

SURVEY ON SHEEP AND GOATS MILK PRODUCTION IN MALTA (TAPAS PROJECT)

FINAL REPORT

Agriculture and Fisheries Unit
National Statistics Office,
Malta 2005

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1 Introduction

Way back in July 2003, during the ASA Committee Meeting, Eurostat informed Acceding Countries that it was possible to finance actions to improve milk statistics. Malta took up the offer and an official request, together with an action plan, was sent to Eurostat on the 29th July 2003. Several projects, including Malta's application, were approved by Doc. ESTAT/CPSA/429 during the Committee Meeting of the 6th July, 2004. The formal approval of the work program was officially granted on the 3rd December, 2004.

1.1 Approach

The main objective of statistics is to provide timely, accurate and reliable information for planning and policy purposes within a local and global context.

The aim of this TAPAS action was to compile baseline data that would lay solid foundations for future milk statistics estimations. A methodological description on the history of sheep and goats milk production estimates will be explained. Also, the methodology used in the current compilation using a scientific and statistical approach will be dealt with. Finally, within this report, the NSO will be analyzing the results of the study carried out and will make comparisons to previous compilations in this area.

With the ever increasing demand for statistics, the burden on the respondents has increased immensely. However, this should be kept to a minimum and where reliable administrative sources are available, this should compliment or replace direct interviewing as long as it satisfies the requisites of statistics.

1.2 History on sheep and goats milk estimation

The volume of production of milk from sheep and goats has always been based on estimations derived on the number of heads that have been recorded by the Department of Veterinary Services. This activity has always been accepted as being a backyard industry as more than half the holdings have less than 5 heads on the holding. However, the production of sheep and goats' milk for the production of cheeselets plays an important role in the context of traditional Maltese agriculture. Moreover, the contribution of sheep and goats cheese as a secondary activity within the frame work of the Economic Accounts for Agriculture (EAA Rev 1.1) amounts to approximately 5 per cent of the Output of the Agricultural Industry.

The production of cheeselets is considered as a secondary non-agricultural activity, due to the fact that inputs cannot be separated from the production of cheese and the production of milk. Another difficulty arises from the fact that, since the bulk of the production of milk is used for cheese, the sale of raw sheep and goats' milk is negligible, thus, the price for raw sheep and goats' milk is unattainable.

Since the sheep and goats milk production comes from holdings which are considered as a backyard industry, hardly any records on such production are kept. This can create problems during the compilation of the data.

Notwithstanding such difficulties, the Agriculture and Fisheries Unit, through TAPAS Action Plan, has carried out a survey on the production of sheep and goats milk to replace estimates that have been calculated with assistance from the Ministry of Agriculture.

2 Origin of data for the methodological study

2.1 The sheep and goats annual livestock survey

As from the year 2002, , in line with the Council Directive 93/25/EEC of 1st June 1993 a directive *on statistical surveys to be carried out on sheep and goat stocks*, the Agriculture and Fisheries Unit has been carrying out annual surveys on sheep and goats, with a census date being 1st December. The December 2004 survey established that just over 1,500 holdings had a total sheep and goat population of approximately 20,000 heads.

2.2 The role of the Veterinary services

The Food and Veterinary Regulation Division within the Directorate of International and Legal Co-ordination of the Ministry of Rural Affairs and the Environment carries out regular inspections on all farms. For health reasons, it is compulsory to register sheep and goats and farms are visited twice a year where each ruminant is tested for brucellosis. All animals have identification tags and movements have to be approved by the Veterinary Services and records of all small ruminants are kept in a database.

Cheeselet sales must be accompanied by a certificate which satisfies the requisites and has to be approved by three different departments:-

1. The Veterinary Services, for registration and testing purposes.
2. Department of Agriculture, for management, hygiene and welfare.
3. Health Department, to certify that established standards are observed.

The sheep and goat population has been stable for quite some time. This is due to the fact that male lambs and kids are slaughtered whilst the majority of female lamb and kids are reared to replace old stock. Experts from the Veterinary Regulation Division, and results from the surveys on sheep and goat stocks indicate that Sheep and Goats in Malta are mainly used for the production of milk. Approximately 95 per cent of all female ewes and over 80 per cent of all female goats are used for milk production.

2.3 Sample design and methodology

The Veterinary Services provided a list of small ruminants to the Agriculture and Fisheries Unit. This list was to be the base of the Tapas Action Plan, however, updates from the annual survey carried out in December 2004 sample survey, were also taken into account. The survey was kick started in January 2005.

Enumeration errors were minimized as only six (6) qualified staff were involved in the interviewing stage. The actual interviewing was carried out during the milking period which extends from October 2004 to April 2005.

The holdings were stratified according to herd sizes and region. The holdings which had both sheep and goats on the holding were stratified according to total number of sheep and goats on the holding.

Table 1: Stratification of sheep and goat holdings by herd size

Stratum	Region	Herd size	Number of holdings	Total herd size
1	Malta	1-2	176	287
2	Malta	3-5	251	973
3	Malta	6-9	216	1,560
4	Malta	10-19	186	2,480
5	Malta	20-49	125	3,722
6	Malta	>=50	52	4,333
7	Gozo and Comino	1-2	145	231
8	Gozo and Comino	3-5	172	687
9	Gozo and Comino	6-9	82	575
10	Gozo and Comino	10-19	60	818
11	Gozo and Comino	20-49	57	1,813
12	Gozo and Comino	>=50	30	2,756
Total			1,552	20,235

All holdings in strata 6 and 12 were exhaustively surveyed and no sampling procedures were undertaken in these strata. This was due to the fact that these are the larger holdings and sampling procedures in these strata would produce high variances. The sample in the remaining strata was stratified using the *square root allocation* method where the number of units are split into each strata according to the following formula:

$$n_h = n \cdot \frac{\sqrt{N_h}}{\sum_{s=1}^{10} \sqrt{N_h}}$$

Where:

n is the total amount of holdings surveyed in sampled strata

n_h is the amount of holdings to be surveyed in stratum h

N_h is the amount of holdings in the population stratum h

s is the stratum number

The total sample size within the sampled strata was 500 holdings and the remaining 82 holdings in the exhaustively surveyed strata. Thus, the total initial sample size amounted to 582 holdings.

The square root allocation method was used so that the greater the units within a specific population stratum, the greater the units selected from that specific stratum. Using the above formula, the number of units to be surveyed within each stratum and their corresponding representative weights can be seen from the table below.

Table 2: Initial sample design and weighting using square root allocation method

Stratum	Region	Herd size	Number of holdings	Sample size	Weight
1	Malta	1-2	176	56	3.143
2	Malta	3-5	251	67	3.746
3	Malta	6-9	216	62	3.484
4	Malta	10-19	186	58	3.207
5	Malta	20-49	125	47	2.660
6	Malta	>=50	52	52	1.000
7	Gozo and Comino	1-2	145	51	2.843
8	Gozo and Comino	3-5	172	56	3.071
9	Gozo and Comino	6-9	82	38	2.158
10	Gozo and Comino	10-19	60	33	1.818
11	Gozo and Comino	20-49	57	32	1.781
12	Gozo and Comino	>=50	30	30	1.000
Total			1,552	582	

2.4 Enumeration and Interviewing

All sampled holdings were interviewed by five 6 experienced officials, five (5) of them were NSO officials and one (1) from the Animal Husbandry Division, from the Ministry of Rural Affairs and the Environment. The survey was carried out during January and March, 2005. Interviewing was carried out after office hours as the majority of the holdings are part timers. On average, each interviewer handled 104 holdings.

The questionnaire was split into two parts – the first part related to sheep's milk production and the second part related to goats milk production. It should be noted that the breeds of sheep and goats were not classified, hence the production of the Total Milked Milk (TMM) is not linked to the breed.

The data collected from the holdings was compiled from the breeders personal experience and no milk recording was made. The NSO does not have milk recording equipment and the time to carry out the survey was limited. Basically, the total production Milked Milk (TMM) was arrived at by multiplying the milking animals by the daily yield and the number of days during the milking period.

$$TP_i = \sum_{n=1}^n (MA_i \cdot ADY_i \cdot ND_i)$$

Where:

i is the species type

n is the number of farms with species i

TP is the total milk production after suckling

MA is the number of milking animals

ADY is the average daily yield of milk per specie after suckling

ND is the average number of milking days after suckling

The following is the data recorded in the questionnaire:-

Sheep

1. Number of milking sheep
2. Milking period
3. Average milk production per head
4. Milk usage

Goats

1. Number of milking sheep
2. Milking period
3. Average milk production per head
4. Milk usage

The estimated interviewing time per holding was around 10 minutes. A copy of the questionnaire is included in the Annex.

2.5 Unit non-response

In order to deal with unit non-response, post stratification of the actual units surveyed, was taken into consideration. Imputing of original data was not possible as no previous information on milk produced on the holding was available prior to this survey. A total of 523 holdings (89.9 per cent) out of 582 initially selected for the sample, were actually interviewed. The remaining 59 holdings could not be traced (See table 4).

The interviewed holdings were split as follows:

Table 3: Final weighting of holdings actually surveyed

Stratum	Region	Herd size	No of holdings	Final sample	Final weight
1	Malta	1-2	176	49	3.592
2	Malta	3-5	251	59	4.254
3	Malta	6-9	216	55	3.927
4	Malta	10-19	186	49	3.796
5	Malta	20-49	125	46	2.717
6	Malta	>=50	52	49	1.061
7	Gozo and Comino	1-2	145	44	3.295
8	Gozo and Comino	3-5	172	51	3.373
9	Gozo and Comino	6-9	82	34	2.412
10	Gozo and Comino	10-19	60	26	2.308
11	Gozo and Comino	20-49	57	32	1.781
12	Gozo and Comino	>=50	30	29	1.034
Total			1,552	523	

The response rate from each stratum can be seen from the table below.

Table 4 Distribution and response rate

Stratum	Region	Herd size	Initial sample	Final sample	%
1	Malta	1-2	56	49	87.5
2	Malta	3-5	67	59	88.1
3	Malta	6-9	62	55	88.7
4	Malta	10-19	58	49	84.5
5	Malta	20-49	47	46	97.9
6	Malta	>=50	52	49	94.2
7	Gozo and Comino	1-2	51	44	86.3
8	Gozo and Comino	3-5	56	51	91.1
9	Gozo and Comino	6-9	38	34	89.5
10	Gozo and Comino	10-19	33	26	78.8
11	Gozo and Comino	20-49	32	32	100
12	Gozo and Comino	>=50	30	29	96.7
Total			582	523	89.9

3 Results and Comparisons

3.1 Findings on structure of the holdings

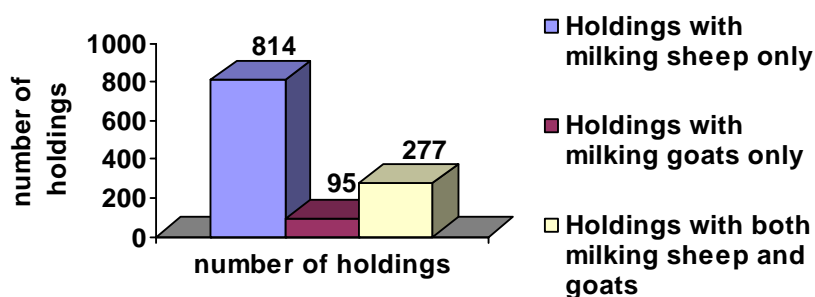
The key concern in the past has been whether the statistics used for EAA were of good quality. It is important that such a survey was carried out so as to establish a strong base for future estimations. The survey findings will serve to have a clear picture of the sheep and goats output.

The tables provide some insight on the results obtained on the sheep and goats milk production. During the annual December survey on sheep and goats, the total number of ewes and goats that have kidded, were recorded at 7,809 ewes and 3,282 goats. However, the 'Tapas Project' established that the total number of milking sheep and milking goats amounted to 7,541 and 2,663, respectively.

It is obvious that not all ewes and goats are intended for milking purposes. In fact, when comparing figures with the December 2004 survey, 96.6 per cent of all ewes are used for the production of milk whilst 81.1 per cent of all goats that have already kidded are intended for milk production. This may indicate that small holdings may have small ruminants as pets but these are still registered with the Department of Veterinary Services. Also, cull ewes and cull goats that have already kidded were recorded in the December annual survey.

There were 1,086 holdings that had milking sheep and 374 holdings had milking goats on the holding. It must be taken into consideration that not all sheep and goat holdings mentioned above are independent of each other, as a holding may have both species.

Graph 1: Distribution of holdings by type of milking activity



The herd structure of milk farms in Malta and Gozo is similar. The majority of the farms are quite small with 80.6 per cent of all holdings which have milking sheep have less than 10 heads. These farms produce milk for the production of cheeselets for their own use. There are only 19 holdings having more than 50 milking sheep.

Table 5: Total milk production by herd size of milking sheep

Region	Milking sheep	Holdings	Milking sheep	Total milk production	Milk for cheeselets	Average yield
	No	No	No	Ltr	Ltr	Ltr
Malta	1-9	524	1,626	241,161	213,891	148.3
	10-49	123	2,225	412,285	380,195	185.3
	>=50	7	559	136,400	136,400	243.9
	Total	654	4,410	789,845	730,486	179.1
Gozo and Comino	1-9	351	885	138,213	130,999	156.2
	10-49	69	1,398	357,401	354,382	255.7
	>=50	12	849	244,141	244,141	287.6
	Total	432	3,131	739,755	729,521	236.2
Malta and Gozo		1,086	7,541	1,529,600	1,460,007	202.8

Table 6: Total milk production by herd size of milking goats

Region	Milking goats	Holdings	Milking goats	Total milk production	Milk for cheeslets	Average yield
	No	No	No	Ltr	Ltr	Ltr
Malta	1-9	181	507	114,266	64,575	225.3
	10-49	44	765	192,301	154,394	251.4
	>=50	4	291	98,460	48,576	338.7
	Total	228	1,563	405,027	267,545	259.2
Gozo and Comino	1-9	116	316	82,087	52,879	259.9
	10-49	25	405	183,254	123,876	452.4
	>=50	6	379	153,737	65,748	405.1
	Total	146	1,100	419,078	242,503	380.9
Malta and Gozo		374	2,663	824,105	510,048	309.4

3.2 Findings on milk production

The survey results show that a total of 1,529,600 Litres of Sheep's Total Milked Milk and 824,105 Litres of Goat's Total Milked Milk was produced during the season.

It has been established that 1,460,007 litres (95.5 per cent) of all milk produced by milking sheep is used for the production of cheeselets, 63,447 litres (4.1 per cent) was used for own consumption and the remaining 6,144 litres (0.4 per cent) was used for feeding lambs. No sheep's milk is passed to the dairies.

The goat's milk production has different usage channel patterns. While, the bulk of production, 510,048 litres (61.9 per cent) is used for cheese making, a total of 153,442 litres (18.6 per cent) was sent to the dairies for the production of drinking milk (this figure is consistent with estimates supplied by national dairy on intake of goats milk). A total of

85,588 litres (10.4 per cent) was utilised for feeding purposes and the remaining 75,027 litres were for 'own consumption'.

From the report, it has also been confirmed that the milk production from sheep and goats is mainly intended for cheese production and only a small percentage actually goes to the market as raw milk.

Table 7: Utilisation of sheep's milk production by herd size

Region	Herd size of milking sheep	Total milk production	Milk for cheeslets	Drinking milk	Milk for feed **
	No	Ltr	Ltr	Ltr	Ltr
Malta	1-9	241,161	213,891	26,958	311
	10-49	412,285	380,195	26,919	5,171
	>=50	136,400	136,400		
	Total	789,845	730,486	53,877	
Gozo and Comino	1-9	138,213	130,999	7,213	
	10-49	357,401	354,382	2,357	662
	>=50	244,141	244,141		
	Total	739,755	729,521	9,570	
Malta and Gozo		1,529,600	1,460,007	63,447	6,144

** 'Milk for feed' is milk mainly used as feed for calves

Table 8: Utilisation of goats's milk production by herd size

Region	Herd size of milking goats	Total milk production	Milk for cheeslets	Drinking milk	Milk for dairies	Milk for feed **
	No	Ltr	Ltr	Ltr	Ltr	Ltr
Malta	1-9	114,266	64,575	41,917		7,774
	10-49	192,301	154,394	6,674		31,233
	>=50	98,460	48,576		33,575	16,310
	Total	405,027	267,545	48591	33,575	55,317
Gozo and Comino	1-9	82,087	52,879	23,536		5,672
	10-49	183,254	123,876	2,900	56,478	
	>=50	153,737	65,748		63,389	24,599
	Total	419,078	242,503	26436		30,271
Malta and Gozo		824,105	510,048	75,027	153,442	85,588

** 'Milk for feed' is milk mainly used as feed for calves

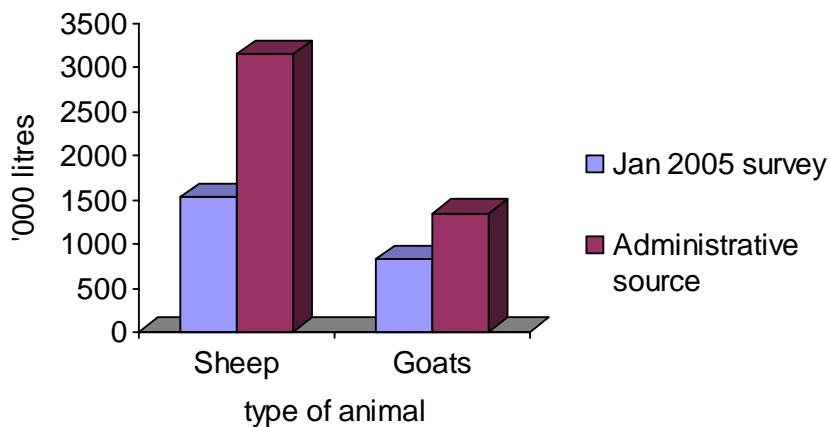
Whilst goat's milk for own consumption is mainly found on the small herds, the supply of goats milk to dairies is found on the professional holdings. On the other hand, milk for feed, is mainly found on the large holdings where producers use it as feed to other animals, mainly calves.

3.3 Comparison with administrative sources

Prior to the survey, production estimates were compiled from data provided by the Ministry of Rural Affairs and the Environment. The aim of the survey was to ascertain whether the administrative sources available to the NSO are in fact a reliable source of information on sheep and goats milk production that may be used with the Economic Accounts for Agriculture.

The table below compares the data that is provided by the Department of Agriculture in comparison with the data obtained from the Tapas survey.

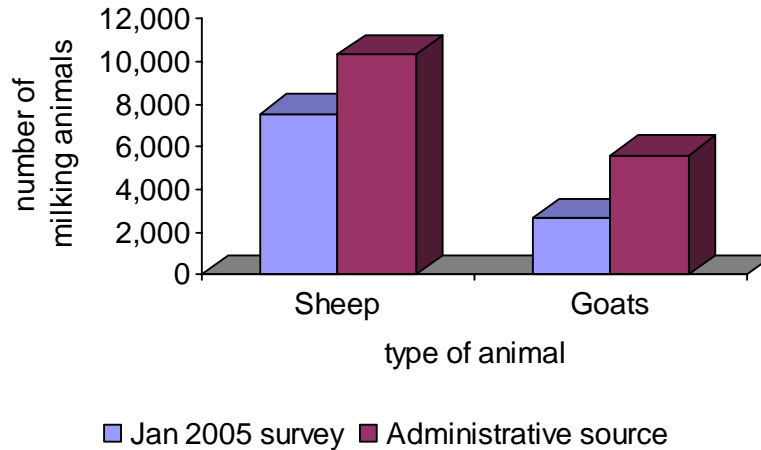
Graph 2: Comparison of sheep and goats milk production



It is evident that previous estimations were overstated and this was due to overestimations in the female population and in milk yields provided by Department of Agriculture.

From the table below estimated figures for milking females by the Department of Agriculture would amount to 10,315 milking sheep and 3,663 milking goats. These are considerably different when compared to the 7,541 milking sheep and 2,663 milking goats found in the 'TAPAS' survey.

Graph 3: Comparison of milking sheep and milking goats



Although administrative sources may give accurate information in some activities, it was not the case with the milk production of small ruminants. Administrative sources are mainly used to limit the burden on respondents. The milk survey just undertaken seems to provide a more realist scenario of the milk production by sheep and goats in Malta.

4 Conclusion

This study concludes that the administrative data previously used in the compilation of the Economic Accounts for Agriculture should be replaced by the results from the 'TAPAS' milk survey. Whereas, the data obtained from the Department of Agriculture was compiled through expert officials at the Department of Agriculture, the data compiled from the survey is obtained directly from the breeders, using a stratified sample.

The TAPAS action plan has aided the NSO in compiling data that will ensure data of better quality. The resultant survey will also have a positive effect on the compilation of the Economic Accounts for Agriculture and also on the compilation of the National Accounts.

Annex 1: Questionnaire

NSO Reference	
Mr/Mrs/Ms/Messrs	
Dar Nru / Isem House No / Name	
Triq Street	
Lokalita' Locality	

Ibdej fejn japplika Change where applicable	Mr/Mrs/Ms/Me SSRS	
	Dar Nru / Isem House No / Name	
	Triq Street	
	Lokalita' Locality	

Enumeratu Enumerator	
Data Date	

PROĠETT TAPAS - Produzzjoni tal-ħalib tan-nagħaġ u l-moġħoż

TAPAS PROJECT - Production of Sheep and Goats' milk

2004/2005

It-tagħrif qiegħed jintalab bis-setgħa ta' l-Att XXIV ta' l-2000 li waqqaf l-Awtorita' ta' l-Istatistika ta' Malta.
Din l-informazzjoni tintuwa biss għal skop ta' [bir ta' statistika u analiżi.
Hemm kontemplati penalitajiet amministrattivi f'każ ta' nuqqas ta' koperazzjoni u dikjarazzjonijiet foloz

Supply of data is compulsory under the Malta Statistics Authority Act XXIV 2000.
Data will be used for statistical purposes only.
Refusal or false declarations may incur penalties.

KUNFIDENZJALI WARA LI JIMTELA

CONFIDENTIAL AFTER FILLED IN

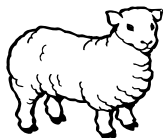
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Signature

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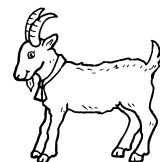
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Nru Karta ta' l-Identita'
Id Card No.



Agriculture and Fisheries Unit
Lascaris, Valletta CMR 02, Malta
Tel: +356 25 997 529 Fax: +356 21 249 841
nso@gov.mt, <http://www.nso.gov.mt>



F'liema LOKALITA' jin\ammu n-Nag]a[/l-Mog]o\?

In which LOCALITY are the Sheep/Goats kept?

NA{ }A{
SHEEP

1. Kemm g]andek nag]a[ja]ilbu dan l-ista[un?
How many milking sheep do you have this season? Numru
Number
2. Wara l-fatma, kemm iddum ta]libhom in-nag]a[?
For how long do you milk the sheep after weaning? Xhur
Months
3. Kemm hi il-medja ta']alib kuljum ta' nag][a wa]da mill-fatma san-nixfa?
What is the daily average milk production per sheep from weaning to drying? Litri
Litres/day
4. Kemm i\\omm]alib g]ax-xorb g]alik kuljum?
How much milk do you use as drinking milk for own consumption (daily)? Litri
Litres/day

MO{ }O{
GOATS

1. Kemm g]andek mog]o\ ja]ilbu dan l-ista[un?
How many milking goats do you have this season? Numru
Number
2. Wara l-fatma, kemm iddum ta]libhom il-mog]o\?
For how long do you milk the goats after weaning? Xhur
Months
3. Kemm hi il-medja ta']alib kuljum ta' mog]\a wa]da mill-fatma san-nixfa?
What is the daily average milk production per sheep from weaning to drying? Litri
Litres/day
4. Kemm tag]ti]alib lill-MDP kuljum?
How much milk do you take to the dairy daily? Litri
Litres/day
5. Kemm i\\omm]alib g]ax-xorb g]alik kuljum?
How much milk do you use as drinking milk for own consumption (daily)? Litri
Litres/day

Noti: 1 gallun = 4.546 litri

1 nofs = 2 terz = 0.639 litri

1 kwarta = 4 krate` = 5.114 litri

1 terz = 0.32 litri

1 karto`` = 2 nfas = 1.279 litri