EVALUATION OF SOME LOCAL MILK PRODUCTION SYSTEMS

BY

REHAM MOHAMED NOUR EL-DIN MOHAMED RASHWAN
B. Sc. Agric. Sc. (Animal Production), Ain Shams University, 1998

A thesis submitted in partial fulfillment
of
the requirements for the degree of

MASTER OF SCIENCE

in
Agricultural Science
(Animal Breeding)

Department of Animal Production
Faculty of Agriculture – Ain Shams University

2006

Approval Sheet

EVALUATION OF SOME LOCAL MILK PRODUCTION SYSTEMS

BY

REHAM MOHAMED NOUR EL-DIN MOHAMED RASHWAN
B. Sc. Agric. Sc. (Animal Production), Ain Shams University, 1998

This thesis for M. Sc. degree has been approved by:

Prof. Dr. Ali Attia Nigm **……**
Professor of Animal Breeding, Faculty of Agriculture, Cairo University

Dr. Mohamed Hussein Sadek **…….....**
Associate Professor of Animal Breeding, Faculty of Agriculture, Ain Shams University

Prof. Dr. Salah Galal **……..**
Professor Emeritus of Animal Breeding,
Faculty of Agriculture, Ain Shams University

Date of Examination: 25 / 02 / 2006

EVALUATION OF SOME LOCAL MILK PRODUCTION SYSTEMS

BY

REHAM MOHAMED NOUR EL-DIN MOHAMED RASHWAN
B. Sc. Agric. Sc. (Animal Production), Ain Shams University, 1998

Under the supervision of:

Prof. Dr. Salah Galal
Professor Emeritus of Animal Breeding,
Dep. of Animal Production, Faculty of Agriculture,
Ain Shams University

Dr. Samira Abdo Arafa
Senior Researcher of Animal Breeding,
Animal Production Research Institute,
Agricultural Research Center

ABSTRACT

Reham Mohamed Nour El-Din Mohamed Rashwan, Evaluation of Some Local Milk Production Systems, Unpublished Master of Science thesis, Ain Shams University, Faculty of Agriculture, Department of Animal Production, 2006.

The objectives of this study were (1) characterization of the crop/livestock production systems in Nile delta region of Egypt; and (2) evaluation of the impact of interventions through the Food Sector Development Programme (FSDP) programme for the development of dairy production system in the target region. Data on 492 Crop/livestock farms were collected through a survey as a part of the data collected during the period between 1993 and 2001. Each farmer was interviewed twice, once at the beginning of study during 1993 to 1997 and another at the end of the study during 1998 to 2001. Data were collected from five different governorates in the Nile delta, Damietta (DAM), Kafr El-Sheikh (KEl), Menoufeia (MEN), Daqahleia (DAQ) and Gharbeia (GHA). Two districts were sampled from each governorate, one had farmers collaborating with the programme (C_1) and the other non-collaborating (C_0) farmers. Collaborating farmers would get at least one of the programme training packages while non-collaborating farmers received no such training packages (as a control group). Data on daily milk yield, weaning mortality rate, farm size, herd size, internal rate of return (IRR), return per feddan (RPF), and return per animal (RPA) were analyzed using least squares procedures. Least squares analysis of variance was performed for all variables studied (daily milk yield, weaning mortality rate, farm size, herd size, internal rate of return (IRR), return per feddan (RPF), and return per animal (RPA)). Three statistical models were applied for evaluating the effects of proposed factors on studied variable. The first model aiming at a preliminary evaluation of the programme

impacts included the governorate and farm within district within governorate (as the model error) expressed as after programme minus before programme separately for collaborating farms (C_1) and non-collaborating farms (C_0). The other two models were assumed to evaluate year effect and district effect and try to deduce an estimate of programme impact minimizing the time factor. The second model included the effects of year, governorate, farm within district within governorate on all studied variables, while, C_0 and C_1 farms were separately analyzed. The third model studied the effects of the year within status, the status (before/after the programme activities), governorate, and farm within district within governorate (considered as the first error to be used for testing the preceding effects). This analysis was done for collaborating districts only.

In addition, linear programming (LP) techniques were employed using a model including land, labor, and available cash resources as factors affecting crop/livestock farm. The objective equation of the LP model was to maximize the gross margin of the farm from the production of both the field crops and dairy animals. Three runs of one LP model were made, the first run (base run) to simulate the actual situation, while the second run (LP_1) to avoid the unacceptable solution for the base run while the third (LP_2) to get feasible solution for the district that had no feasible solution.

Results showed that MEN reported the highest programme impact on daily milk yield (Model I) and highest average (with Model II and III) for buffalo, native and crossbred while DAM was the highest in exotic daily milk yield. The high production of the daily milk yield from exotic animals and the high programme impact in DAM might be due to the high interest in milk processing (e.g., DAM cheese) which makes them follow a different production strategy. The programme had positive impact on daily milk yield in all genotypes, but this impact was higher in buffalo and native than in crossbred and exotic. This result could be due

to that, the programme paid more attention for developing the production from buffalo and native cattle or that farmers with crossbred and exotics are more progressive producers who had already been applying some interventions and the interventions by the programme was less meaningful to them than to farmers with buffalo and native cattle.

Programme showed significant effect on weaning mortality rate in all genotypes, which might be due to the training packages and other technical support activities concerning animal health, improving feeds, calf rearing and better animal housing that all improved calf management and viability. DAQ governorate showed the highest estimates for the weaning mortality rate in all genotypes, while DAM governorate scored the least.

MEN registered the lowest mean and impact on farm size and herd size while DAQ registered the highest estimates for both, except the herd size estimate for the C0 group in the first Model where GHA recorded the highest value. The programme had a positive effect on both farm and herd size.

DAQ, DAM and MEN scored the highest IRR percentage, RPF and RPA, respectively, while the lowest governorates were respectively, KEL, KEL and DAM. Collaborating districts were significantly higher the non-collaborating ones in all economic indicators. Dairy animals in MEN are well selected for milk production and their products are transferred and sold in the main nearby cities especially Cairo. The case is different in DAM since the land holdings are much lager and cash crops with high return are normally cultivated i.e., rice which resulted in high returns from land. Generally, results indicated the positive effect of the FSDP activities on the income for small mixed dairy farms.

The LP (base run) solution showed that, the dairy animal activities contributed considerably to the total farm gross margin, representing about 25%. The GM, RPF and RPA increased in general by about 9 % , 5% and 11%, respectively, due to programme impact.

However, the solution of LP_1 showed that, the dairy animal activities contribution slightly decreased from 25% in base run to about 24% to the total farm gross margin. The GM, RPF and RPA increased in general by about 10%, 7% and 10%, respectively after programme. Also, GM and RPF increased in general by 0.8% , 0.2% and RPA decrease by about 0.4%, as compared to the base run. This could be due to modifying the land constraints to cultivate at least one feddan, which led to cultivating more cropping area. The solution of LP_2 showed that, the dairy animal activities contribution slightly increased from 25% in the base run and 24% in LP_1 to about 26% to the total farm gross margin. The GM, RPF and RPA increased in general by about 8% , 3% and 10%, respectively after programme impact and by 3%, 10%, 5% as compared to the base run and by 2%, 10%, and 9% as compared to LP_1, respectively. In general, the LP model with the three runs showed that, both land and available cash resources (ACR) were the limiting resources while labor was not. It could be concluded that FSDP in general had a positive impact in improving Crop/livestock production system in the Nile delta region. MEN farmers would earn more income if they improved fresh buffalo milk production and market it to the nearest big cities like Cairo, while DAM farmers would do so by increasing milk processing industry by keep high yielding dairy breeds.

Key words: Crop/livestock farm, Linear programming, Gross margin.

ACKNOWLEDGMENT

All praises are to Allah, who gave me the ability to complete this study.

Sincerest gratitude is due to Dr. Salah Galal, Professor of Animal Breeding and Genetics, Faculty of Agriculture, Ain Shams University, for his supervision, guidance and sincere help and care paid to me during the study.

Deep gratitude is to Dr. Samira Abdo Arafa, Senior Researcher of Animal Breeding, Animal Production Research Institute, for her close supervision and care.

I am very much beholden to Dr. Samir M. Alsheikh, Researcher, Desert Research Centre, for his helping, training and teaching in linear programming.

I am also indebted to the staff of the Dept. of Animal Production, and the Scientific Computer Unit, Faculty of Agriculture, Ain Shams University for the encouraging atmosphere and help they provided during the study.

My gratitude and sincere appreciation go to Prof. Dr. Hussein Mansour, Professor of Animal Breeding and Genetics for suggesting the topic and initiating the study.

Finally, I am gratefully thankful to my husband and family for their support and help which facilitated the completion of this work.

Contents

List of Tables

List of Figures

List of Abbreviations

ACR	Available Cash Resources
AI	Artificial Insemination
APRI	Animal Production Research Institute
ASDP	Agricultural Sector Development Programme
C_0	Collaborating District
C_1	Non-Collaborating District
D	District
DAM	Damietta
DAQ	Daqahleia
DF	Degrees of Freedom
∈	Random Error
€	Euro
EC	European Commission
F	Farm
FSDP	Food Sector Development Programme
FTF	Farmer To Farmer Project
G	Governorate
GAMS	General Algebra Modeling System
GHA	Gharbeia
GM	Gross Margin
GO	Gross Output
IRR	Internal Rate of Return
ISDC	Information Support Decision Center
KEL	Kafr El Sheikh
kg	Kilogram(s)
LE	Egyptian Pound(s)
LP	Linear Programming
LSM	Least Squares Mean
μ	Overall Mean
MEN	Menoufeia