



Analysis of the Socio-Economic Constraints of Small Ruminants' Production in West Bank-Palestine

Yahya Istaitih¹, Makbule Nisa Mencet Yelboga^{2*}

¹Faculty of Agricultural Science and Technology, Palestine Technical University, Kadoorie, Palestine

²Department of Agricultural Economics, Faculty of Agriculture, Akdeniz University, 07058 Antalya, Turkey

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ABSTRACT

This study analysed the socio-economic constraints facing small ruminants' production in West Bank Palestine. Therefore, it investigated the sites of Al-thaheryia and Facuoia and included. From primary data collected from different sources, 170 small ruminants' rearers have been randomly selected. Additionally, two workshops have been implemented to gather both quantitative and qualitative data through discussion and brainstorming. Descriptive statistics; frequency, percentage, mean, standard deviation, Chi-square test and T-test are used to shape the socioeconomic constraints facing by small ruminants rearers. The findings revealed a need for extension system to enhance small ruminants' productivity.

*Corresponding Author:

E-mail: nmencet@akdeniz.edu.tr

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Introduction

Livestock production is an important feature of Palestinian agriculture sector, where it contributes largely towards meeting food security, providing employment for internally displaced peoples and generating farm cash income. The livestock was estimated to 778 thousand heads and is composed of three breeds: the common Awassi breed which is the predominant one followed by the Assaf then the improved Awassi breeds (Palestine Central Bureau Statistic, 2013). Besides, this sector contributes to Palestine's economy by approximately 5.8% to Gross Domestic Product (GDP) (Palestinian Central Bureau of Statistics, 2013). Small ruminants' production of Palestine regions is characterized by a high demand of products. So, it is considered as one of the most important agricultural activities in the villages situated in the south and north of Palestine. More than one million people live in these areas and represent the poorest farmers in the country (Food and Agriculture Organization, 2012). These herders have very tiny access to basic resources like shelter, clean water, sanitation systems, schools, roads, and markets. This large zone of semi-arid lands, especially at Al-thaheryia site, can only be used well by the small ruminant and related production

system, but it faces serious constraints that limit its development. The main characteristics of these areas are marginal lands, predominantly rural, common availability and a very low level of mechanization (Ministry of Agriculture, 2014). The importance of the small ruminant sector for farmers is multiple and includes cash assets, means of savings, also as diversification strategy that aims to reduce market and climatic risks and to optimize the use of available resources. Consequently, small ruminants rising have usually been a key source of income and food security for thousands of West Bank inhabitants.

Within the small ruminant sector, small-scale rearers who maintain herds primarily for household consumption represent an important group. Approximately over half of owners in the West Bank keep a heard size fewer than 26 heads, and herding remains their primary source of livelihood, which covers about 78 percent of household needs (Palestinian Central Bureau of Statistics, 2012). Bedouin is another important group which has large flock sizes and also has been most affected by closures of land, shrinking grazing land availability and water shortages. Otherwise, the weakness of the market and rising prices

of feeds, the fluctuating product prices of meat and milk make them a vulnerable group. As a result, small ruminant sector has been facing a crisis, due to the rising of input prices especially fodder that led to change production systems, low productivity. The continuous increasing of feed prices which leads to a limitation of investment and the current decrease in profitability of 'rearing' has had a strong negative impact, on development and sustainability of this sector (Ministry of Agriculture, 2014).

The analysis of constraints that the small ruminant production system faces can lead to a strategy for enhancing and developing this sector. This study assesses the constraints faced by small ruminant sector in rural areas of Facuoa and Al-thaheryia by focusing on more marginalized communities, especially small-scale keepers.

Materials and Methods

Material

The study has been conducted in two benchmark sites; Facuoa in the northeast of the eastern slopes and Al-thaheryia in the southern part of West Bank in Palestine. The study used three sets of data. Primary data were been collected from 170 small ruminant keepers using designed questionnaire and personal interviews at the two sites. They included information related to production and inputs of land fattening and constraints facing by small ruminants. The questions concerns household characteristics, water resources, land use and crop patterns, livestock structure, production of lamb fattening with full inputs output data, rain-fed farming, extension services, credit, farmers associations, and constraints and priorities. Data collection was undertaken by two teams of surveyors through personal interviews with selected small ruminant (SR) keepers at the two target locations. Additionally, secondary data were also gathered from project reports as well as from research conducted in concerning the same topic from different sources; government departments, and literature.

Sampling Method

Multi-stage sampling method has been used and the communities selected purposively have been based on the presence of small ruminants' rearers. There are a total of 340 rearers of small communities in Al-thaheryia owning 20.000 heads, and 120 rearers in Facuoa owning 2400 heads. Therefore, from the records of Ministry of Agriculture (MOA) farmers' names, the simple random sampling technique has been used to select the respondents and the sample size has been determined by the formula:

$$\left\{ n = \frac{NZ^2 \times pq}{(Nd^2 + Z^2 pq)} \right\}$$

Where n is Sample size, N the Farmers population, Z the confidence level, d the standard error and p and q represent the probability.

The total sample size considered is 170 respondents, around 33% of total rearers population, by 125 respondent from Al-thaheryia area and 45 from Facuoa.

Results

Small Ruminants Socioeconomic Structure Analysis

Palestinian sheep farming is characterized by the breeding of fat tail Local Awassi (AW), and Assaf (AF), grazed sheep's on semi-intensive pastures in late winter and spring and fed indoors with barley, wheat bran, and hay most of the year. Additionally, most farmers use Assaf species in a closed system of production and concentrated feed because of its high sensitiveness (Ministry of Agriculture, 2014). All these breeds have a great genetic diversity (large and small tails a horned/polled, white/color) and moderate size compared to other sheep breeds with ewes weighing 50 kg for AW to 70 kg for AF, rams 80-120 kg, AW species fertility around 1.15 – 1.6 lamb born per ewe lambing, milk production from 110 to 300 litter per season (120 days), and moderate to hardy adapted to the harsh climate condition of West Bank. Their regional distribution in the households is as shown on Table 1.

Educational Level

The results reveal that 77.8% of the farmers registered the schools to get different education levels while one-third of the sample has the basic education, 45.6% and 35.6% in Al-thaheryia and Facuoa have a secondary level and 24.1% has a higher education in total. Otherwise, the illiteracy rate is very low at 0.8% in Al-thaheryia governorate and 2.2% in Facuoa. This indicates that farmers have a basic level of education which may allow them to participate in some programs such as increasing productivity's strategy to enhance the productivity and profitability of their small business as shown on following Table 2.

Gender and Age of Small Ruminant Keepers

Among 170 farmers, only 0.4% is female, the rest of 99.06% are male and the farmers' age ranged between 20 and 83 years with an average of 53.3 years. Moreover, the normal distribution of household ages indicates that the majority of sample ages are between 40-60 years while an average household age is 54 in Facuoa and 52 years in Al-thaheryia. This shows that farmers are generally in the middle age group and that may affect the acceptance of new ideas but also the experience of older age is important and can influence the responses to proposals of the new sector strategy.

Distribution of Farmers Per Uses of Harvested Water

The study reveals that in both target sites, households used mainly rainwater harvested for the domestic uses (76.3%), irrigation (10.1%) and watering animals (13.6%) as indicated in Table 3. According to the respondents around 33% depend on water harvesting because of water quantity limitations in Palestine.

Ranking of Small Ruminant Production Insecurity And The Constraints

The sources of insecurity for the small ruminant sector are presented in Table 4. The first source of insecurity in both sites is the feed costs, which is about 70% of the total production cost. There is a continuous increase in feed prices which is not compensated by the increase in

products prices, leading to economic losses from livestock sector generally and small ruminant especially. Then the second major source of insecurity is natural disasters and Israel activities at Al-thaheryia, and the marketing and prices fluctuations at Facuoia. Disasters include floods, frost, and storms. This indicates some variations in farmer perceptions of disasters between sites, wherein Al-thaheryia farmers generally see the disasters as a priority after feed cost. The reason for that strong perception of disaster in Al-thaheryia is due to the nature of landscape consisting of valleys and mountains and the relatively greater reliance on partial grazing. The Al-thaheryia site rearers are distributed in a very big area with low services. In addition, the disasters are also considered due to Israel occupation, regulations and military activities that always threaten farmers by confiscation of water and damage the animal houses.

Table 1 Percentage distribution of households with respect to the total number of owned animals in different regions (N=170)

Means of owned animals per regions		
Number of owned livestock	Al-thaheryia head / hh	Facuoia head / hh
Cattle	0.03	0.71
Goat and sheep	120	89
Donkey	0.99	0.09
Horse	0.09	0.15
Camel	0.29	0.03
Layers	10.89	11.55
Poultry chicken	70.70	387

Table 2 The education level of small ruminant rearers in regions

Education Level	Al-thaheryia		Facuoia		Total	
	%	N	%	N	%	N
Illiteracy	0.8	1	2.2	1	1.2	2
Primary	31.2	39	33.3	15	31.8	54
Secondary	45.6	57	35.6	16	42.9	73
Diploma and more	22.4	28	0.9	13	24.1	41
Total	100%	25	100	45	100	70

Table 3 Distribution of farmers per uses of harvested water

Uses of harvested water	Sites		
	Al-thaheryia (%)	Facuoia (%)	Total (%)
Domestic use	73.7	77.5	76.3
Irrigation	13.1	7.7	10.1
Watering animal	17	10.2	13.6

Table 4 Insecurity sources rank between sites from small ruminant rearers perceived

Insecurity Sources Rank	Sites		
	Al-thaheryia (%)	Facuoia (%)	Total (%)
Feed cost	1st	1st	1st
Fund and Insurance	5th	5th	5th
Disasters	2nd	4th	4th
Water	6th	6th	6th
Diseases	3rd	3rd	3rd
Marketing and PF	4th	2nd	2nd

PF: prices fluctuations

However, in Facuoia site farmers consider marketing and price fluctuations as major sources of insecurity after feed costs as a result of the distance between central city market and the village. Consequently, they feel insecure from this aspect which makes the marketing more sensitive for the low demand of small ruminant products as a result of importing or high prices. Therefore, the insecurity results from disasters, but depending on the farmers the fluctuations of marketing prices are more urgent. The third insecurity in both sites is the animal diseases, where farmers agreed that most losses from production resulted from animals' diseases. Furthermore, the farmers indicated that this is due to low coverage of veterinary services and the availability of free vaccinations at MOA. Most of the farmers' awareness against diseases is late cases and after losing some animals, where the early discovery of disease according to the availability, the advanced laboratories and vaccinations reduce those losses. Farmers, especially in Al-thaheryia site, depend on own experience and other farmers to treat some cases to save money, they also feel more confident in farmer-to-farmer experiences.

The final insecurity expressed by farmers is related to finance and insurance, where farmers are working on risk in farming without insurance. This makes difficult to fund operations and to cover when losses occur. There is lack of governmental or nongovernmental funds that could eliminate this constraint. The main insecurity sources are ranked on Table 4.

Cropping Patterns by Average Area of Cultivated Land

The average area of field crops amounts is 18 ha⁻¹ for own lands, 8 ha⁻¹ for rented lands and 18.5 ha⁻¹ for sharecropped land. The main crops cultivated by SR keepers to minimize the feed cost are wheat and barley. The analysis found that during previous season 40% of farmers in Facuoia site cultivated wheat and 31% in Al-thaheryia due to low precipitation in this area. According to this results, the farmers turn to cultivate crops because of low income from SR production and the high feed prices while the exploited areas are still not economic to satisfy animals complementary feed. The maximum amount of wheat cultivated areas are 100 ha⁻¹ on average 9 ha⁻¹, and 70 ha⁻¹ for barley is on average 5 ha⁻¹, which is related to MOA economic size standards, with an average of 20 ha⁻¹ as an economic size to get benefits.

A quantitative overview of cropping patterns of main crops in the two targeted sites is illustrated in the following Table 5.

Income Sources and Agricultural Income

Farmers' income is generated from different sources with different priorities. Therefore, off-farm income ranks first with 60% in the two sites, on-farm income with 22%, and trade with 9% and aid with 4.3%. On-farm income is the main source for 68% of Facuoia households, and 46% of Al-thaheryia households comes from agricultural activities such as rainfed agriculture, fruit trees, and animal production. The analysis leads to the high experience of the farmers in both sites, wherein Al-thaheryia 33.3% from 24-30 years' experience, and the rest farmers between 8-20 years, and in Facuoia around 55% from 16-30 years of experiences in small ruminant

keeping. The main source of income comes from selling the products (lambs and dairy products) in 89%, where there is no significant relationship between sites in Table 6.

Table 5 Percentage of respondent's growing crops according to sites

Crops	Sites		
	Al-thaheryia (%)	Facuoa (%)	Total (%)
Wheat	31	40	35
Parley	21	33	26
Lentils	0	2	2
Chickpeas	1	3	3
Total	52	73	56

Table 6 Sources of household's income from small ruminants according to sites

Sources of household income	Sites		
	Al-thaheryia (%)	Facuoa (%)	Total (%)
Crop sales	0.8	1.2	1.2
Dairy and meat products sales	35.2	34.7	34.7
Animal sales	30.4	26.5	26.5
Dairy products and animal sales	33.6	37.6	37.6
Total	100	100	100

Conclusions and Recommendations

In spite of the benefits associated with small ruminants sector, Palestine suffers structural and chronic constraints reflected by the socio-economic condition of SR production. Therefore, to understand the overall contribution of SR production in developing national economy, it is important to have an understanding of the different SR production systems and constraints that exist in the West Bank and the producers objectives from different views. Official statistics may be underestimating the total contribution of SR sector, by placing emphasis on the production and disregarding the non-marketed socio-economic functions which SR also assumed. This is because the functions are difficult to value, whereas production and technical aspects from SR raising have been extensively studied and socio-economic structure analyzed, quantified and modeled. But so far very little has been done to get a conceptually better underpinned, and more quantitative grasp of the importance of the socio-economic sector that would explain why SR keepers are willing to keep low productive animals in the herd as perceived by the farmers and technical staff.

The study focuses on the analysis of policy setting and socio-economic conditions, which examine the resource management and the role of institutions for sustainable small ruminant production. The productivity level of small ruminants (meat and milk) is less compared to other countries, which produce three times more than Palestine with same livestock population (Garcia et al., 2003). Under small mixed traditional framing system, artificial

insemination and development strategies do not seem to be successful (Sugiyama et al. 2003).

The socioeconomic analysis covered most variables that have a relationship with SR production and development like; respondent's age, education, experience, type of work and other variables that may affect and make interaction with different interaction models and technologies. The SR production constraints included, ranking of the insecurity factors that affect the SR sector, with highlights of the feed costs as main insecurity source. Also ranking the list of constraints that affect the production and the profitability of the SR sector, where we found the first constraints are the feed cost, lack of health control and veterinary vaccinations, and the marketing difficulties and prices instability, in addition to the occupation of Israel regulations.

Improve production efficiency from small ruminant is needed by focusing on quality a through using available improved breeds and inside flock selection. The new technology verification aiming to minimize costs and maximize the profits, and try to deal with what recommended by experts is a need for small ruminant sector. Also the laws, regulations and issue new ones depending on farmers' needs to be reviewed. Also support the preparation of refrigerated storage facilities and complimentary on-farm processing facilities.

Improve production efficiency from the small ruminant, by focusing on quality animals, not quantity, through using available improved breeds and inside flock selection. Continuously visit the extension and veterinary services offices and present constraints to benefit from their technical and management advice. Work as cooperatives to benefit from collective action, by joining available cooperatives.

The lack of information on the contribution of small ruminants to rural households in Palestine is considered to be the main reason to review a lot of updated articles discussing these prospects, and for the non-recognition of their importance by policy makers, planners, and relevant institutions.

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