in two governorates was done. According to cluster analysis the data were divided into 3 clusters (“El-Beheira”, “Qena”, and “Mix”) according to 14 input variables. Four scenarios were proposed by the model for each cluster (El-Beheira and Qena): first scenario (SI) calculated the current feeding situation without any intervention as base run, second scenario (SII) covered animal feeding requirements according to NRC (2001), third scenario (SIII) covered the animal feeding requirements by reallocating some green forages in summer with other green forage that were higher in protein and energy, and fourth scenario (SIV) used the available and easy feeding package or reallocated farm feed resources. All four proposed scenarios were tested on the same herd. The results indicated that lactation period, the total milk yield and the number of milking heads were significantly ($P<0.05$) higher in El-Beheira cluster as compared to those in Qena cluster. Berseem area was significantly ($P<0.05$) higher in El-Beheira

cluster (48 kirats) than Qena cluster (23 kirats). Darawa percentage was significantly ($P < 0.05$) higher in Qena (8%) than El-Beheira (2%). Annual crops (sugarcane and alfalfa) was cultivated only in Qena cluster. Using appropriate nutritional packages such as corn silage and Berseem hay reduced the shortage of feed leading to a sustainable animal production. Using available feeding packages and reallocated farm resources in scenario IV reduced feeding costs in winter and summer seasons in El-Beheira by 52.7% and 4.2% and in Qena the reductions were by 52.3% and 20.9%, respectively. Scenario IV increased farm profitability followed by scenario III and scenario II. From the present results, it could be concluded that a great attention should be given to increase the farmers' awareness about the optimum balanced animal feed. Likewise appropriate use of the available feed resources that will lead to reduce animal production costs. With limitation of cultivated land, farmers have no or limited choice so, it need help to take decision. Computational models is time, effort and money saving and more efficient method to help farms to test proposed options.

Ensuring a relation between farmers and researchers through extension agents and systems study is highly recommended.

Keyword: Mixed farming system, Cluster analysis, Dairy animal feeding and Computation model.

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