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ANALYSIS OF EWUP FARM MANAGEMENT DATA FOR THE ABYUHA SITE

by

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ABSTRACT

The characteristics of farms at the El Minya project site of the Egypt Water Use and Management Project are described. The farms for which records are kept are compared with the average of farms served by the Abyuha cooperative. Record keeping farms were larger than the average farms served by the cooperative. In contrast to the other EWUP project sites, land rental is much more common among Abyuha cooperative farmers. The larger record keeping farms follow similar cropping patterns as the average for the Abyuha cooperative. The larger record keeping farms have less berseem in relation to total cropped area, a difference which can be explained by fewer livestock on some of the larger record keeping farms.

Crop enterprise budgets for the important crop enterprises on Abyuha farms are compared. The profitability of crops are compared on a per unit of land, per hour of labor and per unit of water basis. Depending on which resource, land, labor or water is considered most limiting, the relative profitability of crops is shown to vary.

Arabic Abstract

الخلاصـــــة

هـذا التقـرير يبيـن السمـات المميـزة للمزارع التـى تقـع بناحية ابيـوهـا بمحافظة المنيـا وهى احدى مناطق مشروع تطوير استخدام مياه الرى فى مصـر • وبمقارنة المزارع التى نحتفظ لها بسجلات مزرعيـة بالمزارع الاخرى بنفس الناحية ، وجد ان متوسط حجم المزارع التى لها سجلات اكبر من حجـم المزارع الاخرى بالناحية فى المتوسط • وبالنسبة لنظام الحيازة نجد ان حيـازة الارض بالايجـار اكثر تواجـدا بناحيـة ابيـوهـا علـى عكس النـواحـى الاخـرى التابعـة للمشـروع ، وقد تلاحظ ان المسـاحات المنزرعـة بمحصول البرسـيم اقل بالنسبة لمجموع المساحـات المنزرعة خاصة بالمـزارع كبيرة الحجم التى نحتفظ لهـا بسجلات وهذا الوضع قـد يرجـع لقلة عـدد الحيـوانات المزرعيـة رغم كبر حجم المزرعة •

لقد عنى هـذا التقـريـر باجـراء مقارنـة بين حساب العـائد لبعـض المحاصيل الرئيسية بناحية ابيـوهـا لمعرفـة ايهم اكـثر اربحيـة او اكثـر عـائدا ، وقد تمت هذه المقارنة لمعرفة حساب العائد بالنسبة لوحدة الارض ووحـدة العـمل ، ووحـدة الميـاه المستخدمة فى الـرى وقد وجـد ان هنـاك تباينا فى هـذا العـائد •

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I. INTRODUCTION

The primary objective of the Egypt Water Use and Management Project (EWUP) is to improve the economic and social well-being of Egyptian farmers through improved water management practices. For this reason, detailed farm level data are required and analyses of those data are necessary to understand the potentials for improved irrigation practices given the availability of resources, major constraints to decisions, and the linkages between farms and other sectors of the economy.

This report summarizes the farm management data collected at the El Minya site and presents some analyses of those data. The report presents (1) a summary of the resources available, (2) the cropping characteristics, (3) the income levels, and (4) the enterprise budgets for the major crops produced on study farms at the El Minya site. Also presented is a disucssion of how the various cost and return items were estimated. Further, the constraints faced by farmers regarding flexibility of resource use and the profitability of alternative enterprises relative to resource constraints are considered. An understanding of the economic environment in which the farmers operate is necessary for planning interventions which will improve on-farm water management and will increase farm income and/or will increase water use efficiency.

II. CHARACTERISTICS OF EL MINYA FARMS

Located south of the city of El Minya the EWUP project area focuses on farms served by the Abyuha village cooperative. In the discussion

that follows, data from Abyuha Cooperative are presented first, and then data from the detailed farm records maintained by the El Minya EWUP economists are presented.

1. Abyuha Cooperative.

As throughout Egypt, the farms in the area served by the Abyuha Cooperative are relatively small. The average farm size, shown in Table 1, is abut 1.5 feddans. While almost 50 percent of the farms in the area are less than one feddan in size, over 95 percent of the farms are included in the less than five feddans category.

The ownership characteristics of the Abyuha farms are also shown in Table 1. About 25 percent of the farm operators fully own their farms. About 18 percent of the farm operators own and rent their farms. The largest group of farms are rented; 55 percent fall in this tenure category.

Rented farms are smaller than owned and partially-owned farms. The average rented farm has slightly more than one feddan of land, owned farms are about 1.5 feddans, and those farms with both owned and rented land are almost three feddans in size. The largest farms, those over 10 feddans, are all either fully or partially owned by the individuals operating them. About 41 percent of the land area served by the Abyuha Cooperative is in farms which rent all their land. When combining land in the fully rented farms with the land rented by farmer which own some of their land, over one-half of all the land is operated by someone other than the landowner.

The structural characteristics of the Abyuha Cooperative farms are further described in Table 2. The distribution shows that four percent of the farmers operate 28 percent of the land. On the other hand, 77 percent of the farmers with two feddans or less operate 39 percent of the land. These structural distributions are important since decisions made by the majority of

Table 1. Size Distribution and Tenure Status of Farms Served by the Abyuha Cooperative, 1979.

Farm Size	Owners only		Renters only		Owners and Renters		Holding Total	
	Farmers	Area (Fed.)	Farmers	Area (Fed.)	Farmers	Area (Fed.)	Farmers	Area (Fed.)
Less than one feddan	172	77	344	183	39	27	555	287
From one to less than 2 fed.	67	87	172	200	59	86	298	373
From two to less than 5 fed.	41	107	91	238	80	223	212	568
From five to less than 10 fed.	4	27	11	75	18	118	33	220
Ten feddans and more	7	127	--	--	8	130	15	257
Total	291	424	618	696	202	584	1113	1705

Table 2. Distribution of Farmers by Size and Distribution of Land Area Among Farm Size Groups, Abyuha Cooperative, 1979.

Farm Size	Ownership Farm		Rented Farm		Owner and Rented		Holding Total	
	% Farmers	% Area	% Farmers	% Area	% Farmers	% Area	% Farmers	% Area
Less than one feddan	60	18	56	26	19	5	50	17
From one to less than 2 fed.	23	20	28	29	29	15	27	22
From two to less than 5 fed.	14	25	14	34	39	38	19	33
From five to less than 10 fed.	1	6	2	11	9	20	3	13
Ten feddans and more	2	30	--	--	4	22	1	15

farmers may not be representative of a majority of the land, and conversely.

2. Farm Records.

Records were kept on 9 farms in 1979-80 and 15 farms during the 1980-81 farm record year. The farm record year is assumed to begin November 1 and continues through October 31 of the following year. The records provide a detailed profile of each farm. Complete enterprise descriptions includes the timing and amount of each input application and planting, irrigation, and tillage along with the associated livestock use. Livestock enterprises are also maintained in the farm record.

Table 3 presents the size, number of parcels and land ownership status of the 1980-81 record keeping farms. The first 9 farms listed in Table 3 had records during the previous year. The farms are larger than the average for the Abyuha Cooperative. The record keeping farms averaged 4.39 feddans. Of the 15 farms, none had only owned land, seven had part-owned and part-rented and eight had only rented land.

The 15 farms include 53 land parcels. Over one-half of the parcels are less than one feddan (Table 4) with an area of about 25 percent of the total area in the record keeping farms.

A. Crop Sequence

Two crop seasons are practiced at the Abyuha site. The winter season begins November 1 and continues until June 30 in the following year. The summer season runs from July through October.

Three crops dominate the winter season; broad beans, wheat and berseem. Broad beans typically are planted in early November and harvested in late April. Wheat is planted in late November and harvested towards the end of May. Berseem is planted towards the end of October and

Table 3. Size, Number of Land Parcels and Feddans of Land Owned or Rented, for Record Keeping Farms, 1980/81.

Farm No.	Size of Farms (Feddans)	Feddans of Land		Number of Land Parcels					Total Number
		Owned	Rented	1 Feddan	1-2 Feddans	2-5 Feddans	5-10 Feddans	10 Feddans	
1	7.58		7.58		1	2			3
2	4.38	2.50	1.88	1	2	1			4
3	12.92	10.96	1.96		3	1	1		5
4	3.83	3.70	.13	3	2				5
5	2.38	.50	1.88	4					4
6	14.42	13.75	.67			2	1		3
7	4.04		4.04	1	2				3
8	1.92	.54	1.38	1	1				2
9	.50		.50	1					1
10	1.75		1.75	2					2
11	1.42		1.42	5					5
12	1.54		1.54	6					6
13	2.25	1.37	.88		1				1
14	5.33		5.33	4	1	1			6
15	1.58		1.58	2					2
Total	65.84	33.32	35.52	30	13	7	2		52

Table 4. Distribution of Land Parcels by Parcel Size for Record Keeping Farms, 1980/81.

	Farmers		Parcels		Area	
Farm Size	Number	Percent	No.	%	Fed.	%
Less than 1 fed.	11	73	10	58	17.2	26
From one to less than 2 fed.	8	53	13	25	16.8	26
From two to less than 5 fed.	5	33	7	13	20.0	30
From five to less than 10 fed.	2	13	2	4	11.8	18
More than 10 fed.	0	0	-	-	--	--
Total	15	100	52	100	65.8	100

harvested through April or May. The long-season berseem crop, is harvested through June.

Important summer crops are cotton and maize. Sunflowers are also grown in the summer and recently, soybeans have been introduced. Government programs require that cotton be planted in March or early April. The planting data for maize, although usually early June, varies depending upon the previous crop.

The cropping sequence generally has cotton following short-season berseem; berseem is removed and cotton planted in mid-March. If maize follows wheat or broad beans, it would be planted at the beginning of June. But, if the previous crop is long-season berseem, maize would not be planted until late June or early July. Sunflowers may follow wheat or broad beans instead of maize. Sugarcane is also an important crop among Abyuha Cooperative farmers. Once established it occupies a piece of land for about six years.

1. Abyuha Cooperative.

Table 5 presents the crop rotation followed by Abyuha Cooperative farmers. Of the land planted to maize during the 1979/80 crop year, 35 percent was previously in wheat, 25 percent in broad beans, 35 percent in long-season berseem, and five percent in other crops.

Alternatively, of the land planted to cotton, 54 percent follows short-season broad beans, 37 percent follows short-season berseem and nine percent follows other crops.

About 14 percent of the total land area was in sugarcane and two percent of the land is in orchards. The total cultivated area in 1979/80 was 3,127 feddans resulting in a cropping intensity of 1.84 (3,127/1,703). The cropping intensity was a slightly lower 1.83 for 1980/81.

Table 5. Crop Sequences and the Percent of Land Area Devoted to a Crop by Season, Abyuha Cooperative.

	1979/1980		1980/81	
Crops	Feddans	%	Feddans	%
Winter				
Wheat	308	18	335	20
Berseem Long Season (LS)	307	18	410	24
Berseem Short Season (SS)	204	12	138	8
Broad beans (LS)	221	13	286	17
Broad beans (SS)	296	18	204	12
Others *	88	5	39	2
Total Winter	1424	84	1412	83
Summer				
Maize	866	51	874	51
Sunflower	-	-	50	3
Soybeans	10	1	105	6
Cotton	548	32	359	21
Other	-	-	24	2
Total Summer	1424	84	1412	83
Perennials				
Sugarcane	245	14	257	15
Orchards	34	2	34	2
Total Perennials	279	16	291	17
Total Cultivated Area	3127	184	3115	183
Total Land Area	1703	100	1703	100

Source: Abyuha Agricultural Cooperative.

* Others include onions, garlic, barley, potatoes and fallow land.

During the winter of the 1979/80 crop year, 18 percent of the land area was in wheat, 30 percent in berseem, 31 percent in broad beans and the remainder in other crops. The summer had 51 percent of the cultivated area in maize, 32 percent in cotton and about one percent in soybeans.

During the winter of the 1979-80 crop year, 18 percent of the land area was in wheat, 30 percent in berseem, 31 percent in broad beans and the remainder in other crops. The summer had 51 percent of the cultivated area in maize, 32 percent in cotton and about one percent in soybeans.

During the winter of the 1980-81 crop year a slightly lower percentage of the land area was in broad beans and larger percentages in wheat and berseem. The newly introduced crops, sunflowers and soybeans, showed a marked increase of area in production resulting in reduction of the percentages of land devoted to maize and cotton production during the 1980-81 summer season.

2. Record Farms.

Table 6 presents the crops cultivated on the record keeping farms for 1979-80 and 1980-81. No distinction is made for berseem and broad beans between short-season and long-season, but the records indicated that short-season crops were planted prior to cotton. About 17 percent of the land of farm record keepers was planted to berseem in both 1979-80 and 1980-81, in contrast to 32 percent among all farms in the Abyuha Cooperative. This difference is hypothesized to be due to the inclusion of large farms that don't produce livestock in the farm record keeping set. Farms without livestock, plant wheat and broad beans during the winter season instead of berseem. During 1980-81 winter season, 26 percent of the land was planted to wheat and 38 percent was planted to broad beans. One of the large farmers had 45 percent of his land planted to sugarcane in 1979-80 and 1980-81.

Table 6. Distribution of Land Among Crops Among the Record Keeping Farms, 1979/80 and 1980/81.

1979/80

	Total area	Berseem	Wheat	Broad beans	Cotton	Maize	Sugarcane	Other
				(feddans)				
	7.58	4.30	1.30	2.30	4.00	3.80	0.00	0.00
	4.38	1.54	0.00	1.79	2.08	1.04	0.75	0.00
	14.67	0.20	3.00	9.00	4.70	3.00	0.00	0.00
	3.83	0.50	1.50	1.90	1.00	2.50	0.00	0.40
	2.38	1.00	0.40	1.40	0.00	1.20	0.00	0.50
	14.42	0.20	3.30	4.70	0.00	1.50	6.50	0.00
	6.13	0.80	2.10	2.00	0.40	4.10	0.40	0.00
	1.92	0.50	0.50	0.90	1.00	0.90	0.00	0.00
	0.50	0.30	0.50	0.00	0.00	0.50	0.00	0.00
Total	55.81	9.34	12.60	23.99	13.18	18.54	7.65	0.90
Percent	100	17	23	43	24	33	14	2

Total cultivated area 86.2

Cropping Intensity 1.54

1980/81

	Total area	Berseem	Wheat	Broad beans	Cotton	Maize	Soybeans	Sugarcane	Other
				(feddans)					
	7.58	3.58	2.00	2.00	3.75	3.83	0.00	0.00	0.00
	4.38	0.50	1.04	1.58	0.00	3.12	0.50	0.75	0.00
	12.92	0.25	5.42	4.00	1.50	2.50	0.00	0.00	0.00
	3.83	1.25	0.25	2.34	1.09	2.00	0.75	0.00	0.00
	14.42	0.00	0.00	7.92	3.21	0.00	4.71	6.50	0.00
	4.04	0.38	2.00	1.26	0.00	3.43	0.00	1.05	0.00
	1.92	0.38	1.00	0.54	0.00	0.92	0.00	0.00	0.00
	0.50	0.08	0.00	0.42	0.00	0.00	0.00	0.00	0.50
	1.75	0.00	0.75	0.00	1.00	0.75	0.00	0.00	0.00
	1.42	0.42	0.71	0.29	0.29	1.13	0.00	0.00	0.00
	1.54	0.38	0.67	0.50	0.50	1.05	0.00	0.00	0.00
	2.25	0.67	0.46	1.21	1.33	0.92	0.00	0.00	0.00
	5.33	2.51	1.71	1.12	2.92	1.88	0.00	0.00	0.00
	1.58	0.00	0.79	0.79	0.79	0.79	0.00	0.00	0.00
Total	65.84	11.07	17.18	24.80	17.21	23.37	5.96	8.30	1.58
Percent	100	17	26	38	26	35	9	13	2

Total cultivated area 109.47

Cropping intensity 1.66

During the summer season of 1981, cotton occupied 26 percent of the land and maize occupied 35 percent. Soybeans and sugarcane accounted for 9 and 13 percent, respectively. The latter was concentrated on three farms. Other crops in eithr 1979-80 or 1980-81 occupy only about two percent of the land.

The cropping intensity was 1.54 for 1.66 for 1979-80 and 1980-81, respectively. Deleting the land planted to sugarcane resulted in a cropping intensity of 1.63 and 1.75 for 1979-80 and 1980-81, respectively.

B. Livestock

Table 7 presents the farm record inventories of the various kinds of livestock including the values of the livestock for the 1979-80 and 1980-81 crop years. Most farms have access to either a cow or a buffalo, sometimes both. Donkeys are also common to most farms. Livestock tend to be concentrated on the medium-sized farms, however, the two large farms have very few livestock. Farms with less than two feddans have less livestock investment than do farms between two and 10 feddans.

There is an integration of crops and livestock on Egyptian farms. Livestock are not only important consumers of products produced on the farm but are also contributors of important products used on the farm. Livestock provide draft power, transportation, manure and milk and meat for home consumption.

Table 8 presents information on the extent of crop-livestock-household integration. Livestock consume an average of 14 to 17 percent of the value of crop production on farms, with values ranging from 0 to 51 percent. The livestock products during 1980-81 (eggs, milk, meat) tended to be consumed entirely on the farm where they are produced. There were no off-farm sales of livestock products in 1980-81. During 1979-80, only 51 percent of the value of livestock products were consumed on the farms where produced.

Table 7. Numbers of Livestock by Type and Value of Livestock on Record Keeping Farms, 1979/80 and 1980/81.

	Farm Size (feddans)	Number of Animals of Kind							Value of Livestock (L.E.)
		Cow	Buffalo	Calf	Donkey	Camel	Goat	Poultry	
1979/80									
	7.58	2	2	0	3	0	21	24	1758
	4.38	0	1	0	1	1	0	0	335
	14.67	0	0	0	2	0	3	38	206
	3.83	0	1	1	1	0	0	15	410
	2.38	1	0	0	1	0	6	8	460
	14.42	0	1	0	1	0	0	0	210
	6.13	0	1	0	3	0	1	15	445
	1.92	0	1	0	1	0	3	25	417
	0.50	0	1	0	1	0	0	15	345
Total	55.81	3	8	1	14	1	34	140	4586
Average	6.2	.33	.89	.11	1.56	.11	3.78	15.56	510
1980/81									
	7.58	2	3	0	3	0	16	15	1985
	4.38	1	0	0	2	1	0	0	880
	12.92	0	0	0	2	0	0	26	173
	3.83	0	2	0	1	0	0	25	715
	2.38	1	0	0	1	0	10	0	1050
	14.42	0	0	0	1	0	0	0	50
	4.04	0	1	0	3	0	1	27	386
	1.92	0	1	0	1	0	0	26	483
	0.50	0	1	0	0	0	0	20	400
	1.75	0	0	0	0	0	0	20	50
	1.42	1	1	1	1	0	2	15	875
	1.54	1	1	0	1	0	0	14	803
	2.25	0	1	0	1	0	6	0	800
	5.33	1	1	0	2	0	32	0	1885
	1.58	0	0	0	0	0	0	0	0
Total	65.84	7	12	1	19	1	67	188	10535
Average	4.38	.47	.8	.07	1.27	.07	4.47	12.53	702

Table 8. Integration Between Crop and Livestock Enterprises and the Farm Household, Record Keeping Farms, 1979/80 and 1980/81.

Value of crop production	Value of livestock production	Total production	Percent of crops: Fed to livestock	Percent of crops: Consumed at home	Percent of livestock consumed	Value of livestock: Transportation	Value of livestock: Other
1979/80							
3195.1	389.2	3585.1	28	22	56	211.5	15.3
1293.0	205.4	1498.4	29	21	58	129.8	0
4066.0	41.0	4107.0	3	12	100	135.0	0
1797.0	200.8	1997.8	19	24	0	100.5	0
1449.2	414.0	1863.2	26	18	29	65.3	0
5344.2	35.5	5379.7	0	5	100	90.0	0
1719.5	156.0	1875.5	17	34	100	196.5	0
1034.6	261.3	1295.9	21	36	58	76.5	0
334.0	134.5	468.5	36	22	69	52.5	0
1980/81							
3105.0	346.9	3451.9	35	12	100	247.2	0
1549.0	0	1549.0	12	11	0	164.7	0
3131.5	0	3131.5	4	10	0	180.0	0
1867.0	425.0	2292.0	29	13	100	112.5	0
1328.5	137.3	1465.8	24	14	100	120.0	0
7203.0	0	7203.0	0	0	0	97.5	0
1299.0	56.0	1355.0	14	19	100	247.5	0
737.8	232.3	970.1	31	41	100	111.0	0
261.5	0	261.5	20	0	0	0	0
573.0	0	573.0	0	15	0	0	0
557.0	270.9	828.7	51	29	100	97.5	0
608.5	159.0	767.5	36	23	100	97.5	0
867.5	200.0	1067.5	32	19	100	61.7	0
2761.0	329.0	3090.0	34	9	100	210.0	0
542.5	0	542.5	0	20	0	0	0

Livestock contribute to the transportation activity on farms. Unlike livestock in other areas of Egypt, livestock were not used to lift water to the fields. However, their contribution to transportation was important.

C. Farm Income

A summary of income and expenses incurred by the record keeping farms is shown in Table 9. All farms had a positive net farm income duirng 1979-80 and 1980-81. Crops production was the major source of farm income.

In Table 10, net farm income attributable to each family member and to a unit of area are compared. Farm size appears to have an impact on income per person, however, farm size does not affect income per feddan. Farms without livestock tended to have slightly higher incomes per feddan than those with livestock. The number of observations limit the validity of these conclusions, however.

III. CROP ENTERPRISE BUDGETS

A crop enterprise budget is a system for presenting data about a specified enterprise on the costs of input resources (including labor, machines, etc.) and on the value of output for a given amount of land. Crop enterprise budgets can be developed from crop inputs and outputs collected from farm records or from special farm management surveys. The enterprise budgets presented here were developed using the EWUP farm records of the cooperating farmers in the Abyuha area. In some cases, farm record data has been supplemented with information obtained from the Abyuha cooperative or from special farm management surveys. Budgets were estimated for one feddan of each crop even though many farmers cultivated less than one feddan of the crop at any one time. The budgets were constructed to represent a complete crop year. Enterprise budgets for 1979-80 are presented in

Table 9. Income and Expense by Source Among the Record Keeping Farms, 1979/80 and 1980/81.

Income			Expenses			Net farm
Livestock	Crop	Total[a/]	Livestock	Crop	Total[b/]	income[c/]
			1979/80			
- - - - - - - - - - - - - - - - - - - -			L.S.	- - - - - - - - - - - - - - - - - - - -		
389.2	3195.9	4399.1	607.5	734.7	2247.0	2152.1
205.4	1293.0	4889.4	216.0	505.1	2854.1	2035.3
41.0	4066.0	9287.0	370.0	1430.4	3596.4	5690.6
200.8	1797.0	4749.8	119.5	536.1	2204.6	2545.2
414.0	1449.2	2785.2	215.7	249.3	847.0	1938.2
35.5	5344.2	7938.7	182.0	1658.3	1860.3	6078.4
156.0	1719.5	2388.5	204.7	536.6	1035.3	1353.2
216.3	1034.6	1894.6	166.8	251.3	640.1	1254.5
134.5	334.0	733.5	127.0	57.2	304.2	429.3
			1980/81			
346.9	3105.0	4243.9	1015.0	1007.0	3301.0	942.9
0	1549.0	3381.0	249.0	453.0	1441.0	1040.0
0	3131.5	8864.5	414.0	1319.6	1854.6	2009.9
425.0	1867.0	3956.0	216.3	468.6	1733.4	1122.6
137.3	1328.5	2113.8	300.0	305.9	919.5	944.4
0	7203.0	13174.0	254.0	2859.9	3141.9	3907.1
56.0	1299.0	1996.0	185.0	507.1	1250.1	745.9
232.3	737.8	1284.3	158.3	144.0	527.8	606.5
0	261.5	477.5	90.5	23.2	165.7	311.8
0	573.0	781.7	155.0	214.1	369.1	412.6
270.9	557.8	1158.7	223.0	203.6	826.6	332.1
159.0	608.5	1487.5	207.2	165.1	921.3	566.2
200.0	1059.5	1730.7	214.0	260.8	748.8	705.9
329.0	2761.0	4050.0	514.3	529.2	2043.5	2006.5
0	542.5	1160.5	95.0	333.7	428.7	731.8

[a/] Includes adjustments for capital sales, inventory increases and off-farm incomes.

[b/] Includes adjustments for capital purchases, inventory decreases and credit for livestock feed produced on the farm.

[c/] Excludes land appreciation.

Table 10. Net Farm Income per Person and per Feddan, Record Keeping Farms, 1979/80 and 1980/81.

Total family members	Land area	Net farm income	Net farm income/ person	Net farm income/ feddan
		1979/80		
		L.S.		
10	7.58	2152.1	215.2	283.9
4	4.38	1135.3	283.8	259.2
5	14.67	3287.6	657.5	224.1
10	3.83	1545.2	154.5	403.4
9	2.38	1838.2	204.2	772.4
7	14.42	4078.4	582.6	282.8
9	6.13	1353.2	150.4	220.8
5	1.92	1154.5	230.9	601.3
4	0.50	429.3	107.3	858.6
		1980/81		
10	7.58	942.9	94.3	124.4
4	4.38	1040.0	260.0	237.4
5	12.92	2009.9	402.0	155.6
10	3.83	1122.6	112.3	293.1
9	2.38	944.4	104.9	396.8
7	14.42	3907.1	558.2	271.0
9	4.04	745.9	82.9	184.6
5	1.92	606.5	121.3	315.9
4	0.50	311.8	78.0	623.6
5	1.75	412.6	82.5	235.8
3	1.42	332.1	110.7	233.9
4	1.54	566.2	141.6	367.7
6	2.25	705.9	117.7	313.7
12	5.33	2006.5	167.2	376.5
3	1.58	731.8	243.9	463.2

Appendix Tables 1-8 for wheat, broadbeans, berseem, maize, sugarcane, and cotton. Since cotton typically follows either short-season berseem or broad beans, the enterprise budgets represent these crops in fixed sequence.

A farmer has a given amount of each of the resources: land, labor, capital and management so the farmer must choose what products or enterprises to produce from among several possible enterprises, selecting those that will maximize the farm profits. This selection depends on:

a) quantity of product required for household consumption,
b) the crop rotation,
c) the expected price of the product
d) the amount of resources available such as land and capital, and
e) the production quotas imposed by the government.

Since a production function is defined as the physical relationship between the inputs of resources and the output of a commodity for a given amount of land per unit of time, a crop enterprise budget represents one point on a production function. As the amount of input use changes, it will affect the level of output. Although an optimum level of input use can be defined, the budgets presented here are typical of those practices being followed by the record keeping farmers.

A. Parts of a Crop Enterprise Budget

1. Production.
   a) Production includes the main product represented for each crop measured in the units associated with the crop, such as an ardab for grain crops like wheat, broad beans and maize, a kentar for cotton, and ton for sugarcane.
   b) Additionally, by-products like straw in units of camel or donkey loads from grain crops are also included.

2. Variable Costs.

Variable costs include cash costs for purchased inputs like fertilizer, seeds, wages for hired labor and machines. Non-cash costs are also included in variable costs using assigned values for family labor and farm equipment. The level of use of these inputs also varies with the level of production.

3. Fixed Costs.

Fixed costs such as land rent, taxes and management charges do not vary with the level of production. These costs should be applied to the entire farm unit, but when computing the long-run profitability of each crop enterprise, the fixed costs must be allocated among each enterprise on an equitable basis to approach consistent enterprise analysis.

From these three parts of crop enterprise budget, the net returns to the crop can be derived. The enterprise budgets also include a schedule of the monthly labor and water use for each crop. These schedules were derived from the farm record data which reflect the application times of these two resources (labor and water) during cultivation of the crop.

Among the Abyuha farms there were differences in the variable inputs such as the amount of fertilizer, seeds, and farm practices applied. These differences resulted in different amounts of production (output). The enterprise budgets discussed were based on the average of inputs and outputs of all the farms.

For the broad bean/cotton sequence, land preparation for both crops is completed prior to planting of the broad beans. The land is minimally disturbed during the broad bean harvest in mid-April, requiring only minor reshaping of the "beds" prior to planting cotton.

For the short-season berseem/cotton sequence, land preparation for the cotton crop is completed in early March after the berseem is harvested. The land is usually pre-irrigated after the land is prepared prior to the cotton planting.

Government of Egypt policy requires that the total cotton production be delivered to the cooperative. Therefore, the price is based on the average price to the farmers paid by the cooperative.

B. Production (Income)

Broad beans and cotton or short-season berseem and cotton are grown in a set sequence. Consequently, the enterprise budgets for these two sequences reflect the crops as joint enterprises. The cotton enterprise budget represents data for the 1979-80 agricultural season. The yield was 6.0 kentar/feddan, average kentar per feddan from cooperative receipts, and the price 38.00 L.E./kentar.

The yield for broad beans, wheat, and corn is measured in ardabs. Two prices were used for broad beans, since the farmer must deliver 2.5 ardabs per feddan to the cooperative at the government price of 35.00 L.E. per ardab. The market price in 1981 was 38.00 L.E. per ardab and it was assumed that yields in excess of 2.5 ardabs per feddan were sold at the market price. The farmer usually retains sufficient quantity for seed for the next year. Broad bean straw has value for use as animal feed during the summer season.

The average production of wheat in 1980 was 11 ardabs per feddan. The price for wheat 13.00 L.E. per ardab. Wheat straw is also included in production having value for use as animal feed during the summer season.

The average production of maize in 1980 was eight ardabs per feddan, valued at 12.00 L.E. per ardab. Maize was used for household consumption. Maize stalks, an important by-product, are used as a fuel by the farmers.

The yield of long-season berseem was based on 23 kerats per feddan averaging four cuts per crop which was used for animal feed. The value of the forage ranged from L.E. 2 to L.E. 4, averaging L.E. 3 per kerat cut during the 1980 production period. A fifth cutting of long-season berseem yields seed production averaging 12 kela per feddan worth L.E. 4 per kela. The short-season berseem production averages two cuts per season.

Two sugarcane enterprise budgets are presented. The first is for initial year sugarcane production and the second budget represents the ratoon sugarcane crop. There are two periods during the year in which sugarcane is planted. The autumn planting period usually occurs in November and the spring planting period occurs in February. Most of the area is planted during the autumn period. The autumn planting of sugarcane is usually intercropped with broad beans (in most cases) or wheat. After harvesting the broad beans or wheat, the sugarcane continues growing for another 10 months before being harvested. In total, sugarcane occupies the land for about 15 months before the first cutting. The crop enterprise budget for the initial sugarcane crop represents the per feddan average for about 11 feddans in the Abyuha area in which data were collected in a special survey by the project team during 1979-80. The sugarcane yield was 30 ton of stalks per feddan, plus 7 ardabs of broad beans and broad bean straw.

The ratoon sugarcane crop occurs after the first production of sugarcane. Subsequent production periods for the ratoon crop continued over about 12 months from the last harvest. The average sugarcane yield is about 34 tons per feddan per harvest. This average yield holds for the six-year period the crop remains on the land. The GOE price for sugarcane in 1980 was L.E. 15.00 per ton. The farmer receives payment at the sugar factory in the Abolarkas district or in the district where he has a contract. One ton of sugarcane produces 100-105 kg sugar.

The prices of crops included in the enterprise budgets are the market prices paid to farmers except when the government sets the prices for crops such as cotton, part of the broad bean production, and sugarcane.

The production and prices used in the enterprise budgets are summarized in Table 11. Market and government prices are denoted where used. These prices were also applied to the amount of the production used on the farm or consumed in the home to reflect the opportunity value of production.

Crop residues, such as broad bean straw, do not have a readily identifiable market value. The quantities and values assigned to these products were based on farm record information.

C. Variable and Fixed Costs

This section discusses how quantities and values were assigned to (a) variable costs and (b) fixed costs. Variable costs are those costs which vary with the level of production. These costs include the purchased inputs, the inputs and/or services contributed by the farm family, and the costs of various agricultural operations. Purchased inputs include seed, chemical fertilizers and pesticides, including application costs. The farmers purchase all cotton seed from the cooperative at a price set by the government. For other crops like wheat, broad beans, maize and berseem, farmers keep some of their production from the previous year's crop to be used as seed. A small percent of the farmers purchase seed for these crops from the cooperative or other markets. The amount purchased depends on the availability of seed.

The price for sugarcane stock used in the enterprise budgets is an average of the government and market prices. If the new field for sugarcane is in an area of sugarcane production, the farmer will likely purchase the root stock from another farmer. The prices depend on what services are to be provided and are negotiated by the farmers.

Table 11. Average Production per Feddan and Price per Unit for Main Crops and Residues in Abyuha, El Minya 1979/80.

Crops and Residues	Unit	Product/Feddan	Price/Unit
Cotton after berseem			
Cotton unginned	kentar	6.0	38.00
Berseem forage 2 cuts	kerat cut	48.0	2.25
Cotton stalk	camel load	4.0	1.50
Cotton after broad beans			
Cotton unginned	kentar	4.9	38.00
Broad beans grain (gover.)	ardab	2.5	20.00
Broad beans grain (market)	ardab	4.0	24.00
Cotton stalk and bean straw	feddan	1.0	44.00
Maize			
Grain	ardab	8.0	12.00
Leaves for animal feed	feddan	1.0	10.00
Stalks for fuel	camel load	5.0	1.00
Sugarcane (initial crop)			
Sugarcane stalks	ton	30.0	15.00
Broad beans grain	ardab	7.0	33.00
Broad beans straw	feddan	1.0	50.00
Sugarcane (ration)			
Sugarcane stalks	ton	34.0	15.00
Wheat			
Wheat grain	ardab	11.0	13.00
Wheat straw	camel load	8.0	12.00
Broad beans			
Broad bean grain (gover.)	ardab	2.5	35.00
Broad bean grain (market)	ardab	3.5	38.00
Broad bean straw	camel load	5.0	12.00
Berseem long-season			
Berseem forage 4 cuts x 23 kerats	kerat cut	92.0	3.00
Berseem seeds	kela	12.0	4.00
Berseem straw	load	3.0	4.00

Table 12 presents the seeding rate per feddan of each crop and the seed price per unit for crops produced in the Abyuha area.

Chemical fertilizers, nitrogen and phosphorous, are usually purchased for all crops from either the cooperative or the market. The price included in the budgets is the weighted average between government and market prices. The cooperative limits the amount of chemical fertilizer which can be purchased for each crop on a feddan basis. Farmers use more fertilizer for maize than the available allocation from the cooperative. The excess amount is assumed to be purchased in the market where the price of fertilizer is usually about twice the government price. Table 13 presents types and quantity of the chemical fertilizers applied to crops produced in the Abyuha area. The prices for the quantity allocated by the cooperative and the actual amount applied on each crop are included in the table. Notice in Table 13 that there is a difference between the prices of chemical fertilizer used for (cotton, maize) and the other crops. The enterprise budgets for cotton and maize represent 1979 data whereas 1980 data were used for other crops. Market prices for fertilizer was used for maize and broad beans because farmers usually use more than the government allocation of fertilizer.

Insecticides were also used in the production process, especially for cotton. Pesticide use is generally managed by the cooperative. Pesticide costs in the budgets were the average costs per feddan paid by the farmers to the cooperative at time for pesticide application. In 1980 this cost was L.E. 21.80 per feddan.

Labor is the most important input used for carrying out the agricultural operations from planting to harvesting. Table 14 shows agricultural operation costs as a percent of variable costs for each crop. The major aspect of each agricultural operation was divided into labor, machine and animal. Men, women, and children contributed to the labor force. Men carried out specific operations such as turning the tambour

Table 12. Seeding Rates per Feddan and the Value per Unit of Seed, El Minya Project Site, 1979/80.

Crops	Unit	Units/Feddan	Price/Unit*/	Number of Units Recommended by the Government
Cotton	kela	6.0	0.27	6.0
Maize	kela	1.5	1.20	1.5
Wheat	kela	6.0	1.25	6.0
Broad beans	kela	6.0	2.25	6.0
Berseem	kela	1.5	12.00	---
Sugarcane	kerat	2.5	20.00	---

*/ 1979/1980 Prices.

Table 13. Amounts of Fertilizer Applied and Government Quota With Corresponding Prices, for Crops at the El Minya Site, 1979/80.

Crops	Variety of Fertilizer	Kilograms/Feddan		Prices	
		Applied	Government Quota	Government	Market
Cotton	Ammon. Nit. (31-0-0)	200	200	0.051	-
	Super phos. (0-15-0)	100	100	0.027	-
Maize	Ammon. Nit. (31-0-0)	300	275	0.051	0.100
Wheat	Ammon. Nit. (31-0-0)	200	200	0.063	-
Broad beans	Super phos. (0-15-0)	150	250	0.03	0.050
	Ammon. Nit. (31-0-0)	25	25	0.063	-
Berseem	Super phos. (0-15-0)	150	150	0.03	-
Sugarcane	Urea (46-0-0)	275	275	0.05	-

Table 14. Agricultural Operations Costs of the Crop, Labor, Machines and Animals, as a Percent of Variable Costs.

Crops	Agricultural Operations			Total Agricultural Operations Cost as a Percent of Variable Costs
	Labor	Machine	Animal	
	- - - - - - - - - - - Percent - - - - - - - - - - -			
Cotton, berseem	41[1]	5	5	51
Cotton, broad beans	43[2]	6	6	55
Maize	59	0	6	65
Sugarcane, broad beans	42	19[3]	9	70
Sugarcane	61	0	13	74
Wheat	56	17	3	76
Berseem	38	7	7	52
Broad beans	56	13	4	73

The enterprise budgets for cotton and maize were for the 1979 crop year and the others for the 1980 crop year.

[1,2]Does not include the labor costs for picking cotton worms because this cost was included in insecticide application charges from the cooperative.

[3]The percent in machine cost was high because the enterprise budget for the initial sugarcane crop represents a 11 feddan field which was irrigated using a pump.

to lift water, land preparation, planting (cotton, broad beans, sugarcane, maize) hoeing, harvesting wheat, cutting sugarcane and winnowing grain crops. Women and children carried out other operations like weeding, thinning, gathering cotton and peeling sugarcane stalks. The daily wage rates varied for men from L.E. .75 to 1.25 and for women and children from L.E. 0.30 to 0.50 per day. The higher wage rates generally occur at harvest. Machines are used in land preparation for plowing and also at harvest for threshing grain crops. Animals also contribute to the operations in land preparation, for plowing and furrowing. Cows are the most common animal used for farm operations in the Minya area. Donkeys and camels are used for transportation.

Costs of agricultural operations on farms ranged from 51% of total variable costs for the cotton berseem crop to 74% of the total variable costs for sugarcane. A high percentage of the total variable costs was in labor, ranging from 38% for maize to 61% for sugarcane.

The relative importance of agricultural operations and purchased inputs in the cost structure of the alternative enterprise varied. Table 15 shows the distribution of variable costs between agricultural operations and purchased inputs. At least 50 percent of all variable costs are of farm origin. However, for cotton, a relatively high percentage of variable costs were purchased inputs.

A farmer's cash flow increases with increases in purchased inputs; but, his risk-bearing ability decreases since farmers must repay the cooperative and other lenders for purchased inputs at the end of the crop year, regardless of the amount of production. Foregoing returns to labor, animal or machine power contributed by the farm is much easier done than postponing payments on purchased inputs. Hence, risk increases.

Fixed costs included in the enterprise budgets were for land rent and management costs. The land rent in the budgets was estimated at seven

Table 15. Distribution of Variable Costs Between Agricultural Operations and Purchased Inputs Associated With Crop Rotation

Crops	Agricultural Operations				Purchased Inputs				
	Labor	Machine	Animal	%	Seed	Fertilizer	Insecticide	Organic fertilizer	%
Cotton-berseem	54.18	7.00	6.60	51	11.53	20.40	21.80	12.00	49
Cotton-broad beans	66.65	10.00	9.92	56	17.03	18.23	21.80	12.00	44
Sugarcane (initial crop)	162.44	74.00	33.00	70	61.00	23.40	-----	30.00	30
Sugarcane (ratoon)	127.50	-----	27.25	74	-----	24.75	-----	30.00	26
Wheat-maize	85.70	17.00	6.00	72	9.30	32.13	-----	-----	28
Broad beans-maize	93.60	14.00	7.80	71	15.30	32.61	-----	-----	29
Berseem-maize	49.00	3.20	6.30	59	19.80	21.03	-----	-----	41

times the land tax. In 1979-80, 49 percent of the area operated by the nine record keeping farms was rented. The average rental rate per feddan was L.E. 69. In 1980-81 the 15 record keeping farms rented 53 percent of the area operated at an average rent rate of L.E. 69 per feddan. The average of land tax assessed by the government in Abyuha was about L.E. 10.00 per feddan in 1980 and L.E. 11.00 in 1981. Because the land was occupied by different crops during the year, as well as some inter-cropping, land rent was estimated on a monthly rate.

Some land was also rented for a specific crop. The rental charge differs depending on the crop planted with established rents for planting maize, or wheat and maize, or broad beans and maize, and so forth. The average yearly rental rate in 1980 was about L.E. 150.00 per feddan.

The management cost was considered as the farmer's opportunity cost for his time and effort in managing the farm.

IV. ENTERPRISE COMPARISONS

After constructing the enterprise budgets, several between enterprise comparisons can be made. The cost structure of the various enterprises have already been discussed. The following discussion will focus on returns to land, labor and water--the fixed inputs to the farm. In doing so, the residual return after variable production costs are accounted for are assigned to the three categories of fixed inputs.

A. Return per Unit of Land

Since all of the enterprise budgets were constructed on a per feddan basis, return per unit of land can be observed by direct comparison. From the enterprise budgets presented in the appendix, the net income or return above variable and all costs of the crops can be seen.

Table 16 summarizes the net income above variable costs and above all costs of crops per feddan.

Long-season berseem and maize was the most profitable enterprise in the crop rotation. The net income from this rotation was L.E. 250.67 per feddan. It ranked second before the inclusion of fixed costs having a return above variable costs of L.E. 347.67 per feddan. When comparing returns above variable costs, sugarcane (initial crop) appears more profitable than long-season berseem and maize. However, after fixed costs were included, the berseem-maize crop was more profitable mainly due to the fact that sugarcane's growing period before harvest was more than one year in length. Berseem and maize showed a high profitability since each farmer depended on the berseem forage for maintaining his livestock. Sugarcane ratoon ranked fourth in net income above variable costs and ranked third after fixed costs were included, changing positions with cotton and broad beans. Cotton and berseem, wheat and maize, and broad beans and maize maintained their ranking even after fixed costs were included.

A direct comparison of crop earnings per unit of land can be misleading since the production cycle of some crops is only a few months while for other crops the cycle is much longer. Table 17 shows the ranking of the returns for each rotation per month, developed from the enterprise budgets based on a land area of 1 feddan. There was little difference in the rankings of net return per month when compared to the rankings for net return per unit of land.

B. Return per Hour of Labor

The labor force for carrying out the production operations was divided into men, women and children laborers. The enterprise budgets represent these three labor groups in terms of the number of hours worked by each group during the month. Because there was a difference in the type and quantity of work undertaken by each group, the return per hour of labor valued is not especially meaningful. Therefore, returns

Table 16. Total Income, Variable Costs, Fixed Costs and Returns Above Variable and Fixed Costs for Crop Rotations, 1979/80.

Crops	Total income	Variable costs	Net income above V.C.	Rank	Fixed costs	Net income above all costs	Rank
Cotton-berseem	342.00	133.51	208.49	6	79.56	128.93	6
Cotton-broad beans	387.18	155.63	231.56	3	79.56	152.00	4
Sugarcane (initial crop)	755.00	383.84	371.17	1	127.50	243.67	2
Sugarcane (ratoon)	537.20	209.50	327.70	4	90.00	237.70	3
Wheat-maize	350.00	150.13	199.88	7	89.00	110.88	7
Broad bean-maize	391.50	163.31	228.19	5	81.00	147.19	5
Long season berseem-maize	447.00	99.33	347.69	2	97.00	250.67	1

Table 17. Return per Month for Crop Rotations, 1979/80.

Crop	Net return above all costs	Month	Return per month	Rank
Cotton-berseem	128.93	12	10.74	6
Cotton-broad beans	152.00	12	12.67	5
Sugarcane (initial crop)	243.67	17	14.33	3
Sugarcane (ratoon)	237.70	12	18.81	1
Wheat-maize	110.88	12	9.24	7
Broad beans-maize	147.19	12[a]	13.38	4
Berseem-long term maize	250.69	13[b]	19.28	2

[a]Requires 11 months to complete rotation. Land could remain idle for one month.

[b]Requires 13 months to complete rotation. The planting of a subsequent crop may be delayed.

to labor as expressed in terms of the value of labor used was completed. The wage rates used were for men from L.E. .75 to 1.25 per day and for women and children from L.E. .30 to .50 per day. Assuming an average number of five hours worked per day, the average rate per hour was L.E. .20 for men and L.E. .08 for women and children. The return to labor for long-season berseem, Table 18, was very high relative to the other crops. However, since labor for cutting the berseem was not included in the labor cost, a direct comparison of the return to labor for long-season berseem with other crops must be interpreted with care. Maize produced the lowest returns per value of labor followed by the cotton-berseem and cotton-broad beans crop rotation. When the crop rotations were compared, the bottom of Table 18, little difference was evident between rotations.

C. Return per Unit of Water

In Egypt, water is provided without charge to the farmers. Table 19 presents an estimate of the returns per cubic meter of water applied. Berseem gave the highest return of L.E. 0.091 per cubic meter of water applied, wheat and the berseem and maize rotation were second with a return of L.E. 0.05 per cubic meter of water applied, while maize generated the lowest return of L.E. 0.010 per cubic meter of water applied.

D. Summary

Depending on the availability of resources, the relative profitability of enterprises shifts. The analysis indicated that sugarcane had the highest return above variable costs, however when fixed costs were included, the long-season berseem-maize rotation indicated higher returns. When considering that different crops and/or rotations occupied land for different periods, calculating returns for a given unit of land per month did not change the relative rankings of crops/rotations in the analysis.

Table 18. Return per Value of Labor Expended, by Crop, 1979/80.

Crops	Net income	Value of labor use	Return to labor	Rank
Maize	25.78	47.60	0.54	9
Broad beans	121.43	68.60	1.77	3
Wheat	85.10	48.60	1.75	4
Berseem, long season	224.90	20.80*	10.81	1
Crop rotations:				
Cotton-berseem	128.93	150.92	0.85	8
Cotton-broad beans	152.00	161.60	0.94	7
Broad beans-maize	147.21	116.20	1.27	5
Wheat-maize	110.88	96.20	1.15	6
Berseem-maize	250.68	68.40	3.66	2

* Does not include labor for cutting berseem.

Table 19. Return per Cubic Meter of Water Applied for Different Crops, 1979/80.

Crops	Net income	Water applied per cubic meter	Return/ cubic meter	Rank
Maize	25.78	2,500	0.010	8
Wheat	121.43	2,406	0.050	2
Broad beans	85.10	1,810	0.047	3
Berseem	224.90	2,480	0.091	1
Crop rotations:				
Cotton-berseem	128.93	4,850	0.027	6
Cotton-broad beans	152.00	4,450	0.034	4
Wheat-maize	147.21	4,906	0.030	5
Broad beans-maize	110.88	4,310	0.026	7
Berseem-maize	250.68	4,980	0.050	2

Viewing labor as the most limiting resource, long-season berseem, by a large margin, was the most profitable enterprise. Wheat and broad beans also had a high rank in the return per unit of labor analysis.

Under the present pricing conditions for water; i.e., no charge, berseem, wheat and the berseem and maize rotation ranked the highest in returns per cubic meter of water applied. The analysis indicated that maize had the lowest return per cubic meter of water applied.

AMERICAN EQUIVALENTS OF EGYPTIAN ARABIC TERMS AND MEASURES COMMONLY USED IN IRRIGATION WORK

LAND AREA	IN SQ METERS	IN ACRES	IN FEDDANS	IN HECTARES
1 acre	4,046.856	1.000	0.963	0.405
1 feddan	4,200.833	1.038	1.000	0.420
1 hectare (ha)	10,000.000	2.471	2.380	1.000
1 sq. kilometer	100×10^4	247.105	238.048	100.000
1 sq. mile	259×10^6	640.000	616.400	259.000

WATER MEASUREMENTS	FEDDAN-CM	ACRE-FEET	ACRE-INCHES
1 billion m^3	23,809,000.000	810,710.000	
1,000 m^3	23.809	0.811	9.728
1,000 m^3 /Feddan (= 238 mm rainfall)	23.809	0.781	9.372
420 m^3 /Feddan (= 100 mm rainfall)	10.00	0.328	3.936

OTHER CONVERSION		METRIC	U.S.
1 ardab	=	198 liters	5.62 bushels
1 ardab/feddan	=		5.41 bushels/acre
1 kg/feddan	=		2.12 lb/acre
1 donkey load	=	100 kg	
1 camel load	=	250 kg	
1 donkey load of manure	=	0.1 m^3	
1 camel load of manure	=	0.25 m^3	

EGYPTIAN UNITS OF FIELD CROPS

CROP	EG. UNIT	IN KG	IN LBS	IN BUSHELS
Lentils	ardeb	160.0	352.42	5.87
Clover	ardeb	157.0	345.81	5.76
Broadbeans	ardeb	155.0	341.41	6.10
Wheat	ardeb	150.0	330.40	5.51
Maize, Sorghum	ardeb	140.0	308.37	5.51
Barley	ardeb	120.0	264.32	5.51
Cottonseed	ardeb	120.0	264.32	8.26
Sesame	ardeb	120.0	264.32	
Groundnut	ardeb	75.0	165.20	7.51
Rice	dariba	945.0	2081.50	46.26
Chick-peas	ardeb	150.0	330.40	
Lupine	ardeb	150.0	330.40	
Linseed	ardeb	122.0	268.72	
Fenugreek	ardeb	155.0	341.41	
Cotton (unginned)	metric qintar	157.5	346.92	
Cotton (lint or ginned)	metric qintar	50.0	110.13	

EGYPTIAN FARMING AND IRRIGATION TERMS

fara = branch
marwa = small distributer, irrigation ditch
masraf = field drain
mesqa = small canal feeding from 10 to 40 farms
qirat = cf. English "karat", A land measure of 1/24 feddan, 175.03 m^2
qaria = village
sahm = 1/24th of a qirat, 7.29 m^2
saqia = animal powered water wheel
sarf = drain (vb.), or drainage. See also masraf, (n.)

EGYPT WATER USE AND MANAGEMENT PROJECT

PROJECT TECHNICAL REPORTS

NO.	TITLE	AUTHOR
PTR#1	Problem Identification Report for Mansuriya Study Area, 10/77 to 10/78.	By: Egyptian and American Field Teams.
PTR#2	Preliminary Soil Survey Report for the Beni Magdul and El-Hammami Areas.	By: A. D. Dotzenko, M. Zanati, A. A. Abdel Wahed, & A. M. Keleg.
PTR#3	Preliminary Evaluation of Mansuriya Canal System, Giza Governorate, Egypt.	By: American and Egyptian Field Teams.
PTR#5	Economic Costs of Water Shortage Along Branch Canals.	By: A. El Shinnawi M. Skold & M. Nasr
PTR#6	Problem Identification Report For Kafr El-Sheikh Study Area.	Egyptian and American Field Teams.
PTR#7	A Procedure for Evaluating the Cost of Lifting Water for Irrigation in Egypt.	By: H. Wahby, M. Quenemoen, and M. Helal.
PTR#9	Irrigation & Production of Rice in Abu Raya, Kafr El-Sheikh Governorate.	Compiled By: R. Tinsley.
PTR#10	Soil Fertility Survey in Kafr El-Sheikh, El Mansuriya and El-Minya Pilot Projects.	By: Zanati, Soltanpour, Mostafa, & Keleg.
PTR#11	Kafr El-Sheikh Farm Management Survey Crop Enterprise Budgets and Profitability Analysis.	By: M. Haider & F. Abdel Al.
PTR#12	Use of Feasibility Studies in the Selection and Evaluation of Pilot Studies for Alternative Methods of Water Distribution in Egypt.	By: R. McConnen, F. Abdel Al, M. Skold, and G. Ayad.
PTR#13	The Role of Rural Sociologists in an Interdisciplinary, Action-Oriented Project: An Egyptian Case Study.	By: J. Layton and M. Sallam.

NO.	TITLE	AUTHOR
PTR#15	Village Bank Loans to Egyptian Farmers.	By: G. Ayad, M. Skold, and M. Quenemoen.
PTR#18	Population Growth and Development in Egypt: Farmers' and Rural Development Officials' Perspectives.	By: M. Sallam, E.C. Knop and S.A. Knop.
PTR#19	Effective Extension for Egyptian Rural Development: Farmers' and Officials' Views on Alternative Strategies.	By: E.C. Knop, M. Sallam, and S.A. Knop.
PTR#20	The Rotation Water Distribtuion System vs. The Continual Flow Water Distribution System.	By: M. El-Kady, J. Wolfe and H. Wahby.
PTR#21	El-Hammami Pipeline Design.	By: Fort Collins Staff Team.
PTR#22	The Hydraulic Design of Mesqa 10, An Egyptian Irrigation Canal.	By: W.O. Ree, M. El-Kady, J. Wolfe, and W. Fahim.
PTR#23	Farm Record Summary and Analysis for Study Cases at Abyuha, Mansuriya and Abu Raya Sites, 79/80.	By: F. Abdel Al, and M. Skold.
PTR#24	Agricultural Pests and Their Control.	By: E. Attalla.
PTR#26	Social Dimensions of Egyptian Irrigation Patterns.	By: E.C. Knop, M. Sallam, S.A. Knop and M. El-Kady.
PTR#28	Economic Evaluation of Wheat Trials at Abyuha, El-Minya Governorate. Winter 79/80-80/81 in Awad.	By: N. Farrag and E. Sorial.
PTR#29	Irrigation Practices Reported by EWUP Farm Record Keepers.	By: F. Abdel Al, M. Skold and D. Martella.
PTR#30	The Role of Farm Records in the EWUP Project.	By: F. Abdel Al and D. Martella.

NO.	TITLE	AUTHOR
PTR#35	Farm Irrigation System Design.	By: T.W. Ley.
PTR#36	Discharge and Mechanical Efficiency of Egyptian Water-Lifting Wheels.	By: R. Slack, H. Wahby and W. Clyma.
PTR#37	Allocative Efficiency and Equity of Alternative Methods of Charging for Irrigation Water: A Case Study in Egypt.	By: R. Bowen and R. Young.
PTR#38	Precision Land Leveling On Abu Raya Farms, Kafr El-Sheikh Governorate, Egypt.	EWUP Kafr El-Sheikh Team

EYGPT WATER USE AND MANAGEMENT PROJECT MANUALS

NO.	TITLE	AUTHOR
MAN.#1	Trapezoidal Flumes for the Egypt Water Use Project.	By: A. R. Robinson.
MAN.#2	Programs for the HP Computer Model 9825 for EWUP Operations.	By: M. Helal, D. Sunada, J. Loftis, M. Quenemoen, W. Ree, R. McConnen, R. King, A. Nazr and R. Stalford.

TO ACQUIRE REPORTS LISTED IN THE ATTACHED
PLEASE WRITE TO:

EGYPT WATER USE AND MANAGEMENT PROJECT
COLORADO STATE UNIVERSITY
ENGINEERING RESEARCH CENTER
FORT COLLINS, COLORADO 80523

Reports available at nominal cost, plus postage and handling.

APPENDIX

[illegible]

[illegible]

Prepared by: Flip Sperl
Identifier Code: IW-1,Irk-0,F-9
Date Prepared: June, 1981

[illegible] WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total Income or Costs L.E.
Income				
grain GOV. p. (2)	ardab	2.5	35.000	87.50
grain market p.	ardab	3.5	38.000	133.00
beans straw	load	5.0	12.000	60.00
Total Income				280.50
Variable Costs				
plowing & harrowing by tractor	feddan	1.0	8.000	8.00
furrowing by animal	feddan	1.0	3.000	3.00
making ditchs & ridges	man hour	35.0	0.150	5.25
seeds	kela	6.0	2.250	13.50
planting by hand	man hour	65.0	0.150	9.75
Chemical fertilizer		0.0	0.000	0.00
super phosph. (0-15-0) coop.	kg.	150.0	0.030	4.50
" " " market	kg.	100.0	0.050	5.00
ammonium nitrate 31-0-0 coop	kg	25.0	0.063	1.58
" " " market	kg.	50.0	0.100	5.00
labor to spread chemical fer.	man hour	7.0	0.150	1.05
Hoeing by axes	man hour	120.0	0.150	18.00
irrigation by gravity 5x (3)		0.0	0.000	0.00
labor to spread water	man hour	26.0	0.150	3.90
Harvesting		0.0	0.000	0.00
labor for harvesting	man hour	60.0	0.200	12.00
threshing by machine	machine hour	4.0	1.500	6.00
labor for threshing	man hour	12.0	0.250	3.00
winnowing (4)	man hour	15.0	0.650	9.75
Transport the grain	ardab	6.0	0.300	1.80
Total Variable Costs				111.08
Return Above Variable Costs				169.43
Fixed Costs				
Land rent	month	6.0	6.500	39.00
management charge	month	6.0	1.500	9.00
Total Fixed Costs				48.00
Grand Total Costs				159.08
Return Above All Costs				121.43

FOOTNOTES:

* This study for an area of one feddan.
[1] planting time Nov.1 to Nov. 20 harvesting time March 20 to april 20 previous crop is cotton or soya bean
[1] The farmer has to deliver 2.5 ardab per feddan to the credit bank
[3] first irrigation after planting 6 hours
second irrigation before winter closure 5 hours
third irrigation after winter closure 5 hours
fourth irrigation after 18 days 5 hours
fifth irrigation after 19 days 5 days
[4] costs of winnowing half kela grain for each ardab from the production we transfered these costs to man hour

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	0	0	0	0	0	0	0
November	111	0	0	400	0	0	0
December	127	0	0	310	0	0	0
January	0	0	0	0	0	0	0
February	5	0	0	306	0	0	0
March	5	0	0	472	302	0	0
April	70	0	0	0	0	0	0
May	17	0	0	0	0	0	0
June	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
Total	344	0	0	Total Water Applied		1018 cu meters	

FOOTNOTES:

[1] water requirement measured by IWMP

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CROP ENTERPRISE COST STUDY *

BERSEEM at ABUEHA (1), MINYA GOV.

Prepared by: Ella Sorial
Identifier Code: TP-1,Trk-0,F29
Date Prepared: June, 1981

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total Income or Costs L.E.
Income				
4 cuts x 23 kerats	kerat cut	92.0	3.000	276.00
berseem seeds	kela	12.0	4.000	48.00
berseem straw	load	3.0	4.000	12.00
Total Income				336.00
Variable Costs				
seeds	kert c. (2)	1.5	12.000	18.00
labor to spread seeds	man hour	2.0	0.150	0.30
Chemicl fertilizer		0.0	0.000	0.00
super phosphate ((0-15-0)	kg.	150.0	0.030	4.50
labor to spread super phos.	man hour	2.0	0.150	0.30
Irrigation by gravity (3)		0.0	0.000	0.00
labor to spread water	man hour	50.0	0.150	7.50
Harvesting	man hour	50.0	0.150	7.50
transportion	camel load	4.0	0.750	3.00
threshing by machine	camel load	4.0	0.800	3.20
winnowing	kela	0.5	5.000	2.50
transport the seed	ardab	1.0	0.300	0.30
Total Variable Costs				47.10
Return Above Variable Costs				288.90
Fixed Costs				
Land rent	month	8.0	6.500	52.00
management charge	month	8.0	1.500	12.00
Total Fixed Costs				64.00
Grand Total Costs				111.10
Return Above All Costs				224.90

FOOTNOTES:

* This study for an area of one feddan.
(1) planting time is Oct. 15 to Nov. 15 .Harvesting time June 10 to 25 . previous crop is cotton
(2) one kerat cut of green berseem weights 389 kg.
(3) first irrigation at planting time 6 hours
after that one irrigation each 15 days 11x4 hours 44 hours
TOTAL irrigation hours 50 HOURS

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	8	0	0	500	0	0	0
November	10	0	0	180	180	0	0
December	8	0	0	180	180	0	0
January	0	0	0	0	0	0	0
February	8	0	0	180	180	0	0
March	8	0	0	180	180	0	0
April	8	0	0	180	180	0	0
May	4	0	0	180	0	0	0
June	50	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
Total	104	0	0	Total Water Applied=		2400 cu meters	

FOOTNOTES:

(1) Estimation of water requirements based on Mallawy research station data

CROP ENTERPRISE COST STUDY *

WHEAT at ORUEMA (1), MINYA GOV.

Prepared by: Ella Sarial
Identifier Code: IP-1,Irk-0,f27
Date Prepared: June,1981

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total Income or Costs L.E.
Income				
wheat grain	ardab	11.0	13.000	143.00
wheat straw	load	8.0	12.000	96.00
Total Income				239.00
Variable Costs				
plowing & harrowing by tractor	feddan	1.0	8.000	8.00
basins by axes	man hour	30.0	0.150	4.50
super phosphate (0-15-0)	kg.	100.0	0.030	3.00
labor to spread super phos.	man hour	2.0	0.150	0.30
seeds	kela	6.0	1.250	7.50
labor to spread seeds	man hour	2.0	0.150	0.30
weeding	boy hour	50.0	0.080	4.00
ammonium nitrate (31-0-0)	kg.	200.0	0.063	12.60
labor to spread chemical fert.	man hour	2.0	0.150	0.30
Irrigation by gravity (2)		0.0	0.000	0.00
labor to spread water	man hour	36.0	0.150	5.40
Harvesting		0.0	0.000	0.00
labor for harvesting	man hour	100.0	0.250	25.00
threshing by machine	machine hour	6.0	1.500	9.00
labor for thresing	man hour	36.0	0.250	9.00
labor for winnowin (3)	man hour	20.0	0.300	6.00
trasport the grain	ardab	10.0	0.300	3.00
Total Variable Costs				97.90
Return Above Variable Costs				141.10
Fixed Costs				
Land rent	month	7.0	6.500	45.50
management charge	month	7.0	1.500	10.50
Total Fixed Costs				56.00
Grand Total Costs				153.90
Return Above All Costs				85.10

FOOTNOTES:

* This study for an area of one feddan.
(1) planing time is Nov. 20 to Dec. 20 .Harvesting time is May 1 to 25
previos crops cotton or soya-bean
(2) first irrigation after planting 6 hours
second irrigation after 25 days 5 hours
third " " winter closure 5 hours
then 1irrigation each 15 - 20 days (4x5 hours) 20 hours
TOTAL irrigation hours 36 hours
(1) costs of winnowing half kela grain for each ardab from the production . we transfered these costs to man hour

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	0	0	0	0	0	0	0
November	32	0	0	0	0	0	0
December	14	50	0	476	222	0	0
January	0	0	0	0	0	0	0
February	11	0	0	512	232	0	0
March	10	0	0	253	106	0	0
April	0	0	0	305	0	0	0
May	136	0	0	0	0	0	0
June	20	0	0	0	0	0	0
July	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0
Total	223	50	0	Total Water Applied:		2406 cu meters	

FOOTNOTES:

(1) Water requirement measured by EWUP.

CROP ENTERPRISE COST STUDY *

SUGARCANE MOTHER PLANT AT ABUGUIG AREA (1)

Prepared by: Elia Sorial
Identifier Code: 1P3,TRK0,F1
Date Prepared: March 1981

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total income or Costs L.E.
Income				
Broad beans grain	ardab	7.0	33.000	231.00
broad beans straw	fed.	1.0	50.000	50.00
Sugarcane stalks	Ton (2)	30.0	15.800	474.00
Total Income				755.00
Variable Costs				
Land preparation		0.0	0.000	0.00
manure inc. transportation	m3	30.0	1.000	30.00
spread manure	man h.	15.0	0.150	2.25
plowing by tractor	fed.	1.0	6.000	6.00
furrowing by baladi plow	fed.	1.0	3.000	3.00
Prepare the planting stalks		0.0	0.000	0.00
cut the stalks	man h.	15.0	0.150	2.25
peeling the stalks	boy h.	45.0	0.070	3.15
transport planting stalks	load	20.0	0.500	10.00
Seeds		0.0	0.000	0.00
sugarcane stem cuttings	kerat	2.5	20.000	50.00
broad beans seeds	kelo	5.5	2.000	11.00
planting	man h.	74.0	0.150	11.10
	boy h.	20.0	0.060	1.20
Operations for broad beans		0.0	0.000	0.00
hoeing	man h.	62.0	0.150	9.30
Chemical fertilizer		0.0	0.000	0.00
ammonium nitrate 46-0-0	kg.	43.0	0.090	3.87
spread nitrate	man h.	1.0	0.200	0.20
Irrigation beans & sugarcane		0.0	0.000	0.00
pump rent	fed.	1.0	60.000	60.00
labor to spread water	man h.	92.0	0.180	16.56
harvesting broad beans		0.0	0.000	0.00
labors for harvesting	man h.	75.0	0.150	11.25
threshing by machine	fed.	1.0	5.000	5.00
labor for threshing	man h.	19.0	0.200	3.80
labor for winnowing	kelo	3.5	2.750	9.63
Operations for sugarcane		0.0	1.000	0.00
Refurrowing by baladi plow	fed.	1.0	3.000	3.00
Hoeing & weeding	man h.	100.0	0.150	15.00
Chemical fertilizer		0.0	0.000	0.00
ammonium nitrate 46-0-0	kg.	217.0	0.090	19.53
spread nitrate	man h.	5.0	0.150	0.75
Harvesting for sugarcane (3)		0.0	0.000	0.00
cut the stalks	man h.	80.0	0.200	16.00
peeling the stals	boy h.	500.0	0.080	40.00
loading camels	man h.	40.0	0.200	8.00
transport. to the road	camel h.	80.0	0.250	20.00
loading the cars	Ton	30.0	0.400	12.00
Total Variable Costs				383.84
Return Above Variable Costs				371.17
Fixed Costs				
Land Rent	month	17.0	6.500	110.50
Management charge	month	17.0	1.000	17.00
Total Fixed Costs				127.50
Grand Total Costs				511.34
Return Above All Costs				243.67

FOOTNOTES:

* This study for an area of one feddan.

(1) Mother plant refers to the period from initial planting to the first harvest, planting time last week of Oct. to the 1st one of Nov., harvesting time after about 15 month from planting time

(2) One ton of sugarcane produces 100 to 105 kg. sugar

(3) Harvest time continue about 3 month during the season due to the factory needs, so if the farmer rent his field early till end of Feb. he can use the cost of cutting & peeling the stalks because the labors use the upper part of stalks for feeding animals, cut sugarcane at 10% sugar

CROP ENTERPRISE COST STUDY *

SUGARCANE AFTER MOTHER PLANT AT ABUOMA (1)

Prepared by: Ella Sorial
Identifier Code: TP3,TRKO,F3
Date Prepared: Jun., 1981

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total income or Costs L.E.
Income				
Sugarcane stalks	Ton	34.0	15.800	537.20
Total Income				537.20
Variable Costs				
Manure inc. transportation	m3	30.0	1.000	30.00
spread manure	man h.	15.0	0.150	2.25
Furrowing by baladi plow	fed.	1.0	3.500	3.50
Making ditchs & ridges	man h.	35.0	0.150	5.25
Hoeing & weeding	man h.	35.0	0.150	5.25
Chemical fertilizer		0.0	0.000	0.00
ammonuim nitrate 46-0-0	kg.	275.0	0.090	24.75
spread nitrate	man h.	5.0	0.150	0.75
Irrigatio 20 times		0.0	0.000	0.00
labor to spread water	man h.	140.0	0.180	25.20
Harvesting		0.0	0.000	0.00
cut the stalks	man h.	95.0	0.200	19.00
peeling the stalks	boy h.	585.0	0.080	46.80
loading camels	man h.	47.0	0.200	9.40
transport. to the road	camel h.	95.0	0.250	23.75
loading the cars	Ton	34.0	0.400	13.60
Total Variable Costs				209.50
Return Above Variable Costs				327.70
Fixed Costs				
Land rent	month	12.0	6.500	78.00
Management charge	month	12.0	1.000	12.00
Total Fixed Costs				90.00
Grand Total Costs				299.50
Return Above All Costs				237.70

FOOTNOTES:

* This study for an area of one feddan.
(1) Mother plant refers to the period from initial planting to the first harvest, after mother plant means any generation after first production of sugarcane, its period about 12 months from the last harvest. The average staying period of sugarcane on the land 6 years from the mother plant to the last ratoon.

CROP ENTERPRISE COST STUDY *
MAIZE AT ABUEMA, MINYA GVT. (1)

Prepared by: Elin Sorial & Quenemoen
Identifier Code: IP-1,Trk-0,F25
Date Prepared: February 27,1980

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per Unit L.E.	Total Income or Costs L.E.
Income				
Grain	ardab	8.0	12.000	96.00
Leaves fore animal	feddan	1.0	10.000	10.00
feed		0.0	0.000	0.00
Stalks for fuel	camel load	5.0	1.000	5.00
Total Income				111.00
Variable Costs				
Planting by hand & axes	man hour	30.0	0.120	3.60
Seeds	kela	1.5	1.200	1.80
Hoeing 3x (2)	man hour	100.0	0.120	12.00
Labor for thinning	" "	10.0	0.120	1.20
Ammonium nitrate 31-0-0 (coop)	kg	275.0	0.051	14.03
" " " (Market)	kg	25.0	0.100	2.50
Labor to put fertilizer 3x (3)	man hour	15.0	0.120	1.80
Irrigation by gravity 8x (4)	" "	50.0	0.120	6.00
Harvesting		0.0	0.000	0.00
cut the stalks	man hour	10.0	0.120	1.20
pick the ears	" "	15.0	0.120	1.80
Transport stalks to village	camel load	5.0	0.500	2.50
transport ears to village	donkey hour	10.0	0.050	0.50
boy to drive donky	boy hour	10.0	0.050	0.50
shell corn by hand	woma hour	40.0	0.070	2.80
Total Variable Costs				52.23
Return Above Variable Costs				58.70
Fixed Costs				
Rent	month	5.0	5.600	28.00
Management	month	5.0	1.000	5.00
Total Fixed Costs				33.00
Grand Total Costs				85.23
Return Above All Costs				25.70

FOOTNOTES:

* This study for an area of one feddan.
(1) Planting date June 1. Harvesting time Sep. 20
previous crop Broad-beans, Wheat or Berseem
(2) Most farmers do not plow so first hoeing after 12 days from planting
(3) Putting fertilizer after each hoeinng
(4) Irrigation after planting 8 hours
" each 15 days (7x6 hours) 42 hours
Total Irrigation hours 50 hours

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	15	20	5	0	0	0	0
November	0	0	0	0	0	0	0
December	0	0	0	0	0	0	0
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0
June	97	0	0	400	300	0	0
July	47	0	0	300	300	0	0
August	47	0	0	300	300	0	0
September	10	20	5	300	300	0	0
Total	218	40	10	Total Water Applied=		2500 cu meters	

FOOTNOTES:

(1) Water requirements estimated fom Malawi Agri. Research Station data. The amounts have not been measured by EWUP

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CROP ENTERPRISE COST STUDY *

COTTON-BROADBEAN-FENUGREEK, ORUEHA, MENYA GOV

Prepared by: Elin Serial & Dunemann
Identifier Code: [illegible]
Date Prepared: February 28, 1980

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total income or Costs L.E.
Income				
Breadbeans (govt.)	ardab	2.5	20.000	50.00
" " (market)	ardab	4.0	24.000	96.00
Fenugreek	kata	6.0	2.000	12.00
Cotton, unginned	kantar	4.9	38.000	184.30
Cotton Stk & Bean Stw	feddan	1.0	44.880	44.88
Total Income				387.18
Variable Costs				
Plow & level by tractor 2x (1)	feddan	1.0	7.000	7.00
Ferrow by animals	feddan	1.0	2.500	2.50
Make ditches and ridges	man hour	20.0	0.100	2.00
Breadbean seed	kata	6.0	2.500	15.00
Fenugreek seed	kata	0.3	2.000	0.50
Broadcast seeds (2)	man hour	1.0	0.250	0.25
Organic fertilizer	cubic meter	20.0	0.600	12.00
Spread fertilizer	man hour	10.0	0.100	1.00
Super phosphate (0-15-0)	kg	150.0	0.027	4.05
Ammonium nitrate (31-0-0)	kg	25.0	0.051	1.28
Spread chemical fertilizer	man hour	2.0	0.120	0.24
Hoeing	man hour	50.0	0.100	5.00
Irrigation by gravity 4x	man hour	20.0	0.100	2.00
Cut beans & fenugreek	man hour	60.0	0.100	6.00
Threshing by machine	machine hour	2.0	1.500	3.00
Labor for threshing	man hour	6.0	0.500	3.00
Winnowing by contract	feddan	1.0	3.500	3.50
Transportation, seeds & straw	feddan	1.0	4.400	4.40
Plant cotton on bean furrows	man hour	20.0	0.100	2.00
Cotton seeds (3)	kata	6.0	0.255	1.53
Hoeing 3x	man hour	150.0	0.100	15.00
Thinning	boy hour	50.0	0.050	2.50
Super phosphate (0-15-0)	kg	100.0	0.027	2.70
Ammonium nitrate (31-0-0)	kg	200.0	0.051	10.20
Spread fertilizer	man hour	4.0	0.120	0.48
Insect control by cooperative	feddan	1.0	21.000	21.00
Irrigation by gravity 9x	man hour	45.0	0.100	4.50
Gather cotton (4)	pound	1718.0	0.010	17.18
Transport cotton to village	camel load	2.0	0.700	1.40
Cut stalks	man hour	20.0	0.100	2.00
Transport stalks to village	camel load	3.0	0.540	1.62
Total Variable Costs				155.63
Return Above Variable Costs				231.56
Fixed Costs				
Rent	month	12.0	5.630	67.56
Management	month	12.0	1.000	12.00
Total Fixed Costs				79.56
Grand Total Costs				235.19
Return Above All Costs				152.00

FOOTNOTES:

* This study for an area of one feddan.
(1) Previous crop maize or sunflower.
(2) Planting date November 1. Most farmers put seed by axe and hand.
(3) Planting date April 20. Harvesting will begin September 25.
(4) Picking labor is paid L.E. 0.01 per pound.

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	52	105	105	0	0	0	0
November	18	0	40	400	0	0	0
December	55	0	0	300	0	0	0
January	0	0	0	0	0	0	0
February	5	0	0	300	0	0	0
March	5	0	0	300	0	0	0
April	113	0	0	350	0	0	0
May	187	0	80	350	0	0	0
June	62	0	180	350	350	0	0
July	60	0	150	350	350	0	0
August	10	0	0	350	350	0	0
September	5	65	65	350	0	0	0
Total	492	170	620	Total Water Applied		4450 cu meters	

CROP ENTERPRISE COST STUDY *

COTTON-BERSEEM, ABUEHA, MINYA GOV

Prepared by: Elie Serial & Ovanessian
Identifier Code: [illegible]
Date Prepared: February 28,1980

EGYPT WATER USE & MANAGEMENT PROJECT

Item	Unit	Number of Units	Price or Value per unit L.E.	Total Income or Costs L.E.
Income				
Berseem, 1st cut (1)	berat cut(2)	24.0	2.000	48.00
Berseem, 2nd cut	berat cut	24.0	2.500	60.00
Cotton, unginned	kantar	6.0	38.000	228.00
Cotton stalks	camel load	4.0	1.500	6.00
Total Income				342.00
Variable Costs				
BERSEEM		0.0	0.000	0.00
Berseem seed (3)	kuta	2.0	5.000	10.00
Labor to spread seeds	man hour	1.0	0.100	0.10
Irrigation by gravity 6x	man hour	30.0	0.100	3.00
Super-phos (0-15-0) free mkt	kg	150.0	0.050	7.50
Spread super-phosphate	man hour	2.0	0.100	0.20
COTTON		0.0	0.000	0.00
Organic fertilizer (4)	cubic meter	20.0	0.600	12.00
Labor to spread organic fert	man hour	10.0	0.100	1.00
Plowing by tractor 2x	feddan	1.0	6.000	6.00
Leveling by tractor	feddan	1.0	[illegible]	1.00
Furrowing by animal, 12/kasaba	feddan	1.0	2.500	2.50
Make ditches & ridges	man hour	20.0	0.100	2.00
Irrigation before planting	man hour	5.0	0.100	0.50
Irrigation by gravity 10x	man hour	50.0	0.100	5.00
Hoeing before planting	man hour	50.0	0.100	5.00
Plant cotton (5)	man hour	20.0	0.100	2.00
Cotton seeds	kuta	6.0	0.255	1.53
Hoeing 3x	man hour	150.0	0.100	15.00
Thinning	boy hour	50.0	0.050	2.50
Super phos.(0-15-0) from coop.	kg	100.0	0.027	2.70
Ammonium nitrate (31-0-0)	kg	200.0	0.051	10.20
Spread fertilizer	man hour	5.0	0.100	0.50
Insect control by coop	feddan	1.0	21.000	21.00
Gather cotton (6)	pound	2126.0	0.007	14.00
Transport cotton to village	camel load	3.0	0.700	2.10
Cut stalks	man hour	25.0	0.100	2.50
Transport stalks to village	camel load	4.0	0.500	2.00
Total Variable Costs				133.51
Return Above Variable Costs				208.49
Fixed Costs				
Rent	month	12.0	5.630	67.56
Management	month	12.0	1.000	12.00
Total Fixed Costs				79.56
Grand Total Costs				213.07
Return Above All Costs				128.93

FOOTNOTES:

* This study for an area of one feddan.
(1) Previous crop maize or sunflower.
(2) Berseem is priced standing in the field.
(3) Planting date is October 1. Harvest will end February 15.
(4) Organic fertilizer is transported from the village. Cost includes labor and animals for transport.
(5) Planting date is March 10. Harvesting will begin September 5.
(6) Picking labor is paid L.E. 0.007 per pound. Labor cost increases later in September.

	LABOR DISTRIBUTION			WATER DISTRIBUTION, CU METERS			
	Man Hours	Woman Hours	Boy/Girl Hours	First Irrig.	Second Irrig.	Third Irrig.	Fourth Irrig.
October	13	0	0	300	200	0	0
November	10	0	0	200	200	0	0
December	[illegible]	0	0	200	0	0	0
January	0	0	0	0	0	0	0
February	18	0	40	200	0	0	0
March	103	0	0	400	0	0	0
April	57	0	50	350	0	0	0
May	110	0	90	350	350	0	0
June	18	0	100	350	350	0	0
July	13	0	150	350	350	0	0
August	10	0	0	350	350	0	0
September	.32	212	212	0	0	0	0
Total	381	212	722	Total Water Applied=		4850 cu meters	

FOOTNOTES:

(1) Water requirements estimated from Malawi Agricultural Research Station data. The amounts have not been measured by EWUP.