

APPRAISAL OF THE CURRENT CROP/LIVESTOCK PRODUCTION SYSTEM IN A NEW RECLAIMED AREA OPERATED BY UNIVERSITY GRADUATES IN EGYPT

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SUMMARY

This study was carried out at Bostan sector, a newly reclaimed area, about 130 Km north-west of Cairo. A random sample of 118 farms was taken and a questionnaire was designed to characterize the current crop/livestock production system and assess its financial efficiency. Data were collected over the agricultural year (October 1997- September 1998). Data were analyzed using a fixed effects linear model for all productive traits. Farm budget was used for the financial assessment.

Farm size, family size and herd size were 5.0 feddans, 7.6 persons and 2.2 heads, respectively. About 40% of the farmers kept buffaloes only, while 26% raised cows only and 34% had mixed herds.

The animal production traits were estimated as 943 kg for total milk yield (TMY), in a lactation period (LP) of 180 days and daily milk yield (DMY) of 5.2 kg for native cows. The corresponding figures for buffaloes were 1332 kg, 199 days and 6.6 kg, respectively. The crop production per feddan were 1742 kg of wheat, 870 kg of groundnuts, 1582 kg of maize and 10.5 tons of berseem. Return in LE (Egyptian pound) were 1950 per animal unit (AU), LE 870 per feddan and LE 15 per labor unit. The outputs/inputs ratio per farm was 1.6.

Keywords: *Crop/livestock, production system, farm budget, reclaimed area, Egypt*

INTRODUCTION

One of the most important targets of the government policy is to reclaim desert area in order to increase the area of cultivated land and find job opportunities for young graduates. Attention has been directed towards the newly reclaimed lands located off the Nile Delta, especially the desert lands, as potential areas for crop and livestock development. There is a wide range of production systems in all of the reclaimed lands. The mixed crop/livestock production system is the dominating system and is practiced in the small and medium farms. It is estimated that farms of 5 feddan (feddan = 4200 m²) or less contain about 95% of Egypt's cattle and buffalo population.

The aim of this study is to characterize the current crop/livestock production system operated by young graduates and assess the efficiency of the production system. Such a study would be useful in planning for improvement of the efficiency of the system, and in identifying constraints to animal production development.

MATERIALS AND METHODS

1. The study area

This study was carried out at Bostan sector, a newly reclaimed area, located west of the Nile Delta, about 130 Km north-west of Cairo, Egypt. The total agricultural area in Bostan sector is about 25 thousand feddans. This area is distributed over 10 villages and the farmers are mainly university graduates. They operate mixed farming system where both animal and crop production are practiced.

2. Data

A random sample of 118 farms was taken. A questionnaire was designed to cover available resources, activities, cost and revenues. A field survey was performed and data on the agriculture year (October 1997- September 1998) were collected. Data included the following variables: 1) production resources: farm size, family size, herd size, herd structure, and herd composition, 2) animal production performance: daily milk yield (DMY) in kg, lactation period (LP) in days and total milk yield (TMY) in kg, 3) crop production performance per feddan: main crops yield and by-product yield, and 4) farm budget: gross output, variable and fixed costs.

3. Statistical Analysis

The data were analyzed by the least squares technique using the general linear model procedure of SAS (1990). The fixed-effects linear model used to analyze animal traits and crop yields was as follows:

$$y_{ij} = \mu + a_i + e_{ij}$$

where: y_{ij} is the observation, μ is the general mean, a common element to all observations in the population, a_i is the effect due to the i th animal breed, $i = 1, 2, 3$ (1= buffalo, 2= native cow and 3= crossbred) or due to i th crop type, $i = 1, 2, 3, 4$, (1= wheat, 2= groundnuts, 3= maize and 4= berseem) and e_{ij} is a random effect associated with the individual observation.

4. Farm budget analysis

Farm budget is concerned with organizing resources on a farm to maximize profits, more often, family satisfaction. Preparation of farm budgets allows to plan for efficient use of resources and reflects the profitability of a farm on an annual basis. It is the reward for labor, management and capital during the year.

Farm budget was prepared for the studied area. Gross output is calculated by multiplying the total quantity of the final marketable product by its average farm gate price, as the farm gate represents the point of first sale. The farm gate price is the dividing line between income derived from production and income from marketing the product. Variable costs for items such as feeding, hired labor, veterinary care, seeds, fertilizers were calculated. Gross margin is obtained by subtracting the variable costs from the gross output. The gross margin is useful in identifying the best combination from the available resources to increase profit. Raising the profitability of a production system may be achieved through improving the gross margins of the existing enterprises by changing the enterprise-mix and/or reducing the level of costs.

Efficiency of the current production system (the return per unit of the limiting resource) can be achieved by dividing the gross margin by the number of resource units needed. To facilitate comparison between different production systems and different farm size, the results can be expressed as return per AU, per feddan and per labor (man/day)

RESULTS AND DISCUSSION

1. Characterization of the current production system

The major features of the current crop/livestock production system in Bostan sector are presented in Table 1. The characterization of the system included: production resources, current management practices and production performance.

Table 1. The major features of the crop/livestock production system in Bostan sector

Character	Unit	Average
Farm size	(feddan)	5.0
Family size	(person)	7.6
Herd size	(head)	2.2
Herd composition:		
Buffalo herds only	(%)	40
Cow herds only	(%)	26
Mixed-herds	(%)	34
Fodder productions:		
Area of winter fodder	(feddan)	1.66
% of farm size	(%)	33.0
Area of summer fodder	(feddan)	0.33
% of farm size	(%)	15.0

Under the crop/livestock production system in Bostan sector, three types of herds were differentiated according to herd composition, cow-herds, buffalo-herds and mixed-herds which included both cows and buffalo. About 40% of the herds comprised buffaloes, while cow herds represented 26%. Mixed-herds with small ruminants represented 34%. Most of farmers owned native breeds and crossbred, in addition to few numbers of small ruminants and poultry. The farmers obtained their animals either from the village market or from Central Fund for Animal Wealth Development. Female buffaloes and cows were kept for milk production, and males were kept for fattening.

Manpower is divided into two main classes, family and hired labor. Family labor is used within the house and on the farm, and can be employed elsewhere. Hired agricultural labor (casual and permanent) comes mainly from neighboring governorates of Menofia and Beheira. Source of irrigation is mainly obtained from El-Nassery canal which comes from El-Beherie branch of the Nile. Surface irrigation method is the common system in the area.

Major proportion of the farm size is allocated to produce fodder crops, especially in winter. The remaining area is allocated to other cash crops. Results showed that about one third of the farm size is cultivated with clover in winter and about 15% of farm size for summer fodder.

The cropping pattern and size, results from the interaction of farmers objectives, natural factors, government policies, managerial and financial capacities. Allocation of land for various crops was left to the farmer. The main winter crop was wheat in addition to clover, while in summer the main crops are groundnuts and maize. In the studied area, the highest percentage of farmers (about 70%) were cultivated groundnuts followed by wheat. Groundnuts is clearly the main crop representing about 65% of the total farm size, while wheat representing about 50%.

2. Current management practices

2.1. Animal production

Animals are kept in small enclosures connected to the family house. Animals were taken care of by family labor. Cows and buffaloes were naturally mated with bulls available in the village. Mating was arranged in such a way that cows and buffaloes would calve within the clover season (October - May). Animals were hand milked twice daily, and the milk was used mainly for family consumption. Surplus fresh milk and/or milk products were sold at the village market to the middlemen. Egyptian clover (*Trifolium Alexandrinum*) was the main source of feeding in winter. While in summer animals were fed on fodder maize, rice straw and crop by-products, in addition to some concentrates purchased from market. Manure was transferred from the barn and used for increasing soil fertility.

2.2. Crop production

The dripping and sprinkling techniques of irrigation are the common irrigation systems. Most of farmers used machinery particularly in preparing the soil for cultivation. These equipment were owned by the farmers or rented. Most of the farmers in the studied area utilized chemical fertilizers, in addition to manure produced from their own farms.

3. Production performance

3.1. Animal production

Most of the published estimates on productive performance of buffalo, native and crossbred cows were obtained from state and experimental farms. It is of interest to compare these estimates with those obtained in the present study. Least squares means of the productive traits (TMY, LP and DMY) and standard errors in the studied area for different breeds are presented in Table 2. The obtained result of TMY was estimated as 1332 kg for buffaloes. The estimate of the present study is lower than those reported by Abdel-Aziz and Hamed (1979, 1969 kg) and higher than those reported by Mostageer *et al.* (1981, of 1277 kg), Nigm *et al.* (1986, 1246 kg), Abdel-Aziz (1993, 1250 kg) and Ahmed *et al.* (1996, 1166 kg). The least squares means of TMY for crossbred cows were estimated as 1557 kg. This estimate is higher than that reported by Ahmed *et al.* (1996, 1315 kg) and lower than that reported by Abdel-Aziz (1993, 1600 kg) under small farm conditions. These differences may be due to different management practices or because of selected animals distributed by Central Fund of Animal Wealth Development.

Table 2. Least squares means and standard errors for milk production traits

Classification	N	TMY, kg	LP, days	DMY, kg
Overall	199	1247 ± 36	192 ± 2.3	6.4 ± 0.18
Breed				
Buffaloes	97	1332 ± 52	199 ± 3.3	6.6 ± 0.26
Native cows	65	943 ± 63	180 ± 4.0	5.2 ± 0.32
Crossbred	37	1557 ± 84	197 ± 5.3	8.0 ± 0.42

3.2. Crop production

The crop yield per feddan is a composite trait resulting from natural factors, weed control, soil fertility, seedling rate, system of irrigation, cultivating date and timing of each operation. The crop production per feddan were 1742 kg for wheat, 870 kg for groundnuts, 1582 kg for maize and 10.5 tons for berseem. The obtained results are higher than those reported by Ahmed *et al.* (1996) for all studied crops. This may be due to one or more factors mentioned above that affecting crop yield.

4. Financial assessment

The value of production is measured in terms of total gross output. This measure combines many different farm products into one measure. Results of farm budget analysis are presented in Figure 1. The results revealed that 22.5% of the total annual inputs of the farm are going to the animal production

activities, while 77.5 % are going to the crop activities. Out of the animal production inputs, feeding costs represents about 78 %. On the other hand, animal production gross outputs were 45.8%, while crop production outputs were 54.2%. The breakdown of the animal production products showed that milk production revenues were 30.7%, while meat production was 12.3% of the total gross outputs. The components of the animal gross outputs (milk, meat, manure) depend on herd structure (breeding stock, young stock), breed, number of cows in-milk, daily milk yield, lactation period and average daily gain of fattened animals.

5. Efficiency of the current production system

Return per unit of limited resources are presented in Table 3. The obtained values of the return per feddan and per AU are higher than those obtained by Ahmed *et al.* (1996) under small farm conditions in South Tahreer Province operated by university graduates, while return per labor was lower. This difference may be due to the effect of farm size (5 feddans in the present study vs. 14 feddans in South Tahreer Province).

The results revealed that reward of animal production activities is profitable under proper management and resources allocation of the available resources. The results also showed that in the case of crop production, groundnuts considered the major source of income in the studied area. It represented 29.1% of the total annual gross output. From these results farmers can decide which enterprise could be maximized or minimized and which components have a major impact on the farm profitability.

Table 3. Efficiency of the current crop/livestock production system

Criteria	Value (LE)
Return per feddan	870
Return per animal unit (AU)	1950
Return per labor	15
Output/input ratio	1.6

Constraints to development

The data compiled from the questionnaire were used to identify constraints to development of animal production in Bostan sector, which can be summarized as: low genetic ability and reproductive efficiency of local breeds, lack of genetic evaluation and improvement policies, small herd and farm size, weakness of milk-handling tools and cold transportation facilities, inefficient milk collection and marketing scheme.

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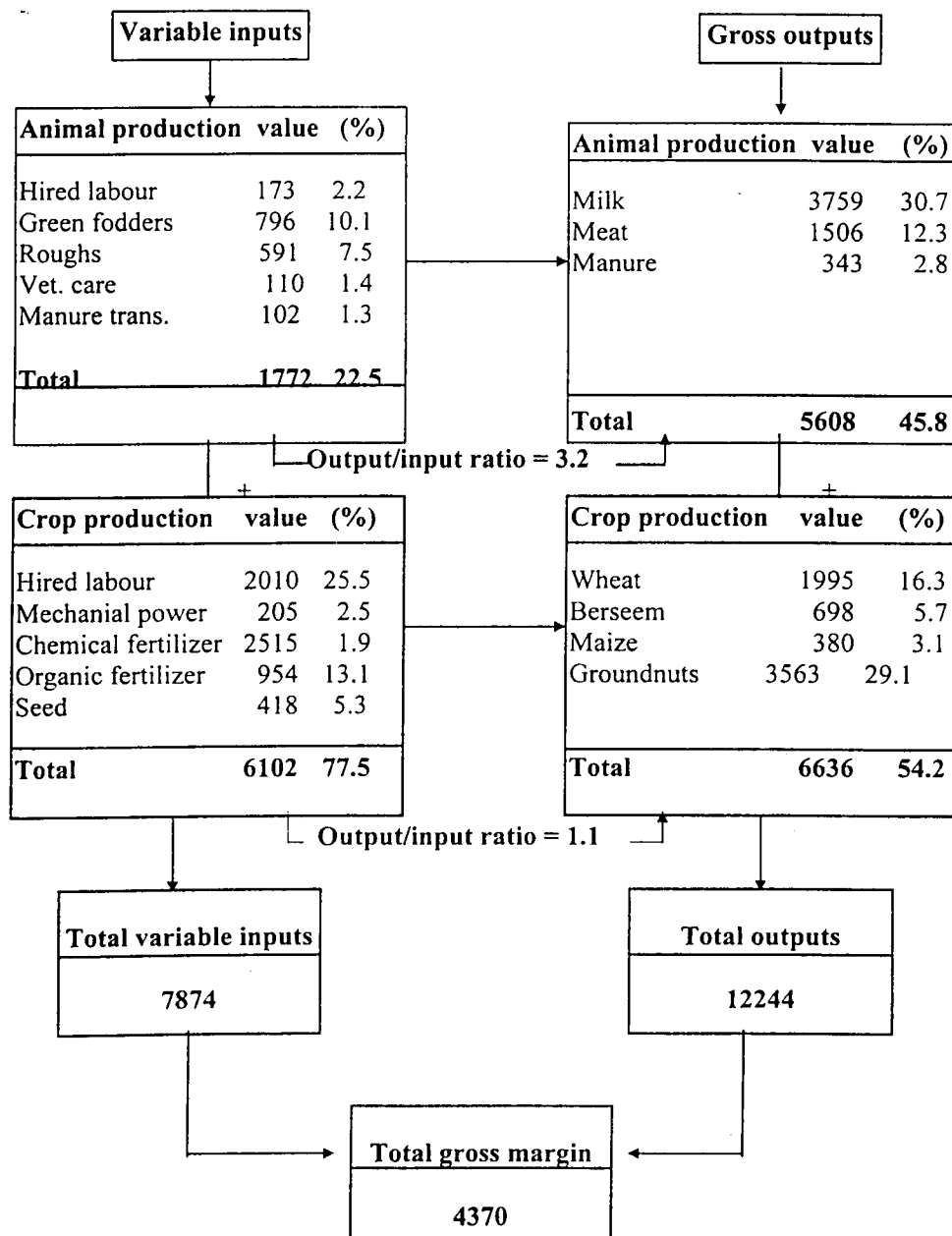


Figure 1. Breakdown of the annual inputs and outputs in LE (Egyptian pound) = 0.29 US Dollar of the crop/livestock production system in the studied area