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MILK MARKETED SURPLUS OF THE EGYPTIAN MIXED FARM*

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Introduction

Recently several research papers have focused attention on economics of the milk production on the small mixed farm in Egypt . these studies provided evidences that Egypt have reasonable prospects for developing milk production on a comparative advantage base. This will be possible if much more attention of the current agricultural policies are devoted towards development of mixed farms which produce around 82 percent of total milk production in Egypt. this type of farming produces not only the cheapest source of milk (adjusted 4 percent butterfat but also it provides better opportunities of employment and income generation for the farm household, particularly women (1,2and3).However, arguments raised around the high proportion of milk produced that is consumed by the farm-household (4), which leads to a little contribution of the farm to the total milk supply, entering into commercial channels.

The available studies showed that principal factors responsible for the substitution between farm household expansion in production : the farm household size , the rise farm income and the product price (5 and 6) , however, the cross section data provides no explicit information about substitution of sale versus consumption against price and income effect , the farm size and the region were used here to indicate, implicitly, to the farm income level and the marketing advantages, respectively (2,3,4 and7).

Data:

A sample survey of 213 farms was conducted in 1981, from 8 village from 4 governorates in the Nile Delta area. These are Sharkia, Kalioubia, Monoufia and Gharbia. The sample covered between less than one Feddan to above 10 Feddan holder .the holdings with animals in milk were only entered the analysis, i.e. 156 farms. Weights were calculated form the land holding records in the agricultural cooperatives of the same villages.

Total milk consumption pattern in Egypt:

The authors estimated the composition of the total milk consumption in Egypt as shown on table 1 which indicates that in 1980 almost 40 percent of all milk consumed was farm produced consumption. Another 39 percent come from farm milk and milk products consumed off-the farm, including that which is processed by small private dairy plants. This 39 percent composed of 25 percent form the mixed farm marketed surplus and 14 percent from commercial buffalo enterprises in big city belts.

Effect of farms size and region on farm milk production:

Table 2 show that there is an increasing tendency with respect to milk production per farm as farm size increase. Previous studies pointed but the larger the farm size the larger is the number of milking animals hold by the farm, but the less is the yield per animal in milk (7). F-test showed a significant difference between milk productions per farm among the farm size classes, However, application of turkey test

(8) indicates that only farm size above five feddan produces, significantly, larger quantity of milk per farm per year than all other smaller farm.

The sample was reclassified into regions. The first region presents a typical traditional area, relatively far or even isolated from by cities. The second region is a village (45 farms in the sample) enjoys the marketing advantages. This village is adjacent to a big city in the center of delta (Tanta city) where the milk price is much higher the sample average and the marketing infra-structure are available. Table 3 indicates that the milk production per farm of second region is higher than the first region , t-test supports the apparent difference between the two regions . A proved that the region enjoys marketing advantages holds higher number of milking animals per farm of a higher yield per animal (7).

Effect of farm size and region on milk marketed surplus:

Table 2 shows that both the quantity and the percent of the fresh milk sold increases as the farm size increases. The ANOVA and turkey's test support this result. The farm located in the second region (table 3) devotes much more fresh milk for sale than the first region. The statistical inference test "t-test" confirms this difference between the two regions.

It should be mentioned that the processed ghee from the farm milk produced is entirely devoted to farm-household consumption. The quantity of milk processing by-products are either waste or home consumed the average annual quantity of while cheese sold (calculated from the sample data) is 36.1 kg, while the total quantity produced from the milk processed on farm is 253 kg, i.e. the quantity sold is only 14.2 percent of the cheese quantity processed on farm or only 1.8 percent of the total milk produced . the quantity of butter sold per year per farm is on the average 5.13 kg , i.e. less than 8 percent of the quantity of butter processed. Therefore, the study focused on the fresh milk sold as an indicator for the milk marketed surplus.

Estimating milk marketed response to farm milk production:

This study provides evidences that as farm milk production expands (either due to larger farm size or availability of marketing advantages) the milk marketed surplus increases. Therefore, effect of farm size and region on milk marketed surplus implies a direct relation with the explanation in farm milk production. Accordingly the study attempts to estimate the best fitted response function that express this relation.

Three regression forms were selected to express such relation: the linear , the quadratic and the semi-log form. These forms allow to investigate not only the magnitude or the direction of the response but they alternatively , investigate if the marginal response is fixed, increasing or decreasing.

Equations (1),(2) and (3) presents the three estimated forms for the response of annual kg of fresh milk sold (QMSLD) to the total annual milk produced (QFMP) . The standard error of the estimated coefficients is shown in parentheses.

$$1) \text{ QMSLD} = -1028.5574 + 0.8309 \text{ QFMP} \\ (0.0195)$$

$$R^2 = 0.9210 \quad F=1818.9259 \quad N=158.$$

$$2) \text{ QMSLD} = -152.8039 + 0.3391 \text{ QMSLD} + .0037(\text{QFMP}) \\ (.0607) \quad (.004)$$

$$R^2 = 0.9321 \quad F=1545.5020 \quad N=158$$

$$3) \text{ QMSLD} = -19514.1594 + 2774.5576 \text{ QFMP} \\ (194.1617)$$

$$R^2 = 0.5669 \quad F= 204.202 \quad N=153. \quad R^2$$

Although the estimated value of R for the quadratic from EQ2 has the higher value, the square term of the function is not significant. Therefore, the linear form was selected as the best fitted form (EQ1). From this equation an expansion in farm produced milk increases the quantity sold fresh by 0.83 kg. at QFMP=ZERO, QMSLD= - 1028.6 GK. This implies (as the negative saving of the consumption function) that there is a minimum subsistence level for home-consumption that should be purchased from off-farm market which is, approximately, 1028 kg. AT QMSLD zero the quantity of QFMP 1237.88 kg this later quantity indicates that up to 1238 kg of milk production the mixed farm is not able to sell any fresh milk, i.e. it is not market oriented enterprise up to such level of production. A previous study (7) estimated the milk yield per milking buffalo by number of locations across different farm size classes. This previous study showed that in a typical traditional region the smallest farm size (one feddan and less) insists to hold a milking buffalo that yields milk per lactation above the minimum quantity required for farm-household consumption and processing, i.e. above 1238 kg. The larger farm size classes has to hold more than one milking buffalo or even a milking cow with a milking buffalo to pass this threshold. Also, this previous study showed that if the mixed farm is located in a region that provides marketing incentives to the milk producer, they hold milking buffaloes of an average yield above the minimum farm-household requirements. for example. in a rural region isolated from the market incentives: the yield per milking buffalo per location ranges between 1298 kg to 1390 kgs for the farms with one feddan and less and between 942 kg to 1041kg for the largest farm (above 5 feddan). In a region enjoys marketing incentives the yield per milking buffalo per lactation ranges between 1906 kg to 2005 kg for the smallest farm size and between 1550kgs to 1649 kg for the largest farm size (7). Accordingly, the smallest farm has the opportunity to sell between 50kgs to 132 kg as milk marketed surplus per each milking buffalo, while the largest farm size, if it hold one milking buffalo will not be able to sell milk at all. Even, in a region that enjoys marketing incentives the smallest farm can sell between 555kgs of milk to 638 kg of milk from the yield of one milking buffalo between 260kgs to 342 kg per year (derived from substituting the milk yield in each case in equation NO.1.

Conclusion

There is a minimum annual quantity of the mixed farm produced milk (1238 kg) required for farm-household use (processing and consumption). Expansion in farm milk production by 1-kg, above such minimum requirements, provides .38d kg to enter the commercial channels of the milk supply in a linear form relation and leaving 0.17kg to be added to the minimum requirements for home-use. Therefore expansion in production increases not only the marketed surplus of milk but it increases also the home-utilization, however at much lower proportion.

The smallest farm size with one feddan and less (36 percent of the population) has not opportunities to enlarge the number of milking animals. it usually hold one milking head. Accordingly, the small farmer insists to hold an animal (buffalo) of higher yield than the minimum requirements of milk for home use and also higher than the larger farm size. The larger farm size has to hold more than one head to cover the minimum requirements for milk home-use and to expand the marketed surplus, because the average yield per animal on large farm is below the minimum needs for home-use.

Expansion in milk production is highly associated with availability of marketing incentives (region effect), which leads to hold a milking animal of a yield much above the minimum need for home-use and to increase the marketed surplus. Therefore, the mixed farm is market oriented with respect to milk supply, if the marketing incentives are available.

The milk marketing cooperatives to be established by the small milk producer is an alternative to expand the marketed surplus. This has been done with some success and under similar circumstances in India (9), where the cooperative system has been operating voluntarily form more than three decades and covering to day more than 3 million holds. Cooperative units in

the village serve as milk collection units and also provide veterinary and artificial insemination services, feeds and credit to member farms at cost price.

Table (1): Egypt milk consumption in 1980 estimated as liquid milk equivalent.

	Estimated quantity (000) tons	percent of total
farm milk and milk products consumed Of farms	960	39.8
farm milk and farm processed products Consumed off the farm , plus farm milk processed By small private dairy plants	929	38.5
Milk and milk products of the Egypt milk company Plus other privately owned modern dairy plants.	261	18.8
Imported cheeses and butter, plus imported Powder milk sold directly to consumers.	262	10.9
total consumption	2412	100.0

Source: estimates of the authors, bases upon

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Table2: Milk production and marketed surplus by the farm size

Annual milk use pattern per farm	Farm	Size	Class	Feddans	Weighted Average*
	0 < to1	>1 TO 3	>3 To 5	> 5	
Total production ,kg	1513.45	1795.5	2658.0	5477.4	1965.7
Kilograms sold fresh	473.7	630.0	1321.0	3018.5	7627
0% of total	31.3%	35.1%	49.7%	55.1%	37.8%

*The weights used are : 35.5% , 49.8% , 9.6% ,and 5.15% For the farm size classes > 0 to 1,> 1 to 3> 3to5 and >5 feddan, respectively

Source: calculated form the sample survey data.

Table (3): Milk production and marketed surplus by the region.

Region	Annual Milk produced kgs per f arm	annual milk sold kgs per farm	% of total
the first region	1413.1	240.2	17
the second region	5933.6	3500.8	19

Source: calculated form the sample survey data.

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