The pear essentials

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

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Series editor: Tim Lobstein

Food Facts No 3

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 and distribution systems 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 methods on our environment and society.

SAFE 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.

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

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Pears are a neglected fruit. We rarely see more than three or four varieties offered in our greengrocers and supermarkets, yet many more exist. And sales are rising - we bought over 120,000 tonnes of pears in 1997, up 50 per cent in a little over a decade.

We could be eating more - and health experts tell us we should - but not all is right in the production of pears. Use of pesticides is widespread, a loss of pear orchards is reducing biodiversity, and increased long-distance transport is damaging the environment.

This document takes a look at those issues and at both the good and bad sides of pear production. We look at the loss of traditional production methods and the use of agrochemicals, and the need to find more sustainable ways of producing pears. We then examine the value of fruit in a healthy diet and how we can do more to ensure the supermarkets provide us with what we really need. And we ask the question: If we want to eat pears, which should we choose?

Pears - cited in Homer's ***Odyssey*** as being one of 'the gifts of the gods' - have been cultivated for over 3000 years. There is evidence that they were brought to Britain before the Romans and records of their cultivation can be traced back to the 12th century. By 1640 there were 64 varieties known to be grown in Britain, including the Warden pear, famous for home-made pies. The Warden pie is mentioned in Shakespeare's ***A Winter's Tale***. Pear fruit have played a significant role in rural economies, with the Black Worcester pear, a large, deep russet, cooking variety, featuring on the coat of arms of the City of Worcester.

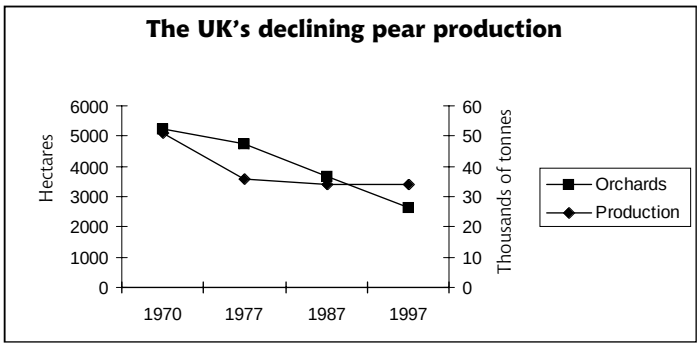
But producing pears means more than producing fruit. In common with other orchard crops, pears and pear growing can make an important contribution to the support of wildlife. Traditional orchards support a wide variety of species (see below). However, many such orchards have been lost in the last few decades, and those that remain may be closely planted with single varieties, and treated with agrochemicals that reduce the diversity of wildlife.

The UK is committed to protecting and enhancing the variety of living things through the international Convention on Biological Diversity. Biological diversity or biodiversity refers to genetic variation within and between species and includes variation in domesticated species such as pears.[2]

Sadly, not only have huge areas of orchards been lost - the area devoted to pear orchards in the UK has virtually halved in 30 years - but among those orchards that remain there are fewer varieties of fruit tree.

Loss of pear orchards and varieties

Forty-eight per cent of UK pear orchards have been lost since 1970,[3] and in some cases EU grants have paid for the orchards to be grubbed up.[4] The area of orchards has plunged more dramatically than the quantity of fruit grown,[5] indicating that the loss of orchards has meant more intensive production[6] - at the expense of wildlife.[7] The move towards more intensive production has been accompanied by concentration on fewer varieties. (see Appendix table 2.)



The loss of pear varieties both reduces the value of orchards as diverse wildlife habitats and also increases vulnerability of the crop to risks such as late frosts or pests. Today three varieties account for 94 per cent of the UK's area of eating pear orchards.[8] The most dominant UK variety, Conference, accounts for 73 per cent of the orchards (see Appendix table 2).

Orchards as wildlife habitats

As traditional orchards have rarely had any artificial inputs such as pesticides, herbicides or fertilizers, they can be an ideal habitat for wild flowers such as common, spotted and early purple orchids, cowslips, primroses, hay rattle and ragged robin. Mistletoe and lichens grow on old trees. Wild bees, butterflies and other insects, hares and birds - feeding on the insects and the fruit - all use orchards as a habitat, as may hedgehogs, foxes and badgers.[9]

A study by the Government's Central Science Laboratory of orchards in Herefordshire found that traditional orchards are significantly better habitats for wild birds than modern intensively managed orchards.[10] Traditional orchards are smaller, have older, larger, widely spaced trees and livestock graze below the trees. The modern orchards are larger with smaller, younger and more densely planted bush trees which have bare strips below them and they are mown. The traditional orchards receive few or no applications of pesticides while the modern orchards use herbicide below the trees and receive relatively frequent applications of pesticides.

The study recorded over twice as many birds in traditional orchards than in modern orchards. The species in traditional orchards were also more diverse. Among the ten most numerous species in the traditional orchards was the tree sparrow, the species which has declined most notably in arable farmland habitats. It was almost absent from modern orchards. Other common species in traditional orchards were the blue tit, chaffinch, blackbird, woodpigeon, robin, great tit, greenfinch and magpie.

The study also found that hedgerows surrounding even the intensively managed orchards could be a habitat for birds, and that the less trimmed and managed the hedges, the higher the number of birds.

Preserving old orchards

Countryside Stewardship grants are available from MAFF to help with the costs of maintaining the environmental benefits of traditional orchards.

Grants apply to old orchards of widely spaced standard trees of traditional varieties. Old trees can be restored by pruning and surgery, and appropriate local varieties planted. Management of orchard pasture to benefit wild flowers is also important and proposals should address associated features such as hedgerows or ponds.[11]

Although this grant scheme is helpful to farmers who wish to ensure environmental benefits from their work, not enough funding is available to meet the demand. During the last three years more than 3000 applications have been turned down.[12] An additional £20 million would be required to fund these projects.

Pesticides in our pears?

Pesticides and the environment

One of the methods used by orchard owners to increase the yield of pears is to apply a range of agricultural chemicals designed to prevent fungal attack (fungicides), to reduce weed growth (herbicides) and to destroy insects and mites which could damage the tree or the fruit (insecticides and acaricides). Crops may also be sprayed with growth regulators to encourage uniform ripening. There are serious concerns about the amount of these chemicals being used in commercial fruit production, especially as the direct and indirect effects of their use are not always easy to determine.

While traditionally managed orchards receive few or no pesticide applications, modern orchards receive relatively frequent applications.[13] Because of the lack of orchards falling in between these two extremes, the Central Science Laboratory study of Herefordshire orchards was unable to determine whether pesticide use alone affected bird numbers, although it did conclude that any effects would be due to indirect (through reducing the birds' food supply) rather than any direct toxicity of the pesticides.

The monoculture nature of many orchards - being devoted to a single variety of a single fruit - may put such orchards at risk from pests which can easily spread from tree to tree.

A government survey of pesticide usage in 1996 found that the average eating pear was sprayed over 13 times, with sprays containing 24 active substances (including repeat applications of the same substance).[15]

High as it is, this application of chemicals is lower than for eating apples (see Food Facts no 4) as pears tend to be hardier than apples. The level of agrochemical application to pears is, though, greater than for other orchard crops such as plums, cherries and nuts.

The modern pear tree's diet

Proportion of orchards treated with...	Eating pears	Pears for making perry
fungicides	99%	61%
insecticides	89%	60%
acaricides	49%	19%
herbicides	91%	47%
growth promoters	14%	3%
no sprays	1%	30%

Source: Central Science Laboratory 1998 [14]

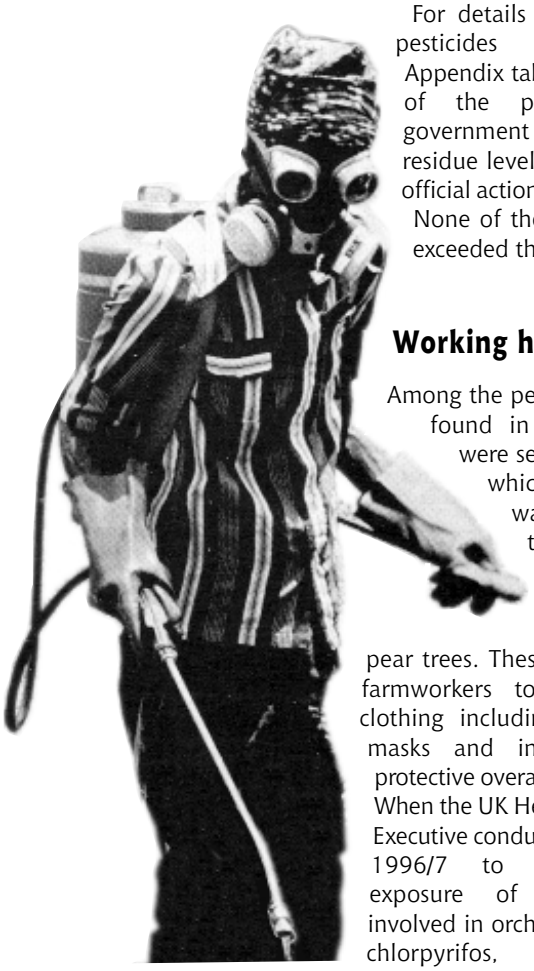
Pesticides and the health of consumers and workers

As well as affecting ecosystems, the use of pesticides has implications both for agricultural workers applying the chemicals to crops and for consumers eating fruit which may have chemical residues on it.

Government health advice is to wash fruit before eating it, because of pesticide residues, and that it is sensible to peel fruit for children.[16] The latest government figures[17] on pesticide residues found in pears show that 23 different pesticides were detected. Comparing UK-produced and overseas-produced fruit, similar proportions were found to contain traces of agrochemicals: 21 out of 27 samples of UK pears, and 23 out of 27 samples of imported pears had residues of pesticides (each sample consisted of ten pears, blended together).

The residues from 8 different agrochemical sprays were found in UK pears and the residues of 14 sprays found in imported pears. The commonest residues was the fungicide carbendazim, found in 56% of UK pears, and the growth regulator chlormequat, found in 30% of UK pears and 48% of imported pears. Chloremquat should not be present in UK crops as it only has a licence in this country for use on cereal crops. Following the finding of 33% of pears having chloremquat residues in 1995, the government asked pear producers to change their practices, but the latest figures imply that this had not happened.

For details of the various pesticides found, see Appendix table 3. For some of the pesticides, the government sets maximum residue levels, above which official action must be taken. None of the pear samples exceeded these levels.



Working hazards

Among the pesticide residues found in pear samples were several chemicals which carry warnings about their handling and use when being sprayed onto pear trees. These warnings tell farmworkers to wear safety clothing including gloves and masks and in some cases protective overalls and helmets. When the UK Health and Safety Executive conducted a survey in 1996/7 to measure the exposure of UK workers involved in orchard spraying to chlorpyrifos, an organo-phosphate pesticide used in pear orchards they found compliance with the safety regulations for protective clothing was poor.[18]

Workers in developing countries are also at risk from applying pesticides to fruit crops destined for the UK market. In Chile, for example, the World Health Organisation found that between 10 and 30 per cent of farmworkers showed signs of exposure to organophosphates, and there are suspicions that this may be linked to the rising number of birth defects, cancer and other disease among agricultural workers and their children.[19]

Imports of pears & food miles

Pears make up 5.6 per cent of the UK fruit market and in 1996 we spent £135m on them.[20] As our fruit consumption is generally increasing[21] (see Appendix table 6), we could be seeing greater production of pears - perhaps combined with an emphasis on reduced use of agrochemicals in their production - to meet the demand for healthier produce. Yet, despite the UK being a suitable growing region for many pear varieties, pears from abroad make up an increasing proportion of those sold in the UK.

Four out of every five of the pears we eat come from abroad.[22] While 34,000 tonnes of pears were grown in the UK in 1997, pear imports were 105,000 tonnes (72,000 from other EU countries, and 33,000 from the rest of the world). In the same year we exported 7,000 tonnes, all to other European countries.[23] (See Appendix table 6.)

The main source of the pears imported from other EU countries is the Netherlands, which in 1996 accounted for over 40 per cent of all imports from the EU by value, followed by France with nearly 20 per cent by value.[24] The other major source of pears was South Africa, responsible for nearly three-quarters of the UK's non-EU imports by value.[25] Pears coming from South Africa have to travel 10,000 kilometres to reach us.

Importing pears which we can grow ourselves in the UK has obvious environmental impacts due to transport pollution (see ***Food miles*** and ***The greenhouse effect*** in the Appendix), but there are other implications, both for the quality of the food we eat and for the environment.

In order to preserve pears during storage and long-distance transport they are routinely treated with post-harvest chemicals and waxed to prevent wrinkling, improving their appearance and extending their shelf life. The waxes used include shellac (the secretion of the Lac beetle) and petroleum-based waxes.[26] Waxed fruit does not have to be labelled as such in the UK, although it does in the US.[27]

Post-harvest treatment chemicals, unlike those which may be used while the pears are being grown, are intended to stay on the fruit. In the UK an estimated 81 per cent of pears are stored.[28] Seventy per cent of pears are treated with a chemical dip or drench before storage.[29] As fruit sold in the UK does not have to be labelled as treated, the only way to

avoid such fruit is to buy organically-produced pears, or pears specifically labelled as not having been subject to post-harvest treatment.

Pears are also kept in controlled atmosphere storage with reduced oxygen to extend the time for which they can be stored. Controlled atmosphere, generally used together with refrigeration, allows fruit to be stored longer, to be picked at a more advanced stage of ripeness and to undergo a longer transport period. In combination with faster transport, this technology has allowed countries in the southern hemisphere to expand their markets in Europe.[30]

In addition, pre-maturation makes it possible to advance the marketing of the earliest southern hemisphere pear varieties in order to avoid competing with home-grown pears in season. This technique consists of spaying ethylene on the fruit which causes the ethylene contained in the pears to be rejected, accelerating ripening. However, this can negatively affect the quality of the fruit, causing it to become soft or floury for example.[31]

A major aspect of the long-distance transport of food is that it can lead to further specialisation and intensification of food production. Varieties that can be picked hard and ripened in storage are preferred. Specialisation increases the risk for producers because, if a crop fails, most or all of that year's income source may have gone. The risk of losing the crop to a spell of bad weather or to pests increases with the production of only one or a few varieties. In turn this may lead to increased use of pesticides to protect the crop, with the environmental and health risks that this can involve (see Pesticides in our pears, above). For overseas workers there may be additional vulnerability due to price fluctuations for their produce.

Finally, long-distance food transport breaks the link between consumer and producer. Unless they choose a Fair Trade product, consumers have little assurance that the people producing the fruit have acceptable working conditions. Fair Trade products and schemes promoting direct purchase from the producer are designed to overcome these problems. As yet no fair trade schemes exist for pears.

Pears and good health

General health guidance to avoid saturated fat and to increase consumption of fruit and vegetables has been given by COMA, the UK government advisory committee on nutrition policy, and similar recommendations have been accepted by other EU member states.[32,33]

UK consumers eat less fruit and vegetables than in most European Union countries, with an average consumption of 2.5 portions per day (half of the recommended amount).[34] There is therefore considerable scope to encourage greater consumption of fruit, including pears, and the Department of Health and many voluntary organisations are encouraging this.[35]

One of the problems with growing a limited range of varieties, in large orchards in just a few regions, is that the fruit tend to be ready for market all at once. Instead of a gradual supply, there are large peaks and troughs of production. This can lead to marketing problems, with fruit being left unsold, or prices falling so low that the fruit are not worth harvesting. Pear harvests show such fluctuations, and a scheme organised under the European Common Agriculture Policy allows pear-growers to remove fruit from the market when they see prices falling too low, and to be compensated for lost sales.

But what happens to this unsold fruit? Under the CAP scheme, the fruit can be offered free to schools and other charities. In reality this has not been happening. In both 1996 and 1997 the excess fruit withdrawn from the market were left to rot or fed to animals.[36]

Pears taken off the market
kilograms

	taken off the market	given to schools, charities etc	dumped or fed to pigs
1996	2,022,000	none	all
1997	2,260,000	none	all

Source: UK Intervention Board 1997, 1998[37]

Despite the UK population eating barely half the recommended amounts of fruit and vegetables, and despite encouragement to eat more fruit, fruit is destroyed rather than marketed.

In 1998 the UK government issued leaflets giving more information for schools and charities on how they can acquire the withdrawn fruit. The scheme is not user-friendly - as it requires recipients to take at least 750 kilograms at three days notice - and it therefore remains to be seen whether it can become a genuine means for encouraging children to eat more fruit.

Storage to extend the season

Some pear varieties were traditionally grown for their ability to store well. Nowadays much research effort goes into discovering how best to store large tonnages of fruit, given that they do not freeze well and their low value makes expensive storage methods unfeasible. Storage conditions vary for different varieties and different storage temperatures. The use of controlled atmospheres with different gas mixtures is being investigated.

Research by the Japanese multinational Mitsubishi has found that storing pears in low temperatures with 90% humidity, in dilute ozone charged with negative ions can extend the life of pears from a typical two weeks to around five months. 'Fruit will now become

available regardless of season,' claimed a company spokesperson.[38] No indication was given of the loss of nutrients such as vitamin C during such long storage times.

Increasing storage extends the marketing season

Average length of pear storage

1975	1 to 4 months
1983	1 to 8 months
1992	1 to 9 months

Source: Export Fruit Boom from the South: A Threat for the North? OECD, 1996

The pears we rarely see

There are over 550 varieties of eating and cooking pears in the National Fruit Collection at Brogdale, Kent. The names of these fruit evoke local histories and diversities, both of the original fruit trees trees and of the communities and cultures that gave rise to them. Before the globalisation of our food economy, many of these varieties would have had particular culinary, local and seasonal uses.

Pears in the shops

An increasing proportion of shoppers (63 per cent in 1997) buy their fruit and vegetables from supermarkets. Most of the supermarkets' gain has been at the expense of greengrocers.[40]

Sales of fresh produce by the major multiple retailers have increased to around 76 per cent of the market (from 63 per cent in 1994), while that of independent greengrocers has declined from 25 to 15 per cent in the same period. Sunday trading and the advent of 24 hour-opening by some Sainsbury and Tesco stores have also adversely affected smaller traders.

As places where most people now buy their food, the major supermarkets have an important role in determining the food production systems that shape our environment. The large scale and centralisation of their operations, however, do not naturally lend themselves to providing a choice of local and seasonal pears.

Smaller-scale growers offering less common pear varieties may only be able to supply a few outlets for a limited period, which demands more effort from the retailers in sourcing different lines through the year. Commercial fruit growers are finding it difficult to continue producing unusual varieties as the traditional wholesale markets are collapsing due to the loss of the high street greengrocers. As a result, the wholesalers are also now only buying in bulk, in order to minimise their costs.

In response, some growers have started to form marketing co-operatives, in order to be able to offer fruit to buyers in sufficient quantities. But unless

Examples of pear names and origins

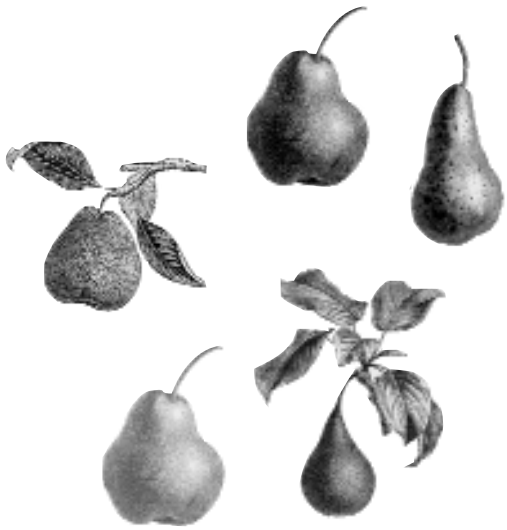
Taken from A Handbook of Hardy Fruits more commonly grown in Great Britain, Part I Apples and Pears by Edward A. Bunyard, 1920.[39]

Vicar Of Winkfield
A very large culinary variety. The skin is smooth; colour grass green fading to pale yellow. The flesh is pale yellow, rather firm, dry and woolly. It was discovered in a wood near Villers-en-Brenne, France, about 1760 by the Curé of the parish. It was introduced to England by the Rev. W. L. Rham of Winkfield, Berkshire, to which circumstance it owes its English name.

Swan's Egg
A small dessert pear. The skin is rough; colour greenish yellow almost covered with thick born russet, occasionally with a dull brown flush. The flesh is white, rather firm, fairly juicy and a little musky. It was first described by Batty Langley in 1729.

Hacon's Incomparable. (Downham Seedling.)
A medium sized dessert pear. The skin is nearly smooth and colour palest yellow with flecks and dots of russet. The flesh is palest yellow, melting and deliciously flavoured. One account attributes it to Mr Hacon, of Downham Market, Norfolk, as a seedling raised in 1815. Another says it was raised in 1792 by Mrs Raynor of the same town.

British Queen
A large dessert pear. The skin is covered with very smooth russet and the colour is pale brownish yellow with occasional slight flush. The flesh is pale yellow, very fine texture; flavour sweet and brisk. It was raised by M. Ingram of the Royal Gardens, Windsor and naturally considered by the Prince Consort to be the best of all pears.



consumer demand for traditional varieties of British pears is strengthened, the major supermarkets will continue to keep their costs down by buying huge amounts of one variety, from the cheapest sources wherever they are.

Supermarkets offering the perfect pear?

Supermarket buyers exercise considerable power as they choose which fruit will be available for their shoppers to buy. Appearance and size have been ranked by the supermarkets as of greatest importance to most shoppers, and they apply stricter standards than European Union classification systems.[41] As a result small or visually imperfect fruit are excluded from the major stores. They are sold at low prices for juice or animal feed instead[42] or even destroyed.

OFT enquiry

The SAFE Alliance highlighted the problems to be found when supermarkets dominate our food supply in a report in 1996.[43] Following concerns about the level of profits made by supermarkets while farmers' incomes were falling, in July 1998 the Office of Fair Trading announced an investigation into power that the major supermarket groups are able to exercise. Preliminary investigations were expected to take until the end of 1998.

The future is not pear shaped

The organic option

Organic farming systems avoid artificial fertilizers and pesticides and maintain fertility and control pests through methods such as crop rotation.

There is a greater demand for organic pears in the UK than growers in the UK can supply. UK growers produced an estimated 300 tonnes of organic pears in 1997.[44]

There is therefore considerable scope for increased UK organic pear production. Conventional pear production relies heavily on chemicals for control of pests and diseases such as aphids and scab, whereas organic systems rely on a healthy living soil to provide sufficient nutrients for strong growth in the crop. This is achieved by returning essential minerals and nutrients to the soil through re-utilising farm waste, and by rotating and varying crops rather than relying on monocultural farming. In orchards the option of crop rotations is not viable, although it may be possible to undersow with clover to boost nitrogen in the soil. If necessary, composted farmyard waste from conventional systems (if they have acceptable animal welfare standards) can be used in organic orchards.

Maintaining biodiversity in organic orchards encourages natural enemies for suppression of pests. A few chemical treatments are allowed in organic systems, including the use of soft soap (Savona) and cultures of the bacterium ***Bacillus thuringiensis*** to prevent the spread of aphids and caterpillars.

No herbicides are allowed in organic systems so weed control needs to be done 'physically'. Plastic mulches are allowed, which prevent weed growth by stopping light reaching the soil around the tree. These may be expensive but will protect from weeds and retain soil moisture.

Pear orchards are among the most difficult of production systems to convert to organic production, due to the lack of natural predators for pear pests in orchards which have been treated with chemicals for years. Neither is the modern orchard design of small, closely-planted trees hospitable to wildlife. Additional financial support is required for growers converting to organic systems in order to encourage conversion.

Celebrating pear diversity

Apple Day was started by the charity Common Ground in order to celebrate and demonstrate the biodiversity and local distinctiveness we are in danger of losing. Despite its name, pears are also a focus of many festivals.

The organic gardening organisation, the Henry Doubleday Research Association (HDRA), has 15 pear varieties as part of their heritage seed collection which preserves varieties not grown commercially.

Some fortunate people enjoy unusual pear varieties, grown with the minimum of chemical intervention, very locally and at little cost. They grow their own. Organisations including the HDRA, the SAFE Alliance, the National Food Alliance and the National Association of City Farms are promoting the practice of 'growing-your-own', particularly in urban areas.[45]

Case study: traditional farm orchards

Awnells Farm Orchards, Much Marcle, Herefordshire

The orchards at Awnells Farm contain widely spaced standard cider apple and perry pear trees, including several local varieties such as Hellens Early and Gregg's Pit perry pears, named after locations within the village. Other perry pear varieties found in the orchards include Blakeney Red, Arlingham Squash, White Bache, Aylton Red, Thorn, Winter Burgundy and Butt.

The orchards provide habitat for pipistrelle bats, as well as little owls, tawny owls, sparrowhawks, buzzards, all three British woodpecker species (green, lesser and great spotted), grey and red legged partridge, pied wagtail, treecreeper, tits and finches.

Orchard management is fully integrated with the main enterprise of the farm which is traditional Hereford beef farming. The majority of the beef herd comes from a line of Herefords which have been in the farmer's family for over 160 years. The cattle live in three family groups, each with a bull, and graze the farm's pastures and orchards extensively throughout the year, except during autumn fruit harvesting. Beef is sold direct to a small chain of local butchers.

Public access to the orchards is facilitated through the creation of a network of new permissive footpaths, linked to the statutory footpath network. The orchards are also open for guided walks and events within the Big Apple Association's spring and autumn programmes.

Case study: community orchards

Community orchards are traditional orchards with open access for the community. They provide the opportunity for people to relax and enjoy themselves as well as providing a focus for reviving traditional knowledge and food production skills.

Cross O'Cliff Orchard, Lincoln

This 140 year old orchard mainly contains pear trees, along with some apple and plum varieties. It was saved from development by local residents who battled for four years and now manage it under the Countryside Stewardship Scheme. It has become a valuable resource for the enjoyment of local residents in the immediate locality, as well as the city at large, including Lincoln's new university.

Recommendations for consumers

Whenever possible, buy local pears in season, and ask your supermarket to stock traditional local varieties

Buy pears direct from the producer. Save on food miles and find out how your fruit is produced by buying directly from the farm. The Soil Association has a directory of local food schemes such as organic food boxes and farm shops. Find out if your area has a farmers' market - contact the Environment Co-ordinator at your Local Authority.

Plant your own pear tree(s). Look for a traditional variety from your area. Common Ground has a list of nurseries which stock traditional varieties. The Brogdale Horticultural Trust also sells traditional fruit trees. The Henry Doubleday Research Association sells a list of tree suppliers, including organic tree suppliers, as well as advice leaflets on planting and organic pest control methods.

Get involved in your local community orchard. Details are available from Common Ground.

Encourage your local school to get hold of free fruit from the Intervention Board stocks (details from the Intervention Board on 0118 953 1694).

Recommendations for retailers

Support the growing of more varieties through assistance to producers and breeders.

Stock local varieties of pears in stores, sourced locally and transported directly to the stores. Label such produce and promote its advantages.

Educate consumers to expect blemishes as part of a move towards chemical reduction and reliance of biological and natural pest and disease control.

Recommendations for government

Increase the level of direct financial aid (through the Organic Aid Scheme) and provide additional assistance and research for production of organic top fruit.

Lobby at the European level in meetings of Agriculture Ministers to reform the Fruit and Vegetable Regime of the CAP such that grubbing-up grants are phased out and promotion of fruit consumption is enhanced. Also phase out any taxpayer-funded destruction of edible fruit.

Make more funding available for Countryside Stewardship grants and other agri-environment schemes.

Encourage schools to make use of Intervention Board stocks.

Appendix

Food miles

Food is being transported longer and longer distances between producers and consumers (see Appendix tables 4 and 5).

To protect food during long distance transit, it is either heavily processed, packaged or preserved. Pesticides are used both in storage and transport. One such, methyl bromide, which is used to fumigate some foods, is also a significant contributor to ozone layer depletion.

Other consequences of long distance food transport include air pollutants and greenhouse gas emissions from transport, packaging and pesticide manufacture.

Long distance trade in foodstuffs leads towards specialisation and intensification in agriculture and to the allocation of resources to production for export rather than meeting local food needs. In developing countries this can lead to health and safety risks for farmworkers, environmental damage resulting from inappropriate methods and economic vulnerability from dependence on export sales, especially where prices fluctuate.

The impacts of intensive production include increased mechanisation and loss of employment, increased use of artificial fertilizers and pesticides, soil erosion and reduced biodiversity in wild and domesticated species.

The enhanced greenhouse effect - global warming

Emissions of gases from the activities of man since the industrial revolution have led to a scientific consensus that the Earth will suffer from an enhanced greenhouse effect. The greenhouse effect is what keeps our planet at a temperature warm enough to support life, but the enhancement of the blanketing effect by man-made gases is thought to be causing global temperatures to rise at a rate that will be too fast for ecosystems or people to easily adapt.

Among the predicted effects of enhanced global warming are a rise in sea levels due to thermal expansion of the oceans, particularly threatening to the third of the world's population living in coastal areas. Other changes may include climatic effects such as increased storms or changes in weather patterns so that crops are no longer suitable for the areas in which they are grown and changes in the occurrence of diseases such as malaria.

Greenhouse gases include carbon dioxide, which is the most important gas in terms of volumes emitted as it is created by the burning of fossil fuels in transport or energy generation, although other gases such as methane have more potent effects. CFCs are also particularly potent greenhouse gases as well as causing damage to the ozone layer.

Though the United Nations Framework Convention on Climate Change, countries have agreed to limit their emissions of greenhouse gases in order to reduce the global impacts of climate change. The UK has the target of reducing emissions to 1990 levels by the year 2000

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 Agricultural Statistics 1997

Table 3
Pear sprays - the traces they leave in the fruit

The pesticide residues detected in samples of pears on sale during 1997

	UK grown	**imported**
captan	7%	15%
carbaryl	nf	4%
carbendazim	56%	44%
chlormequat	30%	48%
dimethoate	nf	7%
diphenylamine	22%	30%
ditiocarbamates	26%	30%
ethoxyquin	nf	15%
imazalil	nf	15%
iprodione	33%	11%
phosalone	nf	7%
phosmet	nf	11%
pirimicarb	4%	nf
procymidone	nf	4%
tolylfluanid	7%	19%

nf = residue not found
Source: MAFF/HSE Working Party on Pesticide Residues, 1998

Table 2
Pears and pear orchards
The declining area of UK pear orchards

	1970	**1977**	**1987**	**1997**
Hectares of pear orchards	5255	4726	3685	2626
of which Conference	3689	3357	2876	1969
William's	365	229	-	-
Comice	691	845	610	375
Concorde	-	-	-	173
Other varieties	510	295	200	109
Pear production (tonnes)	50,600*	36,100	34,000	34,000

Source: MAFF. *1972 statistic.

Table 4
Food miles: our food is travelling further and further
In two decades the amount of food being transported on our roads has increased by 30 per cent and the average distance travelled has increased by nearly 60 per cent. By 1997 the total 'food miles' for UK food, drink and tobacco products amounted to 41 billion tonne-kilometers.

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

Source: SAFE Food Miles Report[46], DETR 1998[47]

Table 7
Our taste for pears
Purchases of pears per person per year

	kilograms
1982	1.51
1984	1.32
1986	1.50
1988	1.94
1990	1.95
1992	1.86
1994	2.18
1996	2.18
1997	2.44

Source: National Food Surveys, MAFF, 1983-1998.

Table 5
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 6 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	Hydrocarbons	Nitrogen oxides	Carbon monoxide
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 Food Miles Report[48]

Table 6
Transport of pears in and out of the UK

Millions of kilograms

	Exported	Imported
1986-1988 average	1	78
1996	4	96
1997	7	105

Source: MAFF agricultural statistics 1997

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Useful contacts

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Home of the National Fruit Collections.

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Tackling the causes of poverty and injustice internationally through advocacy and skill sharing.

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National charity helping people to protect and enhance their local countryside and to keep it beautiful, productive and enjoyable for everyone.

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Provides advice and consultancy on organic production and regional and co-operative marketing and promotes exchange between farmers and organisations in the social economy in the UK and Europe.

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An independent organisation with charitable status and the leading provider of farm conservation advice in the UK.

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One of the UK's most influential national environmental pressure groups.

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Umbrella organisation of small organisations and individuals networking internationally, working on environmental pollution, human health issues, and with and for farmers.

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Researching and promoting organic gardening and food.

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An independent charity addressing the health and environmental problems of pesticides and working for a sustainable future.

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Permaculture is a way of designing and creating sustainable environments and systems.

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Campaigning for organic food and farming and sustainable forestry.

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