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MATHTECH

The Technical Research
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COMPENDIUM OF REPORTS

POULTRY IMPROVEMENT PROJECT

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VOLUME II

SECTION VI

055 - NUTRITION AND FEED MANUFACTURING

Special Report: Feed Optimization in Egypt 3/14/80

Recommendations: Nutrition & Feed Manufacturing 3/27/79

Notes on Team Reports January-October 1979

FEED OPTIMIZATION IN EGYPT

SPECIAL REPORT

TASK 055 NUTRITION AND FEED MANUFACTURING

March 14, 1980

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SPECIAL REPORT

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March 14, 1980

I. INTRODUCTION

After the start-up of the Poultry Improvement Project, the MATHTECH team became increasingly aware of the major constraints on poultry production and expansion that existed because of the feed situation in Egypt. Although an extremely productive agricultural nation, Egypt has thus far been unable to produce all of the cereal grains and other major ingredients required for balanced poultry, livestock and dairy cattle rations. To meet its needs, Egypt must import considerable quantities of maize, soya bean meal, and fish meal -- all essential ingredients for poultry rations. Unfortunately, these same ingredients are used (in varying quantities and rations) for livestock, dairy cattle, and human nutrition as well as for poultry.

As the initial "discovery" phase of the Poultry Improvement Project progressed, it became apparent that the feed problem required special attention and effort from the MATHTECH team. Originally, feedstuffs and poultry nutrition problems had been the responsibility of the Poultry Production Task Team; but subsequently these problems were placed under a separate task. To fulfill the special needs of this task, Drs. Rex Bushong and Elbert Day (experts in the fields of Poultry Nutrition and Feedstuffs)

were added to the MATHTECH team expressly to concentrate on these areas. They were assisted by Dr. Carl Cason, a broiler production expert; Mr. Jacey Huttar, a breeder production expert; and other team members in gathering all existing data regarding the feed situation in Egypt and in analyzing the situation to the maximum extent possible. These efforts were in addition to, and not included in, the original Project Paper, RFP or contract; however, since they were considered so critical and essential to practical project completion, they were added to the project by MATHTECH. Therefore, the budget was adjusted to satisfy the needs of these additional experts and to reflect their inclusion in the project. It was necessary to reduce budgets in other task areas to accommodate these additions.

It was obvious to the entire MATHTECH team that feed constraints throughout the poultry sector were a major factor in production costs, as well as in the growth of every sub-sector of the Egyptian poultry industry. Hatchery capacities were not being utilized (MATHTECH team members were repeatedly advised) because not enough feed was available to support the parent breeder stock. Problems were said to exist in the villages because the Veterinary Extension Service and Village Sector received significantly less than their required feed allocations. Private sector producers stated they had problems in obtaining sufficient feed and rations formulated according to the needs of their flocks. Therefore, all used whatever was available at the time.

Because shortages existed regularly for some ingredients and periodically for others, formulations were not always prepared according to plan.

Producers used whatever ingredients were available, appropriate or not, and productivity reflected these deficiencies.

Feed conversion rates were higher than normal; broiler meat results were lower than normal; and egg layer output was lower than expected. It was also obvious from supplied statistics that shortages of major feed ingredients would continue to be a primary constraint to poultry industry expansion and unless resolved, they would restrict the achievement of desired levels of production or would result in excessive poultry production costs.

MATHTECH launched a major effort to develop a practical capability to overcome these shortage problems through the use of available Egyptian resources. However, it was apparent that available resources would not be enough, and some additional means of providing the necessary technology and assistance to Egypt would be required. Therefore, the MATHTECH team concentrated on identifying sources outside of Egypt which could most economically and rapidly help Egypt resolve their cereal grain and animal feed problems.

In summary, the team decided that the most immediate way in which these goals could be reached was to optimize available cereal grains and feed through improved utilization of all major ingredients used in animal and poultry feed. This special report is intended to address all relevant issues regarding the short and long-range solutions to the cereal grain and animal feed problems in Egypt.

II. BACKGROUND

The major responsibility for supplying feed ingredients to the Poultry sector of Egypt falls to GPC. It also happens that GPC produces approximately 25% of all poultry in Egypt and, therefore, is the largest single user of feed in the Egyptian poultry industry. Additionally the private sector producers look to GPC and other government sources to provide proper rations for their flocks. All others involved in the Poultry Sector (such as APRI, ORDEV and Agrarian Reform) also look to GPC as their primary source for poultry feeds.

To fulfill such needs within the available budget, the estimated annual needs for major feed ingredients are put forth on an annual tender. Bids are submitted by any organization capable of fulfilling that tender; the bids are evaluated; and contracts are awarded on an annual basis. Additional ingredients are then provided from Egyptian stocks, and processed in Egyptian feed mills into the appropriate animal ration.

The formulas used to produce these rations are generally supplied by the "nutritionist" of the organization operating the mill (GPC, ORDEV, MOA, Agrarian Reform, the EXTENSION-VETERINARY SERVICE, etc.). Available feed supplies are milled as closely as possible to the specified formula and the rations then provided to the producer's flocks.

Once milled, the rations are generally "bagged". That is, they are packed in various types of sacks for storage until used. In many instances, the sacks are stored without proper protection, are exposed to the elements,

and are not stored in vermin-proof structures. Therefore, the formulated feed is subject to deterioration and pilferage, as well as to infestation by pests, rodents and birds. Even when properly formulated and milled, these rations can suffer a 10-30% deterioration of value due to improper storage, handling and safekeeping. The longer such ingredients or rations are stored under such conditions, the greater, the deterioration.

Almost all feed ingredients and finished feed are handled in bags. There is only a very limited capability to handle the materials in bulk thereby reducing costs, pilferage, deterioration and contamination. While plans are in process to overcome such problems, progress is necessarily slow. However, there are many things which could be done to reduce waste due to these correctable problems.

When MATHTECH team members tried to have rations analyzed to determine nutritional content and feed effectiveness, they learned that no such facility existed in Egypt which could provide the poultry sector with these very essential analyses. Team members acquired samples of the feed being used and sent them to feed laboratories in the United States and other countries for analysis. Recently, a new small protein analysis laboratory has been put into operation in Gesira which will help, but not resolve, this problem.

MATHTECH Team members visited and inspected every feed mill in Egypt to determine its condition, capability and output. Formulas used for the rations were obtained and analyzed. It was found that only a relatively

few different formulas were used, in constrast to the practice in countries with developed poultry production efficiencies. Least-cost feed formulas -- very popular and essential in most successful poultry production complexes elsewhere -- were generally not in use in Egypt.

When all acquired data had been consolidated and analyzed, the result was this special report to outline a program to optimize Egypt's current feed resources and capabilities and to ensure their best and most productive use. However, this program is dependent upon the correlation of the Poultry Sector's needs with those of the livestock, dairy cattle and human nutrition programs.

III. CURRENT SITUATION

1. The current procedure in most Egyptian poultry programs is to completely formulate the ration at the mill; that is, to combine vitamins, minerals, and all other ingredients during the milling process. This procedure requires that the necessary supplies of all required ingredients be available at the time of milling. Furthermore, the mills must be in good condition and must effectively use good operational procedures.

2. A detailed review and analysis of feed mill operations indicated problems regarding equipment effectiveness. That is, in almost every mill mechanical defects were identified which significantly affected that mill's ability to effectively process the required

ingredients into a good finished ration. In many instances, these deficiences resulted in feed rations which, even when accurately formulated, were either not sufficiently edible by the poultry they were intended to feed, or were rejected (e.g., "billed out") by the poultry. This resulted in a major waste of scarce and expensive ingredients.

Most GPC mills were not in this category and were significantly better as far as operational capability and results were concerned. In almost every other mill, considerable mechanical improvement was indicated, with improvement in mill management and operation strongly needed for acceptable and effective production results.

3. In all of the analyses conducted on feed samples from Egypt, the universal result indicated that the feed was significantly under or overformulated. When overformulated, the ration contained much more protein than normally required for the birds involved. Also, the same basic formulations were used without regard to the age, type of breed, or growing situation of the birds invoved. In almost every instance the ration seemed to contain all or most of the necessary ingredients, but the ingredients were not in proper proportion to one another. It appeared that a relatively minor reformulation would have resulted in a superior ration. Usually, one of the ingredients, although perhaps of minor consequence, was significantly out of proportion to the norm.

These results indicate improper formulation, "sloppy" management in the mill, and improper use of available ingredients essential to proper nutrition, and inefficient use of available ingredients. In all analyses, waste factors appeared high. Overformulation is, of course, more costly than necessary. Also, when too much protein is used, it has a debilitating effect on the birds rather than having a beneficial effect.

4. Imported ingredients are subject to high import duties. Since a large portion of these ingredients are used in government facilities such as MOA, GPC, ORDEV and Agrarian Reform, this taxation is counterproductive to government needs and objectives. The taxation of imported ingredients is also in contrast to the stated national objectives of increasing poultry production and decreasing the cost of providing the high quality protein food to the population through the use of poultry products. The processing of shipments through customs inspection and document clearance also creates extra expense to the poultry sector which results in a higher than necessary cost. This fact reflects in higer that necessary prices to the Egyptian consumer who purchases the poultry products.

5. There appeared to be no inspection or qualitative standards in use for either imported or Egyptian feed ingredients. Feed sample analyses indicated that basic ingredients often did not meet minimum nutritional standards. Even when the ingredients were properly

formulated, effectively milled, and transported to the production site, if the basic nutritional content was not present, then the needs of the poultry could not be satisfied under any condition.

6. Generally speaking, concentrates are not used in the formulation and production of poultry rations in Egypt. This is in contrast to successful practices in most of the effective poultry industries in other countires. It is also in contrast to the conditions and management capabilities existing in Egyptian mills. The use of concentrates tends to overcome ingredient and milling problems since it assures proper nutritional content of the ration.

7. There does not appear to be any effective coordination between the needs of the Poultry sector and the other nutritional programs in Egypt (livestock, dairy and human). The limited Egyptian resources of cereal grains in animal feeds (in-country supply of ingredients, and availability of hard currency with which to import the required ingredients) creates major problems in the effective allocation of these available resources to best satisfy the needs of the various programs.

8. There seems to be no existing central point at which problems relating to feed and its allocation are being coordinated for most effective use of these scarce resources.

IV. CONCLUSIONS

1. Considerable progress can be made toward more effective utilization of existing feed resources through the implementation of appropriate national and/or sectoral programs which encompass all major users.

2. An approximate 15 to 20% decrease in major feed and cereal grain requirements is possible through reduced waste, improved management, increased milling efficiencies, mechanical and management practice improvements in the mills, and more appropriate feed formulation for specific needs.

3. A combination of outside resources and better utilization of Egyptian resources will be required to accomplish feed optimization in Egypt.

4. Requirements and allocations for livestock, dairy and human nutrition programs must be interrelated with requirements and allocations for the poultry sector if any program of feed optimization is to be effective.

V. STRATEGY

1. Obtain the cooperation of a major feed supplier to provide the needed services by which the main problems relating to feed optimization can be overcome in the shortest possible time.

2. Whenever possible and economically feasible, use concentrates to overcome mill and primary ingredient nutritional deficiencies.

3. Use an appropriate least-cost feed formulation program to optimize locally available feed ingredients and to reduce reliance on imports.

4. Eliminate deterioration problems and other factors which increase the cost of feed to the producer. Feed represents more than half the total cost of any poultry product, regardless of how efficient poultry production practices may be.

5. Overcome feed constraints as soon as possible in order to allow the fastest possible development of Egyptian-produced poultry products.

6. Reduce the current proportion of production cost which feed represents in order to maintain or reduce the cost of poultry to the Egyptian consumer, thereby increasing the consumer's demand for, and ability to buy, poultry product.

VI. RECOMMENDED PROGRAMS

1. REMOVE (OR DRASTICALLY REDUCE) THE EXCESSIVELY HIGH IMPORT DUTIES ON FEED AND MAJOR INGREDIENTS. This action will reduce the cost of poultry production and afford the producers the opportunity to "break-even" on their production costs or make a profit. In turn, this will encourage the private sector to produce poultry.

2. INSTALL A CENTRAL FEED OPTIMIZATION UNIT which will monitor the availability OF MAJOR FEED INGREDIENTS IN Egypt and abroad. This should be a perpetual inventory including cost and nutritional content, which would monitor and serve ALL segments of the Egyptian economy using those ingredients (poultry, livestock, dairy and huamn nutrition programs). This unit should be correlated with the Market Reporting & Information System proposed in the Special Report on Tasks 020-030 DATA BASE & SECTOR ANALYSIS programs. In additon, it could input the necessary data for use in the ECONOMETRIC MODEL of the Poultry Sector.

3. INSTITUTE AN IMPROVED PROGRAM OF FEED FORMULATION similar to those successfully used in most dynamic poultry industries. Formulations would be made according to the needs of the animals to be fed by the ration, which should improve both conversion into poultry or other meat, and utilization of scarce feed resources. Such services would be available to both public and private sector users.

4. INSTITUTE A PROGRAM OF FEED FORMULA AND INGREDIENT ANALYSIS similar to those used in most successful and efficient poultry operations around the world. Since there are no currently available complete feed analysis laboratories in Egypt, out-of-country labs must be used. A systematic feed ration sample analysis program should be instituted for GPC, other public sector (MOA) poultry units, and any private sector producers wishing to participate. Results would be

used to modify subsequent ration formulas for those flocks as well as to adjust formulation and management practices at the mills.

5. IMPLEMENT AN UPDATED FEED MILL INSPECTION PROGRAM to identify the mechanical and operational needs of each feed mill. Necessary repairs and upgrading should be accomplished at the earliest possible time to ensure effective milling of specified rations. This will also optimize available ingredients and minimize costs.

6. DEVELOP AND IMPLEMENT AN INGREDIENT INSPECTION AND ANALYSIS PROGRAM. This will ensure that feed ingredients used meet the necessary nutritional standards and that Egypt receives full value for the hard currency it spends for those ingredients.

7. A QUALITY CONTROL PROGRAM SHOULD BE IMMEDIATELY DEVELOPED AND IMPLEMENTED. This should include proper handling and storage of ingredients and finished rations to prevent avoidable losses and deterioration due to any preventable circumstances.

8. PROVIDE TECHNICAL ASSISTANCE TO THE EGYPTIAN POULTRY SECTOR regarding the milling, purchasing, formulation, inspection, and use of feed and feed ingredients. This is necessary to optimize the effective use of the feed resources.

9. USE CONCENTRATES IN FEED FORMULATIONS WHENEVER POSSIBLE. This action will reduce reliance on proper feed mill technology and

operation, and ensure that the poultry recieve the nutrition necessary for efficient and least-cost production. Also, this practice will REDUCE the amount of major feed ingredients required for animal rations as well as improve the cost-effectiveness of the finished product. (SEE EXHIBIT I.)

10. OBTAIN THE COOPERATION OF MAJOR FEED COMPANY to assist in the accomplishment of the previously recommended programs at the least possible cost to Egypt. The MATHTECH team, realizing the major necessity for such assistance, has been discussing such possiblities with various American feed companies. Two companies have expressed interest in possibly becoming involved in the Egyptian poultry sector, with one, CENTRAL SOYA, particularly interested. The other company was GOLD KIST. Of course, any commercial company provides such services only if they are also priviledged to provide their products to those they serve. However, this does not appear to be an impediment since such services can be included as a part of the bid required by the government for the purchase of such commodities. CENTRAL SOYA has agreed, in essence, to provide the majority of the above services if they are fortunate enough to enlist the government of Egypt or those of the poultry sector of Egypt as customers for their concentrates and/or feed ingredients.

VII. SUMMARY

The feed problems of the Egyptian Poultry Sector have been a major constraint to its orderly growth, and have strongly contributed to the

EXHIBIT I

COMPARISON OF ANTICIPATED SAVINGS OF CORN IMPORTS DUE TO IMPROVED FEED CONVERSION RESULTING FROM BETTER QUALITY FEED UTILIZING CONCENTRATES

GPC BROILER PRODUCTION	PRESENT FEEDS	USING CONCENTRATES	
		FEED EGYPTIAN CONVERSION RATE	FEED USA CONVERSION RATES
Broilers produced/yr	25MM	25MM	25MM
Avg wt-live (kg)	1.3	1.3	1.3
Total wt (mmkg)	32.5	32.5	32.5
Kg feed/kg live meat	2.5	2.3	2.0
Total feed (mmkg)	81.2	74.8	65.0
Total feed (mt)	81,200	74,800	65,000
% corn	60	60	60
Total corn in feed (mt)	48,720	44,880	39,000
Handling wasce @ 10%	5,413	4,987	4,333
Corn imports (mt)	54,133	49,867	43,333
Import cost @ 119.7 LE/mt	6.5mm	6.0mm	5.2mm
Savings - corn (mt)	-	4,266	10,800
cost (LE0		0.5mm	1.3mm

problems associated with increased poultry production in Egypt. These problems have kept the cost of poultry production in Egypt at higher-than-necessary levels, and are considered to be a major reason for the budgetary deficiencies of GPC.

A majority of the problems are self-inflicted. That is, costs have been kept higher than they should be because of the excessively high tariffs on imports; for example, the 700,000 metric tons of maize imported in 1979. Also, there is no ingredient inspection and analysis program. Through the implementation of appropriate programs, with the necessary technical assistance from MATHTECH team members, existing feed availabilities can be improved by at least 15 to 20%, for the poultry sector.

The balance of the problems can be resolved through the use of available technologies applicable to the Egyptian poultry sector. Some of these have been outlined briefly in this special report or in other reports submitted by the MATHTECH team.

APPENDIX TO

SPECIAL REPORT TO

FEED OPTIMIZATION IN EGYPT

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TASK 020 - DATA BASE

OCT 29, 1979
JCH

Prices paid monthly by Poultry Growers for:

I. Complete Feed

Ministry of Agriculture

Poultry Feed in tons with bags

		Chickens Ration	Layers Ration
	1975	L.E. 52.350	L.E. 42.880
	1976	L.E. 52.750	L.E. 44.700
(Until June 77)	1977	L.E. 52.750	L.E. 44.700
As from 6 July 77		L.E. 81.500	L.E. 76.000
	1978	L.E. 81.500	L.E. 76.000
	1979	L.E. 81.500	L.E. 76.000

Sharkia Poultry Project

L.E. 85.000	L.E. 80.000

General Poultry Company

Advised that such information has been given to Amercian side.

Cairo Poultry Company (Private Sector): 1979

Starter	L.E. 180	per Ton
Grower	L.E. 175	per Ton
Finishing	L.E. 150	per Ton

II. Price of Corn in Tons

1975	L.E. 33
1976	L.E. 33
1977	L.E. 33
1978	L.E. 33
1979	L.E. 60

III. Price of Soyaben meal in tons (49% Protein)

1975	L.E. 84.524	
1976	L.E.131.287	Devaluation of Egyptian Pounds
1977	L.E.213.510	
1978	L.E.320.000	(imported)
1979	L.E.235.000	(Sharkia Porject - local production)

1)

Quantity of Corn Imported during the years

1975 - 1979

Year	Jan	Feb	mar	Apr	may	Jun	Jul	Aug	Sep	Oct	Nov.	Dec.	Total TONS
1975													5128
1976													5679
1977	119295			18000		130549	38657	25505	98070	43541	19558	64711	5488
1978	48746	24134	46057	86025	26081	36475	163312	45149	54914	77365	99443	129418	8371
1979													

Source of Data: M.O.S.

(2)

Quantity of Soybean Meal improted during the years 1975 - 1979 (Ton)

G.P.C.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov.	Dec.	Tot
1975					1200				5500	6000	6000		295
1976							10500		25000				355
1977	10000	6400				10000				55000			814
1978													
1979													

Source of Data: GPC

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MEMORANDUM

TO: GEORGE R. O'DAY

DATE: FEBRUARY 11, 1980

FROM: DR. REX BUSHONG

RE: TASK 055 - NUTRITION & FEED MANUFACTURING

GOE/MOA PROJECT #2044-055 FORTHCOMING ASSIGNMENT IN EGYPT

After a detailed review of the Second Interim Report, Volume I, November 9, 1979 and conference with you, it appears the major emphasis of the Feed and Nutrition goal in Egypt should be directed toward the development of a "Feed Optimization Program."

The FOP must be a multi-prong approach spearheaded by the involvement of an American feed and feed ingredient company that is capable of supplying quality feed ingredients in the form of a concentrate or super-concentrate with the supervision and approval of MATHTECH and MATHTECH's consultants.

Initially the problems will be manyfold, for example:

1. Quality control of feeds.
2. The logistics of moving the necessary tonnage.
3. The import duty imposed by Ministry of Supply.
4. The optimization of feed ingredients that supply the total livestock industry of Egypt.
5. The change in booking ingredients for expected year's supply.

However, it must be continually emphasized that if the poultry industry is to prosper and develop into an economically satisfying situation in Egypt, changes must continually be made; i.e.:

1. Development of quality control laboratories for feed ingredients and finished feeds.
2. The redesign and engineering of existing continuous-line feed mills to designs more suitable for mixing accuracy.
3. The optimization of locally available ingredients for use in feeds that will compliment the importation of necessary feed items.

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4. A system whereby managers and supervisors of GPC, etc., will have in-service training in the areas of their expertise, along with the interfacing of departments for least-cost production.

My main thrust will be directed toward the development of necessary procedures for standardizing a quality control program for GOE/MOA and GPC.

A governmental feed ingredient utilization program must be the next item of importance, followed by the logistical problem of distribution to farmers and native flocks. From past history, an important aspect of supply of feed to native flocks will be the education of the local farmer to realize that the feed supplied from a U.S. concentrate program is complete and does not have to be remixed with local fish meal, etc.

Final Report & Summary

Task 055 - Nutrition & Feed Manufacturing

R. D. Bushong

RE: Feed Manufacturing

Milling

My report will not cover any mills concerning GPC as these mills were discussed comprehensively by Day. I agree with Dr. Day concerning the restructuring of the milling system used by GPC, however due to the economic situation of the country, it will probably be impossible to change in the immediate future.

United Feed Company - report of 7/29/79

Volumetric mill designed and manufactured in Egypt (see diagram - 7/29/79). Due to the gravemetic design of this mill and to the changing of bulk densities of ingredients, it is my opinion that an accurate mixing job would not be feasible. With close supervision, this mill could possibly mix a corn-concentrate type diet.

Feedex - report of 7/30/79

Feedex was the cleanest and best appearing feed operation (in operation) that was encountered in the country. The mill was of Italian design with a 1-ton batch mixer. All operations are punch-button type with 6 bulk bins feeding a 1,000 kgm weigh-hopper. All micro-ingredients are weighed and hand-dumped into the mixer. The milling capacity is 6 tons per hour. At the present time, they are manufacturing only the two governmental formulas for the village flocks.

Cairo Poultry Company - report of 7/9/79, 7/22/79

CPC has a President (Danish dump mill) and mixing capcity of 10 tons per hour. (maximum of 14). A 1 ton horizontal mixer is supplied by 16 raw ingredient bins. Raw ingredient outside storage is 2,000 tons (corn, wheat, soybean meal) while finished feed storage is 244 tons. The only disadvantage to this mill is the dump method of weighing ingredients. One small pellet mill with 2 ton maximum output per hour. The mill is clean and well isolated from other agricultural enterprises.

Egyptian Poultry Company - report of 7/18/79

EPC is by far the most progressive new company in Egypt. The new mill, not yet in production is Sprout-Waldon construction with 20 tons/hour capacity (1-two ton horizontal mixer). The mill has 1,600 tons corn storage and 400 tons soy storage. Weigh-hopper is charged from 12 bulk bins with total capacity of 180 tons. Two liquid tanks (fat and molasses) with capacity of 200

gallons each. Pellet capacity is 10 tons per hour. When on stream, this will be the most desirable mill in Egypt.

Middle East Land Development Corp.
Melar, Egypt

This enterprise has rather low investment in feed mill as compared to CPC and EPC. Six vertical mixers are used to make mash feeds - there are no pellet facilities. All ingredients must go into each mixer by means of the hammer mill which is undesirable.

-Ranking of Mills-

1.) Egyptian Poultry Co.
2.) Feedex
3.) Cairo Poultry Co.
4.) Melar Egypt
5.) United Poultry Feed Company

Toncy Egg Farm Mill was not discussed. At present, the farm has 2-1 ton vertical mixers which will be replaced by 1-2 ton horizontal mixer. Ingredient storage should be improved.

RE: Procurement of Feed Ingredients

After much discussion with nutritionists and managers of various companies, it seems that feed additive drugs, vitamin-mineral premixes and synthetic amino acids are ingredients that are most difficult to obtain.

	Fees & Taxes
Drugs	17-27%
Vitamins	17%

If immediate action was taken by the Ministry of Agriculture, the Ministry of Supply and the Ministry of Health to implement definite lines of responsibilities and to abolish the fees and taxes on feed supplements, Egypt would, in the immediate future perhaps, find a situation of pletiful supply. Bureaucratic red-tape must be diminished for Egypt to enjoy a competitive situation with other food producing countries of the world. Poultry offers an opportunity for expansion of meat production, therefore all barriers should be removed to allow this production to occur.

Import duties on other feed ingredients such as meat meal and fish meal should be reduced or abolished until that time when Egypt has raised the standard of locally produced ingredients by adequate quality control of production and finished product.

RE: Feed Registration Laws

The feed registration laws need to be revised in the following manner:

1.) At present all feeds must be registered according to the % of each ingredient contained in the formulation. The registration procedure takes at least six weeks. This certainly does not lend itself to computer or least cost formulation. In the future, feed ingredients,

both local and import, may not have as stable a price as at present and linear programming will play a much more definite role in the week-to-week operation of a poultry complex or feed mill operation.

(a.) Changes should include:

1.) Feed should be registered as to tag guarantee only:
Crude protein - % Not less than
Crude fat - % Not less than
Crude fiber - % Not more than
Calcium - %
Phosphorus - %
Salt - %
2.) All ingredients used in the feed should be listed on the tag. I would not recommend group listing at the present.
3.) All drugs should be listed.
4.) Any special feeding directions should be given.

2.) Quality control is a problem--the government needs a modern, simple quality control lab to monitor both ingredients and finished feeds. It would be my suggestion to USAID that some of the money for the special project be channeled to the development of adequate quality control procedures and equipment that would have long range effects in the development of the PIP.

It should be possible to set up an adequate laboratory for $40,000 to $50,000.

RE: Variability of Feed Ingredients

All corn for feed manufacturing is imported, while a majority of the soybean meal and fish meal is imported. Phosphate is supplied by bone meal. There are two soybean meal plants in Egypt and up to the present, the quality has been variable.

Most nutritionists were very cautious of local ingredients due to the variability coupled with the fact that there are no quality control labs to monitor the ingredients.

RE: Formulation and Structure of the Finished Feeds

(1) The Animal Research Institute (ARI) has provided two formulas to be manufactured and distributed to the local farm flocks. The formulas are as follows:

Village Flock Formulas

Ingredients	0-22 wks.	22 wks. forward
	% of Diet*	
Yellow corn, grd.	55	50
Rice Germ Meal	25	18
Cottonseed Meal	11	8.5
Extracted Rice Bran	--	14
Local Fish Meal	6	3
Salt	0.5	0.5
Limestone	1.5	4
Total	99.0%	98.0%
Price	L.E.81.5	L.E.76

*200 gms-Manganese sulfate is added to each formula per metric ton.

It appears that this is a waste of ingredients since 50% of the ingredients (corn) are imported. Basic faults of these rations are (A) No vitamin and trace mineral supplementation, (B) No calcium-phosphorus balance and (C) No amino acid balance. If money is being spent to supplement the local farmers with feed, then slightly more money could insure a diet balanced to the satisfaction of the previously mentioned factors.

(2) The private sector formulas will be analyzed and put into a report at a later date; classification of general formulas of Egypt.

Sundat, July 29, 1979

Task 055 - Nutrition and Feed Manufacturing

R.D. Bushong

Re: United Poultry Feed Co.
Dr. Shulkamy - ARI - MOA
Dr. Radwan - ARI - MOA
Mr. Millad Meggally, Owner

The above listed and I visited the U.P.F. Co. - Ghamra, Cairo - located directly on route to GPC mill and office of Rashid. The mill is a semi-automatic, volumetric continous line mill that will be described in a basic drawing for future reference.

The production for 1978 was about 25,000 tons that was broken down in the following manner.

Broilers - 5,000
Layers - 15,000
Starter Grower - 5,000

Meggally indicated that the total capacity of the mill was 100,000 tons per year; however, simple mathtematics puts the capacity at roughly 60,000 tons with two shifts. The mill manager indicated the mill was roughly a 10-20 ton/hour mill, therefore at two shifts/day with 15 tons/hour - the capacity would be roughly 75,000 tons per year.

Meggally indicated that production was limited by two factors:

1. Anabilibility of ingredients
2. Distribution and Marketing.

This mill produces about 1400 tons for the MOA per year for the 12 farms.

Meggally gave me the following formulations:

Broiler Formulas - two different formulas, both designed to raise the birds from day old to Market.

Ingredients	% of Ingredients * Formula 1	Formula 2
Corn; yellow grd.	70.0	67.0
Fish Meal, 60%	12.0	10.0
Soybean Meal, 48%	10.0	10.0
Cotton seed Meal, 40%	5.0	5.0
Yeast T - 40%	—	3.0

Ingredients	% of Ingredients * Formula 1	Formula 2 *
Dried Skin Mild	—	2.0
Lime stone	1.0	1.0
Bone Meal	1.0	1.0
Salt	0.5	0.5
Mineral Mix	0.5	0.5
Total	100.0	100.0

* For every ton, kilo of vitamins and 150 kg. of MNS 04 are added.

Calculated analysis for broiler nations:

Crude Protein, %	-	22.0
Fat, %	-	2.0
Fiber, %	-	5.0
M.E./ko	-	310.0
Total P %	-	0.8
Total Ca, %	-	1.3

These feeds are produced for private producers and is sold for 145 L.E. /ton.

Untied produces two formulas for village flocks which they admit are not very good formulas but the village farmers supplement the formulas with milk, dried fish, etc.

NOTE: The use of supplemental ingredients by village farmers is a practive that is going to be difficult to overcome. It is an expensive practice that leads to inbalanced diets and a waste of ingredients that may be used elsewhere. However, as long as formulas for the following type are sold - The village farmers will feed the need to supplement the diets inorder to obtain better production, shell quality and egg size.

Village flock Formulas

Ingredients	% of Diet 0-22 wks	22 wks on
Yellow corn grd.	55	50
Rice Germ Meal	25	18
Cotton seed Meal	11	8.5
Extr. Rice Bran	--	14
Local Fish Meal	6	0.5
Salt	0.5	0.5
Limestone	1.5	4
MN S04	200 gms	200 gms.
Price To village farmers	81.5 L.E.	76

If these formulas are any indication of feed supplied to village flocks it is easy to see low production, high mortality, small eggs and poor quality for the mutritional aspect alone, not to mention disease, management and genetics.

Commercial Layer Feed (20-72 wks)

Ingredients	% of Diet
Corn, yellow grd.	64.0
Soybean Meal, 48%	7.5
Poultry By-Product Meal	10.0
Cotton seed Meal	4.0
Corn Gluten Feed	5.0
Limestone	7.74
Bone Meal	1.0
Salt	0.35
Vit-Min Mix	0.37
Dl-Methionine	0.04

Broiler Finishing Feed (5-8 wks)

Ingredients	% of Diet
Corn, Yellow grd.	70.0
Soybean Meal, 48%	17.0
Corn Gluten Feed	4.0
Cotton seed Meal	3.0
Fish Meal, 60%	3.0
Limestone	1.5
Bone Meal	1.0
Salt	0.35
Vit-Min Mix	0.15
Dl-Methionine	0.06

Calculated Analysis:
Crude Protein% - 18.5
Fat - 4.0
Fiber - 2.7

Vitamins and trace minerals were supplied by Istitute Delle Vitamine S.P.A. - Milano, Haly in conjunction with Hoggmann-Sa Roche - Basie, Swizerland.

The fortification levels are as follows:

Contents / Kilo	Zoodry VMI *	Zoodry VM2 *	Units
Vitamin A	5,000,000	5,000,000	14
Vitamin D_3	1,250,000	1,250,000	1U
Vitamin E	3,600	2,000	1U
MSB	2	2	G
Vitamin B_2	3	3	G
Nicotimci Acid	20	15	G
Ca D-Pautothenate	6	4	G
Choline Chloride	300	150	G
Vitamin B_{12}	8	8	MG

Contents /Kilo	Zoodry VMI *	Zoodry VM2 *	Unit
Chlortetracycline	13	--	g
D.O.T. (3,5 -Dimtro -0-Tolnamide)	--	80	g
Manganese	40	40	g
Iron	20	20	g
Zinc	20	20	g
Copper	1	1	g
Ioine	1	1	g
Cobalt	0.1	0.1	g
Corn Distiliers D.G./solubles	1	1	kg

Recommended Addition - 1.5 kg/1000 kg mash.

*VM1 - Broilers - Replacements up to 4 wks

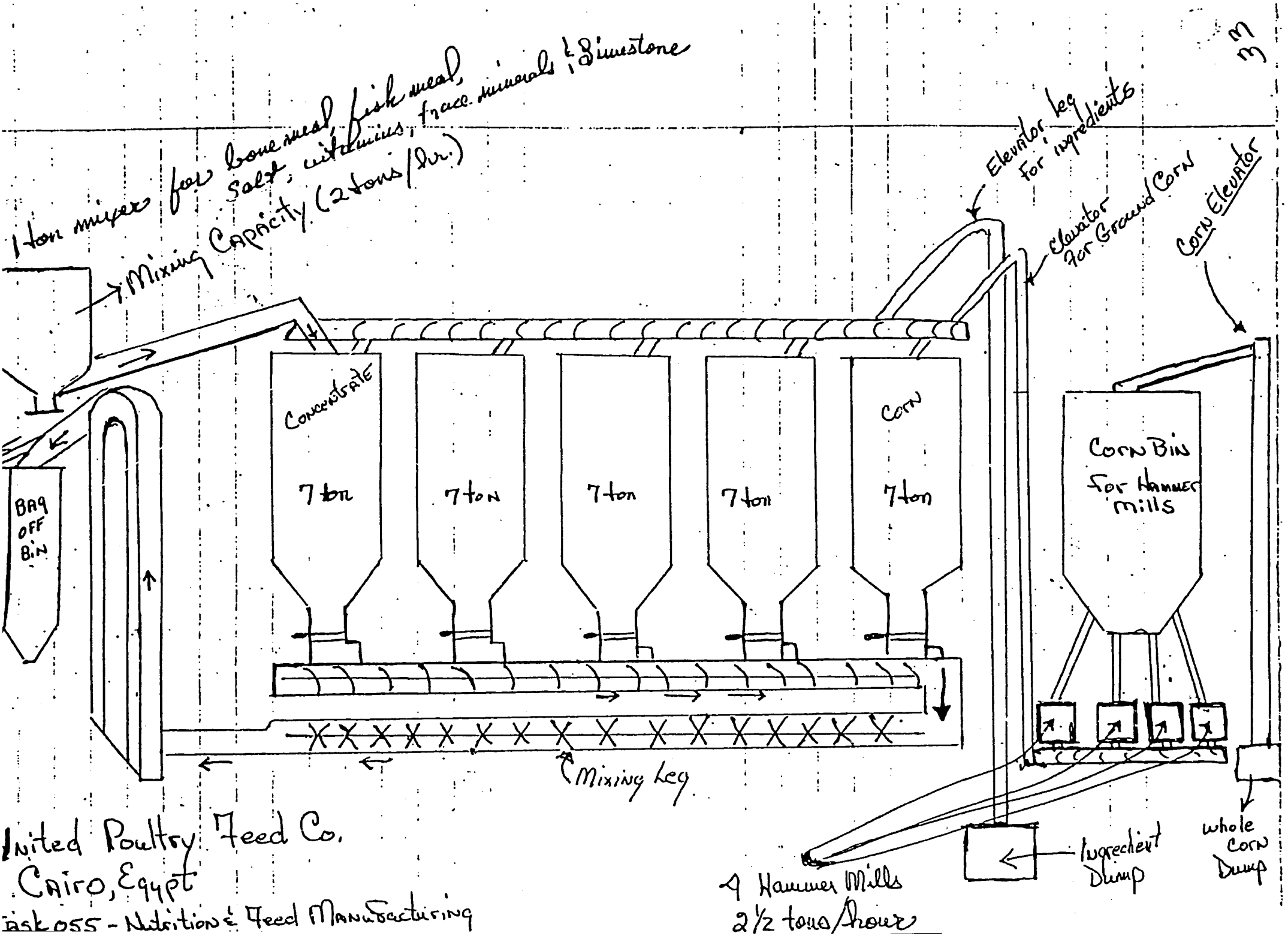
*Vm2 - Repalcements 4-10 wks and pullets.

Vitamin/Mineral Specifications
Total Level / MT

Code	Broiler	Layer	Units
Vitamin A	12,000,000	10,000,000	1 U
Vitamin D_3	2,000,000	2,500,000	1 U
Vitamin E	10,000	1000	1 U
Vitamin K	2	1.5	g
Vitamin B_2	4.5	2.5	g
Vitamin	10	2.5	mg
Pantothenic Acid	12	4	g
Nicotinic Acid	30	10	g
Folic Acid	1	0.1	g
Theamine	2	0.2	g
Vitamin B_6	4	0.4	g
Biotin	15	--	mg
Choline	--	300	g
Manganese	60	50	g
Iodine	1	1	g
Zinc	50	40	g
Iron	25	20	g
Copper	5	3	g
Selenium	0.1	--	g
BHT	100	100	g
Methionine	100	--	g
Lysine	50	--	g

Rousselot S.A. Super Chicks

Ingredient	Per 1 ton	Units
Vitamin A	12,000,000	1 U
Vitamin D_3	2,400,000	1 U
Vitamin	5	g
B_2	4	g
B_3	8	g
PP	10	g
K	200	mg
B_{12}	10	mg
Choline	200	g
MN	60	g
ZN	50	g
Fe	25	g
Mg	10	g
Cu	2	g
Iodine	1.2	g
Cobalt	200	mg
Bacitracin	10	g
Methionine	100	g
D.O.T.	125	g
B.H.T.	50	g



United Poultry Feed Co.
Cairo, Egypt
Task 055 - Nutrition & Feed Manufacturing

Interim Report

on the

Poultry Feed Situation in Egypt

Interim Report - Feed Situation

Poultry feed was originally included under Task-050 (Poultry Production) in the original project outline. For both Task V (GPC consultancy) and Task VI (other government, public and private sector production), the project was principally designed to survey the feed situation with respect to supply, distribution, constraints, and needs as related to each major production segment and the national need. However, during the first phase of the Poultry Improvement Project, it became evident that feed was one of the major problems limiting efficient poultry production in Egypt. Production personnel in governmental and private units were found to be very much concerned about the seemingly lack of a consistant supply of high quality feed. Ingredient shortages necessitated frequent formula changes, which in many instances involved the substitution of poor quality feedstuffs into the formula without adequate nutritonal reformulation with respect to nutrient balance. Feed ingredient and complete feed quality control checks were found to be very limited in the governmental sector and essentially zero in the private sector. Consequently, in January 1979, the decision was made to put more emphasis on the feed problem in Egypt. Task 050 was formed with the idea of studying the feed problem in more detail than originally outlined in the project with special emphasis on feed production problems as related to quality of feeds.

Dr. Robert Harms was originally the team leader on this project. He spent days in Egypt beginning and ending Dr. Harms made only a cursory survey of GPC's feed production units and visited only a very limited number of private mills. Due to unexpected developments, Dr. Harms could not continue working on the project. He was replaced by Dr. Elbert J. Day, Poultry Nutritionist at Mississippi State

University. Dr. Day visited for 30 days beginning February 25 and ending March 25, 1979. A new team member, Dr. Rex Bushong, Extension Poultry Nutritionist at Auburn University, will visit Egypt for 30 days during the month of July 1979.

During the initial visit to Egypt by a feed team member, efforts to survey the feed situation was hampered somewhat by organizational and communication problems. Chief effort was concentrated on GPC's production facilities; however, after other task force members kept hearing of feed quality problems in both government and private production units, a more detailed study of GPC's feed production units was conducted during the second team member's visit to Egypt in February and March of 1979. Several other task members were helpful to the feed task members in site visits to study the following objectives:

1. A review of GPC's feed milling equipment and milling procedures to determine if feed quality problems are the result of inadequate facilities and/or improper milling procedures.

2. A review of feed milling equipment and milling procedures used by privates.

3. A study of the adequacy of quality control programs used by government and private units.

4. A review of ingredient sources, quality of ingredients, procurement procedures, and supply problems including major feedstuffs, feed additives and drugs.

5. An examination of government regulation of feedstuffs, feeds and additives.

I. GPC's Milling Facilities and Milling Procedures:

From an inspection of the seven feed mills that GPC operates, it was obvious that milling facilities are inadequate. Only one of the seven mills can be considered to be completely adequate for mixing critical type feeds. Only one mill, Zowia #2, has a horizontal mixer which is considered to be the best mixer available today. Two of the seven mills are equipped with vertical mixers that could be considered adequate for mixing some types of critical feeds (those that contain agglomerates such as fat); however, four of the mills do not contain batch mixers. Two are volumetric or continuous line mills and two are essentially continuous line mills (Danish dump mills). These mills have two serious disadvantages: 1) They lack the desired mixing accuracy and concentrates must be used in such mills, which entails increased cost from double mixing and transporting of a large portion of the feeds from another mills.

In addition to basic mill design problems, power interruptions are a big problem in some mills. Some mills need improvements in access roads and toilet facilities. All mills receive every ingredient in sacks or drums. Bulk ingredient storage is needed. Pellet mills are needed in the mills making broiler and duck feeds.

Milling procedures in GPC's mills appear to be about as good as possible under the prevailing circumstances. The nutritionist, Mr. Rashid, is well aware of the limitations of continuous line mills. He is presently mixing all concentrates in the horizontal mixer and all micronutrient premixes are mixed in a small horizontal rotating drum type mixer. Sufficient quantities of the concentrates are used in the final mixing operation to minimize mixing errors in the continuous line mills (approximately 20%). Our impression of the

situation is that not enough quality control work is performed to accurately ascertain mixing performance.

II. Private Milling Facilities and Milling Procedures:

All of the private mills visited but one used batch (vertical) mixers. Most were not using supplemental fat to aid against segregation of ingredients so mixing accuracy probably is less than desirable. Limited assay data obtained to date support this supposition. Most appeared to be grinding grains properly but instances of improper grinding or not grinding some of the grain, such as wheat, were observed.

Most of the private mills handle finished feeds in sacks. As with GPC's mills, non-bulk handling of feedstuffs and feeds is undesirable from a labor, wastage, and disease control viewpoint.

Breeder birds maintained by MOA are fed feed manufactured by private companies on a bid basis. Formulation is done by MOA nutritionist. We believe cost could be reduced by computer formulation of these feeds. Also, based on some samples of breeder feed observed and some assay data, feed quality appears to be a problem. MOA should have their own feed mill in order to control quality. It would appear that the same mill could be used to make feed (concentrates and complete feed) to be sold to villagers. We are under the impression from talking to our Egyptian counterparts and other task members that a reliable supply of high quality poultry feed is not available to villagers.

III. Adequacy of Quality Control Programs:

Quality control programs seem to be virtually non-existant in the private sector for both ingredients and finished feeds. We were told that the privates could obtain help in quality control from MOA laboratories located in Alexandria and Cairo and a commercial laboratory in Cairo, but very few assays were being run, if any.

The Poultry Nutrition laboratory in MOA appeared not to have been used for assay work of any kind in months. Quality control work in the GPA laboratory appeared to be very limited. Evidence of a routine quality check program for ingredients and finished feed was not seen. The adequacy or inadequacy of feed mixing in Egypt is not known because not enough assay checks are run.

IV. Ingredient Sources, Quality of Ingredients, Procurement Procedures and Supply Problems:

Both government and privates voiced the same problems with feedstuffs--- unpredicable supply, poor quality of local ingredients, and unavailability of micronutrient premixes and drugs for long periods. Sun dried blood meal and fish meal are low quality ingredients. Improper drying of poultry byproduct meal and rice bran is a problem. Workers were observed rubbing these ingredients through a sieve to break up lumps caused by excessive moisture.

V. Governmental Regulations of Feedstuffs and Additives:

The ingredient subsidized price support system appears to be causing some problems. Products which are only supposed to be used for humans, such as wheat, fava beans and rice, are being used in poultry feeds. Very low prices of some feedstuffs such as rice bran encourages excessive usage in many instances causing nutrient imbalances.

Import taxes on feed additives are excessive (25-30%) and should be reduced or eliminated to encourage growth of the poultry industry.

Interim Recommendations:

To allow the Egyptian Poultry Industry to thrive and grow into a first-class enterprise, the following areas need attention:

1. Establish a quality assurance program for both feedstuff and finished feeds.

2. Improve the quality of local feed ingredients.

3. Take necessary steps to prevent ingredient shortages.

4. Reduce or eliminate import tax on drugs and micronutrients.

5. Convert feed mills to batch systems.

6. Eliminate sack handling of feedstuffs and finished feeds.

7. Computer formulation of feed is necessary for least cost and greatest accuracy in obtaining nutrient balance.

Items 1, 2, 3, 4, and 7 should be looked upon as things which can be accomplished soon. Items 5 and 6 involve costly changes and could take years to accomplish, even with the major feed mills. In the case of small private producers, it may never be economical to convert to 100% bulk handling of feedstuffs and feeds. However, it is imperative that these producers make the necessary arrangements to keep wild birds and other disease-carrying pests away from ingredients and finished feeds for disease control purposes.

Two highly qualified experts, (a chemist who has worked in quality control laboratories and an engineer who has practical feed milling experience) should be added to the task force team to help accomplish the above indicated needs in quality assurance and improved milling capability.

TRT+
MATHTECH ATL
927399
066544 1714 12/21

399 REHAB UN

MATHTECH ATL
12/21/78

JOHN BOND
MATHTECH-CAIRO

BT

CLYNE SHAFFNER CALLED RE FOLLOWING FEED SAMPLE ANALYSIS.
SAMPLES CONTAIN 13.9 AND 19.4 PERCENT PROTEIN. CURRENT
U S RECOMMENDATION IS FOR 16 PERCENT PROTEIN RATION.1325
CALORIES FED AT RTE OF 33 LBS PER 100 HENS PER DAY.

METHIONE OR RATHER METHIONINE: .25, .30, .33 0/0
ISOLUCINE: .55, .75, .70 PER CENTP
LYCINE: .56, .87, .67 PERCENT

AVAILABILTY MAY BE ONLY 90 PERCENT OF ABOVE, THEREFORE
15.9 PER CENT RATION (RAHA ONE) VERY INADEQUATEM OTHER,
(KAHA TWO) MARGINAL.

CLYNE REQUESTS THAT U COLLECT SAMPLES OF PRESENT CONCENTRATE
BEING USED FOR LAB ANALYSIS.

GEORGE AND I ARE BOTH CONCERNED THAT WE HAVE NOT RECD ANY
RESPONSES FROM MY TLX REQUESTS RE INVOICE STATUS AND CASH
BOOK INFO. PLS SEND US A TLX A S A P RE CONFIRMATION OF
RECEIPT OF TLXS.
PLS ACKNOWLEGE RECEIPT OF THIS TLX VIA TLX TO MATHTECH
ATLANTA TLX NO 542564.

THANX AND MERRY CHRISTMAS

PETE BREWER
MATHTECH-ATLANTA

+

399 REHAB UN
.....

002.8 MINS THANKS

The University of Georgia College of Agriculture

ATHENS, GEORGIA 30602

DEPARTMENT OF POULTRY SCIENCE

PLEASE REPLY TO:
LIVESTOCK-POULTRY BUILDING
404 / 542-1351

January 31, 1979

Dr. M. Saubry
GPC
Cairo, EGYPT

Dear Dr. Saubry:

At last the analyses on the feed samples which I took from you in November have come in. As you requested I'm enclosing two copies of the official reports by Anysome Laboratories Limited. One copy is for Dr. Ibrhim Rashad. A sixth sample (#6) was brought to me after you left the Rahab Hotel -- I had contacted Farid Stino asking for a sample in case you were unable to get one. The sample was from Shawki Nadeim ~~and~~ had been purchased as broiler feed from GPC about a month earlier.

My reason for being so eager to have the complete analysis was to know whether or not it would be desirable to use Elancoban (monensin) in case the analysis showed low protein-amino acid levels in the diet. With the high protein levels demonstrated here, there should be no problem in using monensin at 100 ppm with Hubbard birds. Eli Lilly does not recommend use of Elancoban in some countries where extremely low protein levels are being used.

The 200 ppm level is dangerously high. Whether or not the birds will eat the feed is a question with this high level. In fact, this level would certainly act as a growth depressant either from lack of feed consumption or by being borderline toxic to the birds. No doubt these birds are already processed, but precautions should be taken with weighing out the concentrate to make sure that this type of error does not occur in the future. The target level should be 100 ppm $\pm$ 20%. I am also concerned about absence of monensin from sample #3 and amprolium from sample #5. Another coccidiostat (Cycostat or Coyden?) could have been in sample #6, but we did not request a test for it. Sample #4 is on target for monensin.

The furazolidone (Neftin) levels are higher than approved by FDA, but I doubt if you will have trouble for short time medication at 324 ppm. The highest level approved for feed use in the United States is 220 ppm. The protein levels which are higher than NRC recommendations might be questioned from a cost and breeder weights standpoint. I'll send a copy of these results to Dr. Harms who can advise better than I on

nutritional problems. He may have already discussed this matter with Dr. Rashad.

I was pleased to hear that Ahmed Dardiri would be visiting you before long. I wish we could get him in on this poultry project, but he seems to have his hands full of other activities at the moment. Should you find his help especially desirable, your request through the Ministry of Agriculture for a short term visit might be honored.

I have been talking to Dr. Jim Williams about the Salmonell problem and find that he cannot consider coming out as a consult Although I have not been doing research in the field of salmonellosis, I have followed the history of the conquest of this disease in the United States with great interest. Not unti about 1935 when the poultry improvement programs began did pullorum control become possible. The history of the conquest of this disease is indeed an exciting one. I am getting togethe a slide talk on the successful U. S. pullorum programs.

Obviously to meet your needs a more rapid method of doing some checking on feed levels of anticoccidials would be advantag The long delay in getting these results was due to the fact that I carried them to the States, then to Holland; they were then carried back to England during the holiday season. The regular charge for this analysis is $33 per sample for the anticoccidial and $80 for a complete analysis. Eli Lilly in Rome would be happy to work on further feed analysis for monensin levels in the future. I shall plan to stop over and see them either going or coming on my next trip to Egypt. Date for arrival is tentative, but should be between March 18 and April 2. I am looking forward to seeing you and your associates before long.

Yours sincerely,

Malcolm

W. Malcolm Reid
Professor Emeritus
of Poultry Science

cc: Dr. Robert Harms
Mr. George O'Day

Enclosures

/jb

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Aynsome Laboratories Limited
(Registered in England No. 555750)

Analysts & Consultants to the Feed & Allied Industries

ALAN H. WARD
Official Analyst to the United Kingdom Agricultural Supply Trade Association

Tel. : Grange-over-Sands 2321/2
(STD Code 0448-4)
Telex : 65155

Registered Office :
Kentsford Road
Grange-over-Sands
Cumbria, England
LA11 7BA

Our ref: CJF/HC **CERTIFICATE OF ANALYSIS** Date: 12.1.79

Sample(s) of: 1 Parent Broiler Feed containing Amprol
Order No. 9316
Reference

From: Lilly Research Centre Ltd.

Received on: 22.12.78 Lab No. S. 751

10 JAN 1979
Rec'd .....
File .....
Pass to .....

Oil	%	3.1
Protein	%	21.1
Fibre	%	3.4
Starch + Sugar	%	46.5
Met. Energy (Poultry) (As according to Carpenter & Clegg)	kcals/kg	3065
Lysine	%	0.98
Methionine	%	0.54
Cystine	%	0.25
Amprolium	ppm	80

44

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Our ref: CJF/HC

CERTIFICATE OF ANALYSIS

Date: 12.1.79

Sample(s) of: 2 Broiler Feed containing Elancoban
Order No. Reference 9316

From: Lilly Research Centre Ltd.

Received on: 22.12.78 Lab No. S. 752

Oil	%	7.5
Protein	%	28.5
Fibre	%	3.55
Starch + Sugar	%	37.0
Met. Energy (Poultry) (According to Carpenter & Clegg)	kcals/kg	3325
Lysine	%	1.2
Methionine	%	0.57
Cystine	%	0.35
Monensin	ppm	200
Furazolidone	ppm	320

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Our ref: CJF/HC

CERTIFICATE OF ANALYSIS

Date: 12.1.79

Sample(s) of: 3 Broiler Feed containing Elancoban + Neftin
Order No. 9316
Reference

From: Lilly Research Centre Ltd.

Received on: 22.12.78 Lab No. S. 753

Oil	%	3.1
Protein	%	26.9
Fibre	%	2.65
Starch + Sugar	%	44.6
Met. Energy (Poultry) (According to Carpenter & Clegg)	kcals/kg	3205
Lysine	%	1.26
Methionine	%	0.48
Cystine	%	0.27
Monensin		NOT DETECTED
Furazolidone	ppm	300

46

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Our ref: CJF/HC

CERTIFICATE OF ANALYSIS

Date: 12.1.79

Sample(s) of: 4 Broiler Feed containing Elancoban - Neftin

Order No., Reference: 9316

From: Lilly Research Centre Ltd.

Received on: 22.12.78 Lab No. S. 754

Oil	%	4.15
Protein	%	27.9
Fibre	%	3.05
Starch + Sugar	%	38.7
Net. Energy (Poultry) (According to Carpenter & Clegg)	kcals/kg	3085
Lysine	%	1.28
Methionine	%	0.50
Cystine	%	0.37
Monensin	ppm	111
Furazolidone	ppm	324

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(Registered in England No. 555750)

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Our ref: CJF/HC

CERTIFICATE OF ANALYSIS

Date: 12.1.79

Sample(s) of: 5 Parent broiler feed containing amprol plus
Order No. 9316
Reference

From: Lilly Rsearch Centre Ltd.

Received on: 22.12.78 Lab No. S. 755

16 JAN 1979

Oil	%	6.85
Protein	%	23.45
Fibre	%	2.5
Starch + Sugar	%	43.5
Met. Energy (Poultry) (According to Carpenter & Clegg)	kcals/kg	3350
Lysine	%	1.18
Methionine	%	0.42
Cystine	%	0.36
Amprolium		NOT DETECTED

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Registered Office :
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Grange-over-Sands
Cumbria, England
LA11 7BA

Our ref: CJF/HC

CERTIFICATE OF ANALYSIS

Date: 12.1.79

Sample(s) of: 6 Broiler (Coccidiostat unknown)
Order No. 9316
Reference

From: Lilly Research Centre Ltd.

Received on: 22.12.78 Lab No. S. 756

Oil	%	4.95
Protein	%	26.3
Fibre	%	4.5
Starch + Sugar	%	38.8
Met. Energy (Poultry) (According to Carpenter & Clegg)	kcals/kg	3095
Lysine	%	1.14
Methionine	%	0.48
Cystine	%	0.36
Amprolium		NOT DETECTED
Monensin		NOT DETECTED

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Dr. Mohy Z Sabry from GPC brought

General Poultry Company
Insurance Building
Dokki, Cairo, EGYPT

Date of collection Nov. 19, 1978

Sample #1 - Parent broiler feed containing Amprol Plus (Amprol + Ethopabate)

Sample #2 - Broiler feed, containing Elancoban (monensin)

Sample #3 - Broiler feed, containing Elancoban and Neftin (Furazolidone, 100%)

Sample #4 - Broiler feed, containing Elancoban and Neftin

Sample #5 - Parent broiler feed, containing Amprol Plus

Sample #6 - One additional sample of GPC broiler feed obt by Dr. Shawki Nadeim

Request any possible analysis including:

1. Name of anticoccidial and level
2. Furazolidone level in samples #3, 4 and 5
3. Protein level
4. Amino acids (?) sulfur containing
5. Any other routine tests possible.

TECHNICAL

Service Bulletin

not FDA approved

HESS & CLARK, ASHLAND, OR

DIVISION OF VICK CHEMICAL COMPANY

No. G-

nf-180 (R) (furazolidone) SAFETY

CHICKENS AND TURKEYS

1. Furazolidone at 100 gms. (.011%) per ton on an all-mash basis may be fed throughout the life of poultry without adverse effects on any normal functions such as growth, feed efficiency, layability, fertility, hatchability or egg shell quality. The LD 50 level of furazolidone for chickens and turkeys is approximately 500 mgs. per kilo of body weight in a single dose

2. It is safe to feed furazolidone up to 400 gms. (.044%) per ton on an all-mash basis for 21 consecutive days without detrimental effects.

3. Young chickens and young turkeys tolerate continuous feeding of 200 gms. furazolidone per ton of feed without any noticeable retarding effect upon growth or feed conversion.

4. A 200 gm. level of furazolidone may be used for at least 14 days to treat specific diseases in laying hens and breeder turkeys without any detrimental effects. Sexual maturity in some male birds may be delayed somewha Therefore, young males should receive no furazolidone for a period of 4 weeks prior to breeding---then resumed on medication.

SWINE

1. Continuous feeding of 400 gms. of furazolidone per ton of feed for 98 days produced no symptoms of intoxication. Test pigs receiving this medication made a greater gain on less feed than did control pigs receiving same ration without nf-180.

2. Single oral doses of 500 to 800 mgs. of furazolidone per kilo of body weight induced vomiting and no acute toxic dose could be determined.

RABBITS

1. Rabbits are able to take relatively large doses of furazolidone continuous without toxic effect. A 150 gm. level of furazolidone fed continuously fo 3 months showed no toxic effects and no adverse effects on reproduction.

2. A 500 gm. level of furazolidone for 5 days also resulted in no toxicity symptoms.

Note: There was no measurable tissue accumulation of the drug in animals fed at any of the above mentioned levels. LD 50 = Lethal dose for 50% of animals treated.

FWD
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TECHNICAL
Service Bulletin

HESS & CLARK, ASHLAND, OHIO
DIVISION OF VICK CHEMICAL COMPANY

No. G-3A

WITHDRAWAL STATEMENTS

(nf-180, nfz, bīfuran)

A FEED CONTAINING nf-180 (FURAZOLIDONE), nfz (NITROFURAZONE), OR bīfuran AS THE ONLY MEDICATION NEED NOT BE WITHDRAWN BEFORE SLAUGHTER; THERE IS NO REASON, FROM THE STANDPOINT OF SAFETY, TO DO SO.

(a) The above mentioned drugs are safe to use, being tolerated by the animal at several times the ordinary recommended levels.

(b) There is no measurable accumulation of nitrofurans in animals fed at <u>any</u> of the tolerance levels. These drugs do not remain in body tissue for more than 24 hours after withdrawal; they are used up while doing their work against bacteria. No undesirable residue is left to cause side effects or interfere with marketing of the animal or bird. There is no danger when the meat, eggs or milk is consumed from animals or birds having been fed these drugs.

(c) <u>If a withdrawal statement appears on the feed tag containing either of the nitrofurans as the only medication, it is an error and should be corrected</u>. The Food and Drug Administration does not require these drugs to be withdrawn before slaughter.

<u>Reference:</u> Bulletin, Association of American Feed Control Officials

(d) If feeds containing nf-180, nfz, or bīfuran also contain another drug (s) requiring a withdrawal statement, it would be in reference to the other drug (s), not to the <u>nitrofurans</u>.

FILE 055

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#1 - Broiler Starter - GPC - Melja Lillian - Assiut - 4/1 - Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5652

Moisture	8.85%
Protein	14.1%*
Fat	4.85%
Fiber	4.23%
Ash	9.75%
NFE	58.22%
Carbohydrates	62.45%

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

53

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. -- P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
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Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#2 Turkey Starter - GPC - Bahtim Turkey Farm - Bahtim, 3/29
Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5653

Moisture	10.60%
Protein	29.0%
Fat	2.82%
Fiber	2.70%
Ash	5.73%
NFE	49.15%
Carbohydrates	51.85%

Respectfully Submitted,
New Jersey Feed Laboratory

54

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. · P. O. BOX 357
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TELEPHONE 392-8818

Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#3 Turkey Grower - GPC - Bahtim Turkey Farm - Bahtim - 3/29
Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5654

Moisture	10.77%
Protein	31.4%
Fat	3.11%
Fiber	2.58%
Ash	5.79%
NFE	46.35%
Carbohydrates	48.93%

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

ES

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#4 Layers - Sudan - General Mahran - 3/20 - Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5655

Moisture	9.07%
Protein	23.2%
Fat	4.97%
Fiber	3.30%
Ash	10.39%
NFE	49.27%
Carbohydrates	52.57%

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

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New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mannech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#5 Broiler (Starter?) - GPC - El Zauria, El Hamara - 3/20
Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5656

Moisture	10.76%
Protein	23.5%
Fat	4.77%
Fiber	1.84%
Ash	5.17%
NFE	53.96%
Carbohydrates	55.80%

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. P. O. BOX 357
TRENTON, N. J. 08603
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TELEPHONE 392-8818

Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#6 Finisher - mixed locally - Morcous Ezba Fahmy Yakoub - 3/20 -
Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5657

Moisture	12.07%
Protein	15.7%*
Fat	3.35%
Fiber	2.09%
Ash	4.38%
NFE	62.41%
Carbohydrates	64.50%

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

58

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech, Inc.
2220 Parklake Drive, N.E.
Atlanta, GA

#7 Chick Starter - CEOSS - 3/27 - Sent by: W. Malcolm Reid, University of Georgia

May 3, 1979 No. 5658

Moisture	10.75%
Protein	15.1%*
Fat	3.76%
Fiber	2.90%
Ash	5.66%
NFE	61.83%
Carbohydrates	64.73%

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

69

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. · P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlnta, GA

Poultry Offal Meal - Melar, Egypt - 7/17 - Sent by: Mississippi State University

September 13, 1979 No. 4403

Moisture	5.94%
Fat	16.82%
Fiber	.90%
Ash	5.21%
Crude Protein	69.3%*
Pepsin Indigestible Protein	21.5%
Pepsin Digestible Protein	47.8%

68.98% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory 60

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Meat Meal - Imported - Franco - Cairo Poultry Co. 7/9 - Sent by: Mississippi State University

September 13, 1979 No. 4404

Moisture	6.97%
Fat	3.34%
Fiber	2.02%
Ash	22.68%
Crude Protein	57.2%
Pepsin Indigestible Protein	7.5%
Pepsin Digestible Protein	49.7%

86.89% of crude protein is digestible.

Respectfully Submitted,

New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Local Fish Meal - United Poultry Feed Co. - 7/29 - Sent by:
Mississippi State University

September 13, 1979 No. 4405

Moisture	10.45%
Fat	9.82%
Fiber	.53%
Ash	35.69%
Crude Protein	40.2%
Pepsin Indigestible Protein	2.2%
Pepsin Digestible Protein	38.0%

94.53% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

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DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. · P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Local Fish Meal - Melar, Egypt - 7/17 - Sent by: Mississippi State University

September 13, 1979 No. 4406

Moisture	5.40%
Fat	6.92%
Fiber	.88%
Ash	36.40%
Crude Protein	44.6%
Pepsin Indigestible Protein	8.0%
Pepsin Digestible Protein	36.6%

82.06% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Local Fish Meal - Stino Farm - 7/30 - Sent by: Mississippi State University

September 13, 1979 No. 4407

Moisture	6.36%
Fat	18.92%
Fiber	.93%
Ash	15.78%
Crude Protein	37.0%*
Pepsin Indigestible Protein	4.9%
Pepsin Digestible Protein	32.1%

86.76% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

64

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Local Fish Meal - Feeder Co. - 7/30 - Sent by: Mississippi State University

September 13, 1979 No. 4408

Moisture	6.82%
Fat	25.14%
Fiber	.73%
Ash	16.24%
Crude Protein	41.4%
Pepsin Indigestible Protein	7.0%
Pepsin Digestible Protein	34.4%

83.09% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Fish Meal - Herring - Stino Farm - 7/30 - Sent by: Mississippi State University

September 13, 1979 No. 4409

Moisture	6.98%
Fat	14.55%
Fiber	1.70%
Ash	20.74%
Crude Protein	57.0%
Pepsin Indigestible Protein	7.0%*
Pepsin Digestible Protein	50.0%

87.72% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

66

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

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FEED TECHNOLOGISTS
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Fish Meal - Imported - United Poultry Feed 7/29 - Sent by:
Mississippi State University

September 13, 1979 No. 4410

Moisture	6.47%
Fat	12.56%
Fiber	3.03%
Ash	27.25%
Crude Protein	47.4%*
Pepsin Indigestible Protein	6.0%
Pepsin Digestible Protein	41.4%

87.34% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
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AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Fish Meal - Imported - Cairo Poultry - 7/9 - Sent by: Mississippi State University

September 13, 1979 No. 4411

Moisture	7.45%
Fat	8.48%
Fiber	.44%
Ash	20.14%
Crude Protein	64.0%
Pepsin Indigestible Protein	6.8%
Pepsin Digestible Protein	57.2%

89.38% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

68

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

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FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Fish Meal - Imported - Sample #2 - Melar, Egypt - 7/17 - Sent by: Mississippi State University

September 13, 1979 No. 4412

Moisture	7.42%
Fat	6.00%
Fiber	.58%
Ash	15.73%
Crude Protein	69.8%
Pepsin Indigestible Protein	8.6%
Pepsin Digestible Protein	61.2%

87.68% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

69

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
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TRENTON, N. J. 08603
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Fish Meal - Imported - Melar, Egypt - 7/17 - Sent by: Mississippi State University

September 13, 1979 No. 4413

Moisture	6.06%
Fat	5.48%
Fiber	.74%
Ash	31.22%
Crude Protein	56.2%*
Pepsin Indigestible Protein	6.6%
Pepsin Digestible Protein	49.6%

88.26% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

10

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

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FEED TECHNOLOGISTS
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Meat Meal - General Poultry Co. - Sent by: Mississippi State University

September 13, 1979 No. 4414

Moisture	6.72%
Fat	8.04%
Fiber	.78%
Ash	15.98%
Crude Protein	67.8%*
Pepsin Indigestible Protein	6.2%
Pepsin Digestible Protein	61.6%

90.86% of crude protein is digestible.

*The above result was carefully rechecked.

Respectfully Submitted,

New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Bone Meal - Feedex - 7/30 - Sent by: Mississippi State University

September 13, 1979 No. 4415

Moisture	5.55%
Fat	.41%
Fiber	1.03%
Ash	85.95%
Crude Protein	3.8%
Pepsin Indigestible Protein	1.1%
Pepsin Digestible Protein	2.7%

71.1% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

17

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

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FEED TECHNOLOGISTS
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Bone Meal - Cairo Poultry Co. - 7/9 - Sent by: Mississippi State University

September 13, 1979 No. 4416

Moisture	2.51%
Fat	.93%
Fiber	1.46%
Ash	87.23%
Crude Protein	4.2%
Pepsin Indigestible Protein	1.4%
Pepsin Digestible Protein	2.8%

66.7% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

13

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
TRENTON, N. J. 08603
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TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Bone Meal - Stino Farm - 7/30 - Sent by: Mississippi State University

September 13, 1979 No. 4417

Moisture	1.34%
Fat	.57%
Fiber	.78%
Ash	84.55%
Crude Protein	9.8%
Pepsin Indigestible Protein	1.1%
Pepsin Digestible Protein	8.7%

88.8% of crude protein is digestible.

Respectfully Submitted,
New Jersey Feed Laboratory

14

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

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FEED TECHNOLOGISTS
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Sent by: Mississippi State University

September 13, 1979

Sample	Moisture	Protein	Fat	Fiber	C N
Sesame Meal - Stino Farm 7/30	5.93%	22.0%	16.18%	4.65%	44
Rice Germ Meal - Feedex Co. 7/30	17.57%	19.2%	6.29%	8.49%	44
Rice Bran - Cairo Poultry Co. 7/9	8.12%	11.7%	4.44%	8.88%	44
Rice Bran - Feedex Co. 7/30	9.12%	13.5%	3.21%	10.13%	44
Rice Bran - Normal - United Poultry Feed Co. 7/29	5.07%	7.8%*	6.22%	8.59%	44
Rice Bran - Extracted - United Poultry Feed Co. 7/29	9.15%	13.7%	2.18%	10.40%	44
Cottonseed Meal - Local - Melar, Egypt 7/17	7.90%	48.0%	2.43%	7.45%	44
Cottonseed Meal - Local - United Poultry Feed Co. 7/29	8.53%	44.5%	1.51%	10.48%	44
Cottonseed Meal - Local - Feedex Co. 7/30	8.98%	43.3%	2.12%	8.53%	44

*The above result was carefully rechecked.

Respectfully Submitted,
New Jersey Feed Laboratory

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
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TRENTON, N. J. 08603
AREA CODE 609
TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Sent by: Mississippi State University

September 13, 1979

Sample	Moisture	Protein	Fat	Fiber	Our No.
Cottonseed Meal - Local - Cairo Poultry Co. 7/9	8.16%	43.2%	4.38%	8.32%	4427
Soybeans Toasted - Stino Farm 7/30	5.74%	34.9%	22.31%	5.00%	4428
Soybean Meal - Local - General Poultry Co. 7/79	7.54%	43.2%	1.59%	7.18%	4429
Soybean Meal - Local - General poultry Co. 7/8/79	9.16%	42.7%	3.23%	5.06%	4430
Soybean Meal - imported USA - General Poultry Co. 7/79	8.94%	50.6%	1.12%	3.08%	4431
Soybean Meal - local - free zone Melar, Egypt - 7/17	10.19%	48.0%	1.41%	4.96%	4432
Soybean Meal - imported USA - Stino Farm 9/30	9.41%	48.6%	1.54%	4.00%	4433
Soybean Meal - imported USA - United Poultry Feed Co. 7/29	8.87%	52.2%	.65%	2.88%	4434

Respectfully Submitted,
New Jersey Feed Laboratory

DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A.O.A.C.

16

New Jersey Feed Laboratory, Inc.
FEED TECHNOLOGISTS
910 PENNSYLVANIA AVE. - P. O. BOX 357
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TELEPHONE 392-8818

Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Sent by: Mississippi State University

September 13, 1979

Sample	Moisture	Protein	Fat	Fiber
Corn Gluten Feed - Melar, Egypt 7/17	9.34%	28.0%	4.83%	5.28%
Yellow Corn - ground - imported USA - Stino Farm 7/30	11.19%	9.9%	4.86%	1.76%
Yellow Corn - whole - General Poultry Co. 7/79	10.32%	9.4%	3.82%	1.92%
Yellow Corn - whole - Cairo Poultry Co. 7/9	9.76%	9.8%	3.91%	1.95%
Yellow Corn - whole - imported USA - United Poultry Feed Co. 7/29	10.57%	9.6%	3.82%	1.78%
Fava Bean - Stino Farm 7/30	9.33%	27.3%	2.06%	4.09%
Rice Germ Meal - United Poultry Feed Co. 7/29	9.10%	18.3%	7.44%	8.39%

Respectfully Submitted,
New Jersey Feed Laboratory

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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Sent by: Mississippi State University

September 13, 1979

Sample	Moisture	Protein	Fat	Fiber	Our No.
Whole Wheat - Cairo Poultry Co. 7/9	9.80%	12.1%	1.58%	2.37%	4442
Wheat Bran - United Poultry Feed Co. 7/29	9.89%	15.3%	4.12%	8.01%	4443
Wheat Bran - Stino Farm 7/30	10.03%	15.9%	2.61%	7.70%	4444
Wheat Bran - Cairo Poltry Co. 7/9	9.96%	16.2%	3.57%	7.18%	4445
T. Yeast - Stino Farm 7/30	9.44%	37.2%	2.21%	1.27%	4446

Respectfully Submitted,

New Jersey Feed Laboratory

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DETERMINATIONS MADE IN ACCORDANCE WITH OFFICIAL METHODS OF A. O. A. C.

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FEED TECHNOLOGISTS
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Certificate of Analysis

Mathtech
2220 Parklake Avenue, NE
Atlanta, GA

Sent by: Mississippi State University

September 13, 1979

Sample	Calcium	Our No.
Ground Clam Shell - Stino Farm 7/30	30.40%	4447
Ground Limestone - Feedex Co. 7/30	38.80%	4448
Ground Limestone - Stino Farm 7/30	36.00%	4449

Respectfully Submitted,
New Jersey Feed Laboratory
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055

FEED AND PESTICIDE LABORATORY

1.	Gas Chromatograph, Hewlett-Packard 5830A with 2 EC, 1 FID, and Keyboard.	$20,000.00
2.	Kjeldahl (12 unit for Protein)	4,800.00
3.	Fat Extraction Apparatus, Goldfisch (6 unit)	1,800.00
4.	Crude Fiber Apparatus (6 unit)	1,500.00
5.	Analytical Balance, Mettler	2,000.00
6.	Marble Table for Balance	300.00
7.	Blue M Stable Theremometer Oven (Moisture, Etc.)	700.00
8.	Furance Thermolyne Type 1500 (Ash, fibers at 600 C)	400.00
9.	Drying Oven 200 Degree C (fat, moisture, etc.)	300.00
10.	Fume Hood and Blower	2,000.00
11.	Safety Shower & Eye Wash Unit	450.00
12.	Rotating Rack for Pepsin	200.00
13.	Glassware Washer, Undercounter Model	1,600.00
14.	Atomic Absorption (Measurement of trace elements)	9,950.00
		$46,000.00

Equipment cost only

EGYPT CHKST 0-4

ADJUSTED COST = $152.307 PER 2205.000 LBS.

DATE =07/12/79

COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE	RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
2.950		-3.876	4.069	WEIGHT	EQU	100.000	100.000	100.000
11.790		10.898	12.547	PROTEIN	MIN	.000	18.061	18.061
.910		-47.281	5.276	TOTAL FAT	MIN	.000	2.999	2.999
3.630		.688	17.200	FIBER	MIN	.000	3.103	3.103
3.170		********	4.423	CALCIUM	EQU	.850	.850	.850
2.270		.824	4.510	AVAIL PHOS	MIN	.420	.420	.420
.910		-873.210	77.393	TOTAL PHOS	MIN	.000	.716	.716
181.410		********	206.932	METAB ENERGY	EQU	1300.000	1300.000	1300.000
181.410		.172	261.392	ARGININE	MIN	.000	1.215	1.215
681.800		**********		LYSINE	MIN	.930	.930	.930
********	3.218			METH	MIN	.000	.457	.457
********	2.865			METH + CYST	MIN	.740	.740	.740
********	12.912			TRYPTOPHANE	MIN	.000	.235	.235
********	10.301			XAN	MIN	.000	6.288	6.288
6.800	3.475			SODIUM	EQU	.190	.190	.190
********	3.231			CYSTINE	MIN	.000	.314	.314
********	8.147			GLYCINE	MIN	.000	.913	.913
********	3.737			HISTIDINE	MIN	.000	.436	.436
7.710	6.155			ISOLEUCINE	MIN	.000	.887	.887
********	19.077			LEUCINE	MIN	.000	1.667	1.667
22.727	21.283			PHENYLALININE	MIN	.000	.966	.966
				THREONINE	MIN	.000	.746	.746
				TYROSINE	MIN	.000	.801	.801
				VALINE	MIN	.000	.931	.931
				ADDED FAT	MIN	.000	.000	.000
				SALT	MIN	.000	.438	.438
				VIT-T.M.	EQU	.250	.250	.250
				FISHML	MIN	.000	.000	.000
				FISHML	MAX	2.500	.000	.000
				SESAME	MAX	10.000	.000	.000
				CORN GL ML	MAX	5.000	5.000	5.000
				CORN	MIN	.000	62.880	62.880
				SOYBEAN ML	MIN	.000	22.110	22.110
				LIMESTONE	MIN	.000	.546	.546
				L-LYSINE	MAX	.050	.050	.050

AMT. ADJ BATCH WT	AMOUNT	INGREDIENT
1386.497	1386.497	CORN
487.516	487.516	SOYBEAN ML, 48
12.032	12.032	LIMESTONE
45.835	45.835	STEAMED BONE ML
110.250	110.250	CORN GL ML, 20
143.435	143.435	WHEAT BRAN
9.661	9.661	SALT
1.102	1.102	L-LYSINE, 78.6
3.159	3.159	D L METH
5.512	5.512	VIT-T.M.
		WHEAT, HARD
		BROKEN RICE
		PO BYPROD ML
		PO OFFAL ML
		FAT, AN(3500)
		RICE BRAN
		SESAME ML
		WHEAT FLOUR
		HORSE BEANS
		FISHML, MENH
		FISHML, HERR

Best Available Document

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EGYPT BRDR

$137.497 PER 2205.000LBS. ADJUSTED COST = $137.497 PER 2205.000 LBS. DATE =07/12/79

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE
CORN	2.950		-3.876	4.069
SOYBEAN ML, 48	11.790		10.898	12.547
LIMESTONE	.910		-47.281	5.276
STEAMED BONE ML	3.630		.688	17.200
CORN GL ML, 20	3.170		********	4.423
WHEAT BRAN	2.270		.824	4.510
SALT	.910		-873.210	77.393
L-LYSINE, 78.6	181.410		********	206.932
D L METH	181.410		.172	261.392
VIT-T.M.	681.800		**********	
WHEAT, HARD	********	3.218		
BROKEN RICE	********	2.865		
PO BYPROD ML	********	12.912		
PO OFFAL ML	********	10.301		
FAT, AN(3500)	6.800	3.475		
RICE BRAN	********	3.231		
SESAME ML	********	8.147		
WHEAT FLOUR	********	3.737		
HORSE BEANS	7.710	6.155		
FISHML, MENH	********	19.077		
FISHML, HERR	22.727	21.283		

RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN	MIN	.000	14.897	14.897
TOTAL FAT	MIN	.000	2.947	2.947
FIBER	MIN	.000	2.460	2.460
CALCIUM	EQU	3.000	3.000	3.000
AVAIL PHOS	MIN	.400	.400	.400
TOTAL PHOS	MIN	.000	.632	.632
METAB ENERGY	EQU	1300.000	1300.000	1300.000
ARGININE	MIN	.000	1.000	1.000
LYSINE	MIN	.750	.750	.750
METH	MIN	.000	.367	.367
METH + CYST	MIN	.610	.610	.610
TRYPTOPHANE	MIN	.000	.189	.189
XAN	MIN	.000	6.911	6.911
SODIUM	EQU	.200	.200	.200
CYSTINE	MIN	.000	.268	.268
GLYCINE	MIN	.000	.761	.761
HISTIDINE	MIN	.000	.363	.363
ISOLEUCINE	MIN	.000	.731	.731
LEUCINE	MIN	.000	1.471	1.471
PHENYLALININE	MIN	.000	.820	.820
THREONINE	MIN	.000	.637	.637
TYROSINE	MIN	.000	.697	.697
VALINE	MIN	.000	.763	.763
ADDED FAT	MIN	.000	.000	.000
SALT	MIN	.000	.466	.466
VIT-T.M.	EQU	.250	.250	.250
FISHML	MIN	.000	.000	.000
FISHML	MAX	2.500	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
CORN	MIN	.000	69.106	69.106
SOYBEAN ML	MIN	.000	16.474	16.474
LIMESTONE	MIN	.000	6.151	6.151
L-LYSINE	MAX	.050	.050	.050

AMT. ADJ BATCH WT	AMOUNT
1523.785	1523.785
363.260	363.260
135.619	135.619
46.996	46.996
110.250	110.250
6.296	6.296
10.271	10.271
1.102	1.102
1.908	1.908
5.512	5.512

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GHOROB BRO ST 0-21 DATE =07/12/79

72.357 PER 2205.000LBS. ADJUSTED COST = $172.357 PER 2205.000 LBS.

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE
ORN	2.950		2.828	3.097
AT, AN(3500)	6.800		6.360	7.229
OYBEAN ML, 48	11.790		11.674	16.780
IMESTONE	.910		-46.633	6.666
TEAMED BONE ML	3.630		1.188	105.801
ORN GL ML, 20	3.170		********	3.313
ALT	.910		-11.506	1442.289
-LYSINE, 78.6	181.410		********	225.918
ETH, DL	181.410		148.192	336.202
IT-T.M.	681.800		**********	**********
ISH ML, HERR	22.727		********	22.947
HEAT, HARD	********	2.917		
HEAT BRAN	2.270	.604		
ICE BRAN	********	2.484		
ROKEN-RICE	********	2.787		
ESAME ML	********	7.439		
O BYPROD ML	********	13.745		
O OFFAL ML	********	11.248		
HEAT FLOUR	********	3.495		
ORSE BEANS	7.710	5.399		
ISH ML, MENH	********	20.456		

AMT. ADJ BATCH WT	AMOUN
1467.069	1467.069
36.513	36.513
357.308	357.308
13.326	13.326
37.718	37.718
110.250	110.250
8.069	8.069
1.102	1.102
3.307	3.307
4.961	4.961
165.375	165.375

RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN	MIN	.000	19.750	19.750
TOTAL FAT	MIN	.000	5.131	5.131
FIBER	MIN	.000	2.367	2.367
CALCIUM	EQU	.900	.900	.900
AVAIL PHOS	MIN	.450	.450	.450
TOTAL PHOS	MIN	.000	.674	.674
METAB ENERGY	MIN	1425.000	1425.000	1425.000
ARGININE	MIN	.000	1.281	1.281
LYSINE	MIN	1.140	1.140	1.140
METH	MIN	.000	.580	.580
METH + CYST	MIN	.869	.869	.869
TRYPTOPHANE	MIN	.000	.245	.245
XANTHRO.	MIN	.000	6.653	6.653
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.351	.351
GLYCINE	MIN	.000	1.182	1.182
HISTIDINE	MIN	.000	.474	.474
ISOLEUCINE	MIN	.000	.990	.990
LEUCINE	MIN	.000	1.813	1.813
PHENYLALININE	MIN	.000	1.009	1.009
THREONINE	MIN	.000	.831	.831
TYROSINE	MIN	.000	.835	.835
VALINE	MIN	.000	1.006	1.006
ADDED FAT	MAX	5.000	1.656	1.656
SALT	MIN	.000	.366	.366
VIT-T.M.	EQU	.225	.225	.225
FISH ML	MIN	2.500	7.500	7.500
FISH ML	MAX	7.500	7.500	7.500
PO OFFAL ML	MIN	.000	.000	.000
PO OFFAL ML	MAX	5.000	.000	.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	66.534	66.534
SOYBEAN ML	MIN	.000	16.204	16.204
LIMESTONE	MIN	.000	.604	.604
BONE ML	MIN	.000	1.711	1.711
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH, DL	MIN	.000	.150	.150
L-LYSINE	MAX	.050	.050	.050

COST = GHOROB ST X

$169.956 PER 2205.000LBS. ADJUSTED COST = $169.956 PER 2205.000 LBS.

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE
CORN	2.950		2.828	3.097
FAT, AN(3500)	6.800		6.360	7.229
SOYBEAN ML, 48	11.790		11.674	16.780
LIMESTONE	.910		-46.633	6.666
STEAMED BONE ML	3.630		1.188	105.801
CORN GL ML, 20	3.170		********	3.313
SALT	.910		-11.506	1442.289
PO OFFAL ML	9.070		********	11.248
L-LYSINE, 78.6	181.410		********	225.918
METH, DL	181.410		148.192	336.202
VIT-T.M.	681.800		**********	**********
FISH ML, HERR	22.727		********	22.947
WHEAT, HARD	********	2.917		
WHEAT BRAN	2.270	.604		
RICE-BRAN	********	2.484		
BROKEN RICE	********	2.787		
SESAME ML	********	7.439		
PO BYPROD ML	********	13.745		
WHEAT-FLOUR	********	3.495		
HORSE BEANS	7.710	5.399		
FISH ML, MENH	********	20.456		

RESTRICTION	EQU	INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT		100.000	100.000	100.000
PROTEIN	MIN	.000	21.159	21.159
TOTAL FAT	MIN	.000	5.307	5.307
FIBER	MIN	.000	2.375	2.375
CALCIUM	EQU	.900	.900	.900
AVAIL PHOS	MIN	.450	.450	.450
TOTAL PHOS	MIN	.000	.661	.661
METAB ENERGY	MIN	1425.000	1425.000	1425.000
ARGININE	MIN	.000	1.337	1.337
LYSINE	MIN	1.140	1.140	1.140
METH	MIN	.000	.538	.538
METH + CYST	MIN	.869	.869	.869
TRYPTOPHANE	MIN	.000	.242	.242
XANTHRO.	MIN	.000	6.633	6.633
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.390	.390
GLYCINE	MIN	.000	1.279	1.279
HISTIDINE	MIN	.000	.464	.464
ISOLEUCINE	MIN	.000	1.023	1.023
LEUCINE	MIN	.000	1.894	1.894
PHENYLALININE	MIN	.000	1.026	1.026
THREONINE	MIN	.000	.876	.876
TYROSINE	MIN	.000	.874	.874
VALINE	MIN	.000	1.089	1.089
ADDED FAT	MAX	5.000	.232	.232
SALT	MIN	.000	.280	.280
VIT-T.-M.	EQU	.225	.225	.225
FISH ML	MIN	2.500	7.500	7.500
FISH ML	MAX	7.500	7.500	7.500
PO OFFAL ML	MIN	5.000	5.000	5.000
PO-OFFAL-ML	MAX	5.000	5.000	5.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	66.326	66.326
SOYBEAN ML	MIN	.000	13.343	13.343
LIMESTONE	MIN	.000	.614	.614
BONE ML	MIN	.000	1.340	1.340
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH, DL	MIN	.000	.090	.090
L-LYSINE	MAX	.050	.050	.050

AMT. ADJ BATCH WT	AMOUN
1462.484	1462.484
5.109	5.109
294.219	294.219
13.534	13.534
29.540	29.540
110.250	110.250
6.180	6.180
110.250	110.250
1.102	1.102
1.995	1.995
4.961	4.961
165.375	165.375

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GHOROB GRO 22-42

3.664 PER 2205.000LBS. ADJUSTED COST = $163.664 PER 2205.000 LBS. DATE =07/12/79

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE	AMT. ADJ BATCH WT	AMOUNT
RN	2.950		2.828	3.097	1578.762	1578.762
T, AN(3500)	6.800		6.360	7.229	31.075	31.075
YBEAN-ML,-48	11.790		11.674	16.780	255.281	255.281
IMESTONE	.910		-46.633	6.666	15.892	15.892
TEAMED BONE ML	3.630		1.188	105.801	30.574	30.574
RN GL ML, 20	3.170		********	3.313	110.250	110.250
ALT	.910		-11.506	1442.289	8.063	8.063
O OFFAL ML	********		11.248	********	.000	.000
-LYSINE, 78.6	181.410		********	225.918	1.102	1.102
ETH, DL	181.410		148.192	336.202	3.664	3.664
IT-T.M.	681.800		**********	**********	4.961	4.961
ISH ML, HERR	22.727		********	22.947	165.375	165.375
HEAT, HARD	********	2.917				
HEAT BRAN	2.270	.604				
ICE-BRAN	********	2.484				
ROKEN RICE	********	2.787				
ESAME ML	********	7.439				
O BYPROD ML	********	13.745				
HEAT-FLOUR	********	3.495				
ORSE BEANS	7.710	5.399				
ISH ML, MENH	********	20.456				

RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN.	MIN	.000	17.965	17.965
TOTAL FAT	MIN	.000	5.055	5.055
FIBER	MIN	.000	2.349	2.349
CALCIUM	EQU	.850	.850	.850
AVAIL PHOS	MIN	.400	.400	.400
TOTAL PHOS	MIN	.000	.613	.613
METAB ENERGY	MIN	1445.000	1445.000	1445.000
ARGININE	MIN	.000	1.138	1.138
LYSINE	MIN	1.012	1.012	1.012
METH	MIN	.000	.574	.574
METH + CYST	MIN	.838	.838	.838
TRYPTOPHANE	MIN	.000	.216	.216
XANTHRO.	MIN	.000	7.160	7.160
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.324	.324
GLYCINE	MIN	.000	1.103	1.103
HISTIDINE	MIN	.000	.430	.430
ISOLEUCINE	MIN	.000	.892	.892
LEUCINE	MIN	.000	1.697	1.697
PHENYLALININE	MIN	.000	.912	.912
THREONINE	MIN	.000	.760	.760
TYROSINE	MIN	.000	.770	.770
VALINE	MIN	.000	.905	.905
ADDED FAT	MAX	5.000	1.409	1.409
SALT	MIN	.000	.366	.366
VIT-T.-M.	EQU	.225	.225	.225
FISH ML	MIN	2.000	7.500	7.500
FISH ML	MAX	7.500	7.500	7.500
PO OFFAL ML	MIN	.000	.000	.000
PO OFFAL ML	MAX	5.000	.000	.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT-BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	71.599	71.599
SOYBEAN ML	MIN	.000	11.577	11.577
LIMESTONE	MIN	.000	.721	.721
BONE ML	MIN	.000	1.387	1.387
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH, DL	MIN	.000	.166	.166
L-LYSINE	MAX	.050	.050	.050

GHOROB GRO X

.61.264 PER 2205.000LBS. ADJUSTED COST = $161.264 PER 2205.000 LBS.

DATE =07/12/79

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE	AMT. ADJ BATCH WT	AMOUN
:ORN	2.950		1.316	3.097	1573.193	1573.193
;OYBEAN ML, 48	11.790		11.674	12.547	193.445	193.445
.IMESTONE	.910		-47.281	6.587	16.085	16.085
;TEAMED BONE ML	3.630		1.188	17.200	22.456	22.456
:ORN GL ML, 20	3.170		********	3.460	110.250	110.250
;ALT	.910		-11.506	77.393	6.186	6.186
'O-OFFAL-ML	9.070		********	11.123	110.250	110.250
-LYSINE, 78.6	181.410		********	223.407	1.102	1.102
METH, DL	181.410		148.192	297.066	2.356	2.356
/IT-T.M.	681.800		**********		4.961	4.961
:ISH-ML, HERR	22.727		21.283	22.947	164.716	164.716
:AT, AN(3500)	6.800	6.360				
WHEAT, HARD	********	2.957				
WHEAT BRAN	2.270	.824				
RICE-BRAN	********	2.583				
BROKEN RICE	********	2.798				
SESAME ML	********	7.533				
'O BYPROD ML	********	13.635				
WHEAT-FLOUR	********	3.527				
HORSE BEANS	7.710	5.499				
:ISH ML, MENH	********	20.464				

RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN	MIN	.000	19.376	19.376
TOTAL-FAT	MIN	.000	5.241	5.241
FIBER	MIN	.000	2.358	2.358
CALCIUM	EQU	.850	.850	.850
AVAIL PHOS	MIN	.400	.400	.400
TOTAL-PHOS	MIN	.000	.600	.600
METAB ENERGY	MIN	1445.000	1445.000	1445.000
ARGININE	MIN	.000	1.194	1.194
LYSINE	MIN	1.012	1.012	1.012
METH	MIN	.000	.532	.532
METH + CYST	MIN	.838	.838	.838
TRYPTOPHANE	MIN	.000	.213	.213
XANTHRO.	MIN	.000	7.135	7.135
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.363	.363
GLYCINE	MIN	.000	1.200	1.200
HISTIDINE	MIN	.000	.419	.419
ISOLEUCINE	MIN	.000	.925	.925
LEUCINE	MIN	.000	1.778	1.778
PHENYLALININE	MIN	.000	.930	.930
THREONINE	MIN	.000	.806	.806
TYROSINE	MIN	.000	.809	.809
VALINE	MIN	.000	.987	.987
ADDED FAT	MAX	5.000	.000	.000
SALT	MIN	.000	.281	.281
VIT-T.M.	EQU	.225	.225	.225
FISH ML	MIN	2.000	7.470	7.470
FISH ML	MAX	7.500	7.470	7.470
PO OFFAL ML	MIN	5.000	5.000	5.000
PO-OFFAL-ML	MAX	5.000	5.000	5.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT-BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	71.347	71.347
SOYBEAN-ML	MIN	.000	8.773	8.773
LIMESTONE	MIN	.000	.729	.729
BONE ML	MIN	.000	1.018	1.018
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH. DL	MIN	.000	.107	.107
L-LYSINE	MAX	.050	.050	.050

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GHOROB FIN 42+

34.560 PER 2205.000LBS. ADJUSTED COST = $134.560 PER 2205.000 LBS. DATE -07/12/79

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE
ORN	2.950		2.828	3.097
AT, AN(3500)	6.000		6.360	7.229
OYBEAN ML, 48	11.790		11.674	16.780
IMESTONE	.910		-46.633	6.666
TEAMED BONE ML	3.630		1.188	105.801
ORN GL ML, 20	3.170		********	3.313
ALT	.910		-11.506	1442.289
-LYSINE, 78.6	181.410		********	225.918
ETH, DL	181.410		148.192	336.202
IT-T.M.	681.800		**********	**********
ISH ML, HERR	22.727		********	22.947
HEAT, HARD	********	2.917		
HEAT BRAN	2.270	.604		
ICE BRAN	********	2.484		
ROKEN RICE	********	2.787		
ESAME ML	********	7.439		
O BYPROD ML	********	13.745		
O OFFAL ML	********	11.248		
HEAT FLOUR	********	3.495		
ORSE BEANS	7.710	5.399		
ISH ML, MENH	********	20.456		

RESTRICTION	EQU	INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN	MIN	.000	16.128	16.128
TOTAL FAT	MIN	.000	4.802	4.802
FIBER	MIN	.000	2.338	2.338
CALCIUM	EQU	.800	.800	.800
AVAIL PHOS	MIN	.350	.350	.350
TOTAL PHOS	MIN	.000	.552	.552
METAB ENERGY	MIN	1465.000	1465.000	1465.000
ARGININE	MIN	.000	.990	.990
LYSINE	MIN	.879	.879	.879
METH	MIN	.000	.494	.494
METH + CYST	MIN	.733	.733	.733
TRYPTOPHANE	MIN	.000	.186	.186
XANTHRO.	MIN	.000	7.727	7.727
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.297	.297
GLYCINE	MIN	.000	1.023	1.023
HISTIDINE	MIN	.000	.384	.384
ISOLEUCINE	MIN	.000	.791	.791
LEUCINE	MIN	.000	1.581	1.581
PHENYLALININE	MIN	.000	.813	.813
THREONINE	MIN	.000	.688	.688
TYROSINE	MIN	.000	.703	.703
VALINE	MIN	.000	.799	.799
ADDED FAT	MAX	5.000	.961	.961
SALT	MIN	.000	.365	.365
VIT-T.M.	EQU	.112	.112	.112
FISH ML	MIN	.000	7.500	7.500
FISH ML	MAX	7.500	7.500	7.500
PO OFFAL ML	MIN	.000	.000	.000
PO OFFAL ML	MAX	5.000	.000	.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	77.266	77.266
SOYBEAN ML	MIN	.000	6.736	6.736
LIMESTONE	MIN	.000	.839	.839
BONE ML	MIN	.000	1.062	1.062
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH, DL	MIN	.000	.108	.108
L-LYSINE	MAX	.050	.050	.050

AMT. ADJ BATCH WT	AMOUN
1703.722	1703.722
21.191	21.191
148.536	148.536
18.489	18.489
23.418	23.418
110.250	110.250
8.055	8.055
1.102	1.102
2.391	2.391
2.470	2.470
165.375	165.375

GHOROB

32.203 PER 2205.000LBS. ADJUSTED COST = $132.203 PER 2205.000 LBS. DATE =07/12/79

INGREDIENT	COST CWT	SHADOW PRICE	LOW RANGE	HIGH RANGE
ORN	2.950		1.316	3.097
OYBEAN ML, 48	11.790		11.674	12.547
IMESTONE	.910		-47.281	6.587
TEAMED BONE ML	3.630		1.188	17.200
ORN GL ML, 20	3.170		********	3.460
ALT	.910		-11.506	77.393
D-OFFAL-ML	9.070		********	11.123
-LYSINE, 78.6	181.410		********	223.407
ETH, DL	181.410		148.192	297.066
IT-T.M.	681.800		**********	
ISH-ML, HERR	22.727		21.283	22.947
AT, AN(3500)	6.800	6.360		
HEAT, HARD	********	2.957		
HEAT BRAN	2.270	.824		
ICE-BRAN	********	2.583		
ROKEN RICE	********	2.798		
ESAME ML	********	7.533		
O BYPROD ML	********	13.635		
HEAT-FLOUR	********	3.527		
ORSE BEANS	7.710	5.499		
ISH ML, MENH	********	20.464		

AMT. ADJ BATCH WT	AMOUNT
1668.610	1668.610
124.281	124.281
18.252	18.252
17.079	17.079
110.250	110.250
6.528	6.528
110.250	110.250
1.102	1.102
1.214	1.214
2.470	2.470
144.964	144.964

RESTRICTION		INITIAL LEVEL	ACTUAL AMOUNT	AMT. ADJ BATCH WT
WEIGHT	EQU	100.000	100.000	100.000
PROTEIN	MIN	.000	17.615	17.615
TOTAL FAT	MIN	.000	5.307	5.307
FIBER	MIN	.000	2.365	2.365
CALCIUM	EQU	.800	.800	.800
AVAIL PHOS	MIN	.350	.350	.350
TOTAL PHOS	MIN	.000	.544	.544
METAB ENERGY	MIN	1465.000	1465.000	1465.000
ARGININE	MIN	.000	1.065	1.065
LYSINE	MIN	.879	.879	.879
METH	MIN	.000	.449	.449
METH + CYST	MIN	.733	.733	.733
TRYPTOPHANE	MIN	.000	.187	.187
XANTHRO.	MIN	.000	7.567	7.567
SODIUM	EQU	.210	.210	.210
CYSTINE	MIN	.000	.336	.336
GLYCINE	MIN	.000	1.098	1.098
HISTIDINE	MIN	.000	.377	.377
ISOLEUCINE	MIN	.000	.829	.829
LEUCINE	MIN	.000	1.664	1.664
PHENYLALININE	MIN	.000	.844	.844
THREONINE	MIN	.000	.737	.737
TYROSINE	MIN	.000	.750	.750
VALINE	MIN	.000	.891	.891
ADDED FAT	MAX	5.000	.000	.000
SALT	MIN	.000	.296	.296
VIT-T.M.	EQU	.112	.112	.112
FISH ML	MIN	.000	6.574	6.574
FISH ML	MAX	7.500	6.574	6.574
PO OFFAL ML	MIN	5.000	5.000	5.000
PO-OFFAL-ML	MAX	5.000	5.000	5.000
PO BYPROD	MAX	7.000	.000	.000
SESAME	MAX	10.000	.000	.000
CORN GL ML	MAX	5.000	5.000	5.000
WHEAT BRAN	MAX	2.000	.000	.000
WHEAT FLOUR	MAX	10.000	.000	.000
HORSE BEANS	MAX	10.000	.000	.000
CORN	MIN	.000	75.674	75.674
SOYBEAN ML	MIN	.000	5.636	5.636
LIMESTONE	MIN	.000	.828	.828
BONE ML	MIN	.000	.775	.775
RICE BRAN	MIN	.000	.000	.000
RICE	MAX	20.000	.000	.000
METH, DL	MIN	.000	.055	.055
L-LYSINE	MAX	.050	.050	.050

Dr. Elbert Day

March 27, 1979

Recommendations - Task 055 - Nutrition and Feed Manufacturing

1. GPC:

1. Convert the 4 volumetric feed mills to batch mills as soon as possible preferobly to horizontal mixers. This conversion would increase mixing accuracy and reduce cost by eleminating the need for concentrates. All feed mills would have the capability of making their own inter-mill premixes or concentrates.

2. Convert from sack to bulk handling of all major ingredients and finished feed. This would reduce feed wastage and minimize the possibility of introducing diseases via feeding eleminating pests from having access to it.

3. Establish a routine quality control program for both feedstuffs and finished feeds.

4. Ingredient quality should be substantial. Quality of local ingredients appears to be poor and variable in many instances but to what extent is not known.

5. Ingredient shortages appear to occur frequently and sometimes cause production problems. This could be reduced.

   a. By increasing ingredient storage capacity, at each mill

   b. Planning ingredient needs and coordinate buying with needs

   c. Tenders made for feedstuffs on time and simplify payment procedures.

6. Formulate feeds with computer to obtain least-cost and increase accurancy of nutrient balance.

7. Pellet all broiler and duck feeds. This would increase conscerious and reduce disease risk.

II. Privates:

1. The privates should work toward bulk handling of feedstuffs and finished feeds.

2. Comments about quality control in applicable for privates.

   There is considerable doubt about assay accuracy of MOA, GPC and private lays - there seems to be very few assays performed in Egypt to check quality of ingredients and feeds.

3. The import tax on feed additions is entirely too high (20-30%) and should be eliminated to encourage growth of the poultry industry.

   All feed additions (vitamins, drugs, trace minerals, antioxidates, and amino acids). The availability of feed additives to the privates appears to be a problem. Small producers need help in obtaining needed supplies. The government (MOH) should not make it more difficult by developing registration and increasing the proper work.

   Non-taxed feed additives should be exempt from registration.

4. The privates need technical help in the feed formulation.

   Perhaps the extension service with the aid of MOA Nutritionist, can supply this service. Computer formulation is needed.

5. The private, even very small producers, can mix feed from basic ingredients with very little investment since all feed is handled in sacks. All that is needed in terms of equipment is a scale, grinder and batch mixer.

NOTES ON 055 TEAM REPORTS - NUTRITION AND FEED MANUFACTURING

TEAM MEMBERS: Dr. Elbert Day
Dr. Rex Bushong

1-31-79 Feed Sample Analyses - through Reid

- 6 feed samples analyzed by Aynsome Laboratories Limited (England) from Lilly Research Centre Ltd. - Received by Lab in December, 1978.
- Letter from Reid to Dr. Sabry of GPC included with analyses - discussion of results.
- 1 page description of feed samples obtained in Egypt Nov. 1978.
- 2 page Technical Service Bulletin attached (Safety of hurazolidone and withdrawal statements).

3-5-79 Weekly Report 2/26 - 3/5/79 - by Day

- arrived Cairo 2/26/79.
- Visited with: Dr. Zaher (Production Manager for GPC) with Bell; Mr. Ibrahim Rashid (Director General for Poultry Nutrition for GPC) with Huttar, discussed infrastructure of GPC-operated feed mills and broiler breeder production problem; and Mr. Tonsy's Commercial Egg Farm with Saif, info. gathered on housing capacity and feed mill.
- Visited 4 feed mills with Mr. Rashid and examined field quality control laboratory (positive and negative points of the visited feed mills outlined). Also info. on lab equipment, and much info. on feed ingredient situation (according to Mr. Rashid) provided in report (2-1/2 pages of info.).
- Chart on type of feed manufactured at each GPC mill
- Chart on GPC Feed mills - location, capacity, operating time, type of mixer, presence of complete feed bulk facilities, of fat spray system.

3/6/79 GPC Feed Procurement Procedures - by Day

- met with Mrs. Afaf Seifi (Undersec. of GPC) and Mr. Mohamed El Nakoury (Dir. General of Dept. of Financing and Commercial and Administration) on March 6, 1979.

- Info. obtained on GPC feed procurement procedures, including: MOS responsible for importation of food such as fats, meats, corn, eggs (corn is only feedstuff bought through MOS) and all other imported feedstuffs purchased through private or general (Govt.) companies through agents; GPC must make tenders (open bids) for all supply needs except mach. equip. replacement parts; each dept. of GPC calculates its needs prior to beginning of each year for budget purposes; timing of tenders (yearly or seasonal); and info. on storage and transportation of feedstuffs.

3-11-79 Visit to GPC Alexandria Feed Mill - by Day and Huttar

- Visit by Day and Huttar on March 11, 1979.
- Basic info. gathered and list of criticisms of Alex. mill
  (1) this mill should be a batch mixing mill using horizontal mixers
  (2) all ingredient storage is for sacked ingredients
  (3) bulk tanks are too small to receive truck or boxcar loads of bulk ingredients
  (4) no pelleting facilities

3-14-79 Oriolia farm, Giza area - by Day

- Visit to private poultry farm (Oriolia farm, Giza area) owned by Dr. Farid K.R. Itino on March 6, 1979 by Day, Voss, Wiens and Bell.
- Info. gathered re farm, list of what ingredients current diet fed to quail and layers includes (and percentages), and comments re Dr. Itino's feeding program:
  (1) His wheat should be ground to facilitate mixing and to prevent selective eating.
  (2) Should have separate feeds for quail and chicken layers.
  (3) Need for three antibiotics continuously is questionable.
  (4) Trace mineral levels were more than adequate re supplemental vitamins.
  (5) Computer formulation more exacting - Dr. Itino negative.
  (6) Mixing, grinding and feed ingredients should be under cover.

3-15-79 Visit to Private Broiler Farm of Mr. Ghorab - by Wiens and Day

- Visit on March 13, 1979 by Wiens and Day with Dr. Adel El Dera and Mr. Hattem El Zomer (prev. visit by Saif and Bell background report 3-8-79).
- Visit was to obtain more info. on feed situation in private sector in return for help in feed formulation.
- Composition of Cairo Company Ration listed
- Table of market prices for feed ingredients and the finished Ghorab is mixing.
- Info. also obtained on costs of private broiler house, costs of private feed mixing (Ghorab), and info. on other related items.
- Table giving nutrient composition of available feed ingredients and nutrient values per LE (not presently attached to ATL. copy).
- Composition of recommended finisher for Ghorab, based on cost and nutritional considerations.

3-18-79 Soybean Processing Plant at Damanhour - by Day

- Huttar, Mr. Rashid and Day visited private broiler farm owned by Mr. Gebaly Kaloub (Huttar report on this broiler farm) and govt. soybean processing plant located near Alexandria in city of Damanhour.
- Soybean processing plant at Damanhour is only Egyptian plant, but capable of processing 200 tons/day. A cotton seed processing plant and a feed mill (lg. animal feeds) located adjacent. Quality control lab is also adjacent to soybean processing plant.
- Info. on soybean processing plant and equipment gathered.

3-18-79 Animal Production Research Institute - by Day

- Visited with 2 poultry nutritionists who are with Animal Production Research Institute, MOA (Cairo), Pr. Mohamed Shalkany - chief research worker , Dr. Abdel Selim - chief research worker.
- 13 institutes conducting research under MOA. 11 workers in poultry institute - 2 chief researchers, 1 sub-chief researcher, 3 research workers and 5 asst. researchers.

Advanced (educational) degree programs joint venture between research institutes and ag. colleges (colleges don't have any poultry bio. testing facilities).

- Lab has capability of conducting approx. analysis on feeds and feedstuffs. Researchers feel they need atomic absorption analyzer, amino acid analyzer, and more/better biological testing facilities for broilers and layers.
- Researchers said they didn't work with privates - only research work, guest lectures, and formulation of breeder diet feed to MOA broiler breeders. Research data published primarily in Ag. Research Review monthly issue (Eng. and Arabic). Animal Production Institute has library (but not current).
- Report gives (1) table of ingredient composition (source: Animal Production Institute, MOA), (2) table entitled "Super Chicks" giving inclusion rate and vitamins/minerals contained, and (3) table "Composition of the MOA Broiler Breeder Diet"

3-20-79 Middle East Development Company (Melar Egypt) - by Day

- Day and Huttar visited Middle East Development Company (Melar Egypt) office in Heliopolis.
- Company has small feed mill in Badrashee, Giza. Company has 2 part-time nutritionists - Dr. Ahmed A. Khalil and Dr. Elataily - both teach at University.
- Melar Egypt seems to be growing company. Plan to build commercial layer operation and will soon be third party in joint venture with GPC and Ministry of Charities to form new company, also considering buying Lebanese soybean processing plant in free-zone in Alex.
- Melar Egypt manufacturers and sells only poultry feed. Greatest problem is not being able to buy sufficient quantities of high quality ingredients locally.
- Very little quality control assay work done in Egypt (by privates or govt.).

- Feeds sold in Egypt must be registered with MOA. Law requires feed to be sampled and quality checked before sold - but, in reality, this is rarely done.
- Second greatest problem - extreme difficulty in importing feed additions (all drugs, vitamins, trace minerals, amino acids, antioxidents, etc.). Must have special permission from MOH to import feed additions.
- Every foreign co. selling in Egypt must have Egyptian agent.
- Recommendations should be made to exempt non-toxic additives from MOH requirements.
- Dr. Khalil interested in least cost feed formulation using computer.

3-22-79 Visit to Alexandria Port and Lebanese Soybean Processing Plant - by Day

- Day and Huttar visited Alex. Port and Lebanese Soybean Processing Plant in free-zone in Alex. on March 12, 1979.
- Soybean processing plant 3 years old - owned by Mr. Mohamed Sinno and managed by Englishman Mr. John Kingly. Known as Al Ar Industries. Processing plant made in England, but U.S. technology employed in design - permits high quality soybean meal. Plant can process 300 tons soybean/day. Asset to Egyptian poultry prod. industry because its proximity should minimize possibility of soybean meal shortages.
- Mr. Ahmed Eid (Director of Export and Import Dept. for Alex.) conducted tour of port. His office handles paperwork for all products imported by GPC through Alex., including feedstuffs - also arranges for shipment of products to each operation via trucks (40%) and trains (60% of ag. imports).
- All feedstuffs (intact or by-products from food milling industries) produced in Egypt are under govt. control (except limestone and poultry offal).
- Report gives description of ingredient procurement structure in Egypt.

3-26-79 Visit to Melar Egypt's feed mill - by Day.

- Visited Melar Egypt's feed mill in Bradraseen, Giza with Dr. Ahmed A. Khalil.

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- Started making 4 tons/day of poultry feed in October, 1978 - presently makes 50 tons/day, and expects 100 tons/day by early 1980.
- Info. gathered on operations and equipment
- Info. re ruminant feed marketing situation was obtained - the MOI (Ministry of Industries) manufactures ruminant feeds (which are marketed by MOA via cooperatives. Unlawful for privates to make and sell ruminant feeds - they can only buy certain feedstuffs and in limited amounts.
- Melar Egypt seems to be thriving progressive company - biggest problem is obtaining high quality ingred. in quantity - worried about obtaining ingredient registrations from MOH.

3-27-79 Recommendations - by Day

Copy of 2 page report attached

3-29-79 Ismailia Mist Poultry Company - by Day

- Day and Mr. Rashid visited Ismailia Mist Poultry Company in Alexandria on March 20, 1979. Mr. Rashid is technical consultant for this firm - advises on feed mill design and construction and in future feed formulation. Dr. Elkhishen is chairman of company
- Feed mill to be under construction soon, located close to production units. Day impressed with future plans of company re feed mill design. It will be all bulk with pelleting facilities and will be a batch mill employing a horizontal mixer. 15 ton/hour mill purchased from West Germany.

5-3-79 Feed Sample Analyses - through Reid

- 7 feed samples (broiler starter GPC, turkey starter GPC, turkey grower GPC, Layers Sudan, broiler GPC, finisher mixed locally, chick starter CEOSS) analyzed by New Jersey Feed Laboratory on May 3, 1979. Samples submitted by Dr. Reid.
- Also 1 page titles "Feed Samples brought from Egypt by W.M. Reid, April, 1979" - gives sample number, type, mixed by, date of collection, farm source, and city.

5-79 Interim Report On The Poultry Feed Situation In Egypt - by PIP/Mathtech Team

- Copy of report attached

6-79 Feed and Pesticide Laboratory - by Day

- List of estimated costs of equipping feed and pesticide laboratory (equipment cost only). Includes 12 items - estimated total cost $46,000.

7-12-79 Feed Specs for Sectoral Model - by Day

- 9 Xerox pages from computer run on feed specs for inclusion in 020 sectoral model. Includes cost ($ per pounds) and adjusted cost ($ per pounds) - columns include: amount adjusted (batch weight, amount, ingredient), cost, Shadow Price, Low Range/High Range, Restriction, initial level, actual amount, amount adjusted (Batch Weight).

7-29-79 United Poultry Feed Company - by Bushong

- Bushong,Dr. Shulkamy (ARI-MOA), Dr. Radwan (ARI-MOA) and Mr. Millad Meggally (owner) visited United Poultry Feed Company (U.P.F. Co.) in Ghamra, Cairo.
- Mill is a semi-automatic, volumetric continuous line mill (drawing by Bushong attached to report).
- Meggally indicated total mill capacity was 100,000 tons/yr. - although more likely capacity is approx. 75,000 tons/yr. 1978 production was 25,000 tons (15,000 tons layers and 5,000 tons each broilers and starter growers).
- Production limited by (1) unavailability of ingredients and (2) distribution and marketing.
- Formulations given for: broiler formulas (2 different) - ingredients, % of ingredients and calculated analysis; village flock formulas - ingredients and % of diet; commercial layer feed - ingred. and % of diet; Broiler Finishing Feed - ingred. and % of diet, and calculated analysis; Fortification levels for Zoodry VM1 and Xoodry VM2' Vitamin/mineral Specifications Total Level/MT (for broilers and layers); and Rousselot S.A. Super Chicks - ingred., ingred/ton, and units.

8-79 Final Report and Summary - by Bushong

Four-page report attached.

9-79? Milestones Of Feed and Feeding (1929-1979) - by ?

- One-page sample list of major events in feed and feeding - last date 1957.

9-13-79 Feed Sample Analyses - through Day

- Twenty pages of "Certificate of Analysis" for samples collected in Egypt and submitted to New Jersey Feed Laboratory by Dr. Day of Miss. State U. - analyzed Sept. 13, 1979. Samples: Poultry offal meal (Melar, Egypt), meat meal (imported - Franco - Cairo Poultry Co.), local fish meal (United Poultry Co.), local fish meal (Melar, Egypt), local fish meal (Itino Farm), local fish meal (Feeder Co.), fish meal - herring (Itino Farm), fish meal (imported - United Poultry Feed), fish meal (imported - Cairo Poultry), fish meal (imported - Sample #2 - Melar, Egypt), fish meal (imported - Melar, Egypt), meat meal (General Poultry Co.), bone meal (Feedex), bone meal (Cairo Poultry Co.), and bone meal (Itino Farm). Five pages in summary form for moisture, protein, fat, and fiber analyses for sesame meal, rice germ meal, rice bran, cottonseed meal, soybeans toasted, soybean meal, corn gluten feed, yellow corn, fava bean, whole wheat, wheat bran, T. yeast, ground clam shell, and ground limestone.

9-14-79 Memo Re Project Team Needs For Task 055 - Day & Bushong

- Copy of Memo attached

10-79 Materials from French - Egyptian Symposium on Poultry Farming - sent by Bond to Atlanta Office.

- Symposium in Cairo Sept. 24, 25, and 26, 1979.
- Materials include bound book of presentations, containing: Optimum Economy in Day-Old Chicks Production, Prophylaxis in Poultry Farming, Poultry Breeding, <u>Mixing Poultry Feed</u>, <u>Workshop for Feeding Stuff Fabrication at the Farm</u>, <u>Mills for Producing Concentrated Animal Feed</u>, French Fowl Selection - Relations Between Research and Breeders, Poultry Farming in France, and The Protection of Poultry Farms. (Underlined titles indicate articles filed in 055 task file).

SECTION VII

060 - VILLAGE FLOCKS

Final Report by Dr. Barbara Larson 3/26/80

Final Poultry Technical Report by Lee Herrick 6/25/79

Notes on Team Reports January-September 1979

POULTRY IMPROVEMENT PROJECT FOR EGYPT

TASK 060 - VILLAGE FLOCKS

FINAL REPORT

from

Dr. Barbara K. Larson

March 26, 1980

for MATHTECH, Inc.
Atlanta, Georgia

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INTRODUCTION

This is the second part of the village flocks team report, and is based primarily on the data I have collected in two separate visits to Egypt, one in October-December 1978, the other in May-July 1979. It is to be read in conjunction with Lee Herrick's report of June 25, 1979.

The village flocks team has been charged with essentially four tasks: 1) to determine the size, importance and efficiency of village flock production; 2) to analyze its articulation with the rest of Egypt's poultry industry; 3) to provide information which can be integrated into the econometric model of Egypt's poultry industry as a whole; and 4) to assess major needs and make recommendation for improvements. The following report, in conjunction with Lee Herrick's, will seek to do just that. Inasmuch as Lee's and my work covered much the same ground, I will not in this report reiterate ground that he has already covered, but instead will seek to complement and supplement it with information on those areas where our paths of work and analysis diverged.

In general, the division of labor between us was as follows: In the fall, we both visited the same areas, trying to get a feel for the problems of village poultry production and some assessment of the size of flocks and the poultry-raising methods used. Lee was more concerned with the technical aspects of poultry-raising; I with getting a feel for the availability of poultry services, the importance of poultry to the local populace, and differences, if any, between richer and poorer households; but to a large extent our work overlapped. Together, we visited villages in the governorates of Giza, Kafr esh-Sheikh, Beni Suef, Sohag, and Aswan.

In the spring, our work diverged somewhat more. Lee went back in March and visited most of the rest of the governorates, sampling flocks all over the country and getting general data on the number of poultry projects and services available to villagers from GOE agencies, thus filling in the extensive picture of poultry production in rural Egypt. I, on the other hand, went back in May to do a more intensive study of two villages and their surrounding areas (one in Qena governorate in Upper Egypt, the other in Beheira governorate in Lower Egypt), in order to get a better idea of 1) local marketing networks, which we had not previously gathered much data on; 2) actual delivery and availability of poultry services on the local level (as opposed to what exists on paper); [illegible] and 3) differences between rich and poor as far as methods and significance of local poultry production were concerned. All of these tasks required more time in one place than had been previously available in our visits to different governorates in the fall.

As a result of these different research strategies, Lee's and my reports cover somewhat different ground. His report provides a general description and assessment of poultry-raising practices under village conditions; a statistical summary of variations in those practices for his sample; a description of native hatcheries; a general tabulation and description of GOE support services to village flocks through the country; his assessment of the major problems facing village producers; and his recommendations for improvement and change.

My report will focus on the following:

1. A statistical summary and analysis of my sample of 71 households and their flocks, broken down in each case by income level and region (Upper vs. Lower Egypt), and compared where possible with Lee's data.
2. A description of local marketing networks for poultry and eggs.
3. A detailed summary of poultry services available to Beheira villagers, and a less detailed summary for Qena, where I had lesser access to government records.
4. My assessment of problems facing local producers and my recommendations for improvement and change.

PART 1: CURRENT STATUS OF EGYPT'S VILLAGE FLOCKS

Village flocks are a significant aspect of the rural and domestic economy. Virtually every rural household (not to mention many urban households) has its household flock, on which it depends for eggs, petty cash, or to a lesser extent, meat. Median flock size for my sample is 15 chickens (over 30 days old) per household, and the median number of chicks bought per year is 40, but these figures vary considerably by income level and region, as my subsequent analysis will show. In general, most village flocks (76%) come from the native hatchery or are hatched at home; they are raised by housewives and kept indoors, usually on roofs or in courtyards, where they often share quarters with the family livestock. Most households (63%) also have some turkeys, ducks, geese, or pigeons. Mostly they are fed on grain and table scraps; often some grain is bought for them but rarely balanced feed. In general, mortality is high (the average is 45.8%) and vaccination erratic (59% of the households vaccinate).

However, these broad generalizations are in a sense meaningless, for they obscure some important differences between Upper and Lower Egypt and between rich and poor. For those, it is necessary to look at the more detailed analysis below. In general, I have tried to analyze the data in as many different ways as possible, in order to extract the maximum amount of information and facilitate integration of this material with other material from the project.

I. SIZE OF VILLAGE FLOCKS

The following tables represent various ways of trying to get at village flock size. They are based on only the data which I personally have collected, first in my brief visits to various governorates in the fall of 1978; then in my somewhat longer visits to villages in Qena and Beheira governorates in June and July, 1979. In addition to my data summaries, I include the raw data figures as well, to facilitate the task of integrating them with Lee Herrick's data. Where possible, I have broken down the data by income level, using as my criteria of Rich (R), Well Off (WO), Middle (M) and Poor (P) a collapsing of the different levels singled out in Table Four of Susan Randolph's "Working Paper Number Two: The ORDEV 116 Village Survey", October 1978, p. 23, which classifies rural households in terms of both average expenditures and source of income (see Table IV below).* I also have drawn comparisons between Upper and Lower Egypt, to see if that is a significant variable where poultry is concerned. My findings are as follows:

A. The average number of chicks bought per year is 58; the median 40.

However, more important is the variation by income level and by region (see Tables I and II). In general, wealthier households buy more chicks per year than do poorer households (the middling households are somewhat of an anomaly in this respect), and more importantly, within each

---

* Since Susan Randolph's paper also contains information on what per centage of the rural population is in each of these income categories (see pp. 32 and 38 particularly), one should be able to utilize this information to arrive at a reasonable figure for the amount of chickens in village flocks as a whole. I believe Mathtech does have a copy of Randolph's paper.

Table I: AVERAGE NO. OF CHICKS BOUGHT/YEAR: A SUMMARY*

Income Levels	-Q,B	(N)	+Q,B	(N)	Lower Egypt Only	(N)	Upper Egypt Only	(N)
Rich	116	(6)	110	(10)	180	(4)	63	(6)
Well-Off	96	(7)	68	(20)	92	(10)	44	(10)
Middling	24	(4)	29	(16)	36	(5)	26	(11)
Poor	48	(8)	47	(22)	62	(4)	43	(18)
All Together	71	(25)	58	(68)	89	(23)	42	(45)

Table II: MEDIAN NO. OF CHICKS BOUGHT/YEAR*

Income Levels	+Q,B	(N)	Lower Egypt Only	(N)	Upper Egypt Only	(N)
Rich	100	(10)	200	(4)	66	(6)
Well-Off	48	(20)	70	(10)	34.5	(10)
Middling	25	(16)	25	(5)	24	(11)
Poor	50	(22)	70	(4)	37	(18)
All Together	40	(68)	64	(23)	33	(45)

* N = no. of households in the sample.
Q,B = data on Qena & Beheira governorates.

The figures exclude the 3 (out of a total of 71) households which buy more than 300 chicks/year. For the totals including these 3 households, or for a more detailed breakdown of the data, see Table III: No. of Chicks Bought/Year. It also excludes the 1 household for which income level has not been established.

TABLE III: NO. OF CHICKS BOUGHT PER YEAR*

INCOME LEVELS	VILLAGES & GOVERNORATES: LOWER EGYPT				UPPER EGYPT						NO. OF HOUSEHOLDS (N)**
	Mit Rahina (Giza)	Qibrit (Kafr es-Sheikh)	Sharnub (Beheira)	Farnawa (Beheira)	Ibshenna (Beni Suef)	Saadallah (Sohag)	Dar es-Salaam (Aswan)	Shutb (Aswan)	Bahgoura (Qena)	Awlad Negm (Qena)	
Rich	200	200 120		200 1040	13 90		72		100 45 60 ?		N = 11
Well-Off	125 350 100 @	220	0 30 30 80	200 60 50 20	33	100	48 48		? 30	20 350 16 36 0 30 80	N = 22
Middling		25	24 44 0 64	24	23	0 24		22	37 35 20 40 18 24 18	25	N = 16
Poor	60 85	24 @	80	0	50 @ 50 30 10	30 33 11		150	100 10 11 25 30	50 50 50 40 50	N = 22
Class unknown									10		Total N = 72**

* Each entry represents a separate household.** Households which buy no chicks are not included in the totals.

@ = Households which buy no chicks.

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TABLE FOUR *

STRATIFICATION OF WELFARE BY SOURCE OF INCOME

	SOURCE OF INCOME	POVERTY CRITERIA: Combined Index Rank	Combined Index Score	Average Expenditures, LE Rank	Average Expend.	Average Expenditures, LE Score	% less than LE 100 Rank	%<LE 100	% less than LE 100 Score	% less than LE 300 Rank	%<LE 300	% less than LE 300 Score
Poor	Other Sources	1	0.073	1	LE 137.7 ([illegible]	0	1	54.4	0	2	87.4	.073
	Agricultural Wage Labor	2	1.048	2	LE 151.0 ([illegible]	.022	2	26.5	.513	1	93.7	0
	Farm Operators of less than 1 feddan	3	1.542	3	LE 187.0 ([illegible]	.081	4	17.2	.684	3	85.7	.093
Middling	Self-employed	4	1.740	6	LE 256.0 ([illegible]	.194	3	18.5	.660	5	74.2	.226
	Non-Agricultural Wage Labor	5	2.106	5	LE 243.8 ([illegible]	.174	5	9.2	.831	6	70.4	.270
	Farm Operators of 1 to 2.99 feddans	6	2.146	4	LE 238.2 ([illegible]	.165	6	6.6	.879	4	74.5	.223
Well-Off	Farm Operators of 3 to 4.99 feddans	7	2.458	7	LE 290.7 ([illegible]	.251	7	5.9	.892	7	57.2	.423
	Farm Operators of 5 to 9.00 feddans	8	2.894	8	LE 377.1 ([illegible]	.393	8	5.2	.904	8	34.0	.693
Rich	Farm Operators of 10 or more feddans	9	4.000	9	LE 747.6 ([illegible]	1.000	9	0.0	1.000	9	7.5	1.000

Notes: The higher the rank the greater the welfare
The higher the index score the greater the welfare

* Reproduced from Susan Randolph's "Working Paper Number Two: The ORDEV 116 Village Survey," October 1978, p. 23. The collapsing of her categories into Rich, Well-Off, Middling, and Poor is mine. It should be noted that 300LE/year per household is considered the minimum amount necessary to meet subsistence needs. Therefore, every household above that amount I have put into the Well-Off category. Assignment of households to category is based on my estimate from their combined information on occupation, land-holdings, and wages.

TABLE V*

IV. RANKING GOVERNORATES BY LEVEL OF CONSUMPTION EXPENDITURES

The 116 Village Survey also permits us to rank the Governorates by consumption expenditures when total averages are taken from the data comparing educational status to consumption by governorate. The criterion of poverty used here will be the average household expenditures of the Governorate. (See Note 7). The results are as follows:

Governorate	Rank*	AverageExpend LE/Year
Domiat	1	139.8
Quena	2	157.2
Dakahlia	3	181.0
Assiut	4	186.4
Aswan	5	189.3
Souhag	6	194.5
Gharbeya	7	197.8
El Wadi El Gedeed	8	217.3
Beheira	9	222.2
Menya	10	222.8
Beni Suef	11	224.3
Sharkia	12	236.4
Menoufia	13	238.2
Kalyoubia	14	272.6
Fayoum	15	273.0
Kafr El Sheikh	16	285.5
Guiza	17	329.3

* the lower the rank, the lower the average expenditures and hence the greater the poverty

Table Seven on page 31 presents the results in the form of a frequency distribution plot. It can be seen that there are three major divisions grouping Governorates. Domiat and Quena fall in the very poor group. Kalyoubia, Fayoum, Kafr El Sheikh and Guiza fall within the wealthiest group with Guiza substantially wealthier than all other Governorates. (See Note 8)

* Reproduced from Susan Randolph's "Working Paper Number Two: The ORDEV 116 Village Survey," October 1978, p. 30.

income level Lower Egyptians buy significantly more chicks each year than do Upper Egyptians. This trend is further exaggerated by the fact that Lower Egyptian villages are in general wealthier than Upper Egyptian villages (see Table V above).

B. Average flock size calculated on the basis of the number of chickens over one month of age at the time of interview is 27; the median is 15. But again, there are significant differences according to income level and region (see Tables VI and VII).

TABLE VI: AVERAGE NO. OF CHICKENS OVER 30 DAYS OLD AT TIME OF INTERVIEW*

Income Levels	-Q,B	(N)	+Q,B	(N)	Lower Egypt Only	(N)	Upper Egypt Only	(N)
Rich	66	(6)	60	(8)	80	(5)	28	(3)
Well-Off	42	(9)	32	(21)	40	(13)	19	(8)
Middling	17	(5)	20	(15)	24	(5)	17	(10)
Poor**	14	(9)	11	(16)	18	(3)	9	(13)
All Together	34	(29)	27	(60)	42	(26)	15	(34)

TABLE VII: MEDIAN NO. OF CHICKENS OVER 30 DAYS OLD AT TIME OF INTERVIEW*

Income Levels	-Q,B	(N)	+Q,B,	(N)	Lower Egypt Only	(N)	Upper Egypt Only	(N)
Rich	36½	(6)	36½	(8)	60	(5)	35	(3)
Well-Off	30	(9)	20	(21)	25	(13)	12	(8)
Middling	3	(5)	16	(15)	12	(5)	15½	(10)
Poor **	13	(9)	11	(16)	17	(3)	11	(13)
All Together	20	(29)	15	(60)	21	(26)	11	(34)

* N = no. of households in the sample.
Q,B = data on Qena and Beheira governorates.

** Includes the 1 household whose income level is unknown, but is presumed poor.

C. Another way of calculating village flock size is by calculating the number of surviving chicks/year. (See Team 060's January 1979 interim report for the rationale for doing this.) This figure represents the number of chicks bought and/or hatched per year minus the number which have died. As such, it does not correspond exactly to the number of chickens at any given moment, for additional chickens may have been removed by slaughter. But it does have the advantage of leveling out differences in flock sizes due to seasonal variations in buying and consumption patterns. By this calculation, the average number of surviving chicks/year is 43 and the median is 25, but as with the number of chicks bought/year, there are significant variations with level of income and region (see Tables IX and X).

TABLE IX: AVERAGE NO. OF SURVIVING CHICKS/YEAR *

Income Levels	-Q,B (N)	+Q,B (N)	Lower Egypt Only (N)	Upper Egypt Only (N)
Rich	103.6 (6)	87.6 (12)	122 (5)	63 (7)
Well-Off	72.0 (8)	53.2 (19)	73 (10)	31 (9)
Middling	21.7 (5)	19.8 (16)	21 (5)	12 (11)
Poor	30.2 (11)	22.3 (20)	30 (7)	18 (13)
All Together	55.2 (30)	42.8 (67)	65.6 (24)	29.3 (43)

TABLE X: MEDIAN NO. OF SURVIVING CHICKS/YEAR *

Income Levels	-Q,B (N)	+Q,B (N)	Lower Egypt Only (N)	Upper Egypt Only (N)
Rich	97 (6)	71.5 (12)	124 (5)	69 (7)
Well-Off	60 (8)	35 (19)	42 (10)	25 (9)
Middling	14 (5)	17.5 (16)	20 (5)	16 (11)
Poor	31 (11)	14.5 (20)	33.5 (4)	12 (16)
All Together	44 (30)	25 (67)	35 (24)	20 (43)

* These figures exclude the 3 (out of 71) households which buy more than 300 chicks per year, and also omits those households where no chicks survived. The figures for Qena & Beheira do not include chicks hatched at home. The household whose income level is not well established is also excluded.

TABLE VIII: NO. OF CHICKENS OVER 30 DAYS OLD AT TIME OF INTERVIEW*

VILLAGES AND GOVERNORATES

B

INCOME LEVELS	LOWER EGYPT					UPPER EGYPT						NO. OF HOUSEHOLDS (N)**
	Abis	Mit Rahina (Giza)	Qibrit (Kafr es-Sheikh)	Sharnub (Beheira)	Farnawa (Beheira)	Ibshenna (Beni Suef)	Saadallah (Sohag)	?Dar es-Salaam (Aswan)	Shutb (Aswan)	Bahgoura (Qena)	Awlad Negm (Qena)	
Rich		200	80 29		60 30	35 38		11		? ? ? ?		N = 8
Well-off	20?	46 32 11 -	179	13 10 30 40	100 10 25 13	10	50	13 30		- 11	10 - 5 = 20 ?	N = 21
Middling			3	12 10 22 -	74	50	6 1		25	15 16 - 6 16 13 25	?	N = 15
Poor		17 32	- @	5	?	4 @ 13 - 5	16 12 5		20?	? 3 11 5 ? 11	11 1 - ? ?	N = 16
Class unknown, presumed poor												
											Total	N = 60

* Each entry represents a separate household.

** Only households which had chickens over 30 days old at the time of interview are included in the tally of households, though those which had no such chickens or for which information was lacking are indicated in the Table by - or ?.

@ = Keep no chickens.

TABLE XI: NO. OF SURVIVING CHICKS/YEAR*

VILLAGES AND GOVERNORATES

INCOME LEVELS	LOWER EGYPT					UPPER EGYPT						NO. OF HOUSEHOLDS (N)**
	Abis	Mit Rahina (Gaza)	Qibrit (Kafr es-Sheikh)	Sharnub (Beheira)	Farnawa (Beheira)	Ibshenna (Beni Suef)	Saadallah (Sohag)	Dar es-Salaam (Aswan)	Shutb (Aswan)	Bahgoura (Qena)	Awlad Negm (Qena)	
Rich		200	120 124		135 30	34.5 69		74		100 40? 55? 70?		N = 12
Well-Off	44	101 315 87.5	170	? 0 30 40	200 16 25 16	25	75	30 44		0 20	20 - - 7 ? 20 40	N = 19
Middling			20	17 28 15 -	24	58.5	13 3		14	15 28 - 4 18 16 18	25	N = 16
Poor		52 55	19 @	10	?	20 @ 42 15 10	34 47 11		31	60 2 7 13 8	11 1 - ? 1	N = 20
Class unknown, presumed poor										10		N = 1
											Total	N = 68

* Each entry represents a separate household.

** Only households which had surviving chickens are included in the tally of households, though those with no surviving chickens or for which there is not adequate information are indicated in the table. The one household with more than 300 surviving chicks is also omitted from the final N.

@ = Keep no chickens.

TABLE XII: AVERAGE AND MEDIAN FLOCK SIZES BY VILLAGE

Rural Prosperity Rank of Gov'ate[2]	Village	Sample Size	Surviving Chicks Per Year: Av. Flock Size	Surviving Chicks Per Year: Median Flock Size	% of Sample Which Are Rich, or Well-Off[1]
17 (Giza)	Mit Rahina	6	99	88	67%
16 (Kafr el-Sheikh)	Qibrit	5	89.8	124	50%
11 (Beni Suef)	Ibshenna	8	34.3	30	37.5%
9 (Beheira)	Farnawa	8	46	31	75%
9 (Beheira)	Sharnub	9	18	16	44%
6 (Sohag)	Saadallah	6	30.5	23.5	17%
5 (Aswan)	Dar es-Salaam	3	49.3	44	100%
5 (Aswan)	Shutb	2	22.5	22.5	0%
2 (Qena)	Bahgoura	18	24	18	32%
2 (Qena)	Awlad Negm	11	16	20	54%
?	Abis	1	44	44	100%

Note: Figures exclude the 3 households which buy more than 300 chicks per year.

[1] See Table IV for definitions.

[2] See Table V for complete rankings.

D. Summary of Data on Flock Size

1. Flock Size by various measures is as follows:

Indicators	Average	Median
No. of chicks bought/year	58	40
Flock size (over 30 days old) at interview	27	15
No. of surviving chicks/year	42.8	25

This compares with Lee Herrick's sample as follows:

He says most flocks have 5-20 chickens of all ages.

26% of his sample had more than 50 chickens. In my sample 13.3% of the households had more than 50 chickens 30 days old or more; 27.5% had more than 50 chickens survive per year.

2. Variation by Income Level

While richer individuals buy, have, and have survive substantially more chickens than do poorer individuals, the correlation does not hold for the bottom rungs of the economic ladder. Poor households frequently buy and have survive more chickens than do households at a middling economic level, though they did not have more chickens over 30 days old at the time of interview. This may suggest that the poor put greater reliance on poultry products for protein and petty cash than those who are a little better off.

3. Variations Between Upper and Lower Egypt

In general and at almost every income level Lower Egyptians buy, have, and have survive twice as many chickens as do Upper Egyptians. In other words, Lower Egyptian flocks are twice the size of those in Upper Egypt.

Indicators of Flock Size	Average		Median	
	Low Eg.	Up Eg.	Low Eg.	Up Eg.
No. of chicks bought/year	89	42	64	33
Flock Size (over 30 days old)	42	15	21	11
No. of surviving chicks/year	66	29	35	20

II. SOURCE OF SUPPLY OF CHICKS (See Table XIII for more detail)

Source	% of Flocks from that Source	
	BKL sample	LH sample
Home-hatched	15%	20%
Native hatchery	60.6%	53%
Government	21.7%	26%
Private	1.3%	1%

There was no real variation by income level or region.

TABLE XIII: SOURCE OF SUPPLY OF CHICKS[1]
(By region and income level)

Income Level	(N)	h*	n	m	other(mixed)
Rich	(11)	2 (18%)	9 (82%)	0	0
Well-Off	(27)	5 (19%)	20 (74%)	1 (4%)	1 (4%)
Middling	(19)	5 (26%)	14 (74%)	0	0
Poor	(21)	5 (24%)	16 (76%)	0	0
Combined	(78)	17 (21.7%)	59 (75.6%)	1 (1.3%)	1 (1.3%)
Region					
Lower Eg.	(36)	8 (22.2%)	26 (72.2%)	1 (2.8%)	1 (2.8%)
Upper Eg.	(42)	9 (21.4%)	33 (78.6%)	0	0

Note: On the basis of other data on page 33, the total for n can be further broken down into 15% home-hatched; 60.6% supplied by native hatcheries.

Key: h = government supplied
n = native hatchery or home-hatched
m = private mechanical hatcheries

1 See Table XIX for raw data on which this summary is based.

* The category h here includes both village rearing houses (r) and Agrarian Reform projects (AR), since both are government supplied. It also includes the 3 out of 4 mixed flocks which have some government-supplied chicks, leaving only 1 flock in the other(mixed) category.

III. TURKEYS, DUCKS, AND GEESE

A. Average size of the combined flock of turkeys, ducks, and geese for those households which have them is 14.2; the median is 6. Lee Herrick's report suggests that most households have 7-20.

B. Variation by Income Level

There is some variation as expected with wealth: Wealthier households tend to have more turkeys, ducks, and geese; but in general the differences are not systematic. (See Table XV.)

C. Variation by Region

There is a marked difference between the number of households having some turkeys, ducks or geese in Upper and Lower Egypt.

1. In Lower Egypt, all but 1 (97%) of the 29 households had some turkeys, ducks, or geese. In Upper Egypt, 50% or less (only 35% for the poor) had some. In other words, proportionally twice as many Lower Egyptians as Upper Egyptians have some turkeys, ducks, or geese.

TABLE XIV: COMBINED NO. OF TURKEYS, DUCKS*, & GEESE/HOUSEHOLD

VILLAGES AND GOVERNORATES

INCOME LEVELS	LOWER EGYPT: Abis	Mit Rahina (Giza)	Qibrit (Kafr es-Sheikh)	Sharnub (Behéira)	Farnawa (Beheira)	UPPER EGYPT: Ibshenna (Beni Suef)	Saadallah (Sohag)	Dar es-Salaam (Aswan)	Shutb (Aswan)	Bahgoura (Qena)	Awlad Negm (Qena)
Rich		17	10 2		150 150	39 5		0		6 0 0 15+	
Well-Off	3	1 30 6 3	10	? 15 16 9	1 8 20 5	13	10	0 2		0 0	0 0 0 0 9 8 3
Middling			21	3 13 22 2	14	5	2 0		3	6 8 0 0 0 5 0	0
Poor		10 4	0 2	1	30	5 0 4 0 0 5	4 7 0	3	0 0 0 0 0	0 3 0 0 0	
Unknown									9		

SUMMARY	Lower Egypt	Upper Egypt
Flock Size		
% with 0	0%	50%
Size of remaining:**		
Average	65.8	20
Median	17	15+
% with 0	0%	54%
Size of remaining:		
Average	9.8	7.5
Median	9.8	8
% with 0	0%	50%
Size of remaining:		
Average	12.5	4.8
Median	13.5	5
% with 0	17%	65%
Size of remaining:		
Average	9.4	4.4
Median	4	4.5

Totals:
Average = 14.2
Median = 6.0

* Ducklings not included in sample.

Note: Averages and medians are taken only on those households which have some turkeys, ducks, or geese.

TABLE XV: COMPARISON OF UPPER AND LOWER EGYPT ON COMBINED NO. OF TURKEYS, DUCKS,* AND GEESE/HOUSEHOLD

Size of Combined Flock	Lower Egypt (N = 30)	Upper Egypt (N = 52)
0	1 (3%)	29 (56%)
1-10	17 (57%)	20 (38%)
11-150+	12 (40%)	3 (6%)

Income Levels	SIZE OF COMBINED FLOCK@ Average Lower Eg.	Average Upper Eg.	Median Lower Eg.	Median Upper Eg.	Combined Totals Average	Combined Totals Median
Rich	17	20	17	15+		
Well-Off	9.8	7.5	8	8		
Middling	12.5	4.8	13.5	5		
Poor	9.4	4.4	4	4.5		
Class unknown		9.0		9.0		
Total	19.9	7.6	10	5	14.2	6.0

* Ducklings not included in sample.

@ Figures exclude those with no turkeys, ducks, or geese.

TABLE XVI: SUMMARY DATA ON COMBINED NO. OF TURKEYS, DUCKS,* & GEESE/HOUSEHOLD

No. of Households in Each Flock Size Category

LOWER EGYPT

Combined no. of turkeys, ducks, geese	Rich (N = 5)	Well-Off (N = 13)	Middling (N = 6)	Poor (N = 6)	Total (N = 30)
0	0 (0%)	0 (0%)	0 (0%)	1 (17%)	1 (3%)
1-5	1 (20%)	5 (38%)	2 (33%)	3 (50%)	11 (37%)
6-10	1 (20%)	4 (31%)	0 (0%)	1 (17%)	6 (20%)
11-15	0 (0%)	1 (8%)	2 (33%)	0 (0%)	3 (10%)
16-20	1 (20%)	2 (15%)	0 (0%)	0 (0%)	3 (10%)
21-40	0 (0%)	1 (8%)	2 (33%)	1 (17%)	4 (13%)
150+	2 (40%)	0	0	0	2 (7%)

UPPER EGYPT

Combined no. of turkeys, ducks, geese	Rich (N = 6)	Well-Off (N = 13)	Middling (N = 12)	Poor (N = 20)	Total (N = 52)
0	3 (50%)	7 (54%)	6 (50%)	13 (65%)	29 (56%)
1-5	0	2 (15%)	4 (33%)	6 (30%)	12 (23%)
6-10 1 (100%)@	1 (33%)	3 (23%)	2 (17%)	1 (5%)	8 (15%)
11-15	0	1 (8%)	0	0	1 (2%)
16-20	1 (33%)	0	0	0	1 (2%)
21-40	1 (33%)	0	0	0	1 (2%)
150+	0	0	0	0	0

* Ducklings not included in sample.

@ Income level unknown.

2. As far as size of the combined flocks is concerned, in those households which have them, the averages show Lower Egyptians having larger flocks than Upper Egyptians in every income level, but the medians are roughly the same, except at the middling income level.

IV. MORTALITY (See Tables XVII-XIX)

A. General

1. Average mortality is 45.8%
2. Median mortality is 37.5%

This compares with Wiens'and Foster's 9/10/79 estimate of 40% or less.

However, it varies considerably from Herrick's figures:

% of flocks with	LH sample	BKL sample
more than 50% mortality	19%	35.4%
10-50% mortality	39%	48.1%
less than 10% mortality	42%	16.5%

B. Variation Between Vaccinated and Unvaccinated Chickens

As might be expected, there is a major difference in mortality between vaccinated and unvaccinated chickens.

	Vaccinated	Unvaccinated
Average mortality	29%	64.6%
Median mortality	20%	72.5%

59% of all households sampled do vaccinate their flocks. This compares with Herrick's figure of 62%.

C. Variation by Income Level

Mortality rates are roughly similar across all income levels, if we control for vaccination, but there are expected differences in the percentage of households which vaccinate. The poorer the household, the less likely to vaccinate. Only 35% of the poor vaccinate.

TABLE XVII: MORTALITY FIGURES FOR VILLAGE FLOCKS

AVERAGE MORTALITY	-Q,B	(N)	+Q,B	(N)	Lower Egypt Only	(N)	Upper Egypt Only	(N)
All*	32.8%	(33)	45.8%	(79)	40.5%	(35)	49.9%	(44)
Vaccinated**	18.0%	(18)	29.0%	(42)	28.9%	(26)	29.3%	(16)
Unvaccinated	38.6%	(12)	64.6%	(30)	71.0%	(8)	62.2%	(22)
MEDIAN MORTALITY								
All*	20.0%	(33)	37.5%	(79)	23.0%	(35)	39.0%	(44)
Vaccinated**	13.0%	(18)	20.0%	(42)	22.0%	(26)	17.0%	(16)
Unvaccinated	35.5%	(12)	72.5%	(30)	79.0%	(8)	60.0%	(22)

TABLE MORTALITY FIGURES FOR VILLAGE FLOCKS BY INCOME LEVEL

INCOME LEVELS	VACCINATED** %	(N)	UNVACCINATED %	(N)
Rich	29.6%	(6)	63.0%	(2)
Well-Off	34.0%	(21)	70.4%	(9)
Middling	14.2%	(10)	65.6%	(9)
Poor	36.5%	(5)	58.7%	(10)
		(42)		(30)

* All includes those where it is not known if the flock is vaccinated or not.

** Vaccinated does not include those flocks which were vaccinated only after illness was diagnosed.

Note: N = no. of flocks in the sample; Q & B stand for Qena & Beheira governorates.

Tally by income level does not include the 1 household whose income level was uncertain.

TABLE MORTALITY FIGURES FOR VILLAGE FLOCKS - DISAGGREGATED

by VILLAGES AND GOVERNORATES

	LOWER EGYPT						UPPER EGYPT					
INCOME LEVELS	Abis	Mit Rahina (Giza)	Qibrit (Kafr es-Sheikh)	Sharnub (Beheira)	Farnawa (Beheira)	Ibshenna (Beni Suef)	Saadallah (Sohag)	Dar es-Salaam (Aswan)	Shutb (Aswan)	Bahgoura (Qena)	Awlad Negm (Qena)
Rich		0%hm+	40%n+ 16.7%n+		10%n+ 100%n+ 100%n- 25%h-	0%h+ 50% n?		11.1%n+		? ? ? ?	
Well-Off	12.5%n+	16.7%n+ 24.5%n+ 16%n+ 10%h+ 12.5%?+	25%n+	50%h+ 100%n- 0%m+ 50%n+	0%mn+ 20%n+ 100%n+ 50%n,AR** 20%n+ 100%n+	44.4%n+	57%n-	37.5%n- 8.3%n-		100%*- 33%r+	100%r+ 100%n- 100%n-** 81%n- 33%n+ 50%n+
Middling			20%n+	0%n+ 58%n+ 36%n+ 70%h- 100%n-	0%n+	8%?+ 45%n?	13.3%n- 87.5%n-		36.4%n-	60%n- 20%r+ 100%n- 90%n- 0%r+ 33%n- 0%AR+	0%r+
Poor		13.3%h+ 35.3%nh-	100%n? @	87.%%n-	?h	60%n- @ 20%h+ 50%n+ 0%h+	33%n- 0%n- ?n-		77.8%n-	40%n? 80%n- 36%*- 50%n? 75%n?	78%n- 98%n+ 100%n? ??+ 100%n-** ?
Class unknown, presumed poor										0%?+	

N = 79

Symbols used:

+ = vaccinated; - = unvaccinated.

Letters refer to source of chicks: h =govt.hatched; m = mechanical hatcher; n = native hatchery; r = rearing house, village project; AR = Agrarian Reform.

* = chicks obtained from a neighbor.

** = vaccinated after chicks ill; recorded as no vaccination.

Bracketed percentages come from different batches of chicks in same household. Otherwise each entry represents a different household.

@ = Keep no chickens.

TABLE XX: PERCENTAGE OF FLOCKS VACCINATED

(By Income Level and Region)

Income Level	Lower Egypt	(N)	Upper Egypt	(N)	Combined	(N)
Rich	71%	(7)	100%	(2)	78%	(9)
Well-Off	94%	(17)	42%	(12)	72%	(29)
Middling	71%	(7)	42%	(12)	53%	(19)
Poor	33%	(3)	36%	(14)	35%	(17)
Total	79%	(34)	42.5%	(40)	59%	(74)

TABLE XXI: MORTALITY FIGURES BY SOURCE OF SUPPLY OF CHICKS

Average Mortality	Govt. Source	(N)	Native Source	(N)
Vaccinated	18.9%	(13)	38.7%	(24)
Unvaccinated	47.5%	(2)	67.5%	(26)
Median Mortality				
Vaccinated	10.0%	(13)	29.0%	(24)
Unvaccinated	47.5%	(2)	79.5%	(26)

D. Variation by Source of Supply of Chicks

When vaccination is controlled for, government-supplied chicks have roughly 20% less average mortality than do native hatchery supplied chicks (see Table XXI), but in either case mortality is cut roughly 30% by vaccination. Whether the lower mortality for government-supplied chicks is due to better breeds, or to the likelihood that government chicks are either older and/or already vaccinated by the time they are sold is yet to be determined.

E. Variation by Region

There is no systematic difference in mortality rates between Upper and Lower Egypt if we control for vaccination, but Lower Egyptians are more likely to vaccinate their chickens (79% vs. 42%). However, since Lower Egyptian households are generally wealthier than Upper Egyptian (66% of my Lower Egyptian sample was rich or well-off compared with 37% of the Upper Egyptian sample), and wealthier families vaccinate more, the regional difference here may be simply a function of wealth.

An alternative explanation might be that it is due to the lesser availability of poultry services in Upper Egypt, but in the absence of data on the number and distribution of veterinarians in each governorate, it is difficult to make such a case. Indeed, if one looks at Table XXIII on the Distribution of Poultry Services (which admittedly is not too reliable, for it is based on government-supplied tallies that were available in the Mathtech office in June, 1979 and need to be updated), on a per unit of population basis, it does not appear that Upper Egypt is systematically underserviced in all respects. Lower Egypt does have a relatively higher number of Extension workers, incubators, and extension breeding units per unit of population, while Upper Egypt has more native hatcheries (though I have not controlled for capacity). However, they have proportionally equal numbers of poultry extension villages and veterinarians in regional diagnostic labs (though we do not know how many of the latter deal with poultry). They also have proportionally equal numbers of feed mills, but this misrepresents the evidence somewhat, since Lower Egyptians may have access to the feedmills in Cairo and Alexandria.

TABLE XXII: INCOME LEVELS OF HOUSEHOLDS IN THE SAMPLE

Income Level		Lower Egypt		Upper Egypt		Herrick's Sample
Rich	11 (15%)	5	(20%)	6	(13%)	28% Luxury
Well-Off	22 (31%)	11	(44%)	11	(24%)	44% Medium
Middling	16 (23%)	5	(20%)	11	(24%)	
Poor	22 (31%)	4	(16%)	18	(39%)	28% Poor
Total No. of Households	(71)	25		46		

TABLE XXIII: DISTRIBUTION OF POULTRY SERVICES BY GOVERNORATE[1]

Governorate	Population (1976 Census) 36,656,000	h.h. expend. Rank (See Table IV)	h.h. expend. LE/yr.	EXTENSION Agents	EXTENSION Agents/1000 Villages Pop. (Approx.)	EXTENSION Breed. Units	Incubators (& Feed Mills*)	Supply 1-day Chicks	No. of Native Hatcheries	Vets in MOA Diag. Labs
Cairo	5,084,000				-		5 GPC*			
Alexandria	2,319,000			24	1/100	5	GPC*	MOA	2	9
Port Said	263,000			3	1/90					new
Suez	194,000			2	1/100					
Ismailia	352,000			40	10/90				4	7
Beheira	2,545,000	9	222.2	357	14/100	25	3 Ext.		63	4
Damietta	557,000	1	139.8	43	2/100	3		MOA	9	4
Kafr el-Sheikh	1,403,000	16	285.5	147	11½/100	23	4	2 Ext. 2 MOA	34	7
Gharbia	2,294,000	7	197.8	206	9/100	30	7	MOA,GOV	63	8
Dakahlia	2,733,000	3	181.0	265	7/100	42	3	3 Ext. ORDEV	59	9
Sharqia	2,621,000	12	236.4	291	10/90	51	7	3 Ext. MOA	51	19
Minufia	1,711,000	13	238.2	406	25/100	22	7	3 Ext.	23	7
Kalyubia	1,674,000	14	272.6	134	8/100	32	3	1 Ext.** MOA	21	new
Giza	2,419,000	17	329.3	11	4/100	18	3	1 Ext. MOA	34	9
Fayoum	1,140,000	15	273.0	98	9/100	20	6	2 Ext. MOA	43	7
Beni Suef	1,109,000	11	224.3	167	15/100	15	7	MOA	35	new
Minia	2,056,000	10	222.8	15	Inc.	30		1 Ext. MOA,ORD	88	6
Asyut	1,695,000	4	186.4	137	8/100	21		1 Ext.	97	12
Sohag	1,925,000	6	194.5	151	8/100	27		GOV	22	7
Qena	1,706,000	2	157.2	13	.8/100	20		MOA,ORD	38	2
Aswan	620,000	5	189.3	41	7/100	19		Ext.* GOV	12	2
Red Sea	56,000									
New Valley	57,000	8	217.3	1	2/100			ORDEV		
Matruh	113,000			1	1/100			MOA,ORD		
Sinai	10,000									

1 Based on data available June, 1979. Much is inaccurate & needs updating.
* Each * = 1 feed mill.

One might also argue that though the number of services may be proportionally equal, they are more accessible in Lower Egypt, because of the lesser distances involved. Lower Egyptian villagers also have the possibility of taking advantage of poultry services in Cairo and Alexandria. However, these kinds of benefits would generally be more available to wealthier villagers who have the means (e.g., transportatinn) to take advantage of them.

It is also possible that Lower Egypt gets a bettter quality of service than Upper Egypt. Since the primary providers of services to the villagers are often recent graduates, and most recent graduates prefer to be assigned to Lower than to Upper Egypt, Upper Egypt may have more of a problem with turnover of personnel, though I have no statistics to back this assertion up.

However, given the close correspondence between the mortality rates and income levels for Upper and Lower Egypt, it seems to me that the effect of income levels on the tendency to vaccinate offers the best explanation of the different mortality rates in Upper and Lower Egypt.

F. Inclusion of the Qena and Behaira Sample

It should be noted that the inclusion of the data from Qena and Beheira substantially increases the mortality rates for the sample as a whole, both for vaccinated and unvaccinated flocks. Why mortality should be higher in these governorates is not exactly clear. It does not seem to be a product of either poverty or region per se.(See Table XXIV). Since the data was collected in the heat of the summer, it is conceivable that the higher mortality rates are a function of

seasonal variations. But if climatic factors were responsible, one would also expect the mortality rate to be higher in Upper Egypt, which is not the case if one controls for vaccination.

TABLE XXIV: SUMMARY OF DATA ON QENA AND BEHEIRA GOVERNORATES

		QENA		BEHEIRA	
		Bahgoura	Awlad Negm	Sharnub	Farnawa
Surviving Chicks/ Year:	Average	24	16	18	46
	Median	18	20	16	31
No. of Chicks Bought/year	Average	36	41*	50	89
	Median	30	40	40	45
Mortality	Average	45%	74%	59%	41%
	Median	40%	81%	50%	55%
No. & % of Households by Income Level	Rich	4 (21%)	0 (0%)	0 (0%)	2 (25%)
	Well-Off	2 (11%)	7 (54%)	4 (44%)	4 (50%)
	Middling	7 (37%)	1 (6%)	4 (44%)	4 (12½%)
	Poor	5 (26%)	5 (40%)	1 (12%)	1 (12½%)
	Unknown	1 (5%)			
	Total(49)	19	13	9	8

* Excludes the 1 household which buys more than 300 chicks/year.

V. OTHER FINDINGS

A. Home Hatching

1. 80% of the households for which there is information do some home hatching cf chickens; there is not much difference between Lower and Upper Egypt (85% vs. 75%).

2. On the basis of my fall sample (32 households), 14% of the chickens in current flocks were home hatched.

3. I do not have comparable data on Beheira and Qena for the question was not pursued in detail. However, 4 (16%) of the 24 households questioned on this matter had home hatched chickens in their flocks, and none of the remaining 25 households indicated that any of their current chickens were home hatched, when questioned about the source of those flocks.

4. In general, more rich households than poor households do some hatching at home, as indicated below:

TABLE PERCENTAGE OF HOUSEHOLDS WHICH DO SOME HOME HATCHING OF CHICKS

Income Level	Lower Egypt	(N)	Upper Egypt	(N)	Combined Figures	(N)
Rich	100%	(3)	100%	(4)	100%	(7)
Well-Off	89%	(9)	60%	(5)	79%	(14)
Middling	80%	(5)	75%	(8)	77%	(13)
Poor	67%	(3)	71%	(7)	70%	(10)
Total	85%	(20)	75%	(24)	80%	(44)

TABLE XXV: MISCELLANEOUS DATA DISAGGREGATED BY VILLAGE

VILLAGE	No. of H.H. Which Hatch Chickens	No. of H.H. Buying Feed*	No. of H.H. Vaccinate	Supply of Bought Chicks h	n	b	u	(N)
Mit Rahina	0/1 5 u	7/7	5/7	2	2	1	1	
Qibrit	4/5	5/6	3-4/5		4	1		
Ibshenna	4/5 3 u	7/8	7/8	3	3	2		
Saadallah	4/5 1 u	2/4 (2u)	0/6		5		1	
Shutb	1/1 1 u	2/2	1/2		1	1		
Dar es-Salaam	1/2 1 u	3/3	1/3		3			
Abis II	1/1	0/0 (1u)	1/1		1			
Sharnub	6/7 (2u)	3/7 (2u)	5/9	2	8			
Farnawa	6/6 (2u)	1/7 (1u)	6/8	2	8	2		
Bahgoura	6/9 (10u)	10/11(8u)	7/15 (4u)	4	10	0		
Awlad Negm	2/2 (13u)	6/6 (7u)	9/11 (1u)	2	9	0		
TOTALS[1]	35/44 (80%)	46/61 (75%)	46/76 (61%)	15 (19%)	54 (69%)	7 (9%)	2 (3%)	(78)
LOWER EGYPT	17/20 (85%)	16/27 (59%)	21/30 (70%)	6 (18%)	23 (68%)	4 (12%)	1 (3%)	(34)
UPPER EGYPT	18/24 (75%)	30/34 (88%)	25/46 (54%)	9 (20%)	31 (70%)	3 (7%)	1 (2%)	(44)

Key: h = government supplied
n = native hatchery
b = both h & n
u = unknown
(N) = sample size

* Feed means purchased feed, but not necessarily balanced.

1 Totals do not include unknown entries, except in supply of bought chicks.

B. Rate of Lay

I have no accurate figures on this matter. Most villagers indicate that their hens lay every other day, but this figure seems to be their rule of thumb figure when the chickens are laying well rather than a precise calculation based on the actual production of their flocks at time of interview. See Lee Herrick's report for better data, or Tom Wien's estimates.

C. Number of Households Which Sell Eggs

1. 66% of the households queried do sell some of their eggs.
2. The poorer households in particular are more likely to sell their eggs (81%), though they may have fewer eggs to sell. However, aside from that, there seems to be little significant variation by income level. (The fall sample shows variation by income level, but the larger sample including data on Qena and Beheira does not.)
3. Somewhat more Lower Egyptian households sell eggs than do Upper Egyptians (76% vs. 60%), but that is perhaps expectable given the larger size of Lower Egyptian flocks.
4. The fall data indicate that those households which do sell eggs sell roughly 2/3 of their production (average is 44 eggs/week; median is 28); however, I have little confidence in these figures, since they seem to be highly responsive to social demands and varying financial needs. (That is, if there are social occasions or illness or young children in the family, the household may consume more of the eggs. If they need extra cash or neighbors need extra eggs for social needs, they may sell a greater number.) What is clear is that people do sell surplus eggs on a regular basis. (See the section on marketing networks.)

TABLE XXVI: NO. OF HOUSEHOLDS WHICH SELL EGGS*

(By Region and Income Level)

Income Level	Lower Egypt	Upper Egypt	Combined Total
Rich	3/4 = 75%	1/5 = 20%	4/9 = 44%
Well-Off	9/11 = 82%	6/9 = 67%	15/20 = 75%
Middling	3/6 = 50%	4/10 = 40%	7/16 = 44%
Poor	4/4 = 100%	13/16 = 76%	17/21 = 81%
Income unknown		1/1 = 100%	1/1 = 100%
Totals	19/25 = 76%	25/42 = 60%	44/67 = 66%

*Includes only those households for which there is information on eggs.

D. Number of Households Buying Some Feed

Note: The emphasis here is on purchase; the feed is not necessarily balanced feed, but is frequently corn bought in the local market.

1. 73% of all households buy some feed, but the aggregate figure conceals an important difference between Lower and Upper Egypt:

2. Substantially more Upper Egyptians buy some feed than do Lower Egyptians (88% vs. 59%, or roughly one and a half times as many) even though Upper Egyptians are poorer, and this holds true at every income level, though the differences are minimal for the poor.

   This is significant, because it highlights the necessarily greater dependence on purchased feed in Upper Egypt, and suggests that availability of feed may be a major constraint to poultry production in the area. (See discussion on p. 46 & 47.)

   Of course the greater dependence on purchased feed is expectable, given Upper Egypt's concentration on sugar cane and date production in contrast to Lower Egypt's mixed cropping, which includes substantial production of rice and corn. This means that Lower Egyptians are more likely to produce their own feed.

3. There are not systematic variations in the number of households which buy feed by income level. It is worth noting, however, that most of the poor households buy some feed (80% in Lower Egypt; 85% in Upper Egypt).

TABLE XXVII: NO. OF HOUSEHOLDS WHICH BUY SOME FEED[1]

(By Income Level and Region)

Income Level	Lower Egypt	Upper Egypt	Combined Total
Rich	3/5 = 60%	4/4 = 100%	7/9 = 77.8%
Well-Off	8/12 = 67%	8/9 = 88.9%	16/21 = 76.2%
Middling	1/5 = 20%	6/7 = 85.7%	7/12 = 58.3%
Poor	4/5 = 80%	11/13 = 84.6%	15/18 = 83.3%
Combined	16/27 = 59%	29/33 = 88.0%	45/60 = 75.0%

[1] Feed means purchased feed, but not necessarily balanced.
Totals do not include households on which there is no information, nor do they include the one household whose income level is undetermined.

E. Consumption of Meat, Poultry and Fish

1. As is to be expected, richer families eat more meat, poultry, and fish (measured by the number of times they are eaten per week) than do poorer families, but the differences between Upper and Lower Egypt are not marked.

2. As far as the relative proportion of meat and poultry consumed is concerned, Lower Egyptians eat somewhat more poultry than do Upper Egyptians, but the difference is marked only among the poor. 46% of all households eat approximately equal amounts of meat and poultry (again measured by the number of times per week they are eaten; I do not have figures on the quantity per se), but where there is a difference it is generally in favor of meat. (37% of all households eat more meat than poultry, compared with only 9% of the households which eat more poultry.) The difference is most striking among the poor of Upper Egypt, where 53% of the households eat more meat than poultry. This probably is a reflection of the combined effects of: a) the generally smaller flock sizes in Upper Egypt and therefore the lesser availability of poultry in that region; and b) the general tendency among the poor especially to use poultry primarily for eggs rather than meat.

TABLE XXVIII: CONSUMPTION OF MEAT, POULTRY, AND FISH

(By Region and Income Level)

Average No. of Times Eat M,P,F Per Week

Income Level	Lower Eg.	(N)	Upper Eg.	(N)	Combined Totals	(N)
Rich	4.5	(2)	3.5	(2)	4	(4)
Well-Off	3.3	(10)	4.3	(10)	3.8	(20)
Middling	3.0	(5)	2.7	(8)	2.8	(13)
Poor	1.4	(4)	1.4	(13)	1.4	(17)
Totals	3.0	(21)	2.7	(33)	2.8	(54)

TABLE XXIX: RELATIVE PROPORTION OF MEAT AND POULTRY CONSUMED

(By Region and Income Level)

Income Level	No. of Households Which Consume:				
LOWER EGYPT	=M,P	M+	P+	?	(N)
Rich	2 (100%)	0	0	0	(2)
Well-Off	5 (50%)	3 (30%)	1 (10%)	1 (10%)	(10)
Middling	5 (100%)	0	0	0	(5)
Poor	1 (25%)	1 (25%)	1 (25%)	1 (25%)	(4)
Total	13 (62%)	4 (19%)	2 (10%)	2 (10%)	(21)
UPPER EGYPT	=M,P	M+	P+	?	(N)
Rich	1 (50%)	1 (50%)	0	0	(2)
Well-Off	6 (60%)	3 (30%)	1 (10%)	0	(10)
Middling	3 (38%)	4 (50%)	0	1 (13%)	(8)
Poor	2 (15%)	8 (62%)	2 (15%)	1 (8%)	(13)
Total	12 (36%)	16 (48%)	3 (9%)	2 (6%)	(33)
LOWER+UPPER COMBINED	=M,P	M+	P+	?	(N)
Rich	3 (75%)	1 (25%)	0	0	(4)
Well-Off	11 (55%)	6 (30%)	2 (10%)	1 (5%)	(20)
Middling	8 (62%)	4 (31%)	0	1 (8%)	(13)
Poor	3 (18%)	9 (53%)	3 (18%)	2 (12%)	(17)
Total	25 (46%)	20 (37%)	5 (9%)	4 (7%)	(54)

VI. IMPLICATIONS OF STATISTICAL FINDINGS

The figures suggest the following:

A. Disease, rather than nutritional or other factors seems to be the major cause of mortality, as indicated by:

1. The vastly different mortality rates between vaccinated and unvaccinated flocks (29% vs. 64.6%), even when source of supply is controlled for;
2. The essentially similar mortality rates across all income levels, and regions, once vaccination is controlled for. (Presumably wealthier households are in a better position to feed and care for their flocks properly.)

This means that:

1. Disease is a major constraint on poultry production; and
2. It can be curbed by an effective vaccination program.
3. It also suggests that despite the many criticisms that have been leveled against the quality of Egyptian vaccines, even getting imperfect vaccines out to village flocks will greatly improve their survivability, and this seems to be the case even if each flock is vaccinated only once. (Of course, ineffective vaccines do undermine confidence in vaccination and contribute to the reluctance of some villagers to vaccinate.)

All of this suggests that top priority should go to getting an effective vaccination program out to the villages <u>at once</u>, even if it does take longer to improve the quality of the vaccines.

This means that emphasis must be put on:

1. Increasing the quantity of vaccine available.
2. Improving the <u>distribution</u> of vaccine in the villages, which means improving refrigeration and transportation, and providing

adequate personnel to do the job. See Appendix A. for a more detailed discussion of how to improve the distribution of services.

3. Motivating people to use the vaccine. At present only 58% of the households (62% in Herrick's sample) vaccinate their flocks. While this is partly due to insufficient or erratic availability of vaccines, there are also other complicating factors:

   a. Price

   b. Convenience and accessibility

   c. Attitude. Some people are wary about or unconvinced of the need to vaccinate, because they know of experiences where a whole flock died after being vaccinated (either because vaccination was done improperly or the household vaccinated only after disease was suspected).

   See Appendix A for more specific suggestions in this area.

Mortality seems to be further lowered by 20% when chicks are bought from a government sources; whether this is due to better breeds, older age of chicks at time of purchase, or vaccination before sale is yet to be determined.

B. Differences of income levels affect village poultry production in the following ways:

1. In general, wealthier households have larger flocks (by all 3 measures) and are more apt to vaccinate than are poorer households.
2. Poor households are more likely to buy feed and to sell eggs than are wealthier households.
3. Middling households seem to be an anomaly in much of the data.
   a) They buy fewer chicks and have a lesser average number of chicks than any other income level.
   b) A smaller percentage of middling households buy feed and sell eggs than do any other income categories.

What this seems to suggest is that wealthier households (i.e., Rich and Well-Off) are more involved in poultry production because of their greater resources (and social needs?); but that poor households are more involved in poultry production than middling households because of their greater need to rely on poultry for protein consumption (mainly in the form of eggs, since the poor eat more meat than poultry, even though they do not eat much of either) and petty cash (primarily from the sale of eggs).

4. There are no differences in mortality rates by income level once vaccination is controlled for.

C. Differences between Upper and Lower Egypt

The following differences between Upper and Lower Egypt have been noted:

1. Lower Egyptian flocks are twice the size of Upper Egyptian flocks by all 3 measures of flock size.
2. Proportionally twice as many Lower Egyptian households have turkeys, ducks or geese as do Upper Egyptian households (97% vs. 44%), but among those who do have such poultry, there is little difference in flock size.
3. More Lower Egyptians vaccinate their flocks than do Upper Egyptians (76% vs. 42%), but this seems largely to correlate with the wealth differences between the two (wealthier households being more likely to vaccinate), and hence not with regional differences per se.
4. There are no significant differences in mortality rates between Upper and Lower Egypt, once vaccination is controlled for.
5. Half again as many Upper Egyptians as Lower Egyptians buy some feed (88% vs. 59%), despite the fact that Upper Egyptians are poorer and have smaller flocks.
6. More Lower Egyptian households sell some eggs (77% vs. 60%), as might be expected given their larger flocks.
7. On the face of it, Upper Egypt does not seem to be systematically underserviced in comparison with Lower Egypt, except in the number of extension workers and in the supply of chicks from

government sources and its consequently heavier reliance on native hatcheries for chicks. However, this is a question that needs to be investigated on the basis of more precise data than that available in Table XXIII . (See my reservations about this data on p. 27.)

What this suggests is the following:

That availability of feed or of chicks, rather than disease, may be the major reason for Upper Egypt's lesser involvement in poultry production. (Disease is, of course, the major constraint on poultry production for both regions, but here we are dealing with the differences between regions.) My reasoning is based on the following:

1. Since mortality rates for Upper and Lower Egypt are essentially the same when controlled for vaccination, therefore climate does not seem to be a major factor affecting mortality, though it may affect other things like rates of growth or of lay.
2. Since the principal crops of Upper Egypt are sugar cane and dates, rather than the grain and garden crops of Lower Egypt, it is not surprising that Upper Egyptians buy more feed than Lower Egyptians, who are more likely to produce it themselves. Hence it is reasonable to conclude that availability of feed is a major constraint on poultry production in Upper Egypt.
3. The supply of chicks may be more limited in Upper Egypt because:

a) There are somewhat fewer government projects supplying chicks to the villagers, though the exact numbers need to be ascertained;

b) The excessive heat of summer means that native hatcheries may work only 4 rotations in Upper Egypt, compared to 7 or so in Lower Egypt. Hence climate may be a factor in limiting the number of chicks available.

This suggests that more poultry could be produced in Upper Egypt provided reasonably priced feed were available, but suggests that climate is likely to continue to limit the supply of chicks.

The difference in numbers of households having turkeys, ducks, and geese is most likely related to both the availability of feed and the greater availability of water in the delta.

PART 2: ARTICULATION OF VILLAGE FLOCKS WITH THE REST OF EGYPT'S POULTRY INDUSTRY

This section will concentrate on the marketing of poultry and poultry products on the local level, and the availability of poultry services to villagers. Since Lee Herrick has provided a general count and description of the latter for Egypt as a whole, I will confine my analysis primarily to an intensive look at the provision of services in the two governorates in which I spent the most time. This should be used to provide depth to the more extensive survey presented by Lee Herrick.

I. Marketing of Local Poultry Products
(Based primarily on data from Qena and Beheira Governorates)

There is an extensive and multi-layered marketing network that moves poultry and poultry products from the producer to the consumer. It operates both to circulate poultry and poultry products within the local area, and to feed them into urban commercial markets, particularly Cairo and Alexandria. One is astonished to find that poultry and eggs are shipped into Cairo on a regular basis from as far away as Qena governorate.

In general, aside from housewives occasionally selling their own surplus poultry at the local weekly market, most marketing depends on full-time peddlers and merchants who make the rounds of several villages and weekly markets buying up poultry and eggs. The eggs are either sold to native hatcheries or shipped to Cairo (from Qena governorate) or Alexandria (from Beheira governorate); the poultry may be sold locally or in nearby towns, or shipped to Cairo or Alexandria. Most of the merchants spoken to specialized in one kind of product only: eggs, or chicks, or poultry. Their expenses include the costs of maintaining the donkey with which they make the rounds of the villages; the costs of crates for shipping and carrying, and the cost of sending eggs or poultry to Cairo or Alexandria. Though estimates vary, an egg crate can hold 600 or 1000 eggs and costs 25 PT; a poultry crate can hold 50-80 rabbits, 40-60 chickens, 12-30 geese or ducks, and 50 pairs of pigeons. Trainfare from Nag Hamadi (Qena governorate) to Cairo costs 1-1¼ LE; from Beheira to Alexandria 30 PT.

A. Poultry Sellers

There are three kinds of people selling poultry: housewives selling their own surplus at the local market; full-time peddlers who buy and sell poultry in several villages and markets within the markaz (district); full-time merchants who regularly ship to Cairo and Alexandria.

Housewives. 5 of the 13 poultry sellers I talked to were housewives, who sell poultry in the market with a frequency ranging from once a week to once or twice a year. They sell small amounts of their own production, generally have flocks of 20-40 birds at home, and go only to their own local market, generally on foot. While many such women were visible in the two Lower Egyptian markets I attended (in the Mahallit Farnawa market in Beheira 35 of the 55 sellers present were women), there were only a few visible in the Upper Egyptian market of Bahgoura, reflecting their generally more conservative treatment of women, and I was told that what women traders existed were generally from outside the village and of lower class.

Local Peddlers. 4 of the 13 poultry sellers I talked to were local peddlers with donkeys who made the rounds of several local markets (each meeting on a different day) within a single markaz (district) or possibly two, buying and selling poultry only within the local area. Of the 2 peddlers in Upper Egypt, one handled 15-20 ducks or geese per week; the other handled pigeons only and bought and sold 30-35 pairs of pigeons per week. Of the two peddlers in Lower Egypt, one working with his brother handled 100-150 birds per week; the other, a woman whose husband is in jail, handled about 20 birds per week, and made the rounds of the local markets by foot or taxi rather than by donkey.

Long-Distance Poultry Merchants. 4 of the 13 merchants make the rounds of the local markets by donkey, buying poultry as above, but instead of selling it locally, they ship most of it by train to Cairo (from Qena governorate) or Alexandria (from Beheira governorate) for resale at higher prices. One of the merchants from Upper Egypt said that he ships to Cairo because there is not much of a local market for poultry in Upper Egypt (and indeed, Upper Egyptians both raise and consume somewhat less poultry than do Lower Egyptians). 2 of the 3 merchants in Upper Egypt ship 9 crates of poultry per week; one ships 6; the Lower Egyptian merchant sends 9 crates a week in summer, 18 in winter. Each merchant deals with a single dealer in Cairo or Alexandria, who may specify in advance how much poultry he wants (2 of the 4 indicated this was the case), and he takes a commision on what he sells: one of the Qena peddler said the dealer takes 5LE/crate. The Lower Egyptian merchant also handles eggs and sometimes chicks if people request them (see the data on chick and egg marketing below).

In general, the various kinds of poultry sellers claim they take 5-15 PT profit per kilo of meat. The range of reported prices is given below. (Most of the selling prices are based on sale price in Cairo or Alexandria; sellers interviewed in the market itself were reluctant to talk about price for fear of prejudicing current sales.) The Lower Egyptian merchant said that prices were usually 20 PT/kilo less in winter.

TABLE XXX: PRICES FOR POULTRY: A SUMMARY

Poultry	Price Peddler Pays Producer	Price Peddler Gets on Resale
Chickens	70-100 PT ea.*	
	70-100 PT/kilo.	110 PT/kilo
Ducks	2-3LE ea.	$3\frac{1}{4}$ LE ea.
	80-100 PT/kilo	85 PT/kilo
Geese	2-$2\frac{1}{4}$ LE ea.#	$2\frac{1}{2}$ LE ea.
	80PT/kilo	85 PT/kilo
Turkeys	7-8 LE ea.	
	115 PT/kilo	100-125 PT/kilo
Rabbits	70 PT ea.	80 PT ea.
	80 PT/kilo	80-90 PT/kilo
Pigeons	60-100 PT/pair	80-120 PT/pair
	70 PT/kilo	75-85 PT/kilo

* There was 1 report of 2-$2\frac{1}{2}$ LE ea.
# There was 1 report of 1-$1\frac{1}{2}$ LE ea.

B. Egg Merchandising

Most villagers (66%) and especially the poor (81%) sell some of their eggs. While some eggs are sold on an occasional basis to neighbors in need, most are sold to people who make the rounds of village households buying up eggs. Those egg buyers may be 1) children (of either sex); 2) native hatchery owners who themselves make the rounds of several villages (this was the case in Sayyat in Qena governorate) or send salaried agents to buy them (this was the case of the very large and therefore somewhat atypical native hatchery in Damanhour; see Appendix B); or more commonly, 3) specialized egg merchants.

In general, eggs are bought from the villagers for 2½-3 PT ea. in Upper Egypt, 3-5 PT ea. in Lower Egypt, with the price of eggs being somewhat lower in summer than winter. The eggs are then sold either to native hatcheries or to merchants in Cairo and Alexandria for 3-5 PT ea., and native hatcheries may sell their surplus to merchants in Cairo or Alexandria as well. The usual profit to the peddler or middleman is .3-.5PT/egg.

Of the 4 egg peddlers I spoke to, two, both women, sold eggs only locally either to native hatcheries or at the local market, and dealt only in small quantities: one woman handled around 200 eggs/week; I do not have figures for the other. The two men, on the other hand, were full-time merchants, and shipped eggs into the cities. The one in Lower Egypt, who works with his son and also deals in poultry, sells 1000-2000 eggs a week to the native hatcheries in Damanhour, and in the summer when the hatcheries are not working, ships them instead to his dealer in Alexandria. The other, working with a partner in Upper Egypt, sends 20,000 eggs a day

to 3 or 4 dealers in Cairo. (However, this figure seems to be very high; it is possible that I misheard and the figure should really be 20,000 eggs a week.) He pays the cost of donkey and crates; they pay the cost of transport by train and send him his money by check.

In addition, native hatchery owners get into the egg selling business as well as the egg-buying business. They may buy hatching eggs direct from villagers, from government poultry stations, or from peddlers. As mentioned above, the native hatchery owner in Damanhour has 50-60 agents buying eggs on his behalf, for which they take a commission of .2-.3 PT ea.; the Sayyat (Qena) owners make the rounds of the villages themselves; while the hatchery owners in Huww (Qena) and Farnawa (Beheira) buy eggs mainly from peddlers. On the selling end, hatcheries sell their infertile eggs locally (for 3 PT ea. in Sayyat) or in Alexandria (for 2-2½PT ea. from Farnawa), and may sell their surplus, particularly in summer when the hatcheries stop working, to dealers in Cairo or Alexandria. The Damanhour owner sells his surplus in Alexandria or to Groppi's in Cairo for 3.7PT/egg; the Sayyat owner says he ships a crate of eggs (with 600 rather than 1000 eggs) to Cairo 2-3 times a week in summer, every eight days in winter.

C. Chick Peddlers

I spoke to 2 chick peddlers in Upper Egypt, both men. One specializes only in chicks, buys his chicks either from native hatcheries in Huww (at 7 PT ea.) or from the government station in Sohag (for which he pays 7 PT/chick and 1½ PT trainfare), and takes ½ PT profit per chick. His losses are small (1%) and he generally peddles 300 chicks/day in the circle of villages which he visits in 2 adjacent districts (markaz). The other, who also deals in ducks and geese, buys chicks at 6 PT ea. from the native hatcheries in Huww (I do not know why there is a discrepancy in price), loses about 2% of his stock, and peddles the rest in various villages in the markaz 2 or 3 times a week during the season when the native hatcheries are in operation (January to April). He generally handles about 200 chicks a day, or 600 a week. Both peddlers peddle by donkey.

Of the 4 native hatcheries visited in Qena and Beheira, those in Huww and Farnawa sell their chicks to local peddlers; those in Sayyat peddle the chicks themselves in the nearby villages and ship chicks on demand to merchants as far away as Sohag and Qena, paying the transport themselves; the large Damanhour hatchery has 10 agents who sell the chicks (both 1-day old and 15-day old) to village peddlers, taking .2-.3 PT commission per chick for their efforts.

Prices of day-old chicks from hatchery to peddler range from 5-7 PT ea. in Upper Egypt (7.5 PT if bought on credit); 6-8.5PT in Lower Egypt. Winter prices may be somewhat higher than summer prices. Prices to the consumer range between 8 and 10 PT whether peddled directly by the hatchery owners or by specialized peddlers, but go up to 12 PT if the chicks are bought on credit. Whether credit is extended or not depends on the peddler and whether there is a relationship of trust between peddler and hatchery owner, or peddler and customer.

D. The Role of Women in Marketing

Women are the main producers of poultry in Egyptian villages, and the main beneficiaries of whatever poultry and eggs are sold. Four women stated that they have complete control over the disposal of egg and poultry money; most other women who were asked (I did not begin to ask this question systematically until my spring visit) said that they used the money for household needs and they and their husbands decided jointly what to do with it. However, since in most of those cases the husband was in earshot, I think it probable that they understated their degree of control. In any event, in their primary role as producers of poultry, women contribute significantly to their husband's well-being in kind or in petty cash.

Women are also involved in the marketing of eggs and poultry, though most do so as an adjunct to their housewifely activities - i.e., they sell eggs and poultry to neighbors and local peddlers, or they themselves market their produce in local weekly markets on an occasional or regular basis. Upper Egyptian women are more likely to use a (male) intermediary to market their production, in keeping with the generally more conservative standards of conduct for women there; Lower Egyptian women may either market it themselves or use middlemen. Though these women do not specialize in marketing or engage in large-scale or long-distance trade, their activities are nonetheless significant for their impact on the local and particularly the domestic (household) economy.

However, there are also a few women who specialize in buying and marketing poultry and eggs as a regular income-producing activity. They generally seem to be poorer women, to move relatively small amounts of

product, and to confine their activities to the local district. Large-scale and long-distance trade, on the other hand, tends to be monopolized by men.

E. Further Comments on Native Hatcheries

The technical operations of native hatcheries have been described in Lee Herrick's report and in numerous other reports, so I will not go over them here. However, I would like to make several additional remarks about their management and marketing porcedures on the basis of my talks with native hatchery owners in Sayyat and Huww in Qena governorate; and in Farnawa and Damanhour in Behiera governorate.

All of the hatcheries discussed (4 in Sayyat; 1 in each of the other 3 communities) were jointly owned and operated by 2-5 relatives (and in one case, a friend); in all cases profits were divided equally among co-owners. In Upper Egypt, the hatcheries were owned and worked by Christians; in Lower Egypt they were worked (and in Farnawa owned) by people from the village of Birma (in Lee's notes, Barma) near Tanta which specializes in native hatcheries. In the Upper Egyptian hatcheries, workers were paid half the profits on the chicks they themselves hatched, thereby sharing the risks; in Lower Egypt, the workers were paid a flat salary: 5LE/oven in Farnawa; 30LE/month (i.e., 6LE/oven) plus food and lodging in Damanhour. Both Lower Egyptian hatchery owners were favorable to the idea of any plan to provide only clean eggs to the native hatchery, because they expected that the greater hatchability of such eggs would make their profits go up (the Farnawa owner said he got 90% hatchability from government eggs versus 50% from local eggs). The Upper Egyptian owners were not specifically asked that question, but the markaz (district) veterinarians thought the owners would be reluctant to cooperate with any such plan because the monitoring involved would interfere with the double sets of books they keep for their own records and the tax collectors, and indeed, this seems likely, for the

owners were initially reluctant to speak with me because they feared I might be connected with collecting taxes. I should also mention that the greater receptivity of the Lower Egyptian owners could be in part due to the educational efforts already made in Beheira governorate to improve poultry production, for the governor, Hussein Kamal Daboos, who was energetically promoting poultry improvement programs, had held a meeting several months earlier with a large number of native hatchery owners to discuss what could be done. On the other hand, the agricultural engineer in Sharnub said that despite such efforts, he thought a number of hatchery owners would be reluctant to accept only clean eggs because of the implications of government monitoring for taxes. And indeed, Soheir Habib who accompanied me on the visit said that even in Fayyoum, hatcheries which contracted to accept only clean eggs in fact accepted village eggs as well, in violation of the contract terms. However, it does seem that there is more receptivity to such efforts in Lower Egypt than in Upper Egypt.

Special mention must also be made of the native hatchery in Damanhour, which is atypical and exemplary in the size and scope of its operations, and in its general cleanliness and efficiency. It is a large operation, with 5 hatcheries in the complex which contain a total of 46 ovens. It employs 5 supervisors, 10 hatchery workers, 7 rearing house workers (half the chicks hatched are raised to 15 days before being sold), 3 drivers, and 10 chick distributors. In addition, it has 50-60 local agents working in 15 villages to buy up eggs; and 100-150 peddlers to whom its chicks are distributed for resale to the villagers. For a more detailed description of this hatchery, I have included my field notes on this operation in an Appendix to this report.

II. Availability of Poultry and Poultry Services to Villagers

A general summary of poultry services available to villagers is included in Table XXIII of this report and in Lee Herrick's report. What I have tried to do here is to present a much more detailed analysis of the services available in two governorates, Qena and Beheira, and discuss some of the problems of the delivery of poultry services on the local level. I was able to do this much more thoroughly in Beheira than in Qena, primarily because I had my own transportation and assistant and better access to governorate officials who were especailly cooperative. In addition, because of the governor's active interest in poultry, such data as detailed lists of native hatchery owners and private producers were available. The availability of such material made it possible for me to do some cross-checking of information from various sources, to arrive at a detailed summary and estimate of poultry and poultry services for Beheira. Since Beheira and Qena are both targeted as areas in which special poultry projects may be developed, the information and estimates given below should be especially helpful.

A. Availability of Services in Beheira Governorate

The following tables provide an estimate of the number of chicks, ducks, turkeys, and geese available to Beheira villagers from sources in Beheira, excluding those that are hatched at home. They are based on government records which I have tried to cross-check with on another, and are broken down by markaz to get some idea of the distribution of services within the governorate. Such a break-down gives only an approximate picture,

TABLE XXXI: ESTIMATE OF NO. OF CHICKS AVAILABLE TO VILLAGERS IN BEHEIRA

Source	If brooders & hatcheries work:[3] year-round (11 rotations)	8 mos./yr. (7 rotations)	
Native hatchery capacity/yr.	28,576,716	18,185,182	
Mechanical hatchery capacity/yr.[1]	209,000	133,000	
	28,785,716	18,318,182	
Projects			
3-week old chicks:			
Brooder capacity ORDEV (87,000)	957,000	609,000	
Brooder capacity Ag. Ref. (18,800)*	206,800	131,600	
	1,163,800	740,600	
Chicks distrib'd by Extension[2] (2x Ja-Ju 1979 figures)	1,154,768	1,154,768	If assume Ja-Ju distrib. all 577,384
Chicks to be distrib'd by Agr. Ref. 1979*	72,000	72,000	72,000
	1,226,768	1,226,768	649,384
Total potential no. of chicks available to villagers, if assume no mortality	31,176,284	20,285,550	19,708,166
With Mortality Assumptions:			
Hatcheries (Assume 50%)	14,392,858	9,159,091	
Projects (Assume 5%, the rate at Sharnub; probably low)	1,105,610	703,570	
	15,498,468	9,862,661	9,862,661
+ Chicks from Ext. & Agr. Ref.*	1,226,768	1,226,768	649,384
Total:	16,725,236	11,089,429	649,384
If population of Beheira (1976 census) = 2,545,000, then are:	6.6 new chicks/ person/yr.	4.4 new chicks/ person/yr.	(4.13)
If. av. household = 5.69** individuals, then are:	37.5 new chicks/ household/yr.	25 new chicks/ household/yr.	(23.5)

* I have assumed that the list of chicks distributed by Agrarian Reform does not include the chicks supplied to Agrarian Reform cooperatives; therefore I have included 2 separate figures for Agrarian Reform.

** Figure from CAPMAS 1974-75 household budget survey; quoted in Susan Randolph, "Working Paper Number Two: The ORDEV 116 Village Survey," p. 6. 1978.

1 Sharnub's capacity soon to be increased by 12,000/batch.

2 Extension's plans for 1980 provide for only 60,000 chicks to be distributed.

3 Figures for 11 rotations are given because that makes yearly figures on native hatchery list correspond with interview with hatchery owner in Damanhour. However, 7 rotations/yr. seems more likely; most hatcheries work 8 months.

TABLE XXXII: ESTIMATED NO. OF CHICKS AVAILABLE TO VILLAGERS IN BEHEIRA BY DISTRICT (MARKAZ)

Markaz[4] (Total)	Hatchery Capacity Per Year*	Chicks Distrib'd by: Extension[1]	Agr. Reform[2]	Brooder Capacity ORDEV & AG. Ref.
Kafr ed-Dawar (309,480)	48,000	134,980	0	5500 OR 6000 AR x 11 = 126,500
Abu Humus (1,100,000)	44,000 M* 1,056,000*	0	0	
Damanhour (23,331,768)	132,000 M* 22,472,000	660,268	40,000	2500 AR x 11 = 27,500
Etai el-Baroud (2,422,810)	1,780,500	31,810	0	52,500 OR 3,000 AR x 11 = 610,500
Koum Hamada (613,728)	468,616	90,112	0	5,000 OR x 11 = 55,000
Abu el-Matamir (14,000)	0	0	14,000	0
Ed-Dilingat (202,020)	33,000 M* 32,900	35,120	13,000	8,000 OR x 11 = 88,000
Hosh Issa (284,200)	272,500	6,700	5,000	0
Mahmoudia (,730,588)	565,000	22,588	0	8,000 OR 5,000 AR x 11 = 143,000
Shubra Khit (1,948,330)	1,820,000	40,330	0	8,000 OR x 11 = 88,000
Rashid (86,200)	59,000	27,200	0	
El-Rahmania (27,600)	2,200	25,400	0	
Governorate at large		80,260		
TOTALS	28,785,716	1,154,768	72,000[3]	1,138,500

GRAND TOTAL = (31,150,984)

* Estimated on basis of 11 batches/yr, to correspond with yearly figures given on native hatchery list. However, 7 batches per year seems more likely. M stands for mechanical hatchers; the others are all native hatcheries.

1 Based on doubling the Ja-Ju 1979 figures.
2 Based on projected figures for 1979-80.
3 Agrarian Reform distributed only 8,365 chicks in 1978.
4 Specifics on Mutamadia markaz are not available.

TABLE XXXIII: ESTIMATED NO. OF CHICKS AVAILABLE TO BEHEIRA VILLAGERS/PERSON*

Markaz	Population (from ORDEV)	No. of Chicks Available/Yr. 11 rotations	7 rotations	No. of Chicks/Person** (assume 7 rotations)
Kafr ed-Dawar	166,318	309,480	196,942	1.18
		285,480	181,669	1.09
Abu Humus	184,625	1,100,000	700,000	3.79
		550,000	350,000	1.90
Damanhour	172,715	23,331,768	14,847,488	85.97
		12,029,768	7,655,306	44.32
Etai el-Baroud	212,514	2,422,810	1,541,788	7.25
		1,532,560	975,265	4.59
Kum Hamada	?	613,728	390,554	
		379,420	241,449	
Abu el-Matamir	?	14,000	8,909	
		14,000	8,909	
El-Dilingat	?	202,020	128,558	
		169,070	107,590	
Hosh Issa	?	284,200	180,854	
		147,950	94,150	
Mahmoudia	86,400	730,588	464,920	5.38
		498,088	316,965	3.67
Shubra Khit	56,118	1,948,330	1,239,846	22.09
		1,038,330	660,755	11.77
Rashid	43,877	86,200	54,854	1.25
		56,700	36,082	.82
El-Rahmania	58,352	27,600	17,564	.30
		26,500	16,863	.29
Governorate at large		80,260		

* The top figure for each markaz is based on current capacity; the lower figure is adjusted for native hatchery mortality (assumed to be 50%).

** This figure is only the roughest of approximations, of course, for depending on location and marketing networks, villagers from one markaz may get their chicks from another. Hence one must also look at the placement of poultry projects on the ORDEV map.

TABLE XXXIV: ESTIMATED NO. OF DUCKS & TURKEYS AVAILABLE TO BEHEIRA VILLAGERS*
BY DISTRICT (MARKAZ)

Markaz	Extension (2x Ja-Ju figures 1979)	Agr. Reform (1979-80 Plan) (21-30 days old)	ORDEV or Agr. Ref. Duck Fattening(?) Capacity	x 7 rotations =	Total Ducks Potentially Available
Kafr ed-Dawar					
Abu Humus					
Damanhour	15,000	12,000 10,000 (500 T)	1,000 AR 1,800 AR 2,500 OR	= 37,100	74,100
Etai el-Baroud			3,000 AR 2,500 AR	= 38,500	38,500
Koum Hamada	5,000				5,000
Abu el-Matamir		20,000 (2500 T)			20,000
El-Dilingat		24,000 (5,000 T)	1,500 AR 1,500 AR	= 21,000	45,000
Hosh Issa		2,000 (1500 T)	1,500 AR	= 10,500	12,500
Mahmoudia			3,000 AR	= 21,000	21,000
Shubra Khit	5,000		2,500 OR	= 17,500	22,500
Rashid			3,000 AR	= 21,000	21,000
Rahmania	5,000				5,000

Figures for turkeys are indicated in parentheses with the number followed by a T. All other figures are for ducks.

however, since hatcheries are likely to supply more than one markaz, and sometimes veterinary and agrarian reform services are extended to some villages outside the markaz as well. A more detailed break-down of the number of birds supplied by each source (Extension, Agrarian Reform, ORDEV, private projects, and native hatcheries) is available in the July material I furnished to Mathtech.

The estimates compare with the figures in Tom Wien's 20 March 1979 report as follows:

No. of Chicks Available in Behiera

from Hatcheries:	BKL Estimates (1979) (7 rotations; 50% hatch)	TW Figures 1975-76	1976-77	1977-78
Modern	66,500 (not complete)	129,793	378,327	
Native	ca. 9,093,000	8,312,000	6,607,491	
No. of native Hatcheries	102 (79 owners)		58	53

On the basis of this data, the number of native hatcheries does not seem to be decreasing at least in Beheira, and the number of chicks hatched in 1979 is somewhat low, since 3 of the 5 native hatcheries in the Damanhour complex described above operate 11 rotations a year rather than 7. With 30 ovens with a capacity of 6,000-9,000 eggs each, and assuming 50% hatchability, that would provide an additional 360,000-540,000 chicks/year, for a total of about 9½ million chicks/ year.

B. Availability of Services to Qena Governorate

The figures on the availability of chicks in Qena governorate are less complete and are available in Table XXXV below.

TABLE XXXV: SOURCES OF CHICKS IN QENA GOVERNORATE

Source	Capacity	Under Whom
I. A. Hatcheries - Modern		
1. Nag Hamadi (projected)	½ mil./yr.	Agr. Reform
2. Mataana (projected)	½ mil./yr.	MOA
" (current)	7000/batch	MOA
3. Qena	½ mil./yr.	ORDEV
4. "	½ mil./yr.	Governorate
5. Faw Bahari (in Dishna)	5000/batch	?
6. Hozam (in Kous)	500/batch	?
7. Al Kalta (in Luxor)	2000/batch	?
8. Al Bacerat (in Luxor)	1500/batch	?
B. Hatcheries - Mechanical in Nag Hamadi		
1. Dr. Ayyad Shafiq	12,000/batch	private
2. Hassan Abul Wufi	6,000/batch	"
3. 3 or 4 other individuals	ea. 1000/batch	"
4. School in Nag Hamadi	?	public
C. Native Hatcheries (have figures only for Nag Hamadi; see II below)		
D. Rearing Houses in Governorate		
1. Abu Shousha (in Abu Tisht)	2 projects	ORDEV & Gov.
2. Abu Diab Gharb (in Dishna)	1 project	Gov.
3. El Kharagia (in Quos)	2 projects	ORDEV & Gov.
4. Nakada (in Quos)	1 project (8000/yr?)	MOA (Extension?)
5. El Zatiya Qibli (in Luxor)	2 projects	ORDEV & Gov.
6. El Biadia (in Luxor)	1 project (12,000/yr?)	MOA (Extension?)
7. Bahgoura (Nag Hamadi)	1 project (3000/batch)	ORDEV
8. Awlad Negm (Nag Hamadi)	1 project (3000/batch)	ORDEV
9. Anabir (Nag Hamadi)	1 project (20,000/2 mos.)	Agr. Reform
10. Secondary Ag. School (Nag Hamadi)	?	
11. Huww	?	MOA
12. Bahgoura entrepreneur (Barsoum)	3000/batch = 12,000/yr.	private

TABLE XXXV: SOURCES OF CHICKS IN QENA GOVERNORATE (continued)

E. Distributors of Day-Old Chicks in the Governorate

1. Extension last year (1978-79) brought in and distributed:
   a. 75,000 Fayyoumi chicks from Sohag
   b. 125,000 Dokki 4 chicks from Assiut
   c. 20,000 Dindarawi chicks from Mataana (see item A2)
   = 220,000 chicks
   d. 9,000 Peking ducks from New Valley
2. Agrarian Reform brings in:
   15,000-20,000 chicks from Sohag every 21 days

II. Sources of Chicks for Markaz of Nag Hamadi

Source	Egg Capacity	No. of Chicks Hatched &/or Distributed/Yr.
A. Native Hatcheries		
1. Huww	144,000/yr.	72,000 chicks/yr.
2. 4 others in Huww	?	?
3. 4 in Sayyat	1,120,000/yr.	560,000 chicks/yr.
B. Private Mechanical Hatcheries (Capacity in IB above x 4 rotations)	88,000/yr.	44,000 chicks/yr. (if from baladi eggs)
C. Agrarian Reform brings in: 15,000-20,000 chicks from Sohag every 21 days = (but probably distributed throughout governorate & to Agr. Reform villages only)		100,000 chicks/yr.
D. Projects at Bahgoura & Awlad Negm (D7 & D8 above)		24,000 chicks/yr.
E. Project at Huww		?
F. Private entrepreneur at Bahgoura		12,000 chicks/yr.
		= 812,000 chicks/yr.
G. If speculate: 4 native hatcheries at Huww		= 480,000 chicks/yr.
1 project at Huww		= 12,000 chicks/yr.
Total would then be:*		= 1,304,000 chicks/yr.
H. If we divide this by the estimated pop. of 196,000, then average no. of chicks/person		= 6.7 chicks/person/yr.

*Note: If Agrarian Reform chicks are distributed throught the governorate, the total should be less; if mechanical hatcheries hatch government eggs, the total should be higher. I am assuming these two sources of error cancel each other out.

C. A Comparison of Beheira and Qena Governorates

As for the general similarities and differences in the number and kinds of poultry services available in the two governorates, they are summarized in Tables XXXVI and XXXVII below. I have included both a comparison of the two governorates as wholes (though the Qena data is less complete) and of the two districts (markaz) in which I worked most intensively: Nag Hamadi (Qena) and Shubra Khit (Beheira).

In general, the most striking differences in the levels of services in the two governorates is the greater amount of extension activity in Beheira and the greater availability of chicks, but both governorates face similar problems in getting services down to the local level. Extension, ORDEV, and Agrarian Reform all supply chicks to villagers and to village projects (broiler projects, layer projects, or hatcheries). ORDEV funds local projects for a limited number of years, helps supply chicks, and provides some technical expertise and inspection for ORDEV poultry projects. (There was one ORDEV poultry person in Shubra Khit to check on ORDEV projects, none in Nag Hamadi.) Agrarian Reform performs similar services for Agrarian Reform projects, except that the funding is provided by villagers who are entitled to participate with an amount up to 2LE for each feddan of land they have in the Agrarian Reform Cooperative. 75% of the profits of the project go back to the cooperateurs, the other 25% goes to the workers. Extension distributes chicks to villages and village projects on demand, and gives some technical assistance.(In Shubra Khit, I was told someone comes out from Cairo with advice once or twice a year, and there are two poultry specialists in Shubra Khit itself.) It also has poultry extension

TABLE XXXVI: COMPARISON OF SERVICES IN QENA & BEHEIRA GOVERNORATES

Item	QENA GOVERNORATE	BEHEIRA GOVERNORATE
Population: 1976 Census	1,706,000 (ca. 2/3 of Beheira)	2,545,000
Veterinary Services	3 poultry specialists at Gov. 10 markaz, ea. with director 25 vet. clinics in villages (ea. with radius of 6 km.) 90 vets in Gov. diagnostic lab in Qena	1 poultry specialist at Gov. 12 markaz, ea. with director 65 vet. clinics in villages 124 vets in Gov. no diagnostic lab in Beheira
Extension Services	13 agents in governorate, all generalists distrib'd 220,000 chicks, 9000 ducks in 1978-79	296 agents in villages; 100 more in markaz centers & Gov. distrib'd 577,000 chickens Ja-Ju 1979; 15,000 ducks have 2 vehicles; rent others as needed didn't know what poultry extension villages were
Agrarian Reform	distrib chicks in villages; rearing house capacity100,000 chicks/ year	distrib'd 80,000 chicks in 1977-78, 45,000 ducks on Gov. level, divided into animal production & poultry sections have 1 director, 1 inspector for ea. markaz, 1 director for ea. station

TABLE XXXVII: COMPARISON OF SERVICES IN NAG HAMADI & SHUBRA KHIT

Item	NAG HAMADI (Qena Gov.)	SHUBRA KHIT (Beheira Gov.)
Population	ca. 196,000 (3½ x Shubra Khit) (8 village council units)	56,118 (4 village council units)
Veterinary Services	Director provides services for 2 markaz: Nag Hamadi (11 vets, 1 poultry specialist Abu Tisht (8 vets, 1 poultry specialist)	Director a poultry specialist, as are 2 vets in Shubra Kh. 2 other generalists in villages
	1 car; vets don't go to outlying regions often	2 cars; vets in 2 of villages
	get 30 ampules of vaccine/4 mos.; could use 100	used 63 ampules from Dec. - July; could use 2-4 a day
Extension Services	Inspector no car; gets out to only 4-5 villages/mo.	39 agents, of which 6 are in markaz center; 1 ea. in villages 2 motorcycles 2 poultry specialists
	distribs chicks, but not to Bahgoura or Awlad Negm	distribs 2000 chicks/2 mos.
ORDEV	Supplies chicks to ORDEV projects, including Bahgoura & Awlad Negm	1 poultry specialist in markaz; goes out to inspect 2 ORDEV projects 1-2 times/mo.
Agrarian Reform	rearing house with 100,000 chicks/yr. capacity in Nag Hamadi	Agrarian reform villages administered by Agr. Reform in another markaz
Estimated Chicks Available/Year	1,304,000 ÷ pop. = 6.8 chicks/person/yr.	661,000 ÷ 56,118 = 11.8 chicks/person/yr.

villages, which Lee has visited and I have not, but it is worth noting that in Beheira, when I asked about poultry extension villages (there are supposed to be 25), no one knew what I was talking about.

In general, the various projects manage to get balanced feed, veterinary services, and technical assistance from the organizations listed above (plus the veterinary services of the MOA) on a fairly regular basis, and are usually directed or supervised by an agricultural engineer, but ordinary villagers fare less well. The supply of vaccine is limited and erratic; and this, combined with limited means of transportation, means veterinarians rarely go out to outlying villages to vaccinate. In Nag Hamadi, a veterinarian got out to Awlad Negm once or twice a year to vaccinate, but did not get to Bahgoura at all (except to the village project). In Mahallit Farnawa and Sharnub, both of which have vets, the veterinarians did vaccinate in their respective villages (the figures for the number and frequency of these vaccinations is included in the July material I forwarded to Mathtech), but went out to outlying areas only rarely and on demand. This means large flock owners are better serviced by public services than are the small.

Although there are extension agents located in the villages (at least in Beheira; Qena governorate had only 13 for the entire governorate), most of them work with crops rather than poultry, so that I found little evidence of much poultry extension work being done for ordinary village flocks. If villagers need advice, they get it mainly from the veterinarian, if there is one, or perhaps from speaking with the directors of village poultry projects where such projects exist. However, Beheira does have some poultry extension agents available at the markaz level, and Beheira generally seems

to be making a push for increased poultry production.

Finally, all of the services mentioned above mentioned lack of transport as one of the major factors interfering with getting services out to the villages and making visits and inspections on a regular (or frequent) basis difficult.

PART 3: CONCLUSIONS: AN ASSESSMENT OF MAJOR NEEDS AND RECOMMENDATIONS FOR IMPROVEMENT

I. DISEASE

Disease is the number one problem for village flocks. Average mortality is 45.8%, and mortality of 50% or 100% is not uncommon; Newcastle and pullorum are the main culprits. However, vaccinated flocks have 30-35% less mortality than do unvaccinated flocks. Therefore any program to help village flocks shoud be directed first of all to:

1. Providing systematic vaccination against Newcastle; and
2. Providing pullorum-free eggs to the native hatcheries.

This latter should help to improve the current hatchability rate of 50-60% as well.

Present vaccination programs fall short because:

1. There is insufficient vaccine, and it is often of poor quality.
2. There is often shortage of staff, transportation, adequate publicity, and occasionally of refrigeration.
3. Veterinarians often charge for their services, though they are not supposed to. While this is no obstacle to the rich, it is to the poor.
4. Some people feel vaccination is ineffective (i.e., they vaccinated once and the chicks all died) or fear that the evil eye will doom their flocks if they are exposed to view.

Of these obstacles, 1 and 2 are the most important.

<u>Recommendation</u>

What is needed is a systematic program to blanket an area or preferably the country with an effective vaccination program.a)The first vaccination could be done at the native hatcheries.

b) The later intramuscular injections will be most effectively accomplished if the vaccination can be done in each village, rather than in the veterinary center only, since many outlying villages are not effectively served by veterinary services at present, particularly where poultry is concerned. See Appendix A

for suggestions as to what such a program might look like.

II. Source of Chicks

In addition, chicks which come from government sources have on average 20% less mortality than those which come from native hatcheries. However, since most of those flocks are bought from government-sponsored rearing houses at 21 days or older, it is not clear whether these differences in mortality are due to better breeds, older age of chicks at time of purchase, better early nutrition, or vaccination of chicks prior to resale to villagers, or more probably, a combination of all these factors.

As a result, the policy implications of this finding are not clear. On the one hand, it makes sense to encourage more poultry rearing houses because, as long as they are adequately supplied and serviced, they provide more viable chicks. On the other hand, they provide them at greater cost (20-25PT vs. 10PT) which, particularly in the absence of credit, makes them prohibitive to the poorest segment of the rural population. Furthermore, we do not know how much more viable native hatchery chicks would be if they were pullorum-free and systematically vaccinated before being sold.

<u>Recommendation</u>: This suggests that a two-pronged approach should be adopted, which both:

1. Encourages the proliferation of rearing houses, particularly as village council projects or cooperatives in which villagers have somedirect stake (ORDEV, Agrarian Reform, and Extension all do this kind of thing now); and
2. Improves the viability of native hatchery chicks by:
   a. Providing pullorum-free eggs to the native hatcheries, on some kind of exclusive contract basis (see Appendix A for suggestions on how this might be done).

   While this would mean that villagers would no longer have a local

market for their eggs, at present surplus eggs are channeled into Cairo and Alexandria markets anyway by local merchants, and as long as there remained sufficient demand for table eggs, there need be no substantial disruption of local marketing networks. However, at what point demand for table eggs could be expected to peak is something best answered by the data analysis team.

b. Initiating a program of vaccinating day-old chicks at the native hatcheries before they are peddled to villagers.

3. While there is frequently talk about the desirability of doing away with native hatcheries, it seems to me this is not desirable or economical at present for a variety of reasons:

a. The native hatchery capacity is substantial, already exists, and probably requires less capital than do modern hatcheries (not to mention less repair). Hence to do away with them seems to be a costly proposition unless they are proven to be substantially inferior in product. However, that this is so is not clearly the case, judging from Tom Wiens' report of 20 March 1979, where the difference in hatchability appears not to be all that great (75% for modern hatcheries vs. 61.4% for native).

b. It is not clear whether modern hatcheries have higher hatchability simply because they get better eggs, or whether other factors are involved. A controlled comparison between the two should be made. It may be that supplying native hatcheries with clean eggs and instruction on fumigation would bring their hatchability up to par.

c. Native hatcheries do supply chicks cheaply and when needed on credit, thereby providing needed services to the poor.

III. Nutrition

Inadequate nutrition and management is the second-most important problem. Many people buy some feed, but it is usually grain rather than balanced feed; there is a shortage of the latter. Prices for both grain and feed have increased rapidly and are perceived as high. Increased supply of balanced feed at reasonable prices (i.e., certainly not higher than at present) would be a boon to many, but we must realize that many people are not prepared to buy balanced feed if they can feed the chickens off their own land, which they may perceive as feeding them for essentially nothing. For this reason, I see increasing the supply of balanced feed as second in importance to disease control, for a vaccination program will benefit a larger number of people than will increased availability of feed, though both are highly desirable.

IV. Flock Management

Much could also be done educationally to make people more aware of the importance of a balanced diet and better management. At present, not much poultry extension work actually gets down to the ordinary villager, in part because extension agents are often occupied primarily with crops rather than livestock, and in part because village projects rather than household flocks seem to have first call on whatever poultry services are available, though such projects may have a demonstration effect for village flocks. In general, three kinds of efforts are necessary to improve the situation:

1. More systematic education and information needs to be made available to villagers, perhaps through more effective use of the media (many people and households have transistor radios); perhaps through holding well-publicized poultry management clinics.
2. Carefully-controlled demonstration projects need to be set up in selected areas to show the combined effects of pullorum-free eggs, vaccination, better feed and management on village flocks. This will probably be the most effective means of educating the villagers. Lee Herrick in his report suggests several models for such projects.
3. Since women are the primary producers of rural poultry, special efforts should be made to insure that educational efforts are aimed at them and that they have equal opportunity to participate in demonstration projects. Sending out to the villages on a regular basis women extension agents, preferably of rural background, who could hold

poultry management clinics or explain how to participate in demonstration projects would help in this endeavor. There are women in the delta who do participate in village poultry projects, and this kind of thing should be encouraged. Too often development projects make new opportunities available to men only, thereby undermining women's traditional importance in the local economy; whereas providing such opportunities to women as well as to men is equally important for family welfare and local development.

V. The Question of Breeds

The question of whether native or foriegn breeds are better will have to be solved by the poultry specialists. Most but not all Egyptians (veterinarians, agricultural enginners, and flock owners alike) maintain the native breeds withstand local conditions better. Yet villagers are receptive to trying new breeds, and have tried them in the past.

VI. Receptivity of Villagers to Change

In general villagers are receptive to trying new techniques, breeds, and feed supplements for chickens, provided they are available and do not cost too much. What is more difficult is getting them to follow and continue following a consistent and balanced regimen of care throughout the life of the flock (e.g., subsequent vaccinations, maintaining balanced rations, etc.). At present, many of those who are concerned with improving production utilize any promising innovation that comes along, without regard for the compatibility of the various new products or techniques they use. Improvements in this domain will require educational effort and follow-through.

VII. On the Selection of Projects for Implementation

Though one of the goals of the poultry improvement project is to increase and improve poultry production in Egypt, the other aspect of that goal is to do it in order to increase protein consumption and, in terms of AID's overall mandate, to see that the results benefit "the poorest of the poor." With this in mind, a number of things need to be said.

1. First of all, there are generally two kinds of strategies that could be used to increase poultry production among the rural poor. One is increasingly to commercialize poultry production, on the assumption that the increased efficiency will ultimately lower costs sufficiently that even the poor will be able to buy eggs and poultry for consumption. While this strategy, if successful, may have long-term benefits for everyone, including the poor, in the short run it may be risky (many projects in Egypt have failed) and the immediate benefits may go mainly to the wealthier village entrepreneurs, rather than to ordinary village producers and consumers.
2. The other is to improve the viability of village flocks, enabling villagers the better to meet their own consumption and petty cash needs now. While household flock production may never be as efficient as more commercialized operations, it does serve a real need, and can be improved substantially (ca. 30%) by an effective vaccination program and (ca. 20%) by supplying better chicks, and the benefits of such a program would both be immediate and distributed among rich and poor alike.

3. While both kinds of efforts should be supported, which strategy of poultry improvement will in fact prove better adapted to Egypt's needs is not necessarily clear and must be deicded on the basis of results rather than a priori assumptions. While household flocks are probably unable to improve the nation's poultry production substantially, they still can be improved. On the other hand, what the costs and benefits of full-fledged commercialization will be are not altogether clear, in view of Egypt's resources and organizational problems, notably of distribution and supply. It may well be that decentralized, village-based commercialized poultry production (i.e., the domain of local entrepreneurs and village projects) will prove more efficient and viable than larger, more centralized operations in meeting rural needs. Furthermore, efforts to move toward full-scale commercialization may represent a substantial and radical shift in the local economy, both in terms of cost and in organization, given that virtually all of rural Egypt's poultry and egg consumption is locally-produced, and villagers send substantial amounts of poultry and eggs into city markets as well. For these reasons, until the benefits of large-scale commercialization are in fact proven, any such strategy of development must proceed only gradually, in order to minimize disruption to the local economy.

In the meantime, village flocks and small-scale commercial producers need to be supported, first by vaccination programs and better chicks, which benefit everyone, and then by the dissemination of

improved management techniques, which are of most benefit to larger flock owners, some of whom may be encouraged to go on to increasingly commercialized production. If and when commercialized production finally does produce better and cheaper chickens and enough to satisfy demand even in rural areas, at that point village flocks will presumably disappear by themselves, without damage or hardship to the local population.

b. It is difficult for villagers to bring their flocks far and often they are reluctant to. (One informant said they fear others will be envious or wish them ill - the evil eye - if they see their flocks.)
c. I am not convinced that such services are well-publicized.

4. On the other hand, most villagers are aware that vaccination does some good, and declare their willingness to vaccinate if vaccine were available:
   a. Though some are unwilling or unable to pay-
   b. And some vaccinate only after there is already an epidemic in the village, when it is usually too late;
   c. Villagers may find it difficult to bring their chickens to the veterinary center.

HOW TO REMEDY THIS SITUATION: POSSIBLE SUGGESTIONS

Make sure that vets go out to villages on a regular basis to vaccinate village flocks. (Question: How many times a year?)

Can facilitate this by:

1. Providing transporaation. Here motorscooters might be cheaper and more effective than cars, though there may be some reluctance to use them (see below). Cars are in great demand, and often there are competing claims on their use. This means that even when a car is available, several people may need to be dropped off on the way, certain errands may need to be run first, etc. This in turn means that there is a lot of time spent waiting and coordinating, which could be better spent administering veterinary services. But if each individual had a motorscooter, he would be able to cut through some of this delay. However, it is not clear vets would be willing to ride motorcycles on back roads.

2. On the other hand, there probably is a need for supervision or accountability, to make sure that the vaccine actually goes to the villagers for whom it is intended, and is not sold to friends and relatives instead. Hence the goal is to have the minimum number of individuals necessary to get the vaccination and supervision done, without proliferating the number of individuals to the point where coordination is impossible. Since a vet is not really necessary to carry out the vaccination, exxcept to assure that the vaccine is properly mixed, maybe the best strategy would be for a vet and a number of assistants to go to a village on a particular day, then disperse to different quarters of the village to blanket the entire village in one day. The assistants could be anyone - lower level village officials or workers- students from the nearest agricultural high school, etc.

   If we consider that 1 person could vaccinate approximately ?
   chicks/hr. . . .

Task 060 Village Flocks June 24, 1979
Dr. Barbara K. Larson

APPENDIX A

PRELIMINARY THOUGHTS ON PROGRAM FOR VILLAGE FLOCKS

D R A F T

1. The number one problem in village flocks is disease, especially Newcastle and pullorum, which routinely wipe out entire flocks. Until this is tackled, there is probably not much to be gained from improvement in other areas (such as feed and management). Hence, the first and immediate line of attack needs to be to bring these diseases under control.

2. This requires 2 courses of action_
   a. Supplying vaccine and/or vaccinated chickens to villagers; and
   b. Supplying pullorum-free chicks to villagers.

3. While it is up to other task forces to figure out how to increase the quality and supply of vaccine and how to produce pullorum-free hatching eggs, it is team 060's responsibility to figure out how to get them to the villagers. Toward that end, the following points must be taken into consideration:

A. CONCERNING SUPPLYING VACCINE TO THE VILLAGERS

1. At present most villagers do not vaccinate their chickens because:
   a. The supply of vaccine is limited or unavailable;
   b. Veterinarians do not make housecalls or go to outlying areas to vaccinate chickens:
      - in part because they have more important priorities (large animals take precedence over small; and in general, agricultural concerns are more important than animal husbandry)
      - in part because they lack incentives;
      - often because they lack transportation (this was critical in Bahgoura);
      - sometimes because they lack means to keep the vaccine chilled away from veterinary centers-
      - sometimes because vets are reluctant to open a 1000-dose ampule to serve the needs of a few small flocks.
   c. Where veterinarians do make housecalls or vaccinate small flocks, they often charge 1 PT/chick for the service (in one case, as much as 3 PT/chick) although it is supposed to be free; this automatically eliminates poor people.

2. Establishing rearing houses to sell chicks at an older age (from 21 to 60 days) and after 1 or more vaccinations eases the problem for those who can afford to buy them, but does nothing for the poorest segments of the population, who need the benefits the most.

3. Having fixed hours at which people can bring their flocks to the veterinary center to be vaccinated is of some help, but it is not very effective because:
   a. Most villages don't have this service;

Another alternative might be to turn vaccination over to private entrepreneurs operating as the chick and egg peddlers do. At present, vets seem to need some financial incentive to vaccinate village flocks in outlying areas on a per/chick basis, but 1 PT/chick seems unnecessarily high, particularly if there is systematic village flock vaccination, and therefore high volume, rather than on the present basis, which seems to be in response to crisis.

3. At the same time, there must be some provision to insure that costs are not prohibitive to the poorest villagers, perhaps by allowing them credit or to repay in kind (i.e., in eggs, once the chickens produce).

4. It is impractical to visit every household flock, but ineffective to have vaccine available only at veterinary centers. There will have to be some kind of mobile vaccinating unit (i.e., a person with thermos on a motor scooter?) which goes on <u>regular, well-publicized</u> vaccinating missions to each village. (We need to work out how much he could be expected to do in a day; what the sehedule should be.)

   However, it is not enough to go to only one place in each village, for each village is a collection of neighborhoods and attached satellite villages or hamlets. It would be better if he could make a series of stops in each village, in different quarters and hamlets, in order to facilitate getting the vaccines to the people who need it, and to have distribution points within easy walking and carrying distances for villagees. (After all, if merchants can make the rounds of the villages to buy chickens and eggs, a veterinarian should be able to do it, substituting motor cycle for the traditional donkey.)

   One suggestion was that the reception rooms of large kin groups could be used as a place for vaccinating. (All large houses have a reception area for receiving visitors, and often have a courtyard as well. Since most neighborhoods are knit together by ties of kinship and neighborhood, probably most of the residents of a neighborhood would have access to that household, and one could select strategic households to provide the site of vaccination for neighbors and frineds. This would also mitigate reluctance based on the fear of envy of strangers, since presumably relatives and neighbors already have some idea of one another's flocks.

5. Veterinarians will need to be further encouraged by specifically including a section on their work with village flocks in their annual reports. At present, this is just buried under more general categories of evaluation, and we have heard repeatedly that poultry in general and village flocks in particular are low priority in terms of the veterinarian's general duties.

6. Indeed, more emphasis on the importance of poultry is needed in all braches (extension, veterinary services, agrarian reform) and at all levels.

B. CONCERNING THE SUPPLY OF PULLORUM- FREE CHICKS TO VILLAGERS

There are at present 3 main avenues of distributing chicks to the villagers, and most chicks are procured through these channels, since the total number of chicks hatched at home is relatively insignificant. These are:

1. Day-old chicks from the government hatcheries distributed through extension or agrarian reform (or agricultural cooperatives: this needs to be checked out); or sold directly to the public.

2. Older chicks which come from the same sources but are sold to the public from rearing houses which are run by the governorate, extension, or as local village projects (or occasionally as projects privately owned and operated).

3. Day-old chicks from the native hatcheries, which procure their eggs from the village flocks. There are also a certain number of mechanical hatcheries owned privately or as village projects, but their output is relatively insignificant at present.

Of these 3 sources, the native hatcheries supply the cheapest chicks (though their mortality is highest), at a price of 10-12 chicks/LE, and usually will sell chicks on credit if necessary. For this reason, the native hatcheries are the sole supplier for the poorest segment of the population, while villagers who are in a better economic position alternatie between buying native hatchery chicks or government poultry station chicks (1-day or older) depending on availability. Thus any program to supply chicks to villagers should aim at reaching people at both economic levels, i.e., by supplying chicks both through public distribution channels and through the native hatcheries.

Distribution through public channels presents no real problem once the production of pullorum-free chicks is assured and increased. the problem is how to insure that native hatcheries accept only pullorum-free eggs. Here the best solution seems to be to put native hatcheries, on a voluntary basis, under contract to hatch only pullorum-free eggs. The eggs would have to be stamped in some way so as to be immediately identifiable, and the hatchery owner would have to agree to allow unannounced inspections to verify he is living up to the terms of the contract.

However, there are several potential obstacles to such a plan which must be taken into consideration in working out the details:

1. First and foremost is the poobability that many hatchery owners may be reluctant to enter into an exclusive contract, because relying solely on government-supplied eggs would mean that public records would be kept on the volume of business they do, and this would make it harder for them to evade taxes than it is at present, when most hatchery owners keep separate sets of books for themselves and the tax collectors. (It should be remembered that hatchery owners were at first very reluctant to speak to me because they feared I might have something to do with taxes.) They will probably be persuaded only if there is sufficient profit in it for them.

2. If these pullorum-free chicks are to reach the poorest stratum of the population, which needs them most, 2 things need to be assured:

   a. That the prices remain competitive with current prices, because for the poor, price is the determining factor as to where they buy their chicks, and an extra piaster or two per chick would be prohibitive, at least until there is a certainty that the livability of these new pullorum-free chicks is substantially greater than the ordinary native hatchery chicks. This will take some time to be convincing, since even if pullorum is eliminated, the chicks may die from other causes (or will the effects be immediately apparent?). Keeping the prices competitive will probably require government subsisdy, at least initially.

   b. That the poorest segment can have some form of credit or payment in kind, because at present poor villagers can pay in eggs, either immediately or after the chickens begin to lay. Under contract, the native hatcheries could not, of course, accept village eggs in repayment, but I do not think this is a problem because at present egg merchants (and the chick and egg merchants may often, though not necessarily, be the same person) sell their eggs both to the native hatcheries and for table eggs and table eggs are sent from all over the country (including Upper Egypt) into the markets in Cairo. It is my guess, then, that the eggs that ordinarily would go to the native hatcheries will find their way to Cairo instead through the already established marketing channels (see the report on marketing channels in Bahgoura), and that at present there is probably sufficient demand for table eggs to absorb them. (At what point that demand will peak, I have no way of knowing.)

3. It must be made clear to villagers which of the chicks they buy are pullorum-free, in order that they themselves can verify that there is differential mortality. Initially, if native hatcheries get pullorum-free eggs only on a voluntary basis, there will be some hatcheries which are clean and others which are not. Chick peddlers, however, if not hatchery owners themselves, are likely to buy chicks from all or any hatcheries, and thus conceivably could sell mixed batches of chicks. Thus it is important that villagers be able to distinguish clean chicks from the others.

Sept. 9, 1979

Vicki —

This June 24, 1979 report was written before going to Behira, & ~~before the~~ therefore some parts need to be revised. In particular; ~~[illegible]~~

1. Behira hatchery owners were receptive to the idea of getting pullorum-free eggs; they seemed not to be worried about tax collectors, ~~[illegible]~~ in contrast to the hatchery owners in ~~[illegible]~~ Qena governorate.

2. Dakroury Sabet of ORDEV thought; it would work better to make it compulsory for native hatchery owners to take government supplied, pullorum-free eggs; a voluntary program would not be sufficient. I am not sure whether or not I agree.

I may have other comments as well, but will get to them this coming week when hopefully I can get time to sit down & finish the analysis.

Barbara

Best Available Document

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Raw Data File Tues. 7/3/79 1
Visit to Native Hatchery in Damanhour

This hatchery, owned by Mohammed Awad and his 4 brothers, is the most impressive native hatchery I have seen yet. It is large, with 5 hatcheries in the complex, 4 with 10 ovens each, 1 with only 6. Each oven has a capacity of 6000-9000 eggs. In addition, they also have poultry houses in which they raise half the chicks they hatch to 15 days before selling them. The complex itself is large, orderly, clean, and well-managed. There is a large business often and reception area, rooms for the initial culling of eggs (which is done by candling them in front of a lantern), and for storing the crates. The poultry houses are well-ventilated, have antiseptic or whatever in front of the doors (though the level was low; Soheir told him it should be higher), and generally looked clean and fresh. The hatcheries were similar in form to the standard hatchery, with one exception: There are raised platforms on either side of the main aisle on to put the newly hatched chicks on; these are rimmed, and neatly keep the chicks out from underfoot, in contrast to the usual practice of putting them in the aisle itself. At the end of the aisle was a small pen where the hatchery worker kept his own small flock of chicks. The owner whom we talked to was also impressive in his receptivity to new ideas. He does not fumigate his eggs, but when Soheir explained why it was useful, he quickly wrote down the name of the chemical (potassium permanganate) and the proportions which should be used. (Interestingly, another man sitting there who had his own private mechanical hatcher knew about the utility of fumigating eggs.)

As for the working of the hatchery, it is similar to many. A new batch of eggs is set every 2 days. The eggs are culled before being put into the ovens. Out of 12,000 eggs, usually 8000 are set. After 6 days, the eggs are candled. Of the 8000 set, ½ (4000) are fertile in summer; 2/3 in winter. After 21 days, only 3000 of the initial 8000 set hatch; in winter this number is 4000. One oven thus loses

Raw Data File Tues. 7/3/79 2
Visit to Native Hatchery in Damanhour

about 50LE because the eggs are no good.

He sells 1-day old chicks unvaccinated, but vaccinates the chicks raised to 15 days. They vaccinate by eye drop or in water. They buy imported vaccine from the market for 3.5LE for 1500 doses.

He has 50 or 60 agents working in 15 villages, 3 or 4 agents in a village. He gives them money in advance to buy up eggs in their villages, which they do every day. He then sends out his cars (they have 3) twice a week to collect the eggs. The agents (merchants) buy eggs for 3-5PT each, and make 3LE profit on 1000 eggs. The hatchery gets about 5000 eggs/wk from all the villages in summer; 8000 in winter. The villages in which he has his peddler-agents are Damanhour, Dilingat, Khosh, Shubra Khit, Kum Lakhdar. The excess eggs he sells in Alexandria, and he also sells to Groppi, especially in summer. His agent (permanently employed) goes to sell them, and he sells them at 37LE/1000 in summer, because of fear of spoilage in the hot weater.

The chicks are sold (wholesale) for 7.5PT in summer; 8-8.5PT in winter. They are mostly baladi, but sometimes there are Dokki 4. The 15-day old chicks are sold for 11 PT. He has 10 employees who distribute the chicks to the smaller merchants at these prices; the employees take 2-3LE/1000 chicks. The 100-150 merchants to whom they distribute them sell them for what they can; they are different individuals than those from whom he buys eggs.

5 brothers own these hatcheries, and share in the profits equally, and all have a hand in its operation as well. They employ 3 people in each furnace, 1 supervisor and 2 workers. The supervisor gets 12LE for each oven, which amounts to 15 ovens per month (because each cycle is 21 days and the ovens are set consecutively) or 180LE/mo. Out of this he pays his 2 workers 30LE/mo., plus their food. All receive lodging free at the hatchery. All the workers come from Birma, in the markaz of Tanta, which specializes in native hatcheries.

In addition they employ 7 workers in the poultry houses, and 3 drivers.

3 of the hatcheries work year round; the other 2 in the winter only. The owners are from Damanhour. They would welcome any program to provide clean eggs to the native hatchery, since their hatchability and hence their profits would go up.

They also hatch some ducklings.

They have owned the hatchery since1960, I think.

Raw Data File
Visit with Merchant in Native Hatchery in Damanhour Tues. 7/3/79

Mohammed Kutb Zilibari is also from Birma; he sells chicks for the native hatchery and also hatches ducklings in a mechanical hatchery of his own. He has 2, with 2000 capacity each. He buys hatching eggs from the Native Hatchery in Damanhour for 3.5-4PT; sells ducklings at 20 PT each. He sells the hatchery's chicks for 10PT ea., making the rounds of 3-5 villages (including Sharnub) by bicycle. He sells his ducklings at 1 day or 6 days; fumigates, but doesn't vaccinate. Of 2000 duck eggs set, 900 hatch. He sells for cash and on time, but might wait up to a month for payment; would charge interest only if someone were delinquent a year. He also was receptive to any plan to provide clean hatching eggs.

Task - 060 - VILLAGE FLOCK

6/25/79 - Lee Herrick

FINAL POULTRY TECHNICAL REPORT

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INTRODUCTION

This is the poultry technical part of the Village Flock team, task 060. It does not include the Sociological aspects. They are also equally important, as the village flocks are more than just technical poultry production, they are a way of life, a part of the nation's culture, as they were in U.S. in the 1930's and earlier.

The information includes the 1978 and 1979 observations of 127 village flocks in 43 villages in 14 Governorates. There are 25 Governorates in Egypt, each with 4 to 10 districts, or approximately 175 districts in all. Also observed were 6 Extension Service Poultry Units, 11 Village Council units, 1 ORDEV unit, 1 GPC unit, 4 Extension Poultry Villages, 5 native hatcheries in 4 Governorates. Included in the 127 village flocks are 6 producers large enough to be considered commercial, and 26 large village flock producers with over 50 chickens.

The general structure of village flocks were 5 to 20 chickens of all ages, 3 to 10 ducks, 2 to 5 geese, 2 to 5 turkeys, and 5 to 15 pigeons, all in the residence or on the rooftop. Only 13% could get out of the house and possibly be scavengers.

Towards the last of the village flock visits I felt "saturated" with the village flock observations, and satisfied that I had the feel for the village flock situation. More visits would not increase the information on the technical aspects of the village flocks. If more detailed figures should be needed, it is suggested that an enumerating project could be conducted, similar to the Dutch Fayoum Study Project by Cairo U.

All figures in the January 1979 interim report were provided by Dr. Larson. At that point I was not quite satisfied with my feeling for the village flock situation. The tables with this report were taken from figures in individual reports of both trips, 1978 and 1979. The purpose of the village visits was to observe the poultry technical conditions, and to see how they could be improved. Tabulation of facts was secondary. Hence, not all questions were asked at all flocks which accounts for the less than 127 flocks tallied in

most tables.

Dr. Larson will no doubt obtain very accurate and detailed figures on the two villages she plans to live in for 3 weeks each during the May-July 1979 period. These could be quite helpful to the project. They will be more accurate and detailed than the figures obtained by the very short visits made and reported in this report. On the other hand they will give only a picture of two villages, as compared to the larger and broader number reported here. Both reports should serve a useful purpose.

DISCUSSION

Figures in Egypt often do not tally out when obtained from different sources or from the same person at different times. All consultants have no doubt had this experience. Such things as number of buildings on Government farms, number and capacity of incubators can be physically counted to check accuracy. But many other items can not be, such as number of chickens, percent hatch, number of eggs laid, etc., so some of the tables in this report are "educated guestimates" and I sincerely hope that they are reasonably accurate. Of all the tables I have least confidence in "number of eggs laid per hen per year". Others I feel more confident about though I recognize we are often told what folks think are good results, not their actual results. For example, in one village the answer to the question "How many chicks died from day one to six months old?" was always "none died", which was not logical. The interpretor in that case probably influenced the reply.

Areas of responsibility of several teams overlap and recommendations seem to be similar. The Poultry Health Team, Task - 070 - shows adequate concern for the health problems of the village flocks. The Breed and Hatchery Improvement team, Task - 040 - recognizes the need to get better bred chicks to the villagers, as well as ones with less pullorum and other diseases. The team's planned field testing of Baladi, Fayoumi, Dokki IV and other breeds at Animal Production Research Stations to demonstrate the actual performance of the different breeds and under the different feeding conditions, should give excellent factual information. The tests will probably show facts that the consultants feel reasonably sure of, but they will be of much more value than just plain advice. The Feed Supply Team, Task - 055 - is concerned with the over-all supply of feed, another critical area for villagers because for all practical purposes the villagers just can't buy balanced feed. One exception is for the few folks cooperating with an educational Service, such as Extension Governorate, ORDEV, etc., where balanced feed is uaually available the first 21 days. However, this is not adequate. Poultry keepers need feed for birds of all ages at all times. An over-all plentiful supply in the whole country would make it available to villagers as well as commercial producers.

Many cases of underutilization of resources and facilities have been observed

at both government and private farms, such as brooder houses being used only one or two times a year instead of five or six times.

Management education needs continued and increased emphasis, as there are many "little things" which could be done to reduce morbidity, mortality, and costs, thus increase returns. This includes chicks with better breeding, health, better feeding, disease prevention and control, separation of the species and age groups. It is recognized that the small flocks of 10 chickens, 5 ducks, geese, turkeys, 10 pigeons, will not change, nor have any separation of the species, nor would it be practical. But this is for the larger flock owners with 50 or more birds, the 26% of the flockowners seen in most villages. The other factors of breed, etc., would also be more economically necessary...for these larger flocks. Other "little things" of mismanagement noticed include keeping the heat on the brooder stove for 35 days, feeders too small, set too low and on the floor, and of poor construction permitting much feed waste. (SEE RECOMMENDATIONS)

Extension Service historically worked with crops, some livestock, and a little with chickens, since that was the order of importance in Agriculture in Egypt. They are working more and more with poultry as time goes on, already have a large poultry program, and plan expansion. Details are given in two appendices.

Some people who are well educated, and know, or should know, good poultry practices are a big disappointment. As examples, the Director of the Veterinary Department in Fayoum has 150 chickens on the rooftop above his apartment in the city, and yet feeds the "Local method" of grains, berseem, etc. He could purchase a balanced feed from another Gov't Veterinarian in Fayoum, who makes it for his private flocks of 10,000 chickens, and sells to anyone wishing to purchase. Also, the Director's wife is educated, and a Physician. In a village in an Aswan Governorate I was informed that they always suffered a 50% loss of chicks the first 10 days. When I inquired if they asked the Native hatchery to reimburse them, they said "no", and was told by a well educated Egyptian that "Chick mortality was an act of God, and this will never change". A flock of about 800 birds in Karr El Sheikh Governorate owned by a physician was being fed a purchased "balanced" ration. However,

he felt unsure of its quality, so was adding various protein ingredients to the ration, with no idea as to whether it helped or hurt. In fact he said that sometimes his flocks did better when he didn't add anything....A Minya Physician with 6,000 Fayoumi pullets and layers was purchasing a balanced ration, but giving the birds all the milo they wanted, saying that "Milo gave the birds strength". A poultry professor at Cairo U. with a PhD in diseases from a USA University has a private flock of hatching egg producers, but does not blood test them. How can less informed villagers be expected to use good management practices when people like these do not?

Balanced poultry feed for the villager is generally not available. Under some Government programs it is provided for the first 21 days, but not longer. A few people add one or two items to their local ration of grain, waste, etc., as fish meal, dried blood from the local slaughter slab, cottonseed meal, soybean oil meal, antibiotics, vitamins, etc. Some go farther and buy a "mixed ration" which is practically the same, but made by others for sale. One "mixed ration" consisted of yellow corn, fresh boiled fish, berseem, and kitchen waste. Several others make a balanced ration, obtaining the formula from Extension Service/MOA, or other source. The veterinarian in Garfis, Fayoum will sell his ration to other poultrymen, but the man in Minya produces only for his own use and will not sell. And, although he feeds the balanced ration to his own flock, he purchases chickens and eggs for his own family's consumption from neighbors who feed the local way, "because they taste better". Three villages in different Governorates indicated that some kind of balanced feed was available, although they were rather vague about the source. Many more feed mills are needed, and two services made specific mention of their needs, Minufiya Governorate and Dakhlya Extension Service.

78% of the villagers want to vaccinate their birds against Newcastle, but only 62% do so. Shortage of vaccine, or veterinary service, accounts for the difference. There appears to be a need of more vaccine, clinics, veterinarians, and probably enthusiasm too. One villager stated that they bought vaccine in a pharmacy, and did their own vaccination. Another had connections in Cairo, imported from Europe, and did his own vaccination.

Production of started chicks to sell to villagers, usually to 21 days,

sometimes to 60 days, is a sizeable project of several services, as Extension, Governorates, Village Councils, and ORDEV. The villagers appreciate this service. One private person in each of Dakhlya and Aswan Governorates produced started chicks for sale.

Briefly, problems include native hatcheries, breeds, Newcastle/and pullorum disease, feed, management, and people. The native hatcheries contribute to the continuation of pullorum disease. The breeds developed in Egypt, Fayoumi and Dokki IV, though better than Baladi, contribute to the lower egg production than could be obtained with later model bred-to-lay breeds importable. Both items are such a great source of national pride that they handicap progress. Lack of a complete Newcastle vaccination program contributes to mortality and financial loss. Scarcity of a balanced feed costs villagers a large amount of money, because they do spend money to give their birds grains, etc., to eat, and their local method with unbalanced feed is very inefficient. Management know-how is lacking, or at least its application, in a very large percent of flocks. Some, probably less than 5%, are managed well. Informed, educated people, operating so inefficiently as observed at some farms, was very disheartening.

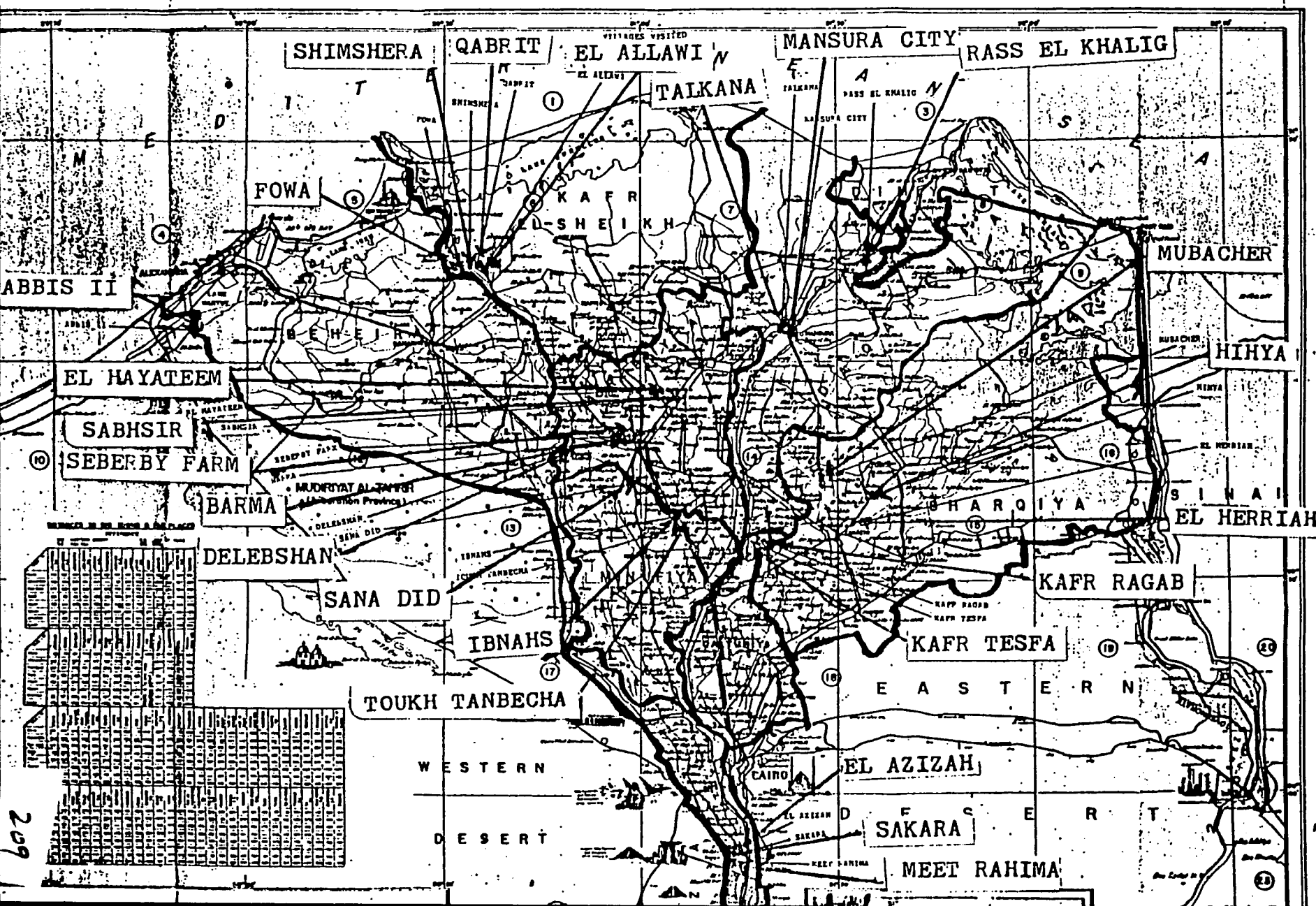
RECOMMENDATIONS

1. Provide native hatcheries and private electric incubators with pullorum free eggs from blood tested hens. Improve hatching egg supply by encouraging village flocks of 100 to 3,000, separate housing, balanced feed, disease prevention program.
2. Extension, or some MOA branch, should plan now to replace the chick supply that may be lost to villagers if Seberby Farm, in Gharbya Governorate, is changed to a joint venture commercial parent broiler breeder stock unit with a foreign company.
3. Increase production of better bred and disease free chicks on Government farms for villagers. Provide production bred chickens, either for egg production or meat production, for villagers who want them. Emphasize egg type unless meat type is especially requested.
4. Provide more feed mills to make balanced feed available to the larger producers, especially the hatchery supply flocks, and also adequate to meet the demands of even the small village poultry keepers. Feed mills could be either private or government. Encourage small private commercial producers who are now mixing a balanced ration for their own flock to enlarge feed production and sell to villagers. An example would be Mr. Ahmed Mahmoud, Minya City and Tala Village, who supplies his own flock but will not make extra for sale. One producer, Dr. M.F. Ezzelie, Garfis, Fayoum, does sell to other poultry keepers. He will sell the complete ration, or hard to obtain ingredients if a poultry producer wants to mix his own. The Extension Poultry Unit at El Mansura, Dakhyla, mentioned a need for a feed mixer, and it should be provided. Probably Extension Units at other Governorates need mixers, and it would be extremely helpful if these were provided.
5. Provide adequate Veterinary Service to all villages, especially vaccination programs. Villages without a veterinary clinic should have scheduled visits by a veterinarian from the nearest clinic. Supplies, as vaccine, thermos flasks, needles, syringes, transportation, must be available. Combine an educational program of sanitary management for disease prevention and vaccination.
6. Increase the educational programs for better management, feeding, housing, sanitation, breeds, by Extension and other organizations involved in

farmer education. Emphasize youth poultry projects with Extension, as 4-H type. Young people are easier to teach, and in a few years they will be the adult farmers.

7. Provide a long term, two year, advisor to work closely with Extension. Provide a resident advisor to assist with the little day to day management details as feeder and water height, size, time of brooding, etc. in Dakhlya Governorate or in a similar situation. A person could cover one, two, or three Governorates. It could be a man or a woman, as there have been quite a few women graduates in poultry husbandry the past few years, who are now working commercially or educationally. The person should live at Governorate headquarters, and could assist all government poultry units of the various services, plus village flocks with Extension, ORDEV, Village Councils. When farm managers know the advisor will return, and can follow through on management suggestions, they are much more likely to take suggestions more seriously. That system would be much more effective than a one time visit.
8. With so much Extension Service activity and assistance to poultry people, and to Mathtech consultants, at both Cairo H.Q. and in the field, they should really be "in on the act" and officially included in any future project. When travelling with ORDEV or the Animal Production Research Institute Section, Governorate contacts are Animal Production, Extension, ORDEV, Veterinary, with one person of those group accompanying us to villages, and explaining the Governorate program. Extension is the service that does this a large part of the time.
9. Increase the number and involvement of Extension Poultry Villages.
10. Initiate one of the 4 outlined Village Poultry Flock Improvement Plans in several Governorates. Try all 4 plans in different Governorates, and villages, but only one plan per village.
11. Provide long term practical working training to teach the simple, but important, facts of management. Have the trainee actually do the work of several tasks - incubation, care of broilers, layers, egg packaging, etc., for a period of at least two months per task. This training could well be in U.S. The trainee should have a farm management responsibility upon returning to Egypt.

VILLAGES VISITED



VILLAGES VISITED

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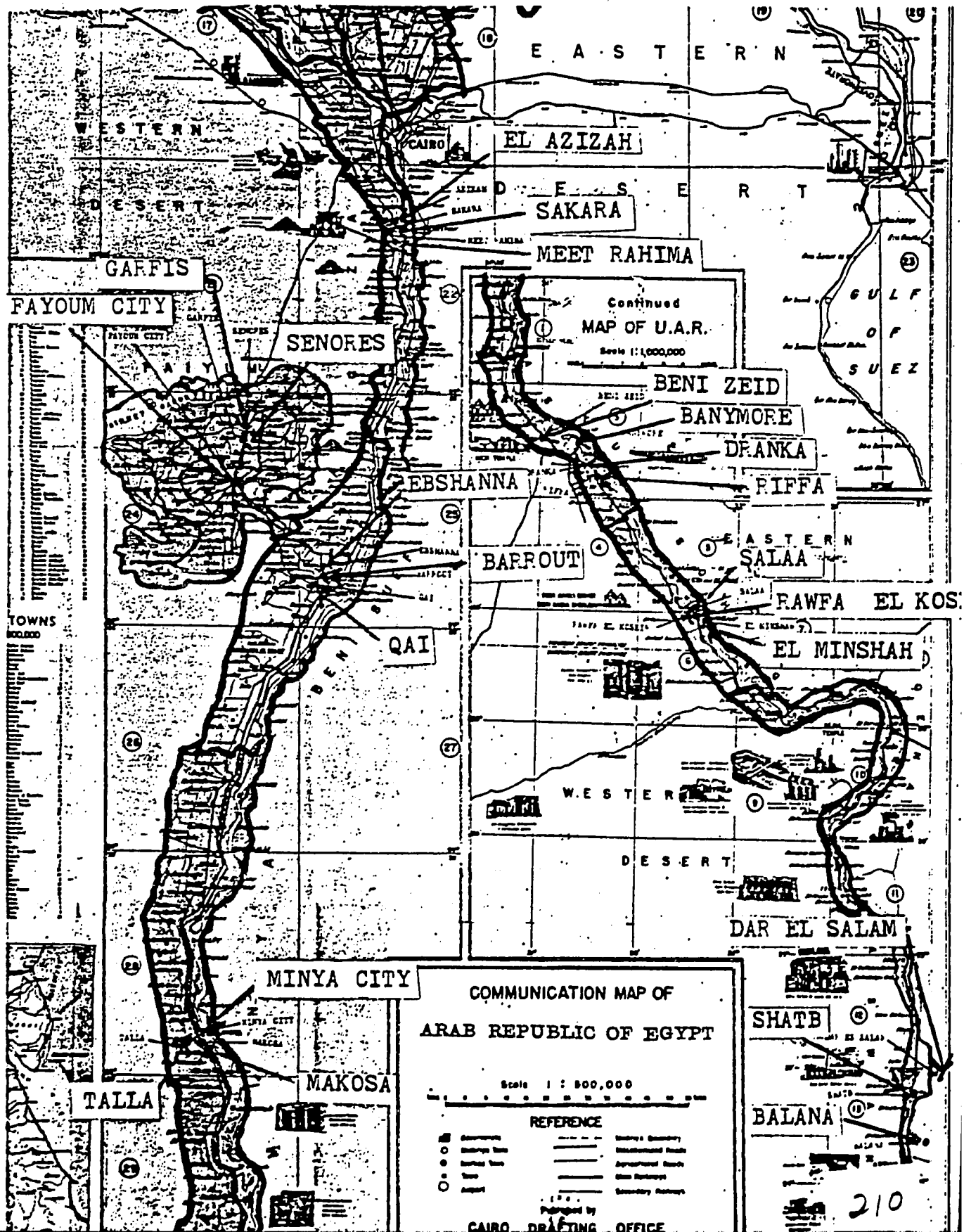

(2) VILLAGE FLOCKS - HUSBANDRY PRACTICES
- EQUIPMENT NEEDS
- CREDIT NEEDS

The typical village flock has 5 to 20 chickens of various ages, 3-10 ducks, 2-5 geese, 2-5 turkeys and 5-15 pigeons. Over 50% of the flocks are Baladi, over 30% are Fayoumi or Dokki IV, the balance mixed or commercial type. Nearly 90% feed the customary native way, with grains, greens kitchen waste, a little over 5% feed balanced feed, and the other few go part way towards giving a little better diet than grains and greens by adding some high protein ingredients such as dried blood or cooked fish.

Poultry is normally housed in the residence in the kitchen, bedroom, living room, sharing the quarters with the family. Sometimes when the family also owns livestock, as goats, cows, there is one room for poultry and livestock. The 2nd and 3rd floor rooms and rooftops are popular for poultry, with only 13% of the flocks on the ground floor and permitted to go out of the house. Often chickens are confined to a very dark room.

Equipment is practically non-existant. It is the usual practice to throw whole grain, berseem, kitchen waste, etc., on the floor, occasionally providing a pan or clay pot, and a pan or clay pot for water. Larger flocks sometimes have imitation of commercial feeders, waterers, but they are usually of improper size, construction and use. Special boxes, mud enclosures, or clay pots are often used for setting hens, ducks, turkeys, geese. Gourds, cans, boxes are hung inside the house for pigeons to raise their squabs. Production methods have been handed down from their ancesters, thousands of years ago. See B&W pictures given Mathtech with interim report of January 1979.

When flocks become larger, 30 to 50 or over, it is more likely to find them in a room or on the rooftop. Grain is used from their own farm or purchased. Many - 81% - expressed the preference to have a balanced ration, although some specified "if cheap". Balanced ration is not available, with one or two exceptions. Projects by Extension, Village Council, etc. that provide chicks also provide balanced rations up to 21 days of age, but no longer. Either Extension, etc. does not fully understand the need of a balanced feed, or their facilities are extremely limited, which is what they say.

Most villagers, 62% of those asked, vaccinate their chickens against Newcastle disease. Asked about their preferences, 22% stated that they preferred not to vaccinate, showing a great need for educational work. Vaccination is not available to poultry keepers of all villages, for various reasons, but people included in this 22% are ones who actually do not want their birds vaccinated.

Generally, when asked, villagers speak of getting 50% egg production, or sometimes higher. Usually this means 50% of hens presently laying, and those hens lay a clutch, stop, start, stop, during the year, sometimes setting on eggs in the meantime. However, only 20% of the flocks hatched eggs under broody hens, the rest were bought from a hatchery, (53%), Government (26%), or privately (3%).

Management, in poultry husbandry terms, is non-existant, with all breeds, species, ages of poultry growing together in the same area, often very closely confined, and with farm animals.

Mortality is high. 19% of all flocks had over 50% mortality, and 39% of the flocks had between 10% and 50% mortality.

Credit for village flocks in general is not available. Small producers under 50 are not concerned. Most credit sources require a track record of costs and returns over a period of several years. Only the more sophisticated villagers and larger producers would have such a record. During the village visits, questions regarding credit were not asked of the small producers because they would not be relevant. Of the larger producers visited, it would appear that only one or two could possibly qualify with a combination of good management and good records. They did not need or desire credit. One native hatchery owner had tried to obtain credit, but with no success. A native hatchery owner would be the most likely person to have the necessary records.

Historically, Poultry credit has always been difficult to obtain. In the 1930's and 1940's it was practically impossible for a poultry producer in U.S. to obtain credit. Banks and other credit businesses were not familiar with poultry, they had heard bad stories of 50% or more death losses with

chickens, and considered poultry a very bad risk. It is necessary in any business to have a successful financial record to borrow, and it is not surprising that bankers required several years good records from poultrymen. In the 1940's U.S. banks hired agricultural specialists to advise and assist them with poultry and other farming loan requests, as they began to realize that some operations would be good business for them. Other countries observed had the same situation. In many countries special agricultural development banks have been established with government assistance to help farmers.

(3) LARGE VILLAGE FLOCK PRODUCERS

Thirty two flocks, or 26%, out of the 127 observed had over 50 chickens. See table "Flock Size", and daily visit reports for details. This is a small but significant number, and these are real potential poultry producers. They fall into two general groups, the oversize "native flock", and the "fledgling" commercial flocks, some up to 6,000 bird size. Although those in the smaller category, under 500, are not the "real native flock", there is a carry-over of native flock management methods. Education is badly needed for this group, to help them obtain better breeding, a balanced feed, proper housing and equipment; and good management. Balanced feed supply is lacking, and hence a critical need.

In spite of the large numbers of chickens, in flocks of 50 or more, 19 were feeding by the native method. Five were adding a few extras as dried blood from the slaughter slab, cooked fish, etc., and only 8 fed a balanced ration. These were the largest producers.

It was surprising that 17 of these larger flocks consisted of Baladi. Six were of mixed birds, (Baladi, RIR, H&L, Fayoumi, etc.) 7 of straight Fayoumi or Dokki IV, usually obtained from some government source, and there were 2 pure commercial bird flocks.

Only 7 provided special housing and equipment for their flocks. These were commercial type, or near commercial type, of varying quality and quantity, but only 2 had what could be considered good all around poultry conditions, at Ebshanna and Toukh Tanbacka.

It was extremely strange to hear one person in this group, with 150 birds, state that they did not want to vaccinate. Again, education is badly needed.

(4) NATIVE HATCHERIES

I. General. Native Hatcheries have been described in reports of many Mathtech Consultants. We are told that there are 600 or 700, or 708, in all Egypt, and many Governorate officials make statements similar to Mr. El Shoney, Secretary to the Governor of Minufiya Gov., "Most chicks come from Native Hatcheries, some from G.P.C." There are some smaller numbers of chicks also from other sources, as electric incubators operated by Extension, Village Councils, etc.

The Extension Service and Veterinary Service of the MCA appear to be the most knowledgeable about Native Hatcheries. Extension states that each hatchery has from 6 to 20 ovens, each with a capacity of 4,000 to 5,000 eggs giving capacity ranging from 24,000 to 100,000. One hatchery was observed with 6,000 eggs per oven capacity. They are used 6 to 8 times a year, usually October through April or May depending upon the Governorate, climate, whether in Upper or Lower Egypt, temperature, and availability of hatching eggs. This means each can set from 144,000 to 800,000 per year, which when multiplied by 700 hatcheries means from 100,800,000 to 560,000,000 eggs per year capacity.

Extension estimates the average would be 8 ovens of 5,000 eggs each, or 40,000 per hatchery capacity, set October through April, giving 250,000 eggs per year per hatchery X 700 hatcheries = 175,000,000 eggs per year for all of Egypt's Native Hatcheries. At 50% hatch this would yield 87,500,000 chicks per year, or if they average 60% hatch, 105,000,000 chicks per year. We have been given figures ranging from 45% hatch to 87% hatch, with most being in the lower side of the range.

Dr. A. G. Badawi, Extension, has stated that the MCA Statistics Year Book in Arabic has hatchery figures, but the one in English does not.

Someone told a group of Mathtech Consultants (Dr. Farid Stino?) that Native Hatcheries were licensed, and that Electric incubators were not. However, he did not know by whom, nor by what Government branch. Later, Extension said that they were not licensed, or if they were, they did not know what branch of government would be involved.

II. Description of buildings. Buildings are constructed with sun cured mud

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bricks, fire cured clay bricks, or concrete. The arrangement of all hatcheries is the same in upper and lower Egypt. One enters a room which serves as the office, storage and service area, then passes through a small door to the incubation area, into a passageway with a high arched ceiling, with ovens on each side. Each oven has an upper and lower level. Ventilation holes in the ceiling of the passageway and ovens serve for ventilation, and are sometimes closed with straw for heat control. There are small holes between the passageway and ovens for a small man to enter. There is a small hole between the upper and lower level of the ovens in the center through which a small man could crawl and heat can enter the upper level. Some Native Hatcheries have electricity for light.

III. Description of operations. Eggs are set in the upper level the first 12 or so days, with the straw burning in the lower level. It is actually smouldering, as it is not burning with a flame. Eggs are candled at 4 to 8 days, the infertiles removed and sold at half price for eating, often to the same huckster who originally sold the hatchery the hatching eggs. At 12 days the fire is stopped. Half of the eggs are moved to the upper level at that time, or sometime before the 19th day so that the chicks have more space as they hatch. Operators report from 45% to 50% hatch, with some reporting up to 87% hatch with one setting of eggs. Eggs are turned from 6 to 12 times daily, the exact number of times varying from hatchery to hatchery. The center passageway between the ovens is used for brooding chicks not sold as day olds. The ray of sunlight through the hole in the ceiling in the passageway is used for candling out infertiles. No thermometer is used: the egg is held against the lid of the closed eye to determine the correct temperature, which technique is learned by experience. Most buy hatching eggs from the villages, either direct from the villagers or through a huckster and set Baladi only. One hatcheryman reported getting 80% hatch with eggs bought direct from the villager, and 60% when bought through a huckster. Some buy eggs from blood tested Fayoumi or Dokki IV from Gov't farms, and rarely other breeds as Nichols, H&L, etc., available. Some have the Veterinarian vaccinate the chicks for Newcastle before they leave the hatchery, but most do not.

IV. Miscellaneous Observations.

Probably the most visited Native Hatchery in Egypt is the one in Garris village (or Semnories, as both addresses were given) belonging to Kamal Ragob Ghanen. During the late 1978 visit we were told that they had a contract with

the Fayoum Governorate to use only Fayoumi hatching eggs from blood tested stock from the Governorate breeding farm, and to follow a rigid sanitation and fumigation program under government veterinary supervision. The Governorate provided a financial incentive for this cooperation.

During March 1979 other consultants visiting the hatchery reported that they were using some Baladi eggs because they "couldn't get enough Fayoumi eggs from the Governorate Farm". During our visit 4/30/79 we were told they used Fayoumi eggs from the Governorate farm, and eggs from Dokki IV, Nichols, H&L, from private farms in Fayoum, and Baladi eggs from villagers. They also pointed out some 2 day old Baladi and "Sharquia" chicks, a native variety, among those being brooded that had not been sold as day old. Upon questioning, the hatchery manager changed the story and said that they only hatched Fayoumi eggs from the Governorate farm, and that they were talking about the owner's 5 other hatcheries in the area. However, there was no explanation of the Baladi and Sharquia chicks observed in the hatchery.

There is a real need for a program in which a native hatchery uses only Fayoumi eggs from blood tested parents (or eggs from another breed, as long as they're blood tested). The Egyptians have the correct idea for the ideal, but apparently something went wrong in the practical application of their idea in this case. Could it be inadequate egg supply, inadequate money incentive, or what?

The Extension Director for Dakhlya Governorate took us to Ras El Khalig, an Extension Poultry Village, where a new project has just started. They will provide the one native hatchery with Dokki IV hatching eggs from blood tested stock from a government farm, the hatchery agreed to use no Baladi or other eggs, and is given a financial incentive for his cooperation. Extension will also provide a balanced ration to buyers of these chicks for their first 21 days, and Veterinary service, including vaccination, will be provided. Before eggs are supplied the hatchery they plan to vaccinate all chicks in the village by a house to house campaign, which began 4/23/79, and up to our visit 4/25/79 they had vaccinated 3,500 chickens. They ran out of vaccine, and will complete that phase when more vaccine is received. The Extension Director felt sure that Extension could provide the hatchery's complete needs. He indicated that the hatchery got 66% hatch, and hatched 12 months a year. It had 8 ovens each with a 6,000 capacity.

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Barma village in Gharbya Governorate has 50 to 60 native hatcheries according to the Director of Extension, each with an average of 8 ovens of 5,000 eggs. This gives the village a yearly potential at 8 hatches per year of 16,000,000 eggs, or at 60% hatch, 9,600,000 chicks per year. Extension Service's list of numbers of native hatcheries for all Egypt shows Gharbya having 63 hatcheries, so apparently Barma has most of them. Dr. A.G. Badawy, Extension Service, Cairo, remarked that because there are so many hatcheries in Barma, and so many people learned the business there, that native hatchery operators all over Egypt are sometimes spoken of as "Barmese".

What a change would be made if one modern electric hatchery could replace the 50 or 60 native hatcheries! It would also mean that hatchery supply flocks would have to replace the small village Baladi flocks for a hatching egg source. Such a project should be phased over a 10 - 20 year period. This would increase the hatch at least from the present 60% to 70%, or a 10% increase, which on the 2,000,000 eggs that could be set at one time (50 hatcheries X 40,000 eggs each) in the village, would equal 200,000 eggs saved. At 4½ P. each, this would save £90,000 per setting, or £540,000 for 6 settings in a year. This is figuring most conservatively, and actual savings possibly could be two to three times this amount. It is recognized that infertiles are removed and sold at half price, reducing the estimated loss. Figure it for yourself! It would be a radical project, one with a large impact, and requiring a substantial financial investment. Work could be furnished the present hatchery personnel in new jobs in the hatchery and on the supply farms. Phased over such a long period would permit the villagers who supply the present diseased eggs to the hatcheries to find alternate markets for their eggs. Some could become hatchery flock owners. It would give even more savings by providing better bred chicks with better liveability and production. It would upset the present economic structure and might be considered socially bad over a short time specially for those wanting to maintain a "status quo", but it would be helpful to villagers involved over the long time.

Native Hatcheries sometimes custom hatch for villagers, charging 4 P per egg (Minufiya) or 5 P per chick hatched (Dakhlya).

Native hatcheries are sometimes looked upon as a matter of Egyptian culture. It is often the practice to sell chicks to villagers on credit, in contrast

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to the various government farms where almost always cash must be paid. One exception was reported. In Riffa, Assiut, people with large numbers of feddams could buy many chicks from the Village Council farm, the number depending upon their number of feddams and expected crop yields, and they could pay for the chicks from their crops, as cotton, after harvested.

It is common practice to sell infertiles at half price. One hatcheryman, in Ebshanna, said that he gave his dead embryos to villagers to cook and feed their chickens.

One hatcheryman paid £4 for 250 kg. straw, required 500 Kg. to incubate 5,000 eggs, making the incubation cost per chick 0.25 P each, or about 0.36¢. He stated that labor was performed by the owner-manager and 2 men. The men were paid £5 per 1,000 chicks hatched, to encourage them to give good attention to details.

Native hatcheries are a big waste of resources. They hatch only 50% to 60% of the eggs set, whereas if good breeding, management, feeding, incubation were used, an 80% hatch could at least be expected, which on the estimated 175,000,000 eggs per year set in native hatcheries would give a 20% difference, or 35,000,000 more chicks which at 10 P each would mean £3,500,000 more income. Admittedly this is not all loss because infertiles are sold as table eggs, an undesireable but accepted practice in Egypt, and at 10% infertiles, and 2 P per egg sale value, they would yield about £35,000, reducing the total loss to £3,465,000. However, a country can ill afford such losses. The obvious recommendation is to phase out native hatcheries as soon as possible, recognizing this will not be done overnight, but hoping that it can be done during the next generation. The above figuring does not even take into consideration the loss from pullorum disease which also is considerable.

In one Giza village there used to be 2 native hatcheries; now there are none; no reason was given. In Riffa, Assuit, the native hatchery closed two years ago because the village council's poultry project provided most of the chicks for the villagers, and in addition they were chicks with better breeding and health. This is good from the poultry technical viewpoint, but bad from the immediate economic viewpoint of those villagers who lost the market of their Baladi hatching eggs. Change for improvement is what G.O.E. wants: change

always effects some adversely and others favorably. From the long term viewpoint it is good for the villagers too, as they will have better chicks, and some will increase flock size. If "status quo" were the goal of GOE they would not have Mathtech doing its present task. Hence, this appears to be one small bright ray of hope in Egypt's dark village poultry picture.

(5) EXTENSION POULTRY VILLAGES

An Extension Poultry Village is one in which the Extension Service:

1. Cooperates with the Veterinary Service in having all chickens vaccinated before chicks are distributed.
2. Distributes improved chicks - Fayoumi or Dokki IV - hatched from pullorum tested parents.
3. The Veterinary Service vaccinates against Newcastle disease during the first three days, and again after 45 days.
4. Provides balanced feed the first 21 days.
5. Conducts educational work by village extension workers, keeps records of distribution, results, etc. of the project.

The Extension Service MOA, Cairo reports that there are 400 Extension Poultry Villages in 16 Governorates. The Gharbya Governorate Director of Extension explained that a village is kept in the plan 2 or 3 years, then dropped from the plan to change to another village, in order to apread the help to as many villages as possible. Gharbya works in 5 villages at one time, as there are a total of 400 villages in the Governorate. The MOA/Cairo report shows 30 Extension Poultry Villages in Gharbya Governorate, in contrast to the 5 presently active ones during our visit. Does this mean that MOA/Cairo's figures are for the total villages worked with and planned to work with over a 6 year or longer period, and should be divided by 6 making the total 66 villages rather than 400, to arrive at a figure of actual villages being worked with in any one year? Dakhylia also works in 5 villages, but is stated to have 42 Extension Poultry Villages on MOA/Cairo's list.

Extension, Dakahlya, started with the Ras El Khalig village in 1979, had vaccinated 3,500 chickens between 4/23 and 4/25 in a door to door campaign, and plans to continue until all chickens in the village are vaccinated. In that village they plan to have the native hatchery use only Dokki IV eggs from Extension's poultry unit in El Mansura through a cooperative agreement. More details regarding the native hatchery are in the Native Hatchery section.

Other Extension Poultry Villages visited include Monsha City in Beni Suef Governorate, El Mimshaw City in Sohag, and Sabsir Village in Gharbya.

The Extension Poultry Village Program is a very good one and it is recommended

that it be expanded. It is especially helpful when the native hatchery is involved where the agreement to use only eggs from improved chickens is adheared to completely, and no "slip-up" occurs to let a few native eggs be used.

(6) SUPPORT TO VILLAGE FLOCKS - EXTENSION SERVICE, MOA
- VETERINARY SERVICE
- O.R.D.E.V.
- GOVERNORATES
- VILLAGE COUNCILS
- G.P.C.

Many Government branches help the village poultry keepers, and visits were made to poultry production units belonging to 6 Governorates, 11 Village Councils, 6 Extension Service/MOA, 1 G.P.C., and 1 ORDEV, a total of 25. See table "Summary - Visits - 1978-79." Others, including missionaries, also help. Basically they all produce or obtain better chicks, usually Fayoumi or Dokki IV, from Government farms where the parents are blood tested against pullorum, and sell to villagers at 1 day old, or 21 days old. Extension provides educational assistance to poultry growers, distribute "How-to-do-it" bulletins, make sure vaccination is done through the cooperation of the Veterinary Service, and provides feed for the chicks they supply up to 21 days.

EXTENSION SERVICE, MOA

Extension Service/MOA reports that they have 50 poultry units in 10 Governorates, each with 600 laying hens, and facilities for hatching, brooding, and growing their own replacements. Four such units were observed in Sana Did, Gharbya Gov.; El Mimshah, Sohag; Minia; and El Mansura, Dakahlya. Each sold both day old and 21 day old chicks, either Fayoumi or Dokki IV.

When asked what the Extension Service Engineer officed in El Shimshera village, Kafr El Sheikh Gov. did, the reply was "nothing with poultry". It later turned out that he worked basically with crops, some with livestock, but had distributed a few poultry bulletins, and 3,000 day old chicks the past year in lots of 50 to 200. True, that probably took a small percent of his working days per year, but he did do something. Probably if we knew we would find that Extension does lots more than they are given credit for by other agencies in the Governorates. Some groups, not all, want to belittle the other groups, which they consider competitors for attention and work funds, and at the same time exaggerate their own activities.

In the Dakhlya Governorate, Extension has 5 Extension Poultry Villages, and one was visited. See "Extension Poultry Village" report. The Poultry Unit at El Mansuar produced 18,000 chicks/mo., bought more from Seberby and other Government farms, sold some day old, and grow to 21 days. They had breeders, incubators, and space to breed and grow chicks. They also make and sell a balanced feed at the farm, mixing by hand with a shovel.

The Dakhlya Governorate has a broiler farm where they produce broilers and sell live at 50 days to villagers, government officials, and anyone wishing to buy.

The Agricultural Extension Service/MOA does much good work in Egypt, but needs to give more attention to poultry.

VETERINARY SERVICE

The Veterinary Service is the most active group in general as far as the village poultry keepers are concerned. They are in the foreground chiefly because of their Newcastle disease vaccination. They do a little diagnosing of sick birds, coccidiosis and other diseases, and provide some treatment. In travelling to villages they are the group most frequently heard about, either good or bad. In general, the largest percent of villagers think well of the Veterinarians, but some lesser numbers definitely do not think well of them. Veterinarians are the ones most sought after for advice about disease, treatment, and even management, as sometimes they are the only ones the villagers know who know much about poultry.

However, they are not working in all villages, and they should be. Several Governorates told of plans to increase their Veterinary Clinics and services by approximately 10 clinics a year until all villages could be serviced by 1989. The Governorates recognize their value. More mobile veterinarians to service outlying villages would help; this is being done some now, but should be increased.

The need for vaccination for Newcastle seems to be pretty well understood by a large percent of folks, even 78% of the villagers. However, it is unclear whether the urgency and necessity for blood testing hatching egg producing

birds is clearly and fully understood, even by the most sophisticated and highest educated poultry people in Egypt. For example, Dr. Farid Stino, who teaches poultry at the U. of Cairo, and earned his PhD in diseases under Dr. Reid at the U. of GA., does not blood test his private hatching egg flock.

The Veterinary Service needs to continue and increase their vaccinating, they need more vaccine and supplies, and more mobile veterinarians.

O.R.D.E.V.

O.R.D.E.V. (Organization for Reconstruction and Development of Egyptian Villages) is a relatively new organization, started approximately 10 years ago or less. They have poultry units in 4 Governorates under implementation, with the following total capacities: 30,000 layers, 41,000 chicks, 94,000 rearing, 255,000 incubation, and estimate they will produce 1,493,000 day old chicks per year for village distribution. ORDEV personnel are met in most governorate headquarters (they probably are in all HQ's) and many villages where they participate in planning and operating village development projects of all types.

Besides the above poultry units, they operate a feed mill in Karf El Sheikh and assist the cooperative at El Hayateen, Gharbya Gov., which has a hatching egg flock and sells 4 month old chickens to villagers.

GOVERNORATES

Many governorates have poultry production projects, most to produce Fayoumi or Dokki IV chicks from blood tested parents for sale to villagers. Governorates seem to be taking an increased interest in poultry. Superficially it appears that Governorate poultry farms are better managed than other government farms.

The Giza Governorate has a 200 bird Dokki IV table egg production flock at Sakara. They sell eggs to Governorate people at their headquarters office. Sakara villagers expressed the desire that the flock should produce hatching eggs, to provide them with chicks better than those obtainable from native hatcheries, and free from pullorum.

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The Sohag Governorate bought day old Fayoumi and Dokki IV chicks from the GPC farm at Sohag, (now a Governorate farm) brooded 3 weeks, and sold to villagers. They reported selling 120,000 chicks per year over an 8 month period.

The Aswan Governorate had a 2,000 broiler production unit in Shatb village, used commercial broiler chicks and balanced feed purchased from GPC, Cairo. It served as a demonstration for the village and nearby area. It was a joint village council and Governorate project, founded and supervised by the village council, paid for and profits returned to the Governorate, which used the profits for further development projects that would help villages. Veterinary Service worked closely with the project. Broilers were sold to people in the village, wholesalers, hotels, hospitals.

Gharbya Governorate took over the Seberby farm in early 1979. From 1962 to 1979 the purpose of this farm had been to produce chicks for villagers in the 9 surrounding governorates, and they stated that they produced 2,000,000 chicks per year. In 1978-79 they were Dokki IV and Ross Tin. After their take-over, the Governorate has changed the farm's purpose to keeping parent broiler breeder stock, to supply chicks to private commercial broiler producers in their Governorate. They hope to have a joint venture with a foreign poultry company, requested bids from interested firms, and have been studied by several firms. This change of direction may change the past normal supply of chicks to villagers, they may have to obtain the chick supply elsewhere. There seems to be no clear plan or apparent concern about the villagers' chick supply.

The Sharqya Governorate has 8 poultry stations, one in each of 8 of the 10 districts and 1 feed mill at Hihya to serve all 8 of their stations. The Hihya poultry station had 14,000 Dokki IV layers when visited. Chicks were sold to villagers from these poultry stations.

The Minufia Governorate has a joint project with 8 village councils. Each council has a 5,000 chick brooding house, brood and sell at 21 days to villagers. Dokki IV from Seberby Farm, Nichols, and Hubbard from GPC, have been used. The Governorate had ordered 40,000 at a time from GPC, for all 8 farms, but some times is unable to get their full order. They would like to have 320,000 chicks per year, to give each village chicks 8 times. Feed

is obtained from GPC and from a mill in Kafr El Sheikh owned by the Governorate of Kafr El Sheikh, for feeding the chicks the first 21 days. The Governorate would like to have a farm to produce their own chicks, a feed mill, and a modern hatchery. In one village Foukh Tonbecha, it was stated that one time the village council could buy chicks from a private source, at a higher price, but that the Governorate would not permit them to do so because they were afraid of pullorum disease. This was evidence that the Governorate had a large say in the joint project.

The Fayoum Governorate started a farm to produce Fayoumi hatching eggs in 1977, with a goal to sell 5,000,000 Fayoumi chicks per year to villagers. They had 8,000 layers in May 1979. They also made a cooperative agreement in 1978 with a native hatchery to set only their Fayoumi eggs from their farm, from blood tested parents, from no other source, and to carry out a strict sanitation program. However, the native hatchery was using other eggs from other sources when visited by this consultant and other Mathtech consultants in Airol and May 1979.

The Assiut Governorate has a large farm at Banymurr, with 15,000 Dokki IV layers when visited in May 1979. They stated that they had produced 1,000,000 chicks per year, producing every 3 days for distribution, and sold when day old to the 11 village council poultry units. These 11 village council units are identical, start 10,000 chicks at a time, have 4 flocks per year, or 40,000 each per farm, or taking only a total of 440,000 per year total. Maybe Banymurr miscalculated or sell some to other buyers.

VILLAGE COUNCILS

Village councils have projects in all areas; cheese making, plant and tree nursery, souvenir plate making, teaching carpentry, sewing, poultry. There seem to be more village council poultry projects than Governorate poultry projects. O.R.D.E.V. usually seems to be active in planning and implementation in most villages.

Meet Rahima village, Giza Governorate, had a 5,000 pekin(?) duck project, 6 times a year, or 30,000 total. They are sold for meat, 10% to villagers, and the balance to Governorate officers. 75% of the profit goes to the village, and 25% to the people working in the unit.

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Qabrit, Karf El Sheikh, buys 1,000 day old chicks from GPC Cairo or Alexandria, broods to 21 days, sells to villagers, repeating the project 4 times a year. They also buy 3,000 Pekin ducklings, brood 1 week, then sell to villagers.

Ebshanna in Beni Suef has a 10,000 broiler project, buying Nichols and balanced feed from G.P.C. They sell the meat birds to the public coming to the farm. They also have a chick brooding project, buying day old Fayoumi, brood 3 weeks, and sell to villagers.

Quai, Beni Suef, has a 1,000 bird Fayoumi hatching egg flock, sell day old chicks to villagers. They also sell to Ebshanna which broods 21 days and sells to villagers.

Salaa, Sohag buys 4,000 commercial type broiler chicks, 5 flocks per year, balanced feed, and sells for meat.

Shatb, Aswan, has a 2,000 broiler farm operation as a joint village council and Government project. It is described under the Governorates.

Dar El Salam, Aswan, has a 150 Fayoumi hen layer farm, and obtains balanced ration from Extension Service.

Kafr Tesfa, Kalubria, buys 5,000 day old Dokki IV chicks from Inshas, broods 21 days, and sells to the villagers. They have 3 flocks per year. They also buy Nichols broilers from GPC and balanced feed, sell for meat birds, run 2 flocks per year. This project started in 1977. Profit from the broiler phase goes to the village council, returned to the people by way of starting another beneficial project. The same brooder house is used, for both phases, but the building and equipment are not fully utilized due to the shortage of chicks.

Delbshan, Gharbya, buys 4,000 day old Dokki IV from Seberby Farm, broods to 21 days, sells to villagers. They produce several times a year.

Toukh Tanbecha, Minufia, has a 5,000 chick brooding project together with the Governorate, and the joint project is described under Governorate projects....

Dranka, Assiut gets 10,000 Dokki IV day old chicks from Banymurr, broods 21

days, some to 60 days, and sells to villagers. They have 4 flocks per year. This is one of 11 villages in the 9 districts with identical puoltry projects in Assiut.

Other groups, as Governorates, and Village Councils, sometimes obtained chicks and feed from GPC. No doubt many more have helped than were observed.

The Seberby Farm in Gharbya and Sohag Farm provided chicks for villagers, and were turned over to their respective Governments in January 1979. Some of the Sohag officers weren't too enthusiastic about taking over, and after observing the farm operation and management it was easy to see why, as it was such a mess. Barout, a GPC farm in Beni Suef claimed to provide 500,000 chicks per year for villagers. Minufia Governorate stated that they obtained some feed from the GPC for their poultry projects, along with some from the Kafr El Sheikh Governorate feed mill.

(7) VILLAGE FLOCK IMPROVEMENT PLANS

Several good plans are now in existance to help villagers, and they should be continued and expanded. The Extension Service, ORDEV, village councils, Religious groups, etc., have programs of various kinds, including the sale of Dokki IV, Fayoumi, chicks day old and 21 days old, to villagers in selected pilot villages, along with Newcastle Disease vaccination by the veterinary services, supply of a balanced feed to 21 days, and sometimes possibly longer, direct from various government owned farms. These include the Animal Production Research Institute farms, Extension Service Poultry Units, ORDEV poultry units, village council poultry units, religious group's farms, cooperatives. Sometimes GPC helps by supplying improved breed chicks, and feed, with emphasis on broilers, and mainly in supplying 5,000 bird commercial units with chicks and feed for the government services mentioned above.

These projects are good and should be continued and expanded, and furnished more facilities and funds, utilize their facilities more fully, and improve management in some units. In some cases, equipment and/or buildings should be added, and of course, funds increased.

In addition to the above, and supplementing them are suggested four programs:

1. Cockerel Exchange.
2. 100 layer hen project.
3. 10 bird laying cage project, with multiples of 10. The ideal goal would be 100 layers for small producers.
4. Subsidized project in combination with either project 2 or 3.

The governorate should select the plan that they feel best suits their situation and that the services, as Extension, ORDEV, etc., within the governorate can supervise adequately. Select the village compatible to the plan that wants to cooperate with the supervising agency. Economic and social factors would affect the plan most suitable. For example, a relatively affluent village where folks already have 50 to 200 baladi, RI, Fayoumi, Dokki IV, and miscellaneous chickens, would not be the one for plan 1, cockerel exchange.

Plan 1, cockerel exchange

Select a village where the village chief and 100%, or a high percentage, (75%) of the poultry keepers want the program, after thorough explanation by the servicing agency (Exten., ORDEV, Etc.) to them. The plan would be operated, supervised, by Extension, ORDEV, village council cooperative, religious group, or some boni fide authoritive group. First, vaccinate all chickens in the village against Newcastle Disease.

Second, exchange 5 months old egg production type males for their baladi males, on a one to one basis at no fee. A few weeks prior to exchange, start feeding those production males similar to the village method to help adjust them to village feeding methods. This would require a growout annex to product the males. The improved males need to be 5 months of age to have villagers feel they're getting a good exchange; a larger male for their baladi male. Also at that age they've passed the problems of chick and grower mortality. The baladi males thus received in exchange would be sold on the market for meat by the supervising service to help pay for costs. Some subsidizing would be necessary in addition.

The villager must agree to dispose of all other baladi males before sexual maturity, to have breeding from improved males only.

Feeding would continue as per previous custom. However, in addition, balanced feed should be made available, and its use encouraged since the service enjoys cooperation with these villagers and can reach them with their educational program.

100% cooperation would be ideal, but in Egyptian villages where chickens from one owner do not mix with chickens from other owners, less than 100% could be accepted in the plan. 87% of the village flocks are not permitted outside the house where it would be possible for mixing of the flocks. However, a high percentage (75%) of all villagers should be insisted upon.

Insist upon a continuing Newcastle vaccination program, in cooperation with the veterinary service. Have a disease preventation management program as far as practical.

Use of Dokki IV or Fayoumi males, though they would give less noticeable and obvious results, could be accepted, but should not be encouraged.

This cockerel exchange program with no feeding changes in other countries has given approximately 50% increase in egg numbers, egg size, body weight in the first generation, and pleased the villagers very much.

Although a 50% increase really means a small number and size of eggs and kg. of chicken because the starting point is so low, and small, it is of significant value to the individual low income villager. A similar program for cattle is in operation in the Raas El Khalig village, Dakhlya governorate. Extension has Friesian bulls to breed local cattle, and the young F. show definite size and markings of the Frisians. See Dakhlya report of 4/25/79.

Plan II, 100 Layer Hen Project

Select a cooperating village poultry keeper with an interest in profitable egg production, financially able to conduct the project, willing & anxious to follow supervisory service's (Extension, ORDEV, etc.) management advice.

The cooperator is to provide suitable housing and equipment for brooding growing, and laying, and to be willing and financially able to purchase chicks, supplies, balanced poultry ration, with the understanding that the income only starts after 6 months, when the hens begin to lay, with the exception of only a small income from cockerels sold for eating earlier. The adequate facilities including brooding are to be observed and approved by the supervisory service before start-up of the project. Supervisory service will give the cooperator a complete estimate of cost of project and the reasonable expected returns. It is specially important for the cooperator to understand how much money he must spend for chicks and balanced feed the first 6 months before returns on his investment begins, and that he does not try to short cut or reduce these costs by alternate feeding methods.

The supervisory service must also assist him (1) to obtain 250 commercial type production bred day old chicks, (2) to be sure balanced poultry feed will always be available, and (3) to assist with the vaccination program with the veterinary service and disease preventation management. Future program planning by the supervisory service would include being sure the cooperator obtains proper day-old replacement chicks when the layers have been in production 6 months, in order to be ready for the next production year for continuity in production.

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Assistance in marketing of cockerels, eggs, spent hens should be discussed and given if needed by the producer. This is one of the first items to check out when considering the project.

Having observed several flocks in some villages with 50 to 200 miscellaneous kinds of chicks being cared for and fed the "local" way, that is with just grains, berseem, kitchen waste, etc...with an occasional rare addition of one or two feed ingredients such as cottonseed meal, fish meal, it seems very logical that cooperators for this plan may be easily found. The profit incentive should convince some.

The plan has been successful in other countries. The biggest problems have come the second and third year after expansion, with marketing, and with overconfidence, of the cooperator resulting in a let down of good management practices, and the temptation to "Short-Cut" costs, and good management practices.

Plan III, 10 bird laying cage project

Although called a 10 bird laying cage project, it could be a 12 or 14 or 15 bird unit if more convenient to make or obtain those numbers of cages as a unit. Multiples of the unit could be used, with the goal of around 100 layers minimum.

Basically this plan is quite similar to the 100 layer hen project, Plan II, except that cages are used for layers.

Select a cooperating poultry person interested in making profit from chickens, financially able to carry on, and willing and anxious to cooperate with a supervisory service (Extension, ORDEV, Etc.) management recommendations. The cooperator would provide the brooding, growing space and equipment, purchase or make laying cages in accordance with the S.S. (Supervisory Service's) instructions. The SS would assist in making the plans, and inspect and approve the housing, equipment, plans, before start-up.

The S.S. would provide the pre-planning, management advice, planning and during the conduct of the project throughout. The S.S. would give the cooperator a complete cost-return figures before start-up, based on reasonable

expectations and present conditions.

It must be emphasized how much the total cost will be for chicks and balanced feed the first 6 months with no returns until that point except a small amount from the cockerels sold, or consumed for eating. The S.S. would make sure the cooperator understands, is financially able, and will not "cut corners" in feeding or any other way, as this would adversely affect results and profits.

The cooperator would purchase, with the S.S. assistance, 25 straight run commercially production bred day old chicks per each 10 cage unit, and adequate balanced poultry ration for full feeding throughout the whole period of the project.

The S.S. would assist the cooperator in purchasing or making the layer cages, in obtaining the veterinary service for Newcastle disease vaccination and a disease preventation management program. The S.S. should assist with the marketing of the cockerels, eggs, spent hens if necessary, and actually discuss this point before the project starts. The S.S. would assist with future planning, especially in obtaining replacement chicks at the time the layers had produced 6 months, in order to have a continuous supply of eggs. The project would be good for some village poultry keepers interested in very small units, and able to finance the program.

Small flocks of 10 production bred layers in cages properly fed with balanced poultry ration have been observed in other countries. They were kept in living quarters of the homes, and in adjoining rooms, and were very successful.

Plan IV, Subsidized Project

In this plan the S.S. (Supervisory Service) would use either project 2 or 3, and pay for the equipment, chicks, feed to 6 months of age. Where plan 2 is the basic project the cooperator would provide adequate housing satisfactory to the S.S. In plan 3, cages would be included as equipment, and the cooperator would be required to provide a suitable location for them.

From three to five cooperators in a village should be selected. Records of

costs - receipts, feed used, mortality, vaccinations, would be required. A daily diary of flock activities would be extremely helpful along with the records.

Similar records should also be kept for plans 2 and 3.

(1)

FLOCK SIZE OBSERVED*

		Number	Percent
Chickens	1- 10	20	16
	11- 30	49	39
	31- 50	26	20
	51- 100	14	11
	101- 500	11	9
	501-1,000	1	1
	Over 1,000	6	5
Total Flocks Recorded		127	
Ducks	1- 5	32	52
	6- 20	29	47
	21- 100	1	1
Total Flocks Recorded		62	
49% of flock owners have ducks			
Geese	1- 5	24	67
	6- 20	12	33
Total Flocks Recorded		36	
28% of flock owners have geese			
Turkeys	1- 5	16	76
	6- 20	5	24
Total Flocks Recorded		21	
16% of flock owners have turkeys			
Pigeons	1- 10	24	50
	11- 50	24	50
Total Flocks Recorded		48	
58% of flock owners have pigeons.			

NOTES: *All birds, all ages.
Note: On the day visited, not yearly basis. Government folks talk in millions per year - not in 100's or 1,000's, etc., so what I feel we need is present day actual counts, not their grandoise dreams of what they wish they had, or could do.

(2) CHICK SOURCE

	Number	Percent
Hatched under broody hens - set down eggs	19	20
Buy - Native Hatchery Direct	35	39
Buy - Native Hatchery via Huckster	13	14
Improved - Fayoumi, Dokki IV - from Government farms, village council, Extension, etc.	24	26
Production Bred	1	1
Private Electric Hatchery	2	1
Total Flocks Recorded	94	

NOTES: Sometimes use two or more sources
Production Bred - birds specially bred for egg production, or for meat production, as commercial men use.

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(3)

MORTALITY

	0 - 10%		11-20%		21 - 30%		31 - 50%		51% & Up	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
1. General	21 -	26%	2 -	3%	2 -	3%	1 -	1%	6 -	8%
2. Age, 1 day to 21 days	13 -	16%	11 -	14%	9 -	11%	6 -	8%	9 -	11%
Combined: Grl. & to 21 day.	34 -	42%	13 -	16%	11 -	14%	7 -	9%	15 -	19%

Total Flocks Recorded - 80.

NOTES: Mortality is sometimes reduced by the practice of eating sick chickens befor they become emaciated and before they die.

The above are actual mortality figures as reported on flocks in the house at the time we visited. In addition we were told that sometimes they had 90 to 100% loss in a previous flock, or 90 to 100% loss after vaccination, or a 50% loss the first 7 to 10 days, or even a 90 to 100% loss of all chickens in a village. These disaster losses are naturally remembered vividly.

Several villagers who do let their chickens out of their house stated that if a poultry disease was going through the village they kept their chickens inside during that period.

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(4) VACCINATED AGAINST NEWCASTLE

	Number	Percent
Yes	48	62
No	29	38
Total Flocks Recorded	77	
REASONS FOR NOT VACCINATING		
Have to carry to next village	3	21
Do not think vaccine good	5	36
Vaccine - or Veterinarian - not available	4	29
Think vaccine too expensive	2	14
Total Flocks Recorded	14	

NOTES: Officially there is no charge for vaccinating. However, a few villagers say they have to pay, a "dash", or outright fee; some affluent villagers feel they pay because they are affluent. Veterinarians always deny both ideas.

No one, including veterinarians, denies that in some villages the chickens would have to be carried to the next village for vaccination. Usually this is a nearby village, of 3 - 5 km., but still too inconvenient to encourage villagers to vaccinate.

Some villagers say there is a special allotment for "distant" villages, especially the refugee villages for the displaced Nubian people in Aswan Governorate but feel that the veterinarians use their allotment for the villages nearest them, or even sell it.

(5) FEEDING OBSERVED

System	Number	Percentage
1. Grains, greens, kitchen waste, etc.	97	87
2. Some additive or additives, as blood, fish, cottonseed meal, etc.	3	3
3. Mixed	5	4
4. Balanced, mixed	7	6
Total	112	

NOTES:

Of the flocks recorded, 87% fed the typical primitive method, System 1; only 6% fed the correct method, system 4; only 7% attempted to improve over typical primitive method, System 1, by System 2 or 3. The reason was that they just couldn't get balanced feed or ingredients in most cases.

I don't remember seeing even 1 flock that could qualify under the category of scavenging; that is, of living on nothing purchased, but only kitchen waste, insects, and shattered out field grains after harvesting. Also, only the smallest number of chickens category (1-10) could even possibly do this. It is true that there are many flies and insects in some villages, but not enough to sustain life. Also, most (87%, see table 9 "where chickens are kept") chickens never could get out of the house.

In technical poultry terms "poultry feed" means a balanced poultry ration. Hence #4 is the only "Poultry feed" as poultrymen think, in poultry terminology.

System #4, balanced mixed feed is mainly fed by larger poultry keepers. It is not available to villagers.

To say a villager "buys feed" when he uses only grain, berseeme, waste, whether purchased or his own, would be misleading to a poultry person. Hence the 4 general types are listed separately.

(6) BREEDS OBSERVED

	Number	Percent
1. Baladi	73	54
2. Fayoumi	23	17
3. Dokki IV	21	16
4. Production Bred, Commercial Type	8	6
5. Mixed - RIR, H&L, Dokki IV, Baladi, Plymouth, Australorp	9	7
TOTAL Recorded	134	

NOTES: In 1978 after totalling Fayoumi, Dokki IV, Production Bred, deducted from total flocks to get No. Baladi - as sometimes breed not recorded, and I recorded all when not Baladi.

For 1979 figures total breeds observed is more than total flocks seen, as several flocks had more than one breed.

(7)

PRICES

CHICK PRICES PAID

	Number	Percent
Day Old - 7½ - 8 P	9	15
Day Old - 9 -11 P	30	51
Day Old -12 -15 P	4	7
15 Day Old - 15 P	1	2
21 Day Old - 23 P	6	10
50 Day Old - 50 - 52 P	5	8
60 Day Old - £1	4	7
Total Flocks Recorded	54	

EGG PRICES - PAID - RECEIVED

2 - 2½ P	3	9
3 P	11	32
3½ P	6	18
4 P	11	32
6 P	1	3
8 P	2	6
Total Flocks Recorded	34	

NUMBER OF EGGS LAID PER HEN, PER YEAR, ESTIMATED, AS REPORTED IN VILLAGE FLOCKS, NOT COMMERCIAL

	60-80	81-100	101-120	121-140	141-160	161 and more
Baladi	15	15	1			
Fayoumi	1	5	1	2		2
Dokki IV		8	4	1	1	
H&L, & Other Production Bred		1	3	1	1	1
Total Flocks Tabulated						
63	16	29	9	4	2	3
Percent	25%	46%	14%	6%	3%	5%

NOTES:

1. Figures on basis of what told (usually 50-70%) plus guestimate of periods in production, clutch size, number. Generally told present day production, and never told how many clutches per year they lay, or how long per clutch.
2. Exception, Abbis II village, (report 4, '78, pg. 3) was told that hens lay 2 months, stop 2 months, lay 2 mo., stop 2 months. Sometimes figured, for example, if was told that egg production = 65%, use the figure 237 and divided by 2 = about 120 eggs. Example, Rowfa El Kosier Village, Sohag Governorate (report 10, '78, pg. 1, first flock).
3. Some villagers do state "so many eggs per year", but in the very short period interviews as these were, and asking only once, their guestimates are probably pretty much what they think they would like to have.
4. A longer study period in one village could determine these figures more accurately for a smaller sample of the village by repeating questions over several days.
5. Dr. A. G. Badawy says "Total production each hen is about 120-140 eggs" at their Extension Units. They use Fayoumi and Dokki IV, with a "sorta" balanced feed! (Report 21, '79, Pg. 3)

(9) WHERE CHICKENS ARE KEPT

		Number	Percent
1.	Ground floor room, and let out on street	6	13
2.	Ground floor room, not let out on street	14	31
3.	Rooftop	16	36
4.	2nd and 3rd floor	9	20
	Total Flocks Recorded	45	

NOTES: With numbers 2, 3, and 4, there is no actual scavanging, except small amounts behind goats, sheep, donkeys, cows. Only 13% of flocks recorded (#1) could possibly scavenge.

In this respect, Egyptian village flocks are quite different from village flocks observed by author in Pakistan, Nigeria, Central African Empire, Congo (Brazzaville), Gabon, Cameroun, Vietnam, and The Gambia. In those countries there are no "rooftop" flocks, except some in Pakistan, few or no 2nd and 3rd floor flocks, and there are crops and/or some vegetation next to the houses that people live in.

From my observations not one flock could qualify as "scavengers".

(10) MANAGEMENT PRACTICES OF THOSE LARGER PRIVATE UNITS USING HOUSING, EQUIPMENT, FEED

	Number	Percent
1. Feeders, waters - Size - Correct	4	36
- Too small	7	64
2. Feeders, waters - Height - Correct	2	22
- Too low	7	78
3. Feeders, waters - Number - Correct	4	50
- Too Few	4	50
4. Brooders - Correct size, operation	3	38
- Incorrect size, operation	5	62
5. Feed (a) Correct	7	70
(b) Grain added to balanced feed	1	10
(c) "Shotgun" method of additions to balanced feed, not knowing real analysis, real need	2	20

NOTES: Comments made on 8 to 11 farms, not 46. The poultry flock owner stated that Milo was added to a balanced feed because "Milo gives hens strength", under 5. b.

Antibiotics, fish meal, and other ingredients were added to a so called "balanced ration" purchased, because the owner just thought it might not be good, under 5 c.

Brooders under 4, were often run entirely too long, wasting fuel.

(11) VILLAGERS' PERSONAL HABITS

	Number	Percent
Eggs - Eat	50	66
- Sell	26	34
Chicken and other poultry - Eat	34	76
- Sell	11	24

NOTES: Duplication, as many do both, eat some, and sell some.

This table is interesting especially in relation to table (12) Number in Family - or in Housing Unit.

(12) NUMBER IN FAMILY - OR IN HOUSING UNIT

	People	Number	Percent
1.	4 - 5	1	3
2.	6 - 7	16	47
3.	8 - 9	4	12
4.	10 -11	4	12
5.	12 -18	5	15
6.	19 -23	0	0
7.	24 -30	4	12

Total Families Recorded - 34

- - - - -

NOTES: Families listed under 5 include: one of 18 with parents, sons, children, grandchildren.

Families listed under 7 are:

one, with one man, two wives, and children, total 24

one, a dwelling house with 30 people, 6 families

one, a dwelling house with 30 people, 4 families

one, 25 people in the house

This table is interesting especially in relation to table (11), Villagers' personal habits, number of eggs and chickens sold and eaten.

(13) GENERAL VILLAGE ECONOMIC LEVEL - OF VILLAGES VISITED

	Number	Percent
Luxury	5	28
Medium	8	44
Poor	5	28
Total Villages Recorded	18	

NOTES: From superficial general observations, from such factors as whether houses were built with sun baked mud bricks, concrete, or fire baked clay bricks; house size, small or large ground floor area; whether 1, 2, or 3 stories high; whether or not have electricity and/or running water in the village.

Furnishings in the house, extras such as T.V. sets, radio transistors, vehicles, especially Mercedes Benz, etc., influence this "superficial" rating.

Evaluations from studies by community development or sociologists specialists would be more complete, and accurate. And, it seems that many studies have been made; it has been commented that the Egyptian Villages are the most studied villages of the world.

(14) GOVERNMENT FARMS OBSERVED

	Governorate	Village Council	Extension	ORDEV	Other
1. Produce, sell hatching eggs and/or day old chicks	4	1	1		1(GPC)
2. Produce, sell 21 day old chicks		5	5	1	
3. Produce, sell table eggs	1	1			
4. Produce, sell broilers	1	2	1		
5. Produce, sell ducks for eating		1			
Total	6	10	7	1	1

NOTES: Poultry keepers in the village where the Governorate kept layers for table eggs complained, saying the flock was mainly to supply Governorate H.Q. office personnel with fresh eggs. They would like the farm purpose to be changed, to supply Fayoumi, Dokki IV or improved baby chicks from blood tested stock to them, as their source of good chicks was limited. It would be well to make this change.

(15) WHAT WOULD HELP YOU, THE VILLAGER, MOST?

	Number	Percent
1. Disease free chicks	5	10
2. Balanced feed	23	47
3. Started chicks, to 21 days	3	6
4. Improved breeds	6	12
5. Educational, Management Advice	2	4
6. Financing, Credit	0	
7. Veterinary Service, Vaccination, etc.	10	20
Total Flocks Recorded	49	

NOTES: Question 6 on credit was not asked often, as the producer with up to 50 chickens would not be interested, nor would they be potential borrowers or users of financing. One Native Hatcheryman did say he once asked for bank financing, but could get none. Others gave no response. Requirements of records, a successful financial history over some period of time, would limit this item to just a few of the larger poultrymen.

(16) PREFERENCES - CHICK SOURCE

	Number	Percent
1. Set eggs under hen	4	14
2. Native Hatchery	2	7
3. Government: Village Council, Extension, ORDEV, Etc.	18	64
4. Commercial	4	14
Total	28	

(17) PREFERENCES - AGE OF CHICKS PURCHASED

	Number	Percent
1. 1 day old	5	33
2. 21 days old	8	53
3. 4 months old	2	13
Total	15	

(18) PREFERENCES - BREED

	Number	Percent
1. Improved; bred for production	7	23
2. Fayoumi	2	7
3. Dokki IV	12	40
4. Baladi	9	30
Total	30	

NOTES: Shows need of educational programs, or well-located Method and Result Demonstrations. The demonstrations scheduled by team 040 Breed and Hatchery Improvement at several farms of the Animal Production Research Institute should help very much.

(19) PREFERENCES - FEED

	Number	Percent
1. Balanced, if cheap	33	67
2. Balanced, at market price	7	14
3. Regular feeding - grains, berseme, kitchen waste	9	18
Total Flocks Recorded	49	

NOTES: Reasons given for preferring regular feeding included cost, habit, better taste of eggs and meat with regular feeding.

One large producer who made a balanced feed for his own chicken flock sold his eggs and purchased all eggs which his family used from another flock owner who did not use a balanced feed.

(20) PREFERENCES - VACCINATE - ?

	Number	Percent
1. Yes	29	78
2. No.	8	22
Total Flocks Recorded	37	

NOTES: It surprised me that there were so many who do not want to vaccinate. As with other points, this emphasizes the need of education. A contributing factor is that sometimes many chickens are lost soon after vaccination, which villagers blame on vaccination - and it might be - but this might be that the birds were already infected but symptoms had not started when vaccinated. It should also be noted that several villagers stated that they would only vaccinate after birds became sick.

(21) SUMMARY-VILLAGE POULTRY FLOCKS AND GOVERNMENT FARMS VISITED-1978

Date	Governorate	Village	No. flocks visited	Gov't Pltry Projects
10/17	Fayoum	Fayoum	1+1 native hatchery	
10/27	Beheira	Abbis II	1	
10/31	Giza	Meet Rahima (Memphis)	1	
		Sakara	6	1 (g)
		Meet Rahima		1 (v)
		El Aziziah	7	
11/6,7	Kafr El Sheikh	Qabrit	2 1 large	1 (v)
11/7	Kafr El Sheikh	El Shimshera	4	
11/7	Kafr El Sheikh	El Allawi	2	
11/8	Kafr El Sheikh	Fowa	1 Huckster	
11/21	Beni Suef	Beni Suef city		
11/22	Beni Suef	Barrout	6	
11/22	Beni Suef	Ibshanna	1 large flock 1 native hatchery	1 (v)
11/23	Beni Suef	Qai	6	1 (v)
11/25	Sohag	Sohag City		
11/26	Sohag	Rowfa el Koseir	4 (1 large)	
11/26	Sohag	Salaa	4	1 (v)
11/26	Sohag	El Mimshaw city	2	1 (e)
11/27	Sohag	Sohag city mkt		1 (p)
11/28	Aswan	Shatb	3	1 (g)
11/28	Aswan	Dar El Salam	1	1 (v)
11/29	Aswan	Balena	3	
	7	18	53	10

(g) = governorate

(v) = village council

(e) = Extension service, MOA

(p) = GPC (government poultry co.)

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(22) SUMMARY - VILLAGE FLOCKS AND GOVERNMENT FARMS VISITED - 1979

Date	Governorate	Capital	Village	No. Flocks Visited	Government Poultry Projects Visited
3/28	Kalubia	Bonhn	KAFR TESFA	4	1 (v)
			KAFR RAGAB	1	
4/2,3	Gharbya	Tanta	SEBERBY(FARM)		1 (g)
			DELBSHAN	5	1 (v)
			BARMA	1(native hatchery)	
			SANA DID	3	1 (e)
			SABSHIR	2	1 (e)
			EL HAYATEEM	4	1 (v)
4/7,8	Minya	El Minya	MINYA CITY	1(large)	1 (e)
			TALA	3(1 large)	
			MAKOSA	4(1 large)	
4/16	Sharqya	Zagazig	HIHYA		1 (g)
			MUBACHER	3	
			HORRIAH	3	
4/18	Minufia	Shibin El Kom	TOUKH TANBECHA	3	1 (v)
			IBNAHS	1	1 (v)
4/25	Dakhyla	El Mansura (2)	TALKANA	2	1 (e)
		(3)	RAAS EL KHALIG	3(1 native hatchery)	
		(1)	EL MANSURA CITY		1 (e)

Native Hatchery is in Poor El Khalig

Date	Governorate	Capital	Village	No. Flocks Visited	Government Poultry Projects Visited
4/30	Fayoum	Fayoum	FAYOUM CITY	2	1 (g)
			GARFIS	4(1 large) (1 native hatchery)	
			SENORES	6(1 native hatchery)	
5/7,8	Assiout (Asyut)	Assiut	BANYMURR	5	1 (g)
			BENI ZEID	5(native hatchery closed)	
			DRANKA	5(native hatchery closed)	1 (v)
			RIFFA	5(native hatchery closed 2 yrs. ago)	1 (v)
TOTAL	8		25	74	16

(g) - Governorate

(v) - Village Council

(e) - Extension Service, MOA

(p) - GPC (Government Poultry Co.)

(o) - ORDEV

On 4/2, visited Seberby Farm; not a village.

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(23)

SUMMARY - VISITS - 1978 and 1979

	Governorates	Villages	Flocks	Government Poultry Projects
1978	7	18	53	10
1979	8	26	74	15
Total	14 (1 duplication)	44	127	25

Government Poultry Projects:

	1978	1979	1978-'79
(g) Governorate	2	4	6
(v) Village Council	6	5	11
(e) Extension Service, MOA	1	5	6
(p) G.P.C.	1	0	1
(o) O.R.D.E.V.	0	1	1
Total	10	15	25

SECTION VIII

070 - POULTRY HEALTH

A Brief: The National Poultry Improvement Plan for Egypt 8/6/79

Second Interim Report - July 1979

Special Report: Animal/Poultry Health and Vaccine Production 6/19/79

Special Report: Poultry Health Situation in Egypt 5/9/79

Notes on Team Reports January-October 1979

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GEORGE S. APPLETON
PRESIDENT

August 6, 1979

Mr. George O'Day
Mathtech
2220 Parklake Drive, NE
Atlanta, Georgia 30345

Dear George:

I am enclosing a "brief" on a National Poultry Improvement Plan suggested for Egypt.

This "brief" is structured along the lines of the U.S. NPIP which dates back about 40-45 years since its inception. It has been modified and improved over the years and should serve as a very useful model for what we have in mind for Egypt.

Please realize that the enclosed "brief" is just that-a "brief"-and that a full-blown Plan would be very detailed.

Let me know where you want to go from here.

Best regards,

George

George S. Appleton
President

GSA:h
Encl.

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A Brief*

Title: The National Poultry Improvement Plan for Egypt.

General Objectives: To establish a National Poultry Improvement Plan for Egypt through cooperative Federal and Governorate participation. To effectively execute such a Plan, it will be necessary to:

1. Establish as the working body in the design and implementation of the Plan a National Committee chaired by the Minister of Agriculture and having a mandate of full power and sanctions necessary to execute the provisions of the Plan and to maintain enforcement procedures.

2. Provide the infrastructure necessary to carry out the provisions of the Plan and for the rapid introduction of new technology.

3. Provide sufficient financial support over an extended period of time to gain maximum effectiveness in the execution of the Plan.

* This initial Brief is designed only to suggest a framework for the establishment of a National Poultry Improvement Plan for Egypt. It is suggested that three major disease conditions of great economic impact to Egyptian poultry be included in the Plan. In Phase I, these are *Salmonella pullorum-typhoid* and Newcastle Disease. Phase II would encompass *Mycoplasma gallisepticum* and *Mycoplasma synoviae*.

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Administration

The master Plan will come under the jurisdiction of the Minister of Agriculture. The Plan will be agreed upon in a spirit of common understanding and benefit between the office of the Minister of Agriculture and the office of the Governor of each Governorate.

Participation

It must be mandatory that every person engaged in the public and private or commercial production of poultry meat and eggs must participate in the Plan. Those persons having other avian species, insofar as possible, such as ducks, turkeys, pigeons, exhibition poultry and other game birds should also be required to participate in the Plan.

Specific Objectives of the Plan, Phase I

1. Through defined actions, as located and described below, to manage and control *Salmonella pullorum* and *Salmonella gallinarum* infections in Egyptian poultry and other avian species.

2. To establish as a major provision of the Plan, Phase I, procedures for the routine vaccination of poultry in all sectors against Newcastle disease using only vaccine of known quality.

Specific Objectives of the Plan, Phase II

1. To establish a National program for the management and control of *Mycoplasma gallisepticum* and *Mycoplasma synoviae*.

Auxiliary Objectives of the Plan

1. The provisions of the National Plan must include programs for good sanitaion practices at the hatchery, the breeder operations, the multiplier flocks, the grow-out operations, etc. It should be recognized that the mandate of the Plan will not succeed,in meeting the objectives,unless specific disease managemant and control practices including sanitation and disinfectant procedures are followed.

2. Supervision and Inspection: The overall supervision for the National Plan should come from the office of the Minister of Agriculture. Each Goverorate should have its own coordinating committee and ongoing liasion must be maintained between the National or Federal office and the Governorates.

Each hatchery, including native hatcheries, should be inspected during the course of a year to satisfy the inspecting body, either from the office of the Minister or from the Governorate, that the operation is in compliance with the regulations of the Plan. It is realized that this is a formidable task because of the numbers of native hatcheries, but best efforts must be put forth.

The key operations for the effective management and control of salmonella infections are the hatcheries. A regimen of sanitation measures must be rigidly followed over a period of time to successfully produce pullorum free chicks.

Blood Testing/Identification

The recommended official procedure for blood testing for salmomella may be found in "The National Poultry Improvement Plan and Auxiliary Provision," November, 1976 (or as amended) published by the United States Department of Agriculture, Agricultural Research Service. Part 447, "Auxiliary Provisions" on National Poultry Improvement Plan, Subpart A-Blood Testing Procedures, Sections 447.1, 447.2, 447.3, 447.4 and 447.5.

The provisions of Part 447, Subpart B, Bacteriological Examination Procedures, Subpart C, Sanitation Procedures and Subpart D, Random Sample Performance Testing Procedures should also be followed.

Newcastle Disease-General Recommendations

1. Only the Newcastle Disease Vaccine, Live Virus, Chick Embryo Origin, B-1 Type (B-1 Strain, Hitchner) and the B-1 Type, LaSota, should be used in imminization programs.

2. Vaccines should be of known high quality, produced from Specific Pathogen Free embryonated eggs and maintained in sufficient quantity to meet the national needs.

3. Until a measure of control over this devastating disease is realized, it should be strongly recommended that only the intraocular route of vaccination be practiced, ie., mass vaccination techniques such as spray and drinking water should be avoided.

4. Storage, transport and administration of Newcastle Disease vaccines must be carefully controlled to assure that the vaccines are in a good quality state at the time of field use.

Phase II-Mycoplasma gallisepticum and Mycoplasma synoviae

For the management and control of these two disease entities, causing air-sac disease or airsaculitis or chronic respiratory disease (M. gallisepticum) and infectious synovitis (M. synoviae), the recommended procedural document is "The National Poultry Improvement Plan and Auxiliary Provisions," November, 1976 (or as amended) published by the United States Department of Agriculture, Agricultural Research Service.

The specific reference from the above document include Subpart A, General Provisions, 445.14,(b), 445.23,(c), (e), 445.33,(c),(e), 445.43,(c), 445.53,(c) and Subpart B, 447.6.

Comments on Phase II

The initial thrust for disease control must be focused on salmonella and Newcastle Disease. At a later date when such disease conditions no longer constitute an economic deterrent to poultry meat and egg production, programs should be established to control chronic respiratory disease and infectious synovitis. The organization and infrastructure set up to manage the salmonella and Newcastle disease programs can then be utilized for the Mycoplasma programs.

Reference document:

The reference doucment for all provisions in the management and control of Salmonella pullorum-typhoid and Mycoplasma gallisepticum/Mycoplasma synoviae is "The National Poultry Improvement Plan," November, 1976 (or as amended) published by the United States Department of Agriculture, Agricultural Research Service.

George S. Appleton
GSA & ASSOCIATES
August, 1979

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Second Interin Report

Team 070-Poultry Health

Poultry Improvement Project

U.S.A.I.D./Government of Egypt

Team 070-Poultry Health: G.S. Appleton-Leader

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Introduction

This second interin report supplements the first interim report and is specifically directed toward recommendations leading to implementation of identified actions designed to promote and expand the poultry industry in Egypt.

Earlier this year a Special Report was prepared. This Special Report was stimulated by growing concern and a sense of urgency on the part of Team 070 menbers and others in the PIP that we must begin the implementation of certain poultry health projects necessary for the successful expansion of poultry meat and egg production in Egypt.

On June 19 of this year, another report took the earlier Special Report a major step forward. In the June 19 report, pre-feasibility studies were prepared on three specific projects:

1.) Design and construction in Egypt of a vaccine production facility.

2.) A pharmaceutical capability for animal (including poultry) ~~for animal~~ health products.

3.) Establishment of new and modern diagnostic facilities, as well as upgrading existing facilities.

Finally, the June 19 Special Report recommended that an in-depth feasibility study be conducted as soon as possible to quantify and justify the need for a poultry vaccine production complex in Egypt. The Report also suggested alternate considerations available regarding pharmaceuticals and steps to be taken to provide modern diagnostic services.

It is, perhaps, well to state again the underlying principle behind the strong recommendations from the Poultry Health Team 070 that cause this Team to establish the very highest priority with the three specific projects above.

The Poultry Health Team-070 is adamant in the position that unless Newcastle disease and salmonellosis and a few other specific disease entities are managed and controlled, the expansion and improvement of the poultry meat and egg industry in Egypt is impossible.

Discussion

The investigative phase related to the original assignment to Team 070, now known as the Poultry Health Team, is finished. It would be counterproductive, keeping in mind the goals of the PIP, to continue with "visits", "inspections", "examinations", etc. We believe we are ready to begin the necessary studies designed to lead to the implementation of our recommendations.

Specifically,

-Team 070 recommends the immediate initiation of a feasibility study to substantiatate and justify the construction of a poultry vaccine (and other animal vaccines, if such a decision is made) production facility in Egypt.

The pre-feasibility study (attached to the June 19, Special Report) reported out preliminary estimations of cost/time elements relative to the construction and equipping of a poultry vaccine production unit. The following major points were made:

1.) It was estimated that 2.6 billion total doses of poultry vaccine would be required in year one, or 1980, for example, at a most probable production cost (produced in Egypt) of U.S. $1.3 million.

2.) It was estimated that the plant should besized at approximately 15-20,000 square feet. The total of 15-20,000 square feet would encompass five major functional areas:

a. Office

b. Production

c. Quality assurance (control)

d. Warehouse (including cold storage)

e. Mechanicals

3. It was estimated that about 5.2 billion doses of vaccine would be required to meet the needs of the Egyptian poultry industry as well as to provide for export considerations by 1989-1990 at a most probable production cost of U.S. $2.6 million.

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4.) It was estimated that the most probable number for the total cost of the vaccine production facility, exclusive of equipment, but inclusive of land, would be in the range of U.S. $1.5 million or approximately U.S. $75.00 per square foot.

5. It is the opinion of the writer that such a facility as described above would be entirely adequate to provide for the needs of the Egyptian poultry industry for at least 10 years. Such a recommended complex would also allow for export considerations. Since plans for export of poultry vaccines are not developed at this stage, it is impractical to highlight export projections as related to the projected capacity of the proposed facility. It is realistic to state, that at least in the early years after start-up of the vaccine facility, the potential for export is at least 1 billion doses per year. Normal or usual planning techniques as the capacity parameters are realized in subsequent years will provide guidance for orderly expansion.

6. It was proposed to conduct a site study for the poultry vaccine facility. The writer, and other members of Team 070, plan to return to Egypt in October of this year. Site study deliberations could be prepared at that time.

7. It was stated that the major piece of equipment necessary for the production of poultry vaccines (and many large animal vaccines) using modern techniques is a freeze-dryer, or lyophilizer. It was recommended that a high performance, high capacity, quality dryer of the Hull type of approximately 100ft^2 shelf capacity be installed in the facility. Such a dryer, with service or

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maintenance contract and substantial spare parts inventory installed in Egypt would cost approximately U.S. $150,000. The estimated cost for all other equipment was established at about U.S. $300,000.

8. It was estimated that, with full cooperation of those involved in the planning, design, construction, etc. of the facility and barring any major economic or political imbalance, the time required to complete the vaccine complex would be about two years. It is thought that this time period would include "shake-down" or "de-bugging" of the facility and the equipment.

9. It was estimated that the design and engineering costs would be in the general range of 5 to 8% of the construction costs, or U.S. $50-75,000.

10. It was estimated that the technical consulting costs (and a number of areas of specific technical items were discussed in the attachment to the June 19 report), covering the estimated two year construction time as well as about one year after construction and during start-up, would be in the range of U.S. $200-250,000.

Some pro-forma considerations, Imported vaccines vs. Locally produced vaccines: It is the opinion of the writer that the financial justification for the construction of the poultry vaccine production complex will be clearly positive. Although it is not the purpose of this report to derive the

supporting numbers for financial justification-such considerations will follow assuming the feasibility studies are authorized-there is obvious evidence that it will be far less expensive to produce the poultry vaccines locally than to have to depend on import. On a discounted cash flow basis, it can be immediately projected that the return on investment should be realized in three to five years!

Simply put,

If we can assume that the total needs of the Egyptian poultry industry can be satisfied at the 2.6 billion dose level in year one-about 90% Newcastle disease vaccine-the total cost of the vaccine will be in the range of U.S. $1.3 million at an estimated unit cost of U.S. $0.50 per 1000 dose unit.

However, if imported, the total cost in year one could be in the range of U.S. $5-10 million! This range assumes a landed cost of imported vaccines in the range of U.S. $2.00 to 4.00 per 1000 dose unit.

There are other considerations to be concerned with in the overall justification of a poultry vaccine unit in Egypt. These are, to list a few,

1.) Self-sufficiency

2.) Control over the quality

3.) Better control over distribution and use

4.)Flexibility and opportunity to adapt vaccines to local disease conditions

5.) Opportunity to integrate vaccine production with research and

development and with diagnostic operations.

6.)Opportunity for continual improvement of vaccines as related to quality and cost.

7.) Opportunity to plan for export market development to provide positive effect on Egyptian balance of payments.

Discussion, Pharmaceutical "Manufacturing" Capability:

There has been much conversation in the past several months by various groups about the building of a pharmaceutical manufacturing facility in Egypt. Team 070 is of the opinion that such a venture is highly impractical because a manufacturing facility per se would be prohibitively expensive and is really not needed.

The manufacture of pharmaceutical type products is a far more broad and complex undertaking than the manufacture of vaccines. A vaccine facility is easily identifiable as a clearcut and free-standing entity designed for only one production output purpose. It may be, in fact, a "turn-key" project.

Pharmaceuticals encompass many diverse technologies and product areas such as feed additives, nutritionals, chemicals, antibiotics, vitamins, trace minerals, anthelmintics, growth promotants, etc., each with its own technology, equipment, personnel, scientific disciplines and "space." Further, it is absolutely essential to have the necessary research and development efforts to support the products produced and to keep the product line current.

It may be estimated that a relatively "modest", modern pharmaceutical complex in the U.S. or elsewhere having chemical and fermentation capabilities,

organic synthesis and reactive capabilities, extraction, purification, etc., may have dedicated assets in the range of U.S. $20-50 million. Many of the larger pharmaceutical complexes about the world have investments in the hundreds of millions.

The construction of a vaccine unit versus a pharmaceutical unit may be compared to the building of a single family residence versus a modern 50 story office complex. The single family residence is constructed and designed for only one purpose, to provide shelter for a family. The office complex is designed to satisfy many needs and is a multipurpose project.

Recommendation, Pharmaceutical "Manufacturing" Capability:

Egypt has the beginnings of a basic pharmaceutical manufacturing industry in the form of such companies as the Chemical Industries Development (C.I.D.) in Talbia, Giza, Cairo. The writer has had the opportunity on at least two occasions to meet and talk with Dr. Ahmed Aly Abul Enein, President of C.I.D., and is aware that C.I.D. and Dr. Enein would like to launch into veterinary (including poultry) pharmaceuticals and similiar products.

The C.I.D. human pharmaceutical complex that Team 070 visited in February, 1979, located in Talbia, were the finest, most modern facilities staffed by very capable personnel that we have seen in Egypt. It is pertinent to recognize that the technology for the manufacture of pharmaceutical products for humans and for animals is basically the same.

Initially, basic drugs (antibiotics, chemicals, etc.) in as pure a form as possible, ie., 100% drug component, could be imported by a company such as

C.I.D., under license or joint venture or simply bought or through other means, and processed, finished, packaged and distributed.

The goal of a company such as C.I.D. should be self-sufficiency and this concept should be built into their planning process as the business prospers. It is, perhaps, well to keep in mind that a modern, completely equipped production fermenter, for example, designed for most economical production and sized in the range of 25-35,000 gallons may cost in the range of U.S. $1 million. A company could purchase and process, and realize profits, a substantial amount of a broad sprctrum antibiotic, for example, for what one fermenter would cost.

Team 070 will, of course, on instructions from the GOE, and through the auspices of the PIP, presumably with supplementary funding, prepare a detailed analysis report or feasibility study of the possibilities and the advisability of constructing pharmaceutical facilities in Egypt. Team 070 will, again under instructions from the GOE, assist a company such as C.I.D. in negotiations and planning to secure licenses or to promote joint ventures and in whatever else is needed to get them started in veterinary pharmaceuticals.

Discussion, Improved Diagnostic Capabilities:

Although there are diagnostic facilities in Egypt, it is the opinion of Team 070 that the quality and organization, along with the lack of expanded programs, of the present diagnostic efforts can be substantially improved.

It is well to look at poultry disease management and control as a totally

coordinated program. There are many essential elements that make up an integrated disease control program. One of these essential elements is good diagnostic capabilities.

It is not enough to have good management at the breeder level, the hatchery level and the grow-out level. It is not enough to have an adequate supply of quality vaccines and pharmaceuticals. To keep on top of disease outbreaks, to recognize new disease entities and to recognize changes in manifestations of existing disease conditions, to monitor the effectiveness of control programs (for salmonellosis, for example), to monitor the effectiveness of the usage of vaccines and pharmaceuticals and for many other reasons, a well integrated diagnostic/technical service/extension service program must be established.

Good diagnostic operations implies many things. The personnel must be well trained in modern procedures both in the field and in the laboratory. Current literature, including professional journals, that report the latest techniques and observations in poultry diseases, must be readily available. Facilities must be strategically located to quickly handle specimens for maximum efficiency in satisfying a case load demand. Modern (and fully operative!) equipment must be provided. A workable syatem for reporting findings with provisions for quick feed-back of diagnosis and recommendations must be established.

The system established for diagnostic services in Egypt will, in all probability, be a joint effort including both the public and the private sectors. The universities should play a vital role and an active extension service

should be provided for the training and education to be directed toward the poultryman.

The private sector should be encouraged to establish diagnostic capabilities and their efforts should be integrated with those of the public sector. Assistance should be requested from the manufacturers of pharmaceuticals wherever possible to take advantage of their specific expertise.

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SPECIAL REPORT

TASK 070

ANIMAL/POULTRY HEALTH AND VACCINE PRODUCTION

TO: MINISTRY OF AGRICULTURE - GOVERNMENT OF EGYPT DATE: JUNE 19, 1979

BACKGROUND:

For almost one year, the Poultry Improvement Project (PIP) teams of specialists have been investigating the problems and opportunities relative to the expansion of poultry and egg production in Egypt.

PIP Team 070 was charged with the responsibility of the health of poultry. It quickly became apparent that many serious poultry health problems exist. Specifically, Newcastle Disease and Salmonellosis were identified as endemic disease conditons capable of devastating the Egyptian poultry flocks. These two diseases alone currently exert strong negative effects on poultry and egg production.

In order to control such endemic diseases, three (3) major factors must exist: quality vaccines produced in sufficient quantity to meet the needs, pharmaceutical products to be used in prophylactic and therapeutic programs, and the capability to rapidly and accurately diagnose disease conditions. Without quality vaccines, the application of pharmaceuticals and diagnostic programs would not by themselves be effective and the Egyptian poultry and egg expansion project would fail.

Therefore, it is our conclusion that priority must be given to providing an adequate supply of quality poultry vaccines produced in Egypt. Other arrangements are more feasible and practical for providing pharmaceutical products, and present diagnostic capabilities can be improved and expanded in due time.

The PIP Team 070 in an in-depth assessment of the Abbasia operations concluded that it is an over-age and entirely inadequate facility for the production of quality poultry vaccines. And such vaccines as are produced at Abbasia and used in the Egyptian poultry sector may, in fact, be a contributing factor in enhancing these endemic disease conditions.

Therefore, an urgent need exists to establish control over these endemic diseases. We believe that a modern, up-to-date poultry vaccine production facility should be constructed as soon as possible to replace Abbasia, whose upgrading to nominal quality production we believe is not economically feasible. Also, an urgent need exists to improve the in-country supply and availability of sufficient animal/poultry pharmaceuticals at most economic prices.

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The initial purpose of the Poultry Improvement Project was to identify the current problems, needs and opportunities associated with Egyptian poultry and egg production. This purpose has been accomplished.

However, the project was limited to investigations concerned with domestic poultry sector needs only; whereas, any new facility for vaccine production might also include vaccines for other food animal species as well as the consideration of potential for the export of vaccines. These two areas, which would be beneficial in and necessary for support and justification of a vaccine facility, were not a part of the PIP objectives or work plan.

Discussions have been held, as a part of the Poultry Improvement Project, with potential joint venture partners and financial sources. While the reaction has been generally favorable, in order to bring such reactions to a point of commitment to proceed, these potential partners and financial sources have stated that they would first require a more in-depth and comprehensive appraisal of the Egyptian food or economic animal situation, including both poultry and animal vaccines and the export potential. Discussions also have included alternative but improved circumstances regarding bulk shipment, repackaging in Egypt, etc., of necessary pharmaceuticals as a more economically feasible alternative to the establishment of an in-country pharmaceuticals plant. The latter has created no interest as yet, due to extensive investment requirements and the relatively lower market potential in Egypt.

RECOMMENDATION:

Based on the pre-feasibility study, it is our recommendation that an in-depth feasibility study be conducted as soon as possible that will quantify and justify the need for a poultry vaccine production facility in Egypt, (see attached pre-feasibility report), and alternative considerations available regarding pharmaceuticals.

PROPOSED:

We will prepare a feasibility report that will define and quantify the need for a poultry and other economic animal, vaccine production facility for Egypt, and pharmaceutical supply alternatives. This will include a basic pro-forma concerning poultry, livestock and export potential.

The preparation of the feasibility report will require up to an estimated ninety (90) person days, and would be completed within an estimated 120 calendar days.

The cost of such a study and final report which could provide the basis for joint venture and long term financing is estimated to be U. S. $60,000 to $80,000.

SUMMARY:

We request your consideration and guidance. Indications have been received from U.S.A.I.D. that they would consider funding such a feasibility study. If your judgment is favorable toward such a study, we can begin preparation immediately.

George O'Day

George O'Day, Project Manager
EGYPTIAN POULTRY IMPROVEMENT PROJECT

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Poultry Improvement Project

MINISTRY OF AGRICULTURE

GOVERNMENT OF EGYPT

Part 1: Poultry Vaccine Manufacturing Facility

Part 2: Pharmaceutical Manufacturing Facility

Part 3: Diagnostic Laboratory Facility

June 1979

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SUMMARY

For almost one year, the Poultry Improvement Project (PIP) Teams have been investigating the problems and opportunities relative to the expansion of poultry and egg production in Egypt.

It quickly became apparent that many serious poultry health problems existed and were having strong negative impact on poultry production. Specifically, Newcastle Disease and Salmonellosis were seen as endemic disease conditions and capable of devastating the Egyptian poultry flocks.

Vaccines for the management and control of Newcastle Disease in Egypt are obtained from two sources:

1. Manufactured at Abbasia under public sector management, and
2. Imported at significant costs.

Pharmaceuticals and other drugs for the intended use of programs designed to control Salmonellosis are generally imported in bulk and finished locally. Members of PIP-Team 070-Poultry Health determined that the Newcastle Disease vaccines (and others) produced at Abbasia were not of good quality, were based on old technology, and were not produced in sufficient quantity to meet the demand (i.e., Despite the generally recognized poor quality, the vaccines are in demand because they are the primary vaccines available in-country except for the relatively small amount imported by GPC and used for their flocks. Some private producers import supplies for their own flocks because of the general unavailability of quality vaccines in the country.) This pre-feasibility report is concerned only with the proposition concerning the urgent requirement for necessary materials with which poultry health problems can be brought under control. It is the conclusion of the team that further, in-depth feasibility studies be initiated using as the base this feasibility

report to consider the construction of a new, modern poultry vaccine manufacturing facility in Egypt, an improved pharmaceutical repackaging facility, and essential diagnostic laboratories. It is the conviction of the team that such facilities are urgently needed to bring the poultry health problems in Egypt under control.

Part 1: Feasibility Report-Poultry Vaccine Manufacturing Facility

Demand:

Estimated Demand for Poultry Vaccines-
10 Year Period-1980-1989-Egyptian Poultry

	Est. Demand-1980	Est. Demand-High Side- 1990	Est. Demand-Most Probable-1990
Newcastle Vaccine	2400 (1)	6400 (2)	4800 (3)
All others	200 (4)	600	400
Total	2600	7000	5200

(1) Numbers are in doses; add 000,000. The number, 2,400,000,000 doses was derived as follows: The present Egyptian poultry population (high side) is estimated at about 150 million head (1979-1980), therefore 150 million times average 4 vaccinations per bird per cycle on 10 week cycle and 4 cycles per year gives 2.4 billion doses of Newcastle Disease Vaccine.

(2) Estimated poultry population of 400 million times average 4 vaccinations per bird on 10 week cycle and 4 cycles per year.

(3) Most probable estimate assumes:
Doubling of poultry population in 10 years to 300 million head on 9-10 week cycle with 4 cycles per year and an average of 4 vaccinations per bird.

(4) Fowl Pox Vaccine, Mareks Vaccine, most probably Infectious Bronchitis Vaccine and others.

Estimated cost of vaccine manufactured in Egypt-Average 1980-1989

Estimated Cost of Vaccines
Manufactured in Egypt-Average 1980-1989

	1980	Total Cost-U.S.$	1989	Total Cost-U.S. $
Estimated most probable-total doses produced	2600 (1)	------	5200 (1)	------
Estimated-least cost-U.S.$-per 1000 dose unit	$ 0.40	$ 1,040,000	$ 0.40	$ 2,080,000
Estimated-most probable cost-U.S.$-per 1000 dose unit	$ 0.50	$ 1,300,000	$ 0.50	$ 2,600,000
Estimated-high cost-U.S.$-per 1000 dose unit	$ 0.60	$ 1,560,000	$ 0.60	$ 3,120,000

(1) To doses, add 000,000.

Assumptions:

1. Least cost to most probable cost range, ie., U.S. $0.40 to $0.50 is about 15-20% higher that average standard cost per 1000 dose unit of U.S. produced vaccines.

2. Costs remain relatively constant over 10 year period on the assumption of productivity gains in the 10-year period 1980-1989 offsetting inflation, increased cost of raw materials, energy, labor, etc.

Summary: Vaccine costs: To produce 2,600,000,000 doses of all classes poultry vaccine in year one will cost $1,040,000 U.S. to $1,560,000 U.S. depending on unit cost per 1000 dose unit. To produce 5,200,000,000 doses in year 10 will cost $2,080,000 U.S. to $3,120,000 U.S. depending on unit cost per 1000 dose unit.

Estimated cost of vaccine manufacturing facility-Egypt

Comment: The most realistic approach to establishing self-sufficiency for quality poultry vaccines in Egypt is to construct and equip a facility specifically designed for this purpose. This is considered TOP PRIORITY.

The directives for the PIP specifically limits activities to poultry. However, a facility designed for the production of poultry vaccines could also be designed to encompass vaccines for other species. It is not recommended that the same facility be used for both human and animal vaccines.

If we assume for the purposes of this feasibility report that we are talking about a facility for the production of poultry vaccines only, the design planning and development will be simplified. However, if a new facility is to be constructed, the most cost-beneficial approach would be to produce all animal vaccines rather than just poultry vaccines. Also, any facility constructed just for poultry or all vaccines, would be capable of producing considerably more than would be required for Egypt. It is believed the excess could be readily sold to other nearby countries, thereby also assisting in reducing Egypts negative international cash-flow.

The Plant

Size: To supply the demand in doses for at least a 10-year period, the plant will be sized in the range of 15-20,000 square feet.

Cost: While it is difficult at this stage to extrapolate U.S. costs of construction to Egyptian costs, it is thought that costs in the range of U.S. $ 50-100 per square foot are ball-park. Realistically, the costs will most probably be in the U.S. $ 50-75 per square foot.

Many factors serve to escalate the costs of such a facility such as the necessity to include an adequate air handling system to maintain a controlled environment within the laboratories. This is essential for quality production of vaccines, and is not economically or practically feasible at Abbasia.

The cost of a 20,000 square foot facility would, therefore, be in the range of U.S. $1 million to $2 million. A most probable number would be U.S. $1.5 million.

Location: It would be advisable to conduct a site study. But, in all probability the facility should be located in the Cairo area. There are no major constraints to constructing such a facility in any reasonable location in Egypt with the exception that an adequate and continuous supply of electrical energy, with standby provisions, must be provided.

Equipment: The major piece of equipment required is the freeze-dryer, also called a lyophilizer or desiccator. It is thought that a 100ft^2 (sum of the square footage of the drying shelves) freeze-dryer of the Hull type would be quite adequate.

A Hull type dryer, built to certain specifications, landed and installed in Egypt, and including all spare parts and maintenance or service contract, is estimated to cost about U.S. $150,000. Because it might be prudent to maintain a larger than usual spare parts inventory to minimize downtime, the total cost could run as high as U.S. $200,000.

The estimated cost for all other equipment is U.S. $300 to 350,000.

Design engineering and construction time: It is estimated that it will require two years from the design and planning stage until plant completion.

Lead time on the Hull-type freeze-dryer is 6 to 9 months.

Consulting and engineering costs: Many factors will be on-going exclusive of the actual construction of the plant. Such activities as personnel selection and training, equipment location, equipment specifications, vaccine development activities, the writing of instructions and specifications for vaccine production, certain testing activities (in the laboratory and in the field), virus strain verification for purity and potency, the sourcing of SPF embryos for virus production, and many others will be necessary to establish a quality production facility.

Engineering costs may be estimated at about 5% of the construction costs. If the plant cost U.S. $1.5 million, the engineering costs would be U.S. $75,000.

Technical consulting costs are estimated for the two-year period, with at least a two-year follow-up at U.S. $200 to 250,000. This would cover all needs from inception through start-up to a stage of effective production.

Engineering and consulting costs should be viewed realistically since such costs may vary upwards significantly because the costs for such services will undoubtedly be higher in Egypt than in the U.S.

Joint Venture Possibilities

To date vaccine manufacturers have indicated only relatively insignificant interest in such a project. However it is believed that the availability of a detailed feasibility study would substantially enhance the possibility, if not the probability, of a joint venture program. Such interest cannot be generated without the detailed feasibility study.

Financial Sources

Several sources indicated possible interest but would not commit or even further consider a financial program without a more detailed, in-depth feasibility study. These sources include the World Bank entities and affiliates, AID-Capital Development, and commercial international banks.

Part 2: Feasibility Report-Pharmaceutical Manufacturing Facility

The Poultry Health Team-070 does not give this proposal high priority. Pharmaceuticals are generally available. But without sufficient vaccines to help control poultry disease problems, pharmaceuticals are relatively minor value. Also the cost of pharmaceutical production units is significantly higher, and would produce a significantly larger volume than could ever be used in Egypt. In contrast to vaccines, it would be difficult to market excess needs in a reasonable marketing area abroad excepting where competition would be extremely tough. Also a facility for the manufacture of pharmaceuticals and other similar products such as feed additives and nutritionals is a far more complex undertaking than building a vaccine manufacturing laboratory.

It is the considered opinion of Team 070 that consultations with a company such as C.I.D. would lead this company to invest assets and know-how in the future of poultry and poultry health products (as well as products for other animal species) in Egypt. Such as in a bulk repackaging, finished processing plant rather than a complete manufacturing plant. The cost and return on investment is significantly better and would suit the needs in Egypt equally as well.

If it is the desire of Egyptian and A.I.D. officials to study the feasibility of constructing such a pharmaceutical facility from "scratch," we could, of course, prepare an initial detailed study complete with design and conception parameters. However, such a project would require several years before an effective level of production would be achieved.

It is estimated that such a facility would cost in the range of U.S. $20-50 million. The estimated cost of a repackaging, finishing unit would cost less than U.S. $ 3-5 million. Therefore the detailed feasibility study would consider the alternatives of a repackaging, finishing unit rather than a complete pharmaceutical production unit.

The same scope of considerations as in the vaccine plant program, should also be included in this segment. That is, pharmaceuticals for other animals and for export potential as well.

The engineering and consulting costs projected for this type facility, are estimated to be U.S. $ 50 to 100 thousand. Construction time no more than 2 years from engineering to production.

Joint Venture Possibilities

The same considerations noted for vaccine also exist here. However, Merck, Inc. has indicated they would make some contribution to the cost of the detailed feasibility study if conducted, but would not conduct such a study by themselves. Merck and C.I.D. have expressed interest in joint venture possibilities pending the availability of a satisfactory feasibility (not pre-feasibility) study.

Financial Sources

Same comments as in vaccines.

Part 3: Feasibility Report-Diagnostic Laboratory

Diagnostic capabilities are generally poor to inadequate. There is no National program for disease reporting, for management control. There is no central philosophy that diagnostic support is necessary for building a poultry industry in Egypt. Experience in every country with an effective, viable poultry sector indicates it is essential to have proper diagnostic support in order to have a strong poultry sector.

It is the opinion of Poultry Health Team-070 that good diagnostic facilities, properly equipped and staffed with trained personnel and dedicated to a national program of disease management and control are absolutely necessary for the success of the poultry industry in Egypt and that any planning for poultry sector improvement must include adequate, modern diagnostic facilities.

At this early stage of planning, the most likely organization for diagnostic services to support the poultry industry on a national basis is as follows. Egypt should have one good centrally located (probably Cairo) diagnostic laboratory. The laboratory should be properly equipped and staffed with trained scientists and other technicians must of which currently are not available.

Regional or satellite laboratories should be established and constructed to allow for modest capabilities in the diagnosis of poultry diseases and the collection of specimens for forwarding to the Central lab for verification and confirmatory diagnosis.

Cost

It is suggested that a Central diagnostic laboratory, an Egyptian National Poultry Diagnostic Center, would cost in the range of U.S. $400-600,000. As the poultry industry in Egypt grows, the diagnostic capabilities should grow with it. A cost estimate at roughly the U.S. $500,000 level would include the necessary equipment, but would not include the cost of personnel training. Regional or satellite laboratories are estimated to cost no more than U.S. $100,000, not including cost of staffing and their training.

Engineering and consulting costs are estimated at U.S. $ 50-100 thousand.

Joint Venture Possibilities

None at this time. Such activities are not considered as profitable enterprise. At best, such facilities would be fortunate to operate on a break-even basis even if all services were provided only for compensation.

Financial Sources

Same as vaccine and pharmaceuticals.

SPECIAL REPORT

ON

POULTRY HEALTH PROBLEMS IN EGYPT

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Mathtech The Technical Research and Consulting Division of Mathematica, Inc.

MAY 9, 1979

SPECIAL REPORT

POULTRY HEALTH SITUATION IN EGYPT

(Including Pharmaceuticals, Biologicals, Vaccines, Medicants and Additives)

INTRODUCTION

The original project paper and background information on the Poultry Sector of Egypt and for the Poultry Improvement Project indicate the major thrust of the activity relating to this Task as originally outlined and as being related to the availability, production and use of pharmaceuticals, biologicals, vaccines, medicants and additives. No identification of the existence of abnormally high incidence of poultry diseases was noted as a problem. Therefore, subsequent team activity was directed not to the solution of poultry health problems, but to those relating primarily to the pharmaceuticals, vaccines, etc. themselves.

Due to those early instructions and during initial Pharmaceutical Team visits in Egypt, concentration was given to these areas. However, as this team co-ordinated their efforts and findings with other teams working in the hatchery, village and poultry production areas, it became apparent that the major problem was poultry health and diseases, with the pharmaceuticals, etc. situation being only a contributing factor. Therefore, prior to the second cycle of team visits to Egypt:

1. The objectives of this special task team was expanded to also include, and the identification changed to, Poultry Health.
2. The main concentration of the team was therefore redirected to the poultry disease problem, with concentrated efforts as required on the pharmaceuticals, etc. activities.
3. Team capability was expanded through the transfer of Dr. Malcolm Reid (noted poultry scientist regarding disease problems, and addition of allocated dedicated time of team members.

This report therefore encompasses the overall poultry health problem, including diseases and vaccines, etc. It contains both findings and recommendations for solution of the problems, short and long range.

While this report and its recommendations are to be reviewed by the MOA and AID, from which we request your written responses to the recommendations, the team has accelerated its consultancies to the sector regarding poultry health problems. However, the problems existing range far beyond the current capabilities of the project as it now exists, and will require further direction by the MOA and AID to provide the necessary solutions to this major problem area.

For the Team,

George O'Day, Project Director

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SPECIAL REPORT - POULTRY HEALTH

(Including Pharmaceuticals, Biologicals, Vaccines, Medicants and Additives)

This report outlines the findings and recommendations of the special Task Team which initially concerned itself with problems relating to Pharmaceuticals, Vaccines, etc. relating to the Poultry Sector of Egypt. However, that team was expanded in January 1979 to include poultry health, and was reidentified as the POULTRY HEALTH TEAM. The conclusions of the original Pharmaceuticals Team, as well as other special Task Teams in the production, hatchery, and village areas, identified as a major significant problem the widespread existence of poultry diseases throughout Egypt.

Therefore, during the January, February and March, 1979 visits of the Poultry Health Team, in-depth concentration of effort was applied to the disease problem and a more finite understanding obtained of these problems areas, including:

1. The importance and variety of diseases present in flocks of different sectors of the poultry industry
2. Disease control measures
3. The quality and quantity of locally produced vaccines
4. The variety and availability of poultry drugs
5. The poultry diagnostic facilities available in Egypt
6. The status of pullorum-typhoid diseases.

I. IMPORTANCE AND VARIETY OF DISEASES:

It became obvious to us and to members of other teams that diseases are one of the major problems, if not the major problem, facing the developing poultry industry in Egypt. Two diseases, Newcastle and salmonellosis, including pullorum "typhoid and pentatyphoid" are the major two disease entities plaguing the industry. Obviously, other diseases exist, but are overshadowed by the devastating effects of Newcastle and salmonellosis. This disease picture is true of the three segments of the Egyptian poultry industry; namely, public, private and village flocks.

The velogenic viscerotropic neurotropic varieties of Newcastle disease (VVND) virus are prevalent in Egypt. These varieties can cause morbidity and mortality up to 100% in unvaccinated flocks. Irregularly vaccinated flocks can also suffer high morbidity and mortality. The regular use of high quality vaccines similar to those used in the Western World provide good protection against the velogenic viscerotropic varieties of the virus. Reports of good control of the disease achieved by the use of imported vaccines were heard from General Poultry Company (GPC) personnel and some owners of private flocks.

I. IMPORTANCE AND VARIETY OF DISEASES (cont'd):

Salmonellosis is apparently a real problem in flocks of different sectors. Paratyphoid infections are very common in public and private sector farms. Although no data is available on the incidence of these infections in village flocks, there is no reason to not believe that these infections are widespread in these flocks. The pullorum typhoid group of Salmonellas are prevalent in village flocks. Salmonellosis can cause morbidity and mortality of up to 100 percent in young birds; in older birds there is very little mortality, but chronic infections with S. pullorum and S. gallinarum can lead to impairment of reproduction performance.

Other diseases that are recognized on the basis of clinical signs or gross examinations are Marek's disease, lymphoid leucosis, fowl pox, gumboro, avian encephalomyelitis, and airsacculities. The latter condition is probably caused by Mycoplasma gallisepticum and complicated by Escherichia coli. Aspegilleris, spirochetosis, coccidiosis and worm infestations are some of the other recognized problems. Although there is evidence of infection with infectious bronchitis virus, no diagnosis is made of that disease. No reports have been made in Egypt of the presence of infectious laryngotracheitis. There is always the possibility that the disease exists but has been misdiagnosed.

Generally speaking, most of the common diseases of poultry encountered in the Western World do exist in Egypt. Diseases that do not exist, or are not currently diagnosed, will probably make an appearance as soon as Newcastle and salmonellosis are brought under control. One other reason for this prediction is the free flow to Egypt of eggs and day-old chicks from Europe, where some of these so-called (nonexistent diseases) are common.

II. DISEASE CONTROL MEASURES:

As indicated in the preceding write-up, Newcastle and salmonellosis are the major diseases that an Egyptian poultry pathologist worries about. The 1978 summary of diseases diagnosed by the Central Poultry Disease Diagnostic Laboratory of the AHRI (see 070 report of February 28, 1979) indicated that Newcastle disease virus was isolated from 815 of 1,396 cases believed to be caused by virus infections. Salmonella organisms were isolated from 2,150 or 7,231 cases believed to be induced by bacterial infections. We do think that under the present circumstances this is a justifiable attitude, because of the devastating effect of these two diseases.

II. DISEASE CONTROL MEASURES (cont'd):

Vaccination schedules used for broilers in the public and private sectors vary within farms, as might be expected. The only vaccines used in broilers in Egypt are Newcastle vaccines. GPC, Ismailia, and Egypco use only imported Newcastle vaccines. Most of the private flocks are vaccinated with imported vaccines, but some still use locally produced vaccines.

Layers operations which are mostly GPC owned (with one exception we know of) vaccinate, besides Newcastle, for Marek's disease, gumboro, avian encephalomyelitis, fowl pox, fowl cholera, and occasionally for spirochetosis. Except for the spirochetosis vaccine, all the other vaccines are imported. Parent flocks are vaccinated for the same diseases as for layers.

Village flocks which are used as dual type birds are vaccinated only for Newcastle. Only locally produced vaccines are used in village flocks.

In discussions with veterinarians from GPC, Ismailia Poultry Company and Egypco and some owners of private flocks, it became apparent to us that the imported Newcastle vaccines have contributed substantially to the control of the disease. This same picture is apparently true also of imported vaccines for other diseases used in layers and parent flocks operations. Yet, the fear of Newcastle has created an interesting attitude, not based on much scientific knowledge, in the mind of the Egyptian veterinarian. This attitude is expressed in a policy of overvaccinating. As an example, Egypco vaccinates broilers at 7, 18, 28, 38, and 45 days of age. Regardless of this and other minor problems, it seems to us that imported vaccines used properly have significantly contributed to the control of diseases in public and private flocks.

The situtation in village flocks is rather depressing. Essentially, the only vaccine available for this sector is the locally produced Newcastle vaccine. The above statement has to be qualified yet, because this vaccine is not always available as will be discussed later. Consequently, it can be stated that disease control in village flocks by vaccination is essentially lip service. The vaccination service for village flocks offered by the MOA veterinary clinics can be considered, in our opinion, as a point of dissemination of disease (see the enclosed report on the visit to Imbaba).

II. DISEASE CONTROL MEASURES (cont'd):

Control of diseases for which no vaccines are available, such as salmonellosis and mycoplasmosis, is another depressing subject. At the GPC and private flocks level, control is achieved by literally dumping a great variety and quantity of antibiotics and chemotherapeutic agents. These drugs are injected or mixed with water or feed and introduced to the birds throughout their lives. In village flocks the situation is even worse. The only drug that the MOA can afford to use for stocking its veterinary clinics is furazolidone and, for that matter, only very small quantities of it could be obtained.

It is one recommendation that a multifaceted approach for the control of diseases should be developed. The judicious use of drugs is useful in the short run, but in long terms such a policy is not acceptable. There is a wealth of information in the scientific literature on the control of diseases for which no vaccines are available which should be drawn upon to formulate such programs. The subject of pullorum and typhoid control will be dealt with later.

III. THE QUALITY AND QUANTITY OF LOCALLY PRODUCED VACCINES:

This subject was discussed in detail in this team's earlier report. More information was gained during this visit on the locally produced vaccines at the MOA facility at Abbasia. This information supports the two main points raised in the earlier report; namely, Abbasia is not able to meet the local demand, and the poor safety and efficacy record of the vaccines produced. The information in the following table was provided by Dr. Ismail Sabry, head of the poultry diseases and epidemics division of the MOA. The production figures in the table are in agreement with figures obtained from Abbasia. The requirements figures are debatable. It should be understood that these are the requirements of the MOA for stocking its veterinary clinics that vaccinate village flocks. Notice that the requirements in the table for the intraocular (F strain) Newcastle disease vaccine is the same as that for the intramuscular (Komarov strain). The F strain is used only for newly hatched chicks (less than one week of age). This indicates that the requirements are calculated on the basis of one F strain and one Komarov strain vaccination during the lifetime of a bird. This is simply inadequate. Obviously, it also becomes clear that the requirements figures in the table are severely undercut. There is no vaccine which will provide such lasting immunity.

III. QUALITY AND QUANTITY OF LOCALLY PRODUCED VACCINES (cont'd):

It becomes clear from these figures and from the available information on the number of poultry in Egypt that Abbasia is not capable of producing NCDV in sufficient quantity to cover local demand.

POULTRY VACCINES PRODUCED BY THE VACCINE & SERUM INSTITUTE ABBASIAH

NAME OF VACCINE	PRODUCTION	REQUIREMENTS
Newcastle (Intramuscular)	109.357.000	150.000.000
Newcastle (Intraocular)	84.554.000	150.000.000
Fowl Pox	8.260.000	10.000.000
Pigeon Pox	450.000	500.000
Haemo. Septicaemia (Rabbits)	200.000	500.000
Fowl Cholera	893.800	8.000.000
Duck Cholera	608.000	1.000.000
Turkey Cholera	288.000	1.000.000
Spirochaete	427.500	1.500.000
Antigens:		
B.W.D. Stained Antigen	334.000 doses	10.000.000
B.W.D. White Antigen	1750	400.000

On the subject of efficacy of the vaccines, we were able to obtain data from one particular flock on this subject. Three month old birds from this flock were vaccinated twice for NC; once using the F strain at five (5) days of age, and another using the Komarov strain at two and one-half (2½) months of age. At 3 months of age an outbreak of NC occured in the flock, and at that time some birds were bled and some were tested for an NCDV antibody titer. The results showed that of 22 birds examined; 6 birds had no titers, 5 birds had 1:2 titer, 5 birds had a titer of 1:4, 3 birds had a titer of 1:8, one bird had a titer of 1:16, and the last two birds had titers of 1:32. These low titers (of lack of titers) are an indication of the lack of efficacy of the vaccine.

III. QUALITY AND QUANTITY OF LOCALLY PRODUCED VACCINES (cont'd):

There are several other reports we heard about the lack of efficacy of Abbasia vaccines. There are also reports of the lack of safety of the vaccines. Several outbreaks of Newcastle were reported that occured a few days following vaccination of birds that were previously vaccinated. As a matter of fact, we visited one of these farms that was experiencing such a problem.

As indicated in this team's previous report, the facilities at Abbasia are in such rundown condition that makes it easy to partially understand why the lack of efficacy and safety of the vaccines. One other problem with the Abbasia vaccines is the lack of a dependable source of eggs to grow live virus vaccines. For all practical purposes, the eggs currently used could be naturally infected by any number of poultry pathogens that could contaminate the vaccine. The other problem is the choice of the Komarov strain for one of their vaccines. Although this strain is supposed to be mesogenic, field observations indicate that this strain is a virulent strain. Because the demand on the locally produced NC vaccine is far exceeding production, a black market for this vaccine has been active. It was indicated to us that 1,000 doses of vaccine are being sold in the black market for LE 10. This is a substantial amount of money by Egyptian standards. This suggested to us, as well as others, that some irresponsible people are taking advantage of the situation and are overdiluting the vaccine so that they can spare 1,000 doses or more to be sold in the black market. Certainly, this is a contributing factor in the reported failure of the immunity induced by the vaccine.

The above observations concentrated mainly on Newcastle vaccine, since these are the vaccines in demand and this is the disease everybody is concerned about. The only other viral vaccine produced at Abbasia is Fowl Pox. We have not heard of any problems about the efficacy of this vaccine. However, this vaccine is also produced in non-SPF embryonated eggs, and the possibility of its contamination with other infectious agents is real.

According to GPC personnel, imported vaccines are bought on tender for approximately the same cost as local vaccines. The private sector does not have this luxury. Imported vaccines are sold to the private sector at twice the cost of the local vaccine.

III. QUALITY AND QUANTITY OF LOCALLY PRODUCED VACCINES (cont'd):

It is apparent to us that some major changes have to be made in the area of vaccine production. There are enormous gains to be made in Egypt that will cost relatively very little if a new poultry vaccine production facility is constructed. A small farm for production of SPF eggs should be part of this facility. The heads of the current poultry vaccine production units are capable people, but the younger generation needs a lot more training on vaccine production than they are currently getting.

IV. THE VARIETY AND AVAILABILITY OF POULTRY DRUGS:

Although we have seen a variety of poultry drugs advertised in Egypt, some important drugs available in the United States were not available. Examples of the unavailable products are gentamicin and lincospic. These are very effective drugs that proved their superiority in the United States. There is also a variety of combination drugs manufactured in Europe that certainly would not be permitted in the United States. Examples of these would be combinations we have seen that contain 3 or 4 antibiotics and, for added measure, few amino acids and vitamins are added in another recipe. It was obvious to us that some of these combinations contain antagonistic ingredients and the interrelationship between other ingredients is unknown. In other words, it is an open market and everything goes. Yet, some of the ethical companies are apparently hesitant in entering this market, and those that did are selling poultry drugs as an offshoot of their human drug sales.

Imported veterinary drugs are taxed at the rate of 23% of the cost. However, it was mentioned to us by the Undersecretary of Agriculture for Animal Health that drugs imported for use by any governmental agency, such as GPC and MOA farms, are exempted from this high taxation. This policy of taxation does not lend itself to the GOE efforts to expand its human food resources. It is a very high rate of taxation that places a heavy burden on the private producers who theoretically pass it on to the consumer. As a result of this high rate of taxation, veterinary drugs are expensive; human drugs are relatively cheaper. Consequently, some private producers are buying human drugs to treat their chickens.

Most of the veterinary drugs are sold by the middlemen who are charging exorbitant prices for these drugs. We were also told of a thriving black market in poultry drugs.

IV. THE VARIETY AND AVAILABILITY OF POULTRY DRUGS (cont'd):

As far as the use of poultry drugs, this is dependent on the industry sector involved. The public sector advertises for bids, and gets the best prices. Consequently, drugs are available for this use and are definitely overused. The private sector suffers the most in this area, and we heard numerous complaints about how the middlemen are putting the squeeze on these producers. The village flock sector essentially has very little available drugs. As mentioned earlier in this report, only flurazolidone is sometimes available in the MOA veterinary clinics for treatment of salmonellosis.

V. THE POULTRY DIAGNOSTIC FACILITIES AVAILABLE IN EGYPT:

The diagnostic facilities for poultry diseases are operated by the Animal Health Research Institute (AHRI). There is one central laboratory in Cairo and 18 regional labs distributed throughout the country (see list enclosed). Three (3) more regional labs are to be in operation in 1980. Two (2) reports are enclosed on the personnel involved and some of the diseases diagnosed.

It becomes obvious to us that the diagnostic facilities are functioning below accepted standards. The central lab which is supposed to be the final referral center lacks space, equipment, reagents and expertise. Yet, it has an overabundance of personnel. It certainly is not a joke that they have so many people employed they do not have enough chairs for them.

In modern poultry diagnostics, post mortem examination is only a supplement to other lab techniques (e.g., isolation, serology, etc.) in making a correct disease diagnosis. Top of the barrel diagnosis of poultry diseases is a thing of the past; yet, this is essentially the only thing done in these diagnostic labs in Egypt. Isolation attempts are only, sometimes, done for Newcastle disease virus. We even doubt the validity of the results of this procedure, since the embryos used for inoculation do not come from Newcastle disease free flocks.

There is an urgent need for a major change in this area if the industry is to make any further progress. Control of diseases goes hand in hand with the availability of a good diagnostic service.

V. POULTRY DIAGNOSTIC FACILITIES AVAILABLE IN EGYPT (cont'd):

GPC has its own so-called diagnostic facility (see enclosed report on visit to Mataria). The activities of this lab fall far short of being acceptable as a diagnostic facility. This lab concentrates mainly on monitoring for NCDV and salmonellosis. An expansion of this facility and a change in its mission is being considered, which we certainly would like to see accomplished.

VI. THE STATUS OF PULLORUM-TYPHOID DISEASES:

These diseases are very widespread in the village flock sector. Very little data is available on the prevalence of these diseases in the private sector. In the public sector, our conversations with their personnel indicated that these diseases are under control. The work force employed by both private and public sectors live in villages where these diseases are common; hence, it is always a possibility that these diseases can break into private and public sector flocks.

There is no cohesive control program for these diseases in the village flocks. The MOA efforts are essentially amateurish, unsustained attempts. The two current proposals for Monoufia and Kafr El-Sheik governorates are examples of this type of thinking.

We looked into the facility that produces all the pullorum-typhoid antigens produced in Egypt. The antigens produced compared reasonably well with those manufactured in the United States that we took with us to Egypt. The method of standardization of the Egyptian antigen is very crude (see enclosed report). This is done on volume basis. The laboratory needs upgrading and again personnel training is badly needed.

VII. RECOMMENDATIONS:

Vaccine Production and Poultry Diagnostics:

Our observations during the last two month visits and our extensive discussions with our colleagues from other teams and our Egyptian counterparts indicated several areas that should be urgently dealt with.

We think, and our colleagues agree, that the two major areas which should bring the best cost-benefit ratio for the Egyptian Poultry Industry are the following:

1. Establishing and equipping a new poultry vaccine production facility
2. Establishing and equipping a new poultry diagnostic facility
3. Initiation of a program to control pullorum disease.

For control of diseases there are no alternatives for excellence, and the present facilities might be actually hurting rather than helping the industry. Diseases are of major importance, and the investment in these facilities is relatively inexpensive. We strongly recommend that this proposal should be given utmost attention.

It is not the intention of this report to consider the specifications and financing of these projects, but is is obvious that the GOE will need all the help it can get from the United States in initiation of these projects. We will be ready to contribute our ideas for these projects. It should be understood that our proposal refers to two different separate physical facilities...each with its own farm to produce SPF eggs. These projects should also include an extensive personnel training program in Egypt and the United States.

Poultry Drugs:

The GOE should be encouraged to cancel or reduce the 28 percent tax levied on poultry drugs. Drug registration should be in one agency. The government should seriously consider licensing of imported poultry drugs that have been approved by the U.S. Food and Drug Administration without further testing. Drugs that have been on the market in the U.S. and Europe, and which have undergone extensive field and lab testing and for which an extensive body of published scientific literature on their efficacy and safety fall in this category. On the other hand, combination drugs for which there is no proof of efficacy on safety should be regulated.

VII. RECOMMENDATIONS (cont'd):

As suggested in our previous report, a pilot study should be initiated for the control of these diseases. This has to be a sophisticated, multifaceted, well financed, highly monitored program to ensure its success. It should be emphasized that village flocks are going to continue to suffer the 50% mortality reported earlier unless pullorum-typhoid diseases are brought under control. Again, this report will not deal with the specifics of such a program, but we will be ready to contribute our ideas for such an initiative.

It should be mentioned that during our visits (with our Egyptian counterparts and public and private personnel associated in the poultry industry), we provided advice on specific poultry health problems. We also made suggestions and recommendations on a variety of disease control programs. The recommendations listed earlier were discussed directly and indirectly with our colleagues on the other teams and with some Egyptian officials.

The control of the poultry disease problem will require both short range immediate action, as well as longer term planning and action. In preliminary discussions with United States producers of vaccines, interest was exhibited to provide limited technical cooperation, providing funding for any subsequent new facility would be available from sources other than themselves. Further investigation with such potential other sources, such as The World Bank and U.S.A.I.D indicated possible interest, but no commitment at this point, to perhaps be involved in development of necessary funding.

Finally, we recognize the fact that building new laboratories and facilities and stocking them with the most sophisticated equipment is not the answer to all problems. We certainly believe that the human factor will be quite important in any program which will bring the poultry disease problem under control. This, in turn, should improve the productivity of the poultry flocks in Egypt while reducing the current costs of production and improving the input of high quality annual protein into the Egyptian population.

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NOTES ON 070 - POULTRY HEALTH - TEAM REPORTS

TEAM LEADER: GEORGE APPLETON

MEMBERS: DR. Y.M. SAIF
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1-12-79 Letter to Dr. Mohy Z. Sabry - from Appleton

- Partial list of items to be accomplished during Appleton's Feb. 1979 visit in Egypt.

1-29-79 Letter to O'Day re 070 Team - from Appleton

- No changes in 070 interim team report at this time.
- Divided 070 team into 3 subgroups: (1) health services, (2) production, and (3) materials.
- Reiteration that 070 team has studied many facets of health care and maintenance of poultry in Egypt in addition to pharmaceuticals and vaccines.

1-31-79 Letter to Dr. Sabry with Feed Samples Analyses - from Reid

- Two page letter from Reid to Dr. Sabry discussing nutritional problems and results of feed sample analyses.
- Six Certificates of Analysis for feed samples - by Aynsome Laboratories Limited (England).
- One page list of samples - date of collection November 19, 1978.
- Two page Technical Service Bulletin on safety of hurazolidone and withdrawal statements (bifuran).

2-1-79 070 Team Info. for Input to Econometric Model - To Wiens/Cushen-from Appleton

- Seven pages of poultry health related figures for input to econometric model

2-12-79 Poultry Health Agenda - by Appleton

- Two page agenda for Dr. M. Sabry/G. Appleton - lists 11 areas to be explored/activities to be undertaken by PIP 070 team.

2-13-79 MOA Reorganization of Veterinary Services - by Saif

- Original document by Minister of Agriculture, Undersecretary of Agriculture for Animal Health Dr. Abd El Moneim Hamed El Sayed - effective Feb. 13, 1979. Original document in Arabic - translated by Dr. Saih.
- Dept. of Vet. Medicine to be abolished, all its authority and workers to be transferred to following new divisions (all under supervision of Undersec. of Ag. for Animal Health):
  (A) Div. of Govt. Affairs and Vet. Needs,
  (B) Div. of Disease Prevention,
  (C) Div. of Animal Care,
  (D) Div. of Public Health and Meat Inspection
  (E) Div. of Zoos, and
  (F) Div. of Vet. quaranteens.
- Remainder of document outlines the responsibilities of each of the six new divisions. Also lists the bureaus attached to Undersec. of Animal Health Office: Technical Bureau, Vet. Training, and Financial and Administrative.

2-21-79 Visit with Dr. Sami Allam, Manager of Egyptian Poultry Company, EGYPTCO - by Saif.

- Only 4 large private or semi-private poultry companies in Egypt: (1) Middle East Poultry Co. (semi-private, GPC), (2) Ismailia Poultry Co. (supported both financially and otherwise), (3) EGYPTCO (private), and (4) Cairo Poultry Co. (private). Capital investment listed for last 3 of these companies.
- EGYPTCO - Intention is to produce 10 million broilers in 2 stages (first stage 1981 to produce 5 million). Feed mill being constructed (capacity 10 tons pelleted feed), also slaughter plant and rendering plant being built. No plans for involvement in layer operations. EGYPTCO will sell chicks, dressed broilers, feed, drugs, and vaccines. Vaccination schedule given.

2-24-79 Visit to Imbaba - by Saif

- Complex to Imbaba (north end of Cairo) which has Poultry Disease Center (staffed by 3 vets), as well as livestock clinic and a training center for assistants who work in MOA vet clinics all over the country.
- Observations on Poultry Disease Center's Operations (vaccination and treatment). Some info. obtained from Center's records re vaccines.
- Conclusions:
  (1) Vaccine production not sufficient to satisfy needs.
  (2) Villagers apparently aware of value of vaccination and medication.
  (3) Variety and quantity of drugs is much below needs.

2-25-79 Comments on Kafr El-Sheikh Project - by Saif

- Objectives of project are reasonable - any imported chicks far better than what is currently available. Not much discussion of disease control in project. Main thing to consider: how does this project fit re PIP (flock and hatchery improvement segments)? Any duplications?

2-25-79 Visit to Fayoum Governorate - by Fadly

- Visit to Fayoum Governorate by Fadly, Bell, and Cushen. Following four places visited:
  (1) MOA Poultry Research Breeding Farm,
  (2) Fayoum Governorate Poultry Project,
  (3) Regional Diagnostic Lab, and
  (4) A native hatchery.
- MOA Poultry Research Breeding Farm - two kinds of research: genetics and nutrition. Has open house facilities for 4500 birds, 3 incubators (15,000 eggs/incubator) and 1 hatchery. Location not ideal - close proximity to vet. diagnostic lab (where dead and diseased poultry examined), as is Fayoum Governorate Poultry

Project. Diagram of layout of MOA Farm, diagnostic lab, and governorate project given. Disease situation and vaccination programs: farm is free of pullorum, use abbassia vaccines (no complaints), mortality is approximately 20% per 18 months, use of nephtin feed for control of E. Coli infection, and Amprolium+ for coccidiosis, 2 years ago had high mortality due to Big Liver Disease.

- Fayoum Governorate Poultry Project - project just begun; has 4 houses, 10,000 layers and 12,000 pullets; Fayoumi birds orginally obtained from MOA research farm; project using 4 native hatcheries in Fayoum Governorate (which are not allowed to hatch any fertile eggs except those supplied by project - other info on these hatcheries provided); projected 13 million chicks 1 year to be produced in 1981 (5 million through project, remainder through native hatcheries); and vaccination/disease problems similar to those outlined for MOA research farm.
- Fayoum Regional Veterinary Diagnostic Lab - (info. obtained from Dr. Refat Boles - assistant director of lab) - 5526 of 24,237 (23%) cases examined in 1978 were poultry; 7 vets in lab, lab is considered one of the active regional labs in diagnosis of poultry cases, lab's capability to isolate NDV and Salmonella decreased significantly during 1978.
- Recommendations - the practice of not examining poultry materials at regional vet lab at Damanhour, Behira because of close proximity to GPC farm is good one - should be followed in Fayoum laboratory.

2-26-79 Visit to GPC Diagnostic Lab at Mataria - by Saif and Fadly

- Lab is housed in a number of scattered old buildings at Mataria, and headed by Dr. Fawzia Moustafa. Lab has three technical divisions: (1) Bacteriology (staffed by 6 vets, 5 assistants, 5 laborers), (2) Virology (2 vets, 4 assistants, 2 laborers), and (3) Postmortem (1 vet, 3 assistants). An adjoining farm is staffed by 1 agriculturalist and 3 laborers also 9 administrative/clerical workers.

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- Bacteriology Division: (1) examines postmortem samples, (2) performs serologic tests on duck sera, (3) routine exams of newly hatched chicks for 4 GPC hatcheries (and ducklings from Bahteem), (4) occasional drug testing, (5) occasional tests for phenoic coefficient (disinfectants), and (6) examines drinking and processing plant water samples periodically (for Salmonella).
- Virology Department: (1) attempts to isolate Newcastle disease virus NCDV from submitted smaples, (2) titrates NCDV antibodies periodically, and (3) occasionally titrates NCDV vaccines.
- General observation that lab personnel utilizing space efficiently and doing reasonable job.
- Long term plans (from Dr. Sabry): (1) new building (different area) to house all lab activities and (2) considering change in goals of the lab and its activities.
- Saif/Fadly conclusions: (1) current lab activities re salmonella and NCDV are understandable since they are dealing with major disease problems facing GPC, private and public flocks, (2) however, salmonella/NCDV activities are carried to extreme and questionable results, (3) more restrained use of testing is recommended, (4) recommend lab divert its efforts for diagnosis of all poultry diseases, (5) personnel should be trained in current techniques of poultry disease diagnosis (and proper equipment made available), (6) recommend purchase of new textbooks and subscriptions to scientific journals, (7) GPC should invest in a good diagnostic lab facility, also person responsible for post mortems should be highly qualified and should coordinate disease diagnosis processes, and (8) staff should include persons with expertise in pathology, parasitology, mycology, and histopathology.

2-27-79 Visit to Chemical Industries Development CID at Talbia - by Saif

- Met by Dr. Ahmed Abou El Enin (chairman of company) and several of his colleaques.
- Company has 2 plants - one at Talbia and one at Assiut (upper Egypt). Vet drugs 1% of their sales. They recognize need for vet drugs for local use and for export to middle east and African

countries. Egypt produces 80-85% of its human drug needs. Company interested in converting Assuit plant into all vet drug production, and interested in joint ventures or licensing agreements with U.S. drug companies.

- Visited several units in plant - looked well-run, clean, modern equipment for manufacture and quality control, staff appeared knowledgable.

2-28-79 Visit with Director of Central Poultry Diagnostic Lab at AHRI - by Fadly

- Director is Dr. Kamal Abbasi
- Central Diagnostic Lab at AHRI is divided into 4 sections: (1) Virology (6 vets), (2) Pathology (5 vets), (3) Parasitology (4 vets), and (4) Bacteriology (9 vets).
- Because of severe shortage of lab equipment, media and inadequate working conditions, no virus isolation (except NDV) has been attempted last 2 years. No cell culture capabilities. Some viral infections have been diagnosed on basis of serological testing, but lack of reference reagent is problem. Vets in pathology section do only gross pathological exams - no histo pathological capabilities.
- List given of poultry diseases diagnosed by central lab in 1978 (categories: viral, bacterial, mycotic, spirochetosis, and parasitic), number of cases, and diagnostic methods used.
- Most cases examined at central lab come from village flocks and private sector farms (some from MOA and GPC farms). All virus isolation tests for NDV are performed on samples from regional vet labs.
- Diagnostic capabilities of Central Diagnostic Lab are far below standards. Reasons: lack of training, no equipment, no maintenance, inadequate library (therefore lack of knowledge of new techniques/ approaches), overstaffing and employee confusion.

2-28-79 Visit to the Training Center of the AHRI - by Fadly

- Training center locatee in main building of AHRI - used to train

newly hired vets in diagnostic procedures of animal and poultry diseases. At least one session per year for training in poultry diseases only (the 1979 poultry disease training session being offered to vets from regional diagnostic labs, GPC, and private sector). Most of training is through lectures (lack individual presentations), Capacity of center is 15-20 persons.

- Training center has severe shortage of texts and journals (AHRI's main library doesn't have last 2-3 years of major poultry disease journals.
- Center needs immediate attention, both technically and financially. REcommend center buy the study sets produced by the American Association of Avian Pathologists (very helpful in training programs).

2-28-79 Visit with General Director of the Regional Veterinary Diagnostic Laboratories in Egypt - by Fadly.

- Dr. Saad Nada is General Director of the regional labs
- Are 18 regional vet diagnostic labs, with 3 more in construction (targeted 1980). All are funded and supervised by the AHRI.
- List giving city and province of the 18 regional labs, number of vets, and degree of poultry diagnostic activities.
- Three new labs being constructed in Port Said, Benha, and Beni Seuif.

3-5-79 Minoufia MOA Training Center and Native Hatchery Trip - by Fadly, Saif, and Bell

- Fadly, Saif, and Bell traveled to Minoufia Governorate with Dr. Ismail Sabry (epidemiology section of MOA) and Dr. Almed Abu Regal.
- Egyptian universities graduate 400-600 new vets/year. Training center trains clinic vets in livestock and poultry work - 35 students per class (6 week classes), 3 - 4 groups per year.
- Daily clinics - farmers bring in animals, vets go to villages to give vaccinations, pullorum testing, diagnosis, and treatment. Drugs (furazolidone, piperazine, amprol, and sulfa drugs) distributed free of charge.

- Sabry says native hatcheries hatch approximately 120 million chicks per year. He feels native hatcheries could be fumigated successfully. Minofia proposed project to bring clean RIR and NH hatching eggs from U.S. and hatch them in disinfected native hatcheries (don't recycle back to hatcheries).
- Sabry says 22 native hatcheries in Minoufia - average of 10-12 ovens (capacity 5,000 - 7,000 eggs each) and hatch for 9 months. Average hatch maybe 50-60% (Sabry says 85% after fumigation). INfo on prices of eggs and chicks. Chick purchasers can buy furazolidone to treat feed.
- NOTE - Second page of report (containing comments) missing.

3-8-79 Visit to Gorab Broiler Farm - by Saif and Bell

- Visit by Saif and Bell with Dr. Adel El Dera (Director Animal Health Insurance for MOA and also private consultant for group of private producers in Giza area).
- Gorab Broiler FArm - 8,500 birds per month. Buys feed from GPC, Cairo Poultry. Has own mixer. Mr. Gorab and relatives produce 60,000 broilers per month (can produce 100,000). This represents total annual production of 720,000 - 1.2 million broilers. They are interested in possibility of putting in parent stock, considering Hypeco, Ross and Hubbard birds.
- Info given on farm facilities and operations. Lost breakdown and performance record for April, 1978 hatch provided, as well as 1978 results for 6 flocks (including selling price range), and vaccination schedule.
- Comments - Mortality is high, as is feed conversion. Housing adequate, business approach excellent, excellent set of data available on daily basis on each flock. Suggested contacting Dr. Day re feed formulation, Hutiar re possibility of owning broiler parents - suggested using imported vaccines only. Discussed disease prevention programs.
- Hatem El Zomer FArm near Giza - Some info obtained on operations (25,000 capacity houses) - cost breakdown and performance record listed.

3-10-79 Visit to the Vaccine Production Laboratory at Abbassia - by Fadly

- Interview with Dr. Adel El Sabagh (Director of ND vaccine unit) and Dr. Helmy El Dahaby (Director of Pox Vaccine Unit).
- Info provided by Dr. Sabagh and Dr. Dahaby re constraints interfering with upgrading the quality and increase production of the ND and pox vaccines.
- ND VAccines - info provided on 2 incubators for innoculated eggs, production per week, number of doses. Problem is capacity of incubators and absence of SPF flock (not in number of fertile eggs), need FAO man to operate 2 new dessicators (then can use vials instead of ampules), lack of well qualified t4chnicians, SPF eggs, and tech expertise to check for viral contaminants. No problem with titer and vaccine protection.
- Pox vaccine - Only 1 incubator (200 egg capacity), fungus contamination of some lots (condemnation), assigned use of dessicator 1 day per week, no problem with titer. Presently produce 300,000 doses per week (could produce more with larger incubators).
- Attachment of 4 handwritten pages (by Dr. Sabagh and Dr. Dahaby) outlining items needed to increase production and improve quality. Titles of lists: (1) To Raise the Quantities of Production of ND Vacines, (2) To Improve Quality of ND VAccines, (3) Gross Requirements to Increase the Quantity of Avian Pox Vaccines, and (4) Gross Requirements to Improve the Quality of Avian Pox Vaccines.

3-11-79 Visit With Dr. Hussein El Ghawi - by Saif and Fadly

- Dr. Hussein El Grawi in charge of pullorum antigen production at the Veterinary Research Institute, Dokki.
- Info obtained on cost of dose of stained plate antigen, annual production of stained and tube antigens. GPC buys most of production (rest bought by Animal Production Institute, regional and central diagnostic labs).
- Comments - Antigen standardization on basis of volume. Antigen looked very turbid - suggested fixing available equipment to get better standardization. Talked with Dr. Kheireldin re including Dr. Ghawi in training program (since he is solely responsible for

antigen production).

3-11-79 Translation of Names and Prices of Veterinary Drugs Used by Some of MOA Poultry FArms - by FAdly.

- Manufacturer is MSD International, dealer (rep) is Egyptian Company for Agriculture Development. Address is El-Batal Ahmed Abdel Aziz, Dokki.
- List giving names of vet drugs, units, price (LE, Pt).

3-11-79 Translation of GPC Document which identifies the Responsibilities of a Veterinarian Working For GPC at the Farm Level - by FAdly

- List of 11 responsibilities of GPC vet working at farm level.

3-13-79 Visit to the Head Diagnostic Laboratory of the Animal Research Institute of MOA - by Reid

- Visit to Head Diagnostic Lab of Animal Research Institute of MOA (Dokki) by Reid and Fadly.
- Director is Kamal H. Abbasy.
- All definitive diagnosis is done in this lab with chickens referred from private sector, village flocks, and some from MOA farms.
- Four sections: (1) Bacteriology, (2) Virology, (3B Parasitology, and (4) Pathology. Met representatives from each section.
- Library-many periodical subscriptions have been stopped due to lack of MOA funds (latest issues 1976 or 1977).

3-15-79 Visits to Animal Health Units - by Reid

- Visits to Animal Health Units with Refaat Iskander Farag (with MOA Vet. Diagnostic & Treatment Units - he operates a private diagnostic poultry center in Guiza near the University).
- Center is well equipped and good supply of pharmaceuticals. Operates 3-10 pm. Drugs are purchased mainly from Italy, France & Germany - Pfizer products mixed and packaged in Egypt. Many of packaged products from Italy contained several antibiotics and coccidiostats, but at relatively low levels.
- Visited Dokki Center (behind Animal Health Research Institute of MOA) - Chicks were being efficiently vaccinated (NC vaccinated (NC vaccination by eyedrop) by laborers under direction of

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4 vets. Also treating sick chickens in same lab. Drugs were being dispensed in folded paper with oral directions for adding to the feed (list of drugs included). This is oldest Animal Health Unit and appears to be patterned after Bahtim. Cases were mostly diarrhea (treated with furazolidone), empacted crop, and cannibalism (debeaking suggested). No pm work done, but dead chicks submitted.

- Visited 2 centers in Giza province - since Giza has high poultry population, there are 52 vets employed in several centers. First center under direction of Mostaga M. Ali and Ahmad Radwin. Diagnostic services under M.M. Ali, which is separate from treatment and vaccination operation. Second center - Similar vaccination program of baladi chicks was in operation. At both centers - brief discussion of coccidiosis prevention attended by vets.
- Also visited with Dr. Ahmad Radwin at Faculty of Agriculture.

3-22-79 Visit to Three Poultry Farms (private sector) in Imbaba area - by Reid

- Visited 3 private sector poultry farms in Imbaba area (near village of El Baradil and near camel market), accompanied by Refaat Iskander Farag (member of consultant group and a director of MOA Animal Health Units).
- Asraf El Gamal farm at Esba - had 5,000 broilers imported from Holland. Chicks looked satisfactory and mortality had been light. Three of four houses empty (and many others in area empty) due to lack of hatching eggs. Roads between houses difficult. Feed manufactured at feed mill of El Zawia, El Hamra, Cairo (GPC). Birds medicated with preventive levels of DOT.
- Morcous farms at Brageel, Embaba in the Azba Fahamy La Koub. This flock of 7000 Dokki Arbah bought from MOA had suffered mortality of 900 (some diagnosed as coccidiosis). Approach of using furazolidone and an antibiotic seems reasonable. Birds looked small. Feed mixed by hand.
- Visited layer flock owned by General Mahrahn (near village of Kom Barran). Were Ross 10 imported as layers - looked small. Being fed "cheap feed" being imported as mixed feed from the

Sudan - many tons being imported and manufactured to MOA specifications.

- Seminar presented at consulting office of Dr. Iskander. Members of "Poultry Scientific Organization" attended - coccidiosis discussion. Two cases brought in for diagnosis.

3-24-79 Annual Meeting of Veterinary Association - by Reid

- Annual meeting convened in National Research Council Building - Poultry Section chaired by Mohey Sabry
- Info provided on research papers presented and commercial drug displays.
- Attached "Immunization Chart" for poultry - obtained at meeting.

4-79 Antibiotic and Chemotherapeutic Agents - from Saif

- This 2 page paper from Dr. Saif was handcarried to Dr. Talaat Abd El-Rarik and Dr. Sabry. Written by Dr. David M. Beddell (formerly with University of Georgia Ag. Experiment Station and presently with Vet. Diagnostic Lab at Jackson Mississippi). Topics covered: antibiotic and chemotherapeutic agents, suggested rules for therapeutic agent combinations, and (diagram) of effect of antibacterial therapeutic agent combinations.

4-79 Exerpts from Marketing Survey of Poultry Industry in Egypt - prepared by Mesim Aringor and George Saba of Rome Office of Eli Lilly Co.

- Info included on: Commercial Broiler and Layer Populations 1978 (table), Size Distribution of non-GPC Broiler Farms 1978 (table), GPC Farms (table), Broiler Feed Production. Broiler and Layer Population Forecast (table), General Poultry Organization (names and titles), Private Company Profiles (Cairo Poultry Co., United Poultry Co., Egyptian Poultry Co., Ismailize Serabium Co., Portsaid Co., and Middle East Co.), Animal Production Research Institute, List of Big Layer Farms, Yearly Production of Feed Mills (table), and Important Distributors and Dealers.

4-2-79 Visit to Poultry Farm in Benimorr - by Reid

- Poultry farm is located in village of Gamal Abdel Nassar - this

is a multiplier farm with breeders. About 8 fairly modern German incubators with chicks hatching (but only about ½ filled). Farm was generally neat and orderly. Farm manager - Dr. Karem. Associate Dr. Gafaar.

4-4-79 Poultry Health Service to Small and Medium Size Flock Owners - by Reid.

- Veterinary Extension Units are scattered throughout Egypt - list of various provinces and number of centers in each was provided by Iskander.
- Three trips on separate days - accompanied by Dr. Iskander and officially arranged by MOA. Also visited independent Christian agencies - depended upon vets with understanding of social service functions.
- General impressions - Vet Extension considered an inferior position to that of research vet. Appears to be no great distinction between a research vet and a diagnostic vet. Vet. Research Institute is governed by a Board of Directors involving the School of Vet. Medicine.
- Several smaller vet. centers were shut down - smaller centers under other agricultural center auspices and are expected to serve the area (usually 3 villages). The vet. is expected to make his own way to other villages - so office is often closed.
- Vet. Extension Units seem well planned - would be used much more if they did not have such a shortage of vaccines and drugs. Also problem with low staff morale and low govt. pay.
- Only 20% of needed vaccine is produced at in Abassia - due to baksheesh and barter nearly all vaccine produced in Abassia goes to larger farms (nearly none to small village flocks). Large amounts of vaccine imported - must be done under govt. license. Several consulting groups are organized to permit such licenses through MOS. Since Vaccine Institute is unable to supply adequate amounts of vaccine, MOA has been attempting to get import permits - but license has not been granted because lack of money.
- At small/moderate size flock level seems to be no complaint on quality of vaccine. Rumors of failures with New Castle. Poultry producers indicate they feel vaccination programs

worthwhile. Some vets. would like drugs packaged in smaller amounts (fewer doses).

- Plans underway to establish 10 more vet. research units - but more than new buildings is needed to activate and motivate present operations.

4-4-79 Can the Egyptian Poultry Industry Continue to Live With 50% Mortality? - by Reid

- This question was asked of numerous poultry producers - from small village flocks owners up to top vet. personnel.
- Three major diseases (all controlled largely through prevention in the U.S.) appear to be the major causes of poultry losses:
  (1) New Castle - controlled through vaccination
  (2) Pullorum - blood testing to eliminate contaminated hatching eggs
  (3) Coccidiosis - controlled through coccidiostats
- New Castle - present program involves 2 vaccinations - eyedrop during first week and intramuscular at three weeks. Virulence of VVND strains leads to heavy mortality in flocks. The frequency of vaccinations is now based on the epidemiology of the disease which is reported.
- Pullorum - This disease very common in village flocks and probably accounts for their expected 50% mortality. Pullorum never found in U.S. hatcheries now (unless fanciers of exhibit birds or fighting cocks). Both Egyptian farm managers and veterinarians need training on how to do pullorum testing, visitors to U.S. need to see machinery in action, plate testing. Native hatchery at root of pullorum problem - hatcheryman must have financial advantage to use plan (can be paid enough to keep baladi eggs out of hatchery?). First priority should be pullorum clean govt. and private breeding farms (hatching egg farms). Need factual information - see actual testing in person - where are the testing books and paperwork?
- Coccidiosis - hear a lot about this disease from flock owners and vets (although mainly a large flock disease). Problem with buying feed without knowledge of whether or not it contains coccidiostat - every customer should be given this info. on a feed tag. Even best trained vets think first of treatment of

coccidiosis, rather than prevention. Emphasize desirability of using lower levels of drug for prevention - also emphasize the need for tagging feed as medicated (with product name and level) or unmedicated.

- If these disease problems cannot be solved, Egypt must depend on shipping in frozen chicken or day-old broiler stock. Solving disease problems will take cooperation among all sectors of poultry production.

4-23-79 Excerpts from Marketing Report Prepared by Eli Lilly - from Reid to 050 team

- Excerpts from report on poultry industry prepared by Nesim Avingor of Middle East division of Eli Lilly & Co.
- Info included: Distribution of Poultry Veterinary Products (diagram), Elancoban competition and Prices (table), concentrates containing coccidiostats (table), coccidostat market in Egypt in 1977 (table), coccidiostat market shares (table), and Legal (maximum). Pricing Formula for all Veterinary Products (table).

4-24-79 Veterinary Extension Centers - by Reid

- Attempt was made to survey the Vet. Extension Centers scattered throughout Egypt. Province locations and numbers were reported in separate memo left in Cairo. MOA has plans for 10 more centers this year - planning for distribution and operation of these centers was well done. Biggest handicap is lack of adequate motivation for GOE vets. Necessary changes can occur only through top level call for new attitude toward working for GOE plus improved working conditions. Most vets more interested in their consulting work than in their primary jobs. Well run training program would be helpful.
- Unfortunate that diagnostic function is so far separated from extension function - little cooperation. Diagnosis should be part of training and responsibility of every extension vet. Increasing number of vets employed tends to dilute motivation and therefore effectiveness.
- Difficult problem with transportation for vets in rural Egypt.
- Distribution system for available vaccines is very unsatisfac-

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tory. Vets or assistants must personally go to Abbdsia on designated days to carry vaccines back to their labs - little wonder why such small percentage of village flocks get vaccinated.

- Appears to be no major problem that women have to transport chicks to the extension centers (if distance not great) - and good trend that women vets. are often assigned to these centers.
- The clusters of little used buildings at extension centers is distressing - building more separate buildings would not be good planning.
- Treatment of sick birds should be separate function from vaccinations. Throughout Egypt the role of prevention (rather than treatment) needs to be stressed with both vets and villagers.

5-3-79 Certificates of Analysis for Feed Samples - through Reid.

- Seven Certificates of Analysis from New Jersey Feed Laboratory, Inc. for feed samples submitted by Dr. W. Malcolm Reid.
- Feed samples analyzed:
  (1) Broiler Starter - GPC - Melja Lillian - Assiut
  (2) Turkey Starter - GPC - Bahtim Turkey Farm - Bahtim
  (3) Turkey Grower - GPC - Bahtim Turkey Farm - Bahtim
  (4) Layers - Sudan - General Mahran
  (5) Broiler (Starter?) - GPC - El Zauria, El Hamara
  (6) Finisher - mixed locally - Morcous Ezba Fahmy Yakoub
  (7) Chick Starter - GEOSS
- All samples analyzed for moisture, protein, fat, fiber, ash, NFE, and carbohydrates.

5-9-79 Special Report - Poultry Health Situation in Egypt - prepared by PIP/Mathtech team

- Copy of this special report attached

6-12-79 Ministry of Agriculture, Agriculture Research Center, Animal Health Institute's Poultry Department - requested by Saif

- Five pages of information re MOA Ag. Research Center's Animal Health Institute's Poultry Dept. - requested by Dr. Y. M. Saif.

- Info on Pathology Section's provided: staff number (names and degrees); nature of work (numbers of positive/negative cases, and type); and chemicals, instruments and devices needed for the section (list of 44 items).
- Info. on Bacteriology Section provided: staff (names, degrees, specialties) and detailed outline for short and long-term plan for improvements in poultry disease diagnostic capabilities in the Bacteriology lab (includes ideas for improvement of diagnostic technique and chemicals and equipment needed).

6-19-79 Special Report Task 070 - Animal/Poultry Health and Vaccine Production To MOA/GOE - by PIP/Mathtech team.

- Copy of Special Report attached

6-25 through 6-28-79 Letters of Appreciation Re Dr. Kheireldin's Visit - from Appleton

- Six separate letters expressing appreciation for cooperation and hospitality during Dr. Kheireldin's visit in the U.S.

8-6-79 A Brief: The National Poultry Improvement Plan for Egypt - by Appleton

- Copy of brief attached

10-79 Materials from French-Egyptian Symposium on Poultry Farming - sent by Bond to Atlanta office.

- Symposium in Cairo September 24, 25, and 26, 1979.
- Materials include bound book of presentations, containing: Optimum Economy in Day - Old Chicks Production, <u>Prophylaxis in Poultry Farming</u>, Poultry Breeding, Mixing Poultry Feed, Workshop for Feeding Stuff Fabrication at the Farm, Mills for Producing Concentrated Animal Feed, French Fowl Selection - Relations Between Research and Breeders, Poultry Farming in France, and The Protection of Poultry Farms. (Underlined titles indicate articles filed in 070 task file).

SECTION IX

080 - TRAINING

Special Report: Revisions - Management Training Program 9/6/79

Training Report - July 1979

Mathtech The Technical Research and Consulting Division of Mathematica, Inc.

SPECIAL REPORT

TO: DR. MAHMOUD KHEIRDELIN
PROJECT DIRECTOR - POULTRY IMPROVEMENT

FROM: GEORGE R. O'DAY

RE: SPECIAL REPORT AND REVISIONS
MANAGEMENT TRAINING PROGRAM
POULTRY IMPROVEMENT PROJECT

THRU: JOHN BOND

DATE: SEPTEMBER 6, 1979

We have just completed an intensive and thorough review of the training program. This report will summarize our findings and recommendations. As you will see, we are prepared to make major changes in the program as it was originally outlined in the contract. Since a training program such as that originally outlined had never before been conducted in the United States, we had expected a review of the experiences of the first two (2) training groups would result in a variety of changes from the original format in the contract.

One of the most significant changes is the concept of the training. Originally it was to be university-based with commercial poultry industry support. Also, it was to include a short review of the basics involved in the poultry sciences and production management. We have found these concepts not practical for a variety of reasons, including the attitude of many of those being trained, which has prevented those training concepts from being effective.

At your request, we have asked the University of Florida to relieve Dr. Boone as Training Director for the Florida project, and to make major changes in the program from an academic to a commercial orientation. As anticipated, they elected to "withdraw" from the training program rather than make these changes. However, to effect a good withdrawal, it will be necessary to negotiate a fair and compatable arrangement with them and that will be no simple matter. There is a legal contract between MATHTECH and the University of Florida which must be satisfactorily settled.

In changing the concept of training from academic to commercial poultry operations, we have shifted the center of training back to our headquarters in Atlanta. This allows us to have an improved control over the training program and shift the field (or hands-on) training to take place in Northern Georgia rather than in Florida. As you know, North Georgia is the center of the heaviest concentration of commercial poultry operations in the United States and in the world. Also, GOLD KIST is headquartered in Atlanta, as are a number of other major producers, most of whom have stated they would actively participate in our new and revised program.

Exhibits I and II (attached) outline our proposed revised 4-week senior and 9-week junior programs. The University of Georgia and the USDA Poultry Health Research lab in Athens, Georgia, have agreed to participate in our new revised program. However, the University of Georgia will be used only for training in those areas in which they have a proven quality capability. They will be used to supplement the commerical aspects of the program rather than to conduct all aspects of the program as was the situtation in Florida.

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We will work closely with the Southeastern (International) Poultry and Egg Association, which is headquartered in Atlanta. That group is the principal professional poultry association in the United States, and has continually conducted almost all of the professional commercial poultry industry training in the United States for quite a few years.

Harold Ford, the SIPEA director, is a personal friend and has committed his group to cooperate fully in the new, revised program. They will provide the curriculum for the variety of seminars they conduct for the U.S. Poultry Industry. These will be used as the basis for the seminars to be given to the program's trainees going through the new, revised program. The only difference between the SIPEA programs and those to be given in our program is that ours will be directed to problems in the Egyptian, rather than the U.S., poultry industry.

For the seminars and the new, revised training program, we will use team personnel such as Drs. Cason, Day, Cushen, Bushong, Reid, Saif, Thomason, Shaffner, and Messrs. Pedersen, Appleton and Bell, etc. On a realistic basis, our team members are much better qualified and experienced than any university faculty or staff of any single poultry company. They will be supplemented by the University of Georgia faculty, members of commercial poultry firms such as GOLD KIST, and USDA, as applicable. Also, the team members have an understanding and knowledge of the problems in Egypt which others do not have. Therefore, the training given will be directed to problems in Egypt rather than operating problems elsewhere.

Don Lodge will continue the administration and general coordination of the program. In fact, his work will increase because of the significant increase in travel, lodging and training arrangements which will have to be made under the new program. To be certain training follows the proper technical direction and that field training is fully professional in commercial poultry operations, we will use a full-time professional poultryman, such as one of our team members, to work along with the trainees on a day-by-day basis. That person will replace Dr. Boone, and assure the training given is technically appropriate.

The proposed senior program (Exhibit I) consists of either a 4 or 5 week absence from Egypt, including travel and the Washington orientation required by AID. For those seniors fully acquainted with travel and work in the United States, the two days in Washington would be waived.

The proposed junior program (Exhibit II) consists of slightly less than 9 weeks absence from Egypt, including travel and AID orientation. The AID orientation would be required in all instances.

The start of both program will basically be the same; orientation in U.S. poultry practices and essential seminars on primary topics relating to identified problems in Egypt: poultry health; use of vaccines, pharmaceuticals, diagnostic techniques, etc.; feed utilization; nutritional problems; management techniques; development and use of data, etc.

The second week will concentrate on poultry health research practices and developments over recent years; visits and discussions regarding typical U.S. commercial poultry installations (e.g., layers, broilers, breeders, hatchery, feed mills, processing plants, diagnostic laboratories); and the USDA-U.S. commercial poultry health research laboratories. The latter will include items such as solar energy test facilities, various facilities and equipment developments, etc.

From that point on, the majority of training will concentrate on the trainees actually working with their counterparts in U.S. commercial or research operations. That is, a broiler flock manager would work for approximately one week at a time with U.S. broiler flock managers in commercial U.S. poultry operations, etc.

The seniors would have two such weeks; the juniors, four such weeks; each week in a different poultry unit to give them a broader variety and cross-section of U.S. poultry management practices and operations.

These field assignments would be hands-on type work in U.S. poultry units or comparable to the trainee's job in Egypt. At the end of each week, there would be a seminar to discuss, highlight and provide interpretations on why the U.S. industry follows such practices, and how they might be applied to Egypt.

For the juniors and, to a lesser degree, for the seniors (because of time restrictions), the field assignments would be interrupted by the debriefing sessions and by additional, more in-depth seminars on primary subjects such as health, nutrition, equipment, management, etc. These would follow the SIPEA formats which they use for training the U.S. commercial poultry industry.

At the end of their training program, the trainees would then have a closing 2-day seminar to summarize their experiences, outline the materials they wish purchased with their $50.00 (U.S.) book allowance, be debriefed and make suggestions regarding future training, etc. For the seniors, this would occur during the 4th or 5th week, and for the juniors in their 9th week.

It also was quite evident to all U.S. personnel involved in the training that there were factors which tended to create a strong negative attitude on the part of the trainees. All are readily correctible, and must relate to what must be done before the trainees leave Egypt.

As you know, the AID requirements for English language testing and qualifications provided serious delays and distraction from a rapid startup of the training program. Because of the language test requirements and the delay in the MOA/GOE nomination of persons to be considered for training, considerable delays and startup problems were experienced. Also, because of a relatively high number of persons nominated for training who did not pass the minimum English language qualifications, final selection of persons to be trained has not, even to this date, been possible. We agree with AID rules for sufficient English capability of the trainees as being essential for the trainees to be able to adequately absorb the training provided. That cannot be effectively handled with use of a translator. We also believe many of the problems experienced by some of the trainees resulted from inadequate indoctrination as to the details of their forthcoming training prior to their departure from Egypt. We have also concluded that the majority of the training was as originally outlined in the contract. However, we now are of the opinion that a portion of that training was too basic and should be eliminated.

We also strongly recommend that the required signing of any document by which any trainee is obliged to personally return/refund costs of their training, if they do not benefit or fully participate, etc., in the training, be eliminated. We believe this only tends to increase the anxiety of the trainees, and tends to make them more critical than receptive of the training being given.

To resolve these and other problem areas, we propose the following pre-departure program:

1. Between 3 to 4 weeks before departure, a mandatory meeting should be held with those scheduled for training in that group. This would be jointly conducted by MATHTECH, MOA and AID. If a trainee does not attend, he is cancelled from that group and rescheduled as possible.

2. The proposed training program for each individual is given to him, reviewed, and the trainee is allowed to suggest areas of training he would like to have. (These will be forwarded to the United States for inclusion, if possible and reasonable). Passports, visas, travel schedule, money situation, etc.; all related items will be discussed at this meeting. The "rules" of the training program - how the trainee will be expected to participate - will be explained (e.g.,the refusal to participate in lab experiments, diagnosis of poultry health problems; vaccination, debeaking, techniques, etc., should be put forward on a "participate or return" basis). Those who are to go to the United States for training should fully understand what is expected of them, and fully agree to participate.

3. Necessary biographical data forms, job descriptions, visa applications, etc., will be given and explained. Medical examinations, medication needs, etc., will be fully outlined.

4. Between 10 and 14 days before departure, another mandatory meeting will be held. Necessary forms will be turned in; trainees advised of the disposition of their training requests; all questions answered; necessary final AID training documents presented and signed; final travel and training schedule given, including emergency Egypt-U.S.A.-Egypt communications, etc. Trainees will be give a packet of materials regarding forthcoming training and asked to sign a statement that he or she understands the "rules", schedule, etc., and is in agreement with the program.

5. Departure from and return to Cairo will be coordinated as previously between MATHTECH and MOA. Arrival in Washington will be coordinated between MATHTECH and AID, as will departure from the United States.

We believe the above pre-departure program will eliminate many attitudinal problems, and provide for a more comfortable training program for each individual involved. We further believe is is essential to the success of any training to be given. If a sufficient and acceptable pre-departure program will not be an essential part of the training program, we believe even the new, revised program outlined in Exhibits I and II will not be as successful as desired and necessary.

Your approval of, and further input into, the new, revised program is hereby requested. When approval is received, the training program can be restarted within three (3) to four (4) weeks.

PAST PROBLEMS:

At your request, we have undergone a thorough review of the training program as scheduled in our project contract. We have concluded some of the criticism made of the program conducted by the Poultry Science Department of the University of Florida had some basis of support. Certain aspects could have been better, or perhaps even totally, eliminated. Unfortunately, most such items are of the type which only become visible after or during, rather than before, the training experience.

We have also thoroughly reviewed both the complaints made by the GPC personnel and the responses by the University of Florida. While these will be separately responded to (for the record only), it is our belief that extended discussion or analysis of the comments by both sides would only tend to distract attention from the main issues; that is, to improve the program to what it should be, rather than what it might or might not have been.

Exhibit III (attached) summarizes a continuing problem; that of AID required English language qualification. As you will note, the following facts exist:

- 84 persons were originally scheduled for training. As of this date, only 19 have been trained, leaving a potential balance of 65 yet to be trained.
- Of the 65 training positions available (as of September 4, 1979), only 33 persons proposed for such training have passed the AID language tests, or have had such tests waived by a joint MOA/AID committee. Obviously, there are not yet enough persons qualified for training, and attention should be given to that need.
- 40 of the training positions were allocated to GPC. However, only two (2) had previously been trained and only 14 additional persons have passed AID training qualifications. This situation also needs serious attention.

Because of the delays incurred in startup of the training program, completion of training by September 1, 1980 appears to be a developing problem. As you know, these delays were caused by the slow responses by some of the Egyptian agencies in nominating people for training, the mandatory AID English language testing, and the relatively low rate of English language qualification of those persons nominated. Unless these problems are resolved in a relatively short period of time, it will be difficult to complete all training by September 1, 1980 and, even if resolved quickly, would most likely require the sending of too many trainees from a single agency (such as GPC) at one time, thereby creating possible operating burdens on those agencies.

CONCLUSIONS:

Problems experienced in the training programs to date have been identified and can be solved. The new, revised program based on the U.S. commercial poultry industry, rather than being university-based, should provide excellent training comparable to that now being given to the U.S. poultry industry. Also, the new program will be directed to providing a basis of helping to solve problems in the Egyptian (rather than any other) poultry industry.

The problems which still exist are in the process of solution and will be solved upon your approval of the new, revised programs outlined in Exhibits I and II.

For the Team,

George R. O'Day, Project Manager

Attachments: Exhibit I
Exhibit II
Exhibit III

cc: Dr. M. Dawood
Mr. Salah Mahdi
Mr. R. Morrow
Mr. M. El Salhey
Mr. G. Armstrong
Dr. N. Agih
Mr. R. Brandt
Dr. R. Edwards
Team Leaders

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Mathtech The Technical Research and Consulting Division of Mathematica, Inc.

EYPTIAN POULTRY IMPROVEMENT PROJECT

TRAINING REPORT

TASK 080

I. THE PROJECT PAPER:

A. Called for a total of seventy (70) trainees for two hundred (200) total training months at a total cost of $487,000, including LE monies. The break-out by organization was as follows:

	Nbr. of Trainees	Training Months	Total $U.S. and LE
MOA, Applied Technology Trainees	20	120	$ 248,200
MOA, Senior Manager Orientation	10	10	37,350
GPC, Technician Trainees	30	60	164,100
GPC, Senior Manager Orientation	10	10	37,350
TOTAL	70	200	$ 487,000

B. Table 9, page 68, provides greater detailed breakout of Training Budget.

C. Training programs were to be designed as follows:

1. The contract economist, working with the project team and the Agricultural Economic and Statistics Department, designs a training program to assist the department's staff conduct the Poultry Sector Analysis and follow-on studies. (p. 47)

2. The Genetic and Hatchery Improvement Team, working with the Project Advisory Committee and the Project Technical Manager, develops a training plan to support the government's breeding and hatchery improvement program. (p. 47)

3. The Poultry Company Consultancy Team, working with the project committee, develops the training plan for the poultry company (p. 47)

4. The Pharmaceutical Production and Marketing Team, working with the Project Advisory Committee, outlines a training program for the Animal Health Research Institute which will complement the poultry production programs being developed. (p. 48)

D. The above-mentioned training plans were to be developed beginning in the eleventh month of the contract and continuing on for an unspecified number of months. (Implementation Plan Network, p. 50)

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E. Training under the Poultry Company Consultancy:

1. The training objective is improving the skills of selected technical and managerial personnel of the Poultry Company in poultry production and processing techniques as practiced in modern, large-scale U.S. commercial organizations by means of a training program. (p. 57.)

2. Training under the Poultry Company Consultancy will function as follows:

   a. During the 120-day consultancy, design a 60-day program for training up to 30 technical personnel of the Poultry Company in U.S. commercial production facilities for the purpose of improving the skills of the trainees in modern poultry production and processing techniques. It is expected the training program will be conducted in two successive periods, each accommodating approximately 15 trainees; however, such details may be adjusted when the course content is determined.

   b. Following approval of the course's design by the Project Advisory Committee and USAID, implement the training course providing all training personnel and facilities as may be required. (p. 57.)

   c. During the 120-day consultancy, design a 30-day program of orientation in the U.S. for 10 Poultry Company senior management personnel in current poultry production and processing management practices and techniques. Because of differing training requirements of the participants, the orientation programs may not run concurrently (p. 58.)

   d. On approval of the plans for the orientation program by the Ministry of Agriculture, implement the program providing all personnel and facilities required. (p. 58.)

   e. On completion of the technical assistance and the beginning of the training phases of the Consultancy, provide the services of two (2) of the poultry production specialists in Egypt for a period of two weeks for the purpose of participating in an evaluative review with the Ministry of Agriculture and USAID of the accomplishments of the Consultancy, and to make recommendations for any further project activities for providing assistance to the Poultry Company (p. 58.)

F. Training under the Poultry Sector Analysis will, within the overall training provisions of the project, support an ongoing capacity to perform economic analysis of high standards relating to the poultry sector through applied technology training at U.S. institutions for personnel designated by the Economics and Planning Research Institute. The courses of training will be determined by the Project Director and the Project Technical Manager. (p. 60.)

G. Training under the Pharmaceutical Production and Marketing Feasibility Study will, within the overall training provisions of the project, support an ongoing capacity to carry out and maintain the poultry pharmaceutical research programs of the Animal Health Research Institute, Ministry of Agriculture, through applied training at U.S. academic institutions for personnel designated by the Institute. The courses of training will be determined by the Project Director and Project Technical Manager. (p.62.)

H. Training under the Genetic and Hatchery Improvement Analysis will, within the overall training provisions of the Project, support an ongoing capacity to carry out and maintain a breeding and hatchery improvement program through applied technology training at U.S. institutions for personnel designated by the Animal Production Department. The courses of training will be determined by the Project Director and Project Technical Manager. (p. 63.)

I. Training by GOE organization:

1. MOA: Training in U.S. institutions will be provided to poultry specialists of the Ministry of Agriculture. Because of the wide availability of courses leading to academic degrees in Egypt, it is intended that this U.S. training will be in applied technology relating to poultry production, or fields related directly thereto, rather than degree work. Training will normally be limited to six months or less of each trainee, with an overall ceiling for the project of 120 training months.

   Orientation in current U.S. poultry production methods and management practices will be provided for senior managers connected with poultry programs of the Ministry of Agriculture. Orientation normally will be limited to four weeks or less for each trainee, with an overall ceiling for the project of 10 training months. The courses of training for the respective participants will be determined by the Project Director and the Project Technical Manager, and will be coordinated through the Office of Training, USAID/Egypt. (p. 66.)

2. GPC: During the Poultry Cpmany Consultancy, a program of training in the U.S. for middle management technicians and orientation for senior managers of the Poultry Company will be designed. Following approval by the Project Technical Manager and the Project Director, it will be implemented by the Project Contractor. It is expected the training for middle management technicians normally will be limited to two months; however, this training will have an overall ceiling of 60 training months.

   For the senior managers of the Poultry Company, it is intended the orientations normally will be limited to one-month duration, subject, however, to an overall ceiling of 10 training months.

   While the Poultry Company trainees will be technical specialists with broad background and experience in their respective fields, and will all have facility in English, it is recognized their English proficiency may not be at a level sufficient to meet requirements for U.S. academic trainees, and such level may not be necessary to meet the objectives of the intended courses of training or orientation. Accordingly, the U.S. technical assistance team assigned to the Poultry Company Consultancy will address this problem in designing the training courses to assure completion of the training objectives. (p. 66.)

II. THE PROJECT CONTRACT:

A. During contract negotiations between MATHTECH, Inc., the Ministry of Agriculture, and various offices of USAID/Cairo, the number and types of trainees was progressively changed from 70 to 84, while the number of training months was reduced from 200 to 193.5. The breakout by organization and level is as follows:

	Number of Trainees	Training Months
MOA, Undersecretaries	4	2.0
Seniors	10	16.25
Technicians	20	68.75
Veterinarians	3	9.75
GPC, Undersecretaries	1	0.5
Seniors	10	16.25
Technicians	30	67.5
ORDEV, Seniors	2	2.5
Technicans	4	10.0
TOTAL	84	193.5

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(Exhibit IX-2)

B. During the periods when MATHTECH personnel were in Cairo to cost out the proposal and to negotiate the final contract, the USAID/Cairo staff neglected to recommend the inclusion of certain items in the proposal and contract budgets. These excluded items were:

1. Payment of a higher level of per diem when in transit status, upon leaving a location after remaining in that location for more than 30 days. At present, this rate is $40 per day as opposed to $23.34 per day.
2. Text book allowance, $50 per person.
3. Equipment allowance; calculators, maximum of $80 per person.
4. Shipment of books and other printed graphic technical material related to their training programs, $30 per person.
5. Membership in one of the approved U.S. professional societies for a maximum of three (3) years, or a 3-year subscription to a professional journal of an approved society if membership is not available.

C. The MOA were to be selected and screened within 30 days after startup of the Poultry Improvement Project, or by September 30, 1978. The lists of names were actually received between October 16 and November 22, 1978.

D. The curriculum vitae/biographical data for the training participants was to be supplied to MATHTECH no longer than 45 days after project startup, or by October 15, 1978. However, because no such data was provided to MATHTECH by the MOA by October 21, 1978, when the first ALIGU test was administered, MATHTECH personnel began asking the training participants to fill out the AID Form 1380-2 right after they had completed the ALIGU exam.

E. Although the contract specifies that the MOA is to provide necessary English language training to assure participants are capable of absorbing the scheduled training, the Egyptian project director objected to requiring the MOA seniors to take the ALIGU test. This has resulted in considerable delay in determining which candidates are language qualified and in the scheduling of tests for MOA personnel who subsequently did not report for testing.

F. Also regarding language readiness, the GPC was unable to release any of its prospective participants for language training during working hours. This necessitated USAID/Cairo negotiating for afternoon language classes, further delaying the progress of the Poultry Improvement Project training efforts. The first group of GPC nominees did not begin language training until April 2, 1979.

G. To date, the training participants have received inadequate briefing from the MOA prior to leaving Egypt for their training in the United States. Thus, some with doctorates have come expecting miniature post-doctoral programs, there has been a strong reluctance to taking examinations designed to assist the University of Florida faculty in designing individual training programs and evaluating program effectiveness, and the participants have passed up opportunities for hands-on work with poultry which the MOA intends for them to receive.

H. Related to G, above, is the fact that presentation of the Participant Training Documents has been made by MOA just prior to the participants' emplaning for their flights from Cairo to the United States. This has caused resentment and confusion as to the purpose and contents of the training program.

III. PROGRESS TO DATE:

A. As of June 5, 1979 we have a list of 114 active nominees, including five (5) undersecretaries. Of these, 52 are language-qualified, as follows:

Passed ALIGU	30
Passed Oral Committee	13
Waived due to place of education	4
Waived as undersecretary	5
TOTAL	52

B. As of June 5, 1979 there were 10 technician-level MOA participants in training on the University of Florida campus in Gainesville. One group of five (5) will finish their 13-week program on June 15, 1979. The second group of 5 will complete their 13-week program on July 6, 1979.

C. A third group of six (6) senior MOA managers will leave Cairo on June 8, 1979 for five (5) weeks of training, followed by two (2) MOA technicians on June 15, 1979 for eight (8) weeks. Additional training is scheduled as follows:

Five (5) GPC senior managers leave Cairo October 7 for five (5) weeks.

Nine (9) MOA technicians leave Cairo September 30 for thirteen (13) weeks.

C. (continued)

In addition, seven (7) veterinarians will shortly be scheduled for six or seven weeks training and five (5) undersecretary-level officials will be scheduled for three-week observational tours.

As other nominees pass the ALIGU exam, they will be scheduled for training.

PROJECT TRAINING BUDGET
(U.S. SHARE)

TABLE 9

PROJECT PROGRAM	NO. OF TRAINEES	TRAINING MONTHS	$US EXPENDITURES			LE ($US EQUIV.)	TOTAL $US AND LE
			TRAINING COSTS*	TRAVEL EXPS.**	TOTAL $US	TRAVEL EXPS**	
MINISTRY OF AGRICULTURE APPLIED TECHNOLOGY TRAINEES	20	120	$208,200	$10,000	$218,200	$30,000	$248,200
MINISTRY OF AGRICULTURE SENIOR MANAGER ORIENTATION	10	10	17,350	5,000	22,350	15,000	37,350
POULTRY COMPANY TECHNICIAN TRAINING	30	60	104,100	15,000	119,100	45,000	164,100
POULTRY COMPANY SENIOR ORIENTATION	10	10	17350	5,000	22,350	15,000	37,350
TOTAL	70	200	347,000	35,000	382,000	105,000	487,000

* Estimated at $1,735/mo.

**Travel per diem and air fare estimated at $US 500/RT and LE 1,500/RT ($US equiv.)

SECTION X

090 - HATCHERY EXPANSION

Building and Equipment Specifications Groups I - VI

BUILDING AND EQUIPMENT SPECIFICATIONS - MOA FARMS, EGYPT

GROUP I

Three (3) each prefabricated floor type brooding-growing poultry houses, each to house a total of 8,300 layer-type chickens (7,300 hens and 1,000 cockrels) from day-old to 16 weeks of age. Each building is to be of open side type with manual roll down ratchet clutch winches controlling roll down curtains of strong, waterproof, durable, opaque material, light in color, of the type and quality used in poultry houses. All buildings and equipment for each building to be packaged so that a complete building and equipment set may be shipped to three (3) separate locations in Egypt.

1. SIZE:

   9 feet high at sidewall by 36 feet wide by 250 feet long, with 3 feet tolerance, plus or minus on length.

2. FOUNDATIONS AND FLOORS:

   The Government of Egypt will provide concrete foundations and floors of smooth concrete or equal material, in accordance with specifications to be provided by the suppliers of the poultry houses. Foundations and floors should be rodent and vermin proof; slope 5 cm to the center from each side, and 80 cm from front end to rear end for easy cleaning; provide for required drainage, waste disposal and sanitation; should be sufficiently porous to allow for good drainage; and extend a minimum of 9 feet by the width of the building from the end of each building for servicing and sanitation. Concrete formulation and load bearing capacities should be included in building suppliers' specifications.

3. SIDE AND END WALLS:

   The end walls are to be solid, except for doors; side walls are to extend 3 feet up from the foundation and 1 foot down from the roof. The open area of side walls is to be covered with heavy gauge 1 inch hexagonal galvanized steel poultry netting, and provided with exterior roll down curtains, as otherwise specified.

3. SIDE AND END WALLS (cont'd):

All outside wall covers should be galvanized iron, steel, or equivalent. Walls should be sealed to exclude rodents. Studs and structural supports are to be non-corrosive steel or iron of sufficient strength to support structure during strong winds up to 50 mph minimum. Outside wall liners are to be vermin proof and should contribute insulation value. Inside wall liners to be vermin proof and waterproof. Walls are to be insulated with fiberglass of minimum 7.6 cm thickness. Inside walls should be vermin proof, should be of light color to reflect light, and should be of material hard and tough enough to resist abrasion from strong cleaning solutions, pecking by chickens, and impacts, vibrations or loads placed by equipment used in house operations.

4. ROOF:

The roofs are to be supported on steel trusses on 10 foot intervals, center to center, with steel legs of sufficient strength to support structure under strong winds up to 50 mph minimum. Metal (or wood 5 cm x 10 cm at 60 cm center to center) purlins of sufficient strength and stability are to be used. Rodent and vermin proof insulation with a minimum of 18 R value is to be used in the ceiling. The inside ceiling material should be the same as the inside walls. Bidders are to supply detailed specifications and diagrams of trusses and entire building structures, including appropriate load bearing information.

The roof is to be of minimum 29 gauge galvanized iron or equivalent material with a tough white coating to reflect heat from the sun and to resist abrasion from blowing sand. There is to be a 3 foot overhang of roof on sides and ends of buildings. Ventilation is to be accomplished from the attic via ridge ventilators, and are to be of sufficient capacity to provide necessary air movement for population of each house, and outside temperatures ranging up to 42°C. Roof is to be pitched a minimum of 15 degrees.

5. WORK AND SERVICE AREA:

This area is to be enclosed as part of, and of the same construction as the main poultry house, but is to be partitioned off from the poultry area in each house by a solid, bird proof, insulated crosswall.

6. DOORS: (each building)

One (1) pair of doors for service and cleanout is to be placed in the end of the house (center of end wall) opposite the work-service area. This double door is to consist of 2 prehung doors, each approximately 5 feet by 8 feet high, each securely hinged and forming rodent proof fits when closed. Hinges to be durable and of non-corrosive materials. One (1) 3 foot by 8 foot prehung door is to be positioned between the work and service area to the chicken housing area in the center of the partition.

One (1) approximately 5 feet by 8 feet door or comparably size pair of doors is to be placed in the outside wall of work-service area in the center of the end of the building. All doors are to be fitted with locks and have 6 keys for each lock. Surfaces of doors which are facing the chicken population are to be covered with peck-proof material, such as galvanized sheet metal.

7. UTILITIES:

Electricity - three (3) rows of incandescent lights on 10 foot centers, with each row on a separate switch, will be required for each building. Wiring and outlets should be provided for operation of mechanical equipment, fans for ventilation or air movement, time switches, alarms and lights for work area. Wiring and hardware should be of materials appropriate to withstand environmental conditions, with the bids containing sufficient detail for assessment purposes.

8. PLUMBING:

Pipe is to be installed to supply water for chicken drinking fountains; to supply two (2) rows of foggers (one on each side of house to fog directly over birds when needed); and to provide four (4) faucets along the inside wall of the poultry house for sanitation/cleaning purposes, plus one (1) faucet in the work-service area. Piping for LP gas which is to be used for brooding must be installed from gas inlet source to outlet points inside each house.

9. VENTILATION:

The natural ventilation system is to be supplemented with fans inside the buildings to move a maximum of 700 Cu.m of air over the birds in each house each minute. Foggers will provide additional cooling for extreme heat periods of up to 42°C outside temperatures. Bidder to supply detailed specifications on these items and their capacities.

10. EQUIPMENT: (See Group III descriptions for details)

Facilities for each building should provide a system for outside hookup of LP gas cylinders, including internal plumbing/pipes for distribution of the gas to the brooders; a system for suspending brooders, waterers, and feeders. These equipment systems should be raised by winches for cleaning and bird moving operations. The LP gas and all equipment systems should include necessary safety provisions and measurement/control devices at or in each house.

11. Use of perches is not intended for these houses.

12. Equipment may be quoted separately or as a part of fully equipped house quotation. However, if fully equipped quotation is submitted it should separate and specify house and equipment items in the quotation.

BUILDING AND EQUIPMENT SPECIFICATIONS - MOA FARMS, EGYPT

GROUP II

Nine (9) each prefabricated floor type poultry breeding/laying houses, each to house a total of 7,200 layer type chickens (6,500 hens and 700 cockrels) of layer type breeders for production of hatching eggs. Each building is to be of open side type with manual roll down ratchet clutch winches controlling roll down curtains of strong, waterproof, durable, opaque material, light in color, of the type and quality used in poultry houses. All buildings and equipment for each building to be packaged so that a complete building and equipment sets may be shipped to three (3) separate locations in Egypt in groups of three (3).

1. SIZE:

   9 feet high at sidewall by 36 feet wide by 250 feet long with 3 feet tolerance, plus or minus on length.

2. FOUNDATIONS AND FLOORS:

   The Government of Egypt will provide concrete foundations and floors of smooth concrete or equal material in accordance with specifications to be provided by the suppliers of the poultry houses. Foundations and floors should be rodent and vermin proof; slope 5 cm to the center from each side and 80 cm from front end to rear end for easy cleaning; should be sufficiently porous to allow for good drainage; and to extend a minimum of 9 feet by the width of the building, from the end of each building for servicing and sanitation. Concrete formulation and load bearing capacities should be included in building suppliers' specifications.

3. SIDE AND END WALLS:

   The end walls are to be solid, except for doors. Side walls are to extend 3 feet up from the foundation and one (1) foot down from the roof. The open area of side walls is to be covered with heavy gauge 1 inch hexagonal galavanized steel poultry netting, and provided with exterior roll down curtains, as otherwise specified.

3. SIDE AND END WALLS (cont'd):

All outside wall covers should be galvanized steel, iron, or equivalent. Walls should be sealed to exclude rodents. Studs and structural supports are to be non-corrosive steel or iron of sufficient strength to support structure during strong winds up to 50 mph minimum. Outside wall liners are to be vermin proof and waterproof. Walls are to be insulated with fiberglass of minimum 7.6 cm thickness. Inside walls should be vermin proof, should be of light color to reflect light, and should be of material hard and tough enough to resist abrasion from strong cleaning solutions, pecking by chickens and impacts, vibrations, or loads placed by equipment used in house operations.

4. ROOF:

The roofs are to be supported on steel trusses on 10 foot intervals center to center with steel legs of sufficient strength to support structure under strong winds up to 50 mph minimum. Metal (or wood 5 cm by 10 cm at 60 cm center to center) purlins of sufficient size and frequency to give roof the required strength and stability are to be used. Rodent and vermin proof insulation with a minimum of 18 R value is to be used in the ceiling. The inside ceiling material should be the same as the inside walls. Bidders are to supply detailed specifications and diagrams of trusses and entire building structures, including appropriate load bearing information.

The roof is to be of minimum 29 gauge galvanized iron or equivalent material with a tough white coating to reflect heat from the sun and to resist abrasion from blowing sand. There is to be a 3 foot overhang of roof on sides and ends of buildings. Ventilation is to be accomplished from the attic via ridge ventilators, and are to be of sufficient capacity to provide necessary air movement for population of each house and outside temperatures ranging up to 42°C. Roof is to be pitched a minimum of 15 degrees.

5. WORK, EGG ROOM AND SERVICE AREA:

This area is to be enclosed as part of, and of the same construction as the main poultry house, but is to be partitioned off from the poultry area in each house by a solid, bird proof, insulated cross wall.

6. DOORS: (each building)

One (1) pair of doors for service and cleanout is to be placed in the end of the house (center at end wall) opposite the work-service area. This double door is to consist of two (2) prehung doors, each approximately 5 feet by 8 feet high, each securely hinged and forming rodent proof fits when closed. Hinges to be durable and of non-corrosive materials. One 3 foot by 8 foot prehung door is to be positioned between the work and service area to the chicken housing area in the center of the partition.

One (1) approximate 5 foot by 8 foot door or comparably sized pair of doors is to be placed in the outside wall of work-service area in the center of the end of the building. All doors are to be fitted with locks, with 6 keys for each lock. Surfaces of the doors which are facing the chicken population are to be covered with peck-proof material, such as galvanized sheet metal.

7. UTILITIES:

Electricity - Three (3) rows of incandescent lights on 10 foot centers, with each row on a separate switch, will be required for each building. Wiring and outlets should be provided for operation of mechanical equipment, fans for ventilation or air movement, time switches, alarms and lights for work areas. Wiring and hardware should be of materials appropriate to withstand environmental conditions, with the bids containing sufficient detail for assessment purposes.

8. PLUMBING:

Pipe is to be installed to supply water for chickens drinking fountains; to supply two (2) rows of foggers (one on each side of house to fog directly over birds when needed); and to provide four (4) faucets along the inside wall of the poultry house for sanitation/cleaning purposes, plus one (1) faucet in the work-service area. Piping for LP gas which is to be used for brooding must be installed from gas inlet source to outlet points inside each house.

9. VENTILATION:

The natural ventilation system is to be supplemented with fans inside the buildings to move a maximum of 700 Cu.M of air over the birds in each house each minute. Foggers will provide additional cooling for extreme heat periods of up to 42°C outside temperatures. Bidder to supply detailed specifications on these items and their capacities.

10. EQUIPMENT: (see Group IV descriptions for details)

Facilities for each building should provide a system for outside hookup of LP gas cylinders, including internal plumbing/pipes for distribution of the gas to the brooders; a system for suspending brooders, waterers, and feeders. These equipment systems should be raised by winches for cleaning and bird moving operations. The LP gas and all equipment systems should include necessary safety provisions and measurement/control devices at or in each house.

11. PERCHES:

If used, perches should be free standing open type, and may be constructed of pipe with materials used to be those which will not contaminate or injure the chickens using them.

GROUP III

The following items of equipment are to be provided for each rearing house described in Group I. This equipment may be quoted separately as a total equipment package or as a part of fully equipped house. Equipment for each of the three (3) rearing houses in this solicitation is to be packaged so that a complete set of equipment for each house is packaged as a complete set which may be shipped to each of three (3) separate locations in Egypt.

ITEMS

1. BROODERS:

   LP gas fired, 36,000 BTU single jet burner with Unitrol type thermostat, snap-action type valve and safety shutoff. One piece heavy duty ceramic type cone shaped radiant. Gas filters. Pilot lights. Universal type connections for application/interface with installed LP gas lines in house. Quantity - 10 each per house, or a total of 30 brooders.

2. HANGING FEEDERS:

   Hen size, 26 gauge galvanized iron or better. Nesting type for storage. Pan 17 inches in diameter at top and minimum 4 inches deep. Cylinder 10 inches at top, 11 inches at bottom, and approximately 23 inches high. Hooks/handle for hanging, carrying. Quantity - 222 per house, or 660 total.

3. ROUND GRILLS:

   Comparable specs to fit hanging feeders (item 2 above). Quantity - 220 per house, or 66 total.

4. HANGING FEEDER ROPES:

   30 inches long with height adjusting wood blocks. Quantity - 220 per house, or 660 total.

5. HANGING FEEDER COVERS:

   For item 2 above. To fit and match applicable specs and sizes. Quantity - 220 per house, or 660 total.

6. OVERHEAD TRACK SYSTEMS:

For egg collecting, feeding, etc. Quantities listed below of components are for one (1) house only. One (1) system required for each house, and a total of three (3) systems for rearing houses. Therefore, quantities listed below are to be multiplied by three (3), but packed in single system containers.

2 ea.	-	Carrier, two tier, adjustable, non-corrosive iron or steel with platforms approximately 3 feet by 8 feet. To be hung from overhead rails.
2 ea.	-	Carrier feed pans to nest into carrier shelves. Solid sheet metal with 12 inch sidewalls.
2 ea.	-	Wheel assembly, 5½ inch wheels, or better, for attachment of carriers to rails.
70 ea.	-	Sections, 8 feet (or equivalent total) lengths, rails for hanging/carrying wheel assemblys and carriers, unrestricted through length of house. High carbon steel material or equivalent, including wheel bearings.
324 ea.	-	Hangers; steel - 12 inches long, for suspension of rail sections above.
1 ea.	-	Track switch for overall assembly listed above. Three directional, for storage of apparatus, change of direction.

7. WATER FOUNTAINS:

Dome type hanging. Including hose cordage, saddles, and connectors. Approximately 12½ inches diameter adjustable water flow rates. Non-corrosive durable materials proven in poultry house use.

Quantity - 84 per house, or 252 total.

8. MEDICANT PROPORTIONER:

To maintain constant, controllable, adjustable as required flow. Non-corrosive materials; one-half gallon or better capacity.

Quantity - one (1) each house or 3 total.

9. TIME CLOCK:

For control of house lights; 50 cycle, 220 volts.

Quantity - one (1) per house, or 3 total.

GROUP III (cont'd)

10. WATER VALVE:

High volume, self-levelling float type. Stainless steel orifice. Adjustable float level. Quantity - one (1) per house, or 3 total.

11. WATER TANK:

20 gallon minimum capacity. Non-corrosive materials, adjustable gravity flow system. Inlet and outlet connections to couple with house plumbing. Quantity - one (1) per house, or 3 total.

12. PLASTIC HOSE:

For use in connecting water fountains to tanks, valves, plumbing parts. Heavy duty, non-corrosive. Able to withstand constant temperatures up to 45°C outside. 1,000 feet per house, or 3000 feet total. T-connections, clamps, etc. to be included.

13. PANS, FEEDER:

Chick size to fit item 2 above. Comparable size and specs. Quantity - 220 per house, or 660 total.

14. 1 GALLON PLASTIC WATER FOUNTAIN:

Clear plastic jar with slip-on plastic base. Quantity - 100 per house, or 300 total.

15. CHICK FEEDERS:

For feeding 100 chicks. Welded ends; round bottoms. One-half inch flange inner edges to prevent billing out of feed. Snap on adjustable legs. Rust resistant metal. Quantity - 70 per house, or 210 total.

16. CORRUGATED PAPER:

18 inches high; 600 linear feet per hen house for use as chick guards, or 3 sets of 600 foot rolls total.

17. BULK FEED BINS:

12 Ton capacity. Weather-tight; vermin proof. All seams double caulked sealed with neoprene washers. 6-foot removable boot. Center or side draw. Heavy duty galvanized iron legs braced to prevent sag and sway for load and winds in excess of 50 mph; ladder attached to side, ground to top of bin. Hopper section to be corrugated for strength. Weather tight fill opening with lid. Access door in boot for servicing. Confined auger from draw point to fill point inside house, from which hanging cart on track may be filled, with adjustment of auger angle approximately 10 degrees to 50 degrees. Motors of sufficient size and horsepower - 220V 50 cycle.

GROUP IV

The following items of equipment are to be provided for each poultry breeding/laying house described in Group II. This equipment may be quoted separately as a total equipment package or as a part of fully equipped house. Equipment for each of the nine (9) breeding houses in this solicitation is to be packaged so that complete sets of equipment for three houses per set are packaged in such a way that one complete set of equipment may be shipped to each of three (3) separate locations in Egypt.

ITEMS

1. NESTS:

   Roll-out, 10 hole front type. Heavy-guage galvanized iron. Removable bottoms of nests. Vent holes in sides, ends of nests for ventilation. Pitched roofs 30 degrees approx. Holes approx. 12 inches wide by 12 inches deep. Heavy poultry-type plastic coated heavy-guage bar stock floors at appropriate angles to allow for gravity roll of eggs to front collection stations. Quantity - 130 per house, or 1170 total.

2. HANGING FEEDERS:

   Hen size, 26 guage galvanized iron or better. Nesting type for storage. Pan 17 inches in diameter at top and minimum 4 inches deep. Cylinder 10 inches at top, 11 inches at bottom, and approximately 23 inches high. Hook/handle for hanging, carrying. Quantity - 220 per house, or 1980 total.

3. ROUND GRILLS:

   Comparable specs to fit hanging feeders (item 2 above). Quantity - 220 per house, or 1980 total.

4. HANGING FEEDER ROPES:

   30 inches long with height adjusting wood blocks. Quantity - 220 per house, or 1980 total.

5. HANGING FEEDER COVERS:

For item 2 above. To fit and match applicable specs and sizes. Quantity 220 per house, or 1980 total.

6. OVERHEAD TRACK SYSTEMS:

For egg collecting, feeding, etc. Quantities listed below of components are for one (1) house only. One (1) system required for each house, and a total of nine (9) systems for rearing houses. Therefore, quantities listed below are to be multiplied by nine (9) but packed in single system containers.

1 ea.	-	Carrier, two tier, adjustable non-corrosive iron or steel with platforms approximately 3 feet by 8 feet. To be hung from overhead rails
2 ea.	-	Carrier feed pans to nest into carrier shelves. Non-corrosive sheet metal with minimum 12 inch sidewalls.
2 ea.	-	Wheel assembly, 5½ inch wheels, or better, for attachment of carriers to rails.
70 ea.		Sections, 8 feet (or equivalent total) lengths, rails for hanging/carrying wheel assemblys and carriers, unrestricted through length of house. High carbon steel material or equivalent, including wheel bearings.
234 ea.	-	Hangers; steel - 12 inches long, for suspension of rail sections above.
1 ea.	-	Track switch for overall assembly listed above. Three directional, for storage of apparatus, change of direction.

7. WATER FOUNTAINS:

Dome type hanging. Including hose cordage, saddles, and connectors. Approximately 12½ inches diameter adjustable water flow rates. Non-corrosive durable materials proven in poultry house use.

Quantity - 84 per house, or 756 total.

8. MEDICANT PROPORTIONER:

To maintain constant, controllable, adjustable-as-required flow. Non-corrosive materials; one-half gallon, or better, capacity.

Quantity - one (1) each house, or 9 total.

GROUP IV (cont'd)

9. TIME CLOCK:
For control of house lights; 50 cycle, 220 volts.
Quantity - one (1) per house, or 9 total.

10. WATER VALVE:
High volume, self-levelling float type. Stainless steel orifice. Adjustable float level. Quantity - one (1) per house, or 9 total.

11. WATER TANK:
20 gallon minimum capacity. Non-corrosive materials, adjustable gravity flow system. Inlet and outlet connections to couple with house plumbing. Quantity - one (1) per house, or 9 total.

12. PLASTIC HOSE:
For use in connecting water fountains to tanks, valves, plumbing parts. Heavy duty, non-corrosive. Able to withstand constant temperatures up to 45°C outside. 1,000 feet per house, or 9,000 feet total. T-connections, clamps, etc., to be included.

13. PANS, FEEDER:
Chick size to fit item 2 above. Comparable size and specs.
Quantity - 220 per house, or 1980 total.

14. 1 GALLON PLASTIC WATER FOUNTAIN:
Clear plastic jar with slip-on plastic base.
Quantity - 100 per house, or 900 total.

15. CHICK FEEDERS:
For feeding 100 chicks. Welded ends; round bottoms. One-half inch flange inner edges to prevent billing out of feed. Snap on adjustable legs. Rust resistant metal. Quantity - 70 per house, or 630 total.

16. BULK FEED BINS:

12 ton capacity. Weather-tight; vermin proof. All seams double caulked sealed with neoprene washers. 6-foot removable boot. Center or side draw. Heavy duty galvanized iron legs braced to prevent sag and sway for load and winds in excess of 50 mph; ladder sttached to side, ground to top of bin. Hopper section to be corrugated for strength. Weather tight fill opening with lid. Access door in boot for servicing. Confined auger from draw point to fill point inside house, from which hanging cart on track may be filled, with adjustment of auger angle approximately 10 degrees to 50 degrees. Motors of sufficient size and horsepower - 220V 50 cycle.

GROUP V

The following equipment will be required in addition to those listed in Groups I through 4.

1. DEBEAKER:

   Complete with complete set of blades. Self-contained enclosed cabinet. 220V, 50 cycle. Adjustable height, heavy gauge, non-corrosive metal debeaker stand motor. Foot pedal and chain.

   Quantity - Three (3) each; separately packaged.

2. EGG WASHER:

   4,000 Watt, 220 Volt, 50/60 cycle. Fiberglass, for washing of plastic egg trays. Locking caster wheels each corner. Built-in heavy duty thermometer. Heavy duty cord and plug. Each washer to include four (4) plastic coated wire egg baskets to fit, with carrying handles and detergent resistant plastic coating.

   Quantity - Three (3) each; separately packaged.

3. DETERGENTS:

   Chlorine base for use in egg washers. Approximately 300 pounds or more per unit.

   Quantity - Three (3) units; separately packaged.

4. POULTRY INCINERATOR:

   To hold and incinerate up to 100 diseased chickens. Automatic. Oil, natural, or LP gas fired. 220 V, 50/60 cycle. Welded steel fabrication.

   Quantity - Three (3) each.

5. BROODERS:

   Kerosene fired; up to 36,000 BTU burners with safety shutoffs. One piece heavy duty ceramic type cone shaped radiant. Including tank for holding of kerosene supply, sufficient for minimum of 12 hours burning. Self standing.

   Quantity - Nine (9) total packed; 3 units per pack. Comparable specs to HUDSON MFG. COMPANY offerings.

6. FEED SCOOPS:

6 Quart galvanized iron.

Quantity - Three (3) dozen total packed in 1 dozen unit pack.

GROUP VI

Following are specifications for three (3) hatchery buildings to be installed in Egypt, each in a different location. Therefore, all materials and complete equippage for each hatchery are to be packed in such a way that three (3) complete sets may be shipped to separate locations.

1. INCUBATORS AND HATCHERS:

   a. At least two (2) incubators and two (2) hatchers should be supplied for each hatchery to prevent loss of eggs due to mechanical failure in a single machine.

   b. A minimum incubator capacity of 75,000 eggs and a minimum hatcher capacity of 15,000 eggs must be supplied. Designed for twice a week setting of 12,000 eggs or more per set.

   c. The machines should be three-phase, 50 hertz, 3 wire, 230V, AC.

   d. One extra set of temperature and humidity control elements, belts and similar parts should be furnished for each machine.

   e. One extra motor of each type should be furnished with each hatchery.

   f. All machines should be completely automatic in respect to temperature control, humidity control and turning, as well as cooling system.

   g. Machines should be completely new and of the type and model for which spare parts can be expected to be available for the forseeable future.

   h. Each machine should be complete with setting and/or hatching trays suitable for egg production type chickens.

   i. The following machines (or equivalents) are examples of those needed:

      1) Two (2) incubators, approximately 120 eggs each, total 84,240 eggs.

      2) Two hatchers, approximately 14,040 eggs each, total 28,080 eggs.

2. CHICK BOXES:

   Polyethylene, white (Poly Chick Box).

   Quantity - 125 per hatchery, or 375 total.

3. GENERATOR:

   Two (2) units, 30 KW., 50 hertz, 220-240 volts (see attached sample specs).

4. BUILDINGS:

Three (3) hatchery buildings, prefabricated; approximately 30 m X 20 m; excluding foundation; including humidification, cooling, ventilation and air conditioning systems; plumbing; electrical system; designed for setting capacity of 75,000 eggs with capability of future expansion to 150,000 eggs setting capacity.

The following should be included in the floor plan (see attached sketch):

Egg cooler - 50,000 egg storage capacity
Incubator Room
Hatcher Room
Wash room with loading dock for waste
Chick room with covered truck dock
Storage Room
Offices - two (2) small
Lounge
Locker Room
Restroom
Employee Entrance
Utility and generator room

A. FOUNDATIONS AND FLOOR:

The Government of Egypt will provide land, water supply, electricity supply, site preparation, facilities for water and solid waste disposal, and build foundations and floors to fit the specifications of the building contractor and AID. The foundation is to be concrete and the floor should be concrete covered with tile or similar material to meet sanitation requirements. Each room should have a center floor drain and the floor should have a slope toward the drain of 0.2 to 0.3 per cent.

B. WALLS:

The support structure should be of non-corrosive steel or other metal of comparable strength. The inside wall surface must be water

proof and resistant to cleaning agents and disinfectants, resist rust, corrosion or other deterioration from moisture and chemicals. The exterior walls, the insulation layer and the interior wall surface must all be rodent and vermin proof.

C. CEILING:

The ceiling should be a minimum of 4 m in height and be washable with water and cleansing agents. Rodent and vermin-proof insulation is required.

D. ROOF:

The roof should be supported by steel trusses and be constructed of galvanized metal or other type metal sufficient to withstand the prevailing weather conditions and winds up to 50 mph.

E. DOORS:

Outside doors - metal, equipped with locks and six (6) keys per lock.

Employee entrance	- 1 X 2.5 m
Utility Room	- 1 X 2.5 m
Egg Cooler	- 1 X 2.5 m
Storage Room	- double, 1 X 2.5 m each
Chick Room	- double, 1 X 2.5 m each
Wash Room	- double, 1 X 2.5 m each

Inside doors - metal.

Storage Room(s)	- 1.5 X 2.5 m, with lock
Offices	- 1 X 2.5 m, with lock
Lockers, Restroom, Lounge	- 1 X 2.5 m
Egg Cooler, Incubator Room, Hatcher Room, Chick Room, Wash Room	- double, 1 X 2.5 m each, swinging, with bumpers and rubber seals, small safety glass in each.

F. PLUMBING:

Pipe, faucets, restroom furnishings and other fixtures will be supplied. At least six (6) faucets will be placed in each of the following areas: incubator room, hatcher room, wash room and chick room. Faucets will also be placed in the utility room, egg cooler, storage room(s), lounge, hall, chick loading dock, washing dock, and on the outside walls (1/10 m). Plumbing and drains will be supplied as necessary for operation of incubators, hatchers, egg cooler, humidifiers, and any other equipment requiring water. A hot water heater will be supplied for the restrooms.

G. ELECTRICAL SERVICE:

All wiring and fixtures will be supplied to provide flourescent lighting in all areas of the hatchery, security lights at the dock areas, electrical outlets in each room and appropriate electrical supply for all equipment. This will include installation of emergency generator and wiring it into the system. Electrical service will be 220V, 50/60 cycle, single phase.

H. VENTILATION:

Egg Room - The cooling system must maintain a temperature of 18-20°C and a relative humidity of 75 to 80 per cent. The system should also provide a minimum of 0.6 CMM of fresh air per 100,000 eggs.

Hatcher and sitter rooms - The ventilation system of each of these rooms must be independent from each other and from all other parts of the building. The temperature should be maintained at approximately 24°C and 40 to 50 per cent relative humidity. A slight positive pressure should be maintained in both rooms. An exhaust system must be furnished for incubators and hatchers as required.

Chick Room - A temperature of approximately 24°C should be maintained with 0.6 CMM fresh air supplied per 1000 chicks. A slight positive pressure should be maintained.

Ventilation for the remainder of the hatchery should be adequate to maintain 22-26°C and fresh air supply.

SAMPLE SPECIFICATION

30KW GASOLINE DRIVEN STANDBY ELECTRIC POWER SYSTEM

1. GENERAL:

The installation of a standby electric power system shall include an Onan 30.0EK series (or equivalent) electric generating set rated for continuous standby service at 30KW, 37.50KVA at 0.8-PF 50 hertz. The system shall be a package of new and current equipment consisting of:

A. A gasoline engine driven electric generating set to provide standby power.

B. An engine start-stop control system mounted on the generating set.

C. An automatic load transfer control to provide automatic starting and stopping of the engine and switching of the load.

D. Mounted accessories as specified.

This system shall be built, tested and shipped by the manufacturer of the alternator so there is one source of supply and responsibility. The performance of this generating set series shall be certified by an independent testing laboratory as to the set's full power rating, stability and voltage and frequency regulation.

This standby electric power system, furnished completely by the manufacturer shall be warranted for a period of five years from the date of installation.

2. ENGINE:

The engine shall be gasoline-fueled, 4-cycle, water-cooled with mounted radiator, fan and pump. It shall have six (6) cylinders with seven (7) main bearings and a minimum displacement of 240 cubic inches and minimum rating of 80-bhp at its operating speed of 1800-rpm. Overhead valve design. Hard faced exhaust valves with rotators shall be provided. Lubrication shall be full pressure as supplied by a positive displacement lube oil pump. The engine shall have an air cleaner and oil filter with replaceable elements, fuel pump, fuel filter, automatic choke and anti-dieseling solenoid. Engine speed shall be governed by a mechanical governor to maintain alternator frequency within 3-hertz from no-load to full-load alternator output. The engine shall have a 12-volt battery

charging DC alternator with transistorized voltage regulator. Remote, 2-wire, starting shall be by a 12-volt, solenoid shift, electric starter.

3. ENGINE INSTRUMENTS:

The engine instrument panel shall contain an oil pressure guage, coolant temperature guage, and battery charge rate ammeter.

4. ENGINE CONTROLS:

The generating set shall contain a complete engine start-stop control which starts engine on closing contact and stops engine on opening contact. A cranking limiter shall be provided to open the starting circuit in approximately 45 to 90 seconds if the engine is not started within that time. The engine controls shall also include a 3-position selector switch with the following positions: RUN-STOP-REMOTE. High engine temperature, low oil pressure, and overspeed shutdown with signal light and alarm terminals shall also be provided.

5. BRUSHLESS ALTERNATOR:

The alternator shall be a 4-pole, revolving field design with temperature compensated solid state voltage regulator and brushless rotating rectifier exciter system. No brushes shall be allowed. The stator shall be directly connected to the engine flywheel housing, and the rotor shall be driven through a semiflexible driving flange to ensure permanent alignment. The insulation system shall be class F as defined by NEMA MG1-1.65. Single phase, 240 volts, 50 hertz.

6. UNIT PERFORMANCE:

Frequency regulation shall not exceed 3-hertz from no load to rated load. Voltage regulation shall be within plus or minus 2 per cent of rated voltage, from no load to full rated load. The instantaneous voltage dip shall be less than 18 per cent of rated voltage when full load and rated power factor is applied to the alternator. Recovery to stable operation shall occur within 2 seconds. Stable or steady state operation is defined

as operation with terminal voltage remaining constant within plus or minus 1 per cent of rated voltage. A rheostat shall provide a minimum of plus or minus 5 per cent voltage adjustment from rated value. Temperature rise shall be within NEMA MG1-22.40 definition.

7. ALTERNATOR INSTRUMENT PANEL:

The alternator instrument panel shall be wired, tested and shock mounted on the generating set by the manufacturer of the alternator. It shall contain panel lighting; manual reset circuit breaker; frequency meter; running time meter; voltage adjusting rheostat; AC voltmeter (dual range, indicates all voltages). Single phase instrumentation includes voltmeter, two ammeters and no selector switch.

8. GENERATING SET MOUNTING:

The electric generating set shall be equipped with vibration isolators and mounted on a welded steel base which shall provide suitable mounting to any level surface.

9. HOUSING:

The complete generating set shall be enclosed in a weather protective sheetmetal housing with removable side panels and hinged meter panel door.

10. ACCESSORIES:

All accessories needed for the proper operation of the generating set shall be furnished. These shall include a muffler, flexible exhaust connection, starting batteries, battery cables, battery rack, fuel tank and lines, and detailed operation and maintenance manuals with parts list.

11. AUTOMATIC LOAD TRANSFER CONTROL:

The complete automatic load transfer control shall be designed, built and tested by the manufacturer of the alternator. The load transfer control shall be rated for continuous duty and for all classes of load. The ampere rating of the transfer switch shall be sufficient to handle the capacity

of the loads being transferred. The control components shall be compatible with the electrical requirements of the standby set and provide the following functions:

A. Upon power line outage, automatically start the generating set and when the set comes up to speed and voltage, disconnect the load circuits from the power line and transfer them to the standby set's output.

B. Upon power line return, transfer the load back to the line and stop the standby set.

C. Include under-voltage sensor, time delay start and stop, time delay transfer and retransfer, test transfer switch.