

CHEAP FOOD COSTS DEAR



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Introduction

The bleak lives imposed on industrially farmed animals are justified by the assertion that this gives us cheap food. But the low cost of animal products is achieved only by an economic sleight of hand. We have devised a distorting economics which takes account of some costs such as housing and feeding animals but ignores others including the detrimental impact on human health and natural resources of industrial agriculture.

“There needs to be much greater realisation that market failures exist in the food system that, if not corrected, will lead to irreversible environmental damage and long term threats to the viability of the food system. Moves to internalise the costs of these negative environmental externalities are critical to provide incentives for their reduction.”

UK Government Foresight Report

Industrial livestock production produces negative externalities including impaired human health, environmental degradation, greenhouse gas emissions and loss of biodiversity. These negative externalities represent a market failure in that the costs associated with them are borne by third parties or society as a whole and are not included in the costs paid by farmers or the prices paid by consumers of livestock products. In some cases the costs are borne by no-one and key resources such as soil and biodiversity are allowed to deteriorate, undermining the ability of future generations to feed themselves. When such externalities are not included in prices, they distort the market by encouraging activities that are costly to society even if the private benefits are substantial.¹

Need to internalise externalities is widely recognised

There is increasing recognition that, in order to avoid market distortions and encourage efficient use of scarce resources, these externalities should be internalised in the costs of meat and dairy production and thus in the price paid by consumers.

The UK Foresight report has said that “the food system today is not sustainable because of its negative externalities. These are not included in the cost of food and hence there are relatively few market incentives to reduce them”.²

The UN Food and Agriculture Organisation (FAO) has taken a similar approach, arguing that “A top priority is to achieve prices and fees that reflect the full environmental costs [of livestock production], including all externalities ...economic and environmental externalities should be built into prices by selective taxing and/or fees for resource use, inputs and wastes”.³

“In many countries there is a worrying disconnect between the retail price of food and the true cost of its production. As a consequence, food produced at great environmental cost in the form of greenhouse gas emissions, water pollution, air pollution, and habitat destruction, can appear to be cheaper than more sustainably produced alternatives”.

FAO Report, 2015: Natural Capital Impacts in Agriculture

The European Commission stresses the need to get prices right.⁴ They point out that markets can only bring about efficient use of resources where the prices match the true cost of the resources used. Prices that do not match true costs lock in inefficient technologies and business structures. The

failure to reflect the cost of externalities in prices can lead to unsustainable exploitation of some resources.

The negative externalities of industrial livestock production

The negative health externalities of industrial livestock production arise from several factors:

- The high levels of meat consumption that have been made possible by industrial farming can lead to obesity, diabetes, heart diseases and certain cancers.⁵
- Free range animals often provide meat of higher nutritional quality - with less fat and higher proportions of the beneficial omega-3 fatty acids - than animals that are reared industrially
- Industrially farmed animals are routinely given antibiotics to ward off the diseases that would otherwise be inevitable when large numbers of animals are kept in overcrowded conditions
- Air pollution arising from agriculture
- Food-borne diseases such as salmonella and campylobacter.

The negative environmental externalities of industrial livestock production largely stem from its dependence on feeding human-edible cereals to animals. This is inherently inefficient as much of the food value of crops is lost during conversion from plant to animal matter. Studies show that for every 100 calories fed to animals in the form of human-edible crops, we receive on average just 17-30 calories in the form of meat and milk.^{6 7} A University of Minnesota paper indicates that the efficiency rates may be even lower for some animal products. It concludes that for every 100 calories of grain that we feed to animals, we get only about 40 new calories of milk, 22 calories of eggs, 12 of chicken, 10 of pork, or 3 of beef.⁸

This core inefficiency brings other inefficiencies in its train. Feeding cereals to animals – which is at the heart of industrial farming - is a wasteful use not only of these crops but of the land, water and energy used to grow them. Moreover, industrial livestock production leads to high levels of soil degradation and water pollution.

The impacts and costs of some of these negative externalities have already been estimated.

Environmental externalities

The Natural Capital Committee (NCC) was established in 2012 to provide independent expert advice to Government on the state of England's natural capital. The NCC's third report *The State of Natural Capital* states that "farming can produce large external costs to society in the form of greenhouse gas emissions, water pollution, air pollution, habitat destruction, soil erosion and flooding. These costs are not reflected in the price of food. As a result, farming is responsible for net external costs to society that have been valued at £700m per annum."

Excess nitrogen in the environment

Industrial livestock production's need for huge amounts of feed crops has fuelled the intensification of crop production with its high use of nitrogen fertilisers. The *European Nitrogen Assessment* (ENA) reports that 75% of industrial production of reactive nitrogen (N_r) in Europe is used for fertiliser (2008 figure). The ENA points out that the primary use of N_r in crops in Europe is not directly to feed people but to provide feeds to support livestock.

The ENA identifies five key threats associated with excess N_r in the environment: damage to water quality, air quality (and hence human health, in particular respiratory problems and cancers), soil quality (acidification of agricultural soils and loss of soil biodiversity), the greenhouse balance and ecosystems and biodiversity.⁹

The ENA points out that although the atmospheric emissions of nitrogen oxide from traffic and industry contribute to many environmental effects, these emissions are dwarfed by the agricultural flows of reactive nitrogen.

The ENA estimates that environmental damage related to N_r effects from agriculture in the EU-27 is €20–€150 billion per year. A cost-benefit analysis shows that this outweighs the benefit of N-fertiliser for farmers of €10–€100 billion per year.

A clear example of the detrimental impact of excess nitrogen in the environment is provided by the extensive algal blooms that affect sections of France's coast line. A paper produced in 2014 by the French Ministry of Ecology, Sustainable Development and Energy states that between 50,000 and 100,000m³ of algal blooms are collected and treated each year. This cost around €1.7 million in 2012 with a cost of €20/m³. In addition, algal blooms have a negative impact on tourism and the shellfish industry.¹⁰

The FAO estimates that fertiliser use has adversely impacted marine and riverine ecosystems, producing over 400 aquatic "dead zones" worldwide, covering an area of 245,000 sq.km through eutrophication.¹¹

Soil degradation

A UK study concludes that "modern agriculture, in seeking to maximize yields ... has caused loss of soil organic carbon and compaction, impairing critical regulating and supporting ecosystem services".¹² The study's authors point out that depletion of soil organic carbon "in conventional agricultural fields is now thought to be an important factor constraining productivity as many arable soils have suboptimal concentrations".

The European Commission points out that "45% of European soils face problems of soil quality, evidenced by low levels of organic matter".¹³ Soil biodiversity is under threat in 56% of EU territory with intensive agriculture being a key factor in loss of soil biodiversity.¹⁴ In 2006, the Commission assessed that soil degradation in the EU-25 was costing the EU economy some €38 billion per year.¹⁵ The consequences of soil biodiversity mismanagement have been estimated to be in excess of one trillion dollars per year worldwide.¹⁶

The FAO reports that globally approximately 33% of soils are facing moderate to severe degradation.¹⁷ The FAO stresses: "the current rate of soil degradation threatens the capacity to meet the needs of future generations, unless we reverse this trend through a concerted effort towards the sustainable management of soils". The FAO that worldwide 75 billion tons of soil are lost every year, costing approximately US\$400 billion per year.¹⁸ Brazil, for example, loses 55 million tons of topsoil every year due to erosion from soy production.¹⁹

Overuse and pollution of water

Industrial livestock production generally uses and pollutes more ground- and surface-water than grazing or mixed systems.²⁰ Unabsorbed nitrogen and phosphorus from fertilisers and chemicals from pesticides are key factors in water pollution. Human-induced eutrophication degrades freshwater systems worldwide by reducing water quality and altering ecosystem structure and function. More than 40% of EU rivers and coastal water bodies are affected by diffuse pollution from agriculture.²¹

A UK study estimates that the cost agriculture imposes on water companies for cleaning nitrates, pesticides and other treatments from their water was £271 million in 2002/2003.²² The OECD reports that the annual costs related to water pollution in six EU Member States (Belgium, France, Netherlands, Sweden, Spain, UK) amount to €2.43-€4.75 billion per year.²³

A U.S. study found that in all U.S. nutrient ecoregions nitrogen and phosphorus concentrations in rivers and lakes exceeded reference values.²⁴ In 12 of 14 ecoregions, over 90% of rivers exceeded reference values. The study calculated potential annual value losses in drinking water treatment costs, recreational water usage, spending on recovery of threatened and endangered species, and waterfront real estate. The combined costs were approximately \$2.2 billion annually as a result of eutrophication in U.S. freshwaters. The study recognises that a substantial portion of human-induced eutrophication ultimately stems from fertiliser use. The authors point out that their evaluation likely underestimates the economic losses.

A number of papers compare the environmental impact of confinement and pasture-based dairy systems in Europe as regards three factors: eutrophication potential, global warming potential and air pollution from ammonia emissions.^{25 26 27} The estimated costs entailed in these various impacts are much higher in high-input confinement systems than in low-input pasture-based systems.

Biodiversity loss

Industrial agriculture is associated with a major decline in Europe's biodiversity.²⁸ Only 7% of habitats linked to agro-ecosystems have a favourable conservation status, compared to 17% for habitat types not related to agro-ecosystems.²⁹

Farmland birds are considered to be a key indicator of the health of the countryside. Europe's common farmland birds have declined by 30% since 1990; this has been linked to increased intensification as well as habitat loss.³⁰ The drive to grow more animal feed has been a major factor in the intensification of cereal production. This has entailed the loss of mixed farming, the erosion of habitat diversity and the development of monocultures all of which result in less diverse opportunities for foraging and a reduction in the insect populations on which birds feed.

Intensive agriculture has also played a major role in the decline in pollinators such as bees through its use of insecticides and herbicides and its contribution to air pollution and habitat deterioration.³¹ ³² The value of insect pollination services to crop agriculture has been estimated at ~ £400 million per year in the UK³³ and €153 billion globally.³⁴ There has also been a dramatic decline in Europe's grassland butterflies of almost 50% between 1990 and 2011 with no sign of recovery.³⁵ As with birds, butterflies are important indicators of what is going on in the environment.

The European Environment Agency estimates that biodiversity loss reduces global GDP by 3% each year.³⁶ Globally food production accounts for 60-70% of total biodiversity loss.³⁷ The European Commission states that the livestock sector may be the leading player in the reduction of global biodiversity through its demand on land.³⁸ The contribution of livestock farming to the present global loss of biodiversity is estimated by a Dutch study to be around 30%.³⁹

EU Member States have identified agriculture (both intensification – including fertilisation and pesticides - and abandonment) as one of the main causes of wildlife loss and habitat degradation.⁴⁰

Adverse impact of EU food and farming in third countries

The costs associated with the negative externalities of the EU's industrial livestock sector are not contained within the EU but spread out causing considerable damage in third countries. The EU imports around 30 million tonnes of soymeal each year primarily to feed industrially raised animals. The imported amount corresponds to an area of more than 20 million hectares of cropland.⁴¹ Much of the imported soy is grown on land that has been converted into cropland by deforestation or clearing of savannahs. This entails massive biodiversity loss and releases huge amounts of stored carbon into the atmosphere, thereby contributing to climate change.

A study carried out for the Commission states that "EU imports are demanding large areas of fertile cropland in distant regions of the world and EU consumption patterns are contributing to deforestation and land use change elsewhere".⁴² In addition, the EU is a net virtual water importer; EU agricultural imports result in the EU having a large water footprint in third countries.^{43 44}

Climate change

The FAO estimates that the livestock sector is responsible for 14.5% of human-induced greenhouse gas (GHG) emissions.⁴⁵ The international community has agreed to limit the global temperature increase to well below 2°C compared with pre-industrial levels in order to avoid a dangerous level of climate change. However, studies suggest that 'business-as-usual' will lead to agriculture's GHG emissions being so high by 2050 that they alone will push global temperatures to increase by almost 2°C.^{46 47}

Human health externalities

The high levels of meat consumption that have been made possible in the western world by industrial farming are having an adverse impact on human health. EU citizens on average consume around 40% more saturated fat than the recommended maximum dietary intake proposed for Europe by the World Health Organisation (WHO) and almost 50% more red meat than the maximum level advised by the World Cancer Research Fund.⁴⁸ A range of studies show that overconsumption of animal products can lead to obesity, diabetes, heart diseases and certain cancers.^{49 50 51}

A report by the World Economic Forum and the Harvard School of Public Health states that 63% of all deaths worldwide currently stem from non-communicable diseases (NCDs) – chiefly cardiovascular diseases, cancers, chronic respiratory diseases and diabetes.⁵² The report stresses that “NCDs have a large impact, undercutting productivity and boosting healthcare outlays”. A key message from the report is that “NCDs already pose a substantial economic burden and this burden will evolve into a staggering one over the next two decades”. The WHO identifies four major risk factors for NCDs: unhealthy diet, physical inactivity, tobacco use and harmful alcohol use.⁵³

A study published in *The Lancet* concluded that a 30% decrease in intake of saturated fats from animal sources in the UK and São Paulo city could reduce the total burden from ischaemic heart disease by 16% and 17% respectively.⁵⁴ It may well be that the UK figure would be similar for the EU as a whole.

The total annual cost of all coronary heart disease related burdens in the UK in 2003 was €11.13 billion.⁵⁵ This figure includes costs to the UK health care system, informal care and productivity losses. As a 30% decrease in intake of saturated fats from animal sources could reduce the total burden from ischaemic heart disease by 15% in the UK, it would appear that such a decrease could save the UK economy around €1.67 billion per annum.

Antimicrobial resistance

The use and misuse of antimicrobials in human medicine is the main driver of antimicrobial resistance. However, the WHO has stressed that over-reliance on antimicrobials in intensive livestock farming is also a significant contributor to the emergence of antimicrobial-resistant bacteria that affect human health.⁵⁶ A Scientific Opinion by the European Food Safety Authority (EFSA) concludes that it is “of high priority to decrease the total antimicrobial use in animal production in the EU”.⁵⁷ The WHO states that worldwide approximately half of current antibiotic production is used in agriculture, to promote growth and prevent disease as well as to treat sick animals.⁵⁸

The link between intensive farming and high levels of antimicrobial use is highlighted by the fact that the Veterinary Medicines Directorate’s data show that around 90% of all UK farm antibiotic sales are for pigs and poultry, the two most intensively farmed species.⁵⁹

Each year 25,000 patients die in the EU from an infection caused by resistant micro organisms with extra healthcare costs and productivity losses of at least €1.5 billion per year.⁶⁰ A recent study commissioned by the UK Government shows that a continued rise in resistance by 2050 would lead to 10 million more people dying worldwide every year than would be the case if resistance was kept to today’s level and a reduction of 2-3.5% in Gross Domestic Product.⁶¹ The study estimates that between now and 2050 the world can expect to lose between 60 and 100 trillion USD worth of economic output if antimicrobial drug resistance is not tackled.

The U.S. Centers for Disease Control and Prevention estimates that at least 2 million people are infected with antibiotic-resistant bacteria every year in the U.S. with at least 23,000 people dying every year as a direct result of these infections.⁶² They state that more kilograms of antibiotics are sold in the U.S. for food-producing animals than for people.

Air pollution

Agriculture is a key source of three major air pollutants: ammonia, particulate matter and nitrous oxide. The UK Department for Food, Environment and Rural Affairs estimates that the cost of the damage caused by these three pollutants emanating from agriculture is £816 million per year.⁶³

Air pollution is a serious problem for human health as it contributes to conditions such as bronchitis, asthma, lung cancer and congestive heart failure. The related costs are considerable. A study has analysed the impact of Danish emission sectors on health-related costs arising from air pollution in Europe.⁶⁴ Emissions in Denmark cause health-related costs in Europe of €4.9 billion per year. The study found that agriculture is the main Danish sector contributing to health-related costs arising from air pollution in Europe; agriculture’s contribution (43%) outweighs those of road traffic (18%)

and major power plants (10%). A study for the US suggests that a 10% reduction in livestock ammonia emissions can lead to over \$4 billion annually in particulate-related health benefits.⁶⁵

A 2015 report by the French Senate concludes that the total cost of air pollution in France is between €68 and €97 billion per year.⁶⁶ This includes the medical costs of treating ill health resulting from air pollution such as certain cancers, asthma, bronchitis and cardiovascular problems. It also includes the costs of lost production as well as placing an economic value on loss of life and years of life spent in poor health. The study states that air pollution is mainly caused by four sectors: agriculture, transport, industry and residential. It does not provide an indication of the proportion of overall costs attributable to agriculture.

Foodborne disease

A U.S. study estimates the cost of foodborne illness in the U.S. is \$152 billion a year. This figure includes medical costs (hospital services, physician services and drugs) and quality-of-life losses (deaths, pain, suffering and functional disability).⁶⁷

A University of Florida study ranked the top 10 pathogen-food combinations and concluded that campylobacter in poultry was the most damaging in terms of both cost of illness and loss of Quality Adjusted Life Years (QALYs), a measure of health-related quality of life.⁶⁸ Salmonella in poultry was the fourth most damaging. The study found that contaminated poultry has the greatest public health impact among foods. It is responsible for over \$2.4 billion in estimated costs of illness annually and loss of 15,000 QALYs a year. Nearly all U.S. chickens are produced industrially.

A 2015 study by the U.S. Department of Agriculture estimates that foodborne illnesses impose over \$15.5 billion in economic burden annually in the U.S.⁶⁹

Campylobacter

The UK Food Standards Agency estimates that campylobacter costs the UK economy about £900 million a year. It says that about four in five cases of campylobacter poisoning in the UK come from contaminated poultry.⁷⁰

The European Food Safety Authority (EFSA) estimates that there are approximately nine million cases of human campylobacteriosis per year in the EU27. The disease burden of campylobacteriosis and its sequelae in the EU is 0.35 million disability adjusted life years per year and total annual costs are € 2.4 billion.⁷¹

There is no doubt that poultry is a major source of campylobacters.⁷² EFSA identifies poultry meat as a major source of campylobacteriosis and states that broiler meat may account for 20% to 30% of cases of human campylobacteriosis, while 50% to 80% may be attributed to the chicken reservoir as a whole (broilers as well as laying hens).⁷³ Around 90% of EU broilers are reared industrially.

Salmonella

EFSA states that over 100,000 human cases of salmonellosis are reported each year in the EU. EFSA has estimated that the overall economic burden of human salmonellosis could be as high as €3 billion a year.⁷⁴ EFSA points out that salmonella is most frequently found in eggs and raw meat from pigs, turkeys and chickens.⁷⁵ Most poultry and pig production in the EU is industrial.

An EU study of laying hen flocks detected salmonella in 30.8% of the laying hen holdings in the EU. It found that cage production was associated with a higher risk of positivity than for the other investigated laying hen production types.⁷⁶ A study of salmonella incidence in British laying hen flocks found that non-cage systems were associated with a reduced risk.⁷⁷

Animal welfare

Industrial livestock production generally results in low standards of animal welfare. A Dutch study seeks to quantify and value the adverse impact of pork production on pig welfare.⁷⁸ Based on willingness-to-pay research, the Dutch study suggests that the animal welfare related costs of producing 1kg of fresh pork are between €1.10 and €4.60 for conventionally produced pork and

between €0 and €3.50 for organic pork. Taking the lower of these figures for conventionally produced pork and assuming that at least 90% of EU pigs are farmed intensively, the animal welfare costs of the EU pig sector are €19 billion per year.

All the above costs are set out in the below Table:

Table: Costs of negative externalities

Negative externality	Estimated cost	Source
UK impacts attributable to farming: GHG emissions, water pollution, air pollution, habitat destruction, soil erosion and flooding	£700 million per year	Natural Capital Committee
EU: environmental damage related to Nitrogen effects from agriculture	€20–€150 billion per year	European Nitrogen Assessment
EU: soil degradation	€38 billion per year	European Commission
Global: soil loss	\$400 billion per year	FAO
UK: cleaning nitrates, pesticides etc from water	£271 million per year	O'Neill
US: eutrophication in freshwaters	\$2.2 billion per year	Dodds <i>et al</i>
Belgium, France, Netherlands, Sweden, Spain, UK: water pollution	€2.43–€4.75 billion per year	OECD
Global: biodiversity loss	Globally food production accounts for 60-70% of total biodiversity loss	PBL Netherlands Environmental Assessment Agency
Global: Climate change	\$100-\$250 billion per year	DARA & the Climate Vulnerable Forum
Global: non-communicable diseases (NCD)	Unhealthy diet one of four major risk factors for NCDs	WHO
UK: ischaemic heart disease	30% decrease in intake of saturated fats from animal sources could reduce the total burden from ischaemic heart disease by 15% in UK. This would save £1.67 billion per year	The Lancet
EU: ischaemic heart disease	€7.3 billion per year even if the savings are only 50% of those achieved in UK (see above row)	Author's calculation based on Lancet figure for UK
EU: antimicrobial resistance	€1.5 billion per year	European Commission
Global: loss of economic output due to antimicrobial resistance between now & 2050 on BAU basis	\$1710-\$2860 billion per year	Study commissioned by UK Government
Denmark: health related costs of air pollution	€2.1 billion per year	Brandt <i>et al</i>
France: total cost of air pollution	€27–€41 billion per year (on assumption that, as in Denmark, 43% of air pollution costs are attributable to agriculture)	French Senate
US: foodborne disease	\$15.5-\$152 billion per year	Scharff; USDA
EU: campylobacter	€2.4 billion per year	EFSA
EU: salmonella	€3 billion per year	EFSA
EU: animal welfare costs of intensive pig sector	€19 billion per year	Van Drunen <i>et al</i> & author's calculation

L'addition, s'il vous plaît

We of course pay for our food when we go shopping or eat out. But just as we are leaving there is a tap on the shoulder, a discreet cough and "I'm afraid you've forgotten part of the bill, the CAP surcharge".

EU taxpayers all contribute to the costs of the Common Agricultural Policy (CAP). Around €50 billion per year are spent on CAP subsidies. Much of this subsidises intensive farming.

And then again the tap on the shoulder "Who do you think is going to pay for cleaning up all the mess created by industrial agriculture – the environmental damage, the dietary ill-health?" And so we are presented with a third bill.

INVOICE

ITEM	COSTS IN EU
Damage due to excess nitrogen in the environment	€20-€150 billion per year
Soil degradation	€19 billion per year*
Water pollution in Belgium, France, Netherlands, Sweden, Spain, UK	€2.43-€4.75 billion per year
Heart disease	€7.3 billion per year
Antimicrobial resistance	€0.3 billion per year**
Air pollution in Denmark and France	€29.1 billion per year
Campylobacter and salmonella	€5.4 billion per year
Animal welfare costs of intensive pig sector	€19 animal welfare costs of intensive pig sector
TOTAL BILL FOR EU NEGATIVE EXTERNALITIES	€168.69 billion per year***

* We have assumed that 50% of EU soil degradation is due to agriculture; the figure could well be higher

** We have assumed that 20% of the healthcare costs and productivity losses arising from antimicrobial resistance are attributable to farm use of antimicrobials

*** In the two cases where there is a range of figures we have taken the mid-point in calculating the total

This total may involve an element of double counting as a proportion of the amounts for water and air pollution may be included in the overall figure in respect of excess nitrogen. Despite this, the figure of €168 billion costs per year incurred due to EU agriculture's negative externalities is almost certainly a substantial underestimate as, due to current uncertainty of the data, we have not included costs for the impact of agriculture and food on:

- Biodiversity loss
- Climate change
- Obesity, diabetes and certain cancers.

Moreover, it only considers the costs of poor animal welfare in the pig sector.

The need to internalise the negative externalities of livestock production

Our economic system is generally poorly equipped to take into account the impact of agriculture on factors that are not owned by anyone and for which there is no, or only a partial, market. These factors include for example clean air, animal welfare, climate stability, good dietary health and the need to leave sufficient and good quality water, soil and biodiversity for future generations. Such factors do not have to be paid for by farmers and consumers of food and so, in the absence of some form of intervention, are vulnerable to receiving insufficient attention.

An economic system that arbitrarily takes account of some of the costs of producing food while ignoring others is inefficient and produces undesirable results such as poor levels of dietary health, erosion of agriculture's core factors of production (soil, water, biodiversity) and low standards of

animal welfare. This capricious failure to take certain costs into account has produced a food system that makes unhealthy, environmentally damaging food cheaper than food that is nutritious and respects the environment and animal welfare.

The consequence of unhealthy food being cheaper in the West than healthy food is that poorer members of society find themselves having to rely on poor quality food. Olivier De Schutter, former UN Special Rapporteur on the right to food, stresses that “any society where a healthy diet is more expensive than an unhealthy diet is a society that must mend its price system.”⁷⁹

Mending our food price system

A wide range of measures can be used to internalise both positive and negative externalities. Legislation, fiscal measures, codes of practice and standards set by food businesses can all internalise external costs. Arguably the most direct way of doing so is through fiscal measures. Taxes can be used to internalise external costs and/or to encourage or discourage certain production or consumption decisions.

Subsidies can be used to incentivise positive externalities or assist those who wish to reduce negative externalities. In the EU a much greater proportion of the CAP budget should be devoted to supporting livestock farming that provides food of high nutritional quality produced to good environmental and animal welfare standards.

A study by the PBL Netherlands Environmental Assessment Agency concluded that the “persistent problems of sustainability in the livestock sector require a major change in production systems ... It would take an estimated 5% to 10% of the total CAP budget to support investments in improved animal housing systems and improved management practices in the coming budget periods.”⁸⁰

Payments for environmental services (PES) can be made to farmers or landowners who agree to take certain actions to manage their land or watersheds to provide an ecological service. Such payments can be a useful market-based mechanism for encouraging the conservation and restoration of natural resources.

Taxation measures

Environmental taxes are in operation in certain countries, for example, carbon/energy taxes, sulphur taxes, leaded and unleaded petrol tax differentials, landfill taxes, pesticide taxes and fertiliser taxes. Such measures are designed to internalise the external costs of certain activities.

Similar approaches could be taken in the field of livestock production. One approach to internalising the externalities of meat production – i.e. including them in the price of meat – is the introduction of a Pigouvian Tax equal to the cost of the negative externalities.ⁱ Such a tax would correct the market failure due to externalities. The Dutch study referred to earlier states that the average rate of the Pigouvian Tax should be at least €2.06 for 1kg of conventionally produced pork, which is 31% of the consumer price in the Netherlands at the time of the study.

The UN advocates the use of fiscal measures to promote healthy diets. The UN *Political Declaration on Non-Communicable Diseases* (NCDs) identifies unhealthy diets as a key risk factor for NCDs. It urges Governments to advance interventions to reduce the impact of unhealthy diets on NCDs through, *inter alia* “fiscal measures”. In his 2011 report on NCDs the UN Secretary-General identifies food subsidies and taxes as a cost-effective way of promoting healthy diets. Countries could, for example, place a tax on unhealthy foods and use the income generated to subsidise healthy foods.

Research shows that a tax on unhealthy foods, combined with the appropriate amount of subsidy on fruits and vegetables, could lead to significant health gains.⁸¹ A Danish study concluded that taxes on “unhealthy” and subsidies for “healthy” food products can improve public nutrition.⁸² U.S. research

ⁱ Wikipedia describes a Pigouvian tax as a tax levied on a market activity that generates negative externalities. The tax is intended to correct the market outcome. In the presence of negative externalities, the social cost of a market activity is not covered by the private cost of the activity. In such a case, the market outcome is not efficient and may lead to over-consumption of the product. A Pigouvian tax equal to the negative externality is thought to correct the market outcome back to efficiency.

found that small price differences at the point of purchase can be highly effective in shifting consumer demand from high calorie milk to healthier low calorie alternatives.⁸³ It reports that low income consumers who are at higher risk for obesity are particularly responsive.

Tax measures should be used not just to reflect the cost of negative externalities but to lower the costs of particular farming practices and certain foods. They should be used to make healthy food produced to high environmental and animal welfare standards economically attractive for both farmers and consumers. For example, tax measures can be used to promote high standards of animal welfare by reducing the cost for farmers of implementing higher welfare production. When calculating net profits for tax purposes, more generous capital allowances could be given to investments for high welfare farming. Governments already uses differential capital allowances to reward activities that they wish to encourage; for example, enhanced capital allowances are given in some countries for businesses that use environmentally beneficial technologies.

Similarly, a percentage of farmers' taxable income could be tax-free when they employ specified animal welfare or environmental practices such as rotations.

Fiscal instruments could be used to encourage consumers to purchase high welfare animal products. In countries which charge VAT on food, the price paid by consumers for high welfare products could be reduced by placing a lower or nil VAT rate on such food.

Studies show varying results as to how effective fiscal measures can be in influencing consumer behaviour. However, a new report by Chatham House and the Food Climate Research Network (FCRN) stresses that "lack of evidence should not be used as an excuse for policy inaction. Indeed policy inaction leads to a paucity of empirical evidence. Trials and experimentation particularly based on some of the more politically challenging fiscal and regulatory approaches discussed are essential. As noted, robust monitoring and evaluation processes need to be in place so that impacts in the short, medium and longer term can be understood. In this way the evidence base is built and policies progressively refined and improved."⁸⁴

Fiscal measures cannot on their own reshape our food system into one that delivers high quality food. They must be implemented in conjunction with other strategies and policies that aim to improve our food system including regulation, voluntary initiatives by food businesses, supportive public procurement and consumer information.

The report by Chatham House and FCRN stresses that while they have important roles to play, the restructuring of our food system cannot be left to "industry goodwill or enlightened self interest".⁸⁵ The report highlights the need for governments' non-interventionist approach to be replaced by a willingness to set a strong policy, regulatory and fiscal framework. It emphasises that governments must govern and must be prepared to step in and lead. It points out that "a supportive policy environment ... enables more voluntary approaches and agreements to actually deliver on their intended results".

Conclusions

Livestock production, in particular industrial production, produces a wide range of negative externalities. These include pollution and overuse of water, soil degradation, greenhouse gas emissions, biodiversity loss and increased levels of disease in humans. These negative externalities represent a market failure in that the costs associated with them are borne by third parties or society as a whole and are not included in the costs paid by farmers or the prices paid by consumers.

An economic system that arbitrarily takes account of some of the costs of producing food while ignoring others is inefficient and produces undesirable results such as poor levels of dietary health, erosion of agriculture's core factors of production (soil, water, biodiversity) and low standards of animal welfare.

A number of studies, including reports by the World Bank and the UN Food and Agriculture Organisation (FAO), have stressed the importance of internalising the negative externalities of

livestock production in order to avoid market distortions and provide incentives for their reduction. The Foresight Report warns that these market failures “if not corrected, will lead to irreversible environmental damage and long term threats to the viability of the food system”.

The FAO stresses that: “In many countries there is a worrying disconnect between the retail price of food and the true cost of its production. As a consequence, food produced at great environmental cost ...can appear to be cheaper than more sustainably produced alternatives.”

At present we pay for our food three times over:

1. As shoppers when we buy our food
2. In the EU, as taxpayers who fund the CAP. Around €50 billion per year is spent on CAP subsidies. The CAP should be reformed so that all its funds are used to support positive externalities i.e. as payments for environmental services and high standards of animal welfare for which there is no, or only a partial, market.
3. As taxpayers to make good the damage caused to natural resources and our health by industrial agriculture. Some of these detrimental impacts have been costed and are set out in Table 1 and the Invoice. A conservative estimate suggests that these costs amount to €168 billion per year. More efficient decisions would be made by policy makers, producers and consumers if these ‘hidden’ costs were internalised and so paid for by farmers when deciding on farming methods and by consumers when buying food. Society cannot make sound judgments about the proportion of animal products in our diets - and how these should be produced - if we do not take these wider costs into consideration.

A considerable amount of work has already been carried out to quantify and value the negative externalities; much, however, remains to be done.

Legislation, fiscal measures, codes of practice and standards set by food businesses can all internalise external costs. Taxation measures can be used to internalise the negative externalities of the production of meat and dairy products – i.e. including them in the price of the product. This could involve the introduction of a Pigouvian tax equal to the cost of the negative externalities.

Such a tax would discourage certain forms of food production and consumption. Crucially monies raised by such taxation should be used to incentivise positive externalities.

Tax measures should be used not just to reflect the cost of negative externalities but to lower the costs of particular farming practices and certain foods. They should be used to make healthy food produced to high environmental and animal welfare standards economically attractive for both farmers and consumers. For example, taxation measures could be used to reduce the cost of good animal welfare:

- to farmers e.g. by offering more generous capital allowances for investments in high welfare farming or by making a percentage of farmers’ income tax-free when they employ specified animal welfare practices
- to consumers by placing, in those countries that charge VAT on food, a lower or nil VAT rate on high welfare food.

The costs of making good the adverse impacts arising from industrial livestock production will in the years to come be massive. In some cases they may even not be capable of being made good, for example the loss of soil through erosion. It would in the medium and long term be much cheaper to move to sustainable forms of livestock and crop production than to have to meet the escalating costs of dealing with diet-related disease and repairing the damage to natural resources that arise from industrial agriculture. An analogy can be found in the Stern review on *The Economics of Climate Change* which concluded that “the benefits of strong, early action considerably outweigh the costs”.⁸⁶ Here too action now to halt the depredations of industrial agriculture will deliver huge savings for future taxpayers.

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