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The multifaceted consequences of 'meat' consumption and the adoption of a vegetable based diet: a core degrowth issue

The depletion of natural resources is today universally acknowledged, and its dependence on one's lifestyles and consequently on one's food choices needs to be known.

We are currently witnessing a division at world level: on one hand there are one billion seven hundred million that overfeed themselves - with unhealthy consequences - on a meat and animal products diet while the FAO estimates that there are – on the other hand - one billion people hungry and two billion who do not eat enough.

One reason for this inequality is our Western lifestyle that favors the consumption of meat, and therefore supports factory farming, using in this way about half the grain grown in the world, an amount that would serve to feed 9 billion people.
Meat production occupies 30% of the land surface of the planet and 70% of agricultural land. Little space is devoted to the cultivation of vegetable proteins for human consumption. While traditional farming means also deforestation – see Amazon rainforest - and overgrazing, landless farms implicate, apart from other negative impacts, that for foraging animals the industry is constantly looking for new acreages to cultivate. Water also suffers the consequences of this system: a kilogram of beef requires at least 15,000 liters of water.
Factory farms, according to FAO data, produce more greenhouse gas pollution than all transports that take place in the world.
Animal wastes are recognized sources of industrial pollution: they spoil and contaminate the soil with nitrates and phosphates that sum with the residues of chemical fertilization. The ever increasing demand for cereals and legumes for livestock contributes also to the spread of monocultures in agriculture, again causing a great deal of chemicals that remain in the environment.

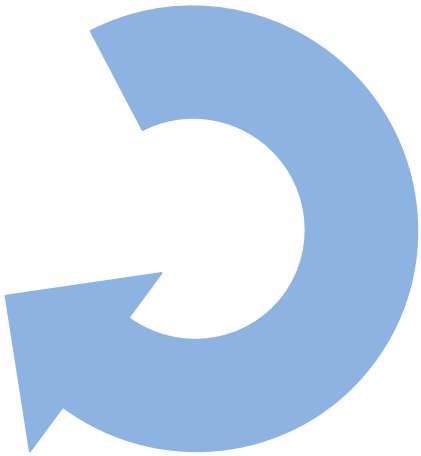
And – last but not least - the aim of reaching the maximum productivity acts, in agriculture as in other sectors, is causing the concentration of businesses and encouraging the development of those already over-sized, causing the small ones to close. Profit is always assured for the multinational chemical industry, which creates pesticides and other poisons, and for the massive stakeholders in commerce and distribution.
Despite this – environmentally, from the health point of view and from the animal welfare side – highly unfair and inefficient production system, experts expect that from about 285 million tons of meat consumed in the world in 2010 we will arrive in 2050 to almost 465 million.

With such a future meat request scenario, many 'different' solutions are being taken into account, as the creation of transgenic animals, or the spreading in Europe and North America of the habit of eating

insects, or the production of 'in vitro' meat created in a lab from stem cells.All the above mentioned solutions appear to be bizarre and extremely complicate if we compare them with the – immediate or gradual - change of our individual 'Western' lifestyle. Starting from our eating habits. The ever increasing demand for animal products comes for countries (like China and Brazil) who are adopting our lifestyle. It's our duty, as our lifestyle is their 'model', to implement a more sustainable lifestyle, aware of the consequences of individual behavior on the future of the whole Planet. A vegan lifestyle responds fully to the principle of contraction, i.e. savings in consumption of essential resources.

Activities of the meat-production cycle

- Feed cultivation
- Land use
- Transport of feed
- Livestock farming
- Transport of animals
- Killing and slaughtering of animals
- Packaging of meat
- Transport of meat
- Distribution of meat



Costs associated with the meat production cycle (soil use, feed cultivation, feed transport, livestock farming, animal transport, slaughter and killing of animals, packaging of meat, transport of meat, distribution of meat)

+ costs associated with the impacts of meat production (ecological impacts, impacts associated with animal welfare, veterinary health impacts, impacts on human health)

+ subsidies from CAP

+ costs expressed by the market

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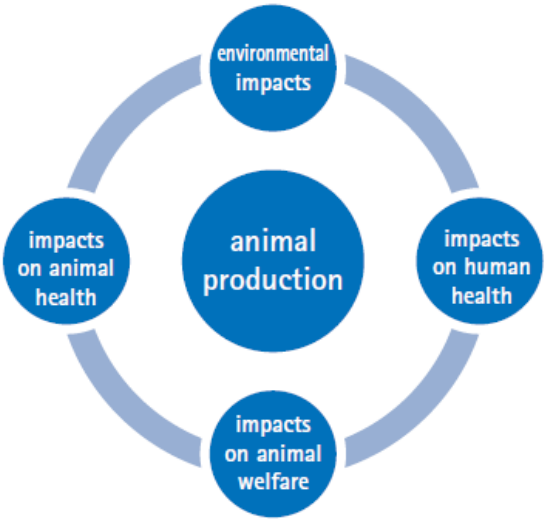
= THE REAL COST OF MEAT

Impact Cycle of Animal Production

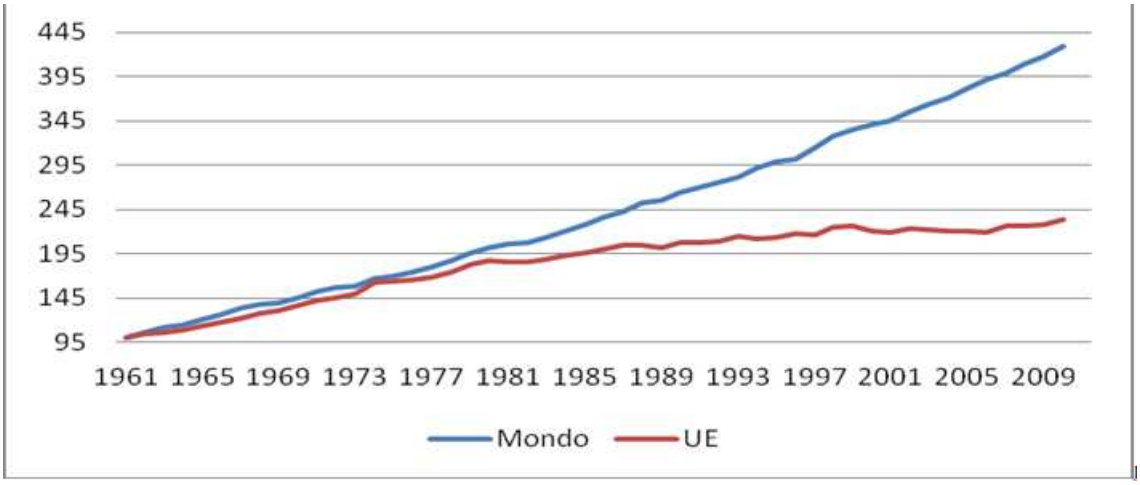


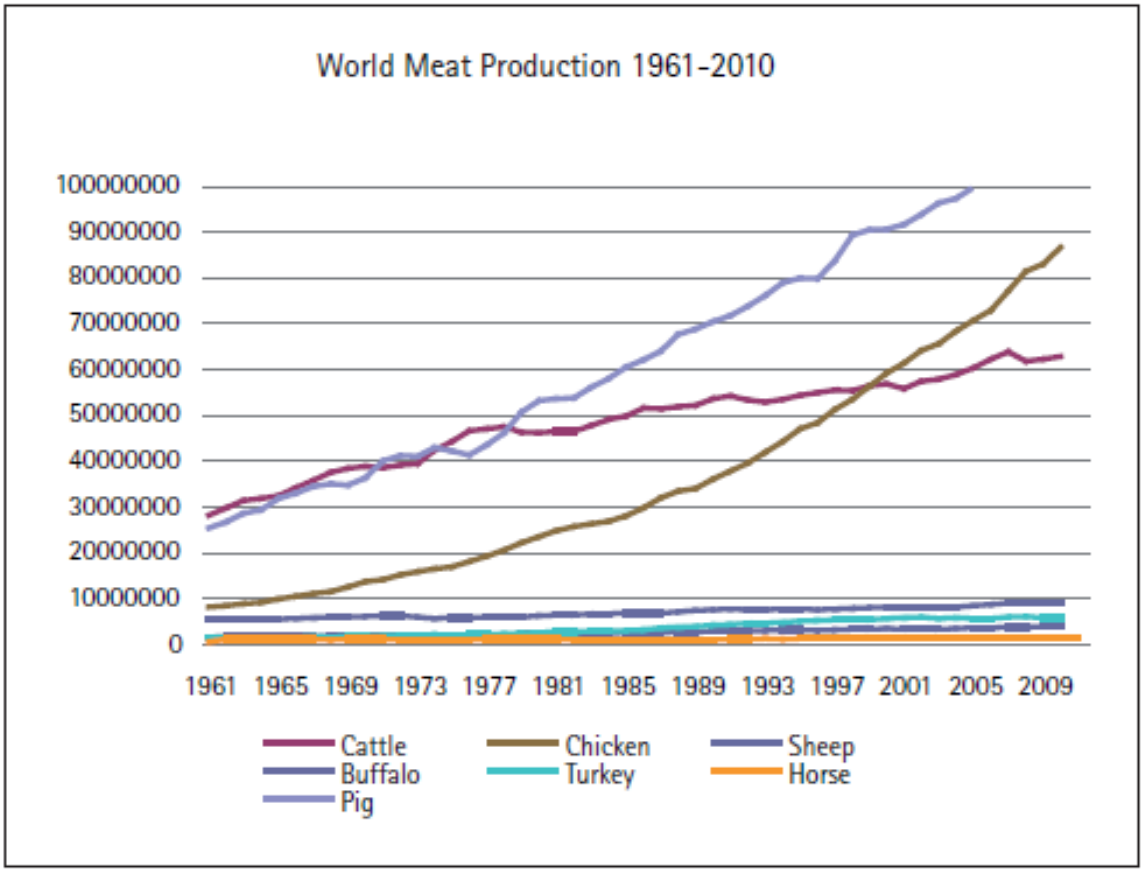
Environmental impacts	• Greenhouse gas emissions, • Land degradation, • Land used for feed production, • Deforestation, • Use of fertilizers, pesticides and antibiotics • Soil pollution, • Groundwater pollution, • Freshwater and ocean pollution, • Overexploitation of natural resources, • Air pollution.
Impacts on animal welfare	• Cruelty to animals, • Animals treated as inanimate machines and integra • Animal suffering • Animal diseases.
Impacts on animal health	• Low standards and industrial farming lead to the spr of animals. • Transmission of animal diseases
Impacts on human health	• Spread of new viruses • Diseases from ecological impacts.

Although available statistics are incomplete and data may be conservative, according to the Food and Agriculture Organization (FAO), in the face of a world population of 6.8 billion, each year about 56 billion animals[1] are raised and killed for consumption.
Applying a business-as-usual scenario, the figure could double by 2050, when world population is estimated to reach 9 billion people. According to FAO (2011), meat consumption should increase by 73% by 2050[2] and dairy consumption by 58%. The FAO estimates meat production rising from the present annual figure of 228 million tonnes to 463 million tonnes in 2050; accordingly, milk production should increase from 580 to 1043 million tonnes per year for the same period.
The impact of meat on the planet is the sum of impacts within the different stages of the meat production chain, starting with the cultivation of feed and ending with the meat served on the consumer's plate

[1] FAO (2006)
[2] The increase is calculated on a 2010 baseline

World and European Union Meat Production





Data FAOSTAT

The **meat production cycle** includes the following stages:

- The occupation of the land for the cultivation of cereal crops and other plants (e.g. soy) for feed production,
- Animal husbandry, transport of feed,
- Transport of live animals,
- Transport of meat products and its by-products,
- Meat packing,
- Use of water,
- Use of animals,
- Management of waste

To this list one must add the potential lack of forestation or **deforestation** of areas used for growing feed and/or farming animals.

Furthermore, the production of fertilizers and pesticides for feed cultivation, together with the generation and management of animal sewage, cause the pollution of soil, groundwater, freshwater and the marine environment.
Greenhouse gas emissions associated with the meat production cycle have a major ecological and economic impact. Billion of Euros in public funds have being allocated to subsidize meat production and offset its harmful effects on both the environment and animal/human health.

As a globalised product, meat can easily become a vehicle for **worldwide epidemics**. The costs of prevention and containment of epidemics can easily reach billions of Euros and include the slaughtering of millions of animals, especially when outbreaks occur in intensive farming units, known to facilitate the spreading of viruses.

CO_2 emissions from the world meat production cycle are estimated to range between 18%[3] and 51%[4] of global emissions; however these impacts are not yet included in the national, European and international CO_2 reduction plans.

Considering the above-mentioned FAO estimates, world meat production **would have a global warming impact just below that of the transport sector**.
If one were to apply the carbon tax of 17 Euros[5] (recently considered but not implemented by France for every ton of CO_2) on the global production of meat, we can assume that this would total between 149 billion[6] Euros and 424 billion Euros[7] per year.

[3] FAO (2006)
[4] World Watch Institute (2009)
[5] In January 2009, France proposed the introduction of a 17 euro national tax per each CO_2 ton emitted by energy products (e.g. fuel) forecasting a progressive application to sectors such as agriculture and fisheries. ENDS Daily 'French Government unveils details of carbon tax' Friday 2 October 2009
[6] The figure corresponds to the application of an hypothetical tax of 17 euro per each ton of CO_2 emissions (considering that global meat production would emit 18% of the global CO_2 emissions)
[7] The figure corresponds to the application of an hypothetical tax of 17 euro per each ton of CO_2 emissions (considering that global meat production would emit 51% of the global CO_2 emissions)

Following the same logic, but applying figures from a Joint Research Centre study, the EU meat production cycle tax would amount to about 11 billion Euros per year.[8]

The world dairy industry is estimated to emit about 4% of global CO_2 emissions.
In 2007 **the dairy sector** emitted 2 billion tonnes of CO_2[9] , 2/3 of which directly originated from milk production; 1 kg of milk would be equivalent to 2.4 kg of CO_2[10].

Despite being a regular practice for major EU policies, **no strategic impact assessment of the European meat production cycle has been published to date.** There is therefore no clear knowledge of the costs and benefits associated with current EU meat production policies.

In February 2011, the Joint Research Centre (JRC)[11] published a study (focusing on only a few stages of the meat production chain) which revealed that the **animal husbandry** sector was responsible for about.8% of total EU emissions[12]. According to the study, cattle and pig production and cattle used for milk production have the highest CO_2 emissions. **Meat production in Europe would then be classified as a source of greenhouse gas emissions, just below the transport sector** (estimated at 19%-20% of total CO_2 in the EU). **The cycle of meat production would be ranked as the third largest source of CO_2 emissions (after energy and transport**). Meat production is also the agricultural activity with the highest carbon footprint on the planet. Considering the rapid world population growth and the likely increase in meat consumption, it is easy to assume that, without immediate and effective intervention, the meat production cycle will soon become one of the main obstacles to the fight against climate change.

A recent study from Wirsenius et al. (2010) points out that agriculture is responsible for 25-30% of global CO_2 emissions, but it is still exempt from provisions relating to the fight against climate change. The study indicates the possibility of reducing the CO_2 emissions rate of 32 million tonnes by simply applying a fee of 60 Euros per tonnes of CO_2 (a lower rate than is normally applied to fuels in the European Union countries) emitted from animal-based products.

It does not seem realistic to reduce the negative outputs of meat production by simply applying innovative technology, while continuing with business-as-usual.

This would mean the further expenditure of public money to attempt to prevent and curb the ecological, veterinary and health impacts caused by agricultural production with the highest footprint on the planet. On the contrary, several technical studies conclude **that the adverse impacts of meat production can be contained only by acting significantly on consumption patterns**.

[8]The figure corresponds to the hypothetical application of a 17 euro tax per each ton of CO_2 emissions (considering that the EU livestock sector would produce 12.8 % of the EU CO_2 emissions, as specified by the JRC study)
[9]Green-house gas emissions are counted as CO_2 equivalent emissions. According to the UN Kyoto Protocol, global CO_2 equivalent emissions are equal to 49 GT (Giga Ton).) IPCC, WG III, 4th Assessment Report.
1 GT: 1 billion tonnes.
[10]FAO (2010)
[11]JRC (2011)
[12]The JRC examines the production cycle starting from soil use to the farm. It includes feed cultivation in third countries. The study does not include a number of activities generating CO_2 emissions, such as the transport of animals, transport of meat, packaging of meat and dairy products.

Animal production in Europe is a market **distorted business fuelled by perverse subsidies,** generating direct and indirect negative impacts and additional costs to society.

Sustainable **vegetable protein** products for human consumption are less subsidized by far, despite their minimal impact on the environment and higher yield productivity. For example, it is estimated that **10 kg of feed and 15.500 litres of water are needed to produce 1 kg of beef**; and that **the production of 1 kg of beef emits as much CO2 as a car that travels 250 km** (the distance between Rome and Florence). It has been estimated that two thirds of the energy consumption associated with the animal production chain is needed for the production and transportation of feed.

1 slide of beef (steak)[13]	**4,5 kg of CO2**
1 broccoli or cauliflower plant	**0,181 kg of CO2**
1 kg of bovine meat requires	**16 kg of feed**
1 kg of sheep meat requires	**28 kg of feed**

In 2008, UK livestock produced about 48 million tonnes of CO_2, equal to 8% of the national CO_2 account[14]. The British Governmental Committee on Climate Change[15] (CCC) has therefore suggested the introduction of a tax on meat consumption, with a view to halving CO_2 emissions from the sector by 2050. A study by the Committee concluded that a reduction in meat consumption by 50% would result in an economic advantage and the saving of 13 million tonnes of CO_2 (40% of total emissions).

Altering consumption patterns would lead to greater availability of agricultural land for extensive cattle breeding as well as forestation. Reaching the target of halving meat consumption by 2050 would require an intermediate consumption reduction of about 11-36% by 2020.

Negative effects of meat production apply beyond the borders of developed countries. Even in several developing countries, where regulation may still be insufficient, the animal production sector is subsidized. However the production of meat is associated with the exploitation of **water resources, pollution, deforestation, loss of biodiversity, indiscriminate use of pesticides and fertilizers and the potential development of infectious diseases**. European consumers become indirectly responsible for the externalization of the negative effects of meat when purchasing products derived from third countries.

The only effective solution is **therefore a change of direction towards a significant reduction in production and consumption; the abolition of subsidies for the sector and the large-scale promotion of alternative protein based vegetable products would contribute to achieving this reduction.** At the same time, it is necessary to regulate the various aspects of the meat production cycle in order to eliminate animal cruelty in farms and during transport (especially over long distances), the generation of

[13]Pachauri R.K. The Impact of Meat Production and Consumption on Climate Change, September 2008. Link: http://whatcom.wsu.edu/carbonmasters/documents/Meat_Production_Climate_Change.ppt
[14]ENDS Daily, 431, December 2010.
[15]Climate Change Committee (CCC), UK, 2010.

pollution and to mitigate CO_2 emissions, all of which lead to global-scale environmental, economic, social and health costs.

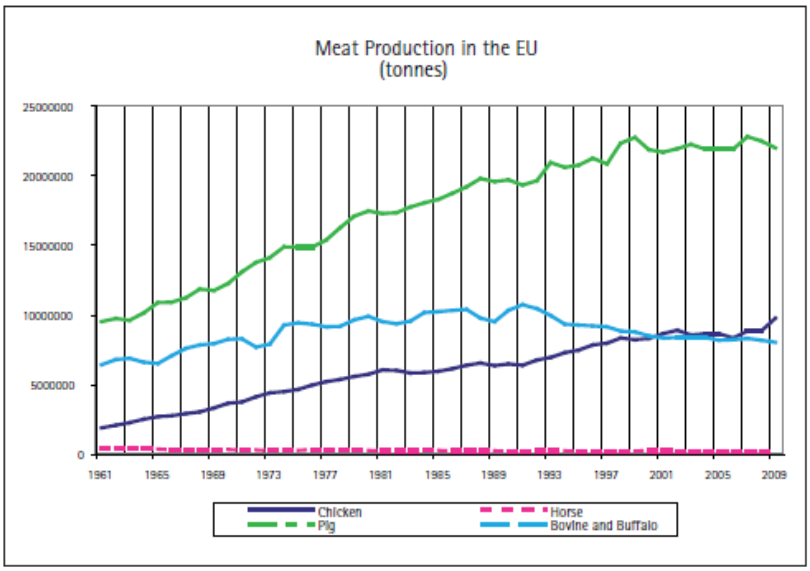
A credible EU Common Agricultural Policy (CAP) Reform must be able to change the current approach to meat production. Firstly, a comprehensive technical assessment of the impacts and risks caused by the production of meat is needed, to prevent negative effects on the environment and reduce the economic costs borne by society. The CAP is currently based on two financial pillars, of which only the least funded one is aimed at promoting environmentally sustainable agricultural activities that would enhance well-being and animal health.

This situation needs a radical change.
At present there are essentially four types of animal husbandry promoted by the CAP: intensive, extensive, mixed and biological; they correspond to different systems of animal management. However, intensive farming is the most used model and is expanding at the highest rate. Among the millions of animals bred in Europe, only a small number pf animals are managed according to European organic farming criteria, enjoying higher standards of well-being. Most livestock are raised according to large-scale industrial models. This phenomenon is related to the financial structure of the CAP, which encourages intensive farming as an efficient method, although it traps the animals in confined spaces and manages them as producing machines.

In reality, intensive farming is all but efficient; these farms are very expensive facilities, supported and promoted with public funding. They are exposed to the permanent risk of disease outbreaks, which in turn may lead to further public allocations and massive killing of animals. For example, in Italy within the period 2001-2007, outbreaks of BSE[16], SARS[17] and avian influenza have cost about 550 million Euro, of which 443 million Euro was for BSE only (233 million Euro allocated for the destruction of the animal carcasses[18]). In 2001, the UK costs associated to BSE were estimated at around 20 billion Euro, including the killing of 7 million animals; in mid-2000 the spread of avian influenza lead the Dutch Government to kill 220 million birds.

The expansion of intensive farming reflects European policies aimed at supporting the concentration of financial powers to the detriment of quality. Within such system consumption costs are kept low, but the negative impacts, such as cruelty to animals and pollution, are very high. This is unacceptable from an ethical point of view.

[16]Bovine Spongiform Encephalopathy
[17]Severe Acute Respiratory Syndrome
[18]Corriere della Sera, 3rd March 2010.



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This trend sharply contrasts with citizens' opinions who consider animal welfare and high quality food as priority goals.

A 2005[19] European Commission survey registered that European consumers' attention to the welfare of animals was higher than in other parts of the world.

However, this sensitivity is not reflected in current agricultural policies. On the one hand, CAP funding mainly flows towards recipients that do not provide high standards of animal welfare, but on the other hand, inadequate labeling and traceability rules applied to the meat production cycle prevent the consumer from influencing the market.

The survey found that more than 60% of consumers have shown a willingness to change their buying habits and pay a higher price for products which ensured a high standard of animal welfare.

The only certainty offered to consumers about the standards used for breeding comes from organic products, which, nevertheless, constitute a minority on the European market.

It is therefore no longer acceptable that the CAP, which accounts for 40% of the annual budget of the Union, continues to reward low-quality production with high negative global impacts, instead of promoting production models aimed at high quality, responsibility, accountability and sustainability. Such a model should also promote vegetable proteins as an alternative to animal proteins.

Meat production occupies 30% of the land surface of the planet and 70% of agricultural land. Little space is devoted to the cultivation of vegetable proteins for human consumption. In Europe the percentage of agricultural land planted with vegetables ranges from 1% to 5% depending on the country.

As for meat production, low quality and **animal cruelty** are also enhanced by a continuous violation of the European Treaty. Despite the Treaty legally defining animals as 'sentient beings' and providing for the

[19]Eurobarometer, 2005

welfare and protection of all animals, the current European agricultural regulations do not meet these obligations. **On the contrary, live animals are still classified as 'products' or 'goods'.** It is imperative that the CAP finally puts a stop to this violation of the Treaty.

Life expectancy of farmed animals [20]		
Animal	*Life expectancy of farmed animals*	*Natural life expectancy*
Chicken	30-40 days	+10 years
Pig	5-6 months	20 years
Dairy cow	4-5 years	30-40 years
Calf	6-8 months	20-30 years
Lamb	30-130 days	16-19 years
Laying hen	11-12 months	+10 years
Sow	3 years	20 years

In addition, an impact assessment of the production cycle on the environment, animal and human health, along with an analysis of the cumulative costs for the society, seems necessary. This analysis should also consider existing and potential alternatives to meat consumption, such as proteins of vegetable origin. Given the negative externalities (direct and indirect costs) associated to the production of meat, the consumption of vegetable proteins seems the only available economic and environmental answer.

Furthermore, it is necessary to apply new, binding and measurable standards of animal welfare for all production processes to comply with the EU Treaty, as well as to reduce the costs associated with ecological, veterinary and health impacts.

The abolition of intensive industrial farming methods is the first necessary step towards a sustainable and responsible farming policy. As a second step, the EU will have to prohibit, on animal welfare and human health grounds, the import of meat and animal by-products which do not meet European standards. Thirdly, the EU will have to show international leadership in promoting high levels of animal welfare standards globally.

The EU meat sectors 'self-sufficiency index' equals 105% of domestic production, more than sufficient to cover European demand. Thus, meat imports from third countries do not seem necessary to cover demands.

However, the flows of exports and imports of meat and animal by-products between the EU and third countries are currently high (the trade in meat and meat products between the European Union and the rest of the world is very high and the export of meat from the EU to third countries represents ¼ of production.

The large volume of trade in the sector, which is most likely related to benefits in terms of cost / price, seems, in part, to indicate an inefficient economic model.

[20] Italian Ministry of Agriculture, report on genetic resources in Italy, July 2005.

On the one hand, the consumer/taxpayer pays for meat production through subsidies via the European Common Agricultural Policy (CAP), but, on the other hand, almost half of these products on the EU market come from third countries (such as China, Brazil, Argentina, South Africa, Hong Kong) which do not ensure the same standards of EU quality (i.e. animal welfare, health checks and security).
Moreover, this system could also encourage the relocation of production outside the EU (where standards of animal welfare and production costs are lower), since foreign animal products can anyway be placed on the EU market without the need to harmonize welfare standards on animal farming.

EU 27 from/to third countries Year: 2009	Import value, (1000 EUR)	Import quantity (1000 Kg)	Export value (1000 EUR)	Export quantity (1000kg)
Meat and meat offal for human consumption	3.386.087,460	1.003.363,800	4.420.864,120	3.175413,300
Milk and milky cream	15.414,610	20.414,300	208.450,790	230.643,800

Source: External Helpdesk on Website Europa, www.exporthelp.europa.eu

In 1998[21] it was calculated that $510 billion in global agriculture subsidies (including those covering animal husbandry), out of a total of $635 billion, could be classified as 'perverse', because of their negative impacts and consequent additional costs to society.

The European Union is one of the major players in domestic and global policies on climate change, pollution control and elimination, forest protection, biodiversity and animal welfare. However, to secure the success of these policies, it is imperative to drastically reduce the consumption of meat, review the methods of meat production and increase and promote consumption of vegetable proteins.

[21] Mayers N.; Kent. J. *Perverse Subsidies* (2001)

Recommendations

Towards a New European Agriculture Policy

- To eliminate subsidies promoting meat production, including those providing incentives for the production of vegetable proteins for feed;
- To promote and sustain the production and consumption of vegetable proteins for human consumption as an alternative to meat. This objective could be achieved through the introduction of new financial instruments dedicated to vegetable proteins;
- To promote the consumption of vegetable proteins as a responsible and sustainable choice from an environmental, economic and ethical point of view;
- To secure harmonized minimum standards of higher levels of animal welfare, to be applied to all farm animals. The rationale is based on the EU Treaty which defines animals as *sentient beings*;
- To elaborate a new framework legislation on minimum compulsory and clearly applicable high levels of animal welfare for farm animals;
- To ban livestock farming methods which do not comply with the new rules on animal welfare;
- To abolish intensive farming, which is based on the mechanization of animals;
- To ban subsidies to the import and export of live animals from/to non- EU countries;
- To ban the import and export of livestock from/to non-EU countries;
- To reduce to a minimum animal transport in the EU, by putting in place the necessary infrastructures. To replace the transport of live animals with the transport of meat. Animals should never be transported for more than 8 hours, as urged by the recent Petition[22] to the European Parliament, supported by more than 1 million EU citizens. A European Parliament Written Declaration on the same issue was adopted in March 2012[23];
- To promote the acknowledged scientific link between animal welfare, product quality and human health;
- To promote transparency and better dissemination of information relating to CAP funds, in order to quantify and monitor the funded activities;
- To introduce new legislation on labeling and traceability of meat, meat derived products and dairy products, to inform consumers on the origin of the animals involved, as well as the transport routes, the farming methods and the slaughtering location;
- To introduce a meat label providing clear information on the place of origin of the animal, the farming system used, the method of transportation, the place of farming (if different from the place of origin) the distance of the journey and place of slaughter. This would enable consumers to make a responsible choice.

[22] http://www.8hours.eu

[23] Written Declaration 49/2011, European Parliament

Reducing Climate Change

- To carry out an international technical study on CO_2 emissions associated with the meat production cycle;
- To include CO_2 from livestock derived products within the EU Emissions Trading System (ETS), as well as within international negotiations on climate change;
- To set reduction targets for CO_2 emissions from the meat production cycle or introduce a tax on them.

Researching

- To promote further research on the connections between high animal welfare, product quality and product security;
- To promote further research on the potential benefits of a vegetable protein diet instead of a meat based one;
- To promote further comprehensive assessment of the impact of the meat production cycle on climate change, the environment, human and animal health;

International policies to be promoted by inter-governmental organizations

- To promote the abolition of meat production subsidies globally;
- To provide incentives to the production and consumption of vegetable proteins for human consumption as a replacement for animal derived proteins;
- To promote the consumption of vegetable proteins as a responsible and sustainable choice from an environmental, economic and ethical point of view;
- To promote high levels of animal welfare standards in animal farming and transport globally;
- To discourage the global marketing of animal products derived from farming methods with low animal welfare standards;
- To eliminate export refunds for live animals;
- To ban the long-distance transportation of animals;
- To economically quantify the real direct and indirect costs of meat of meat production;
- To promote the dissemination of information on the real costs associated with the meat production cycle on the environment, climate change and human and animal health.