Istituto Nazionale di Economia Agraria

INEA methodology for calculating the Standard Output of livestock production. Applied to the three-year period 2003-2005

BY
Franco Mari and Rachele Rossi

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Contributions to this paper:

Presentation: Prof. Giulio Zucchi
Chapter 1: Rachele Rossi
Chapter 2: Franco Mari (2.4, 2.5.1), Rachele Rossi (2.1, 2.2, 2.3, 2.5.2, 2.5.3)
Chapter 3: Franco Mari (3.2, 3.3, 3.3.1, 3.3.3), Rachele Rossi (3.1, 3.3.2)
Chapter 4: Franco Mari

FADN data processing: Novella Rossi, Mauro Santangelo

Technical Secretary: Novella Rossi

Editorial coordination: Benedetto Venuto

Editorial Secretary: Alexia Giovannetti

Graphic layout: Fabio Lapiana

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PRESENTATION

This work on the Standard Output of the livestock sector, carried out by INEA in conformity to the methodology defined by the EU, also suggests a methodological reference that goes beyond institutional tasks.

It is well-known that within the agricultural context livestock production is characterised as a secondary activity carried out through particularly complex and diversified production processes. They create joint large-scale productions which may be differently interpreted according to their final destination, and they also develop strong interrelations with the production of plants producing feedingstuffs and the working environmental conditions.

Such complexity is often insufficiently expressed by the official statistics, both national and Community. Therefore, for many analyses, and specifically for determining reliable territorial Standard Outputs, the reference sources should be strongly integrated by other para-official sources and by a direct analytical knowledge of the various sectors involved. Only by using this critical process of analysis and consistent implementation of various sources of information we can formulate explanatory and documental models that conform to our purposes, are realistic and help us to understand the substantial characterizations of the processes in the various territorial units of reference.

As documented by the methodological indications supporting the various final explanatory elaborations of the Standard Outputs, the methodological framework put in place to carry out each of them and organize the entire system of connections, has significant aspects of originality. These peculiarities are to be considered according to the goals and constraints put in place by the EU.

After due consideration, we believe it is desirable that the methodological approaches developed in this work are extended to and adopted by other Community partners to improve the degree of comparability of the results.

This need is reinforced by the ascertainment that, notwithstanding the many efforts being made, there continue to be mixed levels of statistical reliability among the countries involved; and it becomes even worse due to the different levels of accuracy observed in the surveys.

If the outcomes of this type of study are to constitute the knowledge base for Community decisions on agricultural policy, it is indispensable to stress how important the EU's commitment to perfecting these instruments is.

Prof. Giulio Zucchi

CHAPTER 1

STANDARD OUTPUT: WHAT IT IS AND WHAT IT IS USED FOR

1.1 Introduction

The Standard Output (SO) is the economic criterion underlying the classification of European farms, known as the Community typology for agricultural holdings, hereinafter referred to as 'Community typology'. The purpose of the Community typology consists of providing a classification model throughout the European Union that allows an analysis of the farms situation based on economic criteria and that allows comparison between farms belonging to various classes and between the economic results obtained throughout time and in the various Member States and their regions. The fields of application of the Community typology specifically include surveys such as: the Farm Structure Survey (FSS), Farm Accountancy Data Network (FADN), and Economic Accounts for Agriculture (EAA). The legislation determining the methodology in question is the Commission Regulation (EC) No. 1242/2008 of 8 December 2008 establishing a Community typology for agricultural holdings published in the Official Journal of the European Communities No. L 335 of 13 December 2008. This Regulation repealed the previous Decision No. 85/377/EEC[1] used to classify FADN farms until the fiscal year 2009 included and those involved by the FSS until the 2007 survey included.

1.2 The definition of "Standard Output"

The SO of an agricultural production, whether plant or animal, is the monetary value of the agricultural output, which includes sales, re-use, self consumption, changes in the stock of products, evaluated at farm-gate prices. The SO does not include direct payments, VAT or taxes on products. Gross production is defined as the sum of the value of primary and secondary product(s) obtainable from a given production activity. The values of a given production must be calculated by multiplying the output (unitary physical production) by the farm-gate prices exclusive of VAT.

The SO are determined on the basis of a five-year period[2] to avoid bias caused by fluctuations that might influence the production of a single year (e.g. bad weather). Assuming the year N-3 as a reference point (where N is the year when the FSS survey is conducted) and the years from N-5 to N-1 for collecting basic data from which to obtain average values of the five-year period – and taking as a point of reference the realization of the FSS 2010 survey – the coefficients will be the SO 2007 figures calculated on the basis of the average production values and prices referring to the years from 2005 - 2009 (i.e. agricultural production years 2005/2006 to 2009/2010).

From the territorial point of view, the SO shall be calculated on the basis of geographical units compatible with those used for the FSS and FADN surveys; in Italy it is applied to 21 regions, i.e. the 19 administrative regions and 2 autonomous provinces.

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[1] *Commission Decision of 7 June 1985, establishing a Community typology for agricultural holdings (85/377/EEC), published in the Official Journal of the European Communities No. L 220 of 17 August 1985.*

[2] *As specified in more detail below, the exception are the SO dealt with in this publication which have been calculated on the basis of a three-year period from 2003-2005.*

If no basic data are available for the calculations of the SO of a given production activity in one of the regions, the region in question can be attributed, depending on the case, a value corresponding to the average of the area in which it is located (or the surrounding areas) or the value of the nearest region.

1.3 Principal aspects of the Community Typology

Type of farming (TF) and economic size (ES) are the two classification criteria used in the Community typology[3]. The total SO of a farm, equal to the sum of the SO values of each farming activity, multiplied by the number of hectares of land or animals on the farm for each of the above-mentioned activities, is referred to as "economic size of the farm", the value of which is expressed in euros and can be placed in one of the 14 economic size classes contemplated.

The TF provides information on the production orientation and degree of specialization of the farm based on the share of the economic size (in terms of SO) of the various production activities on the overall economic size of the farm. Therefore the TF is the production orientation of the farm which will be considered, e.g., "specialist olives" if most of its total gross production comes from the cultivation of olives. In this way farms are divided according to a model that, depending on the amount of detail required, contemplates 9 general TF, 21 principal TF and 62 particular TF.

Application of the SO to the farm structure (hectares of crop and/or heads of livestock) is therefore a mechanism through which the physical size of the farm is converted into its "economic size" which is expressed in terms of SO.

Given the growing importance of non-farming activities in the income of the farmers, a new classification variable has been introduced, in order to reflect the importance of the Other Gainful Activities (OGA) directly related to the holding and which contribute to forming the total farm income. The classification is based on an estimate of the share of farm turnover produced by the OGA in the total turnover of the holding.

1.4 From SGM to SO: what has changed

The type of farming and the economic size of the farm, underlying the Community typology, should necessarily be determined by referring to an economic criterion remaining always positive. Such economic criterion, starting from the Decision No. 85/377/EEC, was identified in the standard gross margin (SGM), obtained by deducting the variable specific costs from the total gross production, including production premia. The disappearance of product-related subsidies created a situation where some productions may achieve a negative SGM. Consequently this change led to a decision to replace SGM with SO: indeed, the difference between SGM and SO consists of the fact that to determine the latter, only the gross production results are taken into account, i.e. outputs multiplied by prices, while variable costs disappear entirely along with product-related subsidies.

During the transition from SGM to SO, it was decided that SGM and SO should both be calculated in reference to the same period of time. This means that both SGM 2004 (the last ones

[3] *For more information about the typological classification methodology, refer to the content on the website: www.rica.inea.it*

calculated using the old typology) and SO 2004 (the first ones calculated using the new typology) were obtained from the basic data collected for the three-year period 2003-2005. For a complete description see Chapter 3 which illustrates the methodology used to determine the specific costs and estimate the premia which have been determined to obtain the SGM 2004 of the Italian farm productions. These items, as stated earlier, are no longer taken into account to calculate the SO.

CHAPTER 2

CALCULATING SO OF LIVESTOCK PRODUCTIONS

2.1 Introduction

The SO of the livestock productions corresponds to one head of livestock, except for poultry, where the coefficient refers to 100 head, and for bees, for which the unit of measure is one beehive. Moreover, since the SO are determined on a year basis, for livestock whose production cycle lasts less or more than 12 months, it is necessary to relate the data to the year; therefore for certain animals (e.g. broilers) we have to count several production cycles in one year, whereas for others (e.g. laying hens) the real production cycle shall be reduced so that it refers to a duration of only 12 months.

The SO of a given farm production activity shall include all the possible products obtainable from it: the principal product and any secondary products and byproducts. Considering meat as the principal product for most animal categories, the following can also be indicated as principal products: milk for dairy cows, sheep and goats, eggs for laying hens; honey for bees; newborn calves for other cows (suckler cows). The secondary products and byproducts are: newborns for dairy cows, sheep, goats, sows and breeding rabbits; wool for sheep; wax for bees. To clarify with an example, we can mention the case of ewes (breeding sheep), for which the SO equals the sum of the following values: milk as principal product + meat as secondary product + lamb and wool as byproducts.

The list of livestock categories for which the SO is calculated is the following:

- equidae
- bovine animals under 1 year old (male and female)
- male bovine animals, one but less than two years old
- female bovine animals, one but less than two years old
- male bovine animals, two years old and over
- heifers, two years old and over
- dairy cows
- other cows (suckler cows)
- sheep – ewes
- other sheep
- goats – breeders
- other goats
- piglets less having a live weight of under 20 kilograms
- breeding sows weighing 50 kg and over
- other pigs
- broilers
- laying hens
- turkeys
- ducks
- other poultry
- rabbits – breeders
- bees

As shown above, in particular for bovines, the animals are divided into age categories. This means that SO equals the product obtained in the period of permanence of the animal in a specific age category.

2.2 Gross production calculation model

It has often been emphasized that for the purposes of a more effective use of the SO for the Community typology, it is essential that the results obtained by the Member States are consistent and totally comparable, though the available data, which are used as a basis for the calculations, are often quite different. For this reason the legal provisions and the support handbook provide detailed calculation models which can be modified and adjusted to the basic data by each Member State and therefore they guarantee a total consistency of the final results as well as a better comprehension of the methodologies used and of the quantity and quality of the data. Having stated this preliminary remarks, we can move on to analyse the setting of the study underlying the calculation of the SO.

Table 2.2.a - SO Calculation model for livestock productions

Production code	Description	Region code	Gross production								SO		
			Increase or meat			Other principal product			Byproducts value	Total	National currency	Euro	Note
			Quantity	Price	Value	Quantity	Price	Value					

The first three columns of the calculation model (Table 2.2.a) identify a given production activity through a production code and a description, as well as a regional code, according to which a certain SO can be univocally attributed to a given production carried out in a certain region.

The gross production columns contain the basic data regarding amount, price and value of the meat and of the other principal product, the value of the byproducts and, finally, the total.

The three final columns contain the SO value in the national currency (for countries outside the euro area) and in euro (the conversion rate is provided directly by the European Commission to the concerned Member States), as well as notes and/or comments, if necessary.

To calculate "SO 2004" for Italy, the aforementioned model was modified by adding more columns in order to adapt it to the available data sources. Some columns were added to adapt the description of the livestock category used in ISTAT[4] statistics (the principal source we used) to the description given by EUROSTAT, for which the calculation of the SO is required. In fact, it should be pointed out that in some cases the breakdown of the various types of livestock into different categories as proposed by ISTAT corresponds exactly to the production activities for which the calculation is required. However, in other cases it is necessary to group together a number of ISTAT categories or, vice versa, to split one category into several categories to obtain a grouping

[4] *ISTAT is the acronym of the Italian National Institute of Statistics (http://en.istat.it).*

of data that is consistent with EUROSTAT approach. To this end, we used an adaptation coefficient to convert the numerical figure, referring to live weight per head of a given livestock category as described by ISTAT statistics, into a new numerical figure referring to live weight per head of a given livestock category as described by EUROSTAT (Table 2.2.b).

Table 2.2.b – Adaptation of data (source ISTAT) to the EUROSTAT description

Regions		Livestock category					
		Istat			Eurostat		
Code	Description	Description	Live weight per head	Adaptation	Code	Description	Live weight per head

Moving on to gross production, the calculation model was expanded to include other basic information needed to determine the value of the meat, i.e. the weight produced by the animal per cycle, the number of cycles in a period of 12 months and, finally, the weight produced in one year (Table 2.2.c).

Table 2.2.c – Calculation of livestock weight increase

Meat				
Live weight produced in the category				
Weight per cycle	Cycles per year	Weight per year	Price	Value

Another part of the model that was expanded was the calculation of byproducts, differentiated into newborns and other byproducts. In particular, columns were added to determine the number of newborns and they contain information about the number of births per year, the number of newborns at each birth and the weight of the newborn at weaning (Table 2.2.d).

Table 2.2.d – Calculation of the value of by- products

Value of by-products									
Newborns						Others by-products			
Quantity									
Births per year	Newborns per birth	Weight per weaned newborn	Total Quantity	Price	Value	Quantity	Price	Value	Total

2.3 Information sources

As clearly demonstrated in the previous paragraph, determining the SO values of the livestock productions assumes the availability of all kinds of basic data to be reprocessed according to the survey needs for each situation encountered in the course of the analysis and calculation work. Sources of information were selected, as can be expected, on the basis of their official character and reliability, but also analysing their efficacy a priori in relation to the calculation methodology intended to be used.

ISTAT statistics on livestock were the principal source used, and in particular:

- the annual data published by ISTAT on the number of heads of cattle and buffalo, sheep, goats, equines and swine as of 1 December for the years 2003, 2004 and 2005; these figures provide information on the number of heads in a given region on a precise date, divided into various categories according to the type of livestock population;
- the annual ISTAT survey results for the years 2003, 2004 and 2005 of slaughtered livestock of the following species: bovine, buffalo, swine, sheep, equine and poultry; this data provide information on the number and weight (live weight and dead weight) of the animals slaughtered annually in the various regions, in some cases divided into categories;
- the official statistics published by Associazione Italiana Allevatori (AIA) on the production of milk from cows, buffalos, sheep and goats in the years 2003 - 2005; the data gathered on the production of milk contains information by region, province, breed and refers only to livestock farms controlled by AIA (note, however, that the trend of the number of participants in functional controls by Italian breeders is continuously rising, one reason being the higher level of professionalism they have achieved);
- the economic data of 2003, 2004 and 2005 published by Unione Nazionale dell'Avicoltura (UNA) regarding the trends of the Italian poultry market; these data were used to obtain information about the poultry sector and conduct further analyses and comparisons between the various available sources;
- the data published by Osservatorio Nazionale della Produzione e del Mercato del miele (National Observatory of Honey Production and Market) regarding the number of beehives per region and the average regional production in the three-year period being studied;
- ISTAT statistics on agricultural productions at basic prices, as shown in the Italian Agriculture Yearbook of INEA, in particular for information on the quantities (especially referred to the milk) and the prices of agricultural productions during the three-year period being studied here;
- FADN information regarding livestock farms was used as a term of comparison for the above statistics and for the estimation of certain specific costs needed to calculate the SGM.

2.4 Demographic models of livestock populations

As shown before, the sources of available statistics do not divide domestic livestock according to the production aptitude of the animals or, even less, according to the type of livestock farm. On the contrary, the productions obtained from livestock farms (and the relative specific costs in the case of calculating the SGM) are a function of these two variables, among others. Therefore the correct "standardization" of livestock productions, requires an instrument that

considers the productions themselves according to the incidence of the various types of livestock farms on which the productions are carried out. The instrument in question is the *demographic model* of the bred species and its essential characteristic, for our purposes, is the distribution of the entire population of the species being studied by geographic area, age category (and/or weight and/or sex), purpose of the production (slaughter or breeding) and origin (open or closed-cycle). The methods for applying the demographic models will be explained briefly but for the moment we would like to illustrate how such models were created.

Table 2.4.a shows the demographic model of the Italian bovine and buffalo population. The data reported in it were obtained by first calculating the average three-year size of the population being examined, starting with the annual estimates of heads of livestock by ISTAT. Then, assuming the average regional quantity as equal to 100, we calculated the percentages of the totals of each age and sex category into which the population was divided. The percentages pertaining to the "subcategories" of each category, however, were calculated by relating to 100 the total of the item to which the "subcategories" refers. All of this excluded the number of heads of livestock destined to slaughter and coming from open-cycle farms which, on the contrary, were calculated by the difference between the percentage of livestock destined to slaughter and the percentage of suckler cows (other cows); in cases where this difference was negative, it was set at zero. The assumption underlying this estimation is that on this type of livestock farm "transit" all animals exceeding the production capacity of meat-growing farms (a number which in theory coincides with the sum of animals produced on dairy cow farms, net of imported animals and animals kept by the farm itself for internal livestock replacement). Though this assumption may initially appear exaggerated, the following considerations need to be developed:

- the percentage of animals destined for slaughter and originating from open-cycle farms is a figure needed to calculate the SO of livestock productions and therefore, having no structured information of this kind, we are compelled to estimate the figure;
- on dairy cow farms, the production of meat exceeding the amount produced from animals that have reached the end of their career can be considered as a "separate management" from that of animals bred to produce milk. Therefore animals bred to produce meat on a dairy farm can simply be compared to animals from open-cycle farms.

In light of these considerations, the simplification reached by using the above-mentioned assumption can be considered entirely acceptable. The last item of information to be provided for the demographic model regards buffalo. For the purpose of calculating the SO, buffalo shall be compared to cattle. ISTAT surveys the animals in question by dividing them into two categories only: cow buffalo and other buffalo. As a result, to meet Community provisions, we should divide the other buffalo category into the same categories established for cattle. Such division was carried out by applying to the buffalo population the same percentage composition as that of the cattle population.

Table 2.4.b presents the demographic model of the domestic swine population. Data are taken from the same sources and were obtained through the same methodology already described for the demographic model of cattle. The only exception lies in the fact that, in this case, the production capacity of the closed-cycle livestock farms was not estimated according to the number of sows but that of piglets. The rationale that led to the adoption of a different method for approaching this problem was essentially as follows:

- apart from local practices which do not influence Italian food custom (e.g. the case of the Sardinian *porceddu*), the slaughtering of pigs is carried out according to the weight category >50 kg. The need to estimate the percentage of animals from open-cycle farms is therefore limited to this category;

- given the delicate constitution of piglets, the custom of early weaning is negligible nowadays. We can therefore realistically state that the sale/purchase of swine does not start until they have entered the category of store pigs (just weaned, and weighing 20-25 kg);
- unlike cattle, for which it is easy to hypothesize the same annual ratio for cows and calves, the reproduction characteristics of pigs (along with the local custom of slaughtering piglets) are not such that they would allow the immediate ascertainment of the existing annual ratio between sows and piglets. The estimation of the production capacity of closed-cycle farms starting with the number of sows would have required the need for an additional estimation to determine the number of piglets produced by these sows.

Having said this, the number of pigs destined for slaughter and bred in open-cycle livestock farms was estimated by the simple difference between the overall number of the category being examined (fattening animals) and the number of piglets[5]. It should be pointed out that the estimation criterion adopted and the results obtained are corroborated, though indirectly, in the existing ratio between piglets and sows and in the incidence of open-cycle pig farms on the total number of Italian pig farms. The piglet/sow ratio evidenced in the demographic model and calculated on the basis of the same data reported in it shows, though within the confines of an acceptable regional variability, a substantial standardization of the number of animal categories being compared. The percentage incidence of open-cycle pig farms on the total number of Italian pig farms also, though referring to a different phenomenon from the one being studied here (number of farms instead of number of animals), though originating from a different source of data (census instead of short-term statistics) and though referring to a different period of time (2000 instead of the average of 2003-2005), correlates quite well with the results of the estimation made, i.e. with the percentage incidence of fattening pigs from open-cycle farms on the total number of fattening pigs. The correlation being examined is shown on chart 2.4.c.

[5] *Given the premises of the estimate, the results also indicate the number of imported animals being surveyed.*

Table 2.4.a - Demographic model of the Italian bovine and buffalo population

(Percentages of regional total or category to which the "subcategories" refers, unless otherwise indicated)

	Valle d'Aosta	Piemonte	Lombardia	Trentino	Alto Adige	Veneto	Friuli-V.G.	Liguria	Emilia Romagna	Toscana	Marche	Umbria	Lazio	Abruzzo	Molise	Campania	Calabria	Puglia	Basilicata	Sicilia	Sardegna	Italy
Bovines under one year old	17,6	31,3	34,1	20,2	19,1	39,9	24,4	27,8	20,5	31,7	34,5	33,6	23,1	31,0	32,0	28,6	31,4	24,6	25,4	29,9	30,3	31,0
- to be slaughtered	4,7	14,2	30,6	7,7	4,7	28,8	7,9	13,0	7,7	24,9	20,0	25,4	15,7	17,5	17,1	13,6	26,1	14,0	20,0	17,2	30,0	22,8
- from "open" farms	3,7	2,7	29,5	7,1	3,8	28,2	6,5	0,0	5,1	12,3	0,5	9,2	4,3	5,6	8,5	2,5	7,0	8,5	3,5	0,0	2,5	15,6
- others	95,3	85,8	69,4	92,3	95,3	71,2	92,1	87,0	92,3	75,1	80,0	74,6	84,3	82,5	82,9	86,4	73,9	86,0	80,0	82,8	70,0	77,2
- males	19,6	46,8	30,1	31,3	13,6	47,3	31,1	39,0	24,8	37,5	47,5	42,5	33,5	45,3	45,3	46,0	44,8	37,0	39,7	45,4	35,6	38,1
- females	75,7	39,0	39,3	61,0	81,7	23,9	61,0	48,0	67,5	37,6	32,5	32,0	50,7	37,2	37,7	40,4	29,2	49,0	40,2	37,4	34,4	39,1
Bovines > 1 but < 2 years old	18,7	26,8	22,3	19,8	18,0	34,9	24,3	17,0	23,6	22,6	22,6	21,2	18,7	19,4	17,6	19,1	18,7	18,0	16,2	16,3	13,9	23,6
- males	8,5	55,1	33,6	21,5	5,0	69,4	35,3	36,2	31,9	52,6	63,0	58,6	30,4	53,4	50,4	50,2	62,3	28,2	38,4	42,3	33,3	46,5
- females	91,5	44,9	66,4	78,5	95,0	30,6	64,7	63,8	68,1	47,4	37,0	41,4	69,6	46,6	49,6	49,8	37,7	71,8	61,6	57,7	66,7	53,5
- to be slaughtered	1,1	12,5	8,9	5,5	2,2	10,7	7,9	19,8	7,3	20,1	12,6	11,7	9,3	8,5	13,8	15,0	10,5	5,8	7,9	11,2	8,4	10,0
- from "open" farms	0,1	1,0	7,8	4,9	1,2	10,1	6,5	0,0	4,8	7,5	0,0	0,0	0,0	0,0	5,3	3,9	0,0	0,4	0,0	0,0	0,0	2,8
- for livestock farm	90,4	32,4	57,5	72,9	92,8	19,9	56,7	43,9	60,7	27,3	24,3	29,7	60,3	38,1	35,7	34,8	27,2	66,0	53,6	46,5	58,3	43,5
Bovines 2 years old and over	13,0	9,1	8,4	6,7	10,1	3,7	7,2	14,5	9,2	17,9	11,9	13,3	13,0	11,4	6,3	8,5	14,4	9,3	12,2	12,6	15,6	9,1
- males	6,9	13,6	8,6	3,1	6,3	10,7	6,4	14,4	9,0	11,2	14,9	14,3	13,4	10,8	10,0	16,3	20,1	17,3	18,0	17,8	22,5	12,6
- females	93,1	86,4	91,4	96,9	93,7	89,3	93,6	85,6	91,0	88,8	85,1	85,7	86,6	89,2	90,0	83,7	79,9	82,7	82,0	82,2	77,5	87,4
- to be slaughtered	0,9	8,0	3,7	3,8	4,6	12,6	12,3	7,5	5,3	7,3	6,0	6,8	8,1	9,3	13,6	12,6	8,4	6,9	9,1	6,5	6,1	6,7
- from "open" farms	0,0	0,0	2,6	3,1	3,6	11,9	10,9	0,0	2,8	0,0	0,0	0,0	0,0	0,0	5,0	1,5	0,0	1,4	0,0	0,0	0,0	0,0
- for livestock farm	92,2	78,3	87,7	93,2	89,1	76,8	81,2	78,1	85,7	81,5	79,0	78,9	78,5	79,8	76,4	71,1	71,5	75,9	72,9	75,8	71,4	80,7
Dairy cows	49,8	21,3	34,1	52,7	51,8	20,9	42,7	19,6	44,2	15,2	11,5	15,6	33,8	26,2	35,6	32,7	16,4	42,7	29,6	15,5	12,6	29,2
Buffalo/ Dairy cows %	0,0	0,2	0,6	2,7	0,0	0,8	0,9	0,2	0,2	2,1	4,1	1,5	32,7	0,2	2,5	157,2	0,3	5,4	1,5	1,0	2,9	8,4
Other cows	1,0	11,5	1,1	0,7	1,0	0,6	1,4	21,1	2,6	12,6	19,5	16,3	11,4	11,9	8,5	11,1	19,1	5,5	16,5	25,7	27,5	7,2
Total bovines 1,000 heads	41	838	1.685	50	150	980	104	19	627	110	79	65	250	87	59	219	114	163	82	320	265	6.305
Total buffalo "	0	1	5	1	0	2	1	0	1	1	1	0	39	0	1	151	0	5	0	1	1	210
Total bovines and buffalo "	41	838	1.690	51	150	982	104	19	628	111	80	65	290	87	59	370	114	168	83	320	266	6.515

Source: our processing of data from ISTAT

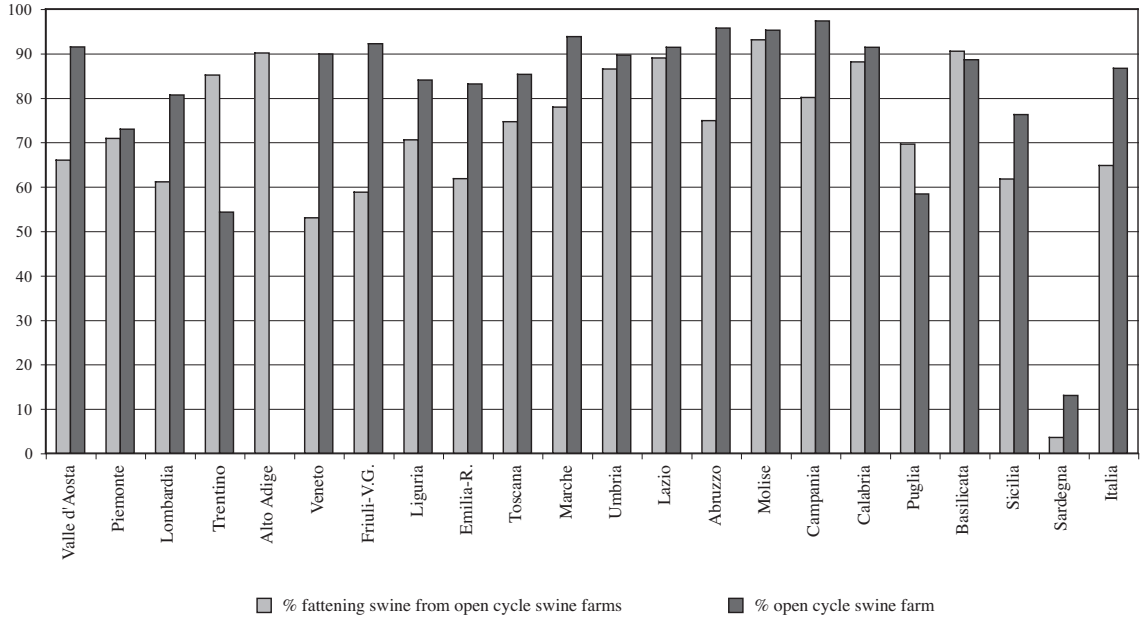
Table 2.4.b - Demographic model of the Italian swine population

(Percentages of regional total or the category to which the "subcategories" refers, unless indicated otherwise)

Regions	< 20 Kg (Piglets)	from 20-50 Kg (Young pigs)	Weighing 50 kg or more					Total (1.000 heads)	Ratio piglets/ sows	Swine farms	
			Fattening animals (light and heavy swine)		Breeders						
						Sows					
			Total	of which from "open" farms	Boars	Total	of which covered			Total (number)	of which open-cycle (%)
Valle d'Aosta	17,9	21,7	52,8	66,0	0,1	7,5	83,0	0,7	2,9	35	91,4
Piemonte	15,8	22,4	54,4	70,9	0,1	7,3	83,3	954,1	2,6	1.249	72,9
Lombardia	19,9	21,0	51,2	61,1	0,1	7,7	82,6	3.962,1	3,1	3.521	80,6
Trentino	10,4	17,4	69,6	85,1	0,1	2,6	91,5	9,0	4,3	352	54,3
Alto Adige	7,8	8,6	79,0	90,1	0,4	4,1	70,7	16,9	2,7		
Veneto	22,2	21,2	47,1	52,9	0,1	9,4	84,5	719,3	2,8	5.583	89,8
Friuli-V.G.	20,7	19,7	50,2	58,8	0,1	9,3	73,4	212,8	3,0	1.969	92,1
Liguria	16,3	12,7	55,2	70,5	0,5	15,3	27,3	2,9	3,9	100	84,0
Emilia-Romagna	19,8	20,9	51,7	61,8	0,1	7,5	81,4	1.595,3	3,3	2.590	83,1
Toscana	14,8	20,6	58,1	74,6	0,2	6,3	88,4	187,7	2,6	2.903	85,2
Marche	13,4	19,7	60,7	77,9	0,1	6,1	88,9	163,7	2,5	9.116	93,7
Umbria	9,1	19,1	67,5	86,5	0,1	4,2	85,0	254,9	2,6	3.703	89,5
Lazio	8,6	9,9	77,7	88,9	0,3	3,5	80,7	91,8	3,0	7.429	91,3
Abruzzo	15,7	15,3	62,4	74,8	0,2	6,4	82,2	113,7	3,0	9.485	95,7
Molise	5,5	12,3	79,1	93,0	0,2	2,9	84,4	51,6	2,2	4.468	95,2
Campania	13,2	12,4	65,9	80,0	0,2	8,3	88,6	145,0	1,8	18.357	97,3
Calabria	8,9	9,9	74,5	88,1	0,4	6,3	75,1	120,8	1,9	9.775	91,3
Puglia	16,6	20,7	54,5	69,6	0,7	7,4	89,1	25,9	2,5	245	58,4
Basilicata	7,0	15,6	73,4	90,4	0,2	3,8	85,8	73,0	2,2	7.518	88,6
Sicilia	17,9	23,8	46,7	61,7	0,9	10,7	76,8	46,0	2,2	614	76,2
Sardegna	26,0	13,6	26,9	3,5	3,5	30,0	84,8	224,6	1,0	6.004	13,0
Italy	18,6	20,3	52,8	64,7	0,2	8,1	82,7	8.971,8	2,8	95.016	86,6

Source: our processing of data from ISTAT

Graph 2.4.c - Correlation between open cycle swine farms and fattening swine from open cycle swine farms



Lastly, Table 2.4.d shows the demographic models of the equidae and sheep/goat populations. As you can see, the information given is extremely concise and coincides with the percentage composition of the herds of animals being studied, estimated with data found in the literature. Though concise, this information is sufficient for the previously explained objectives because, at least in Italy, the breeding of these species on open-cycle farms is lacking in statistical significance, as well as the potential variability of the composition of the different herds that can be found among the various regions.

Table 2.4.d - Demographic model of the equidae and ovicaprid population

Species	Category	% of the population
Equidae	Broodmares	50
	Stallions	2
	Young animals	48
Ovines	Ewes	60
	Rams	5
	“Agnelloni” lambs and wethers	15
	Lambs	20
Caprines	Goats breeders	60
	Billys	5
	Young goat/billy and wethers	15
	Kid goats	20

Source: our processing of data from literature

Contrary to the above statements about equidae and sheep/goat farms, for rabbit and poultry breeding the economic weight of the closed-cycle farms (rural farms) on the total of respective livestock farms is insignificant. Consequently, as regards the last-mentioned productions, the development of a demographic model has no meaning and was therefore ignored.

2.5 Calculating gross production

2.5.1 The value of the meat: quantity and price

Our goal is to estimate the value of the meat produced by an animal[6] in one year and in the category to which it pertains, if a division by categories is available for the species involved.

The estimation in question can be carried out by these two alternative approaches:

1) direct approach (estimation of the value of the live animal);

2) indirect approach (estimation of the value of the animal through the amount of meat it produces).

The direct approach entails the following disadvantages:

- the value of the live animal coincides with the value of the meat produced by it only for animals at the end of their production cycle. The value of the animals who are not at the end of this stage is configured more like the purchase price of a production factor and not as the sale price of a product;
- the variable "value of the live animal" is expression of a market often characterized by little transparency. Therefore, it does not necessarily coincide with the value resulting from the product between the amount of meat produced by the animal (weight of the animal) and the sale price of the same. The estimation of the value in question through that of the live animal, therefore requires forgoing the use of the aforementioned information;
- the failure to use the amount of meat produced by an animal leads to significant difficulty in calculating the costs of feeding the animal; however it should be estimated if we intend to calculate the SGM of the livestock productions. In other words, in the absence of information on the amount of meat produced by an animal, the estimation on the food consumption would necessarily produce values that are excessively standardized.

On the other hand, the indirect approach, i.e. estimation of the value of the animal through the quantity of the meat it produces is relatively simple because we know its "average live weight per head" (ISTAT data –Slaughter Statistics). The only disadvantage encountered in this case, which is easily surmountable, is that the information is provided for categories that do not always univocally coincide with those contemplated by the Community typology.

In consideration of the advantages and disadvantages of each approach, it was decided to use the indirect approach. The amount of meat produced by an animal in one year and in one category was therefore calculated according to the following methodology:

- a calculation was made of the three-year average of the "average live weight per head" for each animal category contemplated by ISTAT and useful for the purposes of calculating the SGM;
- each of the above categories was combined with the respective animal category contemplated by the Community typology;
- in case of non-univocal correspondence among ISTAT categories and Community typology categories, we calculated an "adaptation coefficient" which will be discussed shortly[7];
- the average live weight per head of the animal in the various typological categories was therefore estimated by multiplying the average live weight per head for animals belonging to ISTAT categories by the previously mentioned adaptation coefficient.

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[6] *Produced by 100 heads in the case of poultry.*

[7] *If there is univocal correspondence between ISTAT categories and the typology categories, the value of the coefficient is 1.*

The average live weight per head clearly corresponds to the amount of meat produced by the animal in an entire production cycle, in other words a production cycle not divided into categories, i.e. from birth to slaughter. The amount of meat produced by the same animal in a given category in one year was therefore calculated by subtracting from the figure in question the average live weight per head of the same animal in the previous category and multiplying the figure thus obtained by the number of production cycles that the animal completes in the year. To determine the amount of meat produced by the animal in the first category of each animal production and in those animal productions not divided into categories, on the contrary, we subtracted from the average live weight per head of the category (or of the production), the weight of the newborn calf just weaned or, for open-cycle productions, the weight of the replacement. All of this excluded the piglets whose weight was estimated based on the average weight at birth and an average daily weight increase.

Regarding the method for estimating the weight of the newborns of the other animal species and of their replacement, we will elaborate in the next paragraphs. Currently we would only like to point out that, for the purposes of this estimation and for the reasons given in the description of the demographic models, for the cattle we considered early weaning (a one-week old calf) while, for the other animal species, we considered natural weaning.

Lastly we calculated the number of production cycles carried out by the animal in the year, by figuring the ratio between the year and the number of months the animal remains in that category, also taking into account the time needed for the "sanitary break". Table 2.5.1.a summarizes the above-mentioned methodology and evidences the values that assume the adaptation coefficients used for the "conversion" of ISTAT categories into the typological categories and the calculation factors of the number of cycles/years carried out by the animals in their respective categories[8].

For each animal category involved (with a non-univocal correspondence), the adaptation coefficient was calculated by equaling the total weight of the ISTAT category (the average live weight per head multiplied by the number of animals) to the sum of the products obtained by multiplying the standard weight of each typological category by the number of animals belonging to it and, obviously developing the equation set up in that way according to the variable involved. Evidently the sum is made up of all, and only, the typological categories belonging to the ISTAT category being considered. For instance, in the case of cattle, the three following typological categories belong to the ISTAT category "Bullocks and steer": "Male bovine animals one but less than two years old ", "Female bovine animals one but less than two years old" and "Heifers". The adaptation coefficient from "Bullocks and steer" to "Male bovine animals one but less than two years old", was then obtained by means of the following equation:

$$(P_{VM} \times N_{VM}) = (P_{B1\text{-}2\,m} \times N_{B1\text{-}2\,m}) + (P_{B1\text{-}2\,f} \times N_{B1\text{-}2\,f}) + (P_G \times N_G)$$

Where:

P_{VM} = Live weight of bullocks and steer
N_{VM} = Number of bullocks and steer
$P_{B1\text{-}2\,m}$ = Live weight of male bovine animals between 1 and 2 years old
$N_{B1\text{-}2\,m}$ = Number of male bovine animals between 1 and 2 years old
$P_{B1\text{-}2\,f}$ = Live weight of female bovine animals between 1 and 2 years old
$N_{B1\text{-}2\,f}$ = Number of female bovine animals between 1 and 2 years old

[8] *With the exception of the adaptation coefficients and for the factors involved in calculating the number of cycles/years completed by the animals, all the work summarized on the Table on a national basis was actually carried out with a regional geographic reference.*

Table 2.5.1.a - Sources and methodology for calculating the quantity of meat produced by the animals on livestock farms

Progressive	Livestock category						Quantity of meat produced in the category				
	ISTAT (or other source)		Adaptation coefficient	EUROSTAT (Typology)			Weight per cycle	Production cycle			Weight per year
	Description	Live weight / head (source)		Code	Description	Live weight / head		Geographic area	Months in the category	Cycles/ year	
	A	B	C	D	E	F	G	H	I	L	M
1	Horses, donkeys, etc.	ISTAT	1,00	J01	Equidae	=B1*C1	=F1-newborn weight	Italy	15	0,80	=G1*L1
2	Calves	"	1,00	J02	Bovines under 1 year old - Total	=B2*C2	=F2-newborn weight	"	7	1,71	=G2*L2
3	Bullocks and steer	"	1,01	J03	Male bovines over 1 but under 2 years - old	=B3*C3	=F3-F2	"	13	0,92	=G3*L3
4	Bullocks and steer	"	0,90	J04	Female bovines over 1 but under 2 years - old	=B4*C4	=F4-F2	"	13	0,92	=G4*L4
5	Oxen and bulls	"	1,00	J05	Male bovines 2 years old and over	=B5*C5	=F5-F3	"	9	1,40	=G5*L5
6	Bullocks and steer	"	1,15	J06	Heifers 2 years old and over	=B6*C6	=F6-F4	"	9	1,40	=G6*L6
7	Cows	"	1,00	J07	Dairy cows	=B7*C7	=F7-F6	North Italy - hill and mountain	48	0,25	=G7*L7
								North Italy - plain	43	0,28	
								Centre and South Italy	52	0,23	
8	Cows	"	1,00	J08	Bovines 2 years old and over - Other cows	=B8*C8	=F8-F6	Italy	86	0,14	=G8*L8
9	Sheep and Rams	"	0,95	J09A	Ovines - Ewes	=B9*C9	=F9-F10	"	30	0,40	=G9*L9
10	"Agnelloni" lambs and wethers	"	1,15	J09B	Ovines - Others	=B10xC10	=F10-newborn weight	"	4	2,67	=G10*L10
11	Goats and billys	"	0,95	J10A	Caprines - Breeders	=B11*C11	=F11-F12	"	30	0,40	=G11*L11
12	Kid and young goats	"	1,15	J10B	Caprines - Others	=B12xC12	=F12-newborn weight	"	4	2,67	=G12*L12
13				J11	Swine - Piglets < 20 Kg	estimated value	=F13	"	3	4,80	=G13*L13
14	Fat pigs	"	1,25	J12	Swine - Sows > 50 Kg	=B14*C14	=F14-F15	"	30	0,40	=G14*L14
15	Fat pigs	"	1,20	J13	Swine - Others	=B15*C15	=F15-F13	"	4	2,70	=G15*L15
16	Broilers	"	1,00	J14	Broilers (100 heads)	=B16*C16	=F16-newborn weight	"	2	5,50	=G16*L16
17	Laying hens	"	1,00	J15	Laying hens (100 heads)	=B17*C17	=F17-newborn weight	"	17	0,72	=G17*L17
18	Turkeys	"	1,00	J16A	Turkeys (100 heads)	=B18*C18	=F18-newborn weight	"	4	2,90	=G18*L18
19	Duck	UNA	1,00	J16B	Duck (100 heads)	=B19*C19	=F19-newborn weight	"	2	5,00	=G19*L19
20	Geese and guinea hens	"	1,00	J16D	Other Poultry (Guinea hens) - 100 heads	=B20xC20	=F20-newborn weight	"	3	4,00	=G20*L20
21	Rabbits	ISTAT	0,04	J17	Rabbits - Breeders	=B21*C21	=F21-newborn weight	"	32	0,38	=G21*L21

Source: our processing of data from different sources

P_G = Live weight of heifers
N_G = Number of heifers

By developing the equation in relation to $P_{B1\text{-}2\,m}$ we obtain:

$$P_{B1\text{-}2\,m} = ((P_{VM} \times N_{VM}) - (P_{B1\text{-}2\,f} \times N_{B1\text{-}2\,f}) - (P_G \times N_G)) / N_{B1\text{-}2\,m}$$

By substituting the variables of the second member of the equation, the respective values deduced from the demographic model of the cattle (numbers in the various animal categories) and from the specialized literature (standard weights in the different categories) we obtain a figure which, related to the average live weight per head of the ISTAT category, provides the sought-after coefficient.

Concerning the data produced by the described methodology, the only peculiarity to make clear is a slight weight loss in the breeder cow categories, continuously in cattle and occasionally in other animal species. The amount of weight decrease[9] and slower production pace, especially in intensive breeding, can be considered physiological.

The prices used to put a value on the production of meat are illustrated on Table 2.5.1.b and, in this case too, we are mainly dealing with information from ISTAT source[10] (Statistics on National Accounts).

For the purposes of the present study, the principal limitations found when using the information in question are the following:

- like the information on physical productions, these data are determined for product categories not always coinciding with the typological ones;
- the data are made available only within national boundaries.

Upon the first setback we remedied the situation by "spreading" the price actually measured for one ISTAT production over several typological productions or, conversely, we "grouped" the prices measured for several ISTAT productions to arrive at the price of a typological production or, lastly, by "adapting" to certain productions the price measured for similar productions.

Before delving into the described operations, it should be specified that they are the only actions that allow us to obtain a set of prices that can give a value to the productions divided by typological categories and the reason is simply because the categories in question do not always correspond to the commodity categories being used in any given country. In this regard we can give one example that will make it clear: if in Italy a male or female bovine is slaughtered at 18 or 26 months, it is considered a "bullock". It is therefore obvious that it will be very difficult to succeed in defining the price of the commodity category in question by knowing details about the sex or months of life before slaughtering the animal[11]. As stated before, we should also bear in mind that the information to be used for the purposes of this study shall have the characteristics of an average representation of the geographical reference area. Therefore it is unlikely that detailed information can be found in the specialised literature having this characteristic. Having said this, the "spread" started with the category "Bullocks" and ended with typological categories J03, J04,

[9] *On average 9 kg/year in dairy cows and 4 kg/year in suckler cows.*

[10] *The cited source does not give the prices of categories J11, J16A, J16B and J16D; for these productions we used the prices taken from various sources.*

[11] *The variable that determines the slaughter age of bullocks is normally the breed of the animals. Animals of the dairy breeds and also "light meat" breeds are usually slaughtered within the second year of life because further weight increases obtained by procrastinating slaughter have no economic justification. Heavier beef cattle (Chianina, Marchigiana, Piemontese, etc.), on the contrary, are usually slaughtered within the first few months of the third year of life.*

Table 2.5.1.b - Producer prices of livestock productions (national averages)

Productions				Weights	Prices (€/Kg)			
ISTAT categories		EUROSTAT categories			2003	2004	2005	Average
Cod.	Description	Cod.	Description					
1	Equidae	J01	Equidae		1,74	1,78		**1,76**
2	Bovines			100,0	2,07	2,05	2,14	
3	Calves	J02	Bovines under 1 year old - Total	14,2	3,05	3,08	3,13	**3,09**
4	Bullocks (males, females, oxen and bulls)	J03	Male bovines over 1 but under 2 years old	73,5	2,05	2,02	2,09	**2,05**
		J04	Female bovines over 1but under 2 years old					
		J05	Bovines 2 years old and over Males					
		J06	Heifers 2 years old and over					
5	Cows	J07	Dairy cows	12,3	1,03	1,02	1,26	**1,10**
		J08	Other cows					
6	Ovicaprids			100,0	2,82	2,78	2,87	
7	Sheep and goats (Sheep)	J09A	Ovines - Ewes	25,7	0,97	0,96	0,97	**0,97**
8	Lambs	J09B	Ovines - Others	38,2	4,05	3,95	4,01	**3,46**
9	"Agnelloni" lambs			28,6	2,89	2,90	2,76	
10	Wethers and Rams			1,4	1,39	1,48	1,26	
7	Sheep and goats (Goats)	J10A	Caprines - Breeders	2,9	0,97	0,96	0,97	**0,97**
11	Kid goats and newborn kids	J10B	Caprines - Others	3,1	4,87	4,75	4,88	**4,66**
10	Wethers and Rams (Kid and young goats)			0,2	1,39	1,48	1,26	
		J11	Swine - Piglets < 20 Kg		3,78	3,67		**3,72**
12	Fat pigs	J12	Swine - Sows > 50 Kg		1,27	1,22		**1,25**
		J13	Swine - Others					
13	Poultry			100,0	1,40	1,41	1,28	
14	Chickens	J14	Broilers	93,0	1,46	1,47	1,33	**1,42**
15	Hens	J15	Laying hens	7,0	0,71	0,71	0,63	**0,68**
		J16A	Turkeys		1,22	1,02	1,00	**1,08**
		J16B	Duck		1,34	1,35	1,22	**1,30**
		J16D	Other Poultry (Geese and guinea hens)		1,64	1,97	1,79	**1,80**
16	Rabbits	J17	Rabbits - Breeders		2,14	2,17	2,12	**2,14**

Source: our processing of data from ISTAT, UNA and other sources

J05 and J06; from "Cows" to categories J07 and J08, from "Sheep and goats" to categories J09A and J10A, and from "Fat pigs" to categories J12 and J13. The grouping operation was conducted to calculate the price of the J09B category starting with the category "Lambs", "Agnelloni lambs" and "Rams and wethers"; for category J10B we started with "Baby goats and newborn kids" and "Baby and young goats". The operation in question is simply a weighed average calculated using the weights shown on the table above, which were also taken from ISTAT statistics. Lastly the "adaptation" was used only to define the price of the "Baby and young goats", a category not surveyed by ISTAT but necessary for calculating the price of typological category J10B. The price used is that of "Rams and wethers".

The drawback of prices availability only on the domestic market was solved by using the following methodology:

- we calculated the three-year average of the amount and values of the agricultural productions reported on Table A4 of the Italian Agriculture Yearbook of INEA[12], per region and for all of Italy;
- from the ratio between these two variables, we calculated the average unit value[13] of each production in each region and, again, for all of Italy;
- we estimated the average three-year premium per head of livestock[14] which was then related to the live weight per head[15] of the animal itself. By doing this we calculated the premium per kg of live weight per animal;
- from the difference between the average unit value and the premium for kg of live weight we calculated the "estimated prices" of the productions being surveyed;
- from the ratio between the estimated prices of the productions in a given region and the estimated prices of the same productions nationwide, we calculated the average percentage variations of the estimated prices which were compared to the average percentage variations of the actual prices with respect to the average national figure. The results obtained are shown on Table 2.5.1.c;
- from the product of the price vector shown in the last column of Table 2.5.1.b and the matrix of the variations in the prices themselves shown on Table 2.5.1.c, we calculated the regional prices of the productions that were used in the study.

It should be pointed out that the entire aforementioned process, actually involved only bovines and, among Ovicaprids, only sheep and goats, because no premium is contemplated for the other productions.

For the sake of curiosity, Table 2.5.1.d shows the premia received by the various animal categories per kilo of live weight.

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[12] *In any event the source of this information is ISTAT.*

[13] *We use "average unit value" instead of "price" because the values of the productions being studied are calculated by ISTAT at their base prices and, therefore, they include the share of the value concerning premia related to the products (base price = production price + premia –taxes on the product).*

[14] *In order to estimate the average three-year premium per head of livestock, refer to the paragraph that deals with this matter.*

[15] *Bear in mind that this refers to the live weight of the animal and not to the amount of meat produced by the animal in a year and in a given category.*

Table 2.5.1.c - Average percentage variations of the average unit values of livestock productions

	Equidae	Bovines	Ovicaprids	Swine	Poultry	Rabbits
Valle d'Aosta	1,9	2,6	-0,1	8,3	23,4	-0,3
Piemonte	1,9	13,3	-4,2	-3,6	-1,1	0,3
Lombardia	-1,7	-10,6	-4,0	-2,7	-9,5	0,0
Trentino	-2,0	-3,4	-5,4	3,8	6,9	1,1
Alto Adige	-2,0	-3,4	-5,4	3,8	6,9	1,1
Veneto	-1,7	-2,9	-3,9	-1,0	-8,1	-2,2
Friuli-Venezia Giulia	-1,9	1,6	-4,5	0,2	-1,4	-6,7
Liguria	-2,0	-3,4	-4,2	8,5	24,9	16,9
Emilia-Romagna	6,8	-2,5	-10,0	-2,8	-1,1	-10,9
Toscana	-1,8	6,1	-6,9	-1,3	9,8	8,3
Marche	-1,7	16,3	-6,1	-0,8	15,3	-13,0
Umbria	-0,6	6,9	-12,8	-1,6	7,5	-7,7
Lazio	-1,6	14,9	-6,2	4,2	46,9	11,1
Abruzzo	-1,8	9,6	-8,0	8,9	19,6	-0,7
Molise	-1,3	-1,2	-8,4	2,0	11,3	1,5
Campania	-1,8	2,2	-5,0	18,8	35,6	15,3
Calabria	12,4	1,5	-4,1	16,1	23,7	1,8
Puglia	5,9	9,0	-2,3	17,2	47,1	-0,4
Basilicata	-1,8	-4,0	-0,3	10,0	47,2	1,0
Sicilia	-1,9	7,8	17,3	8,1	-1,5	1,5
Sardegna	-1,7	-4,1	1,5	28,0	14,7	9,3

Source: our processing of data from ISTAT

Table 2.5.1.d - Premia per kilo of live weight (€Kg)

		Bovines							Ewes	Goats breeders
		under 1 year old	over 1 but under 2 years old		over 2 years old		Cows			
			male	female	male	female	Dairy cows	Other cows		
221	Valle d'Aosta	0,26	0,12	0,04	0,03	0,04	0,04	0,14	0,12	0,12
222	Piemonte	0,75	0,29	0,09	0,08	0,09	0,09	0,35	0,34	0,34
230	Lombardia	0,35	0,13	0,04	0,03	0,04	0,04	0,15	0,14	0,15
241	Trentino	0,57	0,22	0,07	0,05	0,07	0,07	0,26	0,22	0,23
242	Alto Adige	0,17	0,06	0,02	0,05	0,02	0,02	0,06	0,06	0,06
243	Veneto	0,71	0,26	0,08	0,07	0,08	0,08	0,32	0,33	0,44
244	Friuli-V.G.	0,39	0,14	0,04	0,04	0,04	0,04	0,16	0,16	0,17
250	Liguria	0,59	0,26	0,08	0,07	0,08	0,07	0,28	0,30	0,35
260	Emilia-Romagna	0,36	0,12	0,04	0,03	0,04	0,04	0,15	0,17	0,14
270	Toscana	0,67	0,29	0,09	0,06	0,09	0,07	0,28	0,32	0,30
281	Marche	0,60	0,26	0,08	0,06	0,08	0,08	0,30	0,28	0,29
282	Umbria	0,69	0,28	0,09	0,08	0,09	0,09	0,34	0,34	0,31
291	Lazio	0,52	0,25	0,08	0,05	0,08	0,08	0,29	0,24	0,28
292	Abruzzo	0,53	0,25	0,08	0,06	0,08	0,08	0,31	0,24	0,27
301	Molise	0,42	0,21	0,07	0,05	0,07	0,06	0,25	0,23	0,21
302	Campania	0,46	0,21	0,07	0,05	0,07	0,07	0,25	0,23	0,24
303	Calabria	0,86	0,42	0,13	0,10	0,13	0,13	0,50	0,54	0,48
311	Puglia	0,55	0,29	0,09	0,07	0,09	0,09	0,35	0,26	0,28
312	Basilicata	0,74	0,38	0,12	0,09	0,12	0,11	0,43	0,43	0,38
320	Sicilia	0,81	0,44	0,14	0,11	0,14	0,13	0,52	0,53	0,56
330	Sardegna	0,68	0,35	0,11	0,07	0,11	0,09	0,35	0,38	0,36

Source: our processing of AGEA and ISTAT data

2.5.2 The value of milk, eggs and honey: quantity and price

Milk, eggs and honey are the principal productions for certain categories of livestock: milk for dairy cows, sheep and goats, eggs for laying hens and honey for bees. Milk represents a secondary production in the category of other cows (suckler cows) as they have calves as their principal product.

The information needed to determine the SO is naturally the quantity and the price.

The amount of milk produced was calculated based on ISTAT data on agricultural productions and AIA data on the production of bovine, buffalo, sheep and goat milk. The number of eggs was estimated at 300 per head per year (30,000 per 100 heads), because we chose to take into consideration only intensive poultry farms since they make up over 90% of the Italian market of poultry productions. Lastly, for the amount of honey produced per region and per beehive in one year we used the data published by the Honey Observatory.

Bovine and buffalo milk

The basic data from ISTAT source used to calculate bovine and buffalo milk produced per head on average in the three-year period in question referred to the milk of cows and buffaloes considered as a unitary figure; this information is required for the purposes of determining the SO; since buffalo productions should be considered (and calculated) as one with bovine productions within the category of dairy cows. In fact, this methodological constraint overestimates the production of buffalo milk. Nonetheless, given the low relative incidence of this production on the total, the explicative significance of the model is not misinterpreted.

Two production activities require a calculation of the value of bovine and buffalo milk: J07 Dairy cows and J08 Other cows. In this last-mentioned case, though suckler cows, we thought it would have been proper to also consider the milk as a production destined to the market, though only limited to the surplus amount not needed to feed the calves.

Since available data refer to the total cow and buffalo milk production per region, we have to separate from this amount the production of milk attributed to "Other cows". To this end, on the basis of the indications found in the literature regarding milk production of the principal breeds of beef cows, we estimated the average amount of milk produced by one suckler cow which exceeded the milk amount destined to the calf. The regional average amount of milk destined to the sale attributed by estimate to the suckler cow, multiplied by the average number of "Other cows" during the three-year period allows determining the amount of milk produced by the latter in each region. Subtracting this value from the total amount of milk produced by cows and buffaloes in each region, we obtain by difference the milk produced by the dairy cows. This was then divided by the average population of dairy cows in the three-year period, allowing us to obtain the milk produced by each dairy cow in each region (Table 2.5.2.a).

Table 2.5.2.a - Distribution of bovine and buffalo milk among the categories J07 "Dairy cows" e J08 "Other cows"

	Average production of other cows – estimate (Kg)	Milk produced by Other cows [A x number of Other cows]	Total quantity of milk produced by cows and buffaloes - 3 year average	Milk produced by Dairy cows [C - B]	Average population of Dairy cows	Milk per head produced by Dairy cows
	(A)	(B)	(C)	(D)	(E)	[D / E]
Valle d'Aosta	132	58.710	50.433.333	50.374.623	20.722	2.431
Piemonte	137	13.146.228	818.500.000	805.353.771	178.542	4.511
Lombardia	132	2.498.970	3.954.266.666	3.951.767.695	587.912	6.722
Trentino	177	53.690	138.036.688	137.982.998	28.792	4.792
Alto Adige	177	243.198	378.796.644	378.553.446	79.009	4.791
Veneto	177	1.064.655	1.034.466.666	1.033.402.011	208.901	4.947
Friuli-Venezia Giulia	177	245.912	274.633.333	274.387.421	45.738	5.999
Liguria	126	503.407	25.400.000	24.896.592	3.650	6.821
Emilia-Romagna	177	2.769.956	1.725.966.666	1.723.196.710	280.941	6.134
Toscana	220	2.919.989	92.633.333	89.713.343	16.925	5.301
Marche	188	2.948.188	49.466.666	46.518.477	9.000	5.169
Umbria	203	2.169.352	69.400.000	67.230.647	10.610	6.337
Lazio	215	6.054.229	623.733.333	617.679.103	114.600	5.390
Abruzzo	155	1.588.509	75.833.333	74.244.823	23.371	3.177
Molise	102	521.147	95.266.666	94.745.519	21.553	4.396
Campania	190	4.628.463	437.000.000	432.371.536	182.498	2.369
Calabria	150	3.262.227	80.466.666	77.204.439	18.427	4.190
Puglia	166	1.485.333	280.733.333	279.247.999	74.631	3.742
Basilicata	139	1.928.057	60.433.333	58.505.276	25.839	2.264
Sicilia	185	15.077.739	178.900.000	163.822.26	49.823	3.288
Sardegna	203	15.076.507	198.033.333	182.956.826	35.534	5.149
		78.244.473	**10.642.400.000**	**10.564.155.526**		

Source: processing of data from ISTAT.

Sheep and goat milk

Milk is also the principal production of sheep and goats. To calculate sheep and goat milk produced per head on average in the years from 2003-2005 we used data from AIA source referring to the amount of milk produced per region and, for the sheep only, also the breed. In both cases the resulting value of the milk production in the three-year period – obtained by multiplying the weighed average by the number of heads in the productions per region – and for the sheep also the breed – is high on average because the livestock present at the farms controlled by AIA is more productive. To bring this value to the levels found on average in different typologies of livestock farms, we calculated the ratio between the number of sheep and goats taken from AIA source and the same data taken from ISTAT source, the latter representing the entire domestic ovicaprid population. Since AIA survey covered much smaller portion of the total population than ISTAT statistics, it was considered advisable to lower the values calculated on the basis of AIA data by 10%.

Table 2.5.2.b shows the ratio between AIA and ISTAT data regarding the amount of livestock in the various Italian regions and Table 2.5.2.c illustrates the calculation of the production of sheep and goat milk based on the data from AIA decreased by 10%.

Table 2.5.2.b - AIA coverage of livestock population compared to the ISTAT population (data%)

	cows	**buffaloes**	**cows + buffaloes**	**sheep**	**goats**
Valle d'Aosta	0,77	0,00	0,77	0,00	0,09
Piemonte	0,35	0,84	0,35	0,02	0,10
Liguria	0,41	0,00	0,41	0,04	0,11
Lombardia	0,57	0,45	0,57	0,00	0,13
Trentino	0,60	0,00	0,59	0,00	0,02
Alto Adige	0,53	0,00	0,53	0,00	0,01
Friuli-Venezia Giulia	0,56	0,73	0,56	0,00	0,05
Veneto	0,37	0,26	0,37	0,00	0,11
Emilia-Romagna	0,50	0,13	0,49	0,10	0,03
Toscana	0,33	0,28	0,33	0,02	0,01
Umbria	0,51	0,00	0,50	0,00	0,06
Marche	0,48	0,14	0,47	0,01	0,00
Lazio	0,29	0,32	0,30	0,02	0,04
Abruzzo	0,50	0,00	0,50	0,01	0,00
Molise	0,23	0,35	0,23	0,00	0,00
Campania	0,09	0,11	0,11	0,00	0,00
Puglia	0,37	0,21	0,36	0,01	0,02
Basilicata	0,50	0,48	0,50	0,03	0,02
Calabria	0,31	0,00	0,30	0,04	0,08
Sardegna	0,60	0,62	0,60	0,05	0,03
Sicilia	0,52	0,1	0,51	0,25	0,08
Italy	0,47	0,17	0,44	0,06	0,05

Source: processing of data from AIA and ISTAT.

Table 2.5.2.c - Production of kg of bovine and caprine milk per region (three-year average 2003-05)

	sheep	goats
Valle d'Aosta	119	383
Piemonte	122	455
Liguria	113	426
Lombardia	119	416
Trentino	159	509
Alto Adige	159	509
Friuli-Venezia Giulia	159	351
Veneto	159	509
Emilia-Romagna	159	360
Toscana	198	487
Umbria	182	537
Marche	169	476
Lazio	193	404
Abruzzo	139	278
Molise	92	224
Campania	171	224
Puglia	149	252
Basilicata	124	211
Calabria	135	175
Sardegna	182	235
Sicilia	166	191

Source: processing of data from AIA.

As already seen in the case of bovine and buffalo milk discussed in the previous paragraph, to calculate sheep and goat milk we also initially used ISTAT data referring to the amount and value of the production of sheep and goat milk per region.

In this case, unlike the case analyzed in the paragraph above, the information provided by ISTAT statistics referring to sheep and goat milk considered as a unitary figure does not correspond to what is needed to determine the SO. In fact, the production activities requiring the calculation of the value of sheep and goat milk refer in this case to different typologies of livestock: J09A Ovines – breeders and J10A Caprines – breeders. Therefore we have to separate the total amount of sheep and goat milk produced in each region into the amount produced by sheep and the amount produced by goats.

To this end, starting with known information, i.e.:

- amount of milk produced by goats and sheep (ISTAT source);
- number of goats and sheep (ISTAT source);
- average production per head of goats and sheep (AIA source);

we elaborated a coefficient to convert goats into sheep, i.e. a coefficient that allows us to consider a goat as an "*ovine unit*", relating the average production per head of goats in the three-year period to that of sheep, as shown on Table 2.5.2.d.

Table 2.5.2.d - Conversion coefficient of goats into "ovine units"

Regione	Average production per head of sheep	Average production per head of goats	Conversion coefficient
Valle d'Aosta	132	425	3,22
Piemonte	136	505	3,70
Liguria	125	474	3,77
Lombardia	132	463	3,50
Trentino	177	566	3,20
Alto Adige	177	566	3,20
Friuli-Venezia Giulia	177	390	2,20
Veneto	177	566	3,20
Emilia-Romagna	177	401	2,26
Toscana	220	541	2,46
Umbria	203	597	2,94
Marche	188	215	1,15
Lazio	214	449	2,09
Abruzzo	154	309	2,00
Molise	102	190	1,86
Campania	190	160	0,84
Puglia	165	280	1,69
Basilicata	138	234	1,69
Calabria	150	194	1,30
Sardegna	203	261	1,29
Sicilia	184	212	1,15

Source: processing of data from AIA.

Multiplying the conversion coefficient by the number of goats we calculated the goats as "*ovine units*" and then the total number of sheep, i.e. sheep + goats in "ovine units", as shown on Table 2.5.2.e (Part I).

The average output from the total number of sheep was calculated dividing the total amount of milk produced by goats and sheep (official figure from ISTAT source) by the total number of sheep; it was then multiplied by the number of sheep to obtain the total milk produced by sheep. At this point, subtracting it from the total amount of milk produced only by sheep, we obtained the milk produced by goats. Finally, the last calculation involves the average outputs obtained dividing the total milk produced by the sheep by the number of sheep and the total milk produced by the goats by the number of goats. Table 2.5.2.e (Part II) illustrates in detail the last steps of the calculation procedure just described and the results.

This calculation procedure was repeated for the three years in question (2003, 2004, 2005), to then calculate the weighed average of the three-year period of the productions of sheep and goat milk per region, the results of which, illustrated on Table 2.5.2.f, do not respond very well to reality and show significant and unjustified variations among the various regions. Therefore we preferred to use a sole source (because the just-described calculation is based on data, production per head and total amounts and numbers – from two different sources, AIA and ISTAT respectively), i.e. AIA data, which differentiates the production of sheep milk from goat milk, and later rectifies it as explained above.

Table 2.5.2.e (Part I) – Division of ovicaprid milk into milk produced by sheep and milk produced by goats – data from 2004

	ISTAT data				Average output total	Conversion coefficient	Goats in "ovine" units	Total sheep
	Milk produced (kg)	Number of sheep	Number of goats	Total number				
	1	2	3	4	5	6	7	8
				[2+3]	[1/4]		[3*6]	[2+7]
Piemonte	3.399.000	70.881	37.209	108.090	31	3,70	137.673	208.554
Valle d'Aosta	103.000	1.973	2.437	4.410	23	3,22	7.847	9.820
Lombardia	3.399.000	68.371	45.070	113.441	29	3,50	157.745	226.116
Trento	721.000	41.847	19.588	61.435	11	3,20	62.682	104.529
Bolzano	0	23.376	13.875	37.251	0	3,20	44.400	67.776
Trento	0	18.471	5.713	24.184	0	3,20	18.282	36.753
Veneto	1.751.000	26.176	7.852	34.028	51	3,20	25.126	51.302
Friuli-Venezia Giulia	309.000	3.846	4.757	8.603	35	2,20	10.465	14.311
Liguria	1.030.000	19.748	6.711	26.459	38	3,77	25.300	45.048
Emilia-Romagna	5.047.000	78.542	6.926	85.468	59	2,26	15.653	94.195
Toscana	78.795.000	550.133	10.512	560.645	140	2,46	25.860	575.993
Umbria	8.034.000	153.574	5.253	158.827	50	2,94	15.444	169.018
Marche	9.270.000	160.161	4.817	164.978	56	1,15	5.540	165.701
Lazio	61.079.000	737.341	32.974	770.315	79	2,09	68.916	806.257
Abruzzo	10.094.000	295.191	11.201	306.392	32	2,00	22.402	317.593
Molise	1.751.000	125.294	8.174	133.468	13	1,86	15.204	140.498
Campania	9.991.000	227.676	41.112	268.788	37	0,84	34.534	262.210
Puglia	17.716.000	222.061	42.950	265.011	66	1,69	72.586	294.647
Basilicata	12.463.000	331.684	86.953	418.637	29	1,69	146.951	478.635
Calabria	14.420.000	232.595	129.132	361.727	39	1,30	167.872	400.467
Sicilia	37.698.000	742.404	107.522	849.926	44	1,15	123.650	866.054
Sardegna	376.774.000	3.165.545	196.633	3.362.178	112	1,29	253.657	3.419.202

Source: processing of data from ISTAT.

Table 2.5.2.e (Part II) - Division of ovicaprid milk into milk produced by sheep and milk produced by goats – data from 2004

	Average total output of sheep	Sheep milk	Goat milk	Average output per sheep	Average output per goat	Average weighed output
	9	10	11	12	13	14
	[1/8]	[2*9]	[1/10]	[10/2]	[11/3]	[(12*2)+ (13*3)]/(2+3)
Piemonte	16	1.155.212	2.243.787	16	60	31
Valle d'Aosta	10	20.694	82.305	10	33	23
Lombardia	15	1.027.760	2.371.239	15	52	29
Trento	6	288.645	432.354	6	22	11
Bolzano	0	0	0	0	0	0
Trento	0	0	0	0	0	0
Veneto	34	893.411	857.588	34	109	51
Friuli-V.G.	21	83.039	225.960	21	47	35
Liguria	22	451.523	578.476	22	86	38
Emilia-Romagna	53	4.208.317	838.682	53	121	59
Toscana	136	75.257.452	3.537.547	136	336	140
Umbria	47	7.299.901	734.098	47	139	50
Marche	55	8.960.093	309.906	55	64	56
Lazio	75	55.858.206	5.220.793	75	158	79
Abruzzo	31	9.382.001	711.998	31	63	32
Molise	12	1.561.519	189.480	12	23	13
Campania	38	8.675.146	1.315.853	38	32	37
Puglia	60	13.351.703	4.364.296	60	101	66
Basilicata	26	8.636.604	3.826.395	26	44	29
Calabria	36	8.375.279	6.044.720	36	46	39
Sicilia	43	32.315.694	5.382.305	43	50	44
Sardegna	110	348.822.679	27.951.320	110	142	112

Source: processing of data from ISTAT.

Table 2.5.2.f - Average production of milk per region in kg

	Sheep	Goats
Piemonte	19	71
Valle d'Aosta	18	59
Lombardia	16	57
Trentino-Alto Adige	8	28
Veneto	32	103
Friuli-Venezia Giulia	26	57
Liguria	24	92
Emilia-Romagna	58	131
Toscana	122	302
Umbria	48	143
Marche	58	66
Lazio	78	163
Abruzzo	36	71
Molise	15	28
Campania	43	36
Puglia	67	113
Basilicata	31	52
Calabria	47	61
Sicilia	54	62
Sardegna	105	135

Source: processing of data from ISTAT.

Eggs

For the calculations of the SO of the poultry productions we referred only to intensive farms and ignored rural poultry farms because the former make up 90% of Italian poultry production[16].

Moreover, concerning the production of eggs, data taken from the three-year period in question show that less than 19% of the 12,893,000,000 eggs produced on average every year in Italy come from rural farms.

Therefore, referring to average values attributable to so-called "domestic" farms, the average production of laying hens was estimated at 300 eggs per head per year. This figure is attributable to all the regions precisely because it refers to farms that do not have specific characteristics associated with the place of production but rather they are standardized in their production methods and results.

As regards prices, in this case too we used the data from ISTAT statistics.

Honey

Bee breeding and honey production are often considered a peculiar farming activity mainly because its characteristics cannot be identified univocally, starting with the variety of existing types of beekeepers (farmers who are also amateur beekepers, hobby, professional and semiprofessional beekeepers, with or without land, etc.). This difficulty in delineating from a qualitative point of view the bee breding sector within the zootechny inevitably affects also the quantitative analysis of the phenomenon. Taking into account these difficulties, we firstly analysed the information sources available on honey production in Italy and decided to use the data from the 2004 report of the Honey Observatory as a benchmark and basis for the calculation to establish one source for determining the number of beehives per region, the amount of honey production per region and, then, to determine the number of kilos of honey produced per beehive in each region.

As regards prices, much like the productions described earlier, we used the data from ISTAT statistics on agricultural productions at basic prices, to then determine the value of honey production per beehive and per region in the three-year period 2003-2005 (Table 2.5.2.g).

[16] *Over 90% of poultry meat is produced by the "vertical integration" system, in which the production is a carried out by farms by means of the breeding of breeders, incubators, feed manufacturing, own, affiliated or member-owned livestock farms, own slaughters and meat transformation laboratories and/or own egg selection and packaging plants and egg transformation laboratories (Source: UNA).*

Table 2.5.2.g - Honey production in the Italian region

	Number of beehives	Honey Production (kg)	Honey production per beehive (kg)	Price (€/Kg)	Value (€/Kg)
Valle d'Aosta	7.263	45.757	6	2,30	14,49
Piemonte	100.677	1.510.155	15	2,30	34,50
Lombardia	116.450	1.746.750	15	2,30	34,50
Trentino	21.965	193.292	8	2,30	20,24
Alto Adige	42.540	340.320	8	2,30	18,40
Veneto	63.839	612.854	9	2,30	22,08
Friuli-V.G.	24.992	259.917	10	2,30	23,92
Liguria	18.190	180.081	9	2,30	22,77
Emilia-R.	96.483	1.157.796	12	2,10	25,20
Toscana	89.184	642.125	7	2,30	16,56
Marche	38.118	209.649	5	2,40	13,20
Umbria	33.286	166.430	5	2,50	12,50
Lazio	80.621	443.416	5	2,30	12,65
Abruzzo	36.037	302.711	8	2,30	19,32
Molise	12.650	88.550	7	2,30	16,10
Campania	48.208	385.664	8	2,30	18,40
Calabria	38.002	345.818	9	2,30	20,93
Puglia	13.325	119.925	9	2,30	20,70
Basilicata	39.791	358.119	9	2,30	20,70
Sicilia	90.000	702.000	7	2,10	16,38
Sardegna	58.641	457.400	7	2,30	17,94
Italy	1.070.262	10.268.728	9	2,30	22,02

Source: Honey observatory (for honey production), ISTAT (for price)

2.5.3 Value of byproducts: quantity and price

The following byproducts are to be included in the calculation of the SO: the newborns produced by female breeders, i.e. the brood mares and/or brood donkeys, dairy cows, other cows, sheep, goats, sows and rabbits; the wool from the sheep; the wax from the bees.

The number of newborns were calculated by consulting the large body of data obtained from the literature and partly adapting it to our calculation needs, and by hearing the opinions of experts. In fact, since it often involved standard technical information (number of births per year, number of newborns per birth, etc.), there was no need to have territorialized data or information from specific surveys. To obtain the value of the productions all we had to do was multiply the prices from the official ISTAT statistics by the amounts calculated, sometimes after adjusting them to adapt the figure to the specific nature of the product in question (e.g. to adapt the price of the bovine category under one year old to the price of newborns of the dairy cow as opposed to the newborns of other cows).

The calculation of the value of wool and wax did not present any significant problems because the basic data and prices are available from the official ISTAT statistics.

The calculation model to determine the value of byproducts is illustrated in Table 2.5.3.a.

Table 2.5.3.a - Calculation model for the value of byproducts

Value of byproducts									
Newborns						Others byproducts			Total
Quantity				Price	Value	Quantity	Price	Value	
Births per year	Newborns per birth	Weight per weaned newborn	Total quantity						
A	B	C	D = (A*B*C)	E	F = (D*E)	G	H	I = (G*H)	L = (F+I)

Newborns

The basic data for calculating the quantity and prices relative to the production of newborns were obtained from the literature and experts and by adapting (again by consulting literature and experts) ISTAT figures already used for calculating meat production from female breeders and meat prices from other livestock categories.

As shown on Table 2.5.3.a, the first figure needed is the number of births per year and the number of newborns per birth, which can be determined with the following calculation:

year (12 months) /period between births* twin birth rate – mortality rate

The weight of the weaned newborn calf was calculated by relating the average figure provided by the literature to the average weight of a breeder cow in order to obtain from this ratio a percentage that may be applied to the different regional situations, thereby obtaining a territorialized average weight of the newborn calf which takes into account the differences due to prevalent breeds, breeding methods, etc.

By using this method we determined that for bovines the birth weight was 7.5% of the weight of the mother. In the case of dairy cows, the weight of the newborn to be considered is precisely the weight at birth because calves are weaned prematurely and nursed by artificial methods and the mother's milk goes to market. In the case of other cows, i.e. suckler cows, weaning occurs naturally when the calf is eight months old; in this case the weight at weaning should take into account an increase of 1 kg per day from weight at birth until reaching approximately 35% of the weight of the mother.

For ovicaprids the weight at weaning was estimated to be 20% of the weight of the mother.

In pigs and rabbits the weight of the newborn is practically insignificant and therefore we consider only the weight increase that occurs during nursing. In pigs the weaning occurs at 50-60 days with a weight increase of 0.35 kg per day. Rabbits have a nursing period little less than one month and their weight at weaning is 650 g.

The prices were estimated and related, depending on the cases, either to a) the percentage of the meat price of the adult animal (for bovines we increased it by 25%, for ovicaprids we used the samefigure of the animals other than breeders), or to b) the price of the piglets and breeders for rabbits (since there is no other specific information for rabbits).

Table 2.5.3.b - Calculation model for value of newborns

Livestock category	Quantity				Price
	Births per year	Newborns per birth	Weight of newborn at weaning	Total quantity	
	(A)	(B)	(C)		
J07 Dairy cows	0,9	0,8	7,5% of weight of breeder (one week old calf)	A*B*C	+25% of the price of bovines under 1 year old
J08 Bovines 2 years old and over – other cows	0,95	0,85	35% of weight of breeder (eight month old calf)	A*B*C	+25% of the price of bovines under 1 year old
J09A Ovines – Ewes	1,5	1,5	20% of weight of breeder	A*B*C	Price of the ovines – others
J10A Caprines – breeders	1,5	1,5	20% of weight of breeder	A*B*C	Price of caprines – others
J12 Swine – sows > 50 Kg	2,5	9	0.35 Kg/day * 50 days	A*B*C	Price of sucking pig
J17 Rabbits - breeders	6	7	0,65 kg	A*B*C	Price of the breeder

Wool

In Italy the only type of livestock for which wool represents a production is J09A Ovines – breeders.

Whether we are looking at the amount of wool produced in kg or the prices, like the productions described above, we used the figures from ISTAT statistics on agricultural productions at basic prices. ISTAT statistics referring to the amount produced per region were divided by the number of sheep present in each region according to the statistics on the number of animal categories, also taken from ISTAT source.

Wax

For the amount of wax produced per beehive and its price, there are average national figures reported in ISTAT statistics on agricultural productions at basic prices. These figures say that the amount of wax produced per beehive is 0.25 kg per year at a price of EUR 4.63; the value thus obtained from this production is EUR 1.2 per year.

CHAPTER 3

CALCULATING SGM: SUBSIDIES AND COSTS

3.1 Introduction

As mentioned in the first chapter, for the phase of transition from the typological classification based on SGM to the new classification based on SO, it was decided to use the simultaneous calculation of the old and new coefficients. The SGM of an agricultural production activity represents the monetary value of the gross production including subsidies associated with the products and after deduction of certain specific costs attributed directly to the activity itself. Therefore, to the production calculated as illustrated in the previous chapter should be added premia connected to the production and deduced from the specific costs. Below we give indications on how the economic variables in question were calculated in the three-year period being studied.

3.2 Estimation of the premia

The indications given by the European Commission regarding the handling of premia and rates are the following: the sale prices to be used to value the physical productions making up gross production shall be the farm-gate price exclusive of VAT; the gross production shall include all and only the premia and subsidies directly linked to the products, surface area and livestock, whether the subsidies are Community, national or regional. The premia and subsidies on the purchase of production factors directly linked to the products, surface area and livestock, shall be deducted from the cost of the production factors and all the costs of the production factors shall be considered exclusive of VAT.

In general further specifications regarding individual premia categories are the following:

- compensation payments per hectare (per crop) and/or livestock category introduced with the CAP reform of 1992 shall be included in the calculation of gross production;
- items that should not be considered are agro-environmental subsidies paid through national or regional programs, compensatory premia paid for farms in mountain areas and less-favoured areas pursuant to Regulation (EC) No. 1257/1999[17];
- taxes on products, e.g. the tax on sugar beets, penalties for exceeding production quotas, the tax of co-responsibility, must be deducted from the gross value of production;
- aid given to farms for temporary or rotated pasture must be deducted from the purchase price of the forage[18].

To determine the average amount of aid per hectare and per head we had to divide the entire amount of aid received in a given region by a certain category of agricultural production by the total of hectares or heads pertaining to that production category. In this way the average amount of aid takes into consideration both the hectares and the heads of livestock that have

[17] *Regulation (EC) No. 1257/1999 of 17 May 1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF) and amending and repealing certain regulations, published in the Official Journal No. L160 of26 June 1999.*

[18] *Indications about the handling of premia associated with forage and forage imbalances have no application in Italy because the national adaptations of the typology do not contemplate these surveys.*

received aid as well as those that have not received it (e.g. the total amount of premia for a suckler cow in Abruzzo must be divided by the total number of suckler cows in Abruzzo and not only by the number of suckler cows that have received the premium).

Unfortunately, as we have seen already for the information obtained from ISTAT source regarding livestock productions, Agenzia per le Erogazioni in Agricoltuira (AGEA) provides information about the premia granted in agriculture with reference to sectors that do not always correspond to the animal categories contemplated by the Community typology. The information given here was therefore estimated with the following methodology:

- we calculated the "theoretical annual average premium" that can be received by each animal category having the right to it according to the provisions of the 2003 Fischler Reform of the CAP as shown on Table 3.2.a;
- we calculated, in territorial and/or regional detail, the "theoretical maximum premium" that can be received by Italian livestock farms by multiplying the aforementioned premium by the number of animals belonging to each typological category;
- making the theoretical maximum premium of each region equal to 100, we calculated the percentage incidence of that premium received by each animal category;
- the aforementioned percentage was compared to the actual figure. The overall premia received by a given animal category in a given region was therefore calculated by multiplying the three-year average of regional AGEA subsidies for livestock farms by the percentage mentioned in the previous point above;
- the average per capita premium was then calculated by relating the aforementioned premium to the regional number of single animal categories.

Table 3.2.a - Per capita premia contemplated for livestock farms in the three-year period 2003-05 (€/head)

	Bovines												Sheep and goats			Average theoretical annual premium
	Nurse cow			Special			Slaughter			Extensification						
Years	03	04	05	03	04	05	03	04	05	03	04	05	03	04	05	
Bovines under 1 year old - Total				196	196	196	50	50	50	40	40	40				286
Male bovines over 1 but under 2 years old				134	134	134	80	80	80	40	40	40				254
Female bovines over 1 but under 2 years old							80	80	80							80
Male bovines 2 years old and over							80	80	80							80
Heifers 2 years old and over							80	80	80							80
Dairy cows							80	80	80							80
Bovines 2 years old and over - Other cows	200	200	180				80	80	80	40	40	40				313
Sheep and goats													24	24	24	24

Source: Community legislation

Finally Table 3.2.b shows the three-year average of the regional AGEA subsidies to livestock farms and the percentage of each individual animal category making up that average.

Table 3.2.b - Average allocation for livestock farming and percentage of livestock categories

	Average three-year allocation for livestock farming (1.000 €)	% incidence on allocation of livestock category									
		Bovines								Sheep	Goats
		< 1 year	1-2 years, males	1-2 years, females	> 2 years, males	> 2 years, females	Dairy cows	Nurse Cowles	Total bovines		
Valle d'Aosta	1.103	40,6	3,3	11,1	0,6	7,8	32,2	2,5	98,0	0,9	1,1
Piemonte	106.148	44,8	18,8	4,8	0,5	3,1	8,5	18,0	98,6	0,9	0,5
Lombardia	81.113	58,2	11,4	7,1	0,3	3,7	16,3	2,0	99,1	0,5	0,4
Trentino	3.158	40,7	7,6	8,7	0,1	3,7	29,6	1,4	91,8	6,1	2,1
Alto Adige	2.184	42,4	1,8	10,6	0,4	5,9	32,2	2,3	95,5	2,7	1,8
Veneto	123.463	55,2	29,8	4,1	0,2	1,3	8,1	1,0	99,6	0,3	0,1
Friuli-V. G.	4.882	46,5	14,5	8,3	0,2	3,6	22,7	2,9	98,8	0,5	0,7
Liguria	2.187	34,5	6,8	3,8	0,7	4,3	6,8	28,6	85,5	10,8	3,7
Emilia-Romagna	26.808	40,5	13,3	8,9	0,5	4,6	24,5	5,5	97,8	2,0	0,2
Toscana	19.107	29,0	9,6	2,7	0,5	4,1	3,9	12,6	62,4	36,9	0,7
Marche	12.522	36,3	13,3	2,5	0,5	3,0	3,4	22,5	81,5	17,9	0,5
Umbria	10.784	36,1	11,9	2,6	0,6	3,4	4,7	19,1	78,4	20,8	0,8
Lazio	28.139	28,1	6,1	4,4	0,6	3,8	11,5	15,2	69,8	29,0	1,2
Abruzzo	12.283	32,5	9,7	2,7	0,4	3,0	7,7	13,7	69,5	29,5	1,0
Molise	5.122	38,1	9,4	2,9	0,2	1,9	11,9	11,1	75,6	23,1	1,3
Campania	18.597	38,9	11,6	3,6	0,5	2,7	12,5	16,5	86,3	11,5	2,1
Calabria	24.877	31,8	10,5	2,0	0,8	3,3	4,7	21,2	74,2	16,6	9,2
Puglia	15.276	37,2	6,9	5,5	0,7	3,3	18,1	9,1	80,7	16,2	3,1
Basilicata	16.231	24,1	5,3	2,7	0,6	2,7	7,9	17,2	60,3	31,4	8,3
Sicilia	69.657	31,3	6,4	2,7	0,7	3,0	4,5	29,4	78,0	19,3	2,7
Sardegna	85.243	16,8	2,3	1,4	0,5	1,9	2,0	16,7	41,6	54,9	3,4

Source: our processing of data from AGEA e ISTAT

3.3 Specific costs

Specific costs to be considered when calculating SGM of the animal productions are: the livestock replacement, feeding, veterinary expenses and other costs. Among the last-mentioned items the most conspicuous are generally marketing, specific insurance policies and energy costs (fuel and electricity).

As regards these costs items, no structured official statistics are sufficiently detailed; to determine them it is therefore necessary to resort to estimations that in most cases were obtained by relating the amount of cost in question to the production standards of the animals and/or type of livestock farm. There is no consideration of the costs of labour, mechanization, buildings, fuels, lubricants, repairs and depreciation of machinery, and jobs carried out by third parties (except in the context of planting and removing permanent crops and dessicating them). Specific costs have to be calculated by using the supply prices to the farm exclusive of VAT and deducting the amount of subsidies, if any, associated with the purchase of production factors.

3.3.1 Livestock replacement

Livestock replacement is the cost of substituting livestock at the end of the production cycle with younger animals. This cost is therefore calculated only for breeders and animals bred on open-cycle farms.

In line with this, the estimation methodology designed determines the costs in question by obtaining the product between the following three variables:

- the “amount of meat” to be substituted annually;
- the unit value (price) of that amount;
- an "adjustment coefficient" that takes into account the animal production considered and the breeding method used.

The amount of meat to be substituted annually was estimated:

- for the breeder animals by obtaining the ratio between the average live weight per head and the number of years of career of the animal, i.e. the number of years the animal remains on the farm as a breeder;
- for the non-breeding animals (open-cycle farms), with the exclusion of poultry, by obtaining the product of the weight of the just-weaned animal (with weaning at one week for bovines) and the number of production cycles of the animal per year;
- for poultry, as a percentage of the weight of the animals in production.

Table 3.3.1.a shows the number of years of the breeder's career duration and, for the poultry, the weight of the chicks as a percentage of the weight of the adults. For the laying hens the percentage in question refers directly to the value of the hens rather than their weight.

Table 3.3.1.a -Technical data for the livestock replacement estimate

		Years of duration in production	Weight of "chick" (% of adult weight)
Equidae		16	-
Dairy cows	Northern -- Hill and mountain	4	-
	Northern -- Plain	3,8	-
	Central and southern	4,5	-
Bovines 2 years old and over - other cows		7	-
Ovicaprids		5	-
Swine - sows > 50 Kg		2,4	-
Rabbits - breeders		2,5	-
Broilers		-	10
Laying hens		-	25 (% on value)
Turkeys		-	7,5
Duck		-	10
Other Poultry (Geese and guinea hens)		-	7,5

Source: literature

The price of the livestock replacement was estimated as follows:

- for the breeders of the species divided into categories, using the price of the animal in the category previous to the breeder one (for dairy cows and nurse cows we used the price of the heifers and for the sheep and goats we used the price of the “Agnelloni” lambs, etc.);
- for the equidae, rabbits and poultry, we increased the sale price of the animal by 25%[19];
- for all the other animal categories (open-cycle farms), we deducted the price of the animal of the category in question from the price of the just-weaned newborn (see below).

The adjustment coefficient, as said before, takes into account the animal production considered and the breeding method used. Therefore it can have one of the following values:

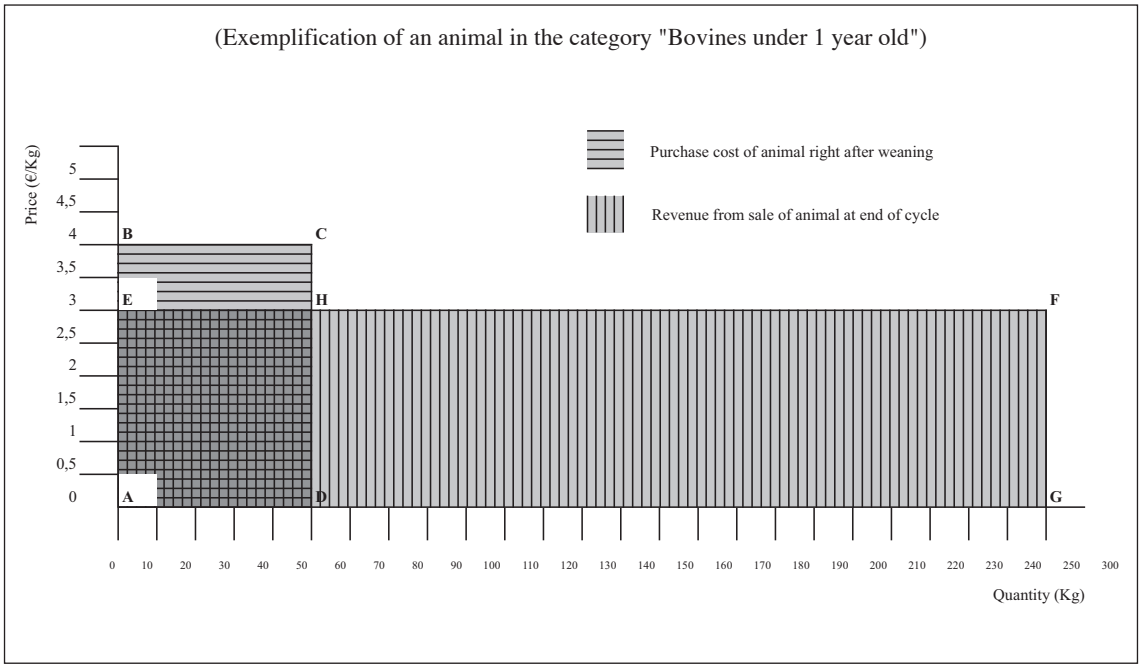
- 1, for animal productions for which the livestock replacement should be calculated entirely (because they are breeders or animals bred only on open-cycle farms: e.g. in the case of poultry);
- 0, for animal productions for which the livestock replacement should not be calculated (because they are not breeders or because they are not raised on open-cycle farms: e.g. all the categories of ovicaprids other than sheep and goats);
- $0 < x < 1$, for productions not divided into categories (equidae) and for categories that do not coincide with breeders, even the ones raised on open-cycle farms. In these last-mentioned cases the value of the coefficient in question correspondents respectively to the percentage of breeders within the species/breed and the percentage of animals destined to slaughter and coming from open-cycle farms. The information for both is found in the demographic models examined before.

To properly understand the method for estimating the price of livestock replacement in the last of the three cases illustrated above, it is advisable to carefully read the in-depth analysis that we will now present. In view of open-cycle farms, the just-weaned animal is a production factor

[19] *This percentage arises from empirical results obtained by analyzing information about the animal productions referred to under the previous point.*

and its purchase price is normally greater than the sale price of the product (fattened animal). The difference between these two prices therefore represents the “unit” replacement, i.e. per kilogram, that the farmer pays every time the animals are substituted. However, using the production of “bovines under one year old” and the data of the three-year period in question (national average), the replacement for a given animal can be represented on a graph like the one shown in figure 3.3.1.b. The price and weight of a just-weaned bovine (one week old) are approximately 4.00 €/Kg and approximately 50 Kg respectively: the relative cost of its purchase is therefore represented by the area of the rectangle ABCD. The price and weight of an animal in the same category, but at the end of the cycle, however, are approximately 3.00 €/Kg and approximately 250 Kg respectively: the revenue from its sale is therefore represented by the area of rectangle AEFG. The portion of purchase cost equal to the area of rectangle AEHD is recovered by the sale of the animal. The cost of substituting the animal at the end of the cycle is therefore equal to the area of rectangle EBCH, where side EB is given by the difference between the prices of the two animals and side EH is given by weight of the just-weaned animal.

Figure 3.3.1.b - Graphic representation of bovine replacement on open-cycle farms



3.3.2 Feeding

Feeding represents the principal component of the livestock variable costs.

The difficulty of determining this type of cost is associated with various aspects that range from determining the amount of feed needed for each animal, depending upon its breed/species, age and the productions required of it, the variety of feeds used on livestock farms, depending on their composition which can vary from place to place (when ingredients are natural) and from one manufacturer to another (when additives are used to obtain optimal output).

The calculation procedure used consisted of the following steps:

1. determining the feeding needs of each livestock category;

2. defining the amount of feedingstuff needed based on its percentage presence in the diet of the animal and on the nutritional power contained in it;
3. calculation of the value of the costs connected to feeding the livestock by multiplying previously obtained amounts by the price of the feedingstuff.

The feeding needs are related to the actual nutritional capacity of the feedingstuff for the livestock. Among the various methods used to assess the nutritional capacity, one of the best known is the Fodder Unit (FU), based on which the energy value of a feed is measured by taking the nutritional value of 1 kg of barley as a reference unit, i.e., 1 FU = nutritional value of 1 kg of barley. The comparative nutritional value of the other feeds was obtained experimentally. The parameterization in terms of fodder units has zootechnical limitations but, given the variants in question, it enables a concise zooeconomic and methodologically homogeneous assessment then that gave results of the highest possible approximation.

After acquiring the method for measuring the nutritional power of each feed, we calculated the feeding needs of the "dairy cow" category expressed according to that method, i.e. in FU. The dairy cow category was chosen because it can be related to the other livestock categories by means of the Livestock Unit coefficients (LU) which we will explain later in this paragraph.

Based on the information shown on Table 3.3.2.a, the feeding needs of dairy cows are orientated toward the following objectives:

- to ensure maintenance of the weight achieved until entering the dairy cow category;
- to ensure the physiological consumption levels for growth (meat production);
- to produce milk[20].

Table 3.3.2.a - Determination of feeding needs of Dairy cows

Feeding needs (FU)			
Meat		Milk	Total FU
Maintenance	Production		
(FU/Kg/day)	(FU/g/day)	(FU/Kg)	
(1)	(2)	(3)	(4)

The following information has been inferred from the literature:

(1) FU/kg/day [for meat maintenance (weight)] = 0.007[21]

(2) FU/g/day [for meat production (weight)] = 0.0027

(3) FU/kg [for milk production] = 0.33

These coefficients were multiplied by the following values respectively: the weight of the heifer (i.e. weight of the animal at the time of entry into the dairy cow category); the weight produced in one year by the dairy cow and the milk production according to the following calculation model:

[20] *It is known that the evaluation of the nutritional needs of dairy cows must take into consideration not only the weight of the animal and the amount of milk it produces but also the butter fat content of the milk and other aspects that for our purposes are overlooked due to our need to simplify the calculation; moreover, we keep in mind the standardized nature that the SGM must have in order to be able to represent a standard theoretical figure for dairy cows for each region which therefore must include all the characteristics typical of the various breeds and farms found in a given region.*

[21] *The standard value indicated 0.007 should be made proportionate to the weight of the dairy cow. This transition was skipped due to the low numbers in question.*

(4) Total FU [dairy cow] = (0.007 * Live weight of the heifer* 365) + (0.0027 * 1,000 * weight/year of the dairy cow) + (0.33 *annual milk production), thereby obtaining the value sought after.

For all the other livestock categories, with the exception of poultry, the feeding need was determined in relation to that of the dairy cows by using the LU (Livestock unit) coefficients[22]. Using these coefficients (Table 3.3.2.b) we determined the feeding needs of the various animal categories expressed in FU by applying the calculation model illustrated below, for example in the case of heifers (whose LU coefficient is 0.800):

(4) Total FU [heifer] =

$$\frac{\text{80\% of the national average of the dairy cows feeding needs}}{\text{national average heifer weight}} \times \left[\text{national average of the heifer weight} \pm \text{regional mean deviation in the heifers} \right]$$

This process allows us to determine the total FU for heifers starting with FU of dairy cows, net of regional variability within the "group" of cows, and taking into account the regional variability of the heifers.

Table 3.3.2.b - Livestock unit coefficients

Bovines	Under one year	0,400
	Between 1-2 years	0,700
	Males > 2 years	1,000
	Heifers > 2 years	0,800
	Dairy cows	1,000
	Other cows > 2 years	0,800
Sheep and goats		0,100
Equidae		0,800
Swine	Piglets	0,027
	Sows > 50 kg	0,500
	Others swine	0,300
Poultry	Broilers	0,007
	Hens laying hens	0,014
	Ostriches	0,350
	Others birds	0,030
Rabbits, females breeders		0,020

On the contrary, for poultry, the feeding needs were determined by using conversion indexes, i.e. growth indexes indicating how much energy provided by the feed is transformed into body mass (or meat, or eggs from the laying hens). Table 3.3.2.c shows the conversion indexes used in the poultry categories examined, obtained from the literature and consulting experts.

[22] *The coefficients are contained, lastly, in Regulation (EC) No. 1166/2008 of the European Parliament and the Council of 19 November 2008 -- on farm structure surveys and on the survey on agricultural production methods and repealing Regulation (EEC) No. 571/88 of the Council -- published in the Official Journal of the European Union No. 321 of 1 December 2008.*

Table 3.3.2.c - Conversion indexes for poultry

Animal category	Conversion index
Broiler	2,0
Laying hen	2,2
Turkey	2,3
Duck	2,0
Guinea hen	2,2

After finding out the feeding needs in terms of FU, we calculated the cost of the feed by relating the feed presence expressed in percentage (points 5, 6, 7 and 8 on Table 3.3.2.d).

The percentage composition of the diet of each animal category was determined with the help of manuals on these matters and consulting experts in order to delineate a standardizable situation that conforms as closely as possible to the prevalent breeding methodologies in the various regions.

Table 3.3.2.e gives a summary of the data used for the animal categories considered and for the various regions. To complete the information we would like to specify that, for the various animal categories, each feed typology may correspond to one specific type of fodder or concentrate. For example the concentrates are grains for equidae, artificial milk with the addition of feeds for calves less than one year old, and feed for bovines of the categories from J03 - J06, 70% of its mother's milk and 30% of artificial milk (for weaning) for the piglets, supplemented feed compounds, having characteristics that are consonant with the various swine categories, etc.

The nutritional power in terms of FU contained in the various feeds (points 9, 10, 11 and 12 on Table 3.3.2.d) was obtained by using calculations based on elementary data obtained from manuals on these matters and from the opinions of experts.

For fodder the estimation was made starting with information found in the literature regarding the composition and nutritional value of feed for livestock and taken from the short-term ISTAT statistics containing information about surface area, production and yield of fodder. In practice, knowing the content in FU of each type of fodder (from the literature) and knowing the quality and amount of fodders produced in the various regions (by the short-term ISTAT statistics), we could calculate a regional average referrable to each of the three macro-categories of fodder (fresh, hay and silo). As regards the concentrates, we calculated a weighed average of the contents in FU present in the various feeds generally used in the preparation of the concentrates, taking into account the information obtainable from the feed industry.

At this point we knew all the values to obtain the amount of different feeds used in each region and for each animal category. Therefore, referring again to Table 3.3.2.d, the following calculation was used to determine the amount:

(13) = (4) / (9) x (5)

(14) = (4) / (10) x (6)

(15) = (4) / (11) x (7)

(16) = (4) / (12) x (8)

After obtaining the prices from the ISTAT statistics on farm productions, where it is required to calculate the average prices of the different types of fodder weighed by production, we first obtained the costs of the various types of feeds considered. Then, by summing these costs, we obtained the total cost of livestock feeds by region and by each animal category.

Table 3.3.2.d - Calculation model of feeding stuff needed for the livestock

Quantity															
Feeding needs (in FU)				Diet											
Meat				Composition %				Content in FU				Quantity			
				Forage				Forage				Forage			
Maintenance (FU/kg/day)	Production (FU/g/day)	Other principal product (FU/kg)	Total FU	Fresh forage	Hay	Silo	Concentrates	Fresh forage	Hay	Silo	Concentrates	Fresh forage	Hay	Silo	Concentrates
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Table 3.3.2.e - Average percentage composition of diet of the animals on livestock farms

Animal category		Geographic area	Forage			Concentrates
Cod.	Description		Pasture and other fresh forage	Hay	Silo	
J01	Equidae	Italy	60	20		20
J02	Bovines < 1 year old - Total	"			30	70
J03	Male bovines > 1 but < 2 years old	"	10		70	20
J04	Female bovines > 1 but < 2 years old	"	10		70	20
J05	Male bovines 2 years old and over	"			90	10
J06	Heifers 2 years old and over	"			90	10
J07	Dairy cows	Northern - Alpine arc	40	40		20
J07	Dairy cows	Northern - Plains			70	30
J07	Dairy cows	Central and southern	20	30	20	30
J08	Other cows	Italy	40	40		20
J09A	Ovines - Ewes	"	90			10
J09B	Ovines - Others	"	90			10
J10A	Caprines - Breeders	"	95			5
J10B	Caprines - Others	"	95			5
J11	Swine - Piglets < 20 Kg	"				100
J12	Swine - Sows > 50 Kg	"				100
J13	Swine - Others	"				100
J14	Broilers	"				100
J15	Laying hens	"				100
J16	Others pull tree	"				100
J17	Rabbits - Breeders	"				100
J18	Bees	"	Sugar – only as rescue nutrient			

Table 3.3.2.f - Content in FUs of forage per region

	Forage		
	Fresh	Hay	Silo
Valle d'Aosta	0,154	0,480	0,168
Piemonte	0,178	0,303	0,218
Lombardia	0,181	0,276	0,227
Trentino	0,161	0,360	0,185
Alto Adige	0,145	0,448	0,170
Veneto	0,179	0,268	0,220
Friuli-Venezia Giulia	0,162	0,375	0,223
Liguria	0,145	0,454	0,181
Emilia-Romagna	0,159	0,432	0,269
Toscana	0,162	0,431	0,243
Marche	0,159	0,452	0,271
Umbria	0,165	0,417	0,260
Lazio	0,180	0,309	0,246
Abruzzo	0,159	0,473	0,263
Molise	0,158	0,417	0,240
Campania	0,170	0,357	0,247
Calabria	0,153	0,388	0,267
Puglia	0,164	0,256	0,264
Basilicata	0,165	0,379	0,210
Sicilia	0,161	0,393	0,234
Sardegna	0,167	0,430	0,242

3.3.3 Veterinarian expenses and other costs

It is easy to guess that veterinarian expenses are those associated with the remuneration of professional services rendered by a veterinarian and therefore involving not only the health of the animals strictly speaking, but several activities such as tests to verify yield, artificial insemination, etc. All the specific costs that do not fall within one of the cost categories previously examined should be listed under other Costs. The highest costs among these are the following: marketing, insurance, fuel and electricity, bedding and water.

As we have already seen for livestock replacement and feeding, there are no official information sources, except for the FADN database, for the costs being examined here. Moreover, in this sense surveys are particularly limited because so little information is obtained from the specialised bibliography and therefore it is difficult to relate the costs in question to the production standards of the animals and/or types of livestock farms. The estimation of these cost items therefore is made by using the information provided by the FADN and the following methodology: average three-year veterinarian costs and other costs, counted by FADN with reference to the entire livestock farm, were first divided into the various animal categories belonging to the farm (proportionate to the LU present in each category) and then into the animals belonging to each category. To carry out the above operations we obviously used the average number of animals expressed first in terms of LU and then in the number of heads provided by FADN.

CHAPTER 4

PRESENTATION OF THE STUDY RESULTS

Though the goal of this study was to illustrate the methodology designed to estimate the SO of livestock productions, and though the results of the same are available[23] in disaggregated form, in order to develop more suitable analyses we can briefly present the results. To this end Table 4.a shows a comparative examination of the major statistics describing the economic variables determined and then observed on a national level by analyzing the following properties of said data:

- central trend: measured by the arithmetic average;
- dispersion: measured by the coefficient of variation;
- form: symmetric distribution (mean = median) indicated by "0"; asymmetric distributions indicated by "+" (mean > median) and "-" (mean < median)

These indexes, lastly, are lined up next to "equivalent heads" (expressed in terms of bovines under 1 year old) which only serve an auxiliary function to the interpretation of the data.

Table 4.a - Descriptive statistics of SO and SGM

	Average			**Variation coefficient**		**Form**		**Equivalent heads of bovines under 1 year old**	
	SO	SGM	Var.% SGM/SO	SO	SGM	SO	SGM	SO	SGM
Equidae	581	209	-64	14	30	+	+	0,51	0,23
Bovines < 1 year old - Total	1.131	928	-18	16	23	+	-	1,00	1,00
Male bovines > 1 but < 2 years old	632	471	-25	24	29	-	+	0,56	0,51
Female bovines > 1 but < 2 years old	508	275	-46	27	45	+	-	0,45	0,30
Male bovines 2 years old and over	538	305	-43	40	75	+	+	0,48	0,33
Heifers 2 years old and over	468	293	-37	13	28	+	-	0,41	0,32
Dairy cows	1.854	1.016	-45	28	36	-	-	1,64	1,09
Bovines 2 years old and over - Other cows	753	286	-62	13	31	-	-	0,67	0,31
Ovines - Ewes	184	139	-24	11	17	-	-	0,16	0,15
Ovines - Others	207	177	-14	29	31	+	+	0,18	0,19
Caprines - Breeders	265	212	-20	23	27	-	-	0,23	0,23
Caprines - Others	73	49	-33	31	41	+	+	0,06	0,05
Swine - Piglets < 20 Kg	366	334	-9	7	8	+	+	0,32	0,36
Swine - Sows >50 Kg	1.719	1.080	-37	7	12	+	+	1,52	1,16
Swine - Others	573	135	-76	7	37	+	+	0,51	0,15
Broilers (100 heads)	2.109	976	-54	15	29	+	+	1,86	1,05
Laying hens (100 heads)	2.284	339	-85	12	53	+	+	2,02	0,37
Turkeys (100 heads)	4.814	1.482	-69	15	44	+	+	4,26	1,60
Duck (100 heads)	1.968	826	-58	15	31	+	+	1,74	0,89
Other Poultry (Geese and guinea hens) - 100 heads	1.534	811	-47	15	25	+	+	1,36	0,87
Rabbits - breeders	61	32	-48	8	17	0	0	0,05	0,03
Bees (beehive)	21	14	-34	28	43	+	+	0,02	0,01

Source: our processing of data from INEA

[23] *www.rica.inea.it*

Concerning the values taken from the purely statistical indexes, the only particularities seems to be the excessive similarity of information on pigs and rabbits. However, in this regard we would like to point out that all the variability shown by these animal categories should be attributed almost exclusively to the regional variability of the sale prices of the products (meat) and the purchase of production factors (mainly feeds) because, considering the standardization of the production techniques, the variability of physical production (body weight) is practically nonexistent.

Overall the data presented on the tables seemed to be quite homogeneous; this also indicates that the methodology designed is sufficiently "robust".

ACRONYMS

AGEA: Agenzia per le erogazioni in agricoltura (National paying agency for agricultural aid)

AIA: Associazione Italiana Allevatori (Italian Breeders Association)

ASSALZOO: Associazione nazionale tra i produttori di alimenti zootecnici (National Association of Livestock Feed Manufacturers)

CAP: Common Agricultural Policy

EAA: Economic Accounts for Agriculture

EAGGF: European Agricultural Guidance and Guarantee Fund

EC: European Community

EEC: European Economic Community

ESU: European size unit

EU: European Union

EUROSTAT: Statistical Office of the European Union

FADN: Farm Accountancy Data Network

FSS: Farm Structure Survey

FU: Fodder Unit

INEA: Istituto Nazionale di Economia Agraria (National Institute of Agricultural Economics)

ISMEA: Istituto di servizi per il mercato agricolo alimentare (Institute of Services for the Agrifood Market)

ISTAT: Istituto Nazionale di Statistica (Italian National Institute of Statistics)

LU: Livestock Unit

OGA: Other Gainful Activity

SGM: Standard Gross Margin

SO: Standard Output

TF: Type of Farming

UNA: Unione Nazionale Avicoltura (National Poultry Farm Union)

VAT: Value Added Tax

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Different data sources of the figures shown on the tables are specified in the paper. Data taken from the sources ISTAT, AIA and UNA are also available online in many cases:

www.istat.it/agricoltura,

www.aia.it,

www.unionenazionaleavicoltura.it