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FEATURES OF DAIRY FARMING UNDER CROP-LIVESTOCK MIXED SYSTEMS IN UPPER EGYPT

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ABSTRACT

A hundred dairy farms under mixed farming system located in three districts (El-Waqaff, 31 farms, Qafft 27 farms and Qana 42 farms) in Qana governorate in Upper Egypt were randomly selected with the objectives to characterize the existing dairy farming systems in Upper Egypt.

A questionnaire was designed and pre-tested to obtain data on average crop production, farm size, family crop consumption, crop cost and revenues, average cattle breed composition per farm, animal feeding, family size, average milk production in dairy farms and milk revenue over feeding cost. Data were collected through personal interviews.

The results showed that average cultivated areas/farm was 23.02, 9.15 and 7.07 feddan (1 feddan = 4200 m^2) for the studied districts, respectively. Percentages of milk production revenue over feeding cost in the three districts were 1.23%, 0.96% and 1.04% for local cows, 1.31%, 1.09% and 1.44% for buffaloes and 1.22%, 1.07% and 1.12% for crossbred cattle for the same areas, respectively. Statistical descriptive and quantitative analyses were used in this study. Average number of animals per farm in the three districts were 22.69, 5.00 and 11.39 heads for local breed; 16.05, 4.00 and 7.09 heads for buffalo and 17.55, 18.17 and 13.40 heads for crossbred animals, respectively.

Average milk productions were 4.50, 5.00 and 6.42 kg/day for local cows, buffalo and crossbred cows in EL-Waqaff, respectively. While in Qafft and Qana the average milk production was 4.23, 5.05 and 6.79 kg/day and 4.10, 6.02 and 6.29 kg/day for the same genetic groups, respectively.

From the present study it could be concluded that most farmers in Upper Egypt need simple animal feeding technical innovation to improve animal productivity. There is a problem in milk market infrastructure in Upper Egypt. Artificial insemination is important to improve milk production as shown in Qafft (1687.30 kg /lac.) compared with 1645.87 and 1614.53 kg/Lac for crossbred cows in El-Waqaff and Qana distracts. Main fodder crops per farm in summer were: sorghum (2.19, 1.20 and 1.50 kirat), darawa (1.37, 1.11 and 1.14 kirat) and alfalfa (2.17, 1.14 and 1.00 kirat) in El-Waqaff, Qafft and Qana, respectively. While fodder crops per farm in winter were berseem (3.33, 1.35 and 1.26 kirat) and alfalfa (2.91, 1.13 and 0.67 kirat) / farm / day in those three respective areas.

Keywords: dairy farm characterization, mixed farming systems, Upper Egypt

INTRODUCTION

Studying farming systems in Upper Egypt is important to get a clear picture of the prevailing production systems and in particular the dairy systems and how far they have evolved over time. Milk marketing structure should also be appraised since it has been learnt from the previous studies that development of small-scale dairy system is a function of milk demand and the product delivery systems. Moreover, the fast changes in milk

marketing as a consequence of a liberalized economy have created opportunities for growth in dairy production and milk outlets that have not been adequately studied in these parts of the country.

The main problem to improve animal production is animal feed which is not efficiently utilized in Egypt. In winter there is a surplus of green forage over the animal feed requirements while in summer a shortage is found. In addition, the concentrates are expensive, where most farmers cannot have enough money to buy it. Moreover, there is a great competition between cash crops (corn, rice, bean and wheat) and green fodders for cultivated area. Egypt still imports almost 55% of wheat requirements (General Statistics Year Book 2005), despite the oversupply of green forage in winter. The individual landholding allows the opportunities to improve feed production in the form of forage cultivation, planting of fodder crops and utilization of crop residues. Smallholder dairy production can be improved without affecting the primary function of animals and could be attractive in the mixed farming system as it offers the opportunity to diversify operations spreads risk and provides regular income (Gryseels, 1988).

The present study would help better understand common dairy systems and agriculture in Upper Egypt. Also it would help to identify constraints, and opportunities for, their improvement, and refining the recommendation domains for the pilot interventions to be selected with stakeholders: the producers, the market agents, the regulators and the policy makers.

The objective of this study was to describe existing dairy farming systems in Upper Egypt in mixed farming systems and formulate recommendation to set up policies and technical intervention.

MATERIALS AND METHODS

The present study was conducted based on the secondary and primary data collected through a questionnaire on farms that are practicing mixed dairy farm in Upper Egypt. The study was conducted on 100 dairy farms in three districts at Qana Governorate. From a total of 100 farms 31, 27 and 42 farms were selected from El-Waqaff, Qafft and Qana districts, respectively. The studied farms were selected as they represent common dairy farms operated as mixed farming system, where animal raising and crops cultivation activities are practiced. The data on farms was collected during April 2007.

A questionnaire was developed and pre-tested on limited number of farms with good experience in livestock practices. The data collected were average crop production, farm size, family crops consumption and expenditure, crop cost and revenue, average cattle breed composition per farm, animal feeding, family size, average milk production in dairy farms and milk revenue over feeding cost. The collected data on herd size were then converted into Animal Unit (AU) according to (El - Sayes and El-Wardani 2004). Statistical descriptive and quantitative analysis was according to (David - Johnson 1990). Average and percentage of technical and economic

variables including (herd stricture, milk production, animal stocking rate, farm size, family size and crops revenue were used in this study to calculate economic efficiency measures).

RESULTS AND DISCUSSION

The present study clarified some differences between dairy farms in the same area according to farmer preference and socio-economic circumstances. Some farmers prefer local animals while others prefer crossbred animals or Buffalo. Also the differences were found in crop rotation in type of crops and even in family size between districts in the same governorate. The averages of farm size were 23.02, 9.15 and 7.07 feddan / farm for El-Waqaff, Qafft and Qana, respectively, which showed the big differences between three districts.

Herd composition & herd size

Table 1 shows the dairy herd composition per farm in animal units (AU). Local, buffalo and crossbred cows represented 77.53%, 72.80% and 73.72% of the total Animal Units in El-Waqaff, Qafft and Qana, respectively. This means that the three types of animals are being economically important in those areas. In El-Waqaff district, other kinds of herds consisted of sheep (4.32), goat (1.41), others (2.39 AU) which includes donkey, horses and camels from a total of 8.12 of AU / farm.

Sheep, goat and others represented 17.01%, 2.64% and 7.55% from the total of 27.20% AU per farm in Qafft while they represented 14.13%, 2.28% and 9.86% of AU/ farm from the total of 26..28% of total AU in Qana.. There was great difference in types of animal holding between the three districts. The differences might be attributed to the role of dairy animals in the farm i.e., local cows in El-Waqaff accounted for 30.52% in spite of its low productivity. It might be also attributed to low green forage with high quantity of crops farm by- products (wheat straw sugar can tops etc.). This condition makes it suitable for local cow raising. On the other hand, milk production is not so important since there is no available market whereas annual calf production is economically profitable. Fattening animals have the potential market so they represent a high percentage in dairy herd in El-Waqaff district.

Local cows represented the lowest percentage i.e. 2.33% and 8.54% of dairy herd in other two districts whereas, crossbred animals had higher percentage (40.57% and 24.50%) in Qafft and Qana. The higher percentage of crossbreed dairy cow was most likely attributed to A.I dissemination as well as the availability of green forage and potential market for milk. In addition, it was found that milk production from buffalo or crossbred cows plays a big role in farm income in Qafft and Qana. Some farmers gained more profits with less risk by inseminating heifers and selling them as pregnant heifers. Similar results have been reported by Khalil et al. (2007) who found that average AU of local cows in El-Waqaff were the highest 30.52% compared with AU of crossbred, while AU of crossbred cows in Qafft and Qana were the highest. 40.57 % and 24.50%, respectively.

Table 1: Herd compositions in Animal Units (AU) at El-Waqaff, Qafft and Qana districts.

Herd composition in AU	El-Waqaff		Qafft		Qana	
	Av.	%	Av.	%	Av.	%
Local	11.02	30.52	0.42	2.33	1.34	8.54
Crossbred	4.63	12.84	7.26	40.57	3.85	24.50
Buffaloes	5.53	15.31	0.48	2.70	2.26	14.40
Young stock (1:12 months)*	6.81	18.86	4.87	27.20	4.13	26.28
Total dairy herd	**27.99**	**77.53**	**13.03**	**72.80**	**11.58**	**73.72**
Sheep	4.32	11.95	3.04	17.01	2.22	14.13
Goat	1.41	3.91	0.47	2.64	0.36	2.28
Other animals	2.39	6.61	1.35	7.55	1.55	9.86
Total other animals**	**8.12**	**22.47**	**4.86**	**27.20**	**4.13**	**26.28**
Total AU	**36.11**	**100**	**17.89**	**100**	**15.71**	**100**

***Young stock: Claves and Heifers within age 1 to 12 months**
****Other animals are: donkey, horses, camel and Mule**
Notes: Animals more than 12 months consider them as mature animals

Although sheep and goats are suitable for desert climates and disease tolerance the results in El-Waqaff showed a lower percentage of sheep (11.95%) and goat (3.91%) than in the other two districts.

Herd structure

Average large ruminant holding and species structure per farm are presented in Table 2.

Farmers in El-Waqaff areas preferred to raise local cows due to availability of reclaimed area plus their tolerance to diseases. The proportion of local cows were larger in El-Waqaff (40.31%) compared with buffalo (28.51%) and crossbred animals (31.18%). It was observed that intensity of animal holding per farm was considerably greater in EL-Waqaff district compared with the other district

Table 2: Average Number of large ruminant's structure per farm in EL-Waqaff, Qafft and Qana districts.

	EL-Waqaff			Qafft			Qana		
	Local cow	Buffalo	Cross	Local cow	Buffalo	Cross	Local cow	Buffalo	Cross
Total animals (head)	22.69	16.05	17.55	5.00	4.00	18.17	11.39	7.09	13.40
Each breed as % out of 100	40.31	28.51	31.18	18.40	14.72	66.88	35.73	22.24	42.03
Dairy animal %	15.25	10.92	7.12	20.00	0.00	6.99	10.01	21.72	10.75
C & H 1-12 Months% from total animal*	32.92	27.73	37.10	80.00	75.00	40.45	41.70	64.18	42.60
Heifers % >13 month	20.01	19.50	18.52	0.00	25.00	17.89	17.56	0.00	14.93
Fattening %	31.82	41.85	37.26	0.00	0.00	34.67	30.73	14.10	31.72

C&H: Claves and Heifers within age 1 to 12 months

The high proportion of local cow raised in El-Waqaff is likely due to the regular annual calving with less feed requirement and it is tolerant with local weather. There were high preferences to raise crossbred cows in Qafft and Qana, represented by 66.88% and 42.03 % of total number of large

ruminant per farm, respectively. In contrast, buffalo and local cow had the lower proportion i.e. 14.72%, 22.24% and 18.40%, 35.73% in Qafft and Qana, respectively. This is due to the fact that artificial insemination program has been available in Qafft area since a long time, therefore farms are well-experienced with high milk producing cows and good fattening animals. Besides, availability of green forage and concentrates supported crossbred animals to upgrade performance of their genetic capacity.

In spite of the fact that the present study was carried out in dairy farms, it indicated that dairy cows in EL-Waqaff had lower proportion of the herd which was 15.25, 10.92 and 7.12% for local cows, buffalo and crossbred cows, respectively. While fattening animals are represented greater proportions which were 31.82, 41.85 and 37.26%. In addition, calves and heifers aged from 1 to 12 months represented high proportion of the dairy herd. This finding could explaine that, the main farm income depends on fattening animals since lack of milk market or low milk producing animals, long distance between farms and market and hot weather contributed to lower holding of dairy cows or buffalo. In Qafft, crossbred milking cows were the dominant animals and this is attributed to the support for A.I. application supported by governmental project. Also fattening markets for crossbred animals are dominant in Qafft

Lower proportions of milking animals were noticed in Qafft district, being 6.99%, 20.00% and 0.00% for crossbred cows, local cows and buffalo, respectively. In contrary, the young stock of calves and heifers indicated that the majority. Most farmers tented to buy 1 – 2 calves for suckling milk of recently delivered cows. Furthermore, farmer prefers fattening of crossbred calves because of its faster growth rate as compared with local breed so that crossbred calves represented 34.67% of herd composition.

The afore mentioned reasons in addition to the higher price of newborn calves resulted from AI led to increased proportion of young stock in Qafft.

In Qana, among dairy cows, buffaloes were the most important animals constituting to 21.72% of the total dairy herd. While local and crossbred cows were 10.10 and 10.75% of total herd. This is due to the short distance between fresh milk consumers and producers or available milk shops. This may be attributed to the limited numbers of milk processing plants. The present study agree with results of El-Sayes and El-Wardani (2004) who reported that average local cows at Ismailia Governorate represented the lowest percentage (10.00%) of total dairy herd.

Animal feeding systems of three distracts:

Daily feeding systems in summer per farm are presented in Table 3. Sorghum, darawa and alfalfa were the main fodder crops accounting of 2.19, 1.20 and 1.50 kirat for sorghum, 1.37, 1.11 and 1.14 kirat for darawa and 2.17, 1.14 and 1.00 kirat for alfalfa per farm in El-Waqaff, Qafft and Qana respectively. Regarding annual average of straw per farm for the same distracts, the quantity per farm in El-Waqaff was not available while in Qafft and Qana were 3.48 and 4.68 kg/head/day. Furthermore, annual averages of dairy concentrate were 2.69, 5.17 and 3.99 kg/day for cow for El-waqff, Qafft and Qana respectively. While for the follower in the same distracts were 1.29,

1.71and 0.97 kg/day respectively. The amount of concentrate given to buffalo showed little differences to cow i.e. 2.93, 5.17 and 4.00 kg/day for adult's animals and 1.33, 1.79 and 0.99 kg/day for follower in the three areas, respectively.

On the other hand, in winter season feeding system is presented in Table 4. Alfalfa and berseem became the main fodder crops accounting for 3.33, 1.35 and 1.26 kirat for berssem and 2.91, 1.13 and 0.67 kirat for alfalfa per farm in those three respective areas. Green forages are fed to all animals as a group feeding so it is so difficult to calculate the quantity per dairy cow or young stock or sheep and goats.

Ration given to fattening calves was based on their bodyweight, calves less than 300 kg got an average of 4.59, 5.43 and 4.50 kg concentrate/day in those three studied areas, while those above 300 kg got as an average of 5.68, 6.57 and 5.67 kg concentrate /day in the three areas, respectively. El-Sayes and El-Wardani (2004) found that in Ismalia, daily concentrate feeding ranged between 1.20 kg per animal in winter and 4.00 kg per animal in summer.

Table 3: Average daily consumption of summer green forage per farm from sorghum, alfalfa, darawa, straw and concentrate for dairy animal in El-Waqaff , Qafft and Qana districts.

	sorghum		alfalfa		Darawa		straw	Concentrate feed (kg/head)			
	kirat	kg	kirat	kg	kirat	Kg	kg/head	cows	Foll. cows	Buff	Foll. Buff
El-Waqaff	2.19	800	2.17	543	1.37	685	N.A.	2.69	1.29	2.93	1.33
Qafft	1.20	655	1.14	285	1.11	553	3.48	5.17	1.71	5.17	1.79
Qana	1.50	720	1.00	250	1.14	568	4.68	3.99	0.97	4.00	0.99

*** kirat: measurement of cultivated land in Egypt i.e. 1 kirat = 175 m^2**
Foll: followers Buff. : Buffaloes

Table 4: Average daily consumption of winter green forage and dairy animals and concentrate for fattening animal/day in El-Waqaff , Qafft and Qana districts.

	Alfalfa		Berseem		Fattening		Av. Conc. annual Price (L.E./ton)
	Kirat	Kg	kirat	Kg	kg conc./<300 kg BW	Kg conc./>300 kg BW	
El-Waqaff	2.91	727	3.33	1333	4.59	5.68	1077
Qafft	1.13	281	1.35	538	5.43	6.57	1156
Qana	0.67	167	1.26	505	4.50	5.67	1067

The stocking rate, counted as the result of the average green forage consumption in cultivated areas per farm divided over the average AU of the same farm, were 4.66, 6.15 and 8.72 AU/ feddan in winter for El-Waqaff, Qafft and Qana, respectively. However, it was a little bit lower in summer i.e. 3.61, 4.20 and 4.74 AU/feddan for the same studied areas, respectively. In other words, each Animal Unit were given green forage for 8.45, 7.23 and

5.39 kirat in winter and 6.79, 7.75 and 8.45 kirat in summer for El-Waqaff, Qafft and Qana, respectively.

Milk production costs and revenue

Table 5 shows data of milk production cost and revenue in El-Waqaff, Qafft and Qana. El-Waqaff has the highest total milk production and daily milk yield for local cow compared to Qafft and Qana. The lactation length was the lowest in El-Waqaff while it was higher in Qafft and Qana which had similar values. The variation among districts can be attributed to better farm management and efficient utilization of farm feeding resources. Farmers at El-Waqaff prefer raising local cows because of less daily feed cost since it was L.E. 6.97/day, compared with Qafft and Qana it was L.E. 8.76/day and L.E.8.06/day, respectively. El-Sayes and El-Wardani (2004) reported that the average daily milk yield for local cow in Ismalia was 4.10 kg/day and the average of milk production was 858 kg per lactation. Daily milk revenue over feed cost was 1.23%, 0.96% and 1.04% for the three studied areas, respectively. Similar result was found by Khalil et.al. (2005) who reported that daily milk yield over feed cost in Ismalia was 1.24%. El-Waqaff has the best daily revenue from local cow while Qafft had losses from rearing local cows while Qana has the lowest profit from local cows.

Buffalo milk production in the studied areas showed different results. Qana had the lowest lactation length while, it had the highest in daily milk production from buffaloes. The lactation length in El-Waqaff and Qafft was 240.11 and 232.22 days, respectively, while in Qana was 208.21days. Average daily milk production was 5.00, 5.05 and 6.02 kg/day for the same studied areas, respectively. Total milk production was 1200.57, 1172.30 and 1253.38 kg/lactation. Higher results were also reported by El-Ashmawy et. al. (2006) who found that the average buffalo milk production and total milk production in small farms in west delta region was 6.20 kg/day and 1546.00 kg per lactation. Farmers in Qana are raising buffalo for milk production due to the high consumer preference and profitability compared with cows milk. Average profit from buffalo milk over feeding cost in Qana was the highest (1.44%) compared with EL-Waqff and Qafft 1.31% and 1.09% respectively. Almost the similar results were found by Shalaby et al. (2005) who found that buffalo milk revenue over feeding cost was 1.40% in Ismailia. In addition, Qana has some collection centres close to milk producers and this is the reason to explain that milk is easy to be market.

Qafft had the highest total milk production per lactation and daily milk yield for crossbred cows compared to El-Waqaff and Qana. However, lactation length was the lowest in Qafft. The variation among the three districts can be attributed to dissemination of artificial Insemination (AI) through Spanish genetic improvement programme. Besides, farmers at Qafft prefer the crossbred cows as they delivered healthy calves for fattening due to the availability of green forage and concentrate over the year. The highest daily feed cost was in Qafft. Although crossbred milk production at Qafft was the highest, milk revenue over feed cost was the lowest. This can be attributed to the higher availability of feed. El-Sayes and El-Wardani (2004) reported that the average daily milk yield for crossbred cow in Ismalia was 6.50 kg/day it is close to three studied areas. But total milk production in

Ismalia was 1911kg/lactation much higher than the studied areas. The big difference attributed to lactation length in Ismaila was 294 days while in studied areas were 256.37, 248.50 and 256.36 days, respectively.

Table 5: Average of lactation length, milk production cost and revenue per farm at El-Waqaff, Qafft and Qana districts.

	Local cow			Buffalo cow			Crossbred cow		
	El-Waqaff	Qafft	Qana	El-Waqaff	Qafft	Qana	El-Waqaff	Qafft	Qana
Av. Lactation length (days)	186.11	197.40	197.53	240.11	232.22	208.21	256.37	248.50	256.36
Total milk Prod. (kg)	837.48	835.00	809.89	1200.57	1172.30	1253.38	1645.87	1687.30	1612.53
Av. Total milk revenue (L.E.)	1591.21	1653.30	1660.27	3121.48	3165.21	3446.86	3127.15	3340.85	3305.69
Daily milk prod. (kg)	4.50	4.23	4.10	5.00	5.05	6.02	6.42	6.79	6.29
Av. Price/kg milk (L.E)	1.90	1.98	2.05	2.60	2.70	2.75	1.90	1.98	2.05
Daily milk revenue	8.55	8.37	8.41	13.00	13.64	16.56	12.20	13.44	12.89
Daily feeding cost (L.E)	6.97	8.76	8.06	9.96	12.51	11.51	9.96	12.51	11.51
Milk revenue over feeding cost (%)	1.23	0.96	1.04	1.31	1.09	1.44	1.22	1.07	1.12

Calculated price was according to the price on 2007.

Landholding and use pattern:

Percentage and cultivated area allocated for different crops during winter in the three studied areas are presented in Table 6.

Farmers at El-Waqaff had larger farm size average (23.02 feddan.) than those at Qafft average (9.15 feddan) and Qana average (7.07 feddan.). It may be attributed to settlement ownership of the land after reclamation by farmers. Percentages of cultivated areas for green forage (berseem and alfalfa) were 33.66%, 31.80% and 25.46% of the farm size in El-Waqaff, Qafft and Qana, respectively.

Percentages of wheat cultivated areas were 17.42%, 21.09% and 27.58% of total winter areas in El-Waqaff, Qafft and Qana, respectively. The overall percentage of green forage area was 31.81% of the farm size in winter season. Farms in El-Waqaff, Qafft and Qana had allocated 35.10%, 25.36% and 14.43% for herbs plant cultivation in winter, respectively. The remaining land areas of 13.81%, 21.75% and 32.53% in the same three districts were used for vegetables.

The most important summer crop was green forages since farmers allocated 49.36%, 58.27% and 58.02% of cultivated area for green forage at El-Waqaff, Qafft and Qana, respectively. The second important crop was maize. The percentage of cultivated areas allocated for summer maize in El-Waqaff, Qafft and Qana allocated were 15.63%, 21.48% and 16.99%, respectively. The third important crop was tomato and farmers cultivated 2.82 Fed (13.95 %, 20.52% and 16.11% for the corresponding districts. Other crops included sugar cane which was only cultivated in El-Waqaff district with average proportion of 11.28%. Sesame was cultivated in El-Waqaff and Qana

where the average proportions of cultivated area was 9.79% and 8.93% in El-Waqaff and Qana, respectively. The present study was focused in common dairy farms. The sugarcane was considered as one of the most important crop in Upper Egypt but it was not found in studied farms.

The average winter farm size was 23.02, 9.15 and 7.07 Feddan per farm in El-Waqaff, Qafft and Qana, respectively. Average utilized farm size was less in summer due to limited availability of water for irrigation adding that hot weather increases water evaporation. The results were in agreement with El-Sayes and El-Wardani (2004) who found that the average cultivated area in Ismailia and East Qantara districts which have almost the same circumstance were 9.07 and 7.56 feddan/farm.

Table 6: Cultivated area under different crops per farm at El-Waqaff, Qafft and Qana

	Average Farm size						Overall Mean	
	El-Waqaff		Qafft		Qana			
Types of crop in feddan	Feddan	%	feddan	%	feddan	%	feddan	%
Wheat	4.01	17.42	1.93	21.09	1.95	27.58	2.63	20.11
Berseem	3.76	16.33	0.98	10.71	1.03	14.57	1.93	14.76
Alfalfa	3.99	17.33	1.93	21.09	0.77	10.89	2.23	17.05
Av. Winter Green forage	**7.75**	**33.66**	**2.91**	**31.8**	**1.80**	**25.46**	**4.16**	**31.81**
Fennel	4.58	19.90	0.34	3.72	0.00	0.00	1.64	12.54
Fenugreek	2.28	9.90	1.71	18.69	0.00	0.00	1.33	10.17
Aniseed	1.22	5.30	0.27	2.95	1.02	14.43	0.84	6.42
Herbs plants	**8.08**	**35.1**	**2.32**	**25.36**	**1.02**	**14.43**	**3.81**	**29.13**
Vegetable	3.18	13.81	1.99	21.75	2.3	32.53	2.49	19.03
Av. Winter Farm size	**23.02**	**100**	**9.15**	**100**	**7.07**	**100**	**13.08**	**100**
Summer Maize	**3.16**	**15.63**	**1.57**	**21.48**	**0.97**	**16.99**	**1.90**	**17.31**
Sorghum	3.74	18.50	1.56	21.34	1.51	26.49	2.27	20.47
Darawa	2.25	11.13	0.77	10.53	1.03	18.04	1.35	12.17
Alfalfa	3.99	19.73	1.93	26.4	0.77	13.49	2.23	20.11
Av. Summer Green forage	**9.98**	**49.36**	**4.26**	**58.27**	**3.31**	**58.02**	**5.85**	**52.75**
Tomato	2.82	13.95	1.5	20.52	0.92	16.11	1.75	15.78
Sugar cane	2.28	11.28	0.00	0.00	0.00	0.00	0.76	6.85
Sesame	1.98	9.79	0.00	0.00	0.51	8.93	0.83	7.48
Av. Summer farm size	**20.22**	**100**	**7.31**	**100**	**5.71**	**100**	**11.09**	**100**

Family crops consumption and crop sold per farm

Table 7 shows the average family crop consumption and marketing in the three studied areas. Farmers sold their herbs product in local market or exported with good price in the three studied areas.

In contrast, farmers tended to sell all farm products of herbs and vegetable except some vegetables which can be stored over the year such as onion. The interest of farmers of the studied areas to cultivate herbs plants comes due to their higher marketing prices compared with other crops since herbs are considered as valuable exporting crops. The average productions for fennel per farm were 2.84, 0.21 and 0.00 tons and 0.61, 0.14 and 0.51 ton

for aniseed in El-Waqaff, Qafft Qana respectively. Fenugreek was found only in Qana with the average farm production of 1.50 tons.

Green forages from all cultivated areas were kept for animal feeding except El-Waqaff where sales in average exceeded 38.16 and 80.69 tons for darawa and alfalfa per farm respectively. Tomato, the most popular summer vegetable cultivated by farmers in surveyed areas was completely for sale in all farms. Sugar cane is the most profitable summer crops in Upper Egypt but since mixed farms (crops/livestock) was characteristics of the studied farms, all farmers cultivated cereals, herbs, vegetables and green forage for animal feeding.

Table 7: Average farm crop consumption and marketing (in tons)

	El-Waqaff		Qafft		Qana	
Types of Crops	Family consumption (ton) & (%)	Sold (ton) (%)	Family consumption (ton) & (%)	Sold (ton) (%)	Family consumption (ton) & (%)	Sold (ton) (%)
Winter crops:						
Wheat	1.70 (15.83%)	9.04 (84.17%)	1.46 (30.10%)	3.39 (69.90%)	0.38 (7.92%)	4.42 (92.08%)
Berseem	0.00	0.00	0.00	0.00	0.00	0.00
Onion	0.17 (3.37%)	4.88 (96.63%)	0.05 (1.84%)	2.67 (98.16%)	0.00	0.00
Fennel	0.00	02.84 (100%)	0.00	0.21 (100%)	0.00	0.00
Aniseed	0.00	00.61 (100%)	0.00	0.14 (100%)	0.00	0.51(100%)
Vegetable	0.00	29.68 (100%)	0.00	22.17 (100%)	0.00	55.84 (100%)
Fenugreek	0.00	0.00	0.00	0.00	0.00	1.50 (100%)
Summer crops:						
Maize	4.75 (34.30%)	9.10 (65.70)	1.41 (28.48%)	3.54 (71.52%)	1.53 (38.25%)	2.47(61.75%)
Sorghum	5.86 (39.62%)	8.93 (60.38%)	1.39 (32.48%)	2.89 (67.52%)	1.53 (68.26%)	3.29(31.74)
Darawa	35.97 (48.52%)	38.16 (57.48%)	16.50 (100%)	0.00	16.62(100%)	0.00
Alfalfa	187.54 (69.92%)	80.69(30.08 %)	81.91 (100%)	0.00	32.39(100%)	0.00
Tomato	0.00	55.31 (100%)	0.00	36.41(100%)	0.00	22.38(100%)

Crops production costs and revenue per farm

Table 8 shows the total cost and net revenue per feddan for different crops in the three studied areas.

In winter, among other winter crops, fennel generated the highest revenue in El-Waqaff compared to the other two districts and the lowest was in Qafft which was followed by wheat. Berseem, darawa, and alfalfa had negative values of cash revenue but they gained positive revenue as meat and milk products. Sugar cane generated the highest revenue compared to all summer crops in all districts but it was not cultivated for mixed farming systems (livestock /crops) in Qana Governorate.The benefit/cost ratio indicates the profitability of crop production was used to rank the economic importance of crops in the three studied areas. Winter crops had higher ratio compared to summer crops. The highest ratio was attained for fennel followed by fenugreek aniseed, in winter as well as sugar cane, sorghum and tomato, maize and onion in summer.

Table 8:Crops production total cost and net revenue per feddan in (L.E.)

Types of crops	El-Waqaffa		Qafft		Qana		Benefit/cost ratio
	Cost (L.E.)	Net revenue (L.E.)	Cost (L.E.)	Net revenue (L.E.)	Cost (L.E.)	Net revenue (L.E.)	
Winter crops:							
Wheat	1388.41	3353.41	1399.80	3341.20	1393.20	3348.00	2.40
Berseem	444.42	-444.42	381.00	-381.00	412.00	-412.00	-1.00
Onion	2039.15	1797.12	1812.00	2024.00	1900.00	1936.00	1.01
Fennel	1036.76	5180.45	1137.00	5080.00	1200.00	5017.00	4.55
Aniseed	1173.00	3285.00	1106.00	3352.00	1278.00	3180.00	2.77
Vegetable	1619	1381.00	1357.00	1643.00	1254.00	1746.00	1.15
Fenugreek	951.47	2500.00	865.25	2586.25	900.00	2551.00	2.82
Summer crops:							
Maize	1607.04	2439.00	1519.09	2527.09	1796.31	2250.31	1.48
Sorghum	1158.28	1904.00	1174.62	1887.00	1152.39	1910.39	1.64
Darawa	1415.81	-1415.81	1021.25	-1021.25	1143.05	-1143.05	-1.00
Alfalfa	770.71	-770.70	515.48	-515.48	515.00	-515.00	-1.00
Tomato	2767.46	5637.46	3429.23	4975.20	3437.04	4967.04	1.64
Sugar Cane	3324.81	6004.81	3200.00	6129.00	3600.00	5729.00	1.77

Calculated price was based on price in 2006.

Family size and age structure

Family size and age structure per farm are presented in Table 9. Average farm size was 3.32, 5.85 and 4.58 persons/farm for El-Waqaff, Qafft and Qana districts, respectively. The percentage of family members younger than 10 years ranged between 47 and 56% in the three studied areas. However, the smallest percentage of the population was those older than 50 years (6-9%), this was consistent with those reported by FAO (1995) that determined the farm size as 5.5 persons per farm in Sohag Governorate.

Table 9: Family size and age structure per farm in El-Waqaff, Qafft and Qana districts.

	El-Waqaff		Qafft		Qana	
Age (year)	No.	%	No.	%	No.	%
<10	1.55	47.00	3.28	56.00	2.50	55.00
>10 - <15	0.5	15.00	0.56	10.00	0.50	11.00
>15 - <25	0.53	16.00	0.79	14.00	0.75	16.00
>25 - <50	0.45	13.00	0.86	15.00	0.75	12.00
>50	0.29	9.00	0.35	6.00	0.28	6.00
Av. Family size	3.32	100	5.85	100	4.58	100

Age structure of studied farms showed a typical pyramidal composition, and this is characteristic in developing countries where the majority of farm members are children under 17 years of age. The age structures per farm in this study was 61.30% for children and 38.70% for adults, while FAO (1995) reported that age structure in Sohag next to Qana Governorate was 60.30% for children and 30.30% for adults. Farm size can influence labour force required for farming activities. However, due to the large proportion of children, most farms reported a shortage of labour for various farm activities. Employment of extra family labour was noticed among studied farms in the three areas especially during the peak cropping season. Labour deficiency could also be solved through various social cooperation such as groups of casual labourers (5-10 persons), who mobilised to work in farms.

Conclusion

The present study indicated that dairy farming systems in Upper Egypt had particular characteristics under mixed farming condition. For instance, farms located in the adjacent back desert were characterized by large cultivated area mainly occupied by green forages and herbs plant. In addition, greater holding capacity of animals with tendency to breed local cows as well as smaller family size in comparison with farms located in the village. Application of A.I. in the valley districts enabled farmers to raise more crossbred cattle and to produce milk for marketing in urban areas. Raising small ruminant was pronounced in the desert farms that in valley areas. Furthermore, crops and fodder crops production as well as animal productivity were greatly affected with several climatic conditions in summer and availability of water.

. Therefore, it can be concluded complementary and interdependency nature of the mixed farming system in these areas. Animal extension services, increased application of A.I. programme and conservation of green forges are important tools to upgrade animal productivity in the studied areas.

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خصائص نظم مزارع انتاج الالبان فى صعيد مصر

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معهد بحوث الإنتاج الحيواني-مركز البحوث الزراعية-وزارة الزراعة-دقي-جيزة-مصر.

أجريت الدراسة على ١٠٠ مزرعة من مربى إنتاج الألبان تحت النظم المزرعية المختلطة (انتاج حيواني/نباتي) وتم تقسيمهم إلى ثلاثة مراكز (الوقف ، قفط، قنا) تابعين لمحافظة قنا. أستخدم أسلوب العينة العشوائية فى اختيار عينة الدراسة. تم تصميم استمارة استبيان تحتوى على كل البيانات التى تفي بغرض الدراسة وتم تجربتها على عدد محدود من المزارعين . ثم جمعت البيانات عن طريق المقابلة الشخصية وكان الهدف من الدراسة

هو توصيف خصائص مزارع أنتاج الالبان لمعرفة المعوقات التى تعوق تنمية قطاع الالبان فى صعيد مصر ومن ذلك يمكن وضع توصيات لتطوير هذا القطاع .

وقد أضحت النتائج أن متوسط حجم المزرعة فى الثلاثة مراكز هو ٢٣,٠٢و ٩,١٥و ٧,٠٧ فدان على التوالى. وكانت عوائد البن مقسوما على مصاريف التغذية هو ١,٢٣% و ٠,٩٦% و ١,٠٤% للأبقار البلدية فى الثلاثة مراكز بينما كانت النسبة ١,٣١% و ١,٠٩% و ١,٤٤% للبن الجاموسى وكانت ١,٢٢% و ١,٠٧% و ١,١٢% للأبقار الخليط فى الثلاثة مراكز على التوالي.

كانت متوسط الحيازة الحيوانية ٢٢,٦٩و ٥,٠٠ و ١١,٣٩ رأس / مزرعة للحيونات البلدية و كانت متوسط المزرعة هو ٧,٠٩ و ٤,٠٠ ١٦,٠٥ رأس/ مزرعة للجاموس أما الحيونات الخليط فكانت ١٣,٤٠ و ١٨,١٧ و ١٧,٥٥ راس للمزرعة .

أما عن تغذية الحيوان فكان متوسط أستهلاك الحيونات من الاعلاف الخضراء فى المزرعة فى موسم الصيف من الدراوة و هو ١,٣٧ و ٢,١٧ و ١,١١ قيراط دراوة وكانت ١,١٤ و ١,١٤ و ١,٠٠ قيراط برسيم حجازى فى الثلاثة مراكز على التوالى. فى موسم الشتاء كان متوسط أستهلاك البرسيم ٣,٣٣ و ٢,٩١ و ١,٣٥ قيراط و ١,١٣ و ١,٢٦ و ٠,٦٧ قيراط برسيم حجازى لنفس المراكز على الترتيب.

متوسط أنتاج اللبن اليومى للثلاثة أنواع (البلدى – الجاموس – الخليط) كانت ٤,٥٠ و ٥,٠٠ و ٦,٤٢ كجم/يوم فى مركز الوقف. وكانت ٤,٢٣و ٥,٠٥و ٦,٧٩ لمركز قفط و كانت ٤,١٠و ٦,٠٢ ٦,٢٩ كجم/ يوم لمركز قنا وأستخدم التحليل الوصفى والكمى فى هذة الدراسة.

بصف عامة يوصى بالآتي:

- نظم الانتاج المختلط أنتاج نباتى / حيوانى من أفضل النظم للمزارع المصرى لوجود تكامل بين الانتاجين مما يفيد كلا منهما. أستخدام بعض التكنولوجيا البسيط الغير مكلفة يمكن أن تزيد من الانتاج الحيوانى مثل حفظ الاعلاف الخضراء أستخدام التلقيح الصناعى.