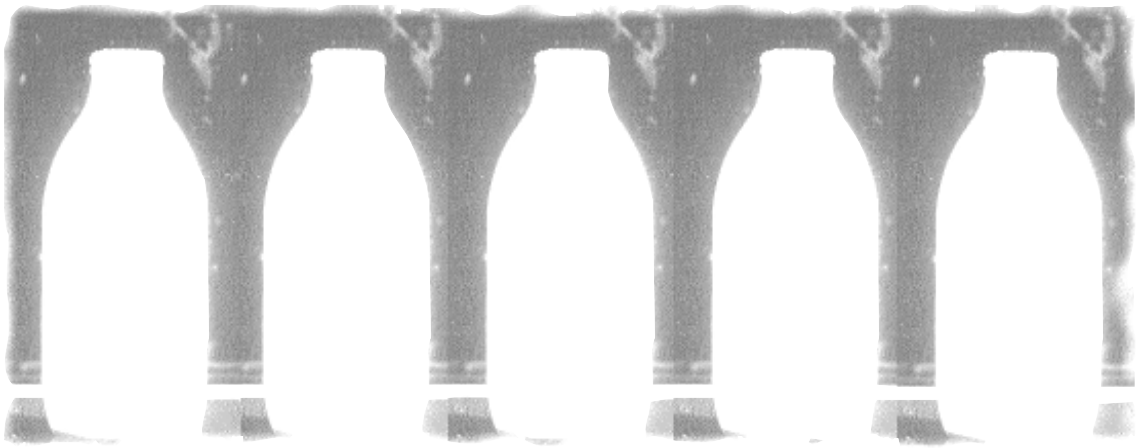
The perfect pinta?



A look at the environmental and social effects of dairy production.

Research: Rosemary Hoskins

Series editor: Tim Lobstein

Food Facts No 2

s.a.f.e alliance

Sustainable Agriculture, Food and Environment.

Public concern about the quality of the food we eat in the UK is demonstrated by increased fears of unsafe food — a recent poll[1] showed a majority now believe food safety is deteriorating — and a growing interest in healthier eating combined with rising sales for organically-produced foods.

There is also concern about the environment and farming practices, and how our food production methods may be contributing to problems such as transport pollution, global warming and loss of wildlife.

This report is one of a series intended to provide information about the negative and positive impacts of food production systems on our environment and society.

SAFE Alliance Food Facts are sign-posting documents, indicating the current scope of the issues and sources of further information. SAFE Alliance members and observer organisations are additional sources of such information and their contact details can be found inside the back cover.

This is the second report in the series, focusing on dairy farming. It has been produced with funding from the Government's Environmental Action Fund, the Esmée Fairbairn Charitable Trust, the Cobb Charity, the Cecil Pilkington Charitable Trust and the Chapman Charitable Trust.

The views expressed do not necessarily represent those of any member of the SAFE Alliance.

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Printing on recycled paper by KKS printing, London.

ISBN 1 89977945 0

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SAFE Food Facts No 2

The perfect pinta?

The great majority of British people — over 90 per cent of households — buy fresh milk on a regular basis. Yet there are increasing concerns over the way that milk is produced and its impact on the environment, on animal welfare and on our health.

In addition, many farmers are facing an unprecedented drop in incomes which may force many out of farming.

This document takes a look at these issues and at both the good and bad sides of milk production.

And it aims to answer the question: If I want to drink milk, what sort of milk should I choose?

At the turn of the century dairy farming was undertaken on a small scale, with mixed farms perhaps keeping only a few cows to produce milk, butter and cheese for the farm's own needs or for local markets.[2]

The invention of the milking machine (1895) began a trend towards more mechanisation and specialisation into dairy farming. In the following decades, improvements in refrigeration methods, mass pasteurisation of milk and the creation of the milk marketing boards greatly expanded the potential market.

The result has been a large increase in the amount of milk and dairy products produced, especially in the latter half of the twentieth century. Production and consumption have been boosted by the resources of the European Common Agricultural Policy, which has helped to increase the market for dairy products and to provide storage facilities for surplus milk and butter.[3]

Such support for milk production, combined with quotas to limit the total produced, have led to increasingly intensive production systems, and the economies of scale have led to larger herd sizes. Since the 1950s UK dairy farms have become larger in size and more specialised in production.

By 1997 the number of farms with dairy cows had declined to about a quarter of the number in the 1950s, but herd sizes had increased from an average of 18 head of cattle in the 1950s to 66 in 1997. Almost half of dairy cows are now in herds of 100 or more.

While the total number of dairy cows in the UK has decreased by over a fifth in the last twenty years, there has been an increase in average milk yield per cow from 3000 litres to 5810 litres per year.[4] Several methods have been used to achieve this. The simplest has been to replace older cows that are past their peak performance (see 'Animal welfare' on page 2) with younger, more productive cows.

A second method of raising yields has been to select high-yielding breeds and then breed for highest yielding strains. This has meant the replacement of more traditional Dairy Shorthorn and Ayrshire breeds with the larger black and white Friesian/Holstein.

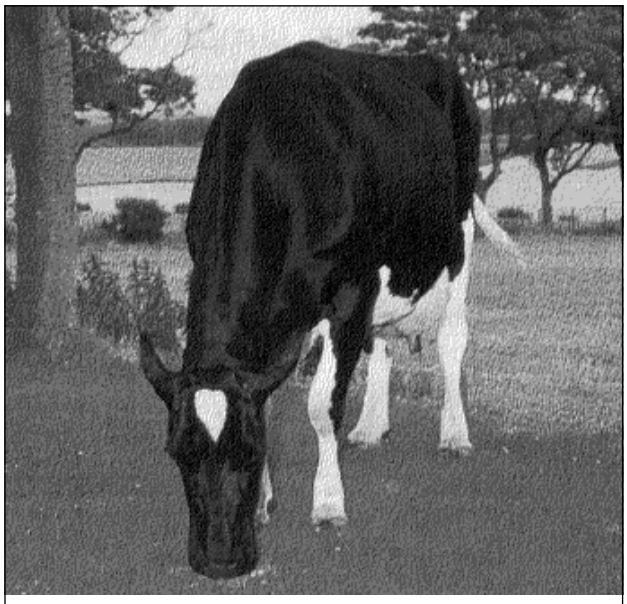
These larger, higher-yielding cows require more and higher quality grass, as well as supplementary feeds. In order to provide suitable grazing, pastures have been drained and re-seeded, fertilizer use

Fewer cows but more milk per cow

The size of the British national dairy herd has shrunk, but the amount produced by each cow has been boosted by selective breeding and altered feeding and management methods.

	Number of dairy cows (millions)	Average amount of milk per cow (litres per year)
1973	3.4	3920
1979	3.3	4590
1985	3.2	4840
1991	2.8	5140
1997	2.5	5810

Source: MAFF Annual Census (yearly).



A cow named Marissa is set to break all milk production records. So far, at nine years old she has produced over 100,000 litres of milk from just seven calvings, averaging 35 litres a day, day after day, since October 1990.[5]

Typically, cows produce some 5,000 - 7,000 litres per year, but another record-holder, Muranda Oscar Lucinda, has produced over 26,000 litres of milk in the first 300 days after calving.[6]

increased and silage (preserved fodder) produced from grass or from maize.

Other methods to raise productivity are used (see appendix, Table 10), such as increasing the number of cattle grazed per hectare, and feeding cows with feed supplements rich in energy and protein. These feed concentrates are made from various sources, including soya bean and soya cake (the meal left after the oil is extracted) along with wheat and barley feeds, milk powder, fish meal and until the late 1980s, meat and bone meal from cattle and sheep remains (see 'BSE' below).

Three milkings per day have also been tried, and so has manipulating the day length with extended lighting schemes. Milk yield can also be boosted by using a synthetic version of a cow's own growth hormone, Bovine Somatotropin (see below).

Animal welfare

Highly productive cows may be good news for some dairy farmers, but animal welfare experts believe that the cows can suffer considerable stress by being pushed to their production limits. They may show increased lameness from the extra weight they are carrying, and infections of their udder (mastitis).

The average milking life of a cow has steadily decreased and is now only three or four lactations. Compassion in World Farming estimates that only a quarter of all dairy cows live to more than seven years old while a quarter are culled before they are 39 months old.[7]

A study carried out on a sample of English dairy herds found that poor fertility accounted for 37 per cent of cullings, management policy (such as low yields) for 12 per cent , mastitis for 10 per cent , BSE for 7 per cent and lameness for 6 per cent.[8] The lifespan of the average dairy cow has decreased from more than twenty years to around six.

Farm employment and incomes

Increasing yields from dairy cows have not been entirely to the benefit of dairy farmers. While dairy farming has become a sophisticated industrial process, dairy farm incomes have tended to fall, putting further pressure on producers to cut their overhead costs and increase the amounts they produce. These trends are common to many forms of farming, but dairying has seen its share. Dairy farm net incomes were 27 per cent lower in 1996/7 than in 1988/9[9] and are still decreasing.[10] The loss of small and medium sized family farms can have serious consequences in the local community.

Lower incomes and increased mechanisation has meant layoffs of farm workers. Regular full time employment on all UK farms fell by over 30 per cent between 1986 and 1996[11] and dairy farms have been among them (see appendix, Table 9). The UK now has the lowest percentage of direct employment in farming in Europe.[12]

Support for milk production

Dairy farmers have had considerable support from the EU's Common Agricultural Policy (CAP). Its initial concerns were to ensure a secure food supply and in the 1950s and 1960s it financed schemes to support dairy farmers, which was extended to British farmers when the UK entered the EEC in 1973.

Common Agricultural Policy budget for supporting milk production

	Billions of ECU
1975	1.2
1980	4.8
1985	5.9
1990	6.0
1995	4.3
1997	3.6

Sources: NCC,[13] CEC,[14] and Agra Europe.[15]

This public support for milk production — the budget for milk support in the UK was over £200 million in 1997[16] — has helped dairy farming to attract bank loans and capital investment. Productivity has steadily risen over the last few decades, and Europe has been producing more milk than it could consume for several decades. By the early 1980s Europe was holding large stocks of surplus milk (in powder form) and butter.

The introduction of a quota system in 1984, allocating production volume limits to individual farmers, was intended to reduce milk production. Milk quotas were set for each farmer based on production levels in 1983-4 less nine per cent. They were designed to prevent the over-production of milk, but they had the ancillary effect of further intensifying the production process as farmers competed to minimise the cost of each litre they were allowed to produce. Quotas became a valuable, tradable commodity among farmers, increasing the entry costs to dairy farming and adding yet more to the cost of milk production. Small herd owners found they could not compete with the economies of scale enjoyed by larger farms,[17] nor easily afford the high-yielding cows being selectively bred by specialist dairy breeders.

European milk production still greatly exceeds the amount that people purchase. The quota system is of limited value in preventing over-production: a farmer will be penalised only if the national milk supply shows a general production level above the total quota allowed.[18] If the national supply does go over quota then farmers will have to pay a levy but by then the milk will have entered the food chain.

With their capital tied up in milk production, it is hard for dairy farmers to escape the cycle of further intensification. Such farmers (or their bank managers) would need a positive programme of support for re-investment to change to less intensive forms of

production, or to other types of agricultural activity. If they move to less intensive production, they need to know they will have a market for their milk.

Traditional cattle breeds

Pressure to raise productivity means that farmers drop local breeds in favour of those which maximise yield and respond well to intensive inputs, such as feed concentrates. Of 1520 breeds of farm animals (including horses, cattle, pigs, goats, sheep and poultry) at the start of the 20th century, 750 have been lost and a third of the remaining breeds are in danger of disappearing in the next decade.[19]

The changing pattern of cattle breeds has been well-documented in Spain. In just 30 years, Spain has seen a fall in the number of traditional breeds from 72 per cent of the national herd to just 19 per cent (see appendix, Table 13), while in the same period the Friesian cow increased its presence from 21 per cent to 70 per cent of the national herd. Spain has greatly increased its milk output, but at the expense of locally-adapted cattle varieties.

Milk and the agricultural costs

Intensive milk production depends on protein-rich feed and cereal substitutes as well as the maintenance of suitable grassland for pasture and silage.

Nearly half of all UK crop-growing land is devoted to the production of crops for animal feed.[20] For every field of wheat grown for human food, a larger field is grown for animal feed. Apart from arable crops, most of Britain's remaining farmland (excluding rough grazing and moorland) is used for pasture and fodder grasses (see appendix, Table 1), largely for dairying, sheep and beef rearing.[21]

Much of the area devoted to crops and a large proportion of the pasture land is routinely treated with nitrogen fertilizers and pesticide sprays. Thus animal production, including dairying, is responsible for a significant proportion of the environmental damage done by excessive agrochemical use.

It is estimated that for every acre farmed in the UK, two more are farmed overseas in order to meet the feed requirements of intensively farmed livestock, including dairy cattle. Imported feed (e.g. cassava, soya beans and soya cake) makes up about 30 per cent of all European animal feed.[22] An estimated 5.6 million acres in Brazil are devoted to soya bean production, as are around 1.2 million acres in Argentina, 560,000 acres in Paraguay, 190,000 acres in Canada and 8 million acres in the US.[23]

Soils in developing countries suffer nutrient depletion due to the intensive production of crops for export and huge areas of land are taken up growing feed for cattle in Europe rather than contributing to local food security.

Milk miles

The Food Miles Report[24] highlighted the contradictions in our food distribution system in which large quantities of animal feed, human food and food packaging are transported long distances causing pollution and creating other social and economic costs, such as road traffic accidents and the loss of countryside due to road construction.[25]

In the UK the share of freight moved by road increased from 89 per cent in 1970 to 95 per cent in 1994.[26] The distance that food travels within the UK has increased by over 50 per cent since 1978[27] partly because food retailers are moving to centralised distribution systems (see appendix, Table 7). To protect food during transit it may be refrigerated, preserved with fungicides or packaged. Long distance food transport can thus mean increasing levels of air pollutants and greenhouse gas emissions from transport, packaging, refrigeration and pesticide manufacture.

In terms of 'milk miles' the large quantities of animal feed brought many thousands of miles from around the globe (see previous section) contribute significantly to the total movement of animal feed which supplies the national dairy herd. Furthermore, this imported animal feed is allowed into the EU without incurring tariffs, which means that it displaces European grown wheat that is then exported with a subsidy, increasing the food miles further at the expense of the European taxpayer.[28]

Milk and other dairy products contribute to the distance travelled by our food supply. Annually, we consume milk and dairy products to a value of nearly £2 billion in the UK, much of which has been transported several hundred miles to reach a supermarket shelf.

Food miles — The strawberry yoghurt case study

A German study examining some of the environmental costs of producing a jar of strawberry yoghurt sold in Stuttgart in southern Germany[29] is a classic example of food miles. The milk for the yoghurt was produced locally and the glass jar was made in the region. However, the strawberries were imported from Poland and processed into jam in the west of Germany before being transported to the south.

Yoghurt cultures were transported from the north of Germany and sugar beet from the east. Corn and wheat flour came from the Netherlands and the labels and aluminium covers for the jars were manufactured over 300 km away with materials which had already come from elsewhere. To bring a truckload of jars of the strawberry yoghurt to the distribution centre in southern Germany a 'theoretical' truck travelled over a thousand kilometres, using 400 litres of diesel fuel, with the consequent environmental costs of pollution and greenhouse gas emissions.

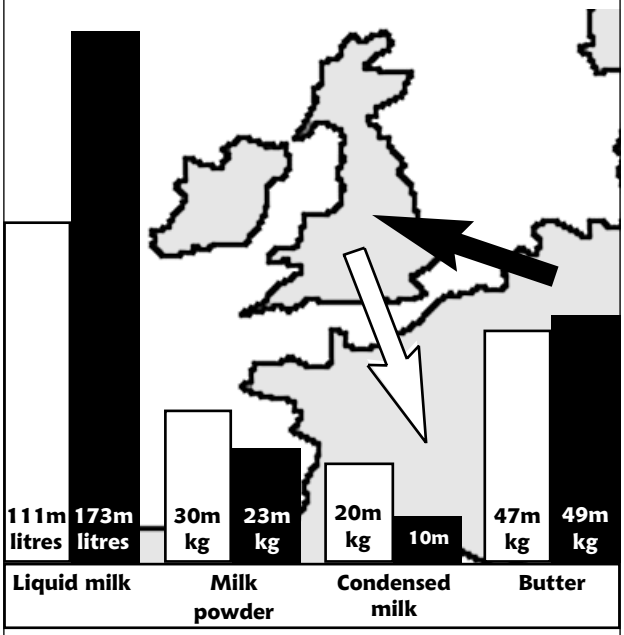
Further food miles could be added to take account of the processing equipment used to ferment and package the yoghurt, the creation of the milk tanker fleet and yoghurt trucks, the miles travelled by the shoppers to collect their yoghurt and by the workers involved in producing it.

International imports and exports of dairy produce add yet more food miles (see appendix, Tables 2, 6 and 7). For example, the UK produced 129,000 tonnes of butter in 1996, of which 47,000 tonnes were exported to EU countries.[30] At the same time, 49,000 tonnes of butter were imported from EU countries.

Similarly, the UK exported 12,000 tonnes of skimmed milk powder to EU countries, and 13,000 tonnes were imported from the EU.[31]

Unnecessary transport of milk products?

Large quantities of milk and butter are crossing the channel — in both directions! Assuming it all goes by the shortest cross-channel route, these foods account for more than 10 billion kilogram-miles just moving from one port to the other.



Source: 1996 figures from Agriculture in the United Kingdom 1997, ***MAFF 1998.***

Methane and carbon dioxide

There is now a scientific consensus that the emissions of gases from human industrial activities over the last two centuries is enhancing the Earth's greenhouse effect.

The production of milk and dairy foods play their part in this. In addition to the polluting effects of transporting milk and dairy products, cattle themselves add directly to the greenhouse effect because they produce methane. On average, each animal produces 48 kilograms of methane a year through fermentation in the stomach and gut. Cattle manure also emits greenhouse gases — six kilograms of methane per animal and 0.2 kilograms of nitrous oxide, a persistent greenhouse gas, are added to the environment every year.[32] The UK dairying herds produce a total of 240,000 tonnes of methane and nearly 900 tonnes of nitrous oxide each year.[33]

Dairy farming makes other indirect contributions to the greenhouse effect. Fossil fuels are burnt to generate the energy to produce the fertilizer that feeds the fodder crops on which many animals feed. Estimates for these embodied fossil fuel emissions are in the range of 25 per cent of the amounts emitted directly from fermentation in the gut and manure.[34] Cattle in total account for around five per cent of UK methane emissions.

The solution is not simply a matter of abandoning milk in favour of some other food product, as this, too may have consequences in terms of environmental pollution and greenhouse gases. The food supply as a whole needs to be carefully evaluated in this respect. The questions then needs to be put: What levels of emissions are sustainable and what sources of emissions — from food production and from other activities —should be given priority?

Slurry and silage

Large herds of cattle kept for long periods indoors can produce an environmental risk when the waste slurry is removed. Most agricultural water pollution incidents come from dairy or beef farms.[35]

In addition, silage, used as feed for large cattle herds, needs to be carefully managed, as silage effluent has a high biological oxygen demand and if it contaminates water courses it causes serious pollution. Silage effluent was the cause of over 200 water course pollution incidents in 1996.[36]

Agrochemical residues

Residues of the agrochemicals used in intensive farming practices may find their way into milk and milk products. In particular, the pesticides sprayed on animal fodder crops may accumulate in the animal and be expressed in the milk. A recent survey found

Residues of pesticides found in dairy products 1996-97

sample	found
376 samples of UK milk	45% contained lindane
36 samples of UK butter	42% contained lindane
36 samples imported butter	11% contained DDT (all from New Zealand)
137 samples UK cheese	43% contained lindane (a fifth of them above acceptable levels)

Source: MAFF[37]

nearly half of milk, butter and cheese samples contained traces of the pesticide lindane, a possible carcinogen, and one in nine imported butter samples contained the pesticide DDT (see table). Subsequent sampling has shown a rapid decline in the lindane levels found.

Organically certified herds must be fed largely on organically-produced feed — from grazing on organic pastures and from feed supplements. Organic cattle are not permitted to be given antibiotics on a routine basis, only on an individual basis for specified ill health.

BSE

Over eight million cattle are expected to be slaughtered and as much as £4 billion spent to try to prevent BSE (Bovine Spongiform Encephalitis) being transmitted to humans.[38]

BSE is largely a disease of older animals, the average age of onset being around five years,[39] and it is largely a problem in dairy rather than beef herds. In 1996 MAFF ordered all British cattle older than 30 months — mostly the older dairy cows — to be banned from the food chain.

The official enquiry into BSE is re-examining possible causes of BSE and its possible links with the human disease, new-variant Creuzfeldt-Jakob Disease (nvCJD), including the role of organophosphate pesticides.[40] The original cause for the BSE epidemic is likely to have been the practice of using the offal and carcass remains from abattoirs as a low-cost source of protein. The use of carcass material as a feed supplement for cattle has been practised for several decades but changes in the rendering processes and a build-up of infected material in the abattoir waste appear to have caused a rapid escalation in the incidence of BSE during the mid-1980s.[41]

The practice of putting meat and bone meal from abattoir waste into cattle feed was banned as part of the BSE control measures, although cattle blood products and processed poultry litter, feathers and carcasses, can still be used in cattle feed.[42]

Under the standards for organic certification, blood and poultry remains are not allowed to be fed to organically-farmed animals.

Unpasteurised dairy products

Pasteurisation is a heat treatment process invented in the laboratory of Louis Pasteur to improve the safety of milk and was introduced for the mass market in the 1920s. Milk is brought to a high temperature and held there for a short time, typically 15-30 seconds, in order to kill any harmful bacteria.

However, this heat treatment also kills the beneficial bacteria contained in unpasteurised milk which would otherwise offer protection against any pathogenic bacteria.[43] Despite this natural benefit of unpasteurised milk and the higher standards of hygiene required of dairies to produce it, unpasteurised milk (green top) is not permitted to be sold to the public in England and Wales except through direct sales from the farm to the final purchaser, and it is prohibited altogether in Scotland.

There are still around 500 government-registered producers of unpasteurised milk in England and Wales, nearly all of whom are small family farms producing fresh milk for nearby towns and villages. Green top milk is a good example of food with very low food miles, strong links between producers and consumers and minimal loss of nutrients due to processing or storage.

Cream and cheeses made from unpasteurised milk may be sold in the normal way. Most unpasteurised milk is used to produce unpasteurised cheeses, which include many of the best traditional cheeses.

The Association of Unpasteurised Milk Producers and Consumers reports that, as well as having better flavour and resistance to infection, unpasteurised whole milk contains higher levels of vitamins B1, B6, and B12 and vitamin C. They also report that pasteurisation impairs the ability to absorb folic acid, an important nutrient for a developing embryo.[44]

Artificial hormones to boost milk production

Bovine somatotropin (BST, also known as bovine growth hormone BGH and recombinant bovine growth hormone, rBGH) is a synthetic hormone produced by genetically modified bacteria, which mimics the cow's own growth hormones and is injected into dairy cows to increase milk production.

There are 21 animal health problems for which cows injected with BST have an increased risk, including mastitis (an infection of the udder) and lameness.[45] Reports by the American organisation Rural Vermont echoed the Federal Food and Drugs Administration's findings that cows injected with BST are 79 per cent more likely to suffer mastitis, and are more likely to give birth to dead and deformed calves.[46]

Concerns have been expressed about human health and BST, as milk produced using BST has a raised level of the hormone IGF-1. Although IGF-1 was thought to be broken down in the gut before being absorbed, there is evidence that the presence of casein in milk prevents this happening and allows IGF-1 to move into the blood stream. A raised level of blood IGF-1 in humans is associated with an increased risk of breast cancer for women and prostate cancer for men.[47]

Opposition from consumers, combined with over-production of milk in the EU, led the European Union to impose a temporary ban on the use of BST in Europe which runs until 31 December 1999. In the USA however, the Monsanto corporation is permitted to market its BST product Posilac®. While European farmers are banned from using BST, there is no ban on the import of American dairy products containing BST.[48]

At a time when quotas to limit the over-production of milk in the EU remain in force, a drug intended to increase milk production may appear unnecessary. But the pressures on farmers to increase their productivity

Genetically Modified Organisms (GMOs) used to make cheese

Cheese is made using enzymes which can come from a variety of sources. Traditionally rennet is used, which is extracted from the stomachs of slaughtered calves. Vegetable enzymes can also be used which are traditionally extracted from stinging nettles, butterwort or other plants. A mould, ***Muhor meihei,*** also produces a suitable enzyme. Chymosin is an enzyme which mimics rennet and is produced using a genetically engineered bacterial culture.

Cheese labelled as 'vegetarian' or 'suitable for vegetarians' may contain any of these enzymes except rennet.

An EU Directive has been passed on regulation for labelling of foods produced using GMOs but these will not require labelling if there is less than 3 per cent GM content, or if the food is 'substantially equivalent' to non GM food.[49] As genetically engineered chymosin is converted during the process of manufacture,[50] the cheese would not require labelling as a genetically modified food under these regulations. Nonetheless, the Co-operative supermarket chain has labelled their cheese as having been made with GM chymosin, and remain the only supermarket to do so.

Organic dairy produce available from major retailers

Organic chocolate ice cream

Green & Black's organic chocolate ice cream is produced from cocoa beans that are grown organically by family farmers in Togo, West Africa and Maya Indian families in Belize, and purchased on secure and non exploitative contracts from their democratically elected co-operatives.

The cream comes almost exclusively from John Jones, who farms a pedigree organic Friesian Holstein dairy herd in Herefordshire, near the Welsh borders. The hedgerows are allowed to flourish to provide more diverse nutrition, and many of the meadows are long established under organic management. Several of his neighbours are now converting to organic dairying, providing a growing supply of milk to his creamery, and greatly increasing the total area under organic cultivation.

The sugar is beet sugar produced by an organic co-operative in Slovakia that has been sponsored by the Good Food Foundation, a group of Western European organic traders.

The vanilla is grown organically in Reunion and processed there by the growers. It is then freeze-dried and milled ultra fine so that no solvents or extractive chemicals are required to produce it or to carry it.

Organic yoghurt and organic cheddar

Organic milk from the Organic Milk Suppliers Co-operative in Somerset is used to make Lye Cross organic cheddar cheese and Yeo Valley organic yoghurt.

Organic milk is produced by cows based outdoors on clover-rich grazing. Organic regulations require that the ration is 70-90 per cent organic and that at least 60 per cent of dry matter is from fresh or conserved forage.[51] Organic herds are not fed animal proteins and do not receive routine antibiotics.

Lye Cross Organic cheddar is made by traditional, labour-intensive farmhouse methods. The vegetarian rennet used in the process does not contain nor is it derived from genetically-modified organisms. The cheeses judged of high enough quality are stored for up to 15 months until they are mature. They are then cut, wrapped in phthalate-free plastic, and distributed at a price only about 15 per cent above that of non-organic cheeses of comparable standard. [52]

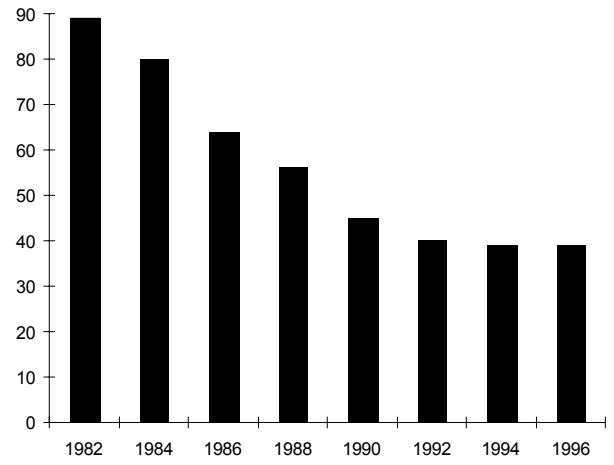
Yeo Valley organic yoghurt started in 1991 and are now the brand leaders in the organic yoghurt sector. The yoghurt is packaged in pots made from polythene coated card from 'sustainably managed' Scandinavian forests.[53] Yeo Valley organic yoghurt retails for the same price as an equivalent quality conventional product. The organic dairy product range has been extended to include fruit yoghurts, creme fraiche, cream and butter.[54]

by reducing their overheads and increasing their yields per cow, may provide BST with a market in Europe if it were permitted.

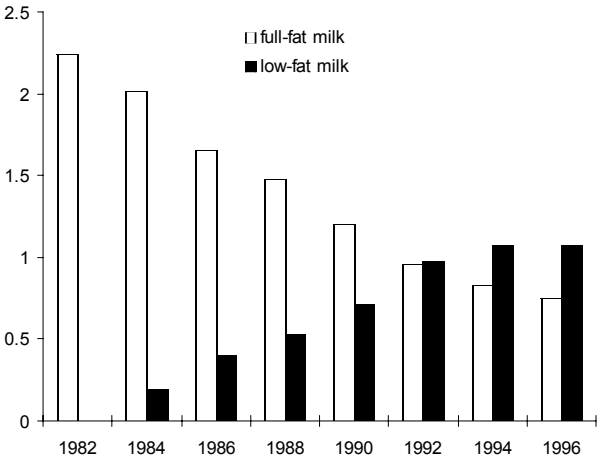
We are buying less butter and full-fat milk, but more low-fat milk.

Health concerns have led increasing numbers of people to change over to low-fat milk. Butter purchases have also fallen, due to health worries and high prices compared to margarine.

Average butter purchases. Grams per person per week



Average full-fat and low-fat milk purchases.
Litres per person per week



Source: MAFF National Food Surveys (annual)

Healthy eating and changing markets

Patterns of consumption in the UK have changed, with a marked reduction in the consumption of full-cream milk and butter. Skimmed milk, yoghurt, mozzarella cheese, fromage frais and other fresh dairy products have become more popular. Cheese consumption in general has remained stable, although low by European standards.[55]

The primary reason for the fall in consumption of full-fat and fat-rich dairy products is concern about fats, especially saturated fats, in our daily food. High levels of saturated fat in the diet are linked to increased risks of coronary heart disease and to a risk of colon and prostate cancer, and possibly cancers of the breast and rectum.[56]

Dairy products differ in their fat and saturated fat content (see appendix, Table 17) and lower fat products have attracted increasing sales (see appendix, Tables 12 and 16).

EU promotion of high-fat milk products

While consumers are being urged by European public health experts to reduce the dairy fat in their diet, and while some farmers are responding by trying to produce milk with a lower fat content, the European Union is, paradoxically, encouraging the consumption of full-fat dairy products through incentive schemes.[57] These include:

- subsidies for schools to buy full-fat milk, yoghurt and cheese but not low-fat versions;
- £1 per kilogram subsidy to school and hospital caterers if they use butter instead of vegetable oils;
- subsidies to bakers, ice cream and chocolate makers to use butter — a quarter of all EU butter goes into our food through this route;
- over £50 million pounds for advertisements and other promotional schemes to encourage purchases of butter and full-fat milk, but not low-fat milk.

Despite all these measures, we still have large stocks of surplus dairy food — 186 million kilograms of milk powder and 155 million kilograms of butter (a kilogram for virtually every household in the EU) were held in intervention stocks in 1997.[58]

'Cheap' food and the alternatives

In the last twenty years the prices of food products has fallen relative to the prices of other goods and services,[59] so that food is taking a smaller proportion of the household purse. In 1960 almost a third of average household expenditure was on food and non-alcoholic drinks: today this has reduced to less than a fifth of expenditure.[60]

We have become accustomed to relatively cheap products, but the price of food is misleading. There are many costs born by the community that are not reflected in the price of the product on the shop shelf. These costs include the environmental damage done

by intensive farming, the loss of wildlife and natural amenities, poor animal welfare standards, the pollution of water courses, damage to the ozone layer, the impact of road building and transport pollution, and the health implications of consuming the products.

Many shoppers, aware of these issues, have started to seek alternative products to eat. Retail sales of organic dairy products increased by 250 per cent over the period 1992 and 1996[61] Soil Association figures for the 1997 organic dairy market indicate a value of £18m, less than 1 per cent of the value of the total dairy market[62] but growing rapidly.

Of 23 million litres of organic milk sold, 85 per cent had been produced in the UK, indicating a growth of organic milk production in the UK of 40 per cent per annum.[63] Following the BSE crisis, increased demand was reported, with imports from the Netherlands to meet demand.[64]

Farmers and supermarket prices

Just six supermarket chains sell over 70 per cent of our groceries[65] and the amount they buy puts them in a strong position when negotiating contracts with milk producers. Supermarkets claim that they compete on cost and that their margins are small, but a recent comparison of the price of food across seven countries showed that the British supermarket shopper pays more for the same basket of goods than in other countries.[66]

In 1995 the SAFE Alliance called for the investigation of the role of the supermarkets by the Office of Fair Trading.[67] and this call was repeated by a House of Commons Select Committee in 1998.[68] The Select Committee noted that the proportion of the retail price which the farmer gets has fallen markedly since 1995, and they stated their concern that 'While no single retailer dominates the market, collectively the multiple retailers exercise considerable power over the whole livestock industry.' The SAFE Alliance were also concerned that supermarkets were using milk as a loss leader, underpricing it and threatening the livelihoods of doorstep milk delivery services (see below).

On 30 July 1998 the Office of Fair Trading announced an enquiry into the major supermarkets' buying power and in particular their profitability.[69] The preliminary investigations are expected to take until the end of 1998.

'Who is creaming off the difference?'

Farmers bitterly resent the power of dairy companies and supermarkets to set low prices for milk. One farmer noted in mid-1998 'Fifteen months ago I was getting 15 pence a pint. I now get 9 pence for a pint, but consumers are paying just as much as they did 15 months ago. The 6 pence difference is going where?'[70]

Doorstep deliveries - disappearing milk men

In 1972, ninety per cent of the total volume of milk sold was delivered to the household doorstep, with just eight per cent sold through shops and supermarkets. By 1997 the doorstep deliveries accounted for only 36 per cent of milk sold (see Table 14) and supermarkets sold about 49 per cent.[71]

Doorstep-delivered milk is a more energy-efficient and resource-efficient distribution system with bottles being returned an average of 12 times and capable of refilling up to 100 times.[72] Doorstep customers tend to be older and less wealthy than supermarket milk buyers, and frequently do not have access to a car.[73]

The milkman plays an important role in reducing milk food miles as well as providing a socially valuable service, but as supermarket prices fall in relation to doorstep prices, the number of customers for doorstep deliveries falls, and the overheads for each area increase, threatening the continued existence of the delivery service.

Conclusion

There are many hidden costs of food production not reflected in the purchase price. While the price paid for milk by consumers is often lower than the price paid for bottled water, there are a number of hidden costs which are not reflected in the checkout price:

- the loss of rural livelihoods through dairy farm intensification and amalgamation;
- intensive arable production using fertilizers and pesticides to produce animal feed, in the UK and overseas
- water course pollution from poor management of silage and cattle manure
- the routine use of antibiotics as a substitute for better animal management
- the long-distance transport of both animal feed and dairy products contributing to local air pollution and to related healthcare costs
- the production and transport (frequently international) of agrochemicals, animal feed and dairy products, contributing to increased global warming through carbon dioxide emissions
- increased road construction and road traffic accidents associated with food freight
- healthcare costs related to excess saturated fats in diets.

Positive choices are available. Small, local dairy producers do remain, and the expanding market for organic milk and dairy products (see case studies) shows that concern about food production and quality do inform a growing number of consumers' decisions.

It is clear is that farmers are getting very small profits from milk at present, and must either expand to reduce their overheads or move to other forms of production, such as extensive and organic farming. Financial aid may be needed to help dairy farmers to make these changes. Consumer — and retailer — support for the products of these more positive systems will be vital to the implementation of change on a significant scale.

Recommendations for consumers

- Support organic and extensive farmers in your neighbourhood. Where possible, buy direct from the producer and engage in dialogue about the systems used to produce your food. Contact the Soil Association and ask for their directory of farm shops and delivery schemes.
- Find out about local farmers' markets and farm shops. Phone your local authority's environment co-ordinator, or Agenda 21 co-ordinator, and ask if there is a farmers' market in your area. Consider getting involved in setting one up.
- Look out for organic milk and dairy suppliers. A directory of where to buy organic food is available from the Soil Association, and in Lynda Brown's book ***The Shopper's Guide to Organic Food*** (Fourth Estate Ltd, 1998).
- If you want to try unpasteurised milk you need to find a farm that sells it. Contact the Association of Unpasteurised Milk Producers and Consumers for their directory. Unpasteurised cheeses may be available from specialist cheese shops and delicatessens.
- With rich dairy foods, go for quality rather than quantity: try small quantities of high quality produce and enjoying 'real' whole foods such as regional cheeses and local organic produce.

Appendix: Food Facts

Table 1
What do we grow on UK farm land?

	Thousand hectares
Crops	4,989
Of which Wheat	***2,036***
Barley	***1,358***
Other cereals	***120***
Oilseed rape	***446***
Sugar beet	***196***
Fodder beans	***197***
Potatoes	***166***
Open field vegetables	***126***
Orchard fruit	***30***
Soft fruit	***11***
All other crops	***299***
Set aside	307
Grass under 5 years old	1,393
Traditional grass	5,241
Rough grazing	5,595
Total	17,525

Source: MAFF 1997

Table 2
Transport of liquid milk in and out of the UK
Millions of litres

	Exported	Imported
1995	185	181
1996	173	111
1997	270	126

Source: MAFF

Table 4
UK public expenditure under the CAP regime: the products that get the most support

	£million for 1997/98
Cereals	911
Beef and veal (BSE)	825
Beef and veal (non-BSE)	522
Sheep	288
Oilseed and linseed	240
Milk/milk products	211
Sugar	110
Set-aside	92

Source: MAFF 1997

Table 5
Food miles: Our food is travelling further and further

In two decades the amount of food being transported on UK roads has increased by less than 30 per cent, but the average distance travelled has increased by nearly 60%. By 1997 the total 'food miles' for UK food, drink and tobacco products amounted to 41 billion tonne-kilometres.

	Quantity (millions of tonnes)	Average (distance km)
1975	266	76
1980	257	94
1985	268	95
1990	299	110
1995	308	122
1997	342	119

Source: SAFE 1994, DETR 1998

Table 3. Food miles: Ship and rail are better than road or air

Road transport consumes more energy than rail, and is more polluting, yet in the UK rail takes barely six per cent of goods while roads take more than 80 per cent.

	Energy consumed kilojoules per tonne-kilometre	Emissions of Carbon dioxide grams per tonne-kilometre	Emissions of Hydrocarbons grams per tonne-kilometre	Emissions of Nitrogen oxides grams per tonne-kilometre	Emissions of Carbon monoxide grams per tonne-kilometre
Rail	677	41	0.06	0.2	0.05
Boat	423	30	0.04	0.4	0.12
Road	2,890	207	0.3	3.6	2.4
Air	15,839	1,206	2.0	5.5	1.4

Source: SAFE 1994

Appendix: Food Facts

Table 6
Transport of milk powder in and out of the UK
Millions of kilograms

	Total exported	Total exported to EU	Total imported (all from EU)
1995	133	67	22
1996	95	30	23
1997	153	28	23

Source: MAFF

Table 7
Transport of butter in and out of the UK
millions of kilograms

	Total exported	Of which, exported to EU	Total imported	Of which, EU imported from UK
1995	53	47	114	49
1996	51	47	114	49
1997	67	40	115	61

Source: MAFF

Table 8
UK dairy cattle population (June 1995)

At any given time, there are some 12 million cattle in the UK, of which around 40 per cent are primarily for dairy production and the remainder primarily for beef. Around 3 million cattle are slaughtered each year. Since 1996, very few cattle over thirty months old are entering the food chain.

	millions
Dairy cows in milk	2.26
Dairy cows in calf	0.90
Bulls for servicing	0.04
Other females over a year	0.79
Females under a year	0.50
Total	4.49

Source: MAFF

Table 9
Dairy farming has seen its share of falling employment

Total numbers of people employed in farming in areas where dairy farming predominates have fallen, though to a lesser degree than in agriculture generally.

1981=100	1981	1995
Dairy farming areas	100	90
All agricultural areas	100	82

Source: MAFF Agricultural Census 1981 and 1995 for counties in England

Table 10
Squeezing more from the dairy farm

A comparison between more and less productive farms found higher stocking density (cows per hectare) and more use of feed supplements, along with larger herd sizes, were linked to greater yields and hence greater profitability. Unprofitable farms were likely to go out of business.

	More productive farms	Less productive farms
Average herd size	139	119
Feed concentrates used (Kg/cow)	1863	1647
Stocking rate (cows/hectare)	2.24	1.93
Yield (litres/cow)	6697	5592
Net profit (pence/litre)	8.7	-0.3

Source: ENTEC 1997

Table 11
UK milk, butter and cheese production
Millions of litres/kilograms

	Milk	Butter	Cheese
1988	14,702	140	301
1989	14,492	130	284
1990	14,811	138	315
1991	14,336	112	302
1992	14,267	98	327
1993	14,317	141	333
1994	14,552	148	334
1995	14,257	133	358
1996	14,217	129	377
1997	14,400	136	385

Source: MAFF

Table 12
Our tastes have changed to lower-fat milk: UK milk consumption

	Pints per person per week	
	Full-fat milk	Low-fat milk
1982	3.95	-
1984	3.53	0.34
1996	2.91	0.7
1988	2.6	0.93
1990	2.12	1.25
1992	1.69	1.7
1994	1.47	1.88
1996	1.32	1.89

Source: MAFF National Food Surveys

Appendix: Food Facts

Table 13
Biodiversity: Spain has seen a dramatic fall in the proportion of cattle that are local varieties.

In just 30 years, Spain has seen a fall in the number of traditional breeds from 72 per cent of the national herd to just 19 per cent increasing its beef (and milk) production at the expense of better-adapted local varieties.

	Thousands of cattle	
	1955	1986
Traditional		
Rubia Gallega	311	189
Asturiana	62	37
Retinta	39	137
Other native breeds	730	10
Total	***1142***	***373***
Non-traditional		
Friesian	338	1374
Swiss Brown	104	194
Charollais	0	22
Total	***442***	***1590***

Source: J Pretty[74]

Table 14
The vanishing milkman

Fewer and fewer pints of milk are being delivered, while increasing amounts are bought in the shops.

Millions of pints

	Doorstep deliveries	Shop purchases
1990	5900	2600
1992	5300	3200
1994	4400	4000
1996	3000	4900

Source: Euro PA Ltd

Table 16
We are buying less butter and more low-fat spreads

	Ounces per person per week		
	Butter	Margarine	Low-fat spreads
1982	3.17	4.33	—
1984	2.87	4.08	0.43
1996	2.27	4.1	1.08
1988	2.00	3.79	1.35
1990	1.61	3.19	1.58
1992	1.44	2.80	1.80
1994	1.38	1.52	2.61
1996	1.02	1.31	2.79

Source: MAFF National Food Surveys

Table 17
Nutrition: for some dairy products most of the calories in the food are from fat.

	Proportion of calories from fat	Proportion of calories from saturated fat
Whole milk	53%	33%
Semi-skimmed milk	31%	14%
Skimmed milk	3%	3%
Butter	99%	66%
Cheddar cheese	75%	47%
Cream cheese	97%	61%
Low-fat yoghurt	13%	8%
Greek-style yoghurt	71%	41%

Source: The Composition of Foods MAFF 1991

Table 15. Nutrition: dairy products can be rich sources of some nutrients

Per 100 millilitres/100 grams

	Protein grams	Calcium mg	Vitamin A ug	Vitamin B2 mg	Vitamin D ug
Whole milk	3.2	115	52	0.17	.03
Semi-skimmed milk	3.3	120	21	0.18	0.01
Skimmed milk	3.3	120	1	0.17	—
Butter	0.5	15	815	0.02	0.76
Cheddar cheese	25.5	720	325	0.40	0.26
Low-fat yoghurt	5.1	190	8	0.25	0.01
Young adult's daily needs	45-55	700	600-700	1.1-1.3	10

Source: The Composition of Foods MAFF 1991

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The Sustainable Agriculture, Food and Environment Alliance exists to unite farmer, environmental, consumer, animal welfare and development organisations. We seek forms of food production which are beneficial to the environment, sensitive to the need for global equity, and which produce safe and healthy food in a manner supportive of rural life and culture.

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Food Facts No 2

The perfect pinta?

A SAFE ALLIANCE PUBLICATION 1998

ISBN 1 89977945 0

Price £4.00

Sustainable Agriculture, Food and Environment Alliance
94 White Lion Street, London, N1 9PF
Tel: 0171 837 1228 Fax: 0171 837 1141
email: safe@gn.apc.org

Printed on recycled paper by KKS Printing, London

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