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Farm Income as an Incentive for Agricultural Graduate Farmers Settled in the Reclaimed Land of Egypt

BY

IBRAHIM SOLIMAN AND SHAWEY IMAM

Dept. Econ. Faculty of Agricultural, Zagazig University

ABSTRACT

In 1977 the government has started to distribute the reclaimed land among agricultural graduates. Only during first year of settlement, the graduates received support from the government in terms of grants and credit and some facilities. The survey was conducted in south-Tahrir area during 1984 with a proportional stratified random sample of 100 graduated farmers. The purpose of such study is to evaluate the farm income as an incentive for the graduates settled in the reclaimed land area . Farm size is 30f .(traditional crops) or 15f (citrus or fruits) for a university graduate, and 20f or 10f . for a high school graduate . several farms have changed the original cropping pattern leading to a wide range of citrus yield among farmers and excess demand for water. The normal profit per feddan ranged between L.E-85.6(barley) and L.E 973.4 (strawberry). Wages of hired labor represent more than 50% of the variable costs (62% for wheat, 79% for barley). the graduates asked for mechanization and other incentives to solve the problem of labor and costs . the major constraints in production are the supply shortage of irrigation water machinery seeds and fertilizers in addition to the land of desert development know –how and the problems in livestock production from different cropping patterns with and only the crops that showed a normal profit above the poverty line (L.E 2193 per year). The proposed crops are citrus. Straw berry, Alfalfa, lupines and peas, and no traditional corps.

Introduction

Over the period 1952/1982 a total area of about 1.03 million feddan has been reclaimed in Egypt. It is proposed to reclaim an additional new area of about 2-8 million feddan up to the year 2000(1). This new area will help in creating an opportunity for settlement of new agricultural communities, in addition to its role in the management of the increasing food gap. The level of the income generated is the effective criteria for the success of employment and settlement (2) in rural community development.

Recently, in 1977 the government has started to distribute the reclaimed land among agricultural graduates to increase employment opportunities for their noticeable surplus and to take advantage of their high receptivity to new technology. This study concerns investigation and appraisal of such rural development experience of Egypt.

A previous study had almost similar of the current study (3). Whereas it evaluated the agricultural year 1979/1980 (i.e. only two years after the onset of such experiment), the current one evaluated the performances after seven years of the graduates settlement.

The land was sold to the graduate holder at L.E. 300 per feddan to be repaid in installment over 20 years. The graduate received additional support from the government in terms of grants and credits and some facilities, only during the first year of settlement. The government criteria determining the farm size distributed among the graduates is based on the educational degree of each and the soil fertility of the land. Land under citrus and other fruit trees is considered more fertile than land under traditional crops. Accordingly, land allocated to a university graduate is around 30m feddan, if cultivated with traditional crops and 15 feddan if cultivated with citrus or other fruits. On the hand, agricultural high school graduate received about 20 feddan of land occupied with traditional crops or 10 feddan of land occupied with citrus and other fruits.

DATA BASE

The selected site to apply the current survey was the south tahrir area (approx. 75 km to the North West desert of Cairo). It is one of the oldest new agricultural communities in Egypt. The water sources are a main Canal from the Nile River and the ground water. The survey was conducted during the summer of 1984 to concern the agricultural season 1983/1984. A proportional stratified random sample of 100 farmers was drawn to represent 20% of the total population of 498 graduates in the area. The sample frame were divided into three specific categories according to the farm size , i.e. 9 to 15 feddan, more than 15 to less than 25 feddan and more than 25 feddan. Other sources of data collection

included some information from graduate leaders and senior government officials in the area. of the 100 graduates covered by the survey, 42 hold a university degree and 58 are graduates of agricultural high schools.

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LAND USE PATTERN

The average farm size per holding was 23.83 feddan, of which: uncultivated area (10.88 feddan) and 11.43 cultivated low fertile area, i.e. only one-half of the land is fertile. Obviously, this is a constraint in diversifying the cropping pattern or increasing the productivity, or at least it raises the fertilization consumption rate, and consequently, the cost of production, in order to reach a profitable yield.

Several farms have changed the original cropping pattern towards other pattern this issue may explain the wide range of the citrus yield among the farmers. In addition, changing the cropping leads to excess demand for water in comparison with originally designed water supply capacity. The total cropped area is shown in table (1), the average is around 24.37 feddan, i.e. the cropping intensity coefficient is between 1.09 (based on the cultivatable area) to 1.02 (based on the average farm size) . This is a relatively low level of intensification in comparison with the national average level which is 1.9. If the perennial crops area is excluded, the winter season area then represents 150% of the summer season area. This is evidence that the berseem and lupines area intercropped crops or cultivated as green manure and / or cultivated as winter fodder for livestock. Low crop intensity in summer may be.

Table (1): cropping patterns of the graduate farms in south Tahrir (1983/1984)

crop	%of ho	Cropped area		Average crop
		Total area	%	
1- perennial crops				
Alfalfa	16	12	3.4	0.12
Citrus	29	272	70.0	2.72
Others	10	102	26.6	1.02
Total		**386**	**100**	**3.86**
2- winter season				
Field crops				
Berseem	79	466	77.5	4.66
Lupines	45	89	14.8	0.89
Barley	20	2	0.3	0.02
Wheat	12	2	0.3	0.02
Beans	8	2	7.1	0.42
SUBTOTAL		601	100	6.01
VEGETABLES				
Green peas	78	632	98.8	6.32
Tomatoes	2	8	1.2	0.08
SUBTOTAL		640	100	6.40
TOTAL(2)		**1241**		**12.41**
3- Summer season				
Field crops				
Groundnuts	83	800	100	8.0
Vegetables				
Watermelon	5	7	70	0.07
Squash	1	1	10	0.01
Eggplant	28	2	20	0.02
SUBTOTAL		10	100	8.10
TOTAL(3)		**810**		**8.10**
GRAND TOTAL		**2437**		**24.37**

Attributed to water supply shortages during this hot season. From table (1), the most common crops in winter are; Berseem, peas and lupines. The most common summer crops is groundnuts, the most common permanent crops is citrus. The food grains like wheat and barley are cultivated by less than one fifth of the farmers on very small areas. Even though are not profitability (table 4) . Those who cultivated such crops are mainly concerned with straw for livestock rather than the profitability of the crop itself. It seems difficult to get straw in such areas at reasonable price. Thus, the by-product is more important than the grains.

Surprisingly, only 2% of the farmers cultivate tomatoes. The farmers in south Tahrir postulate that nematodes infection was the main problem behind such decision. The marketing problem is probably behind such limited expansion in the tomatoes in south Tahrir. Another possibility is that the graduates could not obtain the high yield varieties available to other new land area (4).

If we exclude intercropped area, the cultivable area holding would be around 20 feddan, which represents a cropping intensity coefficient less than unity is it water supply shortage, soil characteristics or finance inadequacy which lower the cropping intensity? It seems that these entire variables contribute to the existing low cropping intensity.

Furthermore, seasonal intercropping with permanent crops is, probably, due to finance inadequacies. This is because to grow seasonal crops under fruit trees, for example, are a source of current income over the fruit years till the trees bear fruits. The absence of ownership title creates serious problem for graduates, especially, with respect to availability of credit facilities. The lack of land ownership bank titles deprives graduates in reclaimed lands form medium term credits obtainable form the principal bank for development and agricultural credits. Furthermore, these graduates receive low priority in security scare inputs as compared to those who have land titles. Furthermore lack of land titles creates a number of social and psychological problems which would, negatively, affect the degree of social adjustment and sense of belonging to their new communities, the degree of support form other government agencies and the degree of participation in developing their communities through self-help projects.

CROP PRODUCTION EFFICIENCY

Analysis of the agricultural production efficient is limited here to the following efficiency measures yield per feddan, normal profit, Breakeven of technology.

Crop yield per feddan:

The yield of each crop per feddan shown by the current survey (1984) for the graduate farmers in south Tahrir was compared with the yield of the same group of farmers in 1980 (3) and also with the national average in 1984.

The yield of wheat barley, groundnuts; green peas and watermelons in 1984 overpasses the yield per feddan reached by the same group of farmers in 1980,even though it was less than 50% of the national average in 1984 (except groundnuts and watermelons). This is because the area is heavily infested with nematodes and intensive weeds growth of different types. These factors magnify the negative effect of low soil fertility and low irrigation capacity. Groundnuts reached almost the national average but it should be of higher yield in such sandy soil (4). Although the watermelons yield of those farmers reached 160% the national average most of its area was cultivated as seed crop for human consumption because many citrus trees were too young the yield did not change much between 1980 and 1980. The newly introduced vegetables did not reach even 20% of the national average in 1984. Strawberry showed a very reasonable yield in 1984, i.e. 71% of the national average (table 2).

Normal profit per feddan

The yield is a necessary but not a sufficient measure of the production efficiency cost and benefit measures are the sufficient measure to judge the success of a given crop. Since all input costs, particular machinery, were calculated at the market price, there is not need to calculate depreciation costs for such assets. However, two items that represent fixed costs were imputed, these are the rent share per feddan and the opportunity costs of the capital invested (the variable costs). The average rent per feddan in the area is L.E. 70 per year. The share per season (winter or summer) is L.E. 35 for perennial crops it is a year's rent, i.e. L.E 70.

TABLE 2: crop on the graduate farms in 1984 relative to 1980 And the national average in 1984.

Crops	Yield(tons)per feddan			(2)-(1) 100×	(2)-(3) 100×
	South 1980 (1)	Tahrir 1984 (2)	National Average (3)		
Wheat	.45	.75	1.5	166.7	49.6
Barley	.43	.75	1.4		
Lupines	.84	.255	.316	30.3	40.3
Groundnuts	.51	.75	.8	147.1	93.7
Green peas	.84	1.5	3.88	178.6	38.7
Watermelon	2.0	15.1	9.5	755.0	159.1
Squash	-	2.0	7.74	-	25.8
Eggplant	-	.46	8.93	-	4.5
Strawberry	-	4.0	5.62	-	71.2
Alfalfa	-	20.7	40.0	-	51.7 Cit
2.76 2.8 - 101.4					
No available		.			

(1) Pacific Consultants, wash . D.C USA, New land productivity in Egypt Technical and Economic feasibility: working paper No.1 crop budget and farm plants. January, 1980.
(2) The study's survey
(3) Ministry of agricultural (Egypt): central department for agricultural Economic and statistics.
The interest rate (bank rate) was assumed to be 13.25% per year, i.e. 6.125% per season (winter or summer).

Table (3) , showed that all crops , except barley , wheat and squash, provide a positive normal profit the highest normal profit in winter is provided by lupines followed by peas and the highest normal profit in summer is obtained from watermelon followed by groundnuts. Strawberry shows an outstanding normal profit. However, it is very expensive in terms of costs production and its marketing may face difficulties alfalfa is a very profitable cash crop around the year.

Table (3)

Crop	Tot Retu L.I	Tota Variab Costs pe	Fixed costs per feddar			Total c variable + L.E.	Normal p per fed L.E
			Re Sha Pe cro	Intere Costs of variable	To L.I		
1. field crops*							
A. winter							
Lupins	269.7	120.9	35	8.0	43.0	163.9	105.8
Barley	150.0	188.1	35	12.5	47.5	235.6	(-85.6)
Wheat	130.0	166.0	35	11.0	46.0	212.0	(-82.0)
B. summer							
Groundnut	274.7	198.5	35	13.2	48.2	246.7	28.0
2. vegetables							
1. winter							
Peas	277.0	154	35	10.2	45.2	199.2	77.8
2. summer							
Watermelon	171.4	90.0	35	6.0	41.0	131.0	40.0
Squash	140.0	145.0	35	9.6	44.6	189.6	(-49.6)
Eggplant	100	51.0	35	3.4	38.4	89.4	10.6
3. fruit							
Citrus	399.3	170.2	70	11.3	81.3	251.5	147.8
Strawberry	2000.0	930.0	35	61.6	96.6	1026.6	973.40
4. fodders							
Alfalfa	267.7	50.6	70	6.7	76.6	127.31	140.4

<u>Level of technology</u>:

The graduate farmers hire all labor required. Human labor is expensive. Percentage of labor (including harvesting) of total variable costs per each investigated crop shows two indicators (table4):a)labor represents around one-half or more of the variable costs of most crops: and b)some crops of negative normal profit. Like wheat and barley, show that labor costs are between 62%and 79% of the variable costs.

Accordingly, appropriate mechanization techniques are required in order to minimize dependence upon human labor and to diminish costs of production. In the case of alfalfa where labor (mainly harvesting) costs represent 48% of the total variable costs, it is clear that grazing-feeding is much cheaper than non-grazing.

The survey data showed that the labor pattern used by the graduate farmers is as follows: 41% hired permanent labor , 52% hired seasonal labor and only 5%

unpaid family labor 2% paid family labor the graduate depend , to a great extent, upon middlemen to provide hired labor . the graduates believe that the availability of mechanization and providing enough incentive to encourage new settlers will solve the labor supply shortage and cut the costs significantly.

In this respect, it is important to specify the labor-mechanization socio-economic relationships. This type of study is not available per se. however; there are some important indicators from the survey –concerning the machinery use. (a). The highest proportion of owned machinery are tractors . Harvesters, and spraying motors and c) the demand for irrigation machines is very low (4%of the graduates own irrigation machines). This, very probably is due to the fact that most of the graduates are already supplied with semi-portable irrigation systems.

Table (4): percentage of labor and harvesting costs in total variable costs for some crops

The crops	total variable costs/fed.(L.E)	labor costs(1)%
Lupines	121	39.2
Barley	188	79.1
Wheat	166	61.7
Groundnuts	199	41.2
Green peas	154	48.9
Watermelon	90	22.2
Squash	145	48.3
Eggplant	?	
Citrus	170	40.8
Strawberry	930	21.5
Alfalfa	51	48.0

(1)=labor costs +harvesting costs
Not-available

MAJOR CONSTRAINTS IN CROP PRODUCTION

The farmers voiced their ideas concerning the constraints and the solutions that could overcome them .they gave the supply shortage of irrigation water. Machinery seeds and fertilizers the first priorities availability of efficient credits system could solve the lack of capital inputs availability. Irrigation and water supply require substantial improvement: most of the factors which limit the

irrigation water supply and /or the irrigation efficiency are in need of governmental actions .as follows :(a) inefficiency of the government irrigation pumping stations and irregularity of irrigation schedule plus few operating hours. Together, represent inefficiency in the government manages operation to provide the water supply, to explain this issue one needs to mention that: 1. the pumping stations maintenance and replacement program is very poor . 2. the original design of the pumps capacity was according to a given proposed cropping pattern later and after land distribution . The farmers cultivates different cropping patterns and the water

Table (5): average hard composition per livestock holding of the graduate farmers.

Type of animal	Purpose of keeping	Average number of heads per farmers		
		milking	others	total
Cattle	fattening	0.0	.94	.94
	Only milk	.59	.03	.62
milk and meat	.63	.36	1.62	
Buffaloes	fattening	0.0	.10	.10
	Only milk	0.57	.06	.63
	Milk and meat	0.24	0.25	.49
Sheep & goats	meat	0.0	3.67	3.67

Table(6) shows the average gross output and costs per milking head. From this table the normal profit per milking head is around L.E.732. from table 3 one feddan of alfalfa generates a normal profit equals L.E.140. since the carrying capacity is one milking cow + followers per 4 feddan of alfalfa , therefore the income foregone due to raising one milking cow is LE 140 * 4 = 560L.E.
Accordingly the net additional income per one feddan of alfalfa due to raising dairy herd on such area is 43L.E.

MAJOR LIVESTSTOCK PRODUCTION CONSTRAINTS

The graduate farmers who hold livestock suffer from poor veterinary service and lack of roughage feeds and concentrates. However, the first priority demand is to improve the milk marketing facilities. Where as
Milk marketing problems are the first obstacle by the graduate farmers in south Tahrir , the milk supply estimated presented earlier show that the 500 holders in the area can provide daily about 3.25 tons cow milk and 1.56 tons buffalo milk. This daily supply is feasible to establish a milk processing plant in the area. There are no milk collection points in the area, in spite the long distance from the markets plus the unfair transaction with the traders. The graduate farmers

have the attitude to support the efforts to overcome the marketing constraints, which in turn is an approach towards increasing the production supply.

FARM INCOME AS INCENTIVE FOR GRADUATE FARMERS

In order to formulated an appropriate economic for graduates family to settle in the new community of south Tahrir . it is necessary to evaluate the net income generated from different cropping patterns with and without livestock. The proposed cropping patterns of a typical farm size (20 feddan) present in table 7 include only the crops that showed a normal profit (table 3) above the property line as a minimum standard of living. The poverty line has been estimated as L.E 36.55 per capital per month (5) I.e. L.E. 2193 per year for a farm (20 feddan) held by a household of 5 persons. In other worlds the share per feddan should not be less than L.E. (110) per year (L.E 55) per season.

The crops that give a normal profit per feddan above the poverty line (as presented in table 3)
Are citrus, strawberry, alfalfa, lupines and peas? Though groundnuts is the common summer crops in south Tahrir, its normal profit does not reach L.E. 55 per feddan .and accordingly, it is excluded. However, groundnuts it is a very profitable crop in other new land and sandy soils (4). Is it a problem of marketing (low prices or poor grading) or poor productivity in south Tahrir? This needs further study.

Results of table (6) were also used to estimate the normal profit per milking cow, and consequently per feddan of alfalfa (one milking cow and its followers are raised on 4 feddan of alfalfa). This estimate was introduced in the proposed models of the cropping pattern. From table 3 although strawberry generates the highest income per feddan (L.E. 973) . it is not possible to keep all the land under strawberry , at least , because of marketing difficulties and the very high costs per feddan (around L.E. 1027) . Lupines are not an important marketable crop and it provides the lowest income level above the poverty line. Therefore, the most recommended crops to provide income as an incentive for the graduate farmers are: strawberry on limited area, Citrus and alfalfa and milking cows.

The average per capita income on the national base was around L.E 500 in 1984, I.e. L.E. 2500per household (5%) per year . accordingly , from table 7 , the 100% citrus farm provides 118.2% of the average national income , the 100%alfalfa – milking cows linkage provides 146.4% of the average national income and a mixed farm of citrus (25%) .alfalfa-livestock (50%) and strawberry (25%) provides 297.4% of the average national income per

household . even though , the following notes should be cited: a)some current cultivated crops suffer from low selling net income b)there is a good possibility in improving the yield of the chosen crops patterns and c) higher yield of alfalfa and using the non-conventional feeds will cause substantial increase in the livestock feed generated net income . d) may farms have recently established their citrus trees, which would be more efficient after the tree reached maturity .also the average sale price per ton calculated from the citrus seems underestimated.

In general. The traditional crops have no place according to the study's standards in the new land livestock fodders linkage and are the most feasible income generated cropping pattern. However, an efficient finance-marketing program is a conditional factor to reach the targets , and to overcome .

Table (6): Estimated normal profit per milking cow (Frisian) in north Tahrir "El-Nahda" company (1983).

Comparative items	value(L.E)	%
Output		
-Milk production	756.0	49.2
-off-take:		
Culled animal	74.6	4.8
For breeding	513.1	33.4
Foreign Breed	187.0	12.2
-manure output	7.0	0.4
(1) Total output	1537.7	100.0
Input costs		
-feeds		
Concentrate	56.7	7.1
Fodders	309.1	38.3
Straws	57.1	7.1
-other variable costs	141.1	17.5
-fixed costs	241.8	30.0
(2)total costs	805.8	100.9
-normal profit (1)-(2)	731.9	

Table7: propose alternative cropping patterns of a farm (20feddans) that generates annual income above the national average.

	citrus	Alfalfa +milking cows	Strawberry	total
Comparative item				
Area(feddan)				
Returns(L0E)	20	0	0	20
Costs(L.E)	7986	0	0	7986
Net farm income(L.E)	5030	0	0	5030
	2956	0	0	2956
Model2				
Area(feddan)				
Returns(L0E)				
Costs(L.E)	0	20	0	20
Net farm income(L.E)	0	7688	0	7688
	0	4029	0	4029
	0	3659	0	3659
Modle3				
Area(feddan)				
Returns(L0E)				
Costs(L.E)				
Net farm income(L.E)	5	10	5	20
	1977	3844	10000	15841
	1258	2014	5135	8407
	739	1830	4865	7434

The physical and technical constraints area are sufficient conditions. These physical and technical constraints are the current inefficient irrigation system . weeds and nematodes infestation and soil improvement.

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