

## **IMPORTANCE OF SMALL RUMINANTS FOR HOUSEHOLD'S FARM INCOME IN THE NEW VALLEY GOVERNORATE**

**Metawi, H.R<sup>1</sup>, H. Hamdon<sup>2</sup>, M. A. Abdel Monaime<sup>1</sup> and S. Abbas<sup>3</sup>**

<sup>1</sup>Animal Production Research Institute. Agriculture Research Center, Giza.

<sup>2</sup>Animal Production Dept., Fac. of Agric. (new valley branch), Assiut University.

<sup>3</sup>Animal Production Dept., Fac. of Agric., Assiut University.

### **ABSTRACT**

The objective of this study was to assess the contribution of small ruminants to farm household's income in Kharga Oasis, which is one of the 3 Oases, of the New Valley Governorate. One hundred and three farmers were randomly selected from six villages and interviewed with a structured questionnaire. Results revealed that the average family size was 5.82 household members from which 1.84 males and 0.38 females participating in agriculture activities. The average ( $\pm$ SE) farm size in the study area was  $7.55 \pm 1.36$  acres. The area cultivated with animal fodder ranged from 30 to 32.5% around the year. The percentage of cattle in the total herd size was 52.88% which was more than other animal species in the herd. Preference for buffalo was very low (1.57%). The second important animal contributing towards the total herd size was goat (20.94%). Livestock alone contribute 49.44% of the total agriculture income in the study area. Within the livestock sector; cattle contribute the highest (42.93%). Small ruminants contribute a mere 5.27%. Nevertheless, the study showed that small ruminant enterprise is economically viable. Small ruminants provided a return of 19.8% from capital invested. This exceeding the returns obtained from various crop production enterprises. These findings have important implication for the improvement of small ruminant enterprises of households in the Oasis. Making farmers aware of the financial benefits of small ruminants may convince them to consider it as a better alternative to crop production in the study area in terms of income generation. This will probably influence their decision on the allocation of their limited resources to the competing alternatives.

**Keywords:** Kharga Oasis, New Valley Governorate, livestock, Small ruminants household farm income.

### **INTRODUCTION**

Small ruminant (SR) production is one of the main alternative sources of income and plays a vital role as sources of meat, milk and wool for smallholder keepers in different farming systems of the developing countries (FAO, 2009 and Okereke, 2012). They are an important source of protein and household self-consumption and household income in rural areas and reason for many of projects which contribute to the improvement of support farmers (Kabore, et al., 2011). Smallholder and without land farmers in rural communities in Tropical Africa kept SR mainly for cash generation (Otchere, 1986). They are important to small holders to benefit from crop residues and household waste (Deans, 1981). They play an important role in producing high products of qualities from poor quality feeds and it was cleaning farms from harm pastures (Qtaishat *et al.*, 2012). Due to their high fertility, short

generation interval, adaptation in harsh environment and their ability to produce in limited feed resource. Small ruminants are considered as important components of the livestock sub-sector for small holders (Kabore, *et al.*, 2011).

The objective of this study was, therefore, to assess the contribution of small ruminants to farm household's income in Kharga Oasis of New Valley Governorate, Egypt.

## **MATERIALS AND METHODS**

### **Description of the Study Area**

#### **Geographical location**

The New Valley Governorate (NVG) is located on the south western part of Egypt, and shares the international borders of Libya to the west and Sudan to the south. As for its internal boundaries, it shares the borders with the Governorates of Menia, Giza and Marsa Matrooh on the north and Assuit, Suhag, Qena and Aswan in the east. The Governorate is located 602 km south west of Cairo and about 226 km of the Asuit and lay between 25°; 42& 30°; 47 E longitude, 22° 30' & 29° 30' N latitude .

It is considered the biggest Governorate in the country in terms of area, which amounts to approximately 440098 km<sup>2</sup>, representing approximately 43.6% of the total area of Egypt (EEAA & EMU, 2008). This study was carried out in Kharga district, which is one of the 3 districts, of the NVG (Figure1). Kharga is the first or second densely populated district in the Governorate with the total area 4500 km<sup>2</sup> (Hasanien *et al.*, 2010).

#### **Natural Resource Base**

##### **Climate**

It is characterized by dry desert climate. Rainfall is almost scarce throughout the year, not exceeding 4 mm/year. The main rainy season extends from February to April; and it was indicated that there are about 3 rainfall months in the district. Ground water is the only available water source for both irrigation and drinking purposes. The Governorate is characterized by wide fluctuations in air temperature both diurnally and seasonally. Winter showed warm days and cold nights while summer climate is more stable which is very hot and dry with intensified solar radiation and strong winds which is north westerly direct. The mean monthly temperature varies between 14.9 ° C to 34.2 ° C.

##### **Soils**

The clay land is the dominant soil type in Kharga. This soil is generally alkaline soil with PH values ranging between 7.5 and 8.5 ( Hasanien *et al.*, 2010).

##### **Agro-ecology**

Agro-ecologically, Kharga district is classified as arid or even super arid tropical region. Altitude in Kharga lies 77.8 meters above sea level (Saleh,1996).

##### **Farming system**

Agriculture is one of the most important human activities in the area. Besides being the mainstay of food supply, the agriculture sector is the main



## RESULTS AND DISCUSSION

### Family members and their participation in agriculture activities:

There were 5.82 household members in the house (Table1). According to the report of CAPMS (2011), the average Egyptian household size is 4.4 persons which are lower than the current result. There were an average 3.07 males and 2.75 females from which 1.65 and 0.38, respectively, participating in agriculture activities. The ratio of male to female for the studied household is higher than the value given for Egypt i.e. 1.03:1.00 (CAPMS, 2011). Metawi (2011) found that the average family size was 7.8 people and 5.7 people under rain fed and irrigated farming systems of north coastal zone, respectively. The average family size in the old cultivated areas of Sharkeia Governorate was 6.4 people.

**Table 1: Family members and their participation in agricultural activities.**

Descriptors	Mean $\pm$ SE
Family size:	5.82 $\pm$ 1.8
Male	3.07 $\pm$ 1.9
Female	2.75 $\pm$ 1.5
Family members participating in agriculture activities:	2.22 $\pm$ 1.5
Male	1.84 $\pm$ 1.47
Female	0.38 $\pm$ 1.40

In the studied area, adult male are usually involved in both cropping and animal production activities, while women usually have care of non ruminants. Khalil et al., (2013) reported that young sons and daughters still in the schools they have no power to do farm activities or primarily able to gain the experiences from their parents for farm activities.

### Land holding and its allocation

The average farm size in the study area was 7.55  $\pm$  1.36 acres (Table 2). The total land holding in the Kharga Oasis is smaller than the value reported for new reclaimed irrigated areas in north coastal zone 12.7 acres, where as greater than the value reported for the old cultivated areas in Sharkeia Governorate, east of the Nile Delta 2.7 acres (Metawi, 2011). The average farm size in three districts of Sohag Governorate ranged from 1.58 to 1.87 acres (Elnahas, 2008). The farmers in the study area allocate larger proportion of their land (43.06%) for wheat which is the main cash winter field crop. On the other hand, the area cultivated with field crops in summer was only 6.56%. The area cultivated with animal fodder ranged from 30 to 32.5% around the year (Table 3). Due to scarcity of water, about 47% of the total farm size left fallow for almost six months a year. In the old cultivated areas, such as Sharkeia Governorate, east of the Nile Delta, about 47% of the arable land is cultivated with berseem clover as an animal fodder in winter (Metawi, 1991).

**Table 2: Mean for land holding (acres) and its distribution for different crops.**

Agricultural systems	Season				
	Around year	Winter		Summer	
	Mean±SE	Mean ± SE	%	Mean ± SE	%
Green fodder <sup>1</sup>	-----	2.26 ± 0.29	29.94	2.45 ± 0.34	32.47
Field crops	-----	3.25 ± 0.41	43.06	0.50 ± 0.11	6.56
Vegetable	-----	0.26 ± 0.06	3.44	0.05 ± 0.03	0.72
Fruit	-----	1.05 ± 0.69	13.96	1.05 ± 0.69	13.96
Fallow land	-----	0.72 ± 0.5	9.6	3.49 ± 0.60	46.29
Farm size (acre)	7.55±1.36		100		100

<sup>1</sup> The winter green fodder: berseem (*Trifolium Alexandrinum* L.) and alfalfa; the summer green fodders: darawa, cow pea fodder, elephant fodder, sweet sorghum Egyptian clover, surdan and denaiba.

In a reclaimed desert area such as South Tahreer Province , Ahmed *et al.* (1996) reported that groundnuts was the major summer crop and represented from 30.4 to 66.6% of the total farm size. In winter, wheat and berseem clover represented 20.6 - 42.7% and 16.5 -36.1% of the total farm size, respectively. Khalil *et al.* (2013) and El-Ashmawy *et al.* (2011) mentioned that the area cultivated by barley represents 56-74% of total rain fed areas.

#### **Household ownership of different livestock species**

The mean and the standard deviation of livestock holding in the study area are given in Table 3. On average, a household owned 4.18 cattle; 1.74 sheep and 1.76 goats. However, households in the studied area own higher number of cattle; this may be due to relatively larger land holdings and more land covered by cereal crop.

**Table 3: Household ownership of different livestock species**

Species	Frequency	Mean	% of the total size
Cattle	101	4.18 ± 3.66	52.88
Buffalo	3	0.07 ± 0.45	1.57
Sheep	45	1.74 ± 2.63	23.56
Goat	40	1.76 ± 3.0	20.94
Camel	2	0.05 ± 0.35	1.05
Total herd size	191	7.8 ± 2.02	100

Elnahas (2008) showed that farmers in Sohag Governorate kept an average of 0.34 AU of native cattle, 0.13 of crossbred cattle, 1.06 animal unit of buffalo, 12.7 ewe equivalents and 6.15 doe equivalent. In Burkina Faso, poultry and small ruminants constitute 37.4% and 34.4%, respectively, of all domestic animal species raised by smallholder farmers (Kabore *et al.*, 2011). FAO (2007) stated that cattle, buffalo, sheep and goat constitute 14, 33, 57 and 43% , respectively, of farmer herds among the Middle East countries.

#### **Income contribution of small ruminants**

The relative contributions of the various farm household income sources are shown in table 4. Livestock alone contribute 49.44 % of the total

agriculture income in the study area. Thus, livestock production is the main means of livelihood in the studied area. Within the livestock sector; cattle contribute the highest (42.93%).

Thus, livestock production is the main means of livelihood in the studied area. Small ruminants contribute a mere 5.27%. Alsheikh and El-Shaer (2007) found that goat production in North Sinai contribute about 14–25% to the total farm gross margin. Kabore et al. (2011) mentioned that sheep and goat represent a means of survival for small holders. Devendra (2000) showed that the contribution of cattle to gross income ranged from 21 to 41% on natural pastures, and from 42 to 71% with cattle an improved pastures. The same source mentioned that the farms without cattle suffered a reduction in gross farm income by 70%.

**Table 4: Farm household income analysis.**

Income source	Contribution %	Return on capital invested %
A. Net crop income		
Fruit	28.3	14.9
Field crops	19.51	6.9
Vegetable	2.73	9.5
Subtotal	50.55	
B. Net livestock income:	42.93	
Cattle		21.1
Small ruminant	5.27	19.8
Other large ruminant <sup>1</sup>	1.23	
Subtotal	49.44	
C. Net farm income (A+B)	100	

<sup>1</sup> Buffalo and camel

Nevertheless, the study concludes that small ruminants enterprise is economically viable .It provided a return of 19.8% on capital invested. This exceeding the returns obtained from various crop production enterprises. These findings have important implication for the improvement of small ruminants enterprises of households in the Oasis. Making farmers aware of the financial benefits of small ruminants may convince them to consider it as a better alternative to crop production in the study area in terms of income generation. This will probably influence their decision on the allocation of their limited resources to the competing alternatives.

## REFERENCES

- Ahmed, A.M., N. Z. Bedier, M. A. M. Ibrahim and A. S. Abdel-Aziz. (1996) Efficiency of the current crop/livestock production system in a reclaimed desert area in Egypt. *Egyptian J. Anim. Prod.*, 33: 81-90.
- Alsheikh, S.M. and H. El-Shaer (2007). A whole farm analysis of goat production systems in north Sinai, Egypt. *Animal health, animal welfare and biosecurity. Proceedings of the 13th International Congress in Animal Hygiene, Tartu, Estonia, 17-21 June, 2007. Volume 2 pp. 621-626.*

- CAPMAS. (2011). Central Agency for Public Mobilization and Statistics. Statistical year book 2011, Cairo.
- Deans, R. (1981). Farming systems research as it relates to the animal sciences. Farming Systems Research Group Working Paper No. 5. Michigan State University, East Lansing, USA.
- Devendra. C. (2000). Strategies for Improved Feed Utilization and Ruminant Production Systems in the Asian Region. Asian-Australian. J. Anim. Sci. 13 Supplement July, PP: 51-58.
- EEAA & EMU, State Ministry of Environment and New Valley Governorate (2008). Report for 2007-2008: Environmental action Plan New Valley Governorate.
- El-Ashmawy. M. M. I, M.A. Khalil, M.A. El-Wardany and S. Afify. (2011). Sheep and goat production characterization under mixed farming system in the desert coast of North West – Egypt. Egyptian J. Anim. Prod., 48, suppl. Issue: 181-195.
- Elnahas A. (2008). Small ruminant production in Mixed Crop-Livestock farming system in Sohag. M.Sc. Thesis. Assiut Univ.
- FAO (2007). The State of the World's Animal Genetic Resources for Food and Agriculture, edited by Barbara Rischkovsky & Dafydd Pilling. Rome, Italy, pp 510.
- FAO (2009). the State of Food and Agriculture Organization of the United Nations, Rome, 2009. Rome 2009. Italy. PP: 180.
- Hasanien, G. H.; M. A.Gameh and A. Talaat. (2010). Suitability of utilizing shallow Groundwater in irrigating different soils in EL-Kharga Oasis. Ass. Univ. Bull. Environ. Res. Vol. 13 No. 2, October 2010. pp 27 – 47.
- Kabore, A., A. Traore, B. I. Gnanda, M. Nignan, H. H. Tamboura, B. M and A. M. Gaston. (2011). Constraints of small ruminant production among farming systems in periurban area of Ouagadougou, Burkina Faso (West Africa). Pelagia Research Library, 2 (6):588-594.
- Khalil M. A., H. B. Sammour and M. A. El-Wardani. (2013). Socio-Economic and technical evaluation of sheep and goat farms in North West coast of Egypt. Egyptian journal of Sheep and Goat Sciences, 8 (1): 29-42.
- Metawi H. R. M. (1991). Assessment of sheep production systems in Egypt. In: Ph.D. Thesis. Fac. of Agriculture, Ain-Shams University; Cairo, Egypt, PP. 219
- Metawi. H. R. M. (2011). Economic sustainability of goat production under different production systems in Egypt. Options Méditerranéennes, A no. 100, 2011 – Economic, social and environmental sustainability in sheep and goat production systems. Pp 185-190.
- Okereke, C. O. (2012). Socio-Economic Factors Affecting Access and Utilization of Veterinary Services by Small Ruminant Producers in IZZI Local Government Area of Ebonyi State, NIGERIA. Continental J. Agricultural Economics 6 (1): 40 – 45.
- Otchere, E. O. (1986). Traditional Cattle production in the sub humid zone of Nigeria. In von Kaufmann, R., Chater, S. & Blench, R., eds. Livestock systems research in Nigeria's sub humid zone. Proceedings of the second ILCA/NAPRI symposium held in Kaduna, Nigeria, 29 October – 2 November 1984.

- Qtaishat, T , A. Al-Sharafat and M.I. Majdalawi. (2012). A comparative economic analysis of sheep production systems: A case study of Jordan. Journal of Food, Agriculture & Environment, 10 (2): 690-694.
- Saleh. M. A. (1996). Environmental factors affecting health of Friesian and Native cattle in New Valley governorate. In: Ph.D. Thesis. Faculty of Veterinary Medicine. Assiut Univ.

**أهمية المجترات الصغيرة فى الدخل المزرعى للحائزين فى محافظة الوادى الجديد**  
**حلمى رشاد مطاوع<sup>1</sup>، حاتم عبد القادر حمدون<sup>2</sup>، محمد الفاتح عبد الرحمن عبد المنعم<sup>1</sup>**  
**سيف اليزال عباس<sup>3</sup>**  
**<sup>1</sup>معهد بحوث الانتاج الحيوانى، مركز البحوث الزراعية، الجيزة**  
**<sup>2</sup> قسم الانتاج الحيوانى، كلية الزراعة (فرع الوادى)، جامعة أسيوط**  
**<sup>3</sup> قسم الانتاج الحيوانى، كلية الزراعة، جامعة أسيوط**

الهدف من هذه الدراسة هو تقييم مساهمة المجترات الصغيرة فى الدخل المزرعى لدى الحائزين فى احدى الواحات الثلاثة بمحافظة الوادى الجديد وهى واحة الخارجة . تم اختيار بشكل عشوائى مائة و ثلاثة مزارع من ستة فرى بغرض اجراء أستبيان يستهدف دراسة النواحي الأقتصادية الخاصة بهم . وقد أظهرت النتائج أن متوسط حجم العائلة كان 5.82 فرد - بشارك منهم فى الأنشطة الزراعية 1.84 و 0.38 ذكور وإناث على التوالي - ووضحت الدراسة ان متوسط حجم المزرعة فى منطقة الدراسة كان  $7.55 \pm$  1.36 فدان، كما ان المنطقة التي تزرع بالأعلاف الحيوانية تراوحت ما بين 30 % إلى 32.5 % على مدار السنة، وكانت النسبة المئوية للأبقار من حجم القطيع الكلي تمثل 52.88 % حيث كانت أكثر من الأنواع الأخرى فى القطيع والنسبة المئوية للجاموس منخفضة جداً والتي كانت 1.57 % فقط. هذا بالإضافة الى ان الماشية فقط تساهم بحوالى 49.44 % من إجمالي الدخل الزراعى فى منطقة الدراسة. الصغيرة تساهم ب 5.27% فقط. وعلى الرغم من ذلك فالدراسة خلصت إلى أن مشروع المجترات الصغيرة فعال اقتصادياً. حيث يعطى عائداً قدرة 19.8% على رأس المال المستثمر. هذه النسبة تجاوزت العائدات المتحصل عليها من مشاريع إنتاج المحاصيل المختلفة. هذه النتائج لها أهميتها عند اجراء مشاريع تحسين انتاجية المجترات الصغيرة ادى المربين فى الواحة. ومن ثم فان إمام المربي بالفوائد المالية لتربية المجترات الصغيرة (الأغنام والماعز) ربما يحثهم على الوصول للاستغلال الأمثل لمواردهم المحدودة ولتحقيقهم دخل أكثر.

**قام بتحكيم البحث**

**كلية الزراعة - جامعة المنصورة**  
**كلية الزراعة - جامعة الاسكندرية**

**أ.د / السعيد زهرى محمد عودة**  
**أ.د / عادل سيد احمد البربرى**