# ECONOMICS OF LIVESTOCK ON TRADITIONAL FARM

BY

Dr. IBRAHIM SOLIMAN and Dr. JAMES FITCH

Dept-Ag-Econ-Zagazig Univ. Agrimanagement INC Yakima Wash-USA

with

Dr. NESREEN ABD EL AZIZ

Ag. Econ. Res. Instit. Egypt

## INTRODUCTION

Livestock production has become a cause for national concern in recent years, since its products prices have tended to rise more rapidly than the prices of other foods and due to sharp increases in expenditure of foreign currency to import Livestock products and feeds (Soliman, 1982a Soliman, 1981 and Abd El Zaher, 1982). Livestock production accounts for about 30 percent of the gross product of agriculture (Abd El Zaher, 1982) and it is a very important source of nutrition for food security with respect to socio-economic aspects of the Egyptian population (Soliman 1982b). Yet Livestock production is one of the least understood aspects of Egyptian agriculture. This lack of understanding stems partly from

the fact that the Livestock data base is one of the weakest aspects of the country's agricultural statistics. Available national livestock statistics have been discussed by Fitch and Soliman (1981). The present study examines the Livestock economy at the farm level.

Ward(1975) claims that "intensive animal production has never been important in the agriculture of the world's less developed countries, basically because animals compete with man for land on which to produce crops". Attention to Livestock on traditional farm, in this study, represents departure from the common tendency in Egyptian research which has been to focus on large scale, commercial or specialized, either feedlots or dairy herds (Wadwan, 1976, Soliman, 1978, El Tambadawy , 1979, Nasr, 1979 and Abd El Zaher, 1982). Indeed, it was long the case that the only technical coefficients which were available for livestock production were those which had been derived from national aggregate secondary data and not from emprical study. The empirical studies concerned with livestock

production response were based on experimental rather than field data (Soliman,1973). A recent exception to this tendency was the Winrock study (1980). However, that study involved farmers in just two villages, and there was no explicit evaluation of costs and returns to livestock production (efficiency measures) nor was there a comparison of the productivity or efficiency of small farms versus large farms. (Soliman and Zaki (1982) used a 1981 survery data of four villages in Sharkia Governorate to show that demogrophic factors more affect decisions on investment in Livestock than economic variables . Such demographic factors are family size and female members of the family on traditional farms. The hypotheses behind this evidence is that family size may reffect labour availability on the farm and/or demand for animal products and also that females on the farm provide most of labour for livestock activity, particularly milk processing. However, Walters (1981), based on a survey of livestock producers in onevillage near Kafr El Sheikh, could find no evidence of any tendency for livestock population density to increase as farm family population density increases.

Hopkins (1980) noted that a very high proportion of the livestock products, of small farms, is used for home consumption. Therefore this mean that small farms should not be viewed as a possible source of surplus livestock products for the country's growing rural and urban non-farm population. Survey data presented by Richards and Martin (1981) found that livestock production generates a Higher proportion of income on small farms than on large farms, and the same studyshowed that small farmers devote more labour to livestock than crops.

## Objectives

The specific objectives of the present study are to identify the production structure and technical coefficients for livestock on traditional farms, to examine feeding practices and patterns of feed availability, to examine output levels and outlets and to measure the cost and return structure . To measure productive efficiency using a budget analysis model is a finai goal. Measurements of efficiency include ; the return to farm family labour and manegement, output per unit of

input and the return to capital invested. It is of particularl concern to identify how the levels of input-output patterns of product processing and utilization and the efficiency measures vary by farm size Finally we consider the implications for national policy. Special attention is given to the role of family labour and family size and sturcutre in livestock enterprising.

## Data Base and Methodology

The study draws, mainly, upon data from the 1977 farm Management Survey to address the objectives. This Survey was conducted in the course of three separate interveiws spread throughout the 1977 cropyear, by the Micro Economic study of the Egyptian farm System Project, Ministry of Agriculture . Financial support for this project was provided by the ford Foundation and PL-480.

Though the survey was designed more in the intrest of collecting cropping data than livestock data, it provided a variety of useful insights into the role of livestock.

for the present study a sub-sample of 10 of the survey villages was selected for detailed examination . They represent a variety of typical areas in the Delta and Upper Egypt. In particular, they include two villages each from Dakahlia, Domyatt, Sharkia, and Monofia Governorates from delta region, Giza Governorate from Middle Egypt, and Kena and Sohag Governorates from upper Egypt. Each village contained between 16 to 18 farmers which had been selected in random fashion so as to represent five different farm size strata. Thus, the entire sample included 175 farms ranging in size from a fraction of a feddan to over 60 feddans. The various farm size strata are all well represented in the sample, with numbers in each ranging from 17 to 69 farms. Nevertheless, the sample strata were not proportional . Weights which were used to derive valid averages, were taken from a 1975, Egyptian Ministry of Agriculture study of farm holdings (Table 1). Data were reprocessed and an effort was made to avoid and overcome their weaknesses through paying careful attection to what was happening , farm by farm . 11 farms were removed, due to data problems leaving 164 farms for analysis.

Table 1. Weights Used For Averages By Farm Size Class

| | Farm Size in feddans | | | | | All Farms in sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| Weights for Averages : | 0 To1 | 1To3 | 3To5 | 5To10 | 10+ | | |
| Proportion of Farms* | 0.400 | 0.411 | 0.130 | .054 | .005 | 1.00 | |
| In Class | | | | | | | |
| Proportion of Farm Area* | .124 | .337 | .198 | .158 | .183 | 1.00 | 1.00 |
| Farms in sample (N) | 33 | 69 | 23 | 17 | 23 | 165 | |
| Average farm size (Feddans) | .83 | 1.97 | 4.06 | 6.56 | 21.63 | 5.22 | 2.13 |

---

* Source : Ministry of Agriculture (Egypt) : A study of farm Holdings size and Distribution in Egypt , 1975 .

## RESULTS AND DISCUSSIONS

For comperhensive presentations, results are discussed under some major titles.

Livestock Holdings Pattern : It was noticed that the vast majority of farms do own animals of one kind or another . As table 2 shows, 89 percent of the farms surved, reported holdings of some animals (not including poultry). Work animals holdings were more common than other animals . Only 20 percent of farms reported sheep and goats holdings. This may support the hypothesis that sheep and goats in Egypt are either in nomadic or semi-nomadic herds . However, in the subsequent analysis, averages and other statistics are based on all (sample)farms, and not just on those who own some livestock or a particular type of animals.

Livestock Holding Size : Farms of less than 1 feddan in size held an average of 1.26 animal units, wheares farms of greater than 10 feddans in size held an average of 3.8 animal units (Table 3) . In other words, larger farms tend to have more livestock than smaller

Table 2: Presentage of Farms Reporting Holdings of Animals, by Type of Animal and by Farm Size Class, 10-Village Sub-Sample, 1977 Farm Management Survey .

| | size of farm | | | | | Weighted |
|---|---|---|---|---|---|---|
| | 0 TO 1 | 1 TO 3 | 3 TO 5 | 5 TO 10 | 10+ | Average |
| Farms with Holdings of some: | | | | | | |
| Animals of any kind : | 84 | 91 | 100 | 82. | 83 | 89 |
| Cattle | 58 | 45 | 57 | 53 | 61 | 52 |
| Buffaloes | 51 | 48 | 61 | 35 | 39 | 50 |
| Sheep and Goats | 19 | 23 | 22 | 0 | 13 | 20 |
| Work Animals, any kind | 58 | 81 | 83 | 71 | 78 | 72 |
| Poultry | 72 | 71 | 78 | 53 | 57 | 71 |

+ Includes all animals listed above, but not poultry .

Table 3 : Livestock Holding Size Composition and Structure by Farm Size Class :

| | Farm size(feddans) | | | | | All farms | Weighted |
|---|---|---|---|---|---|---|---|
| | 0TO1 | 1TO3 | 3TO5 | 5TO10 | /0 | on sample | Average |
| Animal units/farm | 1.26 | 1.42 | 2.59 | 1.7 | 3.8 | 1.91 | 1.54 |
| Animal units/feddan | 1.52 | 0.72 | 0.64 | 0.26 | 0.18 | 0.37 | 0.63 |
| Animal value/farm (L.E.) | 433 | 450 | 846 | 509 | 1359 | 634 | 502 |
| Animal value/feddan(L.E.) | 522 | 228 | 208 | 78 | 63 | 121 | 236 . |

farms . On a per feddan basis, however, the picture changes markedly . Animal units per feddan decreased gradually from 1.52 with farms of less than one feddan to 0.18 units with farms of greater than 10 feddans. Values varied in a similar way . Therefore, it is clear, that smaller farms are far more intensive in livestock holdings than larger farms.

Livestock Herd Structure and Composition :

Larger farms tend to favour cattle over buffaloes, as shown from table 4 , where heads of cattle per farm increase gradually from 0.51 head per farm less than one feddan to 2.78 heads per farm greater than 10 feddans (table 4) , while buffalo heads per farm fluctuate between 0.72 head with farm class 1 to less 3 feddans as a minimum and 1.3 heads with farm class greater than 10 feddans . However, proportion of producible (dairy) buffals females (over 1 year) seems to increase as farm size increases . This implies that buffalo is the main dairy animal in Egypt . With respect to work animals, large farms tend to have more heads than small

Table 4 : Livestock Herd Structure and Comparison by Farm Size Class

| | Farm size class | | | | | All Farms In Sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | | |
| 1. Cattle per farm(Head): | .51 | .94 | 1.35 | 1.41 | 2.78 | 1.21 | .86 |
| % Dairy females * | 74 | 75 | 77 | 75 | 83 | 77 | 74 |
| % Heivers for replacement** | 17 | 19 | 10 | 8 | 8 | 13 | 16 |
| % Feeding calves | 5 | 5 | 3 | 0 | 8 | 6 | 6 |
| % Yearling calves | 4 | 1 | 10 | 17 | 1 | 4 | 4 |
| 2. Buffaloes per farm(Head): | .74 | .72 | 1.22 | .41 | 1.30 | .84 | .78 |
| % Dairy Females * | 80 | 89 | 97 | 99 | 90 | 89 | 87 |
| % Hievers for Replacement** | 9 | 8 | 3 | 0 | 0 | 6 | 8 |
| % Feeding calves | 4 | 1 | 0 | 1 | 3 | 2 | 2 |
| % Yearling calves | 7 | 1 | 0 | 0 | 7 | 3 | 4 |
| 3. Seep & Goats/farm(Head): | 1.15 | .45 | .78 | .24 | 1.22 | .72 | .77 |
| 4. Work animals/farm(Head): | .67 | .98 | 1.4 | 1.43 | 2.6 | 1.24 | .94 |
| % Donkeys ≠ | 73 | 72 | 65 | 52 | 55 | 65 | 70 |
| % Camels | 24 | 14 | 16 | 13 | 8 | 14 | 18 |
| % Cattle & Buffaloes s | 3 | 14 | 19 | 35 | 37 | 21 | 12 |

* Include Females over 1 year
** Include females less 1 year
≠ It may include mules and horses .
s The bulck is cattle cows, but they include, sometimes oxen or buffalo cows .

ones (table 4) . Though, donkeys are the dominant work animals for all farm size classes, their proportion within work animals, tends to decrease in favour of work cattle, buffaloes and oxen, as farm size increases. This is a surprising result, because it means that expantion in farm scale does not cut the work animals expantion on farm. This substitution relationship between animal work and machinary work with farm size constraint is discussed in later section .

On the other hand, cattle and buffaloes herd structure, on table 4 , refers to an important point which is the replacement rate . Proportion of the heivers for replacement (less than one year) decreases as farm size increases. This implies that the small farmers are the main cattle and buffals breaders, they are more responsible for reproducing cycle of livestock than large farmers, though all current policies support large farmers (Soliman 1981 and 1982 a). Another point stems from cattle and buffaloes herd structure . On the average, the

replacement rate of cattle is about two folds that of buffaloes . Even though, the dairy buffaloes proportion is higher than cattle, the culling rate in buffaloes herds is more less than cattle herds. Selling male and female buffalo veal calves for slaughter at high price is a preferable decision to save buffalo milk for sale . With respect to fattening operations on farm, the low percentage of cattle and buffaloes feeding and rearing calves indicates that the traditional farmers prefer to be feeder calves producer more than fattening operators.

Labour Use and Livestock Activity on Farm : Table 5 shows that 80% of weighted average labour use on farm is family labour (207 days /feddan/ year) and 20 percent is hired labour (53 days/ feddan/year ) Proportion of hired labour in total labour use and its density per feddan increases as farm size increases, whereas family labour proportion and its density decreases as farm size increases. This performance may imply higher density of machinary hours per feddan

Tables 5: Labour Use on Farm By Farm Size Class

| | ------ Farm size (Feddans) | | | | | Sample | Weighted |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | average | average |
| Average family size(persons) | 6.4 | 7.7 | 9.2 | 7.9 | 7.5 | 7.7 | 7.38 |
| Persons Per feddan | 7.71 | 3.91 | 2.27 | 1.20 | 0.35 | 1.48 | 5.05 |
| | | Days per year | | | | | |
| Labour/feddan: Total | 474 | 266 | 207 | 164 | 128 | 175 | 260 |
| family | 445 | 216 | 145 | 99 | 69 | 117 | 207 |
| % | 94 | 81 | 70 | 60 | 54 | 67 | 80 |
| Hired | 31 | 50 | 62 | 65 | 59 | 58 | 53 |
| % | 6 | 19 | 30 | 40 | 46 | 33 | 20 |
| | | Percent of total labour | | | | | |
| for crops | 27 | 60 | 68 | 85 | 85 | 72 | 56 |
| For livestock | 73 | 40 | 32 | 15 | 15 | 28 | 44 |
| | | Percent of crop labour | | | | | |
| Hired | 23 | 30 | 41 | 45 | 47 | 42 | 35 |
| Family | 77 | 70 | 59 | 55 | 53 | 58 | 65 |
| | | Percent of livestock labour | | | | | |
| Hired | 0 | 2 | 7 | 10 | 39 | 11 | 2 |
| Family | 100 | 98 | 93 | 90 | 61 | 89 | 98 |
| | | Labour for livestock per animal unit | | | | | |
| Hours/Day | 4.05 | 2.28 | 1.71 | 1.47 | 1.73 | 2.21 | 2.63 |
| Days/Year | 246 | 138 | 104 | 89 | 105 | 134 | 160 |

as farm size increases, because labour for machinary is almost hired. Labour for livestock with farm size class less than one feddan is 73 percent of total labour use. The proportion of total labour for livestock decreases rapidly as Farm size increases to reach only 15 percent on larms greater than 10 feddans. The data on table 5 provide a clear evidence that, on small farms, livestock production is used as a means of absorbing available family labour . Almost all labour used for livestock production on the smallest farms size class is family labour . In other words , proportion of the hired labour in total labour for livestock increases as farm size increases to be 39 percent for farms greater than 10 feddans. This is one of several indicators showing the vital importance of livestock production to small farmers.

It seems that there is an association between family labour and livestock production. As a weighted average 98 percent of the total labour for livestock is from family sources

(Table 6) i.e. hired labour for livestock production is only 2 percent . For crop production, in contrast, 35 percent of total labour is hired as a weighted average .

Distribution pattern of labour within the farm family is far different for livestock than for crop production. As table 6 demonstrates, women do a very high proportion of their efforts for livestock activity . This table shows that, as a weighted average, hired labour devote only 6 percent of their productive efforts for livestock production, and farm family men devote only 41 percent of their total efforts for this activity, wheares 95 pecent of the productive activities of farm family women are for livestock . This disregards normal household work, although that type of work, done by women, is also productive . The labour effort of women devoted to livestock on farm, appears, to decrease as farm size increase. As will be seen below, this is probably related to the fact that production of milk and milk processing activity appears to decline somewhat on larger Farms . Surprisingly ,

Table 6 : Labour Distribution Between Crop And livestock Activities By Each Type of Worker : Percentage

| | Farm size (feddans) | | | | | Weighted |
|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5To 10 | 10 | Average |
| Hired | | | | | | |
| For crops | 98 | 96 | 92 | 96 | 87 | 95 |
| For livestock | 2 | 4 | 8 | 4 | 13 | 5 |
| Family: Total | | | | | | |
| crops | 23 | 52 | 58 | 78 | 83 | 46 |
| livestock | 77 | 48 | 42 | 22 | 17 | 54 |
| Men | | | | | | |
| crops | 28 | 68 | 69 | 74 | 83 | 55 |
| Livestock | 72 | 32 | 31 | 26 | 17 | 45 |
| Women | | | | | | |
| crops | 2 | 6 | 6 | 13 | 16 | 5 |
| Livestock | 98 | 94 | 94 | 87 | 84 | 95 |
| Children | | | | | | |
| crops | 88 | 93 | 93 | 98 | 99 | 94 |
| Livesotck | 12 | 7 | 7 | 2 | 1 | 6 |
| Elders | | | | | | |
| crops | 31 | 53 | 70 | 87 | 92 | 55 |
| Livestock | 69 | 47 | 30 | 13 | 8 | 45 |

children and even elders play a lesser role in livestock production than in crop production, in particular, as farm size increases above one feddan.

From table 5 it also, seems that there is a greater intensity of labour per animal unit on small farms rather than per farm. This may relate to higher proportion of milk processed on small farms than on larger farms. Also, it may relate to extra effort required to collect forage on ditch hancks for livestock feeding on smallest farms, where the available feeds are much lower than the average, as shown in feeds utilization section below.

Furthermore if there is ample human labour available on farm, as is true when family size increases within a given farm size class, it is presumably for available family labor to be devoted to livestock activity . This can be illustrated by table 7 within the common farm size class in the sample (1 TO 3 feddans) Although family labor devoted to both crops and livestock

Table 7 : The Role of Livestock in Absorbtion of Family Labor Available on Farm (1 To 3 Feddans Farm Size Class)

| Labor use and Livestock size per farm | Family size (persons) | | | |
|---|---|---|---|---|
| | 1 To 4 | 5 To 7 | 77 | All Farms of 1 To 3 feddans |
| Number of Farms (N) | 19 | 27 | 32 | 69 |
| | | Day Per Year | | |
| Hired labor : Total | 127 | 88 | 70 | 98 |
| for crops | 114 | 87 | 69 | 94 |
| for livestock | 13 | .0 | 0 | 4 |
| Family labor: Total | 296 | 464 | 537 | 470 |
| for crops | 154 | 188 | 253 | 221 |
| for livestock | 118 | 227 | 242 | 205 |
| Total Animal units | .99 | 1.34 | 1.62 | 1.42 |
| Total livestock value L.E. | 269 | 465 | 539 | 450 |

production rises along with family size (farm size held constant), the increased use in livestock expands at a much higher rate . While average crop labor per farm was 66 percent higher for families with more than 7 members, as compared to families with less than 5 members, labor use for livestock was 104 percent higher . Also livestock holding with larger family increases to absorb ample labor available . Table 7 indicates that livestock holding increasis from 0.99 animal units with family size less than 5 personse to 1.62 animal units with family size greater than 7 persens .

The Relationship Between Human and Livestock Population :

There are some reasons for expecting that there are acompetitive relationship between livestock numbers and the human population . In other words, livestock density might tend to decline as human population density increases. A reason for this would be that livestock depend, to some extent, on the same food crops as humens. Thus as human food demand increases, there would be less food remaining for livestock . However this compatitive relationship may be significant under epecialized commercial livestock activities, wheares livestock feeding system depends, mainly, on concentrate feeds rather than forages or roughages (straws), (Soliman, 1978, Abd El-Zaher, 1982). Under traditional mixed farming system, one reason to expect complementarity relotionship, between livestock and human populations, is that animals often subsist on the by-products of human food crops (straws and slalks...etc.) and fodders. On the other hand, as shown from the previous section and tables (4-7) if there

is ample labor, it is devoted, mainly to livestock activity .

Data from the farm management survey indicate that, on balance, there is a positive relationship between the human and animal population . The simple correlation coeffecient between animals units per feddan of farm area and farm family members per-feddan was 0.63 , which is statistically significant at the 0.01 level.

In table 8, data have been categorized according to total number of animal units . Here also, the positive association between family size and animal units is quite clear For those farms with less than 0.5 animal units , the average family size was 5.9 members, whereas for farms with more than 4 animal units the average family size was 10.7 members; This result confirms what Soliman and Zaki (1982) prooved . The table also shows that as the livestock density per feddan increases the human density per feddar, also, increases. On

Table 8 : Relationship Between Family Size and Herd Size

| | Total Animal Units class | | | | | All farms |
|---|---|---|---|---|---|---|
| | 0 To .5 | .5 To 1 | 1 To 2 | 2 TO 4 | 4 | |
| Number of observations | 29 | 25 | 58 | 40 | 13 | 165 |
| Average family size persons | 5.9 | 7.3 | 7.6 | 9.6 | 10.7 | 7.7 |
| Average farm size, feddans | 5.2 | 2.6 | 2.6 | 5.8 | 20.0 | 5.2 |
| Animal units per farm | .2 | .86 | 1.5 | 2.66 | 7.27 | 1.91 |
| Animal units/feddan | .04 | .33 | .58 | .46 | .36 | .37 |
| Persons/feddan | 1.13 | 2.81 | 2.92 | 1.55 | .54 | 1.48 |
| cattle per farm ,Head | .02 | .6 | .9 | 1.8 | 4.7 | 1.2 |
| Buffaloes per farm, Head | .1 | .6 | .8 | 1;0 | 3.0 | .8 |
| Total value of Animals, L.E. | 46 | 342 | 510 | 805 | 2543 | 634 |

balance the human and livestock population are complementary .

Earlier (Table 3) it was shown that livestock densities tend to increase as farm size decreases. Since the increase in human population density is one of the main underlying forces behind land fregmantation (declining in average farm size) in Egypt, it can be seen that livestock density and population density are undoubtedly related . Since these results stem from a much larger sample of farmers and covers a wider area and from a substantial number of villages, this finding would appear to replace walters (1981) inconclusive results on this matter .

The implications of these findings for the future of Egyptian agriculture are important . If the rural farm population continues to grow (this seems inevitable for the next two to three decades), then the resulting increase in the man to land ratio and reduction in average farm size

will probably lead to further increases in livestock populations and production . Indeed it seems quite probable that it is the increase in human population and the decrease in farm size which have contributed heavily to the increase in livestock population.

Naturally , the upward trend in livestock population might be reversed if there were a major change in farming technology or in market structure. But it appears that changes of sufficient magnitude in such factors, in near future, are unlikely . Assuming then that the livestock population will continue to grow, it is vital to understand the implications of this for production, and particularly for the marketable surplus of production . These issues will be considered in the following sections.

Milk Productivity : Table 9 shows the milk productivity per technical unit by farm size class . It is valued as aggeregete average of mixed cattle and buffalo milk in Kilograms. It is estimated as liquied milk

equivalent of milk products produced on farm, . The technical unit is a head or a feddan. It is a head of buffalo and cattle cows over 3 years old. Surprisingly, it is the smaller farms (less than 3 feddans) which have the highest yield of milk, either per head or per feddan. Farms less than 3 feddans produce between 997 Kg. to 1209 Kg. Milk per head . Though cattle and buffalo milk could not be seperated, the weighted average yield per head (977) seemed higher than the estimates made by the winrok study (1980) . They found that milk yield of native cows averaged from 578 to 756 Kg per lactation per head and that buffaloes averaged ayield from 960 to 990 Kg per head per lactation. It should be observed, however, that their study was derived from just two villages . On the other hand El Tanbadawy (1979) estimated an average milk yield per head of aggregate cattle and buffablo dairy females in his sample . It was 1336 Kg per head, which would be much closer to the yield per head of the farm size class 1-3 feddans in the present study . However his

sample included only farms from Sharkia Covernorate .

Milk Processing on farm : The handling and processing of milk in the Egyptian farm household is still often carried out as much as it was centuries ago . There is no refrigeration . Therefore milk processing on traditional farm has an indirect goal, which is storage of milk in terms of"Ghee"and or"Gibna adeema " .

All other milk by products are mixed to be a home consumed edible product, called "Mish" with no explict market value .

Table 9 indecates that the proportion of total milk production which is processed decreases, rapidly, as farm size increases./ The highest proportion of processed milk was on smallest farm size class (84%), for farms greater than 10 feddans this proportion was, only 18 percent of total milk production per farm . It is important to note that the average value per kilogram of total milk

(1)

Table 9 : Dairy Productivity, Processing and Marketable Surplus By Farm Size Class

| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | Weighted Average |
|---|---|---|---|---|---|---|
| **Productivity :** | | | | | | |
| Kg Milk per Head(2) | 977 | 1209 | 843 | 643 | 272 | 977 |
| Kg Milk Per feddan | 859 | 497 | 225 | 86 | 28 | 394 |
| Sales per feddan (Kg) | 206 | 217 | 105 | 54 | 21 | 154 |
| Value/Kg Milk produced(L.E) | .72 | .46 | .36 | .22 | .22 | .48 |
| **Liquid use versus Processing :** | | | | | | |
| % Processed | 48 | 70 | 66 | 36 | 18 | 73 |
| % Liquid Milk (End-use) | 16 | 30 | 34 | 64 | 82 | 27 |
| **Home Consumption versus sale :** | | | | | | |
| % Home Consumption | 76 | 56 | 53 | 37 | 24 | 61 |
| % Sold | 24 | 44 | 47 | 63 | 76 | 39 |

(1) The quantity is liquid Milk Equivalent of all dairy Products
(2) A Head of Cattle and Buffalo Cows over 3 years old.

produced is associated, positively , with processed milk proportion (Table 9) . In fact this implies that the smaller farms have not only higher milk productivity but they generate also a higher value added to such yield as they process higher proportion of their milk produced . This higher value added may raise family labour productivity for livestock, inspite of higher intensive use of family labour per animal unit (Table 5). In particular, milk processing on farm is a female job .Therefore, it is not surprising to observe higher proportion of female effort for livestock activity on smaller farms . Therefore it is expected that number of the family members of the farm family is associated with investement in cattle and buffalo on farm particularly for dairy activities . This evidence supported by the results of Soliman and Zaki (1982) . Females in rural area may face social barriases in working outside the family . However, the drawbacks of such performance is that the higher proportion of milk processing on smallerfarms declines the marketable surplus of liquid milk as

farm size declines, as expected on long run, development of marketing facilaties in Egyptian village is required to alter this situation, particularly, that liquid milk price in nonrural markets increases rapidly

Marketable Surplus of Milk :

Table 9 shows that as the farm size increases proportion of the marketable surplus of milk (Milk sold) increases. However, absolute quantity sold per feddan decreases as farm size increases . Therefore, small farms have higher milk productivity and higher capacity to process milk and to sell it.

Other Livestock Products :

Table 10 shows that other livestock products, i.e. either edible products or non-edible products have higher levels on small farms than larger farms. On per feddan basis Distribution of each product between own farm utilization and sale did

Table 10. Quantity per Feddan of Livestock Products Other than Dairy Products According to Farm Size Class .

| | Farm size (feddans) | | | | | Weighted |
|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 TO 5 | 5 To 10 | 10+ | Average |
| Eggs, Number | 1210 | 462 | 266 | 63 | 39 | 443 |
| Poultry, value, L.E. | 3.92 | 8.27 | 1.65 | 3.67 | .96 | 4.83 |
| Net Inventory Change, L.E. | 74.70 | 39.7 | 29.65 | 17.71 | 8.53 | 37.48 |
| Manure (Loads) | 442 | 297 | 231 | 85 | 38 | 268 |
| Animal Work(Hours) : | | | | | | |
| Own farm: Total | 837 | 439 | 307 | 181 | 76 | 406 |
| Cattle or Buff. | 142 | 74 | 65 | 43 | 17 | 74 |
| Other animals | 695 | 365 | 242 | 138 | 59 | 334 |
| Off farm: Total | 30 | 34 | 12 | 7 | 2.2 | 21 |
| Cattle or Buff. | 0 | 2 | 12 | 0 | .6 | 3 |
| Other Animals | 30 | 32 | 0 | 7 | 1.6 | 18 |
| Total Hours | 867 | 473 | 319 | 188 | 78 | 429 |

not show, in general, a specific trend with farm size; Therefore, such distribution was omitted from table 10, except for animal work because it would be related to machinary work . Some product levels may be affected by other variables than farm size alone. These products include manure and animal work Cropping patterns may affect, significantly, animal work use on farm and manure use, Also, the later is affected by crop rottation as well as cropping pattern ( Imam, and Soliman 1982) . However with respect to edible products, particularly, eggs production, it seems that smaller farms has a much greater productivity than larger farms. The farm size class less than 1 feddan produces more than 1200 eggs per feddan, whereas, only, 39 eggs per feddan are produced on farms greater than 10 feddans.

The two livestock products which are used as crop inputs (manure and animal work) are, rarely, marketed off farm. Only 5 percent of animal work produced and less than 0.5 percent of manure produced were

used off farm as weighted average of all farms . It is very rare, that a farm hire its own cattle and Buffalo for work off farm. Only 0.76 percent of total animal work hours were for off farm use Even transaction in live animals and growth in value of livestock were of much higher net value per feddan for smaller farms thanlarger farms.

Feed In puts : Utilization Pattern and Intensity:

A relatively high proportion of feed stuffs are purchased. Nevertheless, berseem, the most important singie livestock feed is not subject to a high degree of outside purchase . On average some 13 percent of berseem, 68 percent of bran, 47 percent of grains and legumes, 43 percent of straw, 43 percent of hay, 36 percent of maize fodder (darawa) are purchased from outside the farm . The most striking future is that farms of less than a feddan are evidently more dependent on outside purchases of berseem than larger farms, since they procure 18 percent from off farm . In general, there is a tendenty for larger

farms to precure a higher proportion of bran, grains and legumes from outside the farm than do smaller farmers. Proportion of bran purchased increases from 56 percent for farms less one feddan to 100 percent for farms greater than 10 feddans, whereas propôrtion of grains and legumes purchased raises from 38 percent for farms less than one feddan to 92 percent for farms between 5 to 10 feddans.

Table 11 shows feed use on a per animal unit bases. Viewing feed use in this way, it is seem that farms of one feddan and less in size, use less feed than larger farms. For purposes of feed ulilization and adequacy analysis, starch equivalency, as a measure for total energy available, and digestable protein availability, have also been estimated on a per animal unit basis (Table 12) . Though proportion of berseem in feed availability seems to increase as farm size increases, the relative importance of other feeds does not change much according to farm size .

Table 11 Feed Inputs Per Animal Unit Per Year According To Farm Size Class

| | Farm size (feddans) | | | | | All farms In Sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | | |
| Type of feed, Kg : | | | | | | | |
| Berseem | 5040 | 9665 | 11077 | 15426 | 11691 | 10628 | 8726 |
| Hay | 452 | 549 | 541 | 1659 | 526 | 613 | 583 |
| Maize Fodder(Daiuwa) | 754 | 2782 | 2057 | 3618 | 1632 | 2435 | 2007 |
| Maize Tops & Leaves | 984 | 1599 | 746 | 647 | 424 | 948 | 1156 |
| Straw | 1806 | 2165 | 1830 | 1529 | 1694 | 1832 | 1934 |
| Concentrate feed Mix | 102 | 118 | 218 | 242 | 206 | 161 | 140 |
| Bran | 54 | 127 | 144 | 64 | 3 | 7 | 100 |
| Grains & Legumes | 128 | 235 | 234 | 85 | 240 | 198 | 189 |
| Proportion | | | | | | | |

Table 12 : Starch and Protein Equivalents of Feed Inputs Per Animal Unit Per Year According to Farm Size Class .

| | Farm size (feedans) | | | | | All Farms | Weighted |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | In sample | Average |
| Total Starch Equivalent, Kg | 1308 | 2190 | 2119 | 2792 | 1989 | 2058 | 1911 |
| Proportion Derived from : | | | Percent of total | | | | |
| Berseem | 31 | 35 | 42 | 44 | 47 | 41 | 37 |
| Hay | 11 | 8 | 8 | 20 | 9 | 10 | 10 |
| Maize Forage | 14 | 21 | 14 | 16 | 11 | 17 | 18 |
| Straw | 30 | 22 | 19 | 12 | 19 | 20 | 22 |
| Conc. feed Mix | 4 | 3 | 6 | 5 | 6 | 4 | 4 |
| Other conc. feeds | 9 | 11 | 11 | 3 | 9 | 7 | 9 |
| Total Digest.Protein, Kg | 221 | 407 | 419 | 610 | 348 | 344 | 358 |
| Proportion Derived from: | | | Percent of total | | | | |
| Berseem | 500 | 52 | 58 | 56 | 65 | 59 | 54 |
| Hay | 16 | 11 | 10 | 22 | 11 | 12 | 13 |
| Maize Forage | 16 | 22 | 13 | 14 | 10 | 17 | 18 |
| Straw | 3 | 2 | 2 | 1 | 2 | 2 | 2 |
| Conc. Feed Mix | 6 | 4 | 7 | 5 | 7 | 5 | 5 |
| Other conc. Feeds. | 9 | 10 | 10 | 2 | 6 | 5 | 8 |

The low level of feed inputs reported by farms, in the one feddan and under size class, is quite evident from the starch equivalent and digestable protein per animal unit. This class provides only 1308 Kg. of starch equivalent per animal unit, i.e. about 68 percent of the energy which an animal unit was found to recieve for the survey as a whole . This figure is considerably less than, even , the maintenance requirments per an animal unit. An animal unit scale in this study is an adult camel of 700 Kg live weight (Arab Organization for Agri. Develop, 1980) . Daily maintenance requirements per 100 Kg. Live weight is.58 Kg starch equivalent (Ghonien, 1967). Therefore annual maintenance requirements per an animal unit is some 1482 Kg starch equivalent . As discussion in earlier sections show, animals on farms in this smallest size class appear to be quite productive, in comporison with larger farms animals. It will be recalled from Table 3 that 15 percent of the animal units for farms of this size - a much higher proportion than

for larger farms-are made up of sheep and goats . Undoubtedly, much of the feeds for these sheep and goats are gathered from ditch banks and roadsides . It would have been virtually impossible for farmers to have quantified and reported such feed inputs. Considering, the ample labour available and high labour intensification for livestock activity for farms of this size (less than, feddan), it is likely that much feed is even carried to large animals from ditch banks and road sides.

Berseem is the largest source of both energy and protein providing an estimated 37 percent and 54 percent of these two nutrients overall (Table 12) . This underscore the critical role which berseem plays in Egypt's agricultural system. The fact that berseem, which is available only from late December through May, provides more than half of the protein available would seem to be a reflection of the seasonal imbalance in protein availability . On the other hand, berseem is the source of

hay which is dried in the later part of the berseem season. The amount of hay which were found to be utilized are perhaps some what surprising . The introduction of hay making is often suggested as means of solving the shortage of summer feeds . Hay was found to supply 10 percent of the total available starch equivalent and 13 percent of the protein fed . Thus, it is seen that winter grown berseem is, also , contributing in a significant way to summer feeding .

Straw provides about 22 percent of the energy (starch equivalent) available to the animals, and in this it is second in importance only to berseem . However, straw provides an almost incignificant amount of protein (Table 12) . Most straw which is utilized is from wheat, although bean and other legume straws are utilized when available, and there is now an increasing use of rice straw for feeding, something which almost was unheard of in the past .

Maize is the source of two different types of animal fodders and is thus an important source of summer green fodder. On the one hand, a part of the maize area is often set aside specially for forage production, and the entire plant is removed for feeding as it is needed. Egyptian farmers often remove the leaves and tops of maize plants prior to the grain harvest, in order to derive extra forage. This practice of "stripping and topping" is thought to reduce grain yields and is discouraged (Fitch, 1982). Taken togther, the two types of maize forage supply an estimated 18 percent of total available starch equivalent and 18 percent of the protein (Table 11) . As such, it is seen that maize fodder is a very important source of feed . In addition, maize forage has much lower cost per Kilogram of starch equivalent than either berseem or hay . One kilogram of starch equivalent from maize forage costs. Weighted average of the sample 3 piesters, whereas equivalent Kilo from berseem and hay costs 7.8 piesters and 6.6 piesters, respectively, in 1977 .

Concentrate feed mix is produced mainly, by publicty owned feed mills and is all purchased from off the farm.

Soliman (1981) showed that government policies are geared toward providing most of the concentrate to large feedlot and dairy operations . Even so, the low proportions of total starch equivalent ( 4 percent) and protein (5 percent) provided to traditional farms by this feed mix(Table 12) are not surprising . Average sample price per one kilogram starch equivalent from concentrate feed mix in that year was 8.1 piesters. The official price per a kilogram starch equivalent of the same feed was about 6.5 piesters, wheares free (black) market price per 1 Kg starch equivalent, of this feed during the same year, was over 11 piesters (estimates of Soliman in 1981 were used) . Once the average price of the sample is higher than the official price in that year , obiviously, much of the feed mix which was purchased, was purchased from the black market . It is important to note that the

average price of the smallest farm size class was 6.1 piesters per 1 Kilogram starch equivalent of concentrate feed mix, i.e. the smaller farms have no enough funds to purchase such feed inputs from free (black) market, though (as discussed earlier) small farms have the highest productivity of livestock and lower feed availability. In contrast, larger farms can pay even several folds of the afficial price for concentrate feed mix. Existing feed distribution policies give large herds first periority, though such herds are of much lower productivity than small farms.

The most common grains to be fed are imported yellow corn, locally produced white maize, barley and broad beans. Bran is derived from both wheat and rice.

Small farmers is enforced to depend much more heavily on grains and bran than concentrate feed mix to feed his animals because of quota distribution system and

scarcity of the later feed, even though, the former feeds are more expensive in terms of starch equivelant, in comparison with subsidized concentrate feed mix price.

Livestock value of Products : Table 13 summaries all livestock (animal plus poultry) products in value terms . The total value of animal production per farm increases as farm size increases. Poultry production also increases, but at a lower rate . The value of all livestock products averages LE 356 for farms of less than a feddan and increases to LE 630 for farms greater than 10 feddans. In Table 13, it is seen that total value of crop production was LE 247 on farms of a feddan and less and this increased to an average of LE 3939 for the over 10 feddans size category.

As a proportion of total product value livestock products averaged 43 percent for all farms . This proportion varied-from 63 percent of the total for farms in the smallest size category to only 14 percent for those in the largest category. This

Table 13. Value Of Livestock Products, Comparisom to Crop Production Value, And Various Measures of Productivity By Farm Size Class

| | Farm Size (feddans) | | | | | All farms | Weighted |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | In sample | Average |
| | Egyptian Pounds Per Year | | | | | | |
| Animal Products value Farm | 326.07 | 465.14 | 534.17 | 409.79 | 585.76 | 495.28 | 416.10 |
| value of Poultry Products/farm | 30.24 | 40.30 | 29.00 | 35.30 | 43.8 | 38.53 | 34.59 |
| Total livestock value /farm | 356.31 | 505.44 | 563.17 | 445.09 | 629.56 | 533.81 | 450.69 |
| Value of crop Production /farm | 205 | 619 | 1094 | 1862 | 3989 | 1210 | 599 |
| Measures of Productivity: | | | | | | | |
| Animal prod/Animal unit | 259 | 328 | 256 | 241 | 154 | 259 | 281 |
| Poultry prod/Bird | 1.72 | 1.50 | 1.39 | 1.74 | 1.08 | 1.51 | 1.59 |
| Total livestock prod/ Feedan | 429 | 257 | 138 | 68 | 29 | 102 | 211 |
| crop Production / Feddan | 247 | 314 | 269 | 284 | 184 | 232 | 281 |

means livestock activity is a vital type of vertical extention for small limited area type of farms . As shown in Table 14, dairy products averaged 35 percent of total livestock product value and the proportion was larger for smaller farms than larger farms . Net inventory change in live animals accounted for an average of 18 percent of total livestock product value, and this proportion increases for larger farm sizes. Animal work accounted for an average 27 percent of value, and this proportion seemed to increase with farm size. The value of manure and poultry products averaged 13 and 8 percent of total livestock production value respectively and this proportion varied relatively little with farm size . It should be observed that livestock by products(Animal work and Manure) represent, together, a significant proportion of livestock output on traditional farm, i.e. about 40 percent of total livestock outputs per year . In other words, crop activities are financed by 40 percent of livestock output value, in terms of animal work and manure inputs. On

Table 14: Livestock Production Structure and Outlet According To Farm Size Class :

| | Farm size (feedans) 0 To 1 | 1 To 3 | 3 To 5 | 5To 10 | 10 | All Farms In Sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| Proportion of total in : | Percent of total livestock products value | | | | | | |
| Dairy Products | 35 | 39 | 27 | 18 | 16 | 35 | 35 |
| Poultry Products | 9 | 8 | 5 | 8 | 7 | 7 | 8 |
| Net Inventory change | 17 | 15 | 21 | 26 | 29 | 18 | 18 |
| Animal work | 28 | 25 | 29 | 36 | 34 | 27 | 27 |
| Manure | 12 | 12 | 17 | 13 | 14 | 12 | 13 |
| Sales versus own farm use : | | | | | | | |
| Products for sale | 28 | 33 | 33 | 39 | 43 | 39 | 32 |
| Products own farm use | 72 | 67 | 67 | 61 | 57 | 61 | 68 |

the other hand, total feed inputs utilized for livestock per year per farm is about 34 percent of crop production value as a weighted average . In other words, the value of crop inputs supplied by livestock activity is less than the value of livestock inputs supplied by crop activity.

Livestock products sold off-farm represent about one third of total livestock output . The proportion of aggreagate marketable surplus of livestock output increases as farm size increases. It increases from some 28 percent on smallest farm size scale to 43 percent on farmsize class greater than 10 feeldans .

Livestock Costs of Production : Costs of production, entailing feed stuffs, hired labour and miscellaneous purchased inputs (e.g. veterinary fees and medicines), are given in table 15. While cost of hired labour is included as a purchased item, the cost of family labour is not included as an "on-farm" cost. Imputed charges for family

Table: 15 : sts of Feedstuffs and Other Inputs, / Farm Size Class, 1977 Farm Management Survey .

| | Farm size 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | All Farms In Sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| Costs: | | | | | | | |
| Purchased inputs | | | Egyptian pounds (LE)per farm | | | | |
| Berseem Clover | 8.00 | 11.80 | 31.70 | 5.30 | 48.70 | 18.50 | 12.70 |
| Feed concentrate Mix | 4.04 | 9.90 | 19.30 | 20.00 | 46.86 | 18.15 | 9.51 |
| Bran | 0.54 | 5.70 | 10.30 | 7.50 | 1.40 | 4.84 | 4.31 |
| Grains and legumes | 4.09 | 13.10 | 23.86 | 12.30 | 18.90 | 14.28 | 10.88 |
| Straw | 15.24 | 25.20 | 33.50 | 14.50 | 28.00 | 23.69 | 21.73 |
| Hay | 4.30 | 11.30 | 3.90 | 53.70 | 19.00 | 14.32 | 9.87 |
| Maize forage | 1.69 | 8.10 | 5.30 | 16.50 | 23.20 | 9.44 | 5.70 |
| Sub-Total | 37.90 | 85.10 | 127.80 | 129.8 | 186.06 | 103.22 | 74.7 |
| Miscellaneous costs | 3.84 | 1.28 | 0.40 | 1.49 | 4.23 | 2.20 | 2.22 |
| Hired Labor | .37 | 2.93 | 14.64 | 11.71 | 119.32 | 20.50 | 4.48 |
| Total purchased | 42.11 | 89.31 | 142.90 | 143.00 | 309.61 | 125.92 | 81.40 |
| Inputs from farm: | | | | | | | |
| Berseem Clover | 31.93 | 80.49 | 131.50 | 166.00 | 246.49 | 109.77 | 73.14 |
| Bran | .94 | 4.40 | .38 | .48 | 0 | .21 | 2.26 |
| Grains and legumes | 4.38 | 13.78 | 12.52 | .84 | 24.68 | 11.58 | 9.21 |
| Straw | 24.09 | 24.09 | 43.95 | 28.74 | 84.53 | 35.50 | 27.23 |
| Hay | 9.72 | 8.91 | 0.00 | 36.45 | 35.10 | 18.09 | 9.69 |
| Maize forage | 2.71 | 8.51 | 16.45 | 8.90 | 9.09 | 8.51 | 7.25 |
| Maize tops and leaves | 2.08 | 3.81 | 2.62 | 1.85 | 2.70 | 3.04 | 2.85 |
| Total from own farm | 75.85 | 143.99 | 207.42 | 243.26 | 402.59 | 187.70 | 131.63 |
| Total cost of Inputs: | 117.96 | 233.30 | 350.32 | 386.26 | 712.20 | 313.62 | 213.03 |
| Imputed resource costs : | | | | | | | |
| Family labor | 184 | 132 | 161 | 92 | 167 | 148 | 155 |
| Lstock investment charge | 43 | 45 | 61 | 51 | 136 | 63 | 47 |

labor and investment are both shown separately at the bottom of table 15. Family labour use was charged at the average hired labor rates prevailing during the survey year . The cost of investment was calculated as the interest which the farmer forewent by investing his funds in livestock rather than putting them in a savings account . The interest rate used for calculating this investment cost was 10 percent, the interest which could have been recieved from savings at a bank during the time of the survey .

Table 15 shows that, on average, some 62 percent of total production costs were attributed to the value of inputs from the farmers own farms . Purchased inputs accounted for the remainder . The Cost of berseem accounted for 42 percent of total feed costs .

Table 16 summurizes costs on a per animal unit basis, according to farm size In general, it is seen that the average total cost of inputs per animal unit (A.U.) was

Table 16 : Average Costs Per Animal Unit and Cost Distribution by Farm Size Class

| | Farm size (feddans) | | | | | All Farms In Sample | Weighted Average |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | | |
| | Egyptian pounds per Animal unit | | | | | | |
| Purchased feeds | 30.08 | 59.93 | 61.18 | 76.35 | 48.96 | 54.04 | 50.47 |
| Other Purchased Inputs | 3.38 | 2.96 | 7.20 | 7.76 | 32.51 | 11.88 | 4.53 |
| Total Purchased Inputs | 33.42 | 62.89 | 68.37 | 84.12 | 81.48 | 65.93 | 55.00 |
| Feeds from own farm | 60.20 | 101.40 | 49.24 | 143.09 | 105.94 | 98.27 | 88.94 |
| Total costs | 93.62 | 164.30 | 167.62 | 227.21 | 187.42 | 164.20 | 143.94 |

L.E. 144 for the year of the survey . Of this value, LE 50 (35 percent) represented purchased feeds , LE 89 (62 percent) was for feeds from the same farm and the remaining LE 4.53 represented other purchased inputs . Imputed costs of family labour and livestock investment were not included . In general, the per animal unit cost was higher for larger (5 feddan and greater) farms, particularly, in terms of feed used from the farmer's own farm. Farms in the smallest size class had much lower costs than larger farms, and it is thought that this reflects the fact that farmers in this class collect much of their feeds "free" from roadsides and ditchbanks.

Livestock Productive Efficiency Measures - Budget analysis was found as a substantial procedure for such cross section data to measure productive efficiency of livestock activity according to farm size class.

Net return is the total value of livestock products (include home consumed

proportion) minus costs of purchased inputs obtained from within the farm . It is a gross measure for returns to own farm resources : family labour, livestock investment, maneg-ē ement and enterprises net profit.

However , there is always, some doubt about the meaning of net returns that include items which are consumed on or obtained from within the farm . While such goods as manure from the farm and animal work performed on the farm were included as a return from live-stock, it is doubtful that such goods are fully marketable at the same prices which are received for the relatively small prop-ortion of these items which is marketed. The same can be said for maize tops and leaves, which are marketed only on very limited basis. To avoid problems such as these, net " cash " returns were also calculated. Net cash returns include only those outputs and inputs which were actually sold, purchased, or traded off the farm. Sometimes net cash return is called value added . It is an accounting measure for productive efficiency .

The results shown on table 17 are somewhat surprising, particularly for large farmers. They show that farms in the over 10 feddan category suffered net losses, on average, for the survey year . Even on a net " cash " return basis, these farms posted losses. Smaller farms appear to have higher and positive net returns to livestock production.

Farms in the smallest size category (one feddan and less) had average net returns of LE 238 from their livestock for the survey year, compared to 1E 272 for 1 to 3 feddan farms and successively lower values for farms in larger size categories . On a net " cash " return basis the 1 to 3 feddan farms averaged LE 77, which was again higher than for farms in all other calegories .

On a per animal unit pasis, the 1to 3 feedan farm size class also rates higher than other classes, Althoug all farms of less than 5 feddans in size appear to do

Table 17 : Livestock Productive Efficiency Measures By Farm Size Class

| | Farm size (feddans) | | | | | All Farms Weighted | |
|---|---|---|---|---|---|---|---|
| | 0 To 1 | 1 To 3 | 3 To 5 | 5 To 10 | 10 | In Sample | Average |
| | Egyptian Pounds per Year | | | | | | |
| Net return: per farm | 238.45 | 272.15 | 231.8 | 58.85 | -82.62 | 200.23 | 240.13 |
| per feddan | 287 | 138 | 57 | 9 | -4 | 38 | 113 |
| per A.V. | 189 | 142 | 111 | 35 | -22 | 105 | 162 |
| Net "Cash" Return : | | | | | | | |
| per farm | 59.37 | 77.18 | 50.12 | 30.97 | -34.95 | 74.26 | 63.46 |
| per feddan | 72 | 39 | 12 | 5 | -2 | 14 | 30 |
| per A.V. | 47 | 54 | 24 | 18 | -11 | 39 | 43 |
| | Efficiency of own farm Resources | | | | | | |
| Average Return on Investment (%) | 13 | 31 | 12 | -7 | -18 | 8 | 18 |
| Family labour Earnings (LE/Day) | 1.06 | 1.72 | 1.06 | 0.09 | -1.31 | 0.93 | 1.25 |

well on a per fedan basis, the smallest size class (one feddan and under) shows much higher net returns to animal production, on average, than do larger farms.

Efficiency of Family Labour and Own Farm Investement :

In the preceding analysis no allawance was made for the costs of family labour and own farm investment in livestock . Therefore, net return calculated in table 17 represents return to capital and family labour gross earnings (family labour return, own management return , and farmer enterprising net profit ). Consequently calculations were made for the proportion of net returns attributable to each of these own farm resources .

In the return on investment calculation, the cost of family labour, as shown in table 15, was first deducted from net returns. Similarly, to arrive at the farm family labour gross earnings from livestock,

the imputed investment cost was first deducted. Based on these calculations, as shown in table 17, livestock production is seen to have been a quite feasable activity during the 1976-1977 survey year The overall rate of return on investment was 18 percent, compared to a prevailing bank savings account rate of 10 percent. Also, as the world bank Cited " 15 percent to 18 percent rate of return to investement for projects in developing countries is feasable " (Gittenger, 1972) .

The gross earnings for farm family labour from livestock activity were surprisingly high LE 1.25 per day compared to a prevailing average farm labour rate of about LE, .75 per day . On average, small farms appears to do quite well . Farms in the 1 to 3 feddan size class again registered the best overall performance, with an average 31 percent rate of return to livestock investment or a LE 1.72 per day return to family labour.

## REFERENCES

Abd El Zaher, T.: Milk Production Economics in Egypt , Ph.D. Thesis, Ain Shams University, Cairo, 1982 (in Arabic)

The Arab Organization For Agricultural Development ; Food security Programmes for Arab Countries . A.Developmental Programme for Livestock and poultry, Vol. 6 , 1981 (in Arabic )

El Tambadawy, M.: Economics of Production and Marketing of Milk in Sharkia Governorate M.Sc. Thesis, Univ of Zagazig, Egypt, 1979 (in Arabic) .

Fitch, J.& Ibrahim Soliman . The Livestock Economy in Egypt, Agricultural Development System Project, Economics working paper No. 29, Ministry of Agriculture (Egypt) and university of california, June, 1981 .

Gittinger, J.P.: Economic Analysis of Agricultural projects, John Hopkins Univ. Press, Baltimore, 1972 .

Rabashy, Habil T. and James B. Fitch : Egypt's Agricultural cropping Pattern: A Review of the System by which it is Managed and the Relationship to price policy.

Ministry of Agriculture, Micro-Economic study of the Egyptian Farming system, Project Research paper No.4, 1981 .

Hopkins, Nicholas S., Improved Utilization o feed Resources for the Livestock Sector (Phase I), Rural sociology segment, Social Research center, American University in Cairo preliminary Draft, January 1980 .

Imam, S. & Ibrahim Soliman : An Economic Study for wheat production Activity of Egyptian Agriculture , Seventh International Congress for Statistic Computer Science, Social And Demographic Research 27 March- 1 April, 19

Nasr, M.L. An Analytical Study of Meat Production on farms of Sharkia Governorat M.Sc. Thesis, University of Zagazig Egypt, 1979 ( in Arabic) .

Richards, Alan, and Phillip L. Martin : Rural Social Structure and the Agricultural labor Market ,Sharqiyya Evidence and Policy Implications, Economics Working paper No. 8, ADS Project, Ministry of AGriculture (Egypt ) and University of Colifornia May, 1981 .

Soliman, I : An Anlytical study for Animal Rations in ARE, M.Sc. Thesis, Ain Shams University, Cairo, 1973 ( in Arabic ) .

Soliman, I. Input-OUtput Relationships for Meat Production of Egyptian Livestock Ph. D Thesis, Ain Shams University Cairo, 1978 .

Soliman, I : Concentrate Feed Mix in Egypt : An Analysis of Government Production and Distribution Policies, and Free Market Price Patterns, Mininstry of Agriculture (Egypt) Micro-Economic Study of the EGyptian Farm System, Project Research Paper No.8 1981.

Soliman, I & Refaat El Nagar : Financial pelicies for livestock with special Reference to Sharkia Governorate, Zagazig Univ., Faculty of Agri . Research Bul . No. 221, Jan, 1981

Soliman, I and El Shahat Zake : Socio-Economic Factors Affecting Decisions of Traditional Farmer on Investment in Livestock in Sharkia Governorate, Seventh International Congress for Statistics, Computer Science Social and Demographic Research, 27 March 1 April, 1982 .

Soliman, I : Red-Meat Price Policy in Egypt Zagazig J. of AGri- Res. in press, 1982 .

Soliman, I : Food Security in Egypt : The Socio-economic Implications of Dietory Protein Energy Interrelationships Zagazig Univ., Faculty of Agric . Res. Bul. No. 612, May 1982.

Walters, Forest : The Livestock Enterprise on Survey Farms in Abu-Raia, Kafr EL Sheikh : Selected Implications for Water Distribution and FIeld Management , Staff Working Paper No. 68 Egypt water use and Management Project, Ministry of Irrigation, 1981 .

Ward, Gerald . M. Livestock Production on Small Farms as a Contribution to Economic Development, pp. 117-130 in Biggs and Tinnermeier, eds., Small Farm Agricultural Development Problems, Colorado State University, 1975 .

Winrock International Livestock Training and Research Center Improved Utilization of Feed Resources for the Egyptian Livestock Sector, Report to Catholic Relief Services, Cairo and U.S. Agency for International Development, Cairo, June, 1980 .

# ملخص دراسة

## اقتصاديات الانتاج الحيواني في المزرعة التقليدية

هدفت الدراسة الى : ١) تحديد هيكل الانتاج والمعاملات الفنيه لنشاط الانتاج الحيواني في المزارع التقليدية ٢) دراسة نظم التغذية وانماطها ومدى اتاحتها في المزرعة، ٣) تحليل مستويات الانتاج واوجه التصرف فيه ، ٤) تقدير التكاليف وهيكل العائد للانتاج الحيواني ، ٥) تقدير الكفاءة الانتاجية لنشاط الانتاج الحيواني باستخدام اسلوب تحليل الميزانية ، ٦) شملت مقاييس الكفاءة كل من : العائد للعمل العائلي ، العائد للاداره ، ( الربح الطبيعي ) ، العائد لراس المال المستثمر ، ٧) وحاولت الدراسة استخلاص انعكاسات ما توصلت اليه من نتائج على السياسة الزراعية ، ٨) اعطت الدراسة اهتماما خاصا لعلاقات العمل العائلي وحجم الاسره وحجم المزرعة وحجم الحيازه الحيوانية والعمل الحيواني المزرعي والانشطة الانتاجية الحيوانية الاخرى في المزرعة .

وقد استخدمت الدراسة بيانات ١٧٥ مزرعة تمثل احجام المزارع من اقل من فدان الى اكثر من ستون فدانا مختاره لعشر قرى من الوجهين البحري والقبلي من بيانات الحصر بالعينة لمشروع الاداره المزرعيه للموسم الزراعي ١٩٧٧ .

ومن اهم نتائج الدراسة : ١) ١١ ٪ فقط من العائزين لارض زراعية ليس لديهم حيازة حيوانية ، ٢) حيازة حيوانات العمل اكثر انتشارا من حيازات الانواع الاخرى ، ٣) ٢٠ ٪ فقط من المزارعين لديهم حيازات من الاغنام والماعز ، مما يؤكد ان الاغنام والماعز في مصر مازالت تطعمان بقريه أو شبه رعويه ، كما ان حيازة المزارع الصغيرة للاغنام والماعز اعلى من الحيازات

الكبيرة ، ٤) رغم زيادة حجم الحيازة الحيوانية بزيادة حجم المزرعة ، الا ان حمولة الفدان للمزارع الصغيرة اعلى من المزارع الكبيرة ، اى ان الاستثمار الحيوانى للمزارع الصغيرة اعلى من الكبيرة . ٥) تميل المزارع الكبيره لتفضيل الابقار عن الجاموس ، ربما لقدرة هذه السمات على التسمين ، ولحاجتها لحيوانات العمل بمعدل اعلى ، ولكن نسبة اناث الجاموس فى المزارع الكبيرة اعلى ، ٦) تزيد بنسبة حيوانات العمل بزيادة حجم المزرعة ، اى ان زيادة حجم المزرعة لا يؤدى الى مزيد من التخصص فى الحيوانات المنتجه للحم واللبن ، ٧) اظهرت الدراسة ان المزارع الصغيره هو المربى الاساسى للقطعان من ناحية الذكور والتوالد وانتاج العجول المعده للتسمين واناث وعجلات اللبن .

٨) تتميز المزارع الصغيره بوفرة العمل العائلى المتاح ويستوعب نشاط الانتاج الحيوانى جزءا كبيرا من العمل العائلى فسى المزارع الصغيره كما ان زيادة حجم الاسره المزرعيه يرتبط بزيادة حجم الحيازة الحيوانيه ، وتزيد نسبة مشاركة المرأة الريفية فى العمل العائلى المقدم للانتاج الحيوانى ، وهذا يرفع من قيمة تكاليف الفرصه البديله للعمل العائلى بصفه عامة وخاصة للمرأة حيث ان مشاركتها فى انتاج المحاصيل ضعيفه وعملها خارج المزرعه تحده قيود اجتماعيه ، وقد دعم هذه النتائج زيادة معدلات انتاج اللبن ، ونسبة التصنيع من اللبن المنتج للمزارع الصغيرة عنها فى المزارع الكبيره ، حيث تقوم المرأة بهذه الاعمال بصفه رئيسيه ، كما انه اتضح ان المتاح من الغذاء للوحده الحيوانيه فى المزارع الصغيره اقل بكثير من مستوسطات العينه ومن المزارع الكبيره رغم زيادة انتاجية حيوانات المزرعة الصغيرة ، وهذا يؤكد ان المزارع الصغيرة تستغل العمالة العائلية المتوفره للحصول على غذاء حيوانى اضافى من جوانب الجسور وجنب الحيوانات للرعى على الحشائش المنتشره فى

القرية ، ٩) حيث ان حجم الاسرة ووفره العمل العائلى تزيد بصفر حجم الحيازة ، والاتجاه السائد هو مزيد من التفتت وهذا يؤدى الى مزيد من زيادة عدد الحيوانات كما اثبتت الدراسة وهذا يعنى انه من المتوقع مستقبلا زيادة عدد الحيوانات مع الزيادة السكانية فى الريف وزيادة التفتت الحيازى ، ولكن هل هذا يصحبه زيادة فى الانتاج الحيوانى ذاته ، هذا امر غير مؤكد ، ١٠) أثبتت الدراسة أن المزارع الصغيرة ذات انتاجية اعلى من اللبن ونسبة اللبن المستهلك فى المزرعة ايضا اعلى من المزارع الكبيرة ولكن نسبة التصنيع للبن للمزارع الصغيرة ايضا اعلى ، وهذا محصلته ان المتاح للتسويق ككمية لوحده المساحه او الوحده الحيوانيه يكون بمعدلات اعلى للمزارع الصغيره عن الكبيرة ، كما ان القيمة المضافة تكون اعلى ، ١١) تقل كثافة العمل الحيوانى للفدان بزيادة حجم الحيازة ، وهذا يعنى اما علاقه استبدالية مع العمل الالى او ان المزارع الصغيرة تستخدم العمل الحيوانى بكفاءة اقل لوحده المساحه ، وعادة غالبيه العمل الحيوانى من انتاج المزرعه ، ويبدو ان نسبة المنتجات الغير غذائية للانشطة الحيوانيه ( العمل الحيوانى ، السماد العضوى ) تمثل جزءا هاما من جملة الانتاج ، أى حوالى ٤٠ ٪ من قيمة المنتجات الحيوانية فى العينه ، ١٢) من المهم ملاحظة ان هناك اسرافا فى استخدام بروتين البرسيم شتاءا مع افتقار الصيف للبروتين فى علائق الحيوان ، ويندر وجود مخلوط العلف المركز فى علائق الحيوانات فى المزارع التقليديه نظرا للسياسات المتبعه فسى التوزيع حاليا وهذا يجعل المزارع الصغير يستخدم مواد علفيسة مركزه ( حبوب ، بقول ، نخاله ) اعلى تكلفه لسد احتياجات حيواناته مسن المواد المركزه ، كما اتضح أن الدريس بمثل