



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

CA

Econ. WP-29
=

**AGRICULTURAL DEVELOPMENT SYSTEMS
EGYPT PROJECT**

UNIVERSITY OF CALIFORNIA, DAVIS

THE LIVESTOCK ECONOMY IN EGYPT:
AN APPRAISAL OF THE CURRENT SITUATION

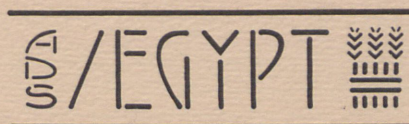
by

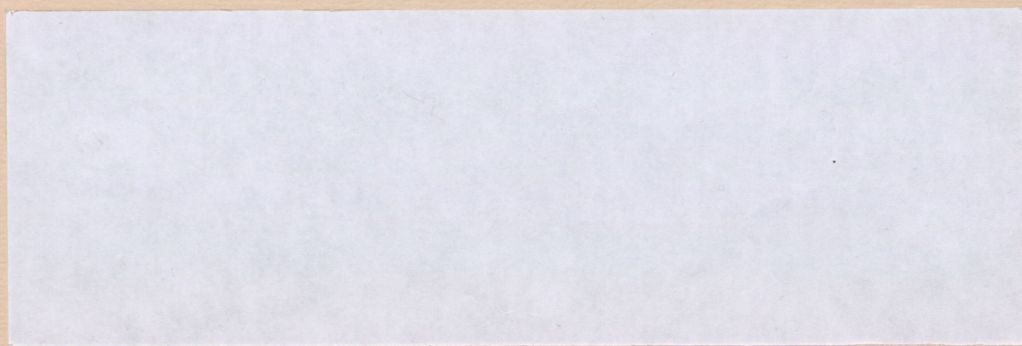
James Fitch
Agrimanagement
Ibrahim Soliman

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS
LIBRARY

NOV 29 1982

WORKING PAPER





**THE LIVESTOCK ECONOMY IN EGYPT:
AN APPRAISAL OF THE CURRENT SITUATION**

by

**James Fitch
Agrimanagement
Ibrahim Soliman**

**Economics
Working Paper Series
No. 29**

Note: The Research Reports of the Agricultural Development Systems: Egypt Project, University of California, Davis, are preliminary materials circulated to invite discussion and critical comment. These papers may be freely circulated but to protect their tentative character, they are not to be quoted without the permission of the author(s).

Revised August, 1981

**Agricultural Development Systems:
Egypt Project
University of California
Davis, Ca 95616**

The Livestock Economy in Egypt
An Appraisal of the Current Situation

By James Fitch and Ibrahim Soliman

Egypt is presently struggling with the problem of how to provide adequate supplies of meat and other livestock products to a rapidly growing, more affluent population. The critical nature of this problem was brought into focus in the summer of 1980, when retail meat prices began to rise unexpectedly and it appeared that there would be a shortage of meat for the big feast following Ramadan in early October. To prevent this from happening, the government banned the slaughter of all meat animals (except poultry) during the month of September, and meat prices were placed under control. These abrupt policy decisions moved the meat problem into full national view.

The pretext on which the government based its dramatic actions was a simple and familiar one. They claimed that the marketing of meat had been oligopolized by a few large and powerful merchants and butchers who were attempting to hold back supplies and thereby reap excess profits. At the same time, however, the government tacitly admitted that there were underlying production problems in the livestock sector. For example, the government promised to increase supplies of basic feedstuffs and to step up efforts to introduce improved genetic stock into the country's livestock herd. It banned the slaughter of young female cattle and buffaloes, in order to encourage the feeding out of these animals.

For the most part, however, both policies and programs were spur of the moment responses to a crises. They offered little hope of remedying Egypt's

livestock problem in the longer run.

Unfortunately, there has been very little in depth research on Egypt's livestock sector upon which to base more serious long run policy measures and decisions. It is generally recognized, for example, that the livestock data base is one of the weakest components of Egyptian agricultural statistics. In the absence of even the most basic information (e.g., total animal population, animal slaughter, milk production, etc.), it is understandable that progress in defining a strategy for the livestock sector has been slow to emerge.

Moreover, before policy makers can take effective action to improve or alter performance, it is also important that they have access to the experience with existing policies and of those which have been tried in the past. Studies of Egypt's livestock policies and programs have been very limited, and there is little in the way of documentation on the performance of existing or past programs. Even a casual inspection in certain areas, however, can be helpful. For example, a review of past regulatory activity would reveal that such measures as the bans on the slaughter of females and the efforts to confine retail price on meats have met with little apparent success.

This report attempts to summarize the data and other information which are available about the livestock sector. After providing some general background, it takes a critical look at the origins of the livestock data, how it is collected, and its inherent strengths and weaknesses. Comments also are offered in this section on how this data might be improved in order to facilitate planning and policy analysis in the future. The report then

reviews the principal policies and programs which affect the livestock sector in Egypt today. In the course of the discussion, a number of observations on past programs are included.

Background

Livestock production in Egypt is unique in that it is confined almost exclusively to irrigated cropping areas. The rest of Egypt is largely uninhabited desert, without sufficient grass or other natural forage to support grazing by more than a few hundred thousand camels, sheep and goats. Livestock production complements irrigated crop production in many ways, but it is also highly competitive with crop production in others. Since mechanization of crop production is still not extensive, livestock are required for work, and in many cases farmers choose to keep dual purpose animals which can produce milk and meat as well as work. Native cattle, in particular, but also the water buffalo, are prized for this dual purpose characteristic. Further complementing crop production, livestock of all kinds consume plant residues and by-products, turning these materials into either work or food products. For example a substantial amount of cotton-seed cake, which is the by-product of Egypt's principal export crop, is fed to livestock.

Livestock are also important consumers of maize, barley wheat, pulses, and other food grains, and in this way they compete directly with crop production. Furthermore, in the winter months almost half of Egypt's agricultural land is devoted to the production of berseem clover for livestock feeding; much of this is land which otherwise might produce such

food crops as wheat, beans or cash crops such as long staple cotton.

In the summer months, there is a severe shortage of forage and roughage material for livestock feed. In fact, roughage has been so scarce in recent years that the price of a wheat straw has often exceeded the price of the grain in many local markets. Another common practice to obtain summer fodder is to strip and top maize plants, although this is thought to reduce maize yields.

Due to the competition with vital and limited irrigated cropping area, Egypt's options for expanding livestock production are thus limited. There does seem to be some potential for altering the feed components in the existing production structure in order to increase productivity. A recent study by Winrock International (1980) found that there would be considerable advantage to adding feed grade urea to the concentrate feed mix which is currently made in government mills; this would reduce the percentage of cottonseed meal required for this ration and thus make it possible to provide a much greater total quantity of the mix. The Winrock study also found that there would be advantage in introducing new crops, such as forage sorghum and elephant grass, to help reduce the shortage of summer forages and also to reduce the amount of land which is devoted to berseem clover in the winter months. If a higher quality of feed were available throughout the year small farmers would be able to support improved dairy cattle and thus boost the annual milk and meat off-take by nearly three fold.

Farm mechanization is progressing in Egypt, and as it does this will undoubtedly change the basic structure of livestock production. Less land will be required to provide for livestock in farm work and transportation.

However, this does not necessarily mean that farmers will then reduce their livestock numbers. They may well elect to shift the land which is thus saved from forage and feed production into the production of food and fibre crop. On the other hand, farmers may instead choose to shift the mix of their livestock holdings from work animals to meat and milk producing animals, with little or no reduction in feed crop land requirements. It is likely that both strategies will be employed. The degree of shift in one direction or the other will depend upon a variety of factors such as the type of mechanization which occurs, which type and size of farm it affects, and which type of work animals it tends to replace. For example, it is logical to speculate that mechanization which replaces draft livestock used for ploughing and land leveling may cause small farmers to replace their native cattle, which are work and meat producers, with buffaloes, which are less valued for work but which are heavy milk producers and which also produce meat. On the other hand, it is reasonable to assume that mechanization in the area of on-farm and in-village transportation would tend to reduce the need for load-bearing animals such as camels and donkeys, and that this would eliminate the need to plant feed and fodders to support these animals.

Until the present, most of Egypt's livestock have been raised in the old land irrigated crop production areas. During the past two decades, however, Egypt has reclaimed almost a million acres of new lands for irrigation. These lands have not always proven to be very productive for food crops, particularly in the beginning years of use, due to problems with alkalinity, salinity and/or poor soil structure. It is often maintained that they would be more suitable

for use in producing livestock feed and forage crops such as barley and alfalfa and, were it not for the low rates of return on investment from extensive agriculture, the new land areas might offer potential for expanded livestock production. Until now, most new lands project areas have been operated by large government-owned companies. Managing livestock in large herds represents a fundamental departure from the small farm ownership pattern which predominates in the old lands. The government has made numerous attempts to encourage livestock production in its new lands companies during the past 20 years, but available statistics seem to indicate that such efforts still constitute a relatively small factor in overall livestock production.

Aside from the additional foodstuffs which can be obtained from new land production and by introduction of new forage crops in the old lands, availability would likely require additional imports of feed grains. Egypt has already made substantial increases in the importation of feed grains during the past decade. For example the country's imports of yellow maize were increased from 136 million tons per year in 1965-69 to over 500 million tons per year in 1975-79. Most of this yellow maize is fed to livestock, with somewhat over half targeted for the feed mix used by large animals and somewhat less than half utilized by poultry.

The question of whether to import feedstuffs or livestock products should be considered is an actively debated policy issue. Moreover, even if there is advantage to importing feedstuffs rather than livestock products, there continues to be a serious question as to whether these inputs would be more productively used in poultry production or in the production of large animals. If the answer to the global comparative advantageous question is positive

and investments are made in large animals, would they be more advantageous for milk production or for meat production?

If Egypt has a comparative advantage in producing its own livestock products with imported feedstuffs, it seems safe to assume that this advantage derives mainly from the abundant and low cost labor force which is available to engage in animal husbandry, since the roughages and other feeds which must complement the imported feedstuffs (with the possible exception of cottonseed cake) are all relatively scarce and expensive in Egypt. Lastly, if the feeding of large animals is to be encouraged, then should these animals be raised on small, traditional farms, where abundant labor exists, or should they be animals which are managed in larger specialized dairy herds, feedlots, or new lands farms?

The answer to these questions depend upon a number of factors. For example, they depend on such technical factors as the relative rates of gain and output of poultry to livestock. They also depend upon whether the scale economies and efficiencies of producing large animals in large production units outweigh the added labor and management costs which would be incurred, when compared to small scale production.

It appears that in the past government policy has attempted to favor the larger scale production units. Government funds have been utilized to establish large publicly owned dairy herds and feedlot operations, and programs such as livestock insurance and distribution of feed concentrates have been skewed in favor of larger producers. Nevertheless, it is not apparent that large scale production units have thrived under these policies.

It appears that, like crop products, with the exception of poultry broilers, small scale, traditional farms continue to produce the major portion of Egypt's livestock products.

The following section of this paper reviews available data for what is known about livestock production in Egypt. This includes trends in production, what is being produced, and where it is being produced.

Livestock Sector Data

The statistical data base for the livestock sector is considerably weaker than the data base for crops. Until data from the 1981 Census of Agriculture are made available, there will be very little concrete information about Egypt's current livestock population. The Ministry of Agriculture (MOA) does publish livestock population statistics annually. However, these statistics are based on trend projections from two national livestock sample surveys which were made in 1968 and 1970. Prior to that, livestock were included in the 1961 Census of Agriculture.

The Central Agency for Public Mobilization and Statistics (CAPMAS) also reports estimates of the livestock population in their Statistics of Animal Wealth series; while they report that the source of the data for this series is the Ministry of Agriculture, the CAPMAS figures vary from those reported by the MOA.

The constant growth rates used by MOA to estimate the livestock population for each year since 1970 are shown in Table 1. These figures indicate that the buffalo population, growing at a rate of 1.7 percent, is expanding somewhat faster than cattle at 1.4 percent. The sheep population, at 3.4 percent, is estimated to be growing much faster than the larger animals.

Table 1. Growth Rates Used to Project Livestock Populations In Egypt.

<u>Type of Animal</u>	<u>Annual Growth Rates</u>	
	<u>Cattle</u>	<u>Buffaloes</u>
Over 3 Years:		
Male	1.0	-1.2
Female	1.4	1.7
1 to 3 Years:		
Male	1.7	1.7
Female	1.4	1.7
Under 1 year:		
Male	1.6	1.5
Female	.9	2.2
Total:		
Male	1.5	.9
Female	1.3	1.8
<u>Total Population</u>	<u>1.4</u>	<u>1.7</u>
<hr/>		
	<u>Sheep</u>	<u>Goats</u>
Old:		
Male	3.6	1.0
Female	3.4	1.4
Young:		
Male	3.6	.8
Female	3.0	1.4
<u>Total Population</u>	<u>3.4</u>	<u>1.3</u>

* Based on changes in estimates of livestock populations derived from 1966 added 1970 services by MOA.

However, the use of constant growth rates for projecting livestock populations is a questionable procedure. It is known that all livestock populations go through cycles and that rates of change in numbers are seldom, if ever, constant from one year to the next. For this reason, longer run projections based on constant rates should be viewed with great doubt.

The Ministry of Agriculture's estimates of the livestock population in 1971 and 1980, derived with the constant growth rates, are shown in Table 2. The CAPMAS population statistics for 1960, 1970 and 1978 are shown in Table 3. The implicit growth rates for the CAPMAS figures are also shown in Table 3.

The CAPMAS population estimates for cattle, buffaloes and goats in 1978 are much higher than the MOA estimates of these populations for 1980. That is, the growth rates implicit in the CAPMAS statistics for 1970-78 are higher, in the case of cattle and buffaloes, than the growth rates used by MOA in their projections for the securities. According to both sources, however, the buffalo population is growing faster than the cattle population. It is not known why the CAPMAS figures are higher than the MOA figures, since CAPMAS claims to base its reports on data from the MOA.

Table 2. Livestock Populations in Egypt, 1971 and 1980,
According to Ministry of Agriculture Statistics.

<u>Type of Animal</u>	Population (1000'0 of head)			
	<u>Cattle</u>		<u>Buffaloes</u>	
	<u>1971</u>	<u>1980</u>	<u>1971</u>	<u>1980</u>
Over 3 years:				
Male	102	112	41	36
Female	100	114	1273	1482
1 to 3 years:				
Male	213	246	60	70
Female	392	445	363	423
Under 1 Year				
Male	157	182	67	77
Female	277	301	239	291
Totals:				
Male	472	540	168	183
Female	1671	1880	1878	2196
Total Population	2143	2120	2043	2379
	<u>Sheep</u>		<u>Goats</u>	
	<u>1971</u>	<u>1980</u>	<u>1971</u>	<u>1980</u>
Old				
Male	231	318	153	167
Female	1317	1780	638	723
Young				
Male	185	255	127	136
Female	402	524	252	286
Total	2135	2877	1170	1312

Table 3. Livestock Population in Egypt, 1970 and 1978, According to CAPMAS statistics.

<u>Total Population for Type of Animal (1000's of head)</u>							
	<u>Cattle</u>	<u>Buffaloes</u>	<u>Sheep</u>	<u>Goats</u>	<u>Camels</u>	<u>Pigs</u>	<u>Donkey</u>
1960	1,867	1,781	2,220	1,583	184	22	1010
1970	2,115	2,009	2,066	1,155	127	15	1362
1978	2,587	2,542	2,554	1,440	93	15	n.a.
<u>Implicit Average Annual Rates of Growth (percent)</u>							
1960-70	1.3	1.2	-0.7	-3.1	-3.6	-3.8	3.0
1970-78	2.5	3.0	2.7	2.8	-3.8	0	n.a.

Source: Central Agency for Public Mobilization and Statistics (CAPMAS), Statistics of Animal Wealth, Ref. no. 71-12412/79, January 1979 (in Arabic).

Although there are reasons to doubt the available statistics, there are reasons to believe that buffaloes may be replacing cattle. As noted above, the buffalo is less valued as a work animal and more valued for its milk. As tractor mechanization and motor pumps have spread in Egypt during the past 20 years, there is less requirement for the farmer to have animals which are used as extensively as before for draft purposes. This has undoubtedly made it possible for many farmers to replace their cows with buffalo cows.

The age and sex structure of livestock, as shown in Table 2, reflects something about the use patterns of the various types of animals. There is far less of a tendency to retain male buffaloes than there is to retain

male cattle. This is partly due to the work factor, but it is also said to be due to the fact that buffaloes have a lower rate of weight gain per unit of feed than do cattle. Therefore, while male cattle are retained for fattening, buffaloes are not. On the other hand, the very high proportion of female buffaloes which are in the over-three-year age category and the very low proposition of female cattle which are in this category is another reflection of the specialization of the buffalo as a milk production animal.

Data on the numbers of livestock held in different types of production units and in different regions and locations is even more scarce than overall livestock population data. CAPMAS does publish periodic reports of the animals held by various government production units. These would include publicly owned production companies and state farms, as well as experiment stations and universities. Table 4 compares 1975 figures to those for 1967. The striking point in these data is that government owned animals appear to constitute only about one percent of the total population of large animals. Whereas private livestock owners have been changing their herd mix in favor of buffaloes and away from cattle, government units have done just the opposite. The government has greatly reduced its emphasis on foreign and cross-bred animal breeds and has shifted back to local or native stains. Overall, government herds have declined while privately owned herds have been growing. While the government does not publish any statistics which identify quantities of animals held in different locations and types of production units more closely, the Ministry of Agriculture does report the amounts of feed concentrate which are delivered to various classes of producers. Thus, it

Table 4. Number of Animals owned by Governmental Units and Public Sector Companies

	<u>1967</u>	<u>1975</u>	<u>Average Annual Rate of Change</u>
	... no of headpercent..
Cattle			
Native	9,752	18,610	8.4
Foreign	8,886	4,681	-7.7
Cross bred	<u>16,930</u>	<u>10,566</u>	<u>-5.7</u>
Total	35,567	33,807	-0.6
Buffaloe	21,449	13,849	-5.3
Sheep			
Native	10,706	15,085	4.4
Foreign	11,233	7,982	-4.2
Cross-bred	<u>33,771</u>	<u>1,600</u>	<u>-31.7</u>
Total	55,710	24,667	-9.7
Goats	69	-	-55.8
Camels	21	9	-10.1
Other work animals	1482	1,085	- 3.8
Poultry			
broilers	1,298,505	4,955,000	18.2
laying hens	<u>148,567</u>	<u>950,000</u>	<u>26.1</u>
Total	1,447,072	5,905,000	19.2

Source: CAPMAS, Statistics of Livestock, No. 20.324 of Dec. 1968, and No. 2210-AA-78 of November 1977.

is possible to make a rough estimate of the animals in each class by deviding the amount of concentrate provided to each class by the quota amount for that class of animal. This was done by the authors, and results are shown in Table 5. This procedure is probably not very accurate since there is no assurance that the animals in any given class received their full quota amount; often, there is not enough of the concentrate to go around. Nevertheless, the results shown in Table 5 do appear to be consistent, in some ways, with other data. For example if the total number of cattle and buffaloes which were estimated to belong to public sector companies is taken from Table 5 (item 2, 46, 415 head), it is quite close to the number of public sector animals which was given in Table 4 (47,653 head).*

What Table 5 indicates, in any case, is that a relatively small number of Egypt's livestock population is held in specialized production units. Of the 5.2 million head of cattle and buffaloes estimated to exist in the country, only 464.4 thousand (7%) are estimated to have been held in feedlots and other specialised fattening activities; 76.6 thousand (1.5%) were on dairy farms, 46.4 thousand (0.9%) were in public sector companies and other government units, and 20.2 thousand (0.4%) were in new lands projects. Presumably then, some 90% of all cattle and buffaloes in Egypt would be held in non-specialized production units, i.e., in traditional farms. This indicates that the traditional farm is still the mainstay of large animal production in Egypt. Furthermore, traditional small farms would account for an even greater proportions of small animals, i.e., sheep and goats.

*Virtually all new lands projects have been owned by public sector companies. The figures derived in Table 5 suggest that Table 4 may not include livestock owned by public sector companies in the new lands.

Table 5. Total Population of Cattle and Buffalo, together with Estimates of Animals Confined in Specialized Production Facilities.

Total Population of Cattle and Buffalo, 1980

Cattle	2,794,478
Buffalo	<u>2,420,022</u>
Total	5,214.500

Estimated Number of Cattle and Buffalo Held in Specialized Production Activities, 1978-80 Average.

	<u>No. of Head</u>	<u>% of Total Pop.</u>
1. Feedlots and other private fattening activities	364,413	7.0
2. Government and Public sector organizations	46,415	0.9
3. New Lands Projects	20,233	0.4
4. Dairy Farms		
a. delivery to Egypt Milk Co.	6,236	0.1
b. not delivering	<u>70,386</u>	<u>1.3</u>
Totals	507, 683	9.7

Source: Total population statistics from Ministry of Agriculture, Institute of Agricultural Economics and Statistics; Estimates for specialized production activities more derived by the authors by dividing the concentrate feeds allocated to each type of activity by the official feed quotas provided by MOA for each type.

In the case of poultry, the government has played a greatly expanded role. Table 5 shows that government broiler flocks grew at an average annual rate of 18 percent between 1967 and 1975, while the number of laying hens in government units grew at a 26 percent rate. No comparable flock growth statistics are available for the private sector. The relative proportions of government versus private poultry production can be evaluated, however. The MATHTECH study, completed in 1980, showed that public sector companies play a particularly strong role in broiler production, where they accounted for one quarter of all the poultry meat produced in Egypt; this can be seen in Table 5, which provides 1978 data. Of the 75 percent of broiler production which was in private lands, one third took place in confined or specialized production units and two thirds came from common village flocks.

Public sector egg production, in contrast to broilers, accounted for only four percent of total output in 1978. Egg production was found to be very heavily concentrated under private ownership, with less than four percent of all eggs produced coming from private sector companies. Of the 96 percent produced in the private sector, all but about one percent came from village flocks, indicating the still heavy reliance on traditional production methods. In the area of bird production about two thirds of the chicks hatched still come from traditional type hatcheries. In terms of genetic stock, an estimated 71 percent of the eggs hatched were baladi (local) varieties and only 29 percent were of modern or improved genetic stock (Table 5).

Table 6. Composition of Poultry Products and Hatcheries, by Sector

<u>Sector</u>	<u>Estimated Production in 1978</u>			
	<u>Poultry Meat</u>		<u>Eggs</u>	
	<u>Quantity</u>	<u>% of</u>	<u>Quantity</u>	<u>% of</u>
	<u>(000 kg)</u>	<u>Total</u>	<u>(000)</u>	<u>Total</u>
I. Public Sector Companies	24,750	24.8%	77,000	3.8%
II. Private				
- Confined Units	25,000	25.1%	16,000	0.8%
- Village Flocks	50,000	50.1%	1,916,000	95.4%
Total Production	99,750	100. %	2,009,000	100. %

Hatchery Capacity, Modern and Traditional, 1976-77

<u>Sector</u>	<u>No. of Hatcheries</u>	<u>Chicks Hatched</u>	<u>% Hatch</u>
Modern	45	40,870,636	75%
Native	693	98,510,928	61%

Chicks Hatched, By Breed, 1976-72

Modern	43,588,272	29%
Native	105,793,292	71%

Source: MATHTECH, Final Report, Poultry Improvement Project, Egypt, September 1980, Volume 11, pp. 111, 126, 129, 130, 146.

Trends in Meat Production and Consumption

Data on meat production and consumption are probably more inaccurate than livestock population data because they are derived from the population data following highly simplified procedures. Both MOA and CAPMAS use fixed equations to estimate red meat consumption from their annual population estimates. That is, population is multiplied by a fixed off-take or slaughter ratio and a fixed carcass weight. The CAPMAS and official MOA (Institute of Agricultural Economics Research) estimates for selected years are shown in Table 7. In those years where comparisons are possible, it is seen that MOA estimates run from 5 to 25 percent higher than those of CAPMAS.

It was noted earlier that populations are estimated by use of constant trend coefficients. Therefore, this feature must carry over into the meat Production estimates made by both agencies. It is known, however, that livestock herds do not grow at constant rates nor are they slaughtered at constant rates. Rather, herd growth and slaughter vary in interrelated cycles. The Ministry of Agriculture's Department of Slaughter oversees the operation of the publicly owned and supervised slaughter facilities and maintains records of the numbers of animals slaughtered. The cyclical behavior of slaughter can be seen in Figure 1, which portrays the data for a number of different animal types. There is no mistaking the cyclic behavior of slaughter in these diagrams.

The problem with the MOA slaughter statistics is that they do not represent total slaughter for the country. Not all of the animals which are slaughtered go through the publicly controlled facilities from which the MOA

Table 7. Domestic Meat Production, Various Series

	<u>CAPMAS Series</u>		<u>MOA, Institute of Ag. Econ. Research</u>		<u>MOA, Dept. of Slaughter*</u>		
	<u>Red Meat</u>	<u>Poultry</u>	<u>Red Meat</u>	<u>Poultry</u>	<u>In</u>	<u>Off</u>	<u>Total</u>
 (000) Tons Carcass Weight.....						
1965	226	76	256	88	79	119	198
1970	272	85	283	97	101	141	242
1975	290	94	305	113	112	165	277
1978	n.a.	n.a.	322	115	124	187	311
1979	n.a.	n.a.	n.a.	n.a.	111	162	273

* All camel carcasses are considered as imported animals. "In" refers to slaughter in officially supervised public slaughter facilities whereas "off" refers to slaughter off or outside these facilities.

slaughter statistics are taken. In 1965, the MOA conducted a survey in order to estimate the number of animals which were slaughtered outside the official facilities. They found that only about 40 percent of the animals slaughtered were killed in the public facilities whereas the remaining 60 percent were killed outside or off these premises. Therefore, in order to estimate total slaughter in the country, the Department of Slaughter uses a constant 60:40 ratio to estimate off-slaughter from the in-house slaughter figures which it gathers from its own regulatory activities. Table 7 shows the Department of Slaughter's estimates of "in", "off", and total slaughter for various years since 1965. The total figure may be compared to the CAPMAS series for domestic red meat production and the MOA's Institute of Agricultural Economic research series. In all cases, the Department of Slaughter's estimate is below the other two estimates. The difference varies, however, in reflection of the cyclical nature of the slaughter statistics.

To summarize what is known about domestic meat production, none of the series is very satisfactory. The CAPMAS and Institute of Agricultural Economic Research series are deficient in that they assume fixed herd growth rates and constant off-take or slaughter ratios, and the Department of Slaughter series is deficient in that it assumes that a constant proportion of animals are slaughtered outside the officially controlled facilities.

To arrive at estimates of total consumption, it is necessary to add imports to domestic production. Again, however, there are some differences in the data series on imports. CAPMAS includes livestock imports in its monthly trade reports. The Department of Veterinary Quarantine, which is

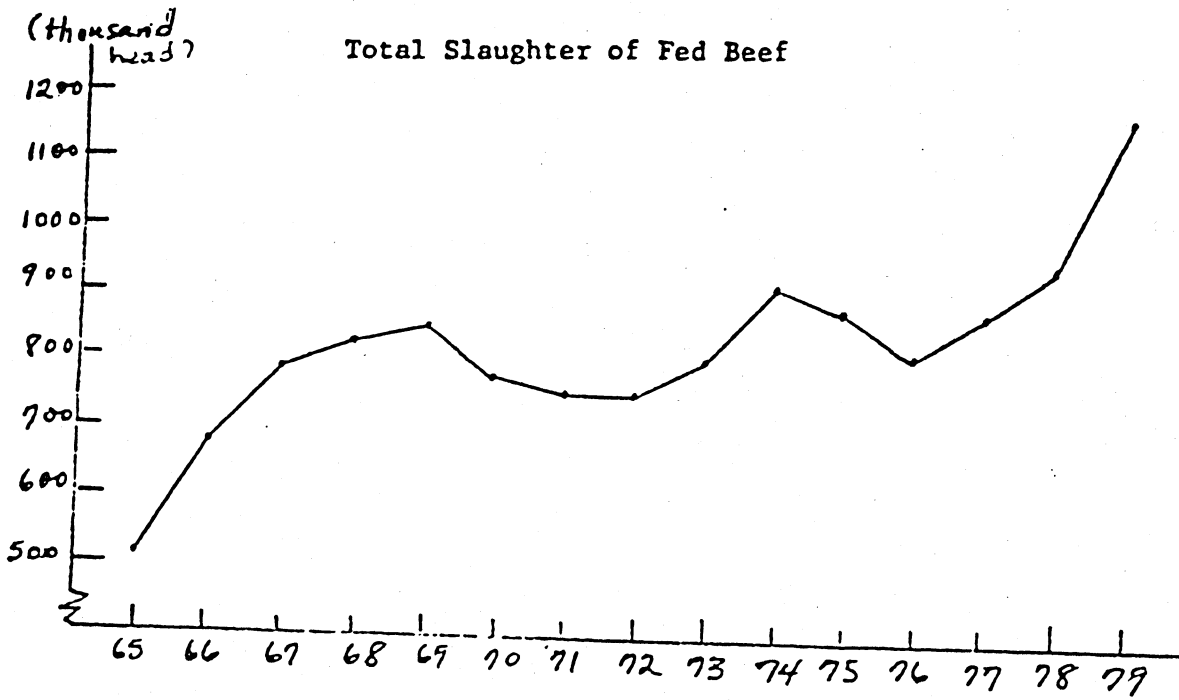


Figure 1a.

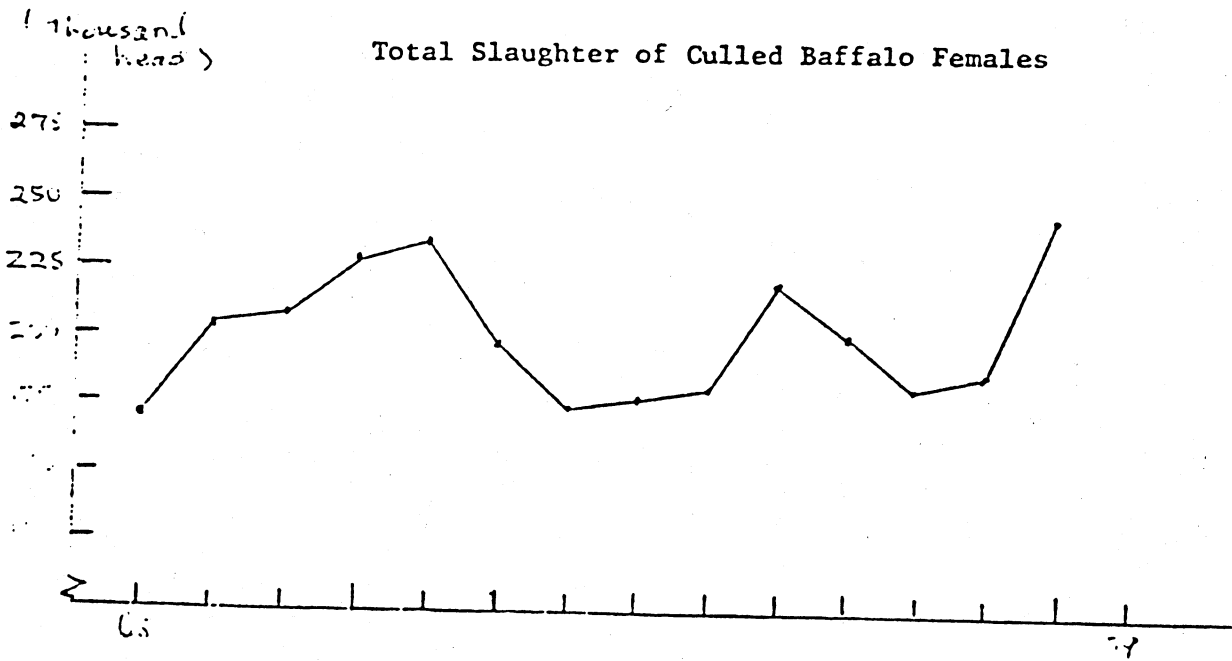


Figure 1b.

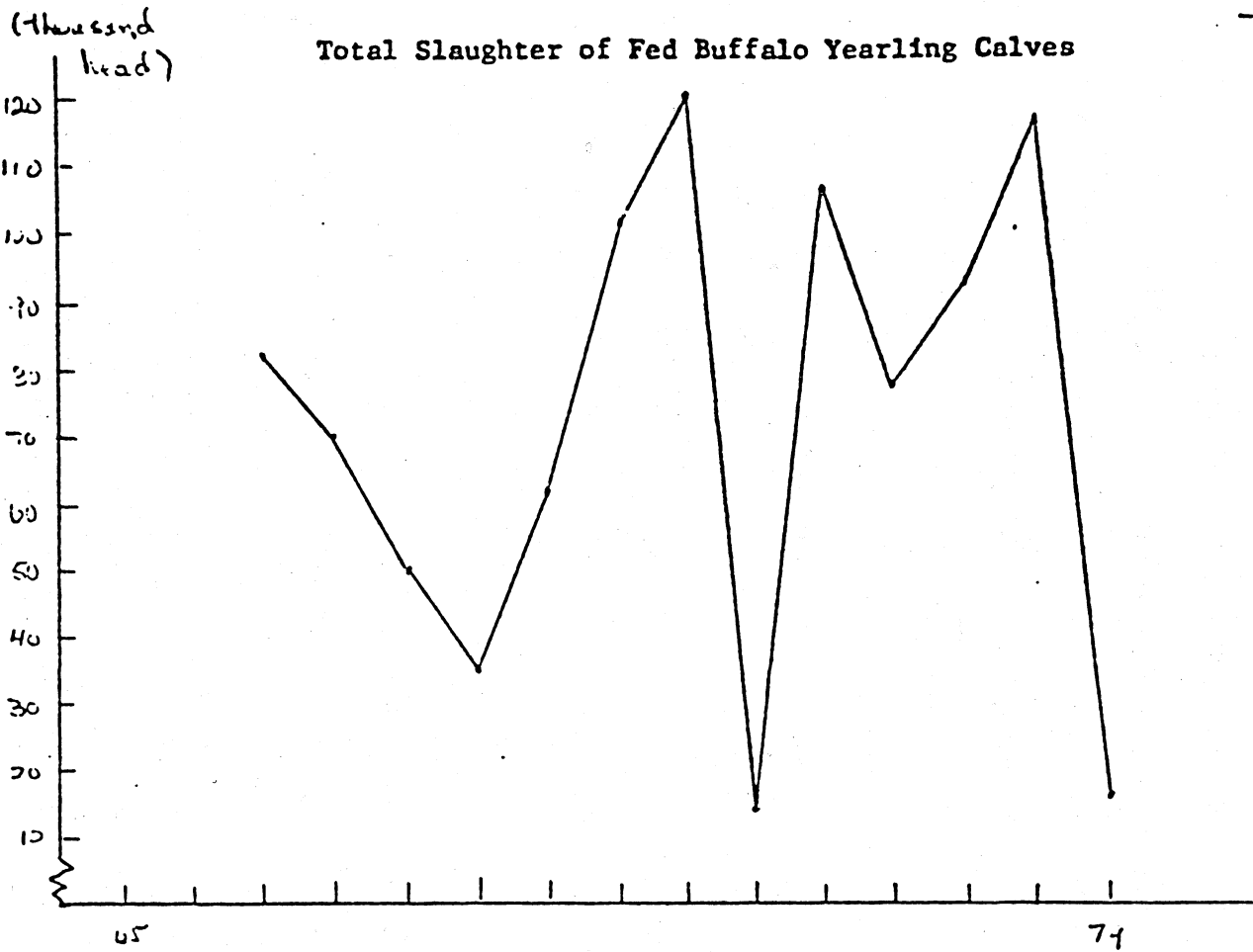


Figure 1c.

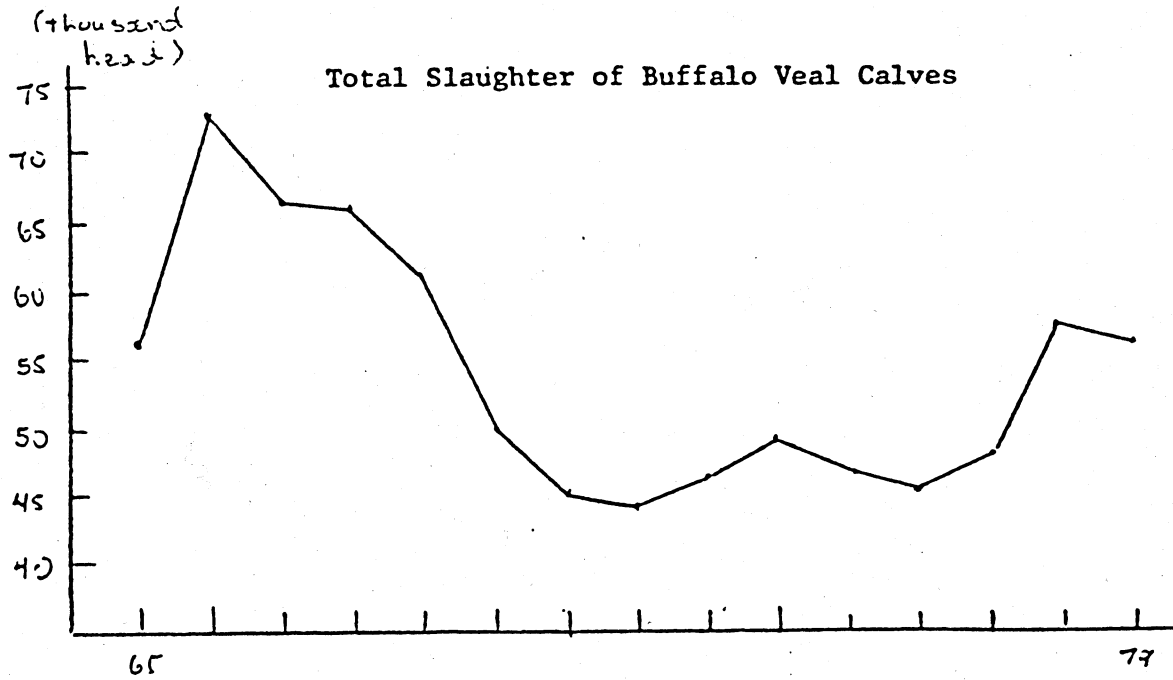


Figure 1d.

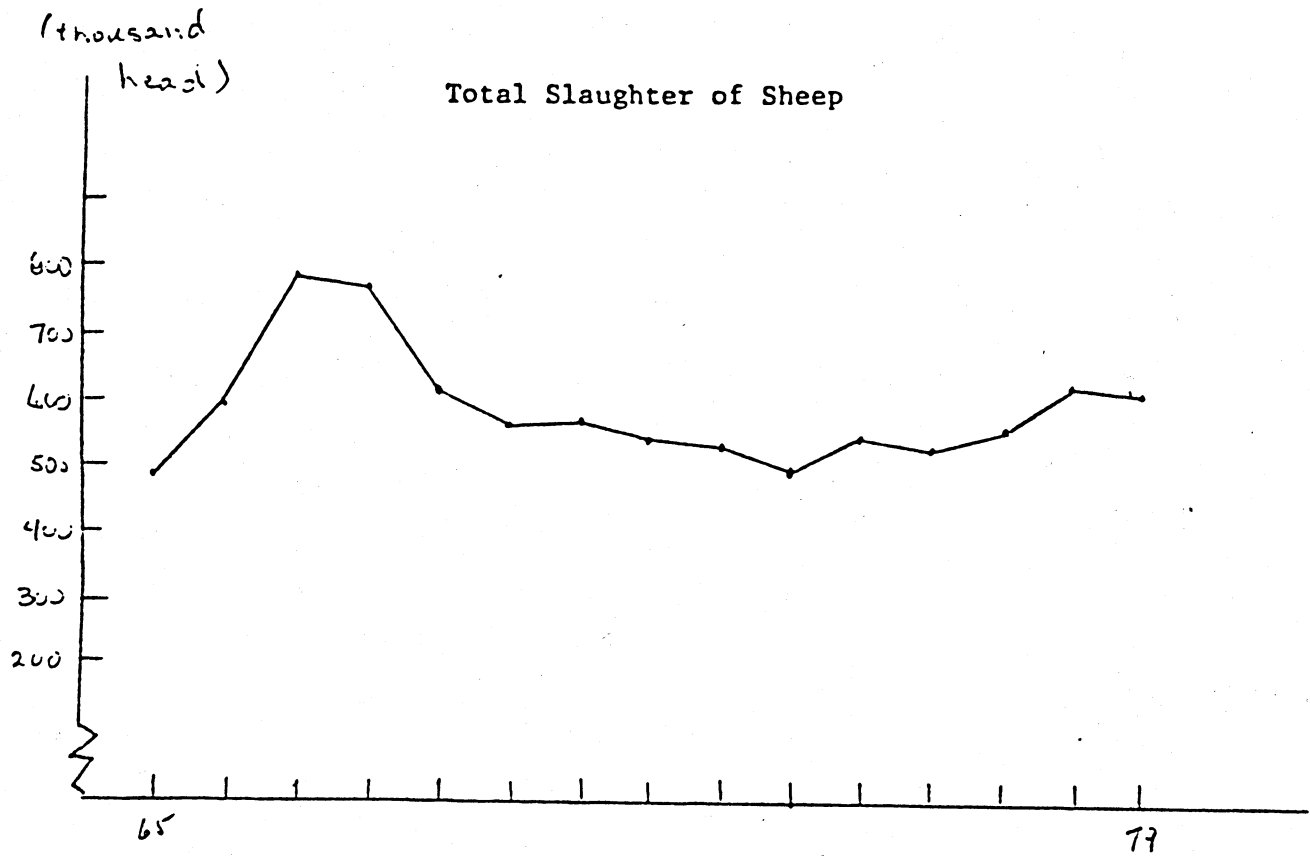


Figure 1e.

responsible for inspecting all imported meats and live animals, keeps a separate import series based on these activities. Table 8 compares these two series. In general, the Department of Quarantines series is much higher than that of CAPMAS. A Major part of the discrepancy lies in differences on reports of imported live animals, an area where the Department of Quarantines is in direct control. Therefore, it is felt that the Quarantines import figures may be more reliable than CAPMAS.

It is necessary to consider one additional factor in order to arrive at an acceptable estimate of total consumption. This is to take account of the fact that many offals, such as intestines and brains, which are derived from the slaughter process, constitute edible meat products in Egypt. These are derived from the slaughter of both domestic and imported live animals. Edible offals have been estimated to constitute about 18 percent of domestic production. In Table 9, adjustments have been made for these edible offals resulting in a total upward adjustment of about 16 percent in the consumption figures for red meat.

Table 10 shows a revised composite series of production, imports and consumption for red meats poultry, and total meats. The domestic production figures for red meats are taken from the Department of Slaughter series, whereas imports have been taken from the Department of Quarantines statistics. Adjustments for edible offals are included. The table shows that Egypt's total meat consumption rose from 385 million tons in 1965 to 612 million tons in 1978, an average annual growth of 3.6 percent. Despite this substantial increase, the country has managed to stay largely self sufficient in meat production. Imports, which accounted for about 15 percent of total consumption in the middle sixties, dropped to only five percent of consumption after the

Table 8. Imports of Meats, According to Two Alternative Sources

Year	Data Source	Chilled and Frozen Meats				Live Animals				Preserved Meats*	Grand Total
		Poultry	Red Meats	Mutton	Total	Cattle	Sheep/Goats	Camels	Total		
..... thousands of tons carcass weight or equivalent											
..... thousands of tons											
1965	A	3.1	2.7	6.8	12.6	6.2	.6	11.3	18.1	5.0	35.7
	B	-	17.0	11.8	28.8	8.4	.6	10.0	19.0	3.4	51.2
1970	A	.6	4.3	.9	5.8	1.6	.4	0	2.0	4.1	11.9
	B	-	3.6	3.8	7.4	3.0	.9	18.4	22.3	1.4	31.1
1975	A	3.0	7.2	.1	10.3	0	1.2	0	1.2	15.3	26.8
	B	-	21.5	.7	22.2	.01	.7	16.4	17.1	6.3	45.8
1978	A	8.5	44.4	0	52.9	0	0	0	0	17.2	70.1
	B	-	76.6 †	0	76.6	.06	.1	18.4	18.6	12.3	107.5
1979	A	19.3	30.3	2.2	51.8	.08	0	0	.08	11.7	63.6
	B	-	5.9	25.2	33.1	.1	0	10.7	10.8	5.1	49.0

Source: A. CAPMAS, Monthly Trade Book
 B. Ministry of Agriculture, Department of Veterinary Quarantines

* Includes fish and shellfish in case of Source A, but Source B contains meat only.

† Includes frozen liver.

✓ B. All live animals have been converted to carcass weight equivalents.

for the period 1965-1973

Year	Production (1)	Imports (2)	Consumption (3)	Edible offals (4)			Consumption including Edible Offals (5)
				of domestic animals	of imported animals	Total	
. . . . thousands of tons carcass weight or equivalent							
1965	198	51	249	43	4	47	296
1966	234	49	283	50	5	55	338
1967	273	24	297	59	3	62	359
1968	286	20	306	62	3	65	371
1969	279	20	299	60	3	63	362
1970	292	31	273	52	4	56	329
1971	232	34	266	50	5	55	321
1972	239	30	269	52	4	56	325
1973	257	36	293	56	5	61	354
1974	268	66	334	50	4	54	388
1975	277	46	323	60	3	63	386
1976	248	95	343	54	3	57	400
1977	266	69	335	58	3	61	396
1978	311	107	318	67	3	70	388
1979	273	49	322	53	2	65	387

Sources: (1) Based on Slaughter Department figures with off-slaughter multiplier for red meats,
 (2) As in Table 8, Source B.
 (3) Equals (1) plus (2),
 (4) Estimates of the authors.
 (5) Equals (3) plus total of (4).

1967 war and returned to the 10 percent of consumption range in the early seventies. In 1974, imports accounted for 14 percent of consumption, but by 1978, they accounted for more than 19 percent.

The rates of growth based on differences between three year averages, shown at the bottom of Table 10, are perhaps somewhat more indicative of the underlying tendency for Egypt to rely more heavily on imports. From 1966-68 to 1971-73, domestic red meat production actually declined somewhat, whereas poultry production increased slightly and poultry imports were greatly expanded. The net result was a 0.4 percent average annual decline in total consumption of meats between the two periods. The picture changed dramatically between 1971-73 and 1976-78. Domestic red meat production was able to expand by an average 2.5 percent annually, while poultry production increased at 18.3 percent per annum. During this same period, red meat imports were expanded by 19.6 percent annually while poultry imports were only increased at the rate of 5.9 percent. Total domestic meat production was increased at a 2.6 percent annual rate, imports at a much higher 18.6 percent, and total consumption was increased at an average 4.6 percent annual. Thus, while domestic meat production has held its own with population growth in the 1970's, total consumption has been increased at a higher rate with the help of greatly expanded imports, particularly imports of red meats.

In terms of overall meat consumption per capita, the picture has changed relatively little since the middle sixties. As Table 11 shows, total consumption per capita averaged 14.5 kg during 1966-68, it dropped to 12.6 during 1971-73, and it had recovered to 14.2 kg by 1976-68. The consumption mixture has been altered somewhat, however. In 1966-68, the average consumer

Table 10. Domestic Production, Imports, and Consumption of Meats, 1965-79

Year	Red Meat			Poultry meat			Total meat			
	Domestic production	Imports	Imports as % of total	Domestic production	Imports	Imports as % of total	Domestic production	Imports	Total consumption	Imports as % of total
	...1000 tons		%	...1000 tons.....		%	...1000 tons....			%
1965	241	55	18.6	86	3.1	3.5	327	58.1	385.1	15.0
1966	284	54	16.0	90	.5	0.6	374	54.5	428.5	12.7
1967	332	27	7.5	94	.1	0.1	426	27.1	453.1	6.0
1968	348	23	6.0	90	0.0	0	438	23.0	461.0	5.0
1969	340	23	6.8	94	0.0	0	434	23.0	457.0	5.0
1970	295	35	11.9	96	.6	0.6	391	35.6	426.6	8.3
1971	282	39	12.1	98	3.4	3.4	380	42.4	422.4	10.0
1972	291	34	10.5	103	5.0	4.6	394	39.0	433.0	9.0
1973	313	41	11.6	102	2.4	2.3	415	43.4	458.4	9.5
1974	326	70	17.7	110	1.2	1.1	436	71.2	507.2	14.0
1975	337	49	12.7	113	3.0	2.6	450	52.0	502.0	10.4
1976	302	98	24.5	115	.1	0.1	417	48.1	515.1	9.3
1977	323	71	13.1	121	5.9	4.6	444	76.9	520.9	14.8
1978	378	110	22.5	115	8.5	6.9	493	118.5	611.5	19.4
1979	336	51	13.2	n.a.	19.3		n.a.	70.3	n.a.	
<u>Three-year Averages</u>										
1966-68	321.3	34.7	9.7	91	.2	0.2	412.7	34.8	447.5	7.9
1971-73	295.3	38	11.4	101	3.6	3.4	396.3	41.6	437.9	9.5
1976-78	334.3	93	21.8	234	4.8	2.0	451.3	97.8	549.1	17.8
<u>Average annual rates of growth between periods</u>										
1966-68 to 71-73	-1.7	1.8		2.1	78.3		-1.8	3.6	-0.4	
1971-73 to 76-78	2.5	19.6		18.3	5.9		2.6	18.6	4.6	

Table 11. Per Capita Meat Consumption and Related Demand Factors, 1965-69

	Per Capita Meat Consumption (kg.)			Human Population (Millions)	Real income per capita (1959-60 Pounds)	Meat prices relative to index of overall food prices. (1965-67 piastres/day)	
	Red Meat	Poultry Meat	Total Meat			Beef	Chickens
1965	10.1	3.0	13.1	29.4	62.1	50.3	45.8
1966	11.2	3.0	14.2	30.1	58.1	54.7	47.2
1967	11.6	3.1	14.7	30.8	55.3	43.9	40.5
1968	11.8	2.9	14.6	31.5	54.5	46.8	42.6
1969	11.2	2.9	14.2	32.3	56.7	50.5	41.5
1970	10.0	2.9	12.9	33.0	57.6	59.3	43.6
1971	9.5	3.0	12.5	33.8	54.0	59.9	42.3
1972	9.4	3.1	12.5	34.6	55.3	62.1	43.3
1973	10.0	3.0	13.0	35.4	55.9	61.1	42.4
1974	10.9	3.1	14.0	36.2	53.6	55.7	42.2
1975	10.4	3.1	13.5	37.0	60.2	62.9	43.9
1976	10.7	3.1	13.8	37.9	63.7	68.4	46.8
1977	10.1	3.3	13.4	38.8	65.9	66.8	46.6
1978	9.7	5.6	15.3	39.9	n.a.	59.3	44.3
1979	9.5	n.a.	n.a.	40.8	n.a.	n.a.	n.a.
- - - - - three-year averages - - - - -							
1966-68	11.5	3.0	14.5		56.0	58.7	43.4
1971-73	9.6	3.0	12.6		55.1	61.0	42.7
1976-78	10.2	4.0	14.2		65.9 *	64.8	45.9
- - - - - Percent changes between intervals - - - - -							
1966-68 to 1971-73	-17%	0	-13%	+2.4%	-2%	+25%	-2%
1971-73 to 1976-78	+6%	+33%	+13%	+2.3%	+20%	+6%	+7%

Source: Calculations of authors. Income figures are from CAPMAS. Red meat prices and poultry prices from CAPMAS were divided by CAPMAS food price index.

ate 11.5 kg of red meat and 3 kg of chicken; by 1976-68, he was eating only 10.2 kg of red meat but 4 kg of chicken. There is a consistent pattern between per capita consumption and relevant income and price relationships. Real incomes declined slightly from 1966-68 to 1971-73, poultry (chicken) prices declined relative to other food prices, and red meat (beef) prices increased sharply, relative to overall food prices. From 1971-73 to 1976-78, incomes were up sharply, and both poultry and red meat prices rose more than did other food prices.

The preceding discussion shows that by piecing together and adjusting existing information it is possible to show what has transpired in Egypt's livestock and meat sector during the past several decades. Most of the data pertains to a very aggregate level. It is thus very weak in the area of showing how livestock is distributed among different types of production units. The quality of the data is subject to doubt in terms of its ability to accurately reveal the rates of growth in herd size or composition. Such information as is available appears to indicate that specialized or "modern" production units still account for less than 10 percent of all cattle and buffaloes and probably a much smaller proportion of cattle and goats. The only area so far where "modern" techniques have made substantial inroads is in broiler production, where public sector companies and privately owned confined production units each account for about one quarter of the total meat produced. However, village flocks are thought to still produce more than 95 percent of Egypt's eggs.

Policies that Affect Livestock Production

Government policies and programs affect livestock production both directly and indirectly. Foremost among the indirect policies which affect

livestock production in Egypt are crop price policies. Direct policies and programs include distribution of subsidized feed concentrate mixtures, subsidation of imported yellow maize for feeding, special insurance programs for livestock, retail controls on meat prices, subsidies on imported meats which are sold through the government's cooperative store system, local policies which restrict the transportation of live and slaughtered animals between governorates, recent programs of subsidized credit for livestock production, provision of veterinary and artificial insemination services, and importation of improved breeds.

Government price policies toward food and fibre crops undoubtedly have profound effects on livestock production. Recent studies by Khedr and Clark (1980), by Habashy and Fitch (1981) and by the World Bank (1980) have shown that the prices which Egyptian farmers receive for the major traded crops, such as cotton, wheat, rice and maize, are typically only 40 to 60 percent of their equivalent international values in trade. In effect, government policies on the procurement prices for crops and on importation result in an effective taxation of from 60 to 40 percent on the production of these crops. Cotton, the country's major export crop, is particularly heavily taxed, as is wheat production. Both of these crops compete for land area with the production of berseem clover, the major winter livestock forage feed crop, which is not taxed or price controlled. Therefore, it is less expensive for farmers to produce clover than it would be if the prices of competing crops were not taxed. In effect, part of the indirect taxation of cotton, wheat and other crops results in a subsidy for livestock production.

Of the many policies which are aimed directly at livestock production, the subsidies on the various livestock concentrate feed ingredients undoubtedly have the most profound effects. A variety of government agencies and public companies participate in a series of interlinked programs to make these subsidized inputs available to producers. The Ministry of Supply imports yellow maize and distributes it at subsidized prices to (1) public companies, supervised by the Ministry of Industry, who produce concentrate feed mixes for livestock as well as poultry, (2) to feedlots and dairy herds which may feed the maize directly, and (3) to village cooperatives who make the maize available to farmers for feeding their poultry and other livestock (Soliman 1981a). The subsidy on maize imports rose from 4.4 million Egyptian Pounds on imports of 609 thousand tons in 1973 to an estimated 100 million L.E. on imports of almost a million tons in 1980. In 1980, it was estimated that 24 percent of the imported maize was distributed to farmers through cooperatives, 52 percent went to cattle fattening activities, including manufacture of feed concentrates, and the balance went to poultry feeding.*

According to Soliman (1981a) feed concentrate mixes for large animals and for poultry are manufactured in publicly owned plants supervised by the Ministry of Industry, based on formulas provided by the Ministry of Agriculture. In addition to the imported yellow maize received through the Ministry of Supply, these mixes take advantage of available local crop by-products, including cottonseed cake, brans and molasses. Cottonseed is obtained from the gins operated by the Ministry of Economy and molasses from Ministry of Industry sugar mill companies. The feed mills pay prices for

* Statistics provided by Ministry of Supply

these local inputs which are typically far lower than their international trading equivalents, and the feed concentrates are, in turn distributed at prices which are also well below equivalent international cost. In 1977, the international cost of feed concentrate for livestock would have been at least L.E. 97 per ton, i.e., more than three times higher than the official L.E. 30 per ton price at which the mix was being distributed.

At the low prices which are charged for the concentrates, the supply is not sufficient to meet demand, and the government must allocate them according to a quota system. As a result the black market price was over L.E. 60 per ton in 1977, more than twice the official price which was charged for this livestock feed (Soliman (1981a)). This shows that some producers and middlemen make money merely by reselling concentrates to producers who have requirements in excess of their quotas.

The government's quota system for distributing concentrate feedmix to livestock follows a specific list of priorities which gives first place to state farms and to specialized producers who have contracts to deliver meat and milk to public sector companies or other state agencies. Next in priority are specialized meat and dairy herds who do not have delivery contracts. In this system, the small farmers who hold the majority of the country's livestock, have had the lowest priority and the smallest quotas (Soliman 1981a).

Although the feed subsidy and distribution system has been widely criticized, there have been few if any studies of alternatives to this system. Such research is badly needed. For example, it would be useful to examine the implication of reallocating existing feed supplies to smaller producers and to consider expanded feed imports at non-subsidized prices.

The Ministry of Agriculture operates a livestock insurance program which permits participants to insure their animals against premature deaths due to accident or disease. This program was long used as a basic qualification for the purchase of subsidized concentrate feeds. Until the latter part of 1980, the rule had been that, to qualify for insurance, a producer had to have at least 10 head of animals for fattening or 5 dairy animals. This meant that only specialized feedlots and dairy herds, together with a few larger farms, could qualify for larger quotas of the concentrates. The distribution quota for insured animals was 150 kg per month, compared to only 20 kg per month, during the six summer months, for uninsured animals. After the summer meat crisis and subsequent slaughter ban in 1980, the rule was changed to permit farmers with any number of productive (meat or milk) animals to purchase the insurance and thus to qualify for higher quotas of concentrate. This new ruling may serve to alter the distribution pattern for the subsidised feed.

Although the quota system has gradually been relaxed, distribution is still dependent on availability and goes according to the same priority system which gives precedence to larger production units. Furthermore, it is thought that Agricultural Credit Bank officials and governorate authorities have a strong influence on how the system operates in each area. It is possible to obtain data from the Ministry of Agriculture on the distribution of feed concentrates, according to governorate and type to production unit. In his feed concentrate study, Soliman reported the figures for the 1976-77 agricultural year. He found that of 781 thousand tons of the concentrate distributed directly for large livestock (i.e., not poultry feeds), 310 thousand tons (36 percent) went to government production units in the new lands and elsewhere, 140 thousand tons (18 percent) went to dairy herds, and 301 thousand tons (35 percent) went to animals on traditional holdings. Thus, livestock in feedlots, thought to

constitute only about 7 percent of the total cattle and buffalo herds (Table 6), received 36 percent of the subsidized feeds, whereas livestock in traditional farms, thought to constitute just over 90 percent of the herd, received only 35 percent of the feed concentrate.

The feed subsidy program has become increasingly expensive for the government to operate. Recent calculations by Soliman and Mousa (1981) indicate that the total cost of feed subsidies increased from 11 million Egyptian Pounds in 1970 to 110 million Pounds in 1980. These figures do not include subsidies for maize distributed for poultry feeds or for direct consumption by large animals.

Although direct price intervention has not been as common in the livestock sector as in crops, it has nevertheless existed. After the summer meat crisis in 1980, the government imposed a retail price ceiling on most forms of meat. Ceilings of from L.E. 2.30 to 2.50 were established whereas free market price levels of from L.E. 3.00 to 3.50 had prevailed prior to the slaughter ban. To back up the retail price ceiling, price limits were also set for beef and buffalo fed animals (but not for other categories, particularly feeders). These ceilings were from L.E. 1.05 to 1.08 per kilogram of live weight. As time has passed, enforcement of these price limits has become less stringent. Current retail prices have risen to almost L.E. 3.00 per kilogram. This is what had happened on several occasions in the past when attempts to control prices were made. In the case of feed calf prices, the price ceilings, set on a per kilogram basis, were virtually impossible to enforce due to the lack of scales in the livestock sale yards.

The government also subsidizes the sale of the frozen meats which are imported by the Ministry of Supply for sale through the cooperative store system. This frozen, boneless meat, most of which is of commercial grade, is sold at the fixed price of 68 piastres (recently, 75 piastres) per kg in the cooperatives. At these prices, supply is never sufficient to meet demand, and rationing is accomplished through waiting lines. Those who can afford to do so purchase their meat in the regular retail market, which relies upon locally produced meats. The locally produced product is superior to the subsidized imports, and the price is typically three to four times as high. The distribution of the subsidized imports obviously reduces the demand for local meats, however, and thus certainly has the effect of reducing prices on the local market.

Although the government meat support program undoubtedly serves to pull retail meat prices down somewhat, prevailing retail price levels are still well above their international equivalents. A World Bank Study (1980) earlier made rough calculations to this effect, and a recent study by Soliman (1981) shows that the real cost of imported beef at the wholesale level is currently L.E. 1.80 per kilogram of boneless meat. Even allowing a generous 25 percent retail margin, this puts the retail price of imported meat at L.E. 2.25 per kilogram, which is well below the prevailing retail price level. This indicates that, in effect, the red meat market currently enjoys a substantial level of effective protection. It also indicates that there is potential for substantial profit in private meat imports. The question which is raised, then, is why private importers have not responded to this incentive.

In 1977, Egyptian law was modified to permit private importers to operate more freely than had previously been the case. The only current restriction, as is the case for many other food imports, is that margins are limited to certain fixed figures which are determined by the government to be adequate to cover transportation, storage and handling plus an additional fixed amount to provide a margin of profit. To date, however, private meat importers have imported very little for sale in the open retail market. It has yet to be determined why this is so. Several possible hypotheses exist. Perhaps the fixed margins established by the government are so restrictive that insufficient incentives exist. Another hypothesis is that certain import handling facilities are so overburdened that the private importer cannot afford the risk of using them to import highly perishable, fresh or frozen meats. These and other hypotheses should be examined in more detailed studies of meat importing and marketing.

Other government programs and policies designed to stimulate livestock production have received little attention in research and analysis. Programs to provide artificial insemination and veterinary services at the village level have existed since the early sixties, but little is known about how extensive or effective they are, or about how many livestock producers have access to and use them. Dating from the same period, The Ministry of Agriculture has had a program of importing improved breeds of cattle from Europe, many of them Friesians. These animals have often been held in experimental and demonstration herds, with farmers given the chance to purchase offspring. As was shown in Table 4, however, the government seemed to

de-emphasize these efforts, starting in the middle seventies, and little is known about their current status or effectiveness. There are no known studies of farmer reactions to the improved breeds or of economic benefits and costs in actual farm settings. Recently, the Ministry of Agriculture has begun to promote the introduction of improved feed crops by making imported seed available to farmers and by demonstrating the cultivation and use of some of these. However, studies of farmer receptivity and on-farm economics are not available for these new crops.

Summary and Conclusions

As Egypt's population and per capita incomes grow, the country is having to come to grips with how to meet rapidly growing demands for meat and other livestock products. In the case of red meats, however, domestic production increased by only 1.6 percent per year during the seventies. While imports were increased at a 13 percent annual rate during the same period, resulting increases in supply were evidently not sufficient to match increased demands, and meat prices rose more rapidly than the cost of other foodstuffs. Rapid price increases in the first half of 1980 caused the government to institute retail price ceilings. Measures such as these are short run, desperation type maneuvers, however, and do little to help solve the country's longer run supply problem.

Given the lack of detailed data on livestock, together with a lack of information and analysis on existing livestock policies, it is difficult to pinpoint problems and alternative solutions with any great degree of accuracy. This paper has surveyed some of the available statistics on livestock and has discussed what is known about some of the main livestock and related

crop policies.

Concerning statistics of production, a critical element in planning and monitoring the status of a country's food security, the study showed the cyclical nature of livestock slaughter. In other words, production does not change linearly, as MOA statistics show. This means that the quality of data for planning and policy making is seriously deficient.

While many of the government's programs to increase domestic livestock production have been directed at publicly owned farms and large scale private production units, data assembled here indicates that most (more than 90 percent) livestock are still held by small scale, traditional farmers. These farms have been lowest in priority in receiving subsidized feed concentrates, which constitutes one of the main government programs to promote livestock production. Although large scale private and public sector production units have been favored by such programs, there is no evidence that these larger scale operations have grown much during the past decade. In fact, available data indicate that publicly owned herds - and presumably production - have even decreased.

Egypt is at a cross-roads in terms of livestock policy. With increasing amounts of crop land already being devoted to the production of fodder crops-- particularly to berseem clover during the winter months--the country must determine if and how expanded supplies of meat and other livestock products can be obtained from further expansion of domestic production or whether the main part of the increased supply should be imported.

There are several important technical issues to be resolved here. One of these is the possible role of improved breeds in increasing the efficiency of domestic production. The receptivity and economic experience of farmers to these breeds must be examined, particularly with respect to the feasibility of integrating these large sophisticated animals into small fragmented Egyptian

farms. The feedstuff problem must also be resolved. The technical feasibility and economics of introducing improved forage crops such as elephant grass and special sorghums must be evaluated against the alternative of expanding imports of feedstuffs, possibly at non-subsidized prices. The economics of meat imports must also be examined, relative to the possible expansion of domestic meat production through improved efficiency.

REFERENCES

Cuddihy, William, Agricultural Price Management in Egypt (Washington, D.C.: World Bank, 1980). World Bank Staff Working Paper No. 388.

Egypt. Central Agency for Public Mobilization and Statistics [CAPMAS]. Monthly Trade Book, numerous issues.

----- . ----- . Statistics of Animal Wealth, No. 71-12412, January 1979. In Arabic.

----- . ----- . Statistics of Livestock, No. 20.324 of December 1968 and No. 2210-AA-78 of November 1977.

Habashy, Nabil, and James Fitch, Management of Egypt's Agricultural Cropping Pattern. Farm Management Survey, Project Research Paper No. 5, Cairo, Ministry of Agriculture, April 1981.

[Khedr, Hassan, and Paul Clark,] Policy Study on Pricing and Taxation of Major Alternative Agricultural Crops (Cairo, no date). To be published along with other papers of the Lisbon Conference on income distribution by Princeton University Press.

MATHTECH, Final Report: Poultry Improvement Project (Cairo: U.S.A.I.D., 1980).

Soliman, Ibrahim, Concentrate Feed Mix in Egypt: an Analysis of Government Production and Distribution Policies, and Free Market Price Patterns. Farm Management Survey. Project Research Paper No. 3, Cairo, Ministry of Agriculture, 1981. (a)

-----, "Marketing Margin for Red Meat in Egypt," Paper delivered to the ADS/Egypt Workshop on Marketing, Alexandria, June 1981.

Winrock International, Potential for On-Farm Feed Production and Utilization by the Egyptian Small Farm Sector. Study prepared for Catholic Relief Services and U.S.A.i.D.. (Cairo 1980).

100

100

