Socio-Economic Characteristics of Small Ruminant Smallholders in Four District of Northern Egypt

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ABSTRACT

The study seeks to characterize socio-economic and farm characteristics of small ruminant smallholders in four districts of northern Egypt. Structured questionnaire was used for data collection from 60 small ruminants' farmers and analyzed with descriptive statistics. Findings show that the average age of respondents included in this study was about 46.6±13.6 years and across the four districts farmer age was not significantly different. The present results showed a high illiteracy rate (75%) among small ruminant farmers across the four districts. Majority (68.4%) of the respondents were identified themselves as full-time farmers, derived that household income from the sale of crops and/or animals only. However, the average household size was 6.2±2.2 persons and about 66.2% of household size are men. The results cleared a positive relationship between education level and access to off farm job. The average land holding per household in the study area is estimated as 6.6±3.3 acres. There is negative correlation between total land holding and herd size. Across the four districts, the data showed that the overall average of herd size consists of 68.1% sheep, 21.1% goats and 10.8% large ruminant. Suckling age represent larger proportion in the flock for sheep and goats, while breeding females is the second largest age group in the flock. On the other hand, lamb/kid is the lowest age groups in the flock which indicated that farmers are forced to rely early marketing of their lambs/kids. Thus, socio-economic and farm characteristics offer significant input in designing effective small ruminant programs.
Keywords: Small ruminants, socio-economic characteristics, households

INTRODUCTION

The area of agricultural land in Egypt is confined to the Nile Valley and delta, with a few oases and some arable land in Sinai. The total cultivated area is 7.2 million feddans (1 feddan = 0.42 ha), representing only 3 percent of the total land area in Egypt (World Bank, 2015). As population pressure increases further and farm sizes decrease, the role of large ruminants reduces and small ruminants that constitute less competition for arable land predominate (Jahnke, 1982).

Livestock farming makes a distinct contribution to the social and economic development of the rural families (Nkonki-Mandleni *et al.,* 2019). Studies suggest that information on socio-economic and farm characteristics of farm households is critical in designing effective and appropriate livestock programs that benefit households (Ayalew *et al.,* 2013). Moreover, understanding multiple factors that influence the livestock rearing is essential in order to work with households on improvement of livestock production (Zaw Win *et al.,* 2018).

Small ruminants comprising sheep and goats are the critical source of livelihood for rural people to the development of sustainable and environmentally sound production systems (Berihulay *et al.,* 2019). Moreover, small ruminants constitute the farm animals largely reared and it serves as a source of income generation and employment to rural people (Offor *et al.,* 2018). However, various studies highlight the importance of emphasizing small ruminant livestock production not only for ensuring food security in rural regions, but also for helping to reduce poverty and overall household well-being (Peacock, 2005 and Dossa *et al.,* 2007). The emphasis is because small ruminants has a unique niche in smallholder agriculture due to the fact that they have shorter production cycles and faster growth rates, ease of management, low investment capital, small risk of loss, low feed requirements and they are more adaptable to harsh environmental climates as compared to large ruminants (FAO, 2002 and Ahuya *et al.,* 2009).

Unfortunately, little is known about small ruminant livestock production in rural regions of Egypt, and there is an eminent lack of information on the socio-economic impact of small ruminant livestock production. Therefore, the purpose of this study was to understand socio-economic and farm characteristics of small ruminant farm households in traditional sheep and goat production systems of Egypt.

MATERIALS AND METHODS

Study Area

The study was conducted in four district of Damietta governorate, located in the North Nile Delta, Egypt, namely, Kafr-Saad, El-Zarka, Faraskor and El-Serw. The four districts are selected based on differences in potential for livestock resources. Damietta government represents around 5% of the whole Nile Delta. Sea greatly moderates its temperatures, typical to the climate of Mediterranean. Sea is making its summers moderately hot and humid while its winters mild and rainy. Principal crops cultivated include wheat, cotton, rice and maize. The cultivated area of Damietta is 117151 acres and the total cropped area is 210120 acres. Livestock (Buffalo, cattle, sheep, and goats) including poultry are also predominant. The major local breeds found in the study area are the Rahmani sheep and Zaraibi goats.

Data Collection

A survey questionnaire was developed and pre-tested to collect quantitative data during the period from October 2014 to December 2015. Fifteen households per districts were selected randomly. Each of the 60 households was interviewed individually. Respondents were farm households engaged in agricultural production. The questionnaire was prepared to obtain information on socio-economic characteristics of farm households, farm-related attributes (land ownership and size, crop production, livestock herd size and flock stricture).

Data Analysis

Microsoft Excel was used to analyze the data. Descriptive statistics such as percentages and frequencies were conducted.

RESULTS AND DISCUSSION

Farmers' Socio-economic Characteristics

Table 1 presents the socio-economic characteristics of small ruminant production farmers in the four districts of Damietta governorate. The average age of respondents included in this study was about 46.6±13.6 years and about 95% of them were married. The low mean age gives an indication of youthful exuberant to carry out the drudgery activities involved in small ruminant production (Adams and Ohene-Yankyera, 2014). Farmers' age across the four districts was not significantly different. This result is similar to the findings reported by Abd El-Monaimea (2014) who found that the average age of household head in the New Valley is 43.2 years old and 52.9 % of breeders have medium age between 30 to 50 years, implying that they are young and able to work. In this respect, Khalil *et al.* (2013) reported that the average farmer's age in the north western coastal zone of Egypt is around 51 years old which is higher than the current results.

However, the present results suggested a high illiteracy rate (75%) among small ruminant farmers across the four districts. This result is similar to the findings reported by CAPMAS (2013) who reported that the literacy rate for Egypt's population above 10 years of age was reported as 25.9%. The literacy rate estimated in the study area is lower than the (42%) reported in Northwestern Coastal Zone of Egypt (Khalil et al., 2013). There were more illiterates in Faraskor (93%) and Kafr-Saad (80%) than El-Zarka (66.6%) followed by El-Serw (60%) which had the least uneducated farmers. Abd El-Monaimea (2014) reported that in New Valley the household who have basic education, high school and graduate education or without education were 9.8, 54.9 and 3.9 and 31.4% of respondents, respectively. The proportion of household who have basic education and secondary or high school were 13.4% and 11.6% of respondents, respectively. Education is a critical instrument in effective running of economic activities and it increases the ability to solve problems in a more skillful manner.

Majority (68.4%) of the respondents were identified themselves as full-time farmers, derived that household income from the sale of crops and/or animals only. There was a significant difference in household who have off farm job between districts from El-Zarka (53.4%) compared with Kafr-Saad (13.4%). It may explain the rationale behind the positive relationship between education level and access to off farm job.

There were 6.2± 2.2 household members in the house (Table 1). There were an average of 3.7±1.6 males and 2.5±1.4 females from which 66.2% and 26.4%, respectively, were involved in crop or livestock production. This result is similar to the findings reported by Abd El-Monaimea (2014) who reported that there were 5.82 household members in new valley. On the other hand, CAPMS (2011) showed that, the average Egyptian household size is 4.4 persons which are lower than that found in the current study. Metawi (2011) showed that the average family size was 7.8 and 5.7 people under rain fed and irrigated farming systems of north coastal zone of Egypt, respectively and the average family size in the old cultivated areas of sharkeia governorate of Egypt, was 6.4 people. Having many members of the family seems to be considered as an asset and security in times of retirements. Generally, the current study farmers could be characterized by socio-economic vulnerability due to their inability to withstand adverse economic as well as social risk (Neupane *et al.,* 2018).

Table1. Socio-economic characteristics of small ruminant households across the studied districts.

Characters	Kafr-Saad	El-Zarka	Faraskor	El-Serw	Total %
Age of household heads (year)	48.2±10.2	45.8±15.6	45.1±11.6	47.4±17.1	46.6±13.6
Marital status, %					
Single	6.6	0.0	0.0	13.4	5.0
Married	93.4	100.0	100.0	86.6	95.0
Education, %					
Illiterate	80.0	66.6	93.4	60.0	75.0
Basic	6.6	13.4	0.0	33.4	13.4
Secondary and high school	13.4	20.0	6.6	6.6	11.6
Occupation, %					
Farmers	86.6	46.6	73.4	66.6	68.4
Others	13.4	53.4	26.6	33.4	31.6
Family size (person)	6.2±0.9	6.4±2.5	5.9±1.9	6.4±3.2	6.2±2.2
Male	3.7±1.09	4.0±1.8	3.4±1.6	3.8±1.9	3.7±1.6
Female	2.5±1.1	2.5±1.1	2.6±1.04	2.6±2.1	2.5±1.4
Family labor, %					
Male	73.8	67.2	63.4	58.4	66.2
Female	26.2	24.3	21.8	25.0	26.4

Cultivated landholding and its distribution for different crops

The average land holding per household in the study area is estimated as 6.6±3.3 acres (Table 2). In New Valley, Abd El-Monaimea (2014) found that the average farm size was 7.55 ±1.36 acres. Metawi (2011) reported the average farm sizes as 12.7 acres for new reclaimed irrigated areas in north coastal zone and 2.7 acres for the old cultivated areas. In three districts of Sohag governorate, the average farm size ranged from 1.58 to 1.87 acres (Elnahas, 2008).

The principal food crops cultivated in the study area include wheat, cotton and rice. The farmers in the study area allocate larger proportion of their land (about 79%) for

berseem as an animal fodder in winter. In New Valley, the area cultivated with animal fodder ranged from 30 to 32.5% around the year (Abd El-Monaimea, 2014). In Sharkeia governorate (located in the east of the Nile Delta), about 47% of arable land is cultivated with berseem as an animal fodder in winter (Metawi, 1991). Khalil *et al.* (2013) and El-Ashmawy *et al.* (2011) mentioned that the percentage area cultivated by barley was ranged from 56 to 74% of total rain areas. Generally, the major income generating activities in the study area were crop and livestock production. This is in agreement with findings of Oyesola (2008) who found that respondents engaged in livestock and crops activities to generate income and household consumption in Nigeria. For many smallholder farmers, the sale of livestock contribute 78 percent of the cash income for smallholder mixed crop and livestock farms (Kuriuku *et al.,* 2013).

Table 2. Cultivated land holding and its distribution for different crops

Particulars	Kafr-Saad	El-Zarka	Faraskor	El-Serw	Total
Farm size (acres)	7.5±4.1	4.3±2.5	5.6±2.7	7.8±4.02	6.6±3.3
Landless%	53.3	60.0	66.6	60.0	60.0
Land holding distribution:					
Summer:					
Rice	62.6	72.1	71.5	61.5	65.2
Cotton	37.4	27.9	28.5	38.5	34.8
Winter:					
Wheat	32.0	30.3	21.5	16.6	21.3
Green fodder	68.0	69.7	78.5	83.4	78.7

Household ownership of different livestock species

Across the four regions, the data showed that a households owned 68.1% sheep, 21.1% goats and 10.8% large ruminants (Table 3). In New Valley, Abd El-Monaimea (2014) found that 27.45%, 7.8% and 64.71% of holder keep only sheep, only goat and both species, respectively. There is indirect relationship between large ruminant holding and amount of land allocated for green fodder. On the other hand, total land holding had negative correlation with herd size. However, the lands allocated for cultivated forage by household were about 5 acres. This allocation of very small land for livestock feed. Elnahas (2008) found that farmers in Sohag governorate kept an average of 0.34 of animal units of native cattle, 0.13 of crossbred cattle, 1.06 animal units of buffalo, 12.7 ewe equivalents and 6.15 doe equivalent. In addition, FAO (2007) showed that farmer herds among the Middle East countries from cattle, buffalo, sheep and goat were 14, 33, 57 and 43%, respectively. Zaw Win *et al.* (2018) reveal that herd size and purpose of rearing across different livestock species were significantly associated with housing practices, feeding and experience of farmers. However, Neupane *et al.* (2018) reported that small ruminants adopted mainly by farmers whose primary and stable source income is agriculture. In particular finances and time are great challenges facing small households with limited resources for raising multi species of livestock animals (Zaw Win *et al.,* 2018).

Table 3. Household ownership of different livestock species

Particulars	Kafr-Saad	El-Zarka	Faraskor	El-Serw	Total
Herd size	64.7±28	86.7±80.4	95.7±81.4	72±65.8	74.8±68.1
Sheep,%	68.2	66.1	70.6	66.8	68.1
Goats, %	25.2	26.8	14.6	19.2	21.1
Cattle,%	6.5	6.3	14.4	12.9	10.2
Buffaloes,%	0.1	0.6	0.6	1.1	0.6

Age and sex structure of sheep and goats flocks

Table 4 shows that suckling age represent larger proportion in the flock for both species, while breeding females is the second largest age group in the flock. The higher proportion of ewes and does in the flocks may be attributed to the prevalent practice of retaining females for breeding. The present study is in agreement with van Niekerk and Pimentel (2004) who reported higher number of females compared to that of male goats. In addition, Ogola and Nguyo (2010) reported that all farmers keep dairy animals mainly for milk production.

On the other hand, lamb/kid is the lowest age groups in the flock which indicated that farmers are forced to rely early marketing of their lambs/kids. Age structures of sheep and goats flocks are similar in different districts. Similarly, Abd El-Monaimea (2014) showed in New Valley that the distribution by age almost follow similar trend for both sheep and goats except for suckling age and breeding female. On the other hand, Galal *et al.* (2011) reported that age structure of sheep and goat's flocks are similar in Sohag governorate. In addition, Ahmed *et al.* (1999) showed that about 40% and 80 % of goat females and males, respectively, are less than 2 years in north Sinai in Egypt.-Furthermore, Metawi and Shehata (1994) found that percentage of females and males of less than one year were 15.7 and 11.0% for goats and 11.5 and 10.2 % for sheep in Egyptian villages, respectively. Also, Ali (1990) found that mature female constitute about 80% of sheep and goat flocks in newly reclaimed lands. Generally, the study by Lubungu *et al.* (2012) shows that as herd size increases, the proportion of households selling that particular type of livestock also increases.

Table 4. Age and sex structure of sheep and goats flocks

Particulars	Kafr-Saad		El-Zarka		Faraskor		El-Serw	
	Sheep	Goat	Sheep	Goat	Sheep	Goat	Sheep	Goat
Ewe/Doe,%	41.6	27.9	38.3	27.7	40.9	30.3	40.0	30.3
Ram/Buck,%	1.7	2.3	1.3	1.8	1.4	2.4	1.3	2.1
Female lamb/Kid, %	7.6	7.6	7.3	9.3	6.4	3.7	10.6	9.7
Male lamb/Kid, %	0.7	0.3	5.4	0.0	4.8	1.4	4.4	0.4
Progeny≤4 month, %	48.4	61.7	47.7	61.2	46.5	62.2	43.5	57.5

CONCLUSION

The results of the study suggest that farmers' socio-economic and farm characteristics are relevant towards understanding and improving small ruminant production for various reasons. First, the average age of respondents included in this study was about 46.6±13.6 years. The low mean age gives an indication of youthful exuberent to carry out the drudgery activities involved in small ruminant production. Second, given the high illiteracy rates (75%) among small ruminant farmers across the four districts in the study area, farmers are forced to rely heavily on traditional methods of livestock rearing. Third, farmers are forced to rely early marketing. For improved sheep and goat production, it is recommended to have an alternative option to improve farmers' technical knowledge and experience in sheep and goat management. For instance, setting up producer associations could provide an accessible platform for farmers to access group extension training, share farming experience and source credit from micro-finance schemes. Subsidized feed and government supported animal diets may lead to additional revenue for farmers through the activity of fattening lambs/kids.

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الخصائص الاجتماعية والاقتصادية لمربين المجترات الصغيرة في أربع مناطق بشمال مصر

حلمي رشاد محمد مطاوع [2] ، ناظم عبد الرحمن شلبي [1]، عمرو أحمد جبر [1]و إيمان جمال ابراهيم البسيونى [1]

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تهدف الدراسة إلى توصيف الخصائص الاجتماعية والاقتصادية والزراعية لمربي المجترات الصغيرة في أربعة مناطق مختلفة بشمال مصر وهي (كفر سعد - الزرقا - فارسكور - السرو) . تم تصميم نموذج استبيان وتجميع البيانات من عدد 60 مربي الأغنام والماعز وتم إجراء التحليل الاحصائي لتلك البيانات. أظهرت النتائج أن متوسط عمر المربين في هذه الدراسة كان حوالي 46.6 ± 13.6 عامًا ، ولا يوجد فروق معنوية بين المربين في الاربع مناطق المختلفة التي تمت بها الدراسة، وقد اشارت النتائج إلى ارتفاع نسبة الأمية (75 ٪) بين المربين في المناطق الأربع محل الدراسة. كما اوضحت النتائج أن (68.4 ٪) من المربين يعملوا بالزراعة وتربية الحيوانات فقط ، ويعتمد دخل الأسرة على بيع المحاصيل أو الحيوانات فقط . وكان متوسط حجم الاسرة للمربين حوالي 6.2 ± 2.2 شخص وتمثل نسبة الذكور بالأسرة 66.2 ٪. وكذلك وجود علاقة إيجابية بين مستوى التعليم والحصول على وظيفة خارج المزرعة. وقدرت البيانات بأن متوسط حيازة الأرض لكل أسرة في منطقة الدراسة بحوالي 6.6 ± 3.3 فدان. وأن هناك علاقة سلبية بين إجمالي مساحة الأرض وحجم القطيع فى المناطق الأربع. حيث أظهرت البيانات أن المتوسط العام لحجم القطيع يتكون من 68.1٪ من الأغنام و 21.1٪ من الماعز و 10.8٪ من الحيوانات المجترة الكبيرة. وأشارت النتائج إلى أن عدد الحملان والجداء الرضيع يمثل أكبر نسبه عمرية في قطيع الأغنام والماعز ، في حين أن عدد إناث التربية هي ثاني أكبر فئة عمرية موجوده بالقطيع. من ناحية أخرى ، تعتبر الحملان والجداء النامية أقل الفئات العمرية في القطيع ، مما يشير إلى أن المزارعين يجبرون على الاعتماد على التسويق المبكر للحملان والجداء. ومما أوضحت النتائج بالدارسة يمكن التوصية بأن الخصائص الاجتماعية والاقتصادية والمزرعية تعد بأنها تقدم مدخلات مهمة في تصميم برامج المجترات الصغيرة الفعالة الخاصة بصغار المربين.