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Analysis of factors influencing commercial off take rate and marketing of small ruminants kept under different production systems in Egypt

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Abstract. This study was conducted to assess the determinants of sheep and goats market supply in two agro-ecological regions located in the north coastal zone of Egypt: (i) the rain fed region in the west, where pastoralists and agro-pastoralists are the dominant economic activity (ii) the irrigated region in the east, where the mixed crop-livestock production system is prevailing. A structure questionnaire was used to collect information from 155 small ruminant owners based on single-visit-interviews. Analysis of data showed that flock differed in size and composition among different agro-ecological regions. In general, very low net commercial off –take rate is observed for both sheep and goats for farmers in the east and pastoralist regions. In most instances, households sold animals of varying sex, age and weight to cover immediate cash needs. Household non farm income and sizes of flock, family and farm had significant impact on their market participation. Specific recommendations are made to obtain sustained high off take rates and commercial supply of quality live animals in the market.

Keywords. Egyptian production systems – Small ruminants – Household marketing behavior – Off take rate and Marketing constraints.

Analyse des facteurs d'influence sur les modes de commercialisation des petits ruminants par les éleveurs de différents systèmes de production en Égypte

Résumé. Ce travail évalue les déterminants de l'offre de moutons et de chèvres sur le marché de deux zones agro-écologiques de la zone côtière du nord-ouest de l'Égypte : la zone agropastorale à l'ouest, la zone irriguée avec agriculture-élevage à l'est. Un questionnaire structurel a été utilisé pour recueillir, en une seule visite, des informations à partir de 155 propriétaires de petits ruminants. En général, de très faibles taux nets de productivité numérique à la vente sont observés. Dans la plupart des cas, les ménages vendent des animaux de différents sexe, âge et poids pour couvrir les besoins de trésorerie immédiats. Les revenus non agricoles des ménages, et les tailles de troupeau, de la famille et de la ferme ont eu un impact significatif sur leurs modes de participation au marché. Des recommandations spécifiques sont faites pour obtenir des productivités numériques durablement plus élevées, et une offre d'animaux vivants de qualité sur le marché.

Mots-clés. Systèmes de production – Égypte – Petits ruminants – Commercialisation.

I – Introduction

One of the major challenges facing agricultural development in Egypt has been the inadequate supply of quality live animals. This has increased the sheep and goats live weight prices. Overcoming the constrained of supply shortage of quality live animals requires understanding the marketing behavior of the producers and the constraints limiting their participation in markets. This information is useful in designing and implementing strategies to alleviate the problem of low market performance (Nicholson and Rish, 2011). However, current knowledge about this information in the current study areas is inadequate. This study was conducted to assess the determinants of sheep and goats market supply in different production systems of Egypt. In addition, the study investigated the factors influencing the farmer's market participation behavior.

II – Materials and methods

This study was conducted in two agro-ecological regions located in the north coastal zone of Egypt: (i) the rain fed region in the west, (ii) the irrigated region in the east. Western region is characterized by low rainfall (<150mm) and high fluctuation of the precipitation. Pastoral/agro-pastoral (P/AP) is the dominant production systems. The mixed crop-livestock production system (MCL) is prevailing in the eastern region. It has major agrarian changes with establishment of irrigated canals from the Nile. The major sheep and goats breeds available in the study area are the Barki sheep and Barki goat's local breeds which are characterized by its ability to withstand the dry season, to survive and produce under adverse local environmental conditions.

Data from sample survey of 155 households conducted during 2013 was used to assess the current commercial off take rates for sheep and goats in the P/AP and MCL production systems and to conduct the econometric analysis of farm household's sheep and goats marketing behavior. A total of 155 households was interviewed individually using structure questionnaire. The questionnaire was prepared to obtain information on farm characteristics, off take rate, and market participation behavior of small ruminant producers.

The data were analyzed using Statistical Analysis Software (SAS, 2003) package. A one-way analysis of variance was applied for quantitative dependent variables using production system as independent variable. Regression models were used to analyze the determinants of household market participation regime as seller during one year.

III – Results and discussion

1. Commercial off-take rates

Analysis of data showed that flock differed in size and composition among different production systems (Table1). The average flock size in the rain fed area is about 140 heads, split into 112 sheep and 28 goats. Raising more goats and increasing percentage of mature female in the flock, has been a major adaptive process developed by breeders in the rain fed region to cope with the long drought conditions and degraded range lands. The average gross and net commercial off-take rates across production systems at household level during one year are presented in Table 1. In general, very low net commercial off –take rate is observed for both sheep and goats for farmers in the MCL (18.4% and 13.1%, respectively) and P/AP' (22 and 18%, respectively) in our sample.

However, significantly higher off-takes were observed in P/AP systems as compared to the MCL system. In most instances, households sold animals during dry season when money is needed in order to buy grains and household inputs. In line with this, Budisatria (2006) reported unplanned sale of small ruminant for emergency cases in Indonesia. Pastoralists in southern Ethiopia are reported to deliberately cull their goat at lower price during the dry season as a result of poor body condition (Adugna and Aster, 2007). The significantly higher mortality rate observed in P/AP systems is as expected due to feed and water scarcity, and limited access to veterinary services in the area. This indicates the potential of increasing small ruminant's off-take rate just by reducing lamb and kids mortality. Adugna and Aster (2007) reported that prolonged dry season and drought are the causes for higher goat mortality in pastoral and agro-pastoral areas.

Table 1. Average commercial off-take rates under different production systems

Type of off-take	Production systems		
	P/AP (n = 78) %	MCL (n = 77) %	Significance level
Sheep gross commercial off-take rate ¹	24.3	22.2	*
Sheep net commercial off-take rate ²	22.0	18.4	**
Goat gross commercial off-take rate	19.4	15.3	**
Goat net commercial off-take rate	18.0	13.1	**
Lamb death rate	14.0	9.7	**
Mature sheep death rate	4.8	4.3	NS
Goat-kid death rate	17.7	11.4	**
Mature goats death rate	6.1	5.6	NS
Flock size, heads:	139.7	94.3	
Sheep in flock, %	79.8	93.1	
Goats in flock, %	20.2	7.1	
Mature female in the flock, %	53	36.2	

n = number of respondents, **significant at (p, 0.01), *significant at (p < 0.05), NS = non significant; MCL = crop livestock system; P/AP = pastoral/agro-pastoral system.

¹As a total sales divided by the sum of beginning stock and inflows during the year.

²Sales less purchase divided by the sum of beginning stock and inflows during the year.

2. Household market participation and constraints

Respondents indicated that seasonality of the market (45%), lack of current market information (40%) and low prices (12%) were the most important constraints (Table 2).

Table 2. Marketing constraints under different production systems

Constraints	P/AP (n = 78)	MCL (n = 77)	Significance level
Seasonality	44.9	46.4	
Lack of regular information	40.6	39.2	NS
Low market prices	12.0	12.6	
Others #	2.5	1.9	

n = number of respondents ; NS = non significant; MCL = crop livestock system; P/AP = pastoral/agro-pastoral system.

Analyses of data showed that household non farm income and sizes of flock, family and farm had significant impact on their market participation regimes. Herd size increases participation as seller because of the possibility to produce surplus to market, result that is consistent with the findings of Boughton *et al.* (2007) in low income country, and Bellemare and Barret (2006) for the pastoral regions of northern Kenya and southern Ethiopia. On the other hand, farm size and distance to nearest livestock market decrease the probability of market participation as seller. Households with larger land size are more likely to have alternative cash sources. Such households may have higher opportunity costs for involvement in market-oriented small ruminant production.

IV – Conclusions and implications

The benefits obtained from small ruminants production in terms of cash is low due to the high mortality and low off take rates. These indicate the potential of increasing commercial off take of sheep by improving veterinary services and increasing utilization of alternative feed resources. Egyptian

government also intervenes to assist Bedouins, through distribution of subsidized feedstuffs or subsidized loans to buy feedstuffs. The strong seasonality of sheep and goats demand represents an opportunity to focus short-term fattening to produce animals in the appropriate condition to coincide with periods of peak prices. Herd size increases the probability of selling. This result suggests that increasing of herd size by promoting improved production and specialized small ruminant producers, combined with availing credit for small ruminant production. Distance from homestead to nearest livestock market decreases the probability of selling. This result suggests that improvement in livestock market access should be an important consideration in promoting market-oriented small ruminant production.

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