Environmental Report

UNIONE NAZIONALE INDUSTRIA CONCIARIA

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INTRODUCTION

Research and investment in the Italian tanning industry yield steadily improving results in terms of reduced environmental impact and increased efficiency. Less water, less energy, less waste.

The tanning industry boasts products of high added value, known the world over for their quality and style.

UNIC, the trade association, represents Italian tanneries. The sector, international leader and strategic to the "made in Italy" mix, exports about two thirds of its nearly 5.4 billion euro in turnover, accounting for 60% of European production and 15% of the worldwide total.

The UNIC "group" includes fairs, innovation, fashion, regulation, credit and publishing.

The data reported demonstrate the continual evolution of our tanneries and their achievement of performance levels unmatched abroad.

A committed and successful effort that should serve as an example to politicians, the public administration and the market.

CONTENTS

PART ONE

ITALIAN TANNING INDUSTRY

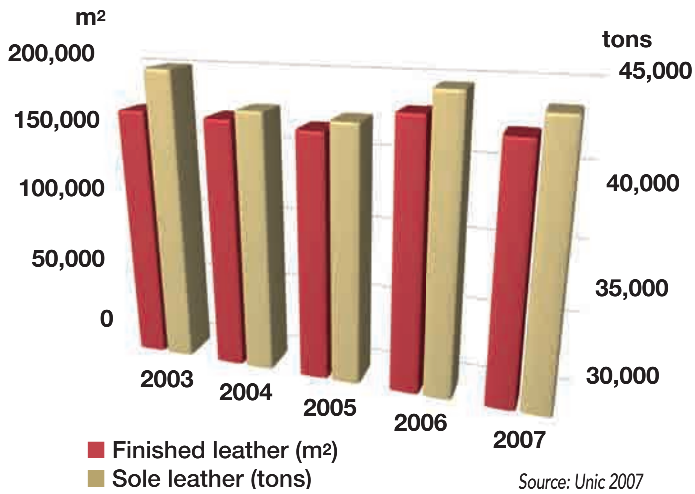
national structural data

The most recent survey data indicate that the Italian tanning industry includes 1,415 companies, with a total work force of 17,604 employees. The average size of a company in the sector is thus of little more than 12 people, rather small, but this datum could be misleading if we overlook the sharp differences between the single production districts. Over the short term (2006-2007) the sector has registered a slight contraction, around 2%, in both the number of operators and the number of employees.

Based on the most recent estimates, over the course of the past year, the industry produced a total of about 167 million square meters of finished leather and 44 thousand tons of soles leather (Tab. 1), a drop of 5.3% and 5.1%, respectively, against the 2006 results. The value of production (5.4 billion Euro) instead registered a slight overall rise, mostly due to the increase in the average cost of raw materials between 2006 and 2007.

An analysis of production over the past five years (Fig. 1) shows, net of the general economic cycle, the excellent state of health of the Italian tanning industry, which has traditionally been an undisputed world leader in the sector, accounting for over 2/3 of European production value and almost 15% of global production value.

Fig. 1 ▸ ITALIAN LEATHER PRODUCTION (2003 - 2007) - VOLUME



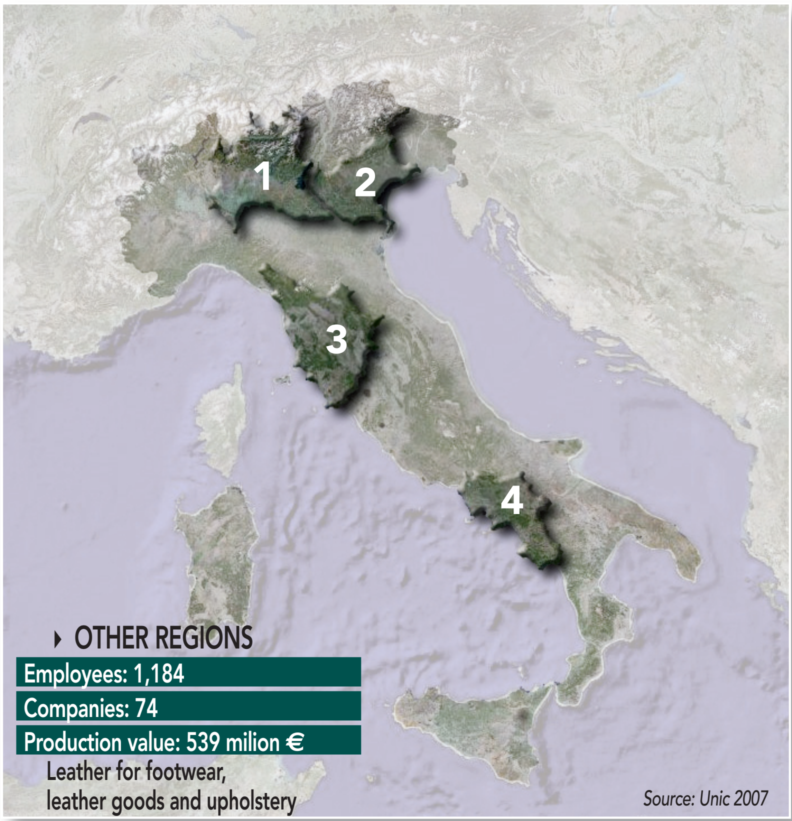
Source: Unic 2007

Tab. 1 ▸ PRODUCTION VOLUMES AND VALUE FOR THE ITALIAN TANNING INDUSTRY (2006 - 2007)

Italian tanning industry	2007 (prelim. estimates)		Variation in % 2006/2007	
	Volume	Value (milions of euro)	Volume	Value
Production ('000 m^2)	167,153	5,106	-5.3%	+2.1%
Sole leather (tons)	43,485	307	-5.1%	-3.4%
Total production		5,413		+1.7%

Source: Unic 2007

Fig. 2 ▸ ITALIAN TANNING INDUSTRY – STRUCTURAL DATA BY REGION (2007 ESTIMATES) AND SPECIALIZATION



1 ▸ LOMBARDY
Employees: 816
Companies: 68
Production value: 249 milion €
Sheep and goat leather for footwear

2 ▸ VENETO
Employees: 9,309
Imprese: 465
Production value: 2,828 milioni €
Bovine leather for footwear and upholstery

3 ▸ TUSCANY
Addetti: 4,613
Companies: 615
Production value: 1,450 milion €
Bovine leather for footwear and leathergoods

4 ▸ CAMPANIA
Employees: 1,682
Companies: 193
Production value: 347 milion €
Sheep and goat leather for leather apparel, footwear and leathergoods

REGIONAL TRENDS

As mentioned above, the sector is divided into production districts, each with its own industrial specialization (Fig. 2).

The tanning district with the greatest production value is in the Veneto region (in the area of Chiampo - Arzignano), which accounts for 52.2% of the national production value. The district includes small and mid-sized companies, as well as large industrial groups; the principal production specializations involveBovine leathers processed for footwear and furniture upholstery.

The district with the greatest number of companies is instead in Tuscany (in the area around S. Croce sull'Arno – Ponte ad Egola), which accounts for 27% of national production. In this district, tanneries are smallest in the country (averaging under 8 employees per company), with processing characterized by highly skilled workmanship and flexibility (cowhide and calfskin for the fashion sector).

In conclusion, there are two districts specialized in tanning small skins (sheep and goats): Campania (in the area of Solofra), which accounts for 6% of national production, and Lombardy (around Turbigo) at 5%. The hides tanned in these regions are destined for use in the footwear, accessories and apparel sectors (typically high end).

Due to the different specializations, production performance in the different districts is often quite varied. Thus, for example, in the Veneto region, turnover dropped in 2007 (current estimate: -2.4%), while it rose sharply in Campania (+18.8%) and Lombardy (+14%) and remained stable with a slight positive sign in Tuscany (+1.9%).

PRODUCTION PER TYPE OF ANIMAL AND USE

The tanning industry recycles (and adds value to) a waste product of the food industry, that is, the raw hides from slaughterhouses. Most of the animal hides used (see Fig. 3) come from adult bovines, which account for 70% of total production, followed by sheep (13%), goats (9.9%) and calves (6.8%). Only 0.3% of the hides tanned by the sector come from other animals (pigs, reptiles, etc.).

In this way as well, the economic situation may vary widely for each type of animal. For example, the overall drop in production experienced by the industry last year can be ascribed to a reduction in the amounts of cowhide and calfskin processed, 9% lower than the year before, while sheep and goats instead posted a sharp upswing (sheep +12.4%, goats +5.1%).

Another typical way of subdividing tannery production is by client manufacturing sectors (Fig.4).

The principal clients of the tanneries have traditionally been footwear manufacturers, who buy almost half the tanned leather produced at the national level. They are followed by the Furniture upholstery sector with (21.3%), Leathergoods (15.3%), Leather apparel (5.5%) and Car interior upholstery, with 4.7%.

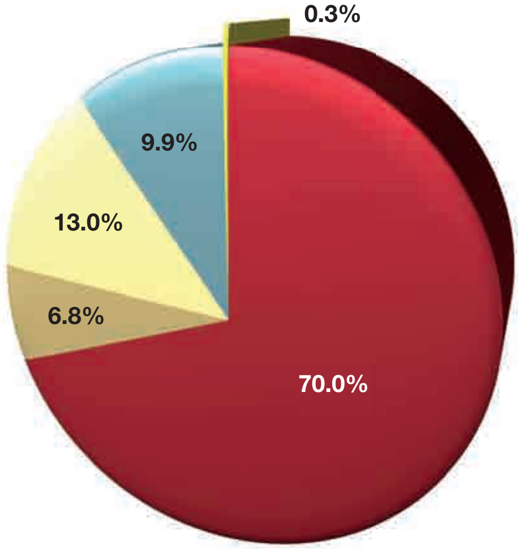
The estimated 2006-2007 performance suffered due to sharp cutbacks in orders from producers of the Furniture upholstery (over 15% less than the previous year), while footwear remained basically unchanged. There was a slight increase in Leathergoods (+1.2%) and decreases in Leather apparel (in difficulty for many years) and Car interior upholstery (a niche market for the sector).

EXPORTS

The sector has always been vulnerable to international market fluctuations, both in terms of the supply of raw materials and for the sale of the finished products. Regarding this last point, it should be underscored that for ten years now, exports have accounted for over 50% of national turnover (currently they have risen to 2/3).

This trade flow, destined to over 140 countries all over the world, is directed by more than half (Fig. 5) to countries in the European Union, about 1/3 to Asia and 6% to the Nafta area. In 2007, exports grew by 4.4% in value while suffering a drop of 8.4% in volume: exports to EU nations increased (including the production outsourced to Eastern Europe, as in Rumania - 2° destination for Italian tanned hides), dropped in the USA (5° foreign market in terms of volume) and increased in

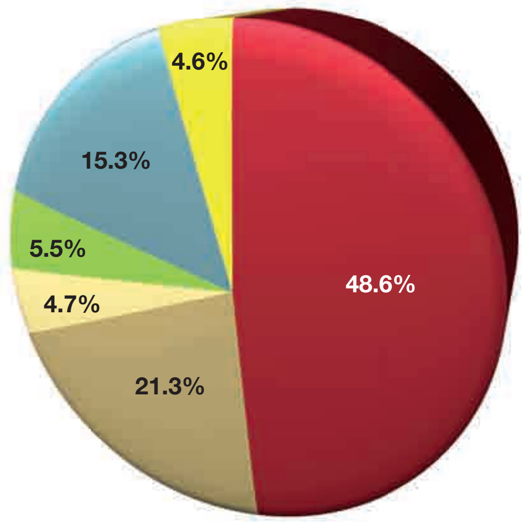
Fig. 3 ▸ PRODUCTION PER TYPE OF ANIMAL
INCIDENCE % ON VOLUME (2007 estimates – m²)



Source: Unic 2007

- Adult bovine (excl. Sole leather)
- Calves
- Sheep
- Goat
- Other animals

Fig. 4 ▸ PRODUCTION PER CLIENT MANUFACTURING SECTOR - INCIDENCE % ON VOLUME (2007 estimates – m²)



Source: Unic 2007

- Footwear
- Furniture upholstery
- Car interior upholstery
- Leather apparel
- Leathergoods
- Other

value (but dropped in volume) for the Chinese area (for over ten years now, the leading foreign destination for Italian tannery products).

SUPPLY OF RAW MATERIALS
(RAW AND SEMI-WORKED HIDES)

Obtaining supplies from foreign markets is of fundamental importance for the sector, given that Italy can only satisfy less than 10% of the demand for raw material (meaning raw and semi-processed hides and skins).

The main area of supply for raw material is the European Union (Fig. 6), which supplies 44% of the annual volumes purchased. From the EU region, hides mostly arrive raw. The second largest supplier is instead Latin America (18% of the total), which mostly exports wet blue. The Russian Area and the Balkans are next (10%), followed by Oceania (9%), Africa (8%) and North America (6%).

Imports, from more than 130 countries, were, over the course of the past year, basically stable in terms of the quantities of raw hides (+0.5%) and dropped sharply for semi-processed leather (wet blue -11%, crust –18.5%). For the former, supplies from the EU have increased and those from outside the EU have dropped, while for the latter, the only increases registered are from South Africa, Great Britain and Syria.

Fig. 5 ▸ LEATHER EXPORTS PER AREA OF DESTINATION INCIDENCE % ON VALUE (2007 estimates)

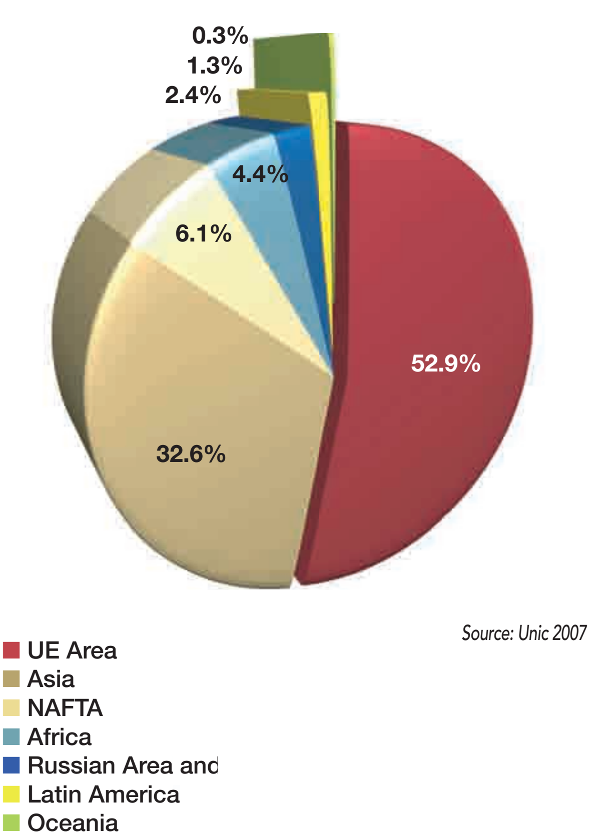
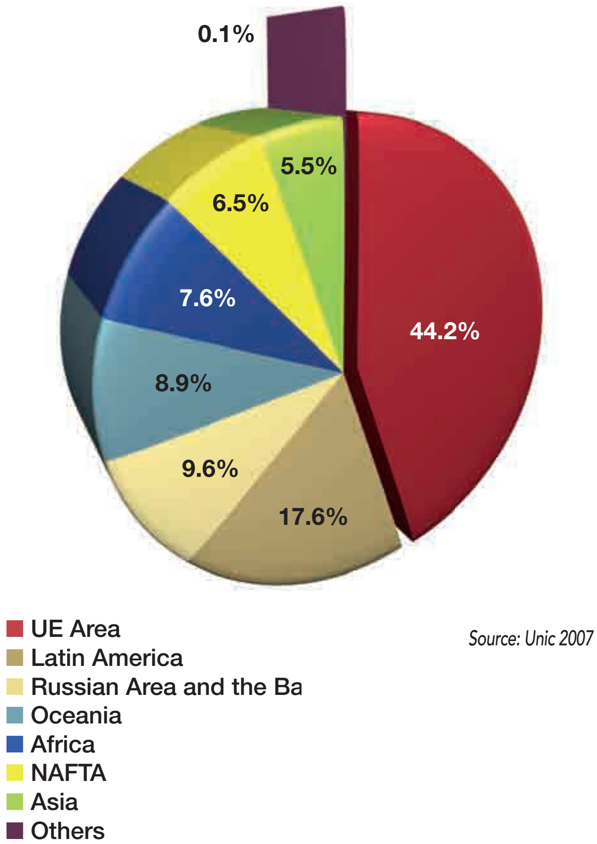


Fig. 6 ▸ IMPORTS OF RAW MATERIALS PER AREA OF ORIGIN - INCIDENCE % ON VOLUME (2007 estimates)



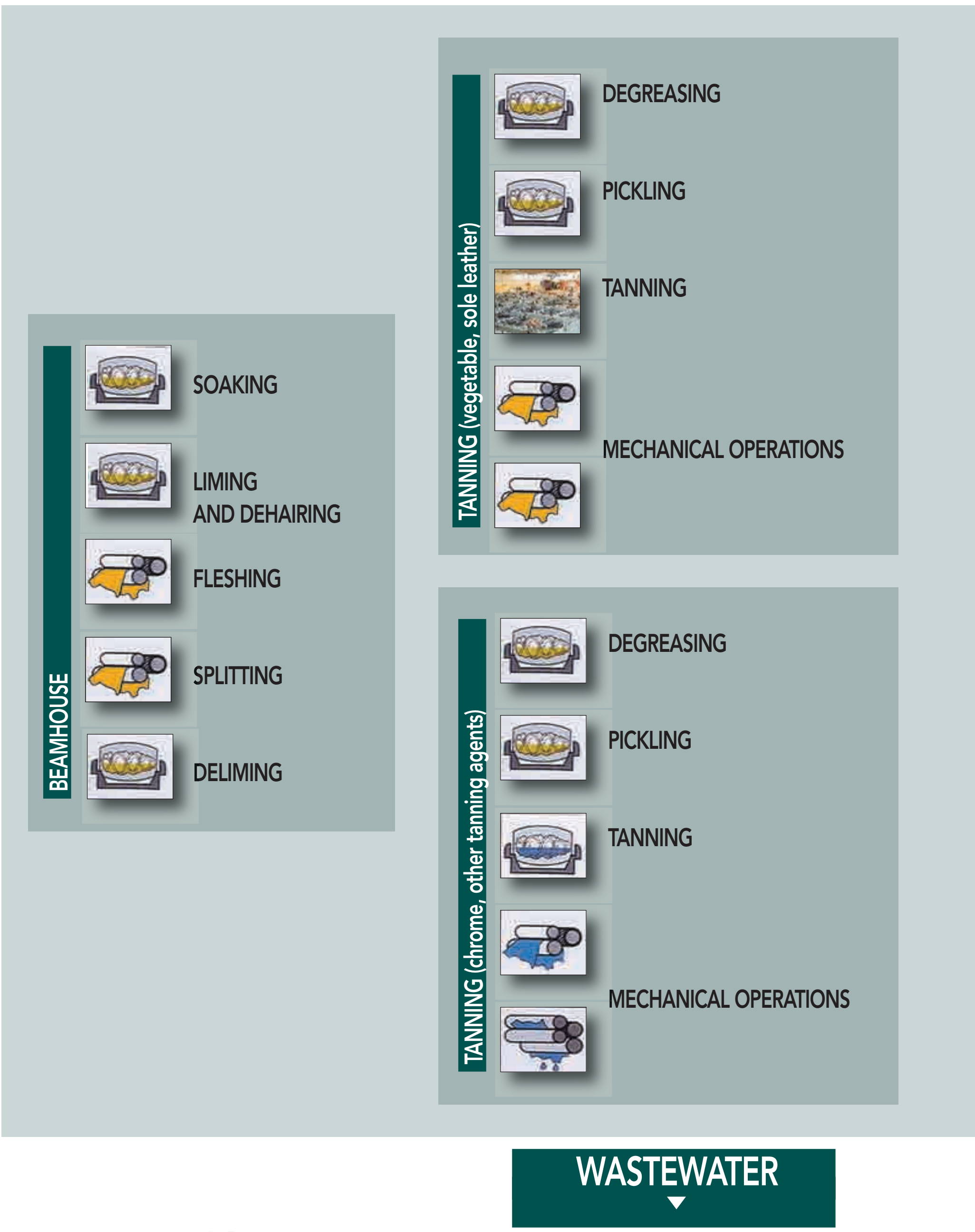
PART TWO

THE TANNERY
Production processes and environmental aspect

Although it still retains some of the typical aspects of the artisan-style workmanship that ensure a high quality product, Italian tannery production has for years now taken on the form of a modern industry: increasingly efficient tanning products and machinery, the automation of processing sequences, the rationalization of the production process and environmental protection are integral parts of the activity of every tannery.

In order to define the environmental aspects of tannery processing, as for other industrial processes,

Fig. 1 ▸ THE "BLACK BOX" APPROACH TO THE TANNING PROCESS



we can follow an approach known as the "black box". Specifically, tannery production is considered a process that transforms raw material and energy into finished products.

The process thus transforms primary inputs (raw and semi-processed hides) into finished leather. To do this, as shown in Fig. 1, the system requires inputs of water, energy and chemicals. The processes' impact on the environment is primarily represented by wastewater, waste, atmospheric emissions and noise. Each use of resources is thus considered an environmental aspect and handled as such by the tannery.

The tanning production cycle is composed of a series of chemical and mechanical treatments that transform an organic material subject to decay (raw hides), into a product with high added value for footwear, furniture upholstery and leathergoods.

The following is a description of the different stages that comprise tannery processing, with indications regarding the principal environmental aspects of each and the main actions undertaken to prevent and/or mitigate environmental impact.

PRESERVING THE HIDES

The raw hides that are received by the tannery have undergone a curing treatment that slows down their putrefaction as much as possible and keeps them in good condition for processing. The methods most commonly used are:

- **refrigeration:** the hides are stored at temperatures that inhibit the proliferation of bacteria, with the aid of specific products. This can be used only for brief storage periods and involves the constant use of means of transport and refrigerated storage facilities;

- **salting:** after skinning, the hides are soaked in brine (sodium chloride, NaCl), which prevents the growth of bacteria and thus inhibits putrefaction;

- **drying:** the moisture content of the hides is reduced to the point that bacteria cannot survive, preventing enzymatic putrefying action.

A poorly executed curing process can result in the development of free ammonia and bad smells, which do not, in and of themselves, present a threat to human health or to the ecosystem in general, but do influence the quality of life of the people living in the surrounding areas. To prevent the formation of ammonia and unpleasant odors, the raw hides are not exposed to the open air, which speeds up the putrefaction process, but are stored inside the tannery, in refrigerated cells whose temperature is kept at just above 0°C.

BEAMHOUSE OPERATIONS

Beamhouse operations are carried out in order to remove all the components not needed for the production process from the hides (for example: conservation salt, hair, bits of subcutaneous tissue), loosen the structure of the collagen and assist the penetration of the various tanning agents. The first Beamhouse operations (soaking, liming/dehairing) are performed in large cylindrical drums, similar to industrial washing machines, where the hides are soaked in a float, usually with the addition of chemical products designed to wash the hides and remove the hair remaining on them. The hides are then treated with machines that remove the subcutaneous tissue (fleshing) and are in some cases cut lengthwise, resulting in two or more layers (splitting) of hide ready for the subsequent treatments.

At this point, the cycle continues in the drums, where the hides are rinsed and the residue of the chemical products used in liming are removed, creating the optimal conditions for tanning.

Beamhouse operations consume quantities of water proportional to the weight of the hides treated. The effluent water is full of dissolved substances that affect its quality; the parameters of the effluent water most influenced by Beamhouse operations are the COD, suspended solids, chlorides, sulfates and organic nitrogen. Effluent water is treated (sometimes different treatments for different floats) in order to reduce the pollutant load to levels that do not present a risk for the environment. Hair can be recovered using special grilles and then utilized to make felt. Some innovative technologies remove hair from hides using enzymes and recycle the depilatory floats, thus reducing both water used and emissions of pollutants. Fleshing produces bits of tissue which, like the residue produced by trimming, must be treated as solid waste. In the tannery, waste is collected separately, so that it can be sent to the intended destination. Tissue, hair and bits of hide are sent to be reutilized in various ways, both industrially and in agriculture and the zoo-technical sector.

TANNING

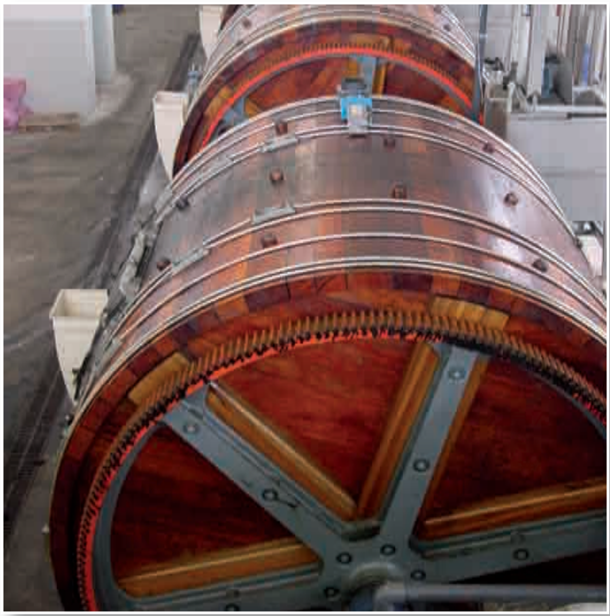
After having undergone treatments intended to eliminate the excess substances, modify the pH value and prepare the collagen fibers, the hides are ready for the tanning process itself. Tanning is carried out using substances that bond permanently with the fibers of the hide, preventing its decomposition, making it stable and long-lasting without altering its natural characteristics. There are different tanning methods, with very different stages depending on the processes and the final product desired: mineral tanning (carried out using mainly chromium salts), vegetable tanning and organic and mixed tanning. The most commonly used method is the one involving chromium, carried out in drums with the tanning product in an acid pH solution.

For sole leather, the vegetable tanning system most frequently used involves floating the hides in a series of vats containing tannin extract solutions at increasing concentrations. The process can last as long as 30 days. For the production of sole leather in Italy, a mixture of tannins taken from chestnut, mimosa and quebracho is most commonly used. Vegetable tanning is characterized by a process of diffusion of the solution (tanning float) to the solid stage (leather), which is continued until a balance is reached and which permeates the entire thickness of the leather. The treatment is carried out in vats where the hides are tumbled against the flow of the current: when these are ready to be worked, they are placed in almost inactive solutions and then exposed to a series of progressively more diluted ones.

At the end of vat tanning, the hides are tumbled in drums, where the same vegetable extracts are almost always used.

Subsequent to the tanning operations, the hides are subjected to mechanical treatments intended to make them of a uniform thickness, depending on their final use; this operation, known as shaving, is carried out for every type of hide.

Tanning operations consume quantities of water proportional to the weight of the hides processed and produce a pollutant load in the effluent water consisting of COD, emollients, chlorides, sulfates, N-ammonia and chromium III. In this case as well, the water discharged from the tanning drums and vats is sent, using special sewage pipes, to in-house and outside treatment facilities. Today, there are several different technologies that can be used to reduce the quantities of chromium III in the effluent water to a minimum; the used tannery floats can be recovered and reutilized, or long-lasting tanning products can be used, which often produce the same effect at lower dosages. Insofar as the vegetable tanning used for sole leather and cowhide, ultrafiltration techniques have been designed for the tanning floats, which permit the recovery of tannins not bonded to the hides, thus avoiding their discharge in the effluent water and permitting their partial reutilization.
The byproducts generated during the shaving stage are collected and stored separately on the tannery premises. They are sent to be recycled for the production, for example, of regenerated leather fiber, adhesives and fertilizer



DYEING

The hides from the various tanning processes must be subjected to further soaking in aqueous solutions. These are grouped together under the heading of dyeing operations and are intended to give the finished product specific organoleptic characteristics: fullness, consistency, tactile characteristics and, obviously, the desired color. The actual dyeing may involve only the surface, or the entire thickness of the hide. First, the hides are re-tanned using natural and/or synthetic products, like tannins and resins of various kinds, and then dyed using various types of pigments. The dyeing operation is carried out in drums that spin at high speed, until the hides have completely absorbed the pigments. Special coloring and re-tanning is also carried out on sole leather, when special products are requested, like colored soles or soles of special softness or elasticity. During re-tanning, the leather is polished and the color is lightened through the elimination of oxidized tannins from the exterior surface, as well as the excess, unbonded tanning agent. The hide is then lubricated, making it softer, water resistant and resistant to oxidation.

Effluent water from dyeing operations, which require less water per unit product than the preceding treatments, are discharged at altered temperatures and contain COD, ammonium nitrate, phenols and fats. The pigments used are mostly consumed in the dyeing solutions themselves, so that the effluent water is not perceptibly colored, especially after it is mixed with the other tannery effluents. In this case as well, all the effluents are sent to be treated using the special tannery sewage pipes present on the premises.

FINISHING

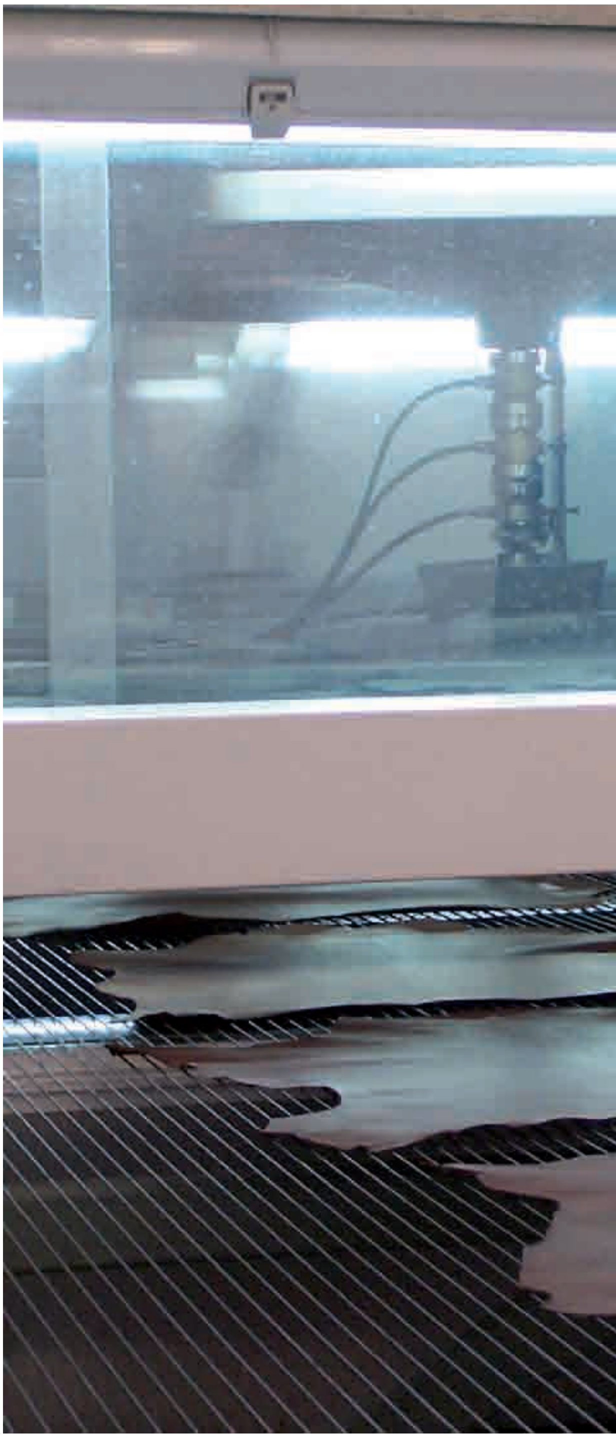
The dyed hides are dried during the pressing operation, which eliminates excess water, and the subsequent drying, mainly achieved by hanging the hides in the air.

The hides are then lightly moistened and subjected to mechanical operations intended to soften them, spread them and make their surfaces uniform. In some cases, they are also subjected to a superficial fluffing, which produces a velvety surface texture. This operation can also be performed on dry hides that have only been tanned and are dyed subsequently. Refinishing proper consists of the application of a surface film, of variable thickness and transparency, of chemical substances of various nature, depending on the finished product desired. Among the various refinishing techniques in use, the most common is the spray technique using compressed air. The hides are placed on a variable speed conveyor and during their transport are covered with the required amount of finishing substances, thanks to spray guns that generally move in a circular motion.

The last operation, before the finished product is delivered to the client, is a quality check, with the hides being trimmed of all defective parts and unusable portions.

If the client so desires, sole leather can be cut using special shears.

The refinishing operations, especially the superficial application of compressed air sprays, influence the quality of atmospheric emissions, particularly with respect to the powders and volatile organic substances (VOC). All the emissions from the surface treatment (fluffing) and the spray chambers in the refinishing line are sent to filters and collectors of various types, which ensure that the legal limits are respected. These collectors sometimes use water as a purifying agent, in which case the water in question is periodically changed and sent for treatment, to keep the systems functioning efficiently. In addition, over the past few years we have seen the gradual replacement of many finishing products with a solvent base with water-based equivalents that have made an important contribution to improving the quality of emissions. Finally, the shards of hide cut away during the final control and selection stage are collected separately and reutilized in the production of small leather accessories or recycled as regenerated leather fiber.



ENVIRONMENTAL BALANCE

This fifth edition of the Environmental Balance for the Italian tanning industry reports the achievement of better environmental data than in the past, especially with regard to water consumption, effluent water and generation of waste. The survey, conducted in collaboration with a significant group of tanneries, provides an analysis of the findings and of the typical activities that lead to the reduction of environmental impact.

For effluent water purification and waste management, the survey data was collected from water treatment consortiums and specialised sector operators.

As standard practice, we used the Eurostat definition of environmental expenditure:

"expenditure incurred for performing activities whose main objective (direct or indirect) is management and protection of the environment, that is to say activities aimed deliberately and principally at preventing, controlling, reducing or eliminating pollution and the environmental decay caused by production and consumption".

THE SAMPLE

The participating tanneries come mostly from the three major production districts and were selected to match the sector's structure on the national level, in terms of geographic distribution, production value and number of employees.

Figures 1, 2, 3, describe the sample composition against the total number of companies, number of employees and turnover.

As shown in Tab. 1, the 29 tanneries participating in the survey represented 11.1% of the total value of national production in 2007, with a local weight that varies from 46.7% in the Campania region to 6.4% for the tanneries located outside the principal production areas. From the standpoint of the number of employees, the sample surveyed includes 9.7% of the national work force.

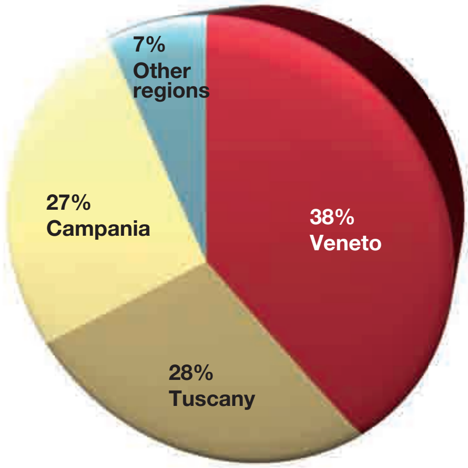
Tab. 1 ▸ SAMPLE POPULATION

	PRODUCTION VALUE		
	SAMPLE	TOTAL	%
Veneto	213,365,303	2,828,000,000	7.5%
Tuscany	172,484,788	1,450,000,000	11.9%
Campania	162,016,310	347,000,000	46.7%
Other regions	50,653,735	788,000,000	6.4%
Totale	**598,520,136**	**5,413,000,000**	**11.1%**

	EMPLOYEES		
	SAMPLE	TOTAL	%
Veneto	744	9309	8.0%
Tuscany	376	4613	8.2%
Campania	443	1682	26.3%
Other regions	150	2000	7.5%
Totale	**1,713**	**17,604**	**9.7%**

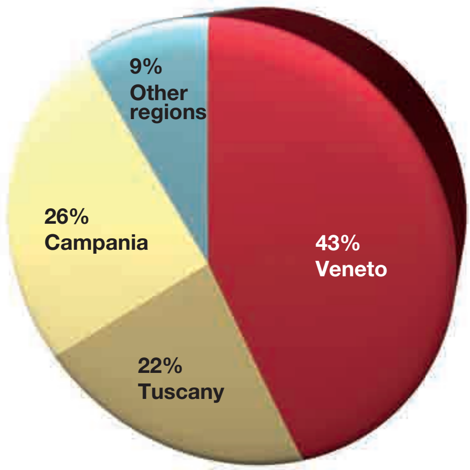
Source: Unic 2007

Fig. 1 ▸ SAMPLE STRUCTURE: PERCENTAGE AGAINST NUMBER OF COMPANIES



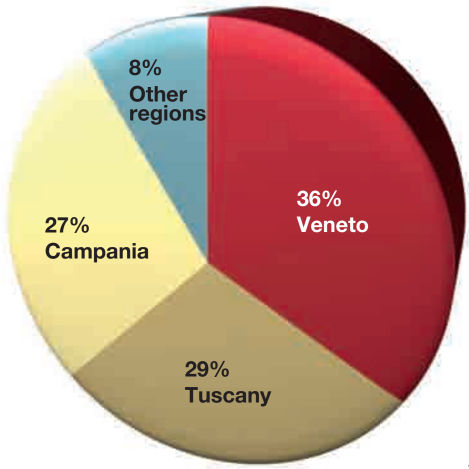
Source: Unic 2007

Fig. 2 ▸ SAMPLE STRUCTURE: PERCENTAGE AGAINST NUMBER OF EMPLOYEES



Source: Unic 2007

Fig. 3 ▸ SAMPLE STRUCTURE: PERCENTAGE AGAINST PRODUCTION VALUE



Source: Unic 2007

CONSUMPTION OF CHEMICALS

Transforming raw hides into finished products involves an intense action on the macromolecules of the derma to prevent their rotting, ensure their suitability and give them the desired aesthetic characteristics. This interaction occurs thanks to the use of special chemical agents, contained in products that are dissolved in water or applied directly to the surface. The tanning industry uses a considerable number of chemical agents, whose availability is in constant development. The survey findings show that a square meter of finished leather required the use of about 1.8 kg of chemical products, of which about 36% contain substances classified as hazardous by the regulations currently in force (DIR 67/548 CEE). It should be made clear that the classification of a substance as hazardous does not necessarily mean that the leather produced is hazardous in itself, but that the chemicals require special attention during their handling and storage by the tannery operators.

As shown in Fig. 4, the tanneries have made a concerted effort to achieve the goal of greater environmental compatibility of the chemical products they utilise, by choosing products that pollute less and devising and applying industrial processes that result in a reduced impact.

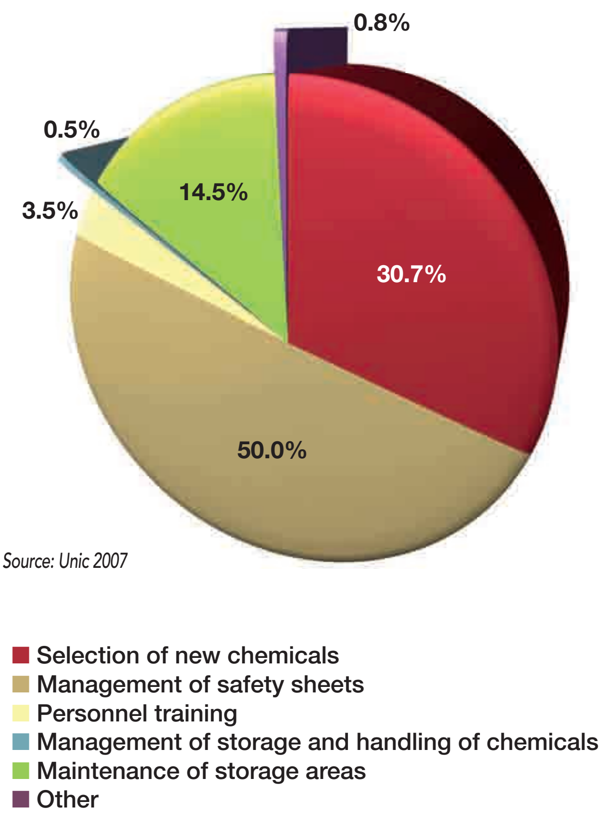
The characteristic activities reported in the survey are primarily carried out by technical personnel on the tanneries' payroll, in collaboration with the suppliers. This because using an innovative product means having tested it carefully, having conducted trials that sometimes require special instruments and equipment. The cost structure of the specific activities is shown in Fig.5.

Tab. 2 ▸ CHEMICAL PRODUCTS: DATA SUMMARY

INDICATOR	2007
Chemicals used/year (kg)	39,933,154
Chemicals used/year (kg/tannery)	1,479,006
Chemicals containing substances classified as hazardous - DIR 67/548 CEE (%)	36%
Chemicals/Product unit (kg/m²)	1.84
Chemicals reduction costs/turnover (%)	0.14%
Chemicals reduction costs/Product unit (€/m²)	0.04

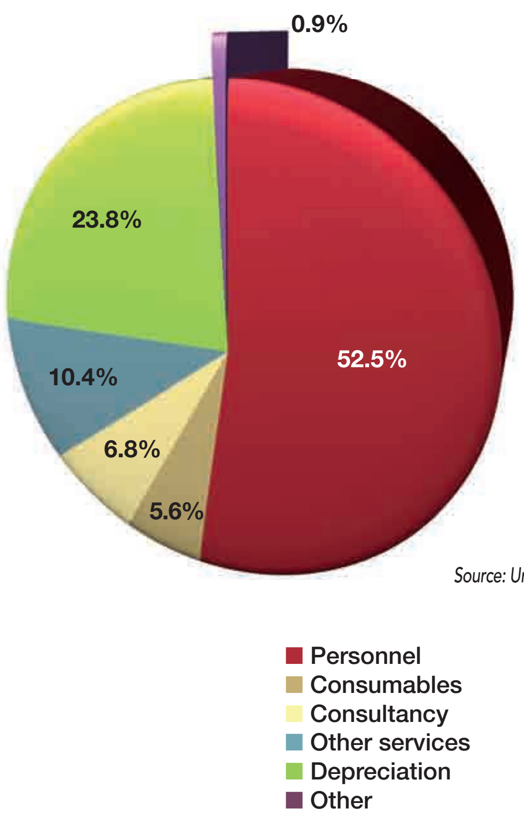
Source: Unic 2007

Fig. 4 ▸ MANAGEMENT OF CHEMICAL PRODUCTS: CHARACTERISTIC ACTIVITIES 2007 (%)



Source: Unic 2007

Fig. 5 ▸ MANAGEMENT OF CHEMICAL PRODUCTS: COST STRUCTURE 2007 (%)



Source: Unic 2007

ENERGY CONSUMPTION

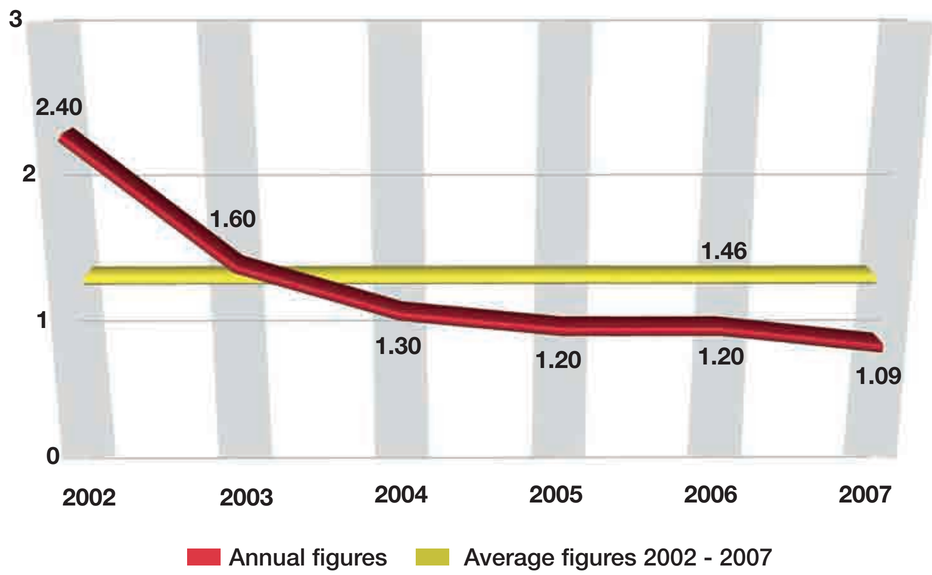
Tanning is not an energy intensive industry, although its processes require both electricity to run the machines and thermal energy, used to raise the temperatures of certain equipment (the drying tunnels, for example) and to heat the processing water and the workplace. While there are various sources of electrical energy and an equally variable supplier production mix, thermal energy is primarily produced through the combustion of natural gas or other fossil fuels.

Specific conversion factors allow us to add up the energy contributed by each source, and thus to calculate the average total consumption per product unit, expressed in Tons of Oil Equivalent per 1,000 square meters of leather produced (TOE/1,000 m^2). As is shown in Fig. 6, over the six years of the survey, energy consumption per product unit has diminished considerably, dropping from 2.4 to 1.09 TOE/1,000 m^2. There are many reasons for this sharp reduction, among which the development of processes that require less energy, the variable mix of raw materials processed and the increased efficiency of machinery and plants in general.

As can be seen in Fig. 7, there has been no significant variation in the structure of energy consumption in the six years surveyed; in 2007, electricity and methane gas accounted for 96.1% of total consumption, with Fuel Oil, Liquid propane and diesel for transport making up the remaining 3.9%.

As indicated above, the main activities carried out in tanneries to reduce energy consumption are the selection and purchase of highly efficient machinery and systems and the development of more energy-efficient processes (Fig.8). In line with this, the main cost items are depreciation, personnel and materials consumed.

Fig. 6 ▸ ENERGY CONSUMPTION PER PRODUCT UNIT 2002 - 2007 (TOE/1,000 m^2)



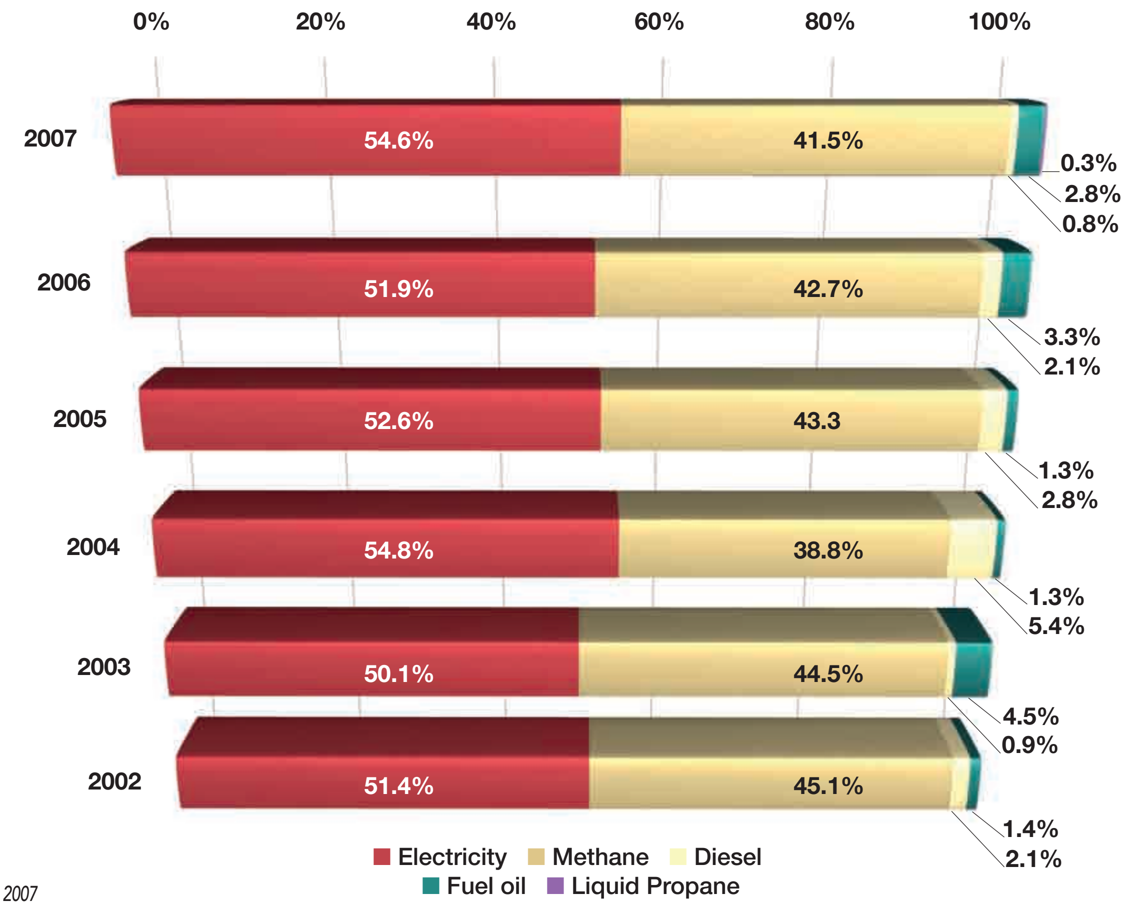
Source: Unic 2007

Tab. 3 ▸ ENERGY CONSUMPTION: DATA SUMMARY

INDICATOR	2002	2003	2004	2005	2006	2007
Energy consumption/Product unit (TOE/1,000m^2)	2.40	1.60	1.30	1.20	1.20	1.09
Electricity on total energy (%)	51.4%	50.1%	54.8%	52.6%	51.9%	54.6%
Methane on total energy (%)	45.1%	44.5%	38.8%	43.3%	42.7%	41.5%
Energy reduction costs/turnover (%)	-	-	-	-	-	0.04%
Energy reduction costs/Product unit (€/m^2)	-	-	-	-	-	0.01

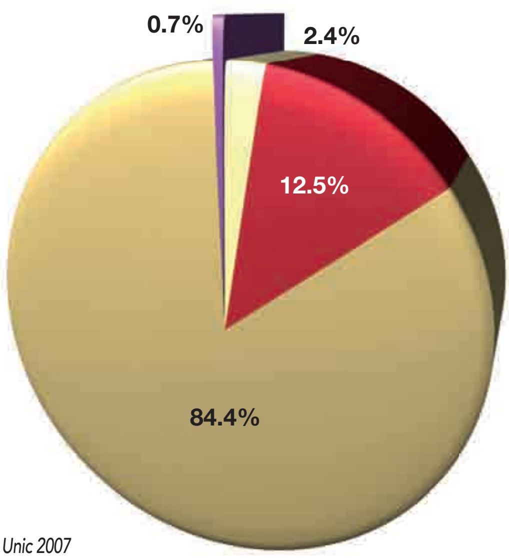
Source: Unic 2007

Fig. 7 ▸ ENERGY CONSUMPTION BREAKDOWN: COMPARISONS 2002/2007 (%)



Source: Unic 2007

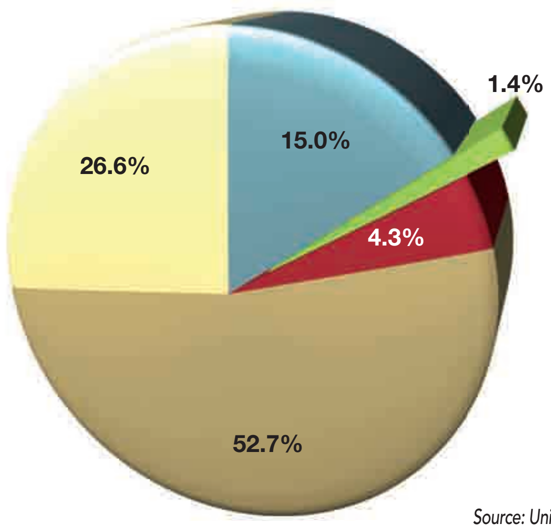
Fig. 8 ▸ REDUCTION OF ENERGY CONSUMPTION: CHARACTERISTIC ACTIVITIES 2007 (%)



Source: Unic 2007

Selection of energy suppliers privileging renewable resources
Development of energy saving processes
Selection and purchase of highly efficient machinery
Installation of renewable energy plants

Fig. 9 ▸ REDUCTION OF ENERGY CONSUMPTION: COST STRUCTURE 2007 (%)



Source: Unic 2007

Personnel
Consumables
Consultancy
Depreciation
Other

WATER SUPPLY AND DISCHARGE

Most of the initial tanning processes utilise water. Water consumption and wastewater treatment are therefore the most significant environmental aspects for the tanning industry, from both the physical and economic standpoint.

Tanneries have designed systems of water supply, consisting mostly of artesian wells, in addition to civil and industrial water supply systems. At the same time, the principal production districts have set up consortiums to manage the treatment of effluent water.

As can be seen in Fig. 10, specific consumption per product unit, expressed in liters consumed per m^2 of leather produced, dropped substantially in 2007, with values equal to 108.57 l/m^2. For the third consecutive year, efficiency increased in 2007, and the figure registered is also decidedly below the mean for the period in question (118.56 l/m^2), which lies about midway between the above mentioned minimum, posted in 2007, and the maximum, registered in 2002, which was equal to 136.0 l/m^2. The data reported is collected by the companies in the sample by recording the meter readings of the company wells and/or the industrial aqueducts they draw their water from.

The tanneries also carry out specific activities intended to reduce the consumption of water. Among these, the most important are the development of processes that use less water and the selection and purchase of water-efficient machinery. The costs associated with these two activities (Fig. 11) account for about 90% of the expenses for ordinary activities, with the breakdown shown in Fig. 12.

About 94% of the water used for processing is thus treated. The remaining amount takes the form of residual moisture in the leather, evaporates or is contained in the waste sent to treatment plants.

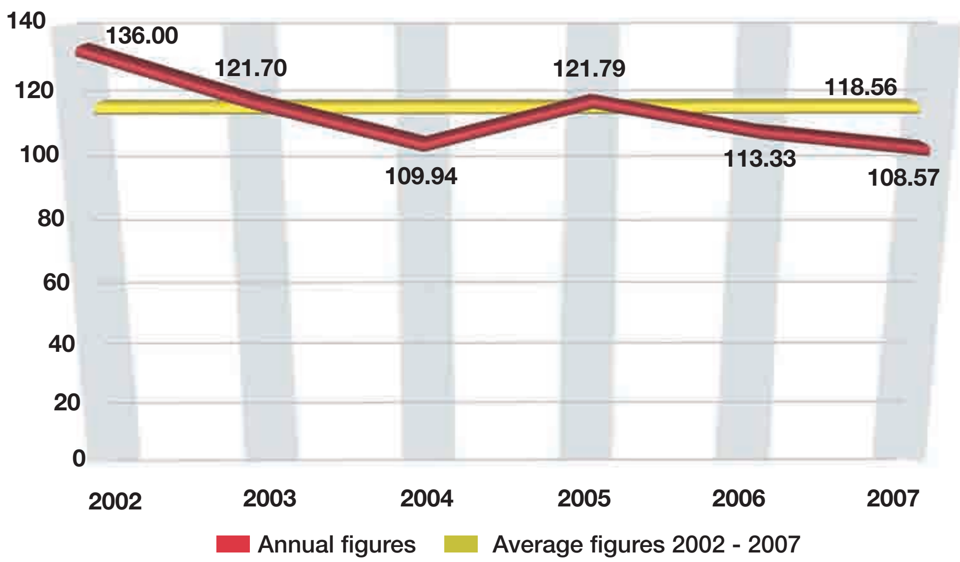
As indicated above, most of the effluent water produced by Italian tanneries is treated in centralised and consortium-run water treatment plants, developed specifically to meet the needs of tannery-produced waste water. Less than 10% of the nation's tanneries, being located outside production districts, treat their own effluent water, most of which is then discharged into the public sewage system.

In any case, almost all the companies using the centralised water treatment plants carry out specific pre-treatments on their premises, which are designed to eliminate large waste and execute a preliminary separation of pollutants.

An evaluation of the sector's performance in terms of water treatment is thus best based on those companies with a direct connection to the centralised water treatment plants. In this edition of the report, we include, for the third time, specific data covering the four-year period 2004 – 2007. In 2007, the water treatment plants surveyed processed the effluent water from 796 tanneries in the Veneto, Tuscany, Campania and Lombardy regions.

The first tannery water treatment plants (prevalently structures with private ownership or private shareholders) date back to 1958, about 20 years prior to the passing of the first national law governing waste water. Since that time, between treatment plants and lines for the treatment of water and sludge to opti-

Fig. 10 WATER CONSUMPTION PER PRODUCT UNIT 2002 - 2007 (l/m^2)



mise waste water discharge, more than 570 million euro have been invested, both on the economic and technical level. The structures have thus developed steadily and their present importance, including a significant contribution to the treatment of civil effluent water throughout Italy, has been acknowledged by the Minister of the Environment himself, in apposite program agreements.

Fig. 11 ▸ REDUCTION OF WATER CONSUMPTION: CHARACTERISTIC ACTIVITIES 2007 (%)

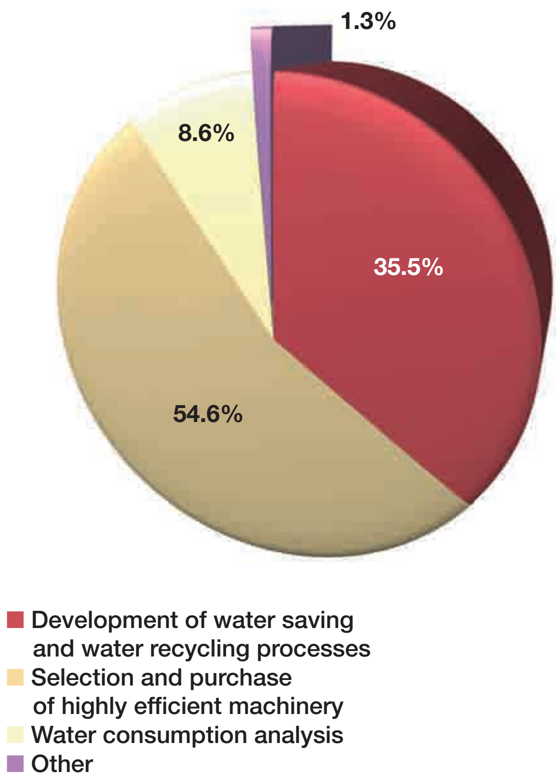
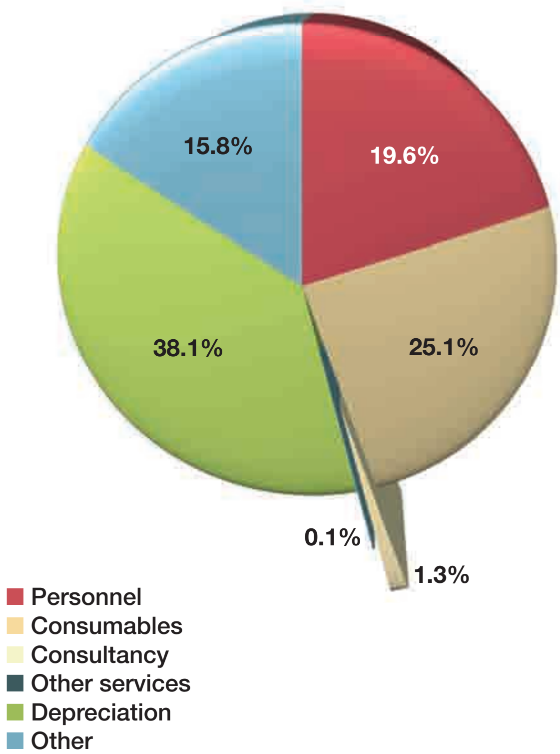


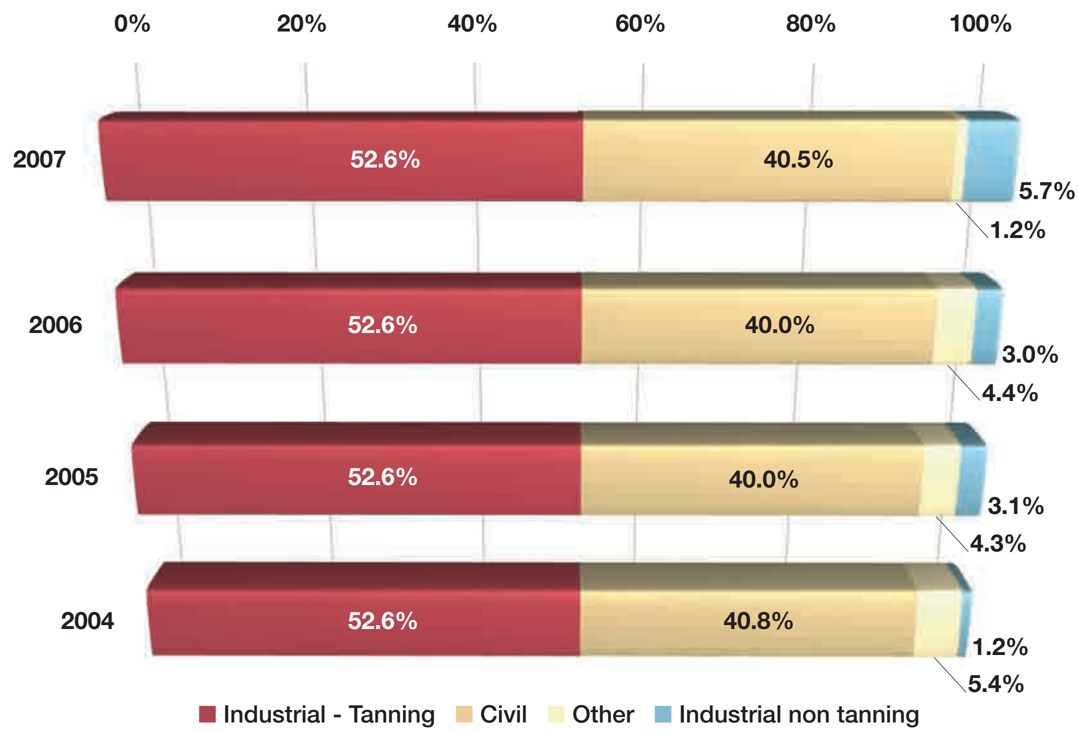
Fig. 12 ▸ REDUCTION OF WATER CONSUMPTION: COST STRUCTURE 2007 (%)



As shown in Fig. 13, in fact, during the four-year period 2004 – 2007, consortium-run water treatment plants primarily treated water from tanneries, but also received significant amounts of civil waste water (about 40%, calculated over the entire period in question) and smaller amounts of other effluents or liquid industrial waste, transported on vehicles.

The water treatment plants participating in the survey received a load of approximately 312,000 tons of pollutants, contained in 16,956,910 cubic meters. More than 238,000 tons of pollutants were extracted from the waste water thanks to the treatment processes used.

Fig. 13 ▸ WASTEWATER INPUTS IN CENTRALISED PURIFICATION PLANTS 2004 - 2007 (%)



Source: Unic 2007

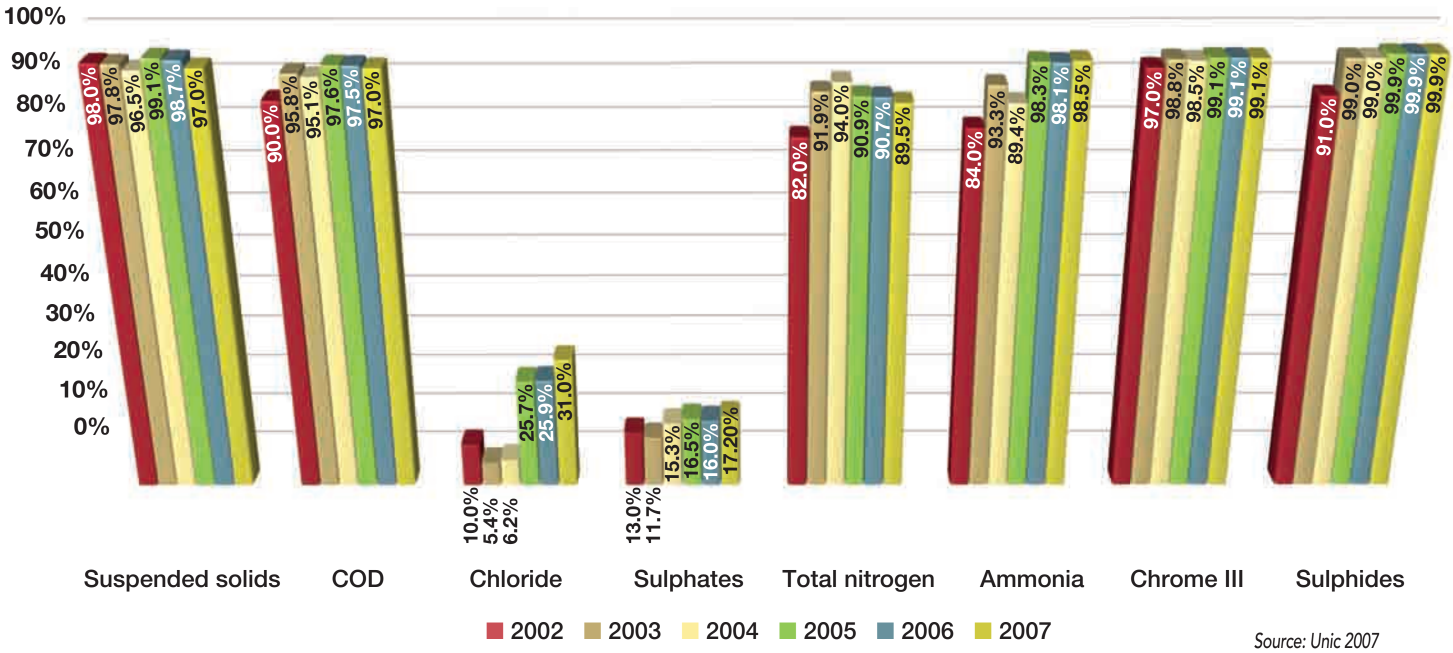
TSS - Total Suspended Solids
Indicates the quantity of undissolved solids, usually measured in milligrams/liter (mg/l), that can be separated out of a liquid sample by filtration. In tannery effluent water, these are due primarily to undissolved chemical products or residue from treatment of the hides in the wet stage of processing. These can be reduced in effluent water (with a positive effect on COD as well) through physical-chemical treatments.

COD
(Chemical Oxygen Demand / chemical oxygen requirement)
This value, expressed in milligrams of oxygen per liter (mgO_2/l), represents the quantity of oxygen needed for the complete oxidation of the organic and inorganic compounds contained in the effluent water. It is thus an index of the degree to which the water is contaminated by organic residue from leather (hair and skin) and chemical products that have not been consumed in the processing solutions (i.e. ammonia, surfactants, organic acids, organic solvents, tannins, resins, dyes, fats etc.). During water treatment, the COD is measured through a combination of physical trials (i.e. filtration/straining etc.) and chemical and biological treatments.

Sulphates ($SO_4^{=}$)
The presence of high concentrations of sulphates can cause several difficulties, first and foremost the reduction of the self-purifying capacity of the water body that receives them. Sulphates have an oxidising effect, which take away oxygen from the processes that break up the other pollutants. They are also responsible for increasing salinity, which consequently raises the osmotic potential, a fundamental parameter for the survival of aquatic organisms. Tanneries use a wide range of chemical products, and a reduction in their environmental impact can also be achieved through the replacement of traditional chemical products with alternative formulations.

Nitrogen
This is one of the key parameters in the evaluation of the pollutant load, because it acts at both the chemical and biological level, intervening directly on the metabolism of living organisms. It is generally expressed in terms of TKN - Total Kjeldhal Nitrogen, or the total concentration of organic nitrogen deriving from the breakdown of protein and urea. In order to measure the total nitrogen content of effluent

Fig. 14 ▸ WATER PURIFICATION PERFORMANCES 2002 - 2007 (%)



Source: Unic 2007

In order to provide additional data illustrating the efficiency of water treatment, we have considered the following principal parameters in effluent water, both coming into the treatment plants and in the water they in turn discharge.

The 2007 data are in line with the trends we have registered throughout the survey period. The treatment processes developed continue to prove extremely efficient against the majority of pollutants.

In fact, as can be seen in Fig. 14, the levels of reduction are close to or over 90% for all parameters except for chlorides and sulphates, which are soluble salts and thus present treatment problems not yet entirely solved at the international level. Although efficiency levels remain lower than those of other parameters, we also see an improvement in these parameters over the period 2002 – 2007.

water, in addition to the TKN we must also consider the portion of nitrogen derived from the ammonia (NH_3) and ammonium salts (NH_4^+) used in processing.
During the treatment of effluent water, the primary action is biological, affecting the balance of nitification/denitrification.

Chlorides (Cl^-)

The chlorides found in the effluent water from tanneries are all of mineral origin, derived from the soaking bath that dissolves the salt preserving the raw hides, the ammonium chloride that may be used for decalcification/maceration and from the use of sodium chloride and hydrochloric acid in the pickling fluid and in tanning.Their presence is not considered particularly worrisome, except for the effects that a high salt load can produce on the osmotic potential of water, on the water's organoleptic characteristics and for eventual corrosive effects on the conduits, linked to the water's increased electrical conductivity.

Chromium (III)

Chromium hydrosulfate ($CrOHSO_4$) is a tanning agent that attaches permanently to the collagen fibers, preventing their putrefaction without altering their softness, flexibility and original fibrous structure, whose use is thus extremely widespread in the tanning industry. It does not present toxic characteristics.
The technology in use in the sector permits the recovery of a large part of the chromium contained in used tannery soaking solutions through physical-chemical treatments, reducing the concentrations entering the water treatment systems, which then eliminate the remaining portion.

Sulphides ($S^=$)

Sodium sulphide (Na_2S) is used in the initial stages of processing, especially in the removal of hair from raw hides. Its environmental impact depends mainly on its potential toxicity in certain environmental conditions, its contribution to the COD value and, of less importance but more obviously perceptible, to the characteristic unpleasant smell it gives to the water.
Sulphides are mostly eliminated (more than 99%) through traditional physical, chemical and biological treatments. Another possible way of eliminating Sulphides is to adopt alternative processing techniques, for example removing hair using enzymes, either partially or completely replacing Sulphides, or fortifying the used soaking solutions and reusing them.

EFFLUENT TREATMENT COSTS

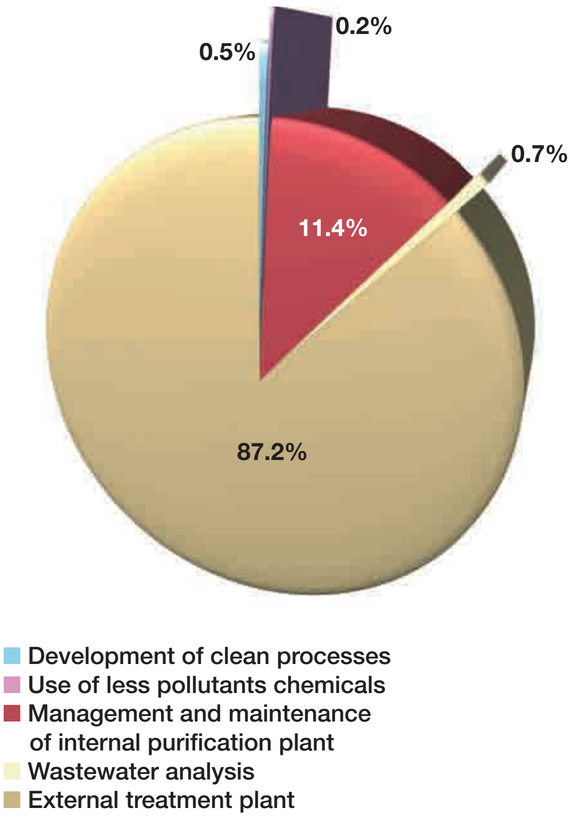
The 2007 survey registered both the in-house costs sustained by the tanneries for treatment of effluents and upgrades of waste treatment systems and the costs to the consortium treatment structures.

For tanneries, the cost of managing the treatment process, internally and externally, is almost equal to the total cost related to effluent water. Outside treatment plants and the operation and maintenance of the treatment plants on the tannery premises account for almost all specific costs (Fig. 15) and water treatment services alone account for almost 90% (Fig.16).

Also, as shown in Fig. 17, over the course of the six year survey period, the average incidence of water treatment on the tanneries' turnover was 1.58%, with a minimum of 1.43% in 2004, a peak of 1.71% in 2005 and a 2007 value of 1.54%, slightly below the mean.

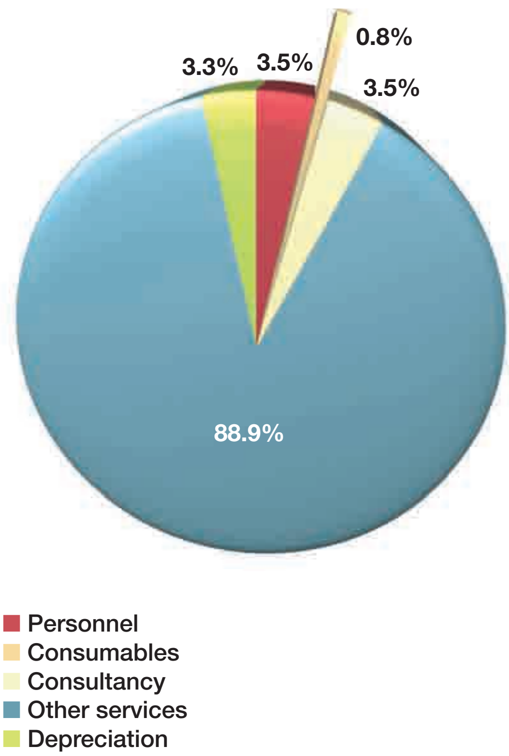
If we consider the values shown in Tab.4, we note that despite a marked decrease in water consumption per unit, the incidence of water treatment costs on turnover did not diminish proportionally, although the values for the incidence per square meter of leather produced showed the same trend as the physical data. In fact, over the period 2002 – 2007 we note a decrease of about 20% in water consumption, coupled with a comparable reduction in the incidence of cost per product unit (approx. -32%). The incidence of such costs on turnover is instead on the rise, increasing about 8% over the period surveyed. It is thus evident that in-house efforts by tanneries to increase their efficiency in water treatment have not yielded concrete results in economic terms.

Fig. 15 ▸ IMPROVEMENT IN WASTEWATER: CHARACTERISTIC ACTIVITIES 2007 (%)



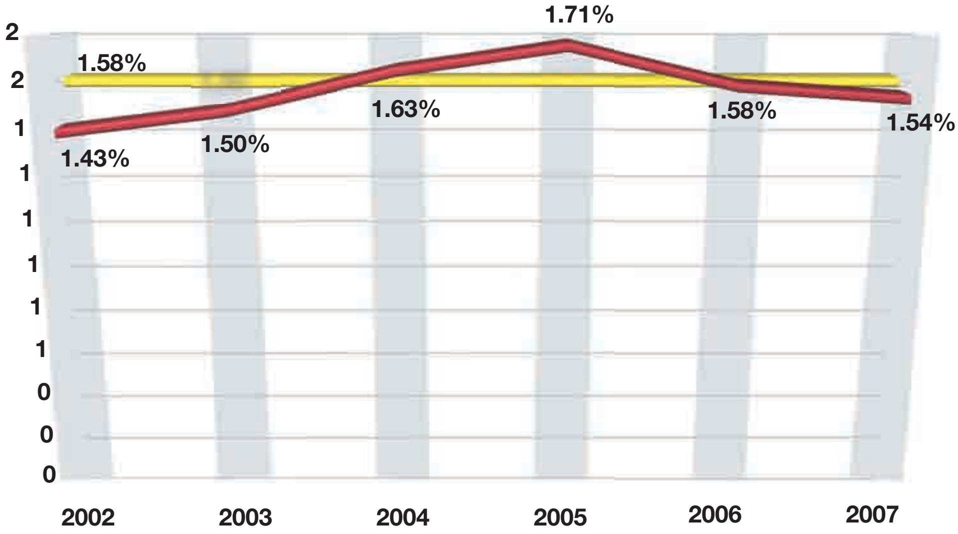
Source: Unic 2007

Fig. 16 ▸ IMPROVEMENT IN EFFLUENT WATERS: COST STRUCTURE 2007 (%)



Source: Unic 2007

Fig. 17 ▸ WATER PURIFICATION COSTS/TURNOVER 2002 - 2007 (%)



Source: Unic 2007

Tab. 4 ▸ WATER: SUMMARY DATA

INDICATOR	2002	2003	2004	2005	2006	2007
Water consumed/Product unit (l/m^2)	136.0	121.7	109.9	121.8	113.3	108.6
Water management costs/turnover (%)	1.43%	1.58%	1.63%	1.71%	1.58%	1.54%
Water management costs/Product unit (€/m^2)	0.61	0.52	0.56	0.59	0.54	0.41

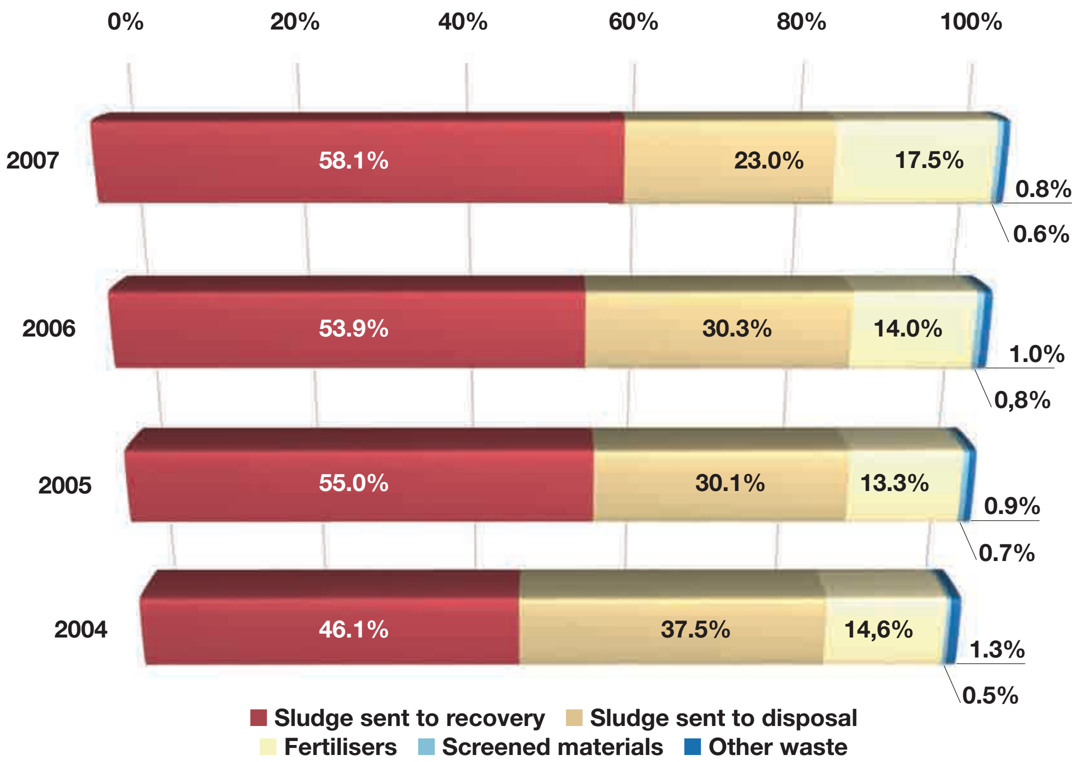
Source: Unic 2007

In 2007, centralised water treatment plants spent about 94.6% of their turnover on processing waste water. If we consider the period 2004 – 2007 for the companies samples whose sole activity is water treatment (thus excluding those companies that also receive liquid waste transported by vehicle), this percentage rises to 99% for the entire period in question.

The average unit cost of treatment for centralised plants is about 3.89 €/m³. As shown in Fig. 18, an analysis of the cost breakdown for centralised treatment plants for the period 2004 – 2007 confirms that the disposal and transfer of sludge and other treatment waste products to authorised plants is the main cost factor. Percentages of turnover varying from 34.8% to 39.7% (2007 value) are in fact so destined.

Disposal of treatment plant wastes is a critical factor in the environmental processing chain. In Figs. 19 and 20 we see the composition of the waste produced by these plants and the costs associated with their disposal. As we can see, although a significant percentage of the waste transferred is destined for subsequent recovery, management of residue like sludge, materials used for fertilisation and screened materials still account for almost all waste costs.

Fig. 18 ▸ COST BREAKDOWN FOR WASTE TREATMENT IN CENTRALISED PLANTS 2004 - 2007 (%)



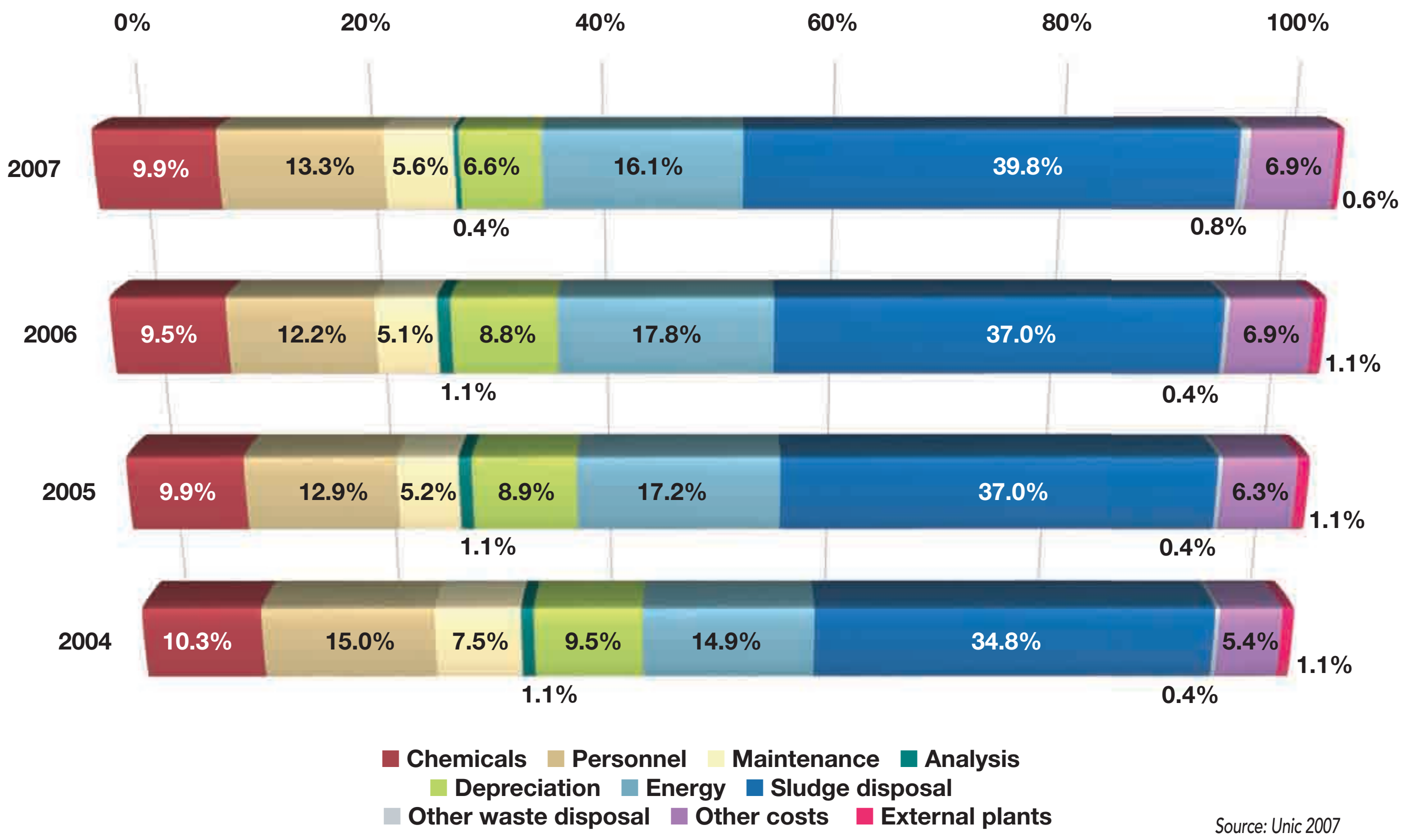
Source: Unic 2007

TREATMENT PLANT INVESTMENTS

In analysing the data provided by the treatment plants surveyed, we note one particularly significant item: the investments made to rationalise and improve the treatment process have totalled more than 14,000,000 euro. These investments included:

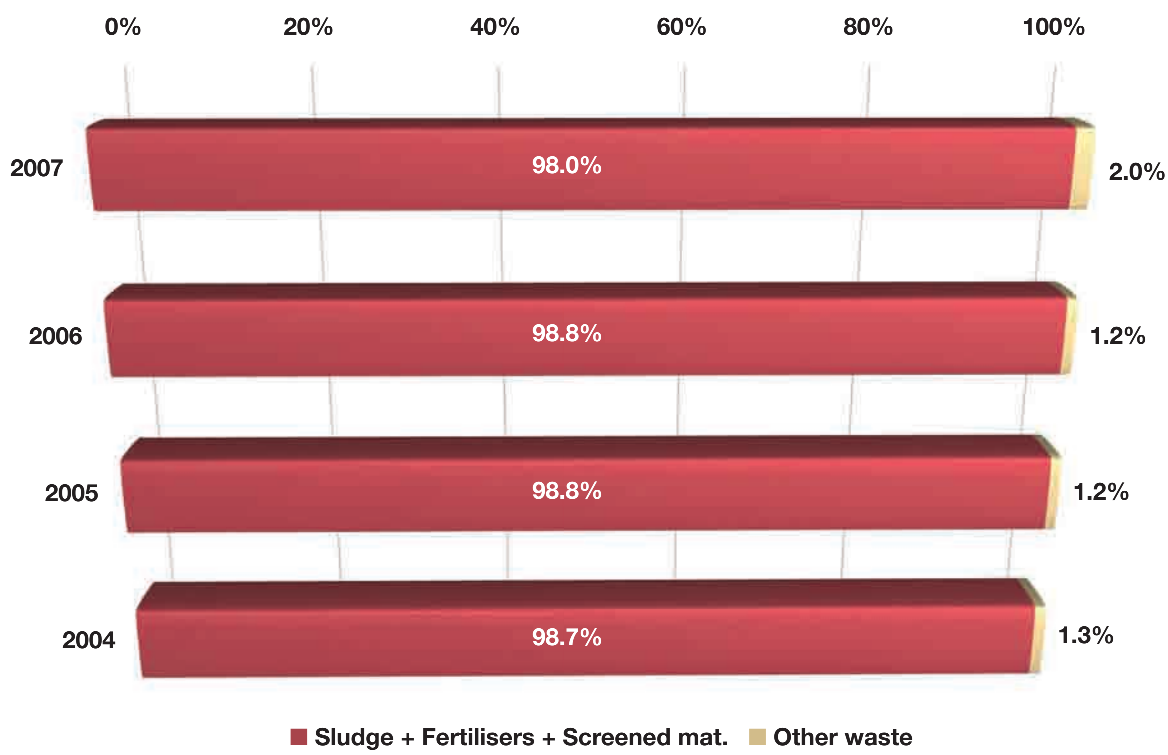
- oxidation basins
- secondary setters
- sand filtration
- aerobic digestion
- ozone treatment
- covering of physical-chemical tanks

Fig. 19 ▸ COMPOSITION OF WASTE FROM CENTRALISED TREATMENT PLANTS 2004 - 2007 (%)



Source: Unic 2007

Fig. 20 ▸ COSTS FOR DISPOSAL OF WASTE FROM CENTRALISED TREATMENT PLANTS 2004 - 2007 (%)



Source: Unic 2007

COLLABORATING TREATMENT PLANTS

CONSORZIO AQUARNO SPA - S. Croce sull'Arno (PI)
www.depuratoreaquarno.it

CONSORZIO CUOIODEPUR SPA - Ponte a Egola (PI)
www.cuoiodepur.it

CONSORZIO CONCIATORI DI FUCECCHIO - Ponte a Cappiano (FI)
www.ofnelson.it/ccf/ita.htm

MEDIO CHIAMPO SPA - Montebello Vicentino (VI)
www.mediochiampo.it

ECOLOGICA NAVIGLIO SPA - Robecchetto con Induno (MI)
www.ecologicanaviglio.it

Impianto di depurazione di Solofra - Soggetto Attuatore - Solofra (AV)

WASTE PRODUCTION AND HANDLING

Processing waste from tanneries take different forms depending on the stage of the processing cycle they originate from, and may thus have different final destinations.

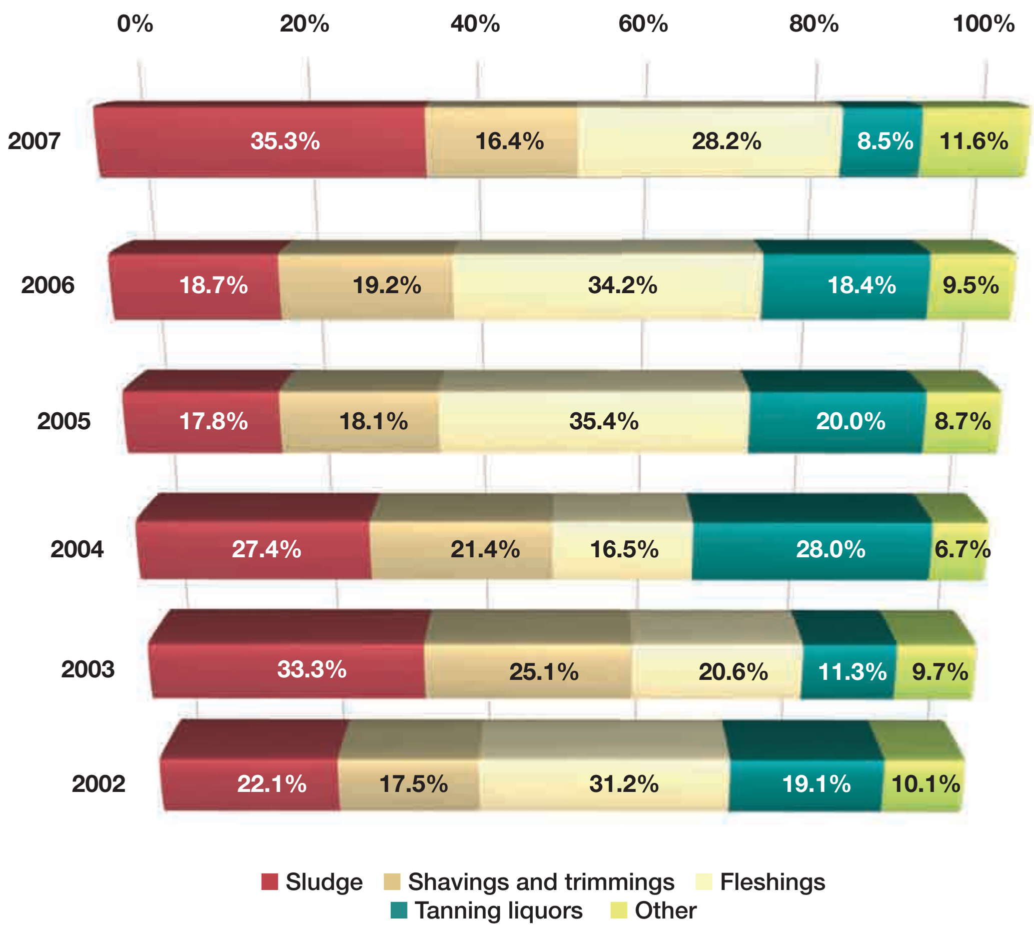
In the tanning process, incoming raw or semi-processed hides must be shorn of all the excess material not needed for the finished product. These generate solid waste or end up in the waste water, forming sludge in the treatment stage.

In the 2007 survey, shavings, trimmings and fleshings taken together accounted for 44.6% of the waste produced. In addition to these, most of the remaining waste is treatment sludge (35.3% of the total). It should be noted that the tanneries that send their effluent water to centralised treatment plants also send them the dissolved portion of these waste materials. Thus, the production of sludge registered by the survey is inevitably underestimated, because the amounts are taken from the treatment process, which is delegated to consortiums in about 90% of the cases. Nevertheless, the amount of sludge produced by the treatment plants is shown in Fig. 19 above.

Tannery effluents containing chromium are sent by tank truck (in compliance with the national waste management regulations) to centralised treatment plants. The chromium recovered is mixed with "fresh" chromium and reused in the production process. This system has been perfected over the years and is now standard procedure for about 210 tanneries in the Tuscan district. Other tanneries recover their chrome in-house, but this data is not contained in the present report.

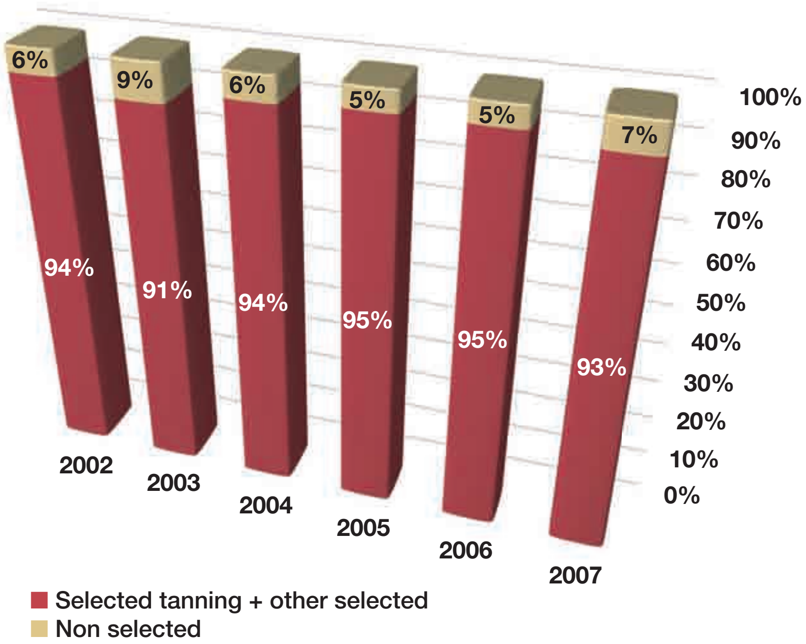
The composition of the various types of waste that emerges from the analysis of the sample data is shown in Fig. 21.

Fig. 21 ▸ TYPICAL COMPOSITION OF WASTE FROM TANNING ACTIVITIES 2002 - 2007 (%)



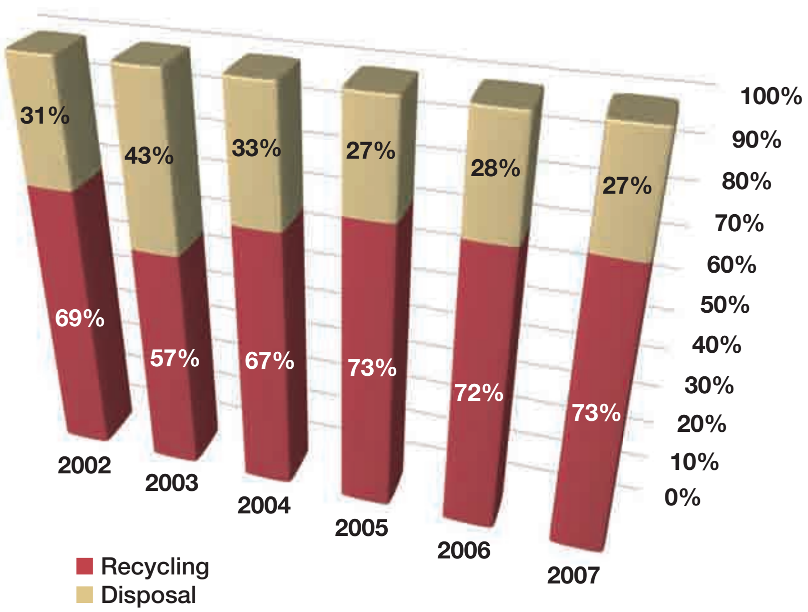
Source: Unic 2007

Fig. 22 ▸ SELECTIVE WASTE COLLECTION: COMPARISONS 2002 - 2007 (%)



Source: Unic 2007

Fig. 23 ▸ FINAL WASTE DESTINATION 2002 - 2007 (%)



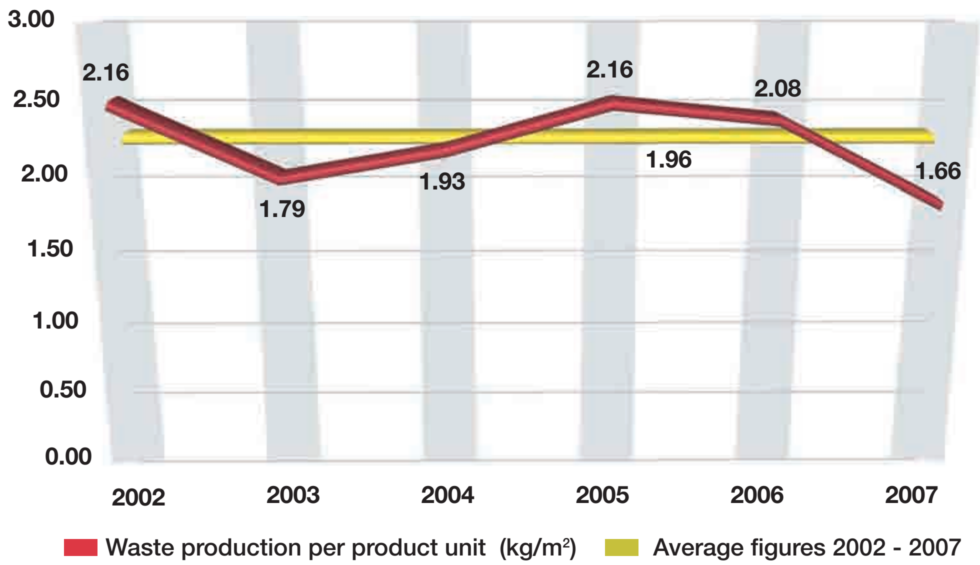
Source: Unic 2007

If we compare the data from the various reports, we note that the composition of the waste produced may vary significantly over a few years. The relative proportion of the individual categories of waste is mostly a function of the different types of raw material that the tanneries utilise.

To permit the reutilization and recovery of the waste produced, tanneries must implement separated in-house collection and storage procedures, thus avoiding mixtures of different types of waste, which would render the waste produced unusable by the specialised companies downstream.

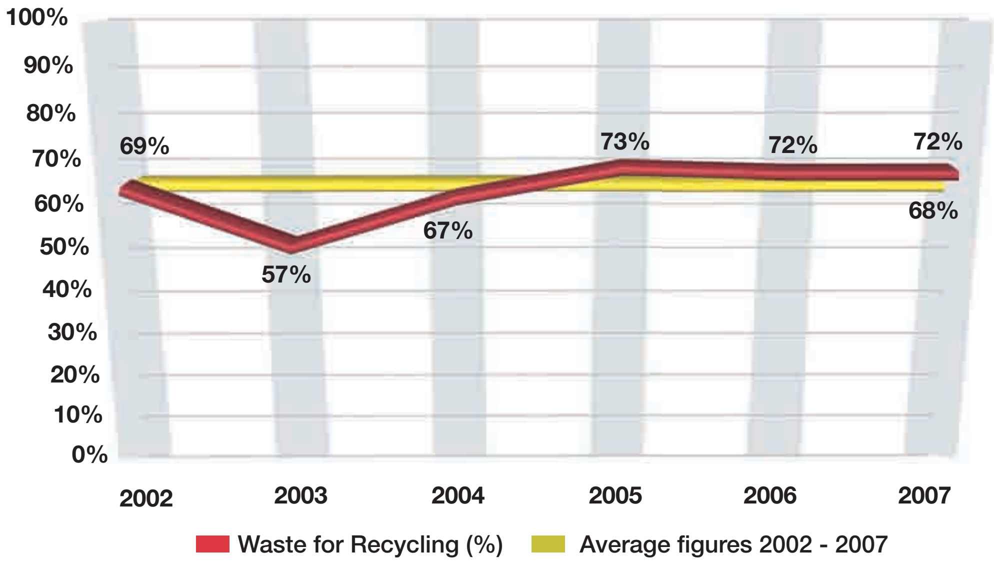
Fig. 22 shows the levels of efficiency achieved by the tanneries over the six years surveyed. The percentages of separated waste never dropped below 91% of the waste produced, with the 2006 and 2007 values equal to 95% and 93% of waste produced, respectively. Most of this waste consists

Fig. 24 ▸ WASTE PRODUCED PER PRODUCT UNIT 2002 - 2007 (kg/m²)



Source: Unic 2007

Fig. 25 ▸ WASTE SENT FOR RECYCLING/RECOVERY 2002 - 2007 (%)



Source: Unic 2007

of typical tannery waste, with the remaining amounts being mostly packaging materials (wood, plastic or other materials), undifferentiated materials and iron, also recycled.

Co-operation between the tanneries and the downstream treatment facilities permits the recovery and re-utilisation of significant amounts of waste. In fact, Fig. 23 shows that in 2007, 73% of the waste produced was subsequently reused/recycled. Considering the entire period covered by the survey, we see that the percentages of re-use only dropped below 70% in 2003 and 2004.

In addition, it is interesting to note, in Fig. 24, the data evidencing the sector's increasing efficiency. Since 2005, the production of waste per product unit, expressed in kg/m² of leather, has declined steadily. The figure for 2007 is the smallest value for the entire survey period, equal to 1.66 kg/m².

WASTE: MANAGEMENT COSTS

Tab. 6 contains the summary data for waste management for the period 2002 – 2007. 2007 is a special case. As mentioned above, the production of waste per product unit has dropped sharply, with the 2007 values 23% lower than those in 2002, the first year surveyed. However, we see in this case an increase in the incidence of waste management costs, both per product unit (+ 4.7% between 2002 and 2007) and against turnover (+ 44.1% compared to 2002). In 2007, costs equalled 0.56% of turnover. In this case as well, it is clear that tanneries have made an effort to improve their performance but have been unable to achieve a satisfactory return on their investments.

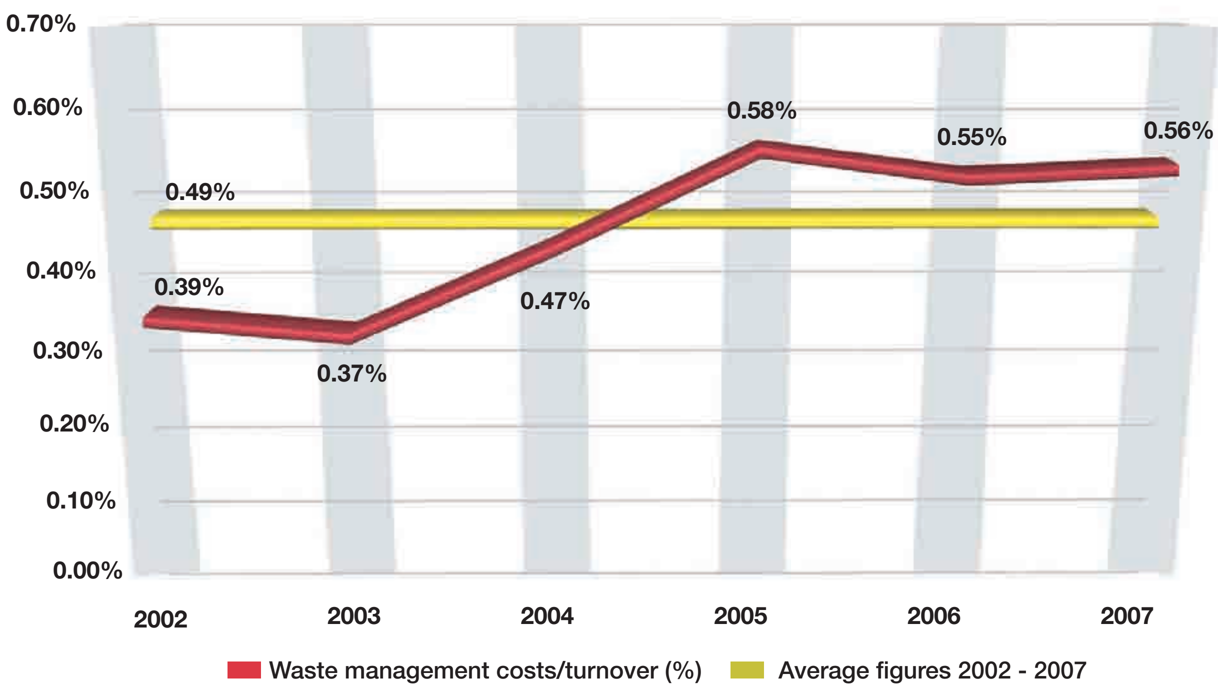
Figs. 27 and 28 show the breakdown of costs per typical activity of waste management and their structure. As we can see, costs for disposal through authorised external plants account for almost all (90.7%) of the cost associated with typical activities, with significant proportions of the remainder going to the personnel dedicated to in-house management, from the technical and the administrative/bureaucratic standpoint (6.2%).

Tab.5 ▸ WASTE: SUMMARY DATA 2002 – 2007

INDICATOR	2002	2003	2004	2005	2006	2007
Waste production per product unit (kg/m^2)	2.16	1.79	1.93	2.16	2.08	1.66
Waste for Recycling (%)	69%	57%	67%	73%	72%	72%
Waste management costs/turnover (%)	0.39%	0.37%	0.47%	0.58%	0.55%	0.56%
Cost of waste management/product unit (€/m^2)	0.120	0.100	0.110	0.174	0.166	0.150

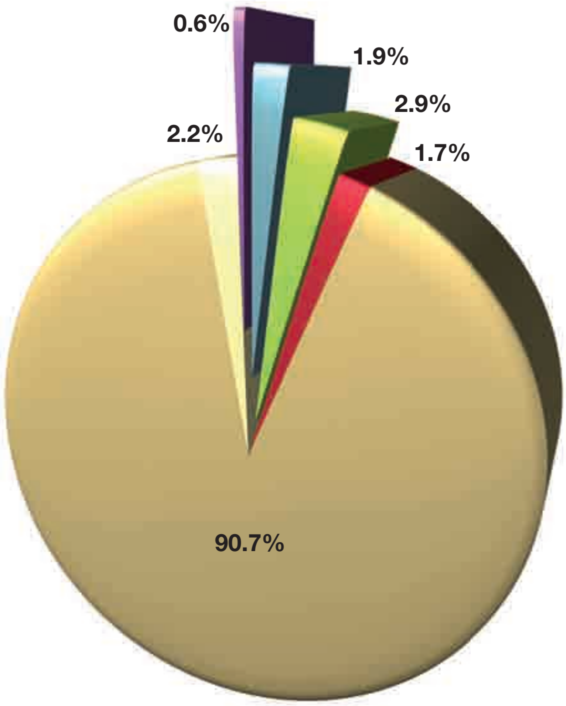
Source: Unic 2007

Fig. 26 ▸ WASTE MANAGEMENT COSTS/TURNOVER 2002 - 2007 (%)



Source: Unic 2007

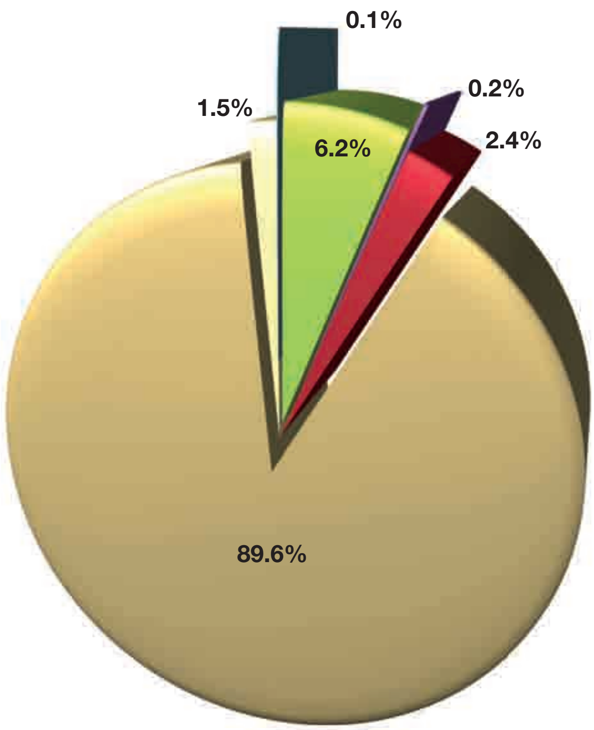
Fig. 27 ▸ WASTE MANAGEMENT: CHARACTERISTIC ACTIVITIES 2007 (%)



- Waste selected collection
- Management of storage areas
- Selection of suppliers
- Waste disposal by authorised organisations
- Administrative management
- Waste analysis

Source: Unic 2007

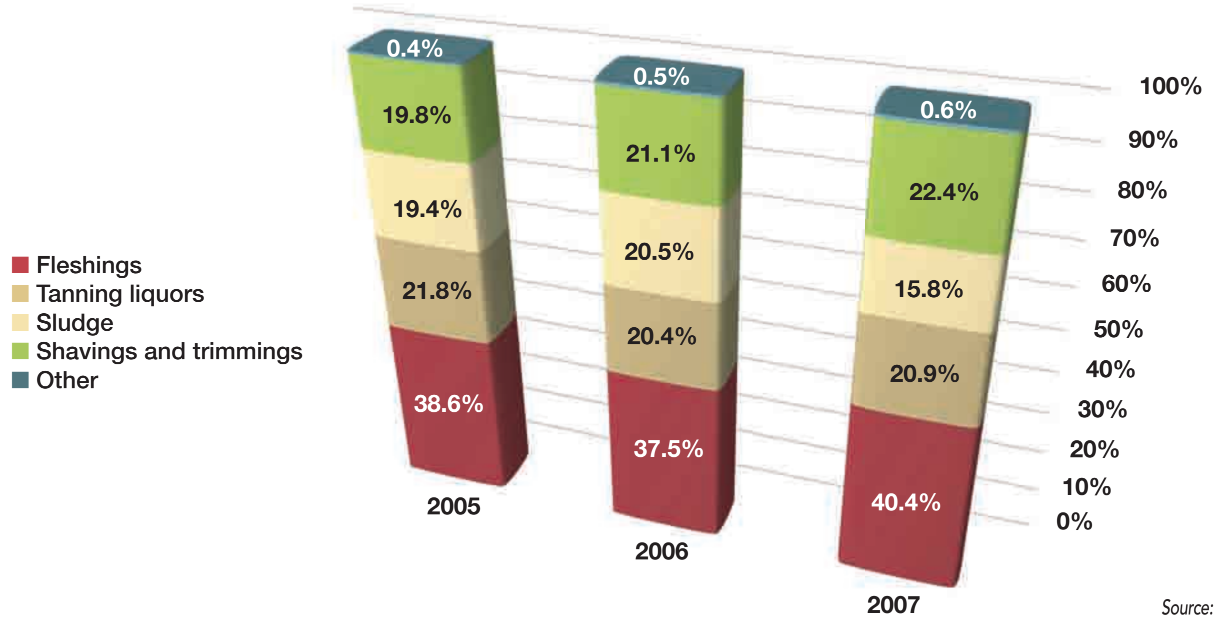
Fig. 28 ▸ WASTE MANAGEMENT: COST STRUCTURE 2007(%)



- Personnel
- Consumables
- Consultancy
- Other services
- Depreciation
- Other

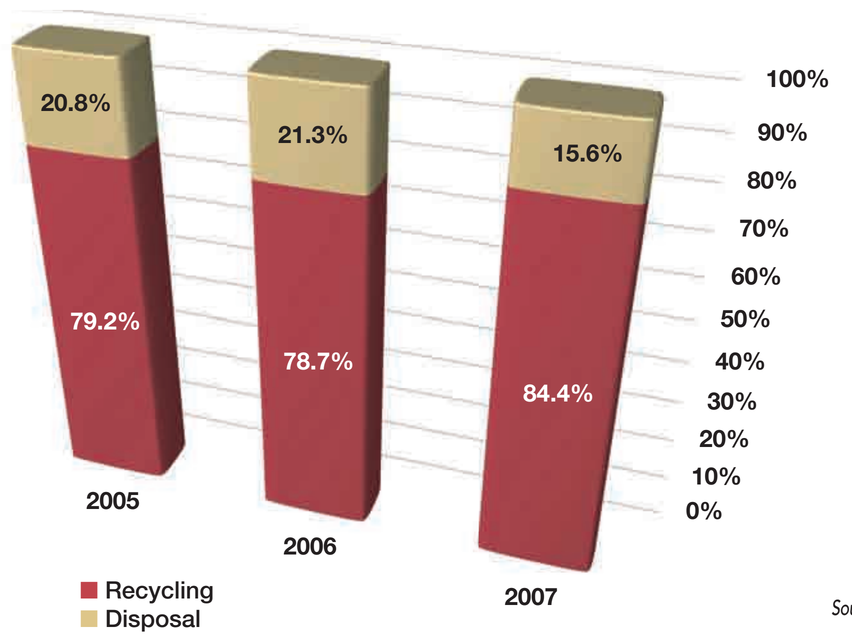
Source: Unic 2007

Fig. 29 ▸ COMPOSITION OF WASTE FROM ITALIAN TREATMENT PLANTS 2005 - 2007 (%)



Source: Unic 2007

Fig. 30 ▸ WASTE TREATMENT IN ITALIAN PLANTS 2005 - 2007 (%)



Source: Unic 2007

As is the case for consortium-run treatment facilities, management of typical waste products generated by tanning activities is sometimes entrusted to centralized structures, mostly located in the main production districts, who have geared their activities and technology to meet the needs of the sector. For this reason, nearly 100% of certain waste (flesh residue, shavings, cuttings and other solid and liquid waste) are sent to be recycled, while other waste registers different percentages. The investments made over the years have led to the development of specific technologies for the recycling even of the treatment sludge.

In 2007, these plants received nearly 299,000 tons of waste from tanneries. Fig. 29 describes the nature of the waste treated by the plants located throughout Italy. The data shown in Fig. 30 underscores the efficiency of the technologies developed, which have permitted the processing for reutilization of nearly 80% of the treatment residue, with a peak of 84.4% in 2007.

It is thus clear that the results achieved stem from the combination of a significant organisational and technical development on the part of the tanneries and technological advances implemented by the downstream companies treating the waste produced.

COLLABORATING FACILITIES

S.I.C.I.T. 2000 SPA - Chiampo (VI)
www.sicit2000.it

CONSORZIO RECUPERO CROMO - S. Croce sull'Arno (PI)
www.recuperocromo.it

CONSORZIO S.G.S. - S. Croce sull'Arno (PI)
www.consorziosgs.com

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ATMOSPHERIC EMISSIONS

The finishing of leather, like some of the wet processing stages, produce pollutants that are vacuumed up and treated before being released into the atmosphere. The main parameters measured to establish the tanneries' influence on air quality are Volatile Organic Compounds (VOC), Powders and Hydrogen Sulphide.

In addition, thermal plants are used to produce heat, and during combustion these emit both nitrogen and sulphur oxides (NOx) and (SOx), as well as carbon dioxide (CO_2).

VOC – Volatile Organic Compounds

Substances produced during the spray finishing process in reduced concentrations in large volumes of air, which are then collected in special filters and scrubbers. The technological solutions for reducing COV pollution tend towards the replacement of solvents with water-based equivalents, reducing the pollution at the source.

Powders

Some mechanical operations, like shearing and fluffing produce dust, and special vacuum aspirators/collectors are used to reduce their concentrations; the powders are produced in the form of particles of pigment, contained in the product and as present in the spray chambers as well.

H_2S – Hydrogen sulphide

Gas with a characteristic odour of rotten eggs. Derived mainly from liming waste in the decalcification drums, due to the variation in pH values. In order to limit the amount of gas emitted, these drums are connected to collection systems utilising caustic soda solutions that bond with the H2S and reduce the gases emitted by over 95%.

NOx and SOx – Nitrogen and Sulphur Oxides

By-products of the combustion of thermal plants. Their concentrations in the emissions depend on the oxidation of the nitrogen in the air and the sulphur content of the fuels used. At the moment, thermal plants using traditional fuels (diesel and Fuel oil) are being converted to cleaner solutions (methane).

Fig. 31 shows the characteristic values of some atmospheric parameters expressed in g/m² and calculated using the following formula:

POLLUTANT PER PRODUCT UNIT

$$(g/m^2) = AL\ (kg/year)/P * 1.000$$

where:

AL = annual load

P = production in m²

Pollutant loads are calculated as follows:

$$AL\ [Kg/y] = C\ [mg/m^3] * F[m^3/h] * h\ [hours\ worked\ /y]/10^6$$

where:

C = average concentration in the stack

F = total flow (m³/h) of the facilities emitting the pollutant

h = sum of the hours worked during the year

As can be clearly seen, emissions have remained almost unchanged, except for a slight increase in the Powders parameter and the almost complete elimination of hydrogen sulphide.

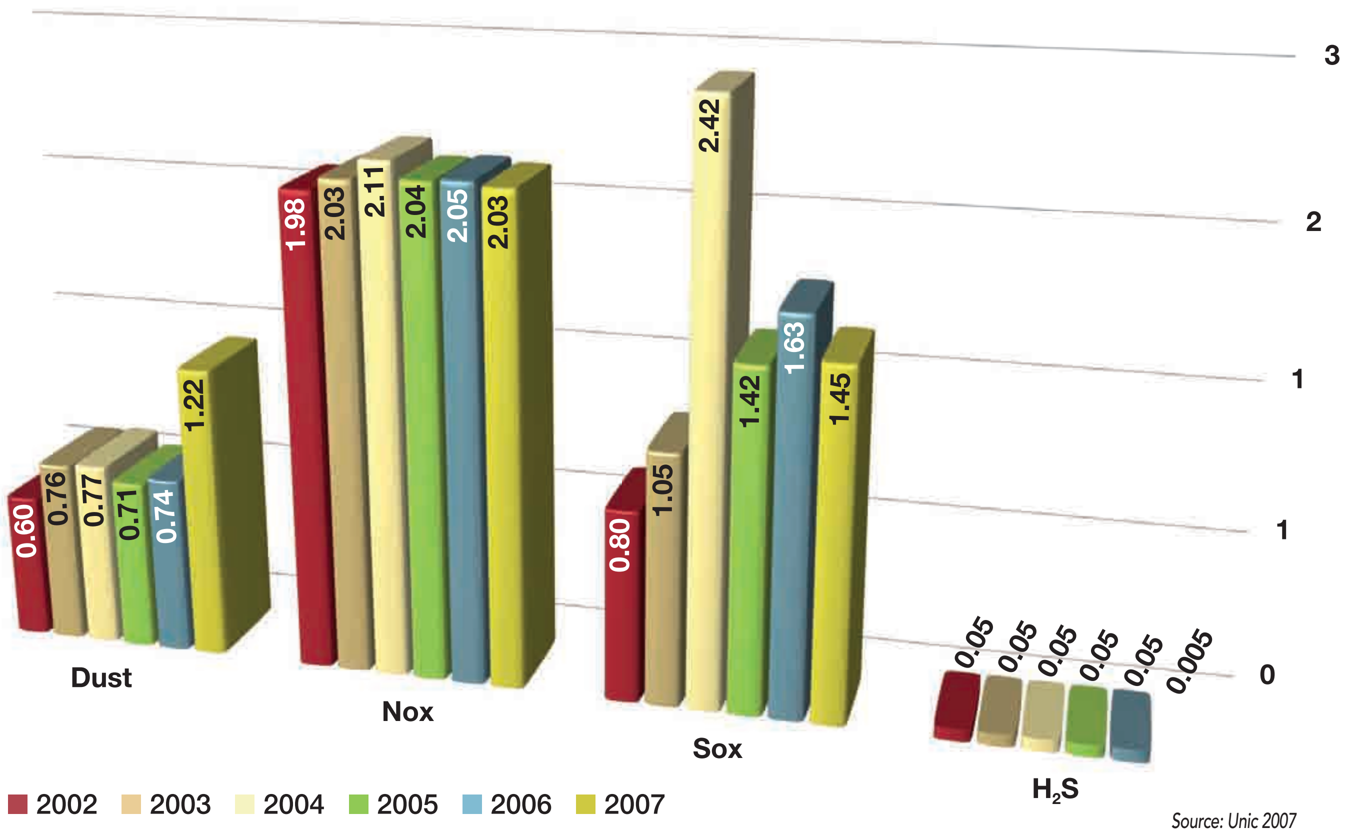
In this edition of the report it was also possible to monitor consumption of solvents per product unit, because the tanneries surveyed adopted a specific physical accounting system. In this way, we were able to calculate an "average emissions factor", expressed in grams of COV per product unit (g/m²). The value computed is just over 50 g/m².

Tab. 6 ▸ TREND IN PRODUCTION AND CONSUMPTION OF SOLVENTS 1996-2006, ARZIGNANO DISTRICT

	SOLVENT CONSUMPTION		LEATHER PRODUCTION	
	FIGURE SHOWN IN Kg	VAR. %	FIGURE SHOWN IN m²	VAR. %
1996	18,439,000	0	125,326,000	0
1997	17,128,000	-7%	128,350,000	2%
1998	15,295,000	-17%	132,856,000	6%
1999	13,489,000	-27%	143,422,000	14%
2000	12,852,000	-30%	165,221,000	32%
2001	12,756,000	-31%	160,766,000	28%
2002	11,467,000	-38%	170,983,000	36%
2003	9,751,000	-47%	167,902,000	34%
2004	8,795,000	-52%	174,391,000	39%
2005	7,987,000	-57%	162,676,000	30%
2006	7,344,000	-60%	165,514,000	32%

Source: Unic 2007

Fig. 31 ▸ POLLUTANTS IN THE ATMOSPHERE PER PRODUCT UNIT 2002 - 2007 (g/m2)

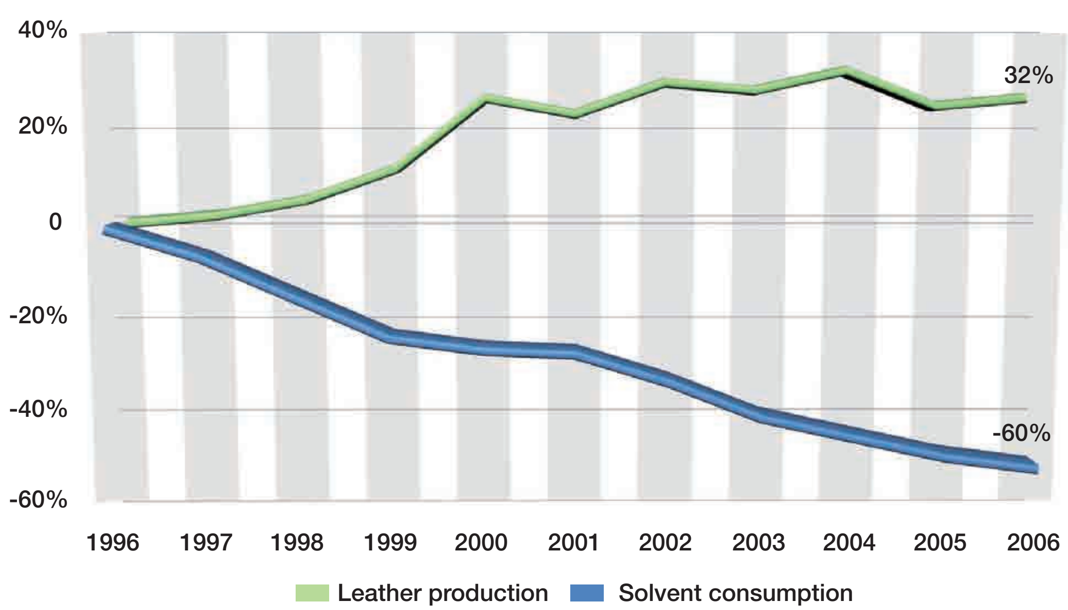


Source: Unic 2007

Again with respect to COV, as in the past editions of this report, we present the data collected by the Province of Vicenza, updated to 2006 (Tab. 6, Fig. 32), relative to the Veneto tanning district: they show the trend of solvent consumption for the period 1996/2007, compared with the production figures for the same district, expressed in m².

Solvent consumption shows a downward trend (-60%) from 1996 to 2005, against a 32% upswing in production.

Fig. 32 ▸ TREND IN PRODUCTION AND CONSUMPTION OF SOLVENTS 1996-2006, ARZIGNANO DISTRICT



Source: Provincia di Vicenza

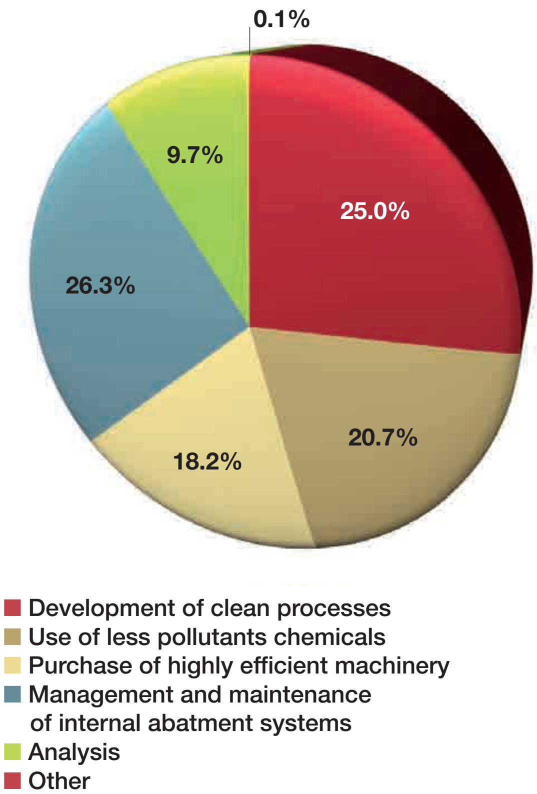
ATMOSPHERIC EMISSIONS: COSTS

The activities that characterise the management and reduction of atmospheric emissions are shown in Fig. 33. Emissions reductions are achieved in the tannery through the selection and purchase of efficient machinery, the development of low-impact processes, the scrupulous maintenance of collection systems and testing.

The associated cost structure shows that personnel account for the largest cost item (with percentages of over 44%). Depreciation, analyses, maintenance and products used to collect and convert pollutants instead register lower values, which depend on the various activities the tanneries carried out during the period of the survey.

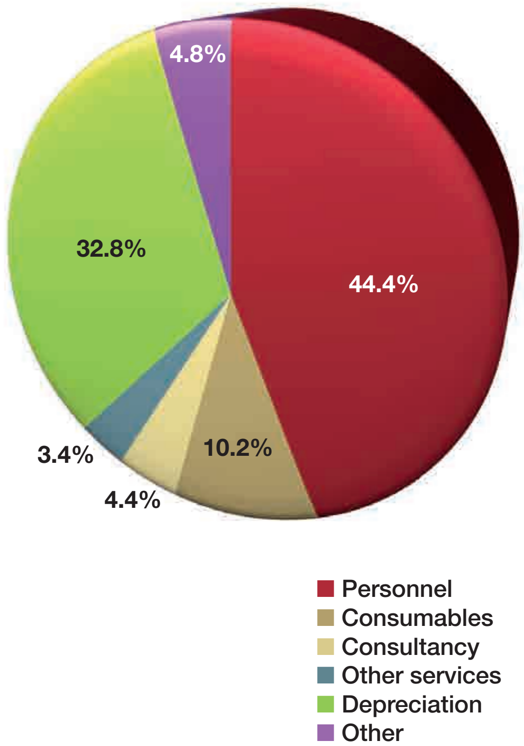
We should in any case take into consideration the fact that some of the main results regarding the reduction of pollutant loads have been achieved thanks to the replacement of products with a solvent base with water-based equivalents. The price difference between these products (rightly calculated as environmental costs) accounted for about 10% of specific costs in 2007.

Fig. 33 ▸ REDUCTION IN ATMOSPHERIC EMISSIONS: CHARACTERISTIC ACTIVITIES 2007(%)



Source: Unic 2007

Fig. 34 ▸ REDUCTION IN ATMOSPHERIC EMISSIONS: COST STRUCTURE 2007(%)



Source: Unic 2007

Tab. 7 ▸ ATMOSPHERIC EMISSIONS: SUMMARY DATA

INDICATOR	2002	2003	2004	2005	2006	2007
Dust (g/m²)	0.60	0.76	0.77	0.71	0.74	1.22
NOx (g/m²)	1.98	2.03	2.11	2.04	2.05	2.03
SOx (g/m²)	0.80	1.05	2.42	1.42	1.63	1.45
H_2S (g/m²)	0.05	0.05	0.05	0.05	0.05	0.004
Air emission reduction costs/turnover (%)	0.1%	0.10%	0.10%	0.10%	0.12%	0.11%
Air emission reduction costs/product unit (€/m²)	0.0490	0.0420	0.0300	0.0383	0.0348	0.028

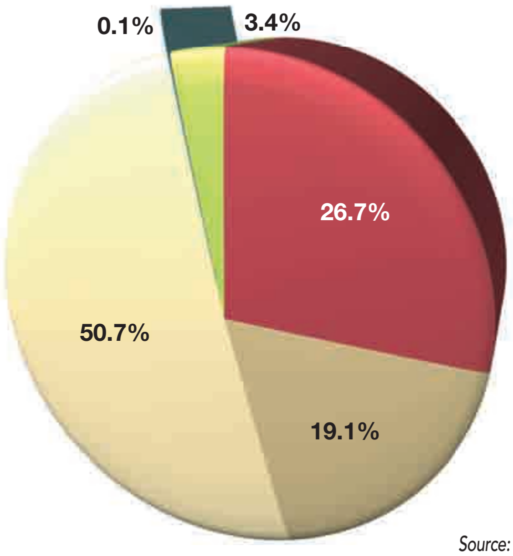
Source: Unic 2007

THE ENVIRONMENTAL MANAGEMENT SYSTEM

The environmental management activities are carried out in-house and their principal aim is to prevent pollution and improve the company's environmental performance, but they do not directly oversee the principal environmental aspects. In the last year we have seen a peak in "Environmental Management" costs, which have risen to account for over 10% of total environmental costs. In particular, 16 of the 29 tanneries surveyed are certified UNI EN ISO 14001. This means that they have adopted an environmental management system in compliance with the normative and have had said conformity verified by a third party. A system of environmental management requires the tannery to be in full compliance with the applicable legislation as a starting point for actions subsequently taken to ensure the continual improvement of its performance. It should also be noted that actions typical of environmental management system are also carried out in tanneries that are not certified, as an integral part of the general in-house management system.

The characteristic activities of an environmental management system, including only the planning and control stage, as found in the 2007 survey, are shown in Fig. 35. As we can see in Fig. 36, personnel, consulting and services account for over 90% of the costs associated with specific activities.

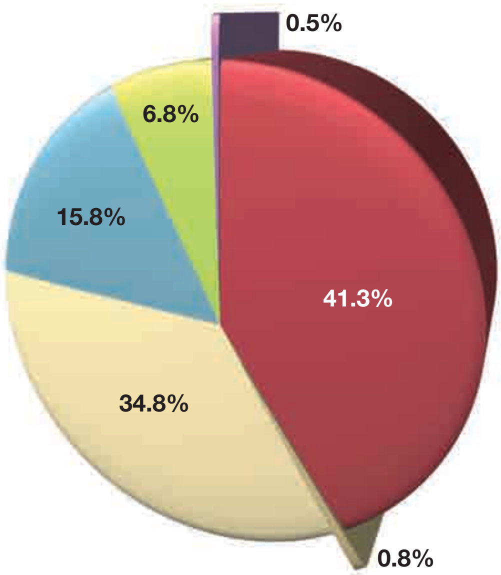
Fig. 35 ▸ ENVIRONMENTAL MANAGEMENT SYSTEM: CHARACTERISTIC ACTIVITIES FOR 2007(%)



Source: Unic 2007

- Identification and evaluation of environmental aspects
- Personnel training on Environmental Management
- Set up and certification of Environmental Management Systems
- Other

Fig. 36 ▸ ENVIRONMENTAL MANAGEMENT SYSTEM: COST STRUCTURE FOR 2007(%)



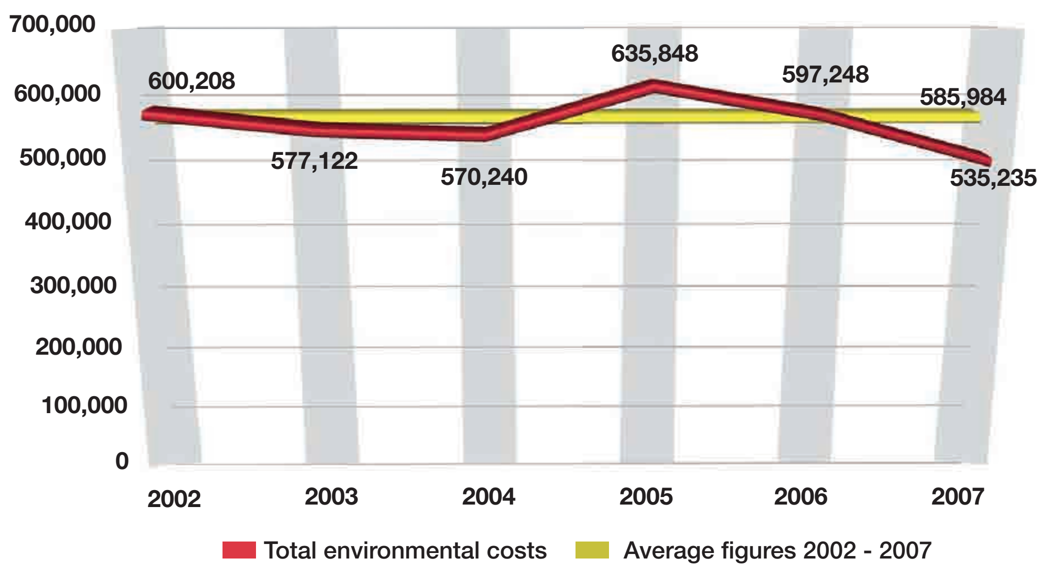
- Personnel
- Consumables
- Consultancy
- Other services
- Depreciation
- Other

Source: Unic 2007

CONCLUSIONS

Over the six years of the survey, the absolute value of average environmental costs per tannery (Fig. 37) varied between a minimum value of 535,525 euro (2007) and a maximum of € 635,848 (2005). We note that the variation in absolute values, especially for 2007, is coupled with an improvement in the tanneries' environmental performance, as these have structurally undertaken to reduce pollution at the source. In the last year, in particular, the most significant environmental aspects (water, waste) have posted excellent results. The companies are making efforts in other areas as well. This is evidenced by the fact that the value of "other environmental costs", which take into account environmental management in the tanneries as well as the activities aimed at reducing consumption (water, chemical compounds and energy) rose by an average of about 740% over the six years surveyed.

Fig. 37 ▸ TOTAL ENVIRONMENTAL COSTS 2002 - 2007 (€)



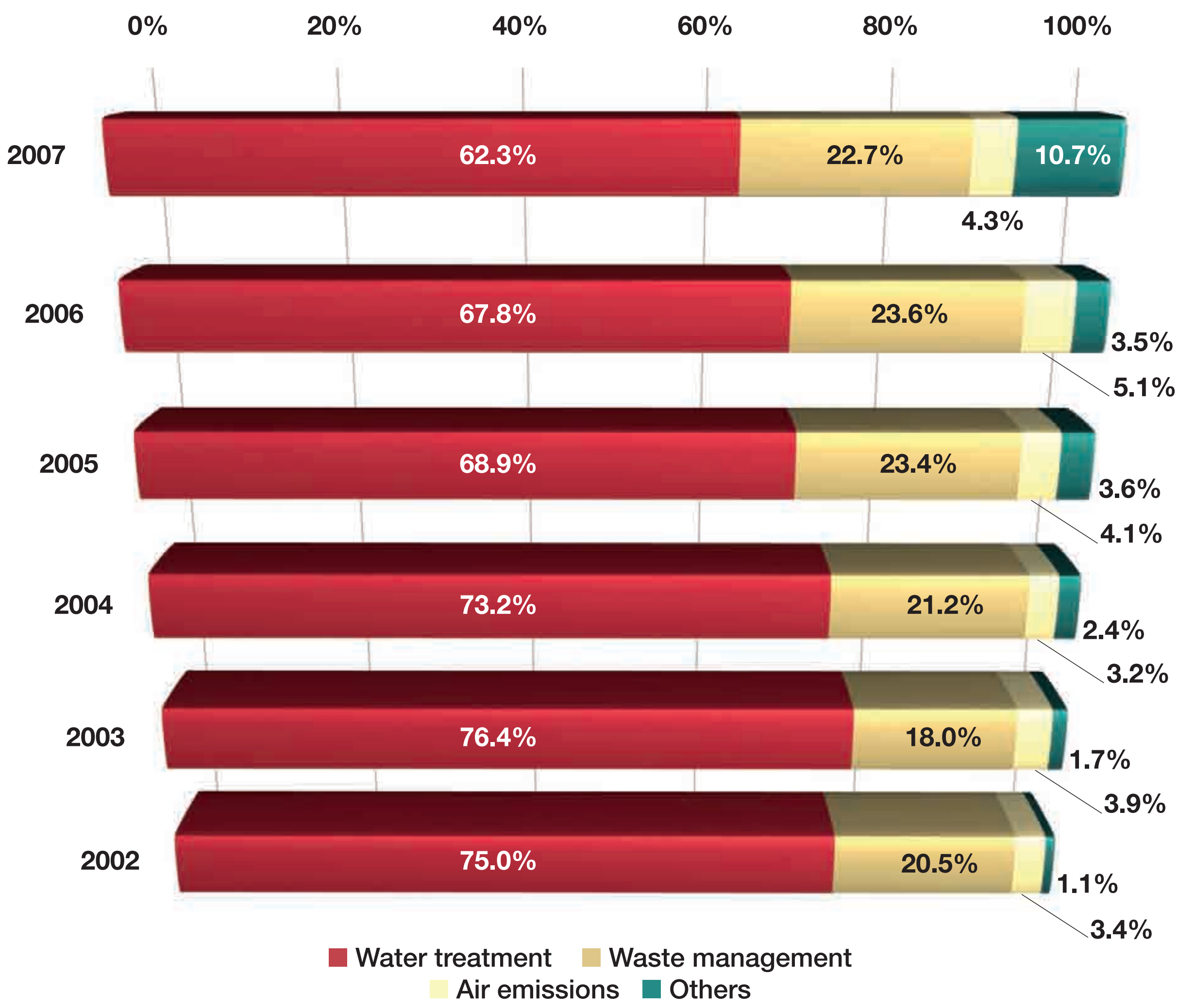
Source: Unic 2007

Tab. 8 ▸ TOTAL ENVIRONMENTAL COSTS 2002 - 2007 (€)

	2002	2003	2004	2005	2006	2007	VAR.% 2006/2007
Total environmental costs	600,208	577,122.3	570,239.8	635,848.3	597,248.0	535,235.0	-10.83%
Water treatment	450,398	444,047.8	420,414.1	468,784.5	440,326.1	342,095.0	-24.05%
Waste management	123,051	101,503.1	116,714.1	130,142.6	122,242.0	115,972.9	-5.75%
Air emissions	20,190	21,939.8	18,255.5	20,355.9	19,120.1	21,849.2	8.22%
Others	6,569	9,631.5	14,856.1	16,565.3	15,559.7	55,317.9	742.12%

Source: Unic 2007

Fig. 38 ▸ ENVIRONMENTAL COSTS: BREAKDOWN 2002 - 2007 (%)



Source: Unic 2007

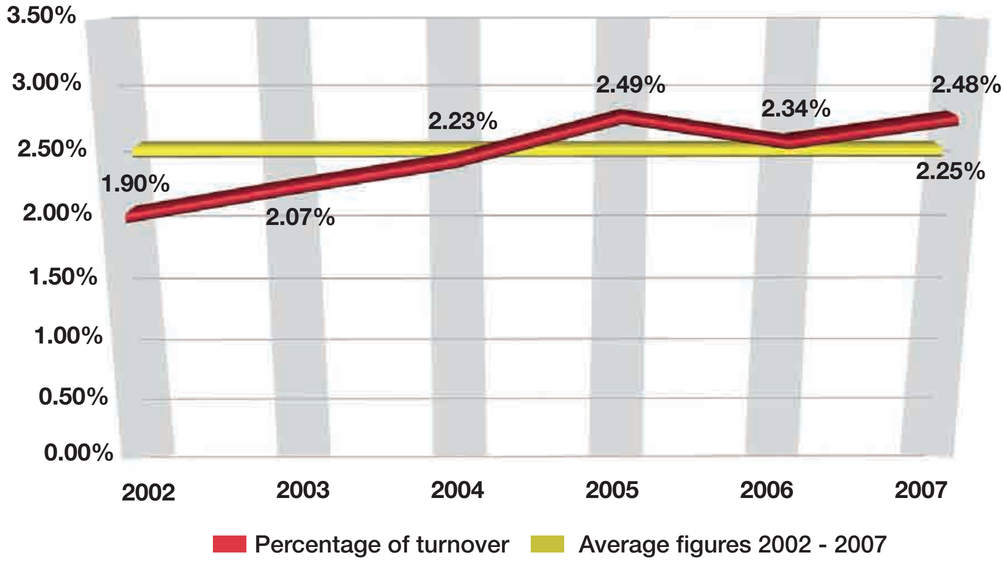
Tab. 8 and Fig. 38 show the 2002 – 2007 distribution of environmental costs. Water and waste are again the aspects registering the greatest economic impact, though their incidence is on a downtrend. In this case as well, we note an increase in the proportion of "other environmental costs".

Tab. 9 ▸ TOTAL ENVIRONMENTAL COSTS 2002 - 2007 (%)

INDICATOR	2002	2003	2004	2005	2006	2007
Water treatment	75.0%	76.4%	73.2%	68.9%	67.8%	62.3%
Waste management	20.5%	18.0%	21.2%	23.4%	23.6%	22.7%
Air emissions	3.4%	3.9%	3.2%	4.0%	5.1%	4.3%
Others	1.1%	1.7%	2.4%	3.6%	3.4%	10.7%

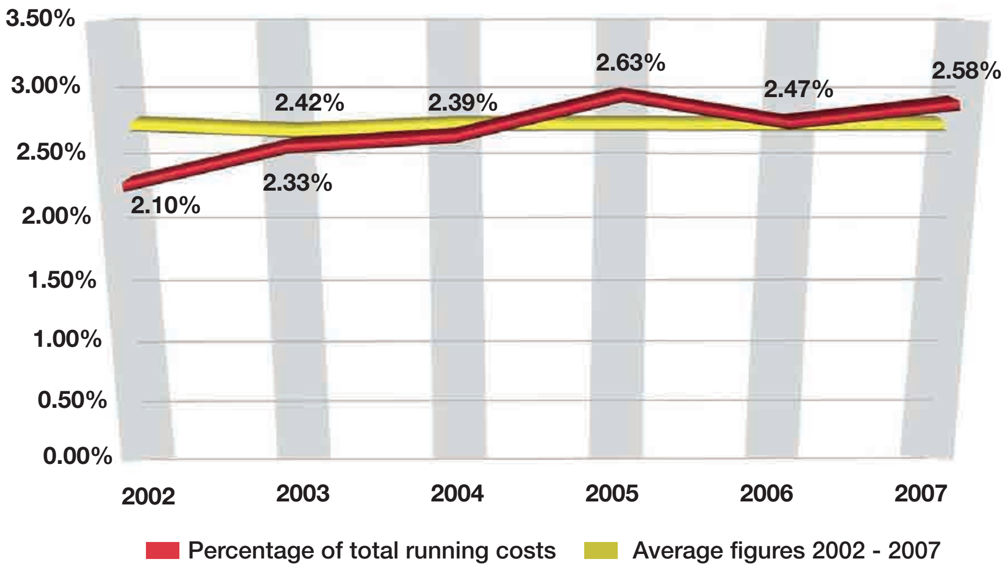
Source: Unic 2007

Fig. 39 ▸ ENVIRONMENTAL COSTS ON TURNOVER 2002 - 2007 (%)



Source: Unic 2007

Fig. 40 ▸ ENVIRONMENTAL COSTS ON TOTAL OPERATING COSTS 2002 - 2007 (%)



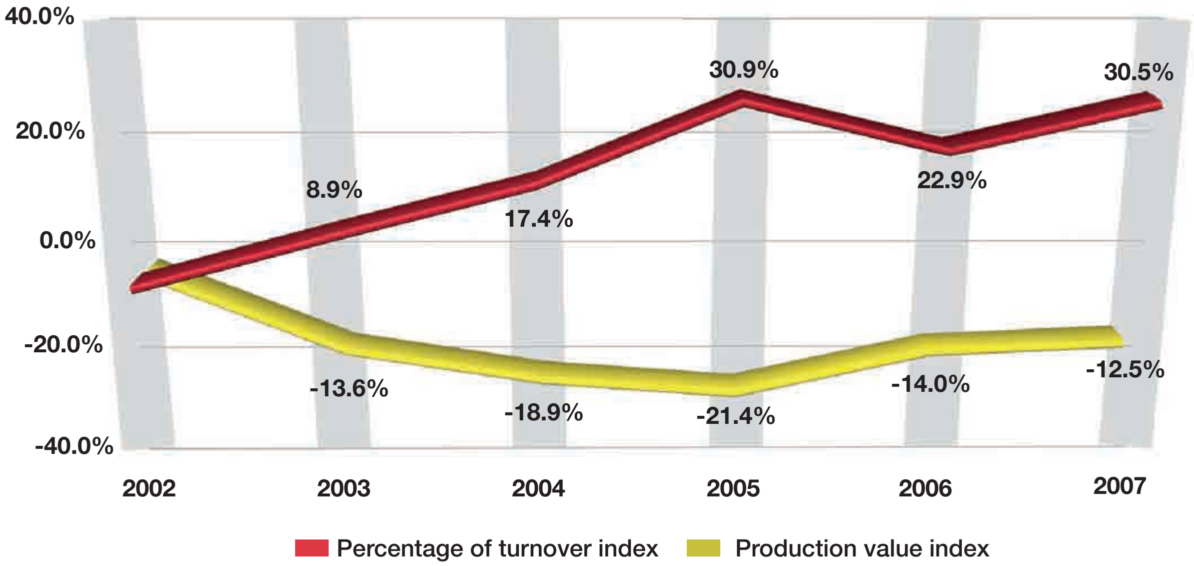
Source: Unic 2007

Tab. 10 ▸ ENVIRONMENTAL COSTS/NATIONAL PRODUCTION FIGURES 2002 - 2007 (%)

	2002	2003	2004	2005	2006	2007	VAR.% 2006/2007
Percentage of turnover index	1.90%	2.07%	2.23%	2.49%	2.34%	2.48%	30.48%
Percentage of total running costs	2.10%	2.33%	2.39%	2.63%	2.47%	2.58%	22.97%

Source: Unic 2007

Fig. 41 ▸ ENVIRONMENTAL COSTS/NATIONAL PRODUCTION FIGURES 2002 - 2007 (%)



Source: Unic 2007

This year as well, the drop in absolute value of environmental costs was not matched by a corresponding drop in the incidence on turnover and total operating costs, whose 2007 values (2.48% and 2.58%, respectively) are second only to those posted in 2005, in concomitance with a peak in specific water consumption (121.79 l/m² against 108.6 l/m² in 2007) and in the production of waste per product unit (2.16 kg/m² against 1.66 kg/m² in 2007). The overall rise in incidence on turnover and total operating costs compared with the 2002 values is thus equal to 30.48% and 22.97%, respectively.

Fig. 41 shows the trend in production value and the incidence of environmental costs on turnover, with 2002 taken as the baseline year.

Until 2006, the incidence of environmental costs mirrored the trend in production value, after which the inflexibility of environmental costs increased their incidence on production value as the latter declined, during the period from 2002 to 2005. The rigidity of environmental costs may be associated with the fixed cost of maintaining centralised structures, such as those for the treatment of water and characteristic waste management, creating greater problems in times of economic crisis.

2007 performance appears to go against this trend, with an increase in production value but also a considerable increase in the incidence of environmental costs on turnover. In 2007 the cost of raw materials increased sharply (especially chemical products and energy), and this increase seems to have been shifted from the downstream sector to the tanneries, through increased unit costs and fees.

The environmental efficiency values posted in this edition of the report are unmatched over the past six years, and the organisational efforts and economic investments in environmental protection are steadily increasing. This information, of concrete value, were gathered in the interests of ample transparency and to receive the recognition of the public administrations and the market for the responsible behaviour of the Italian tanning industry, which once again shows itself to be dynamic, flexible and ready to adapt to change.

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