The hidden cost of meat consumption in Italy

Environmental and health impacts

SUMMARY REPORT

#CARISSIMACARNE
INTRODUCTION

It is now clear, and confirmed by many international bodies, that meat consumption has a very significant impact on the environment and human health, as well as on animals reared for food.

In recent years, scientific and economic bodies have initiated important studies to detect how environmental and health impacts generate costs for society in terms of loss of well-being, lack of productivity, and environmental damage.

At the same time, the livestock sector is supported by continuous flows of subsidies from both the European Union and national funding programmes.

However, 14 years have passed since the publication of FAO’s Report “Livestock’s Long Shadow: Environmental Issues and Options,” denouncing the enormous impact of animal husbandry on the environment. These fourteen years saw fruitful developments. Reports and declarations of authoritative international bodies continue to highlight how urgent it is to reduce meat consumption and to drive a change towards plant-based protein, on environmental, health, and economic grounds.

In 2019, with the Global Warming of 1.5 report, the Intergovernmental Panel on Climate Change (IPCC) stated that to reduce the expected inescapable damage, the following must be achieved: 45% reduction in global carbon dioxide emissions by 2030, compared to 2010 levels, and the elimination of net emissions by 2050, recognising the transition to food behaviours characterized by a lower percentage of animal food as a crucial phase in achieving the goal of not exceeding 1.5°C earth temperature increase as per the Paris Climate Agreement.

Increased demand for animal proteins and increasingly intensive and unsustainable animal husbandry are the first 2 of the 3 factors identified in the United Nations Environment Programme (UNEP) report “Preventing Future Zoonotic Disease” as underlying the high risk of outbreaks and spread of serious and communicable diseases.

The Workshop Report on Biodiversity and Pandemics, on the links between nature degradation and the increasing risks of pandemics recently released by IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services), rings a reliable and frightening bell, also in economic terms: scholars estimate that the costs of preventing pandemics are 100 times lower than the cost of responding to the pandemics themselves.

According to the World Resource Institute (WRI), global demand for animal-based food, which will see a 70% increase in meat and dairy consumption in 2050 compared to 2010, can trigger explosive health conditions.

The impacts of the meat ‘production’ cycle weigh on the planet, collective health, and the economy due to the substantial aid and subsidies to the livestock supply chain. Between March and May 2020 alone, for example, 14.5 million euros were disbursed to the pig, sheep and buffalo sectors in addition to the 100 million euros allocated by the “Cura Italia” Decree to the livestock and fisheries sector.

Moreover, we must not forget the substantial aid donated to glossy advertising campaigns for meat or other products presented as coming from animals living in unrealistically idyllic scenarios.

Meat consumption, in fact, mostly relies on animals, infinite and vulnerable clones of each other, transformed by virtue of increasingly precise genetic selections aimed at maximum yield with minimum effort. These are accompanied by continuous mechanical breeding and births, rapid and never-ending, producing “consumer goods” at incessant rates and broken down for sale. Their much-touted welfare is also, in the minimum criteria that govern it, subject primarily to the quality of the “product” intended for the table. The whole situation has solid and tangible profiles and consequences. There is no excuse to postpone a necessary, profound, and urgent systemic change to stop the destruction caused by meat consumption and performed on multiple levels and on numerous fronts throughout the planet, including Italy.

To address this problem area, first of all, we need to frame and know its dimensions. Subsequently, we, as individuals and communities, must adopt behaviours aimed at maximizing the remediation of damages and preventing them from getting worse.

To identify the problem’s extent, LAV has focused on an accurate and specifically referenced framework of the Italian context and of the environmental and health footprint of the most widespread meat types of production and consumption cycle. At the same time, the aim was to translate these impacts to an economic scale to clearly measure the uncompensated damage resulting from animal husbandry. The report summarised here provides an overview of meat consumption in Italy. Next, it explains the methodology adopted for estimating hidden costs due to meat consumption, to follow with the main study outcomes, interpreted by comparison with those available in the scientific literature, which are discussed with the conclusions emerging from the work performed.

This document is the summary report, prepared by LAV, of the study “Il costo nascosto del consumo di carne in Italia: impatti ambientali e sanitari” (“The hidden cost of meat consumption in Italy: environmental and health impacts”). LAV, as an association, is committed to a rapid “food transition,” a profound systemic change that would see the consumption of animal proteins drastically and rapidly reduced in favour of plant proteins, thus saving the lives of several million animals. Therefore, LAV decided to carry out a unique research: an analysis of the emissions of the entire “life cycle” of meat (“from fodder to table”), with specific reference to the Italian context. This analysis is intended to measure emissions and environmental and health impacts. It will provide an economic estimate of these impacts to clarify the amount of this sector’s indirect costs. The summarised study, therefore, provides scientific, accurate, and specific data on the “hidden cost” of meat in Italy: that is, the economic translation of all the environmental damage caused by meat production and consumption. The economic value is enormous and to date has not been compensated in any way or “referred” to the cost of the various foodstuffs ‘produced’ from cattle, pigs, and poultry.

Demetra performed the research on behalf of LAV. Demetra is a consulting company operating in the field of scientific research on sustainability. A research team consisting of scholars, researchers, and academics was set up:

• Alessandro Arrigoni, Ph.D. in Materials Engineering - Environmental Engineer specialized in sustainability and life cycle analysis – Demetra
• Guido Scaccabatocchi – Sustainability Manager – Environmental Engineer specialized in methods of measuring environmental impacts and climate neutral strategies – Demetra
• Caterina Villa – LCA Expert – Master Degree in Environmental Sciences expert in LCA and methods of measuring ecosystem services – Demetra
• Francesca Allievi – PhD at the University of Turku (Finland), researcher on agri-food sustainability issues and university professor (critical review)
• Giovanni Dotelli – Ordinary Professor at the Department of Chemistry, Materials and Chemical Engineering “Giulio Natta” of the Polytechnic University of Milan (critical review)

Research team

1. https://www.polito.hggswww.it/file/cm/pages/31924/02059.php/1/1/56074
MEAT IN ITALY

To frame the situation, the study first reports statistics on meat production, trade and consumption in Italy and per capita consumption for the different types of meat. Almost 600 million animals are slaughtered in Italy every year (see Table 2). The most extensively reared animals in Italy are chickens (73% of all live animals at the time of the survey), followed by turkeys (12%) and pigs (4%).

Almost a million and a half tons of meat were obtained in Italy in 2018 (40% of the total), from the slaughter of more than 11 million pigs. Next up are chickens and turkeys, approx. 562,000,000; cattle, approx. 2,770,000, and 11,900,000 rabbits (Table 2). The study focused on the most widespread meat consumed in our country, but we should not forget the other animals such as rabbits, horses, sheep and goats that are reared and killed year after year and that are an unrolling part of the gargantuan meat ‘production cycle.’ Together, they reach 3.1% of the annual quantity (Table 2). The percentage is also reflected, in principle, in the breakdown of the per-capita daily consumption, (Table 8) with an amount, for the omnivorous population in Italy, equal to 128 g. This represents the functional unit used in this study to calculate the annual impacts of meat consumption in Italy.

### Table 2. Animals slaughtered and meat produced in Italy in 2018. Source: FAOSTAT

<table>
<thead>
<tr>
<th>Meat</th>
<th>Fresh</th>
<th>Processed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>563</td>
<td>27,6</td>
<td>21,6</td>
</tr>
<tr>
<td>Pork</td>
<td>219</td>
<td>16,2</td>
<td>12,7</td>
</tr>
<tr>
<td>Chicken</td>
<td>680</td>
<td>33,1</td>
<td>25,9</td>
</tr>
<tr>
<td>Others</td>
<td>37</td>
<td>4,37</td>
<td>3,68</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,630</td>
<td>128</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 8. Distribution of daily meat consumption by the omnivorous population in Italy, 2018 (g/pc/gy)

<table>
<thead>
<tr>
<th>Meats</th>
<th>Consumption</th>
<th>Family</th>
<th>Species</th>
<th>Slaughtered animal</th>
<th>Processed meat</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef Fresh</td>
<td>2.620</td>
<td>Cattle</td>
<td>Buffalo</td>
<td>109</td>
<td>22,3</td>
<td>0.6</td>
</tr>
<tr>
<td>Beef Processed</td>
<td>972</td>
<td></td>
<td>Buffalo</td>
<td>2,660</td>
<td>973</td>
<td>31</td>
</tr>
<tr>
<td>Pork Fresh</td>
<td>554</td>
<td>Galliformes</td>
<td>Chicken</td>
<td>534,000</td>
<td>973</td>
<td>37</td>
</tr>
<tr>
<td>Pork Processed</td>
<td>22,800</td>
<td></td>
<td>Chicken</td>
<td>22,800</td>
<td>1,920</td>
<td>110</td>
</tr>
<tr>
<td>Pigs Fresh</td>
<td>11,930</td>
<td>Pigs</td>
<td>Pig</td>
<td>11,930</td>
<td>1,429</td>
<td>40</td>
</tr>
<tr>
<td>Horses Fresh</td>
<td>102,5</td>
<td>Horses</td>
<td>Horse</td>
<td>102,5</td>
<td>1,197</td>
<td>91</td>
</tr>
<tr>
<td>Rabbits</td>
<td>15,400</td>
<td>Rabbits</td>
<td>Rabbit</td>
<td>15,400</td>
<td>43,1</td>
<td>12</td>
</tr>
<tr>
<td>Sheep</td>
<td>2,750</td>
<td>Sheep</td>
<td>Sheep</td>
<td>2,750</td>
<td>33,9</td>
<td>0.9</td>
</tr>
<tr>
<td>Others</td>
<td>16,800</td>
<td>Others</td>
<td>Others</td>
<td>16,800</td>
<td>30,4</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,620</td>
<td></td>
<td></td>
<td>128,000</td>
<td>128,000</td>
<td>100</td>
</tr>
</tbody>
</table>

The per-capita daily consumption in Italy. Actual daily consumption represents the functional unit used to estimate the annual impacts of meat consumption in Italy.

### ESTIMATE OF ENVIRONMENTAL IMPACTS: THE METHOD

In this study, the emissions generated at all stages of four types of meat, i.e., rearing, slaughtering, processing, packaging, distribution, consumption and waste treatment, have been converted into economic costs for society through a lifecycle assessment (LCA). This is a structured and internationally standardized method that allows quantifying the potential environmental impacts associated with a good or service, starting from the consumption of resources and emissions.

The analysis was divided into ‘production’ and consumption of beef, pork, processed pork and chicken, i.e., the four most common types of meat in Italy.

Eleven environmental impact categories are considered: climate change, ozone layer reduction, land acidification, eutrophication (divided into freshwater and marine), human toxicity, photochemical smog formation, particulate formation, eco-toxicity (divided between terrestrial, freshwater, and marine), ionizing radiation, land occupation, and water consumption.

In particular, the costs for society related to the most relevant environmental impact categories for our case study are illustrated in the ENVIRONMENTAL FOCUS SECTION.

### ESTIMATE OF HEALTH IMPACTS: THE METHOD

From the analysis of several cohort studies and scientific literature, we can derive a measurement of health damage associated with meat consumption, compared to different classes of diseases. This figure, compared to consumption levels and population, tells us how many years of life and ‘healthy’ life are lost annually in Italy, out of the total population, due to meat consumption. Therefore, this research uses the DALY (Disability-Adjusted Life Year) as a unit of measurement, which expresses the number of years lost because of a disease, due to disability or premature death. In line with epidemiological studies, the relationship between consumption of red or processed meat and the risk of contracting colorectal cancer, type 2 diabetes, stroke, and cardiovascular disease has been considered.
damage that a warmer planet causes; the diffusion of nutrients and pesticides in nature with indirect costs for man due to damage to ecosystems.

MAIN STUDY OUTCOMES

· This result, distributed among the population, is equivalent to

10 - Emissions of particulates, which damage human health, emissions of acidifying gases, which reduce the productivity of land; greenhouse gas emissions, with all the damage that a warmer planet causes; the diffusion of nutrients and pesticides in nature with indirect costs for man due to damage to ecosystems.

6 - Photochemical smog formation

HIDDEN ENVIRONMENTAL COSTS

· The life cycle of 1 kg of fresh beef generates an environmental impact that can be summarised in a cost to society of €13.5, while 1 kg of pork, depending on the processing, varies between €4.9 and €5.1 while the chicken weighs on the community for €4.7 per kg.

In other words, it can be said that a 100g beef burger11 causes an environmental cost of €1.35, while 300g of beef would cost €4.05. A 100g pork sausage will impact with a cost of between €4.9 and €5.1, while a chicken breast of the same weight will be equivalent to €4.7 cents.

HIDDEN HEALTH COSTS

· Approximately 350,000 years of life are lost each year due to meat consumption in Italy.12 (corrected for disability).

· This result, distributed among the population, is equivalent to saying that every year, the healthy life expectancy of a meat eater is reduced by about 2.3 days and the cost of these lost years of life falls on the whole community, in terms of health costs and lack of productivity.

· Considering an average European value of €5,000 euros for a year of life lost in health and dividing the expenditure among the quantities of meat consumed in Italy, the consumption of 1 kg of red meat costs the community €5.4 and the consumption of 1 kg of cured meat costs €14.13 In other words, the consumption of 100 grams of ham costs the community, in health terms, €1.4.

HIDDEN ENVIRONMENTAL COSTS + HIDDEN HEALTH COSTS

· Adding up the environmental and health damage, the consumption of 1 kg of meat is equivalent to costs for the community of about €5 for chicken meat, €10 for pork, €19 for cured meats (processed pork) and €19 for beef.

· By comparison, the production of 1 kg of legumes costs about €0.50. In other words, applying the same criterion, the consumption of each 100g beef burger costs the community €1.59, the same amount as 100 grams of ham.

ANNUAL HIDDEN COSTS (ENVIRONMENTAL + HEALTH)

· If the cost of one kg of meat is extended to annual meat consumption in Italy, the price paid by society due to environmental and health impacts stands at around €36.6 billion (in a range between €17.9 and €53.2 billion)14.

· Divided by the Italian population, the damage generated by meat consumption per capita is, therefore, in a conservative and balanced estimate, around €605 per year (with a range between the minimum and maximum values, ranging between €316 and €1,530 euros per person). The average cost is almost equally divided between environmental costs (48%) and health costs (52%).

· The highest costs in the community are generated by cured meats, given the high consumption in Italy (39%) and the high health costs compared to other types of meat. Fresh meat also creates a powerful burden on society, mainly due to the emissions that its life cycle generates15.

In-depth study of some environmental impact categories

Below are the impacts and costs for society related to the most relevant environmental impact categories for our case study. As already stated, the survey performed considers 100 g of meat consumed compares the different meats with each other and with both peas and soy, making the same comparison also on 100 g of protein consumed.

Climate change

Anthropogenic emissions of greenhouse gases, notably carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), into the atmosphere trap outgoing heat. The resulting global warming changes the climate and weather conditions and increases the occurrence of extreme events. Costs to society attributable to climate change include rising sea levels and consequent migrations of coastal populations, increased health costs, loss of years of life due to the spread of diseases, reduced availability of water and food in some areas, loss of biodiversity, and altered ecosystems.

Comparing Results

Per 100 g products

Figure 2: Comparison of the cost to society (exchanging) of meat and legumes due to the environmental impacts generated throughout their entire life cycle: a) comparison on 100 g of product; b) comparison on 100 g of protein.

In other words, the consumption of 100 grams of ham costs the community, in health terms, €1.4.
In the comparison by weight (100 g), meat has a global warming potential between 10 and 50 times higher than that of legumes. For 100 g of products, peas show a slightly lower impact than soy. The gap between meat and legumes increases when the comparison considers proteins produced, given the high protein content of legumes. By comparison to legumes, per 100 g of protein, beef generates 55 times the impact of peas and 75 times that of soy.

Per 100 g consumed

Regarding greenhouse gas emissions, the rearing phase is the most relevant phase for all types of meat with a minimum contribution of 66% for processed pork and a maximum of 77% for beef.

By processing 100 g of cooked ham-type processed meat generate 65 g of CO₂ eq, while cured ham generating emissions that are five times more than (320 g CO₂ eq/100).

Example: Climate change impact of some foods

Beef (Hamburger) 100 g = 3.26 kg CO₂ eq
Beef (Streak) 300 g = 9.18 kg CO₂ eq
Pork (Sausage) 100 g = 1.19 kg CO₂ eq
Chicken (Breast) 100 g = 0.54 kg CO₂ eq

The FIGURE: in one year, the emissions associated with the life cycle of beef consumed in Italy alone amount to 18.341.46 kilotons of CO₂ eq. (over 18 million tons), for a hidden annual cost of over € 1 billion. This is equivalent to the amount of greenhouse gases emitted by the largest and most polluting coal-fired power stations in Europe. In total, CO₂ eq. emissions associated with meat amount to about 40 million tonnes per year.

Land acidification

Emissions into the atmosphere are converted into sulphuric acid and nitric acid and deposited on land or vegetation, also in the form of acid rain, which contribute to lowering the soil pH, resulting in damage to crops, growth of plants with diseases, and corrosion of buildings.

Comparing Results

The most impactful phase for this environmental damage is rearing, which contributes between 75% and 80% more than the other production cycle phases. The main cause is ammonia emitted by the manure (shelter and storage) of animal manure and used in the fertilisation of fields intended to produce animal feed.

This is not surprising; given that 60% of the total ammonia emissions in Italy are due to the management of animal manure and, in line with this statistic, almost 60% of the emissions of the entire life cycle of cattle derive from manure (directly in the rearing phase, and indirectly from waste in the subsequent phases) and 33% from field fertilisation.

The contribution of legumes to acidification is minimal compared to that of meat, both in terms of quantity and protein content.

For 100 g of protein produced, peas and soy have a potential impact on land acidification ranging from a minimum of 1% compared to beef to a maximum of 8% compared to chicken meat.

The hidden cost associated with these impacts is estimated at just under € 3 billion a year.

Marine eutrophication

Excessive nutrient enrichment (nitrogen, phosphorus and potassium) of soil, water, and air disrupts natural ecological processes. Different nutrient concentrations lead to variations in the presence of particular species present in the ecosystem (e.g. diatoms). The main cause of this is livestock farming, which produces about 95% of the emissions derive from the use of manure as fertiliser. Almost all of these emissions derive from nitrate emissions into water.

Comparing Results

The FIGURE: in one year, the emissions associated with the life cycle of meat consumed in Italy alone amount to 18.341.46 kilotons of CO₂ eq. (over 18 million tons), for a hidden annual cost of over € 1 billion. This is equivalent to the amount of greenhouse gases emitted by the largest and most polluting coal-fired power stations in Europe. In total, CO₂ eq. emissions associated with meat amount to about 40 million tonnes per year.

PRACTICAL EXAMPLE OF IMPACT

- Food amplification is presented here by way of example by LAV and are not an integral part of the research ‘Il costo nascosto del consumo di carne in Italia’ (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.
- Data processing by LAV.

18 - Food amplification is presented here by way of example by LAV and are not an integral part of the research ‘Il costo nascosto del consumo di carne in Italia’ (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.

19 - Food amplification is presented here by way of example by LAV and are not an integral part of the research ‘Il costo nascosto del consumo di carne in Italia’ (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.
The impact of legumes is much lower than that of meat, both in terms of mass and protein. In protein terms, meat impacts 30 to almost 500 times more (in the case of chicken).

**Agricultural land occupation**

This category includes all land removed from nature to make room for crops or livestock needed for meat production.

### Comparing Results

<table>
<thead>
<tr>
<th>Meat</th>
<th>kg 1,4-DB eq/100 g protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef (Steak)</td>
<td>2.49 m³*3 (7.47)</td>
</tr>
<tr>
<td>Pork (Sausage)</td>
<td>0.79 m³</td>
</tr>
<tr>
<td>Chicken (Breast)</td>
<td>0.69 m³</td>
</tr>
<tr>
<td>Peas</td>
<td>0.31 m³</td>
</tr>
<tr>
<td>Soy</td>
<td>0.05 m³</td>
</tr>
</tbody>
</table>

Note: Pigs and chickens drink less water than beef. Of the 730 litres collected to obtain 1 kg of beef, 92 are from the ground; grey water, which represents the volume of polluted water, quantified as the volume of water necessary to dilute pollutants to the point that the water quality remains at a safe level and refers mainly to water that passes from the ground into the air in the steam state due to the combined effect of perspiration, through plants, and evaporation, directly affects human health. The hidden cost of meat consumption in Italy: (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.

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21. Almost 100% of the impact of chicken is in fact due to these two crops: 70% soy from Argentina and 27% palm oil from Indonesia and Malaysia.

22. Other categories include all land removed from nature to make room for crops or livestock needed for meat production.

23. In this study, ‘land occupation’ refers to occupation for agricultural purposes, given the relevance to the subject matter of the investigation. The livestock model is used to calculate the impact, considering different characterization factors for different land uses. The conversion of land use into an economic cost is particularly problematic given the difficulty in giving monetary value to nature’s ecosystem services, such as food and water supply, climate regulation, water purification or pollination. The economic value used in this study is estimated at the value attributed to biodiversity loss, already presented for the ecotoxicity category.

The difference in consumption among meat types depends mainly on the quantities and type of food consumed by animals. The bulk of consumption, for all types of meat, is the fodder production phase. In particular, the irrigation of fields for maize and wheat production is the main contribution for all types of meat.

Water used to drink and wash animals in corrals also plays an important role in total consumption, a burden of more than 50% in the case of pigs and about 10% for cattle and chickens.

Of the 730 litres collected to obtain 1 kg of beef, 92 are from the ground; grey water, which represents the volume of polluted water, quantified as the volume of water necessary to dilute pollutants to the point that the water quality remains at a safe level and refers mainly to water that passes from the ground into the air in the steam state due to the combined effect of perspiration, through plants, and evaporation, directly affects human health. The hidden cost of meat consumption in Italy: (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.

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24. Food implications are presented here as an example by Liv and is not an integral part of the research ‘Il costo raccostato del consumo di carne in Italia’ (The hidden cost of meat consumption in Italy). For any scientific detail, please refer to the main report.


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The economic value used in this study is estimated at the value attributed to biodiversity loss, already presented for the ecotoxicity category. The difference is due to this study’s exclusion of the contributions of green and grey water related to consumption.
UNDER THE MAGNIFIER: THE ENVIRONMENTAL COSTS OF ALL CATEGORIES

Analysing Table 14, considering the environmental costs deriving from the consumption of 100 grams of beef, processed pork, and chicken, it is noted that in the case of beef, the environmental impact that generates the greatest cost on society is the formation of particulates, responsible for 34% of the total cost. It is followed by acidification (21%), soil consumption (16%), and climate change (14%). Particulate matter generation is also one of the main causes of the social costs of producing other meats: 18% and 15% of the total for pork and chicken, respectively. For both, however, the higher social cost is due to land ecotoxicity, which generates a cost to society of €17 cents per 100 grams of pork (34% of the total) and €24 cents per 100 grams of chicken meat (50% of the total). Agricultural land occupation, land acidification, and climate change also play a leading role in the cost generated by pork and chicken production, with percentages ranging between 10% and 18%. A ruolo of primo piano anche nel costi per la società generata dalla produzione di carne di maiale e pollo, con percentuali che variano tra il 10% e il 18%.

Table 14: Sensitivity analysis of environmental costs deriving from the consumption of 100 g of beef, processed pork, and chicken.

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Beef</th>
<th>Processed Pork</th>
<th>Chicken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate change</td>
<td>0.184</td>
<td>0.318</td>
<td>0.201</td>
</tr>
<tr>
<td>Ozone layer depletion</td>
<td>0.000</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>Land acidification</td>
<td>0.390</td>
<td>0.341</td>
<td>0.092</td>
</tr>
<tr>
<td>Freshwater eutrophication</td>
<td>0.001</td>
<td>0.009</td>
<td>0.000</td>
</tr>
<tr>
<td>Marine eutrophication</td>
<td>0.074</td>
<td>0.074</td>
<td>0.000</td>
</tr>
<tr>
<td>Human toxicity</td>
<td>0.010</td>
<td>0.015</td>
<td>0.000</td>
</tr>
<tr>
<td>Photochemical smog formation</td>
<td>0.014</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Particulate formation</td>
<td>0.378</td>
<td>0.270</td>
<td>0.001</td>
</tr>
<tr>
<td>Land eco-toxicity</td>
<td>0.138</td>
<td>0.145</td>
<td>0.077</td>
</tr>
<tr>
<td>Freshwater eco-toxicity</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Marine eco-toxicity</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Ionizing radiation</td>
<td>0.003</td>
<td>0.003</td>
<td>0.001</td>
</tr>
<tr>
<td>Agricultural land occupation</td>
<td>0.281</td>
<td>0.279</td>
<td>0.170</td>
</tr>
<tr>
<td>Total</td>
<td>1.315</td>
<td>0.563</td>
<td>0.361</td>
</tr>
</tbody>
</table>

Table 14: Sensitivity analysis of environmental costs deriving from the consumption of 100 g of beef, processed pork, and chicken.

2: FOCUS ON HIDDEN HEALTH COSTS

- At the national level, the cost to society, excluding cardiovascular diseases, is between €12.7 and €24.5 billion per year, with an average value of €19.1 billion (equal to €315 per person).
- If the total cost to the community is divided equally on the meat consumed annually in Italy (1,060 kilotons/year of processed meat and 283 kilotons/year of red meat), it is possible to estimate the cost generated by the community due to the consumption of 100 g of meat (as shown in the infographic below).28
- For processed meat, the main contributions are due to costs in terms of DALY loss for type 2 diabetes and cardiovascular diseases (31% and 33%, respectively).

Comparison with plant alternatives

In the studies used as a source for calculating the health impact of meat consumption, dose-response curves are reported in terms of the relative risk of contracting a certain disease, also for legumes.
- For all diseases considered in this report, a consumption of 50 or 100 grams per day of legumes does not increase the risk of contracting them. On the contrary, the risk of getting sick is reduced as the daily consumption of legumes increases.
- For example, for 100 g of legumes consumed per day, the risk of contracting cardiovascular disease is reduced by more than 10%.

The hidden costs of meat consumption in Italy

Fig. 23. Total economic costs to society due to meat consumption (100 g consumed).

The contributions of the environmental and health shares are equivalent in the case of fresh pork. Its consumption costs the community about €10 per kg consumed.

Finally, the environmental impacts generated by the life cycle of chicken meat on society amount to about €5 per kg, entirely attributed to its environmental damage. Even meat generally considered to have a lower “impact,” therefore, produces enormous damage and externalities: €5 of environmental damage per kg produced is twice the average cost of wholesale chicken. For every kg of wholesale traded chicken, there is a double economic value, made up of environmental costs compensated by neither the producer nor the consumer.

3: FOCUS ON TOTAL HIDDEN COSTS (ENVIRONMENTAL + HEALTH)

Table 17: Total economic costs (environmental and health costs) to society due to meat consumption (100 g consumed).

<table>
<thead>
<tr>
<th>Meat Type</th>
<th>Environmental costs (€/kg 2015)</th>
<th>Health Costs (€/kg 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>1.35</td>
<td>0.54</td>
</tr>
<tr>
<td>Pork</td>
<td>0.49</td>
<td>0.54</td>
</tr>
<tr>
<td>Pork (processed)</td>
<td>0.53</td>
<td>1.40</td>
</tr>
<tr>
<td>Chicken</td>
<td>0.47</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table 17: Total economic costs (environmental and health costs) to society due to meat consumption (100 g consumed).

The hidden costs of meat consumption in Italy

Fig. 24. Comparison of total (environmental and health) hidden costs due to meat and legumes consumption (€/kg consumed). A) comparison on 100 g of product, B) comparison on 100 g of protein.

Based on this analysis, the total hidden cost borne by society for 1 kg of beef or cured meat purchased is equal to €17 (considering that 110 grams of that purchased kilo will be wasted and therefore not consumed)29

For processed pork, the health share represents the most significant contribution of the total cost, the opposite is true for beef: 71% of the cost to society is due to the environmental impacts generated during its life cycle.
The environmental and health cost due to the consumption of 1 kg of legumes is equal to €50 cents. Lower than the cost generated by all types of meat considered in the study.

Even excluding the health benefits of a legume-based diet, the hidden cost of meat is between 8 and 37 times higher than that of legumes (€0.30 to €1.70 more).30

The comparison is even more favourable for legumes when protein is compared: 100 g of protein from legumes costs the community €17 cents (excluding health benefits), while 100 g meat proteins cost between €2 and €11. In this comparison, pork further worsens its performance given its lower protein content than other meats.

4: FOCUS ON TOTAL ANNUAL HIDDEN COSTS

Meat consumption in Italy generates a collective hidden cost estimated at €36.6 billion per year, equal to €605 for each individual resident. To provide a term of comparison for the value mentioned, it is equivalent, as an order of magnitude, to the sum of three taxes active in our country: that on electricity and system charges (€14.4 billion in 2017), the regional additional income tax (Irspef) (€11.8 billion), and the tobacco tax (€10.5 billion).

The main contribution (94%) is made by the consumption of processed meat, given the high consumption and high health costs.

Consumption of beef follows (31%). This cost also includes the cost related to the consumption of processed beef (2% of the total cost).31

Overall, beef has a hidden cost to society of around €11.4 billion, mainly due to the environmental impact caused by animal husbandry.

Chicken meat weighs on society for a total annual cost of about €3.3 billion, equal to €53 per person.

Fresh pork (about 17% of the total pork consumed in Italy) costs society about €75.5 per inhabitant each year, at a total cost of €2.3 billion.

- A legume-based diet, in addition to having an environmental impact of 95% lower on average than meat, could create a collective benefit given the reduction of the risk of contracting several diseases.
  - As we have already said, given the numerous conservative hypotheses made in the study, such as the exclusion of some categories of environmental impact and diseases related to meat consumption (e.g. antibiotic resistance, obesity, spread of viruses), the calculated hidden cost is probably an under-estimation of the real cost. In addition, values close to the lower end of the cost confidence interval associated with environmental and health impacts were used.
  - The maximum value associated with health damage (calculated in32 DALY) and environmental damage is equal to €92.3 billion. Divided by the Italian population, this value corresponds to a per capita of €1,530 per year.
  - At the other extreme, if lower economic values are attributed to DALYS and environmental impacts, and if the minimum risk of contracting diseases is considered, the per capita cost would be €36, equal to an annual cost for the community of €19.1 billion (see Table 19).

TOTAL COSTS

Figure 98. Comparison of total environmental and health hidden costs for the Italian society due to annual meat consumption (billion euros 2015).

Table 19. Variability of total hidden costs to Italian society (environmental and health costs) due to annual meat consumption (billion euros 2015).
The current food choices, with the impacts and costs detected by the study presented here, strongly influence the future of everyone and the planet. We can act on the climate and life of the planet, including animals, with simple variations of our behaviour at the table, making it an aware and sustainable one. Meat impact data and population growth require a dietary transition from animal proteins to plant proteins that are more environmentally sustainable and healthy for humans.

Prompt action is needed to avoid ever more serious environmental, health, and economic damage that - as in the case of the Covid-19 pandemic - would spare almost no one.

The path to follow must lead to a systemic change that involves a decisive reset of food systems and the transition towards a clear affirmation of the consumption of proteins of plant origin to the detriment of those from animals.

Individual action must be facilitated and guaranteed by the institutions, which are called upon to adopt active policies, in this sense, commensurate with the epochal crises we are facing.

TO LOCAL INSTITUTIONS
Local authorities play an important role in achieving the 2030 Agenda objectives, and an ambitious local food policy is now essential in this regard. In this context, LAV promotes policies and measures that facilitate the adoption of sustainable individual and collective behaviours oriented towards a 100% vegetable diet.

To this end, LAV recommends:
- The planning of food policies that include elements to raise awareness and educate citizens about the centrality of food choice in terms of improving environmental sustainability, individual health, and respect for animals,
- Local food transition plans for public catering, which provide for a progressive and decisive use of plant proteins instead of animal proteins, thus ensuring the achievement of objectives to reduce greenhouse gas emissions and other pollutants, protect public health and prevent economic damage to the community.

AT NATIONAL AND COMMUNITY POLITICAL LEVEL
LAV believes that at national and European Union level, policies need to be implemented that maximize the spread of proteins of plant origin. To move consistently in this direction, the numerous subsidies that support the livestock supply chain, in many meat “production” phases, must be eliminated soon. The externalities highlighted in this study are largely brought back to the cost of meat; specific tax levers must be activated to discourage the consumption of animal proteins and promote that of vegetable proteins. The challenge of preserving the climate, as discussed over the years and also foreseen in many specific plans, from the current proposal for a National Recovery and Resilience Plan (PNRR), to the previous integrated National Energy and Climate Plan (PNIEC), completely ignores the contribution of livestock to emissions. Similarly, many of the issues addressed in the PNRR (from air quality to ecosystem integrity, from land consumption to population health) inevitably refer to the food issue, but, incredibly, no mention is made.

The country must conceive a Food Transition Plan, a roadmap that aligns the food issue with the themes of development, sustainability, climate, social justice, and health.

To this end, LAV recommends:
- The progressive and rapid reduction to zero of the “Environmentally Harmful Subsidies” (SAD) catalogued by the Ministry of the Environment with reference to livestock farming and the extension of the catalogue with the inclusion of livestock categories not currently included.
- Promoting the consumption of vegetable proteins by lowering VAT from 22% to 4%, as is already the case for animal milk, for “milk-type” vegetable drinks.
- The progressive and then definitive blocking of public funding for animal husbandry and transparency in the criteria and numbers relating to them.
- The adoption of a law that protects vegetarian and vegan food choices and the subjects who adopt them, in all environments and social spheres, promoting their dissemination and correct information about them.
- The revision of the Community Agricultural Policy (CAP) increasingly in the direction of protecting the environment, biodiversity, and public health, with the rapid, progressive, and therefore definitive reduction of subsidies to the livestock supply chain, and a framework of financing and measures to promote the cultivation of plant proteins specifically intended for human consumption (thus excluding those for animal feed intended for income).
- The halt to publicly funded animal product marketing campaigns and their transformation into campaigns on the correct substitution and adoption of plant proteins.

The shift of public livestock farming subsidies from production aid to aid for the conversion of the supply chain to crop production.
- Achieving the Farm to Fork strategy objective, which states that “a correct diet based on plant foods reduces the risk of disease and greatly reduces the impact of our food system on the environment,” to be performed through a decisive enhancement of 100% plant protein foods.
- The adoption and extension of food labelling that will cover the nutritional, climatic, environmental, and social aspects of products. This is already included among the Farm to Fork strategy objectives and must be extended to also contain clear elements regarding the animal’s quality of life (rearing, transport).
- The activation of tax levers, also by applying a ‘meat tax’ or similar measures, capable of reducing consumer prices of meat to the real environmental and health costs generated throughout the supply chain.
- This was followed by a major change in farming practices as part of the planned revision of COUNCIL DIRECTIVE 98/58/EC of 20 July 1998 on the protection of animals kept for farming purposes and measures to phase out intensive farming.
A VACCINE FOR THE PLANET

1 / MORE VEGETABLE FOODS
Because meat, milk and eggs cut down forests, pollute, cause suffering, and spread new viruses.

2 / A TRULY GREEN ECONOMY
Companies, starting with food and clothing firms, must be converted to true sustainability, by giving them access to the ‘Recovery Fund-Next Generation EU’.

3 / STOP THE TRADE OF EXOTIC ANIMALS
Let’s stop import, trade and keeping of wild and exotic animals, who can be vehicles for the spread of new viruses.

4 / NO MORE PUBLIC MONEY FOR ANIMAL AGRICULTURE
Factory farms are time bombs for the spread of new viruses. Let’s shift public funding from animal agriculture to plant-based food production.

5 / MORE RESEARCH WITHOUT ANIMALS
Let’s invest in a science that uses alternative methods, which are more effective for patients than animal testing. Let’s free animals from laboratories.

6 / HELP FOR FAMILIES WITH PETS
The health and economic crisis have affected many families with pets. Let’s help them by providing access to veterinary medicines, reduced VAT on food and care and incentives for pet adopters.

Animal exploitation caused the pandemic. Let’s make this pandemic the last one.

LET’S NOT COME BACK AS BEFORE

#NONCOMEPRIMA