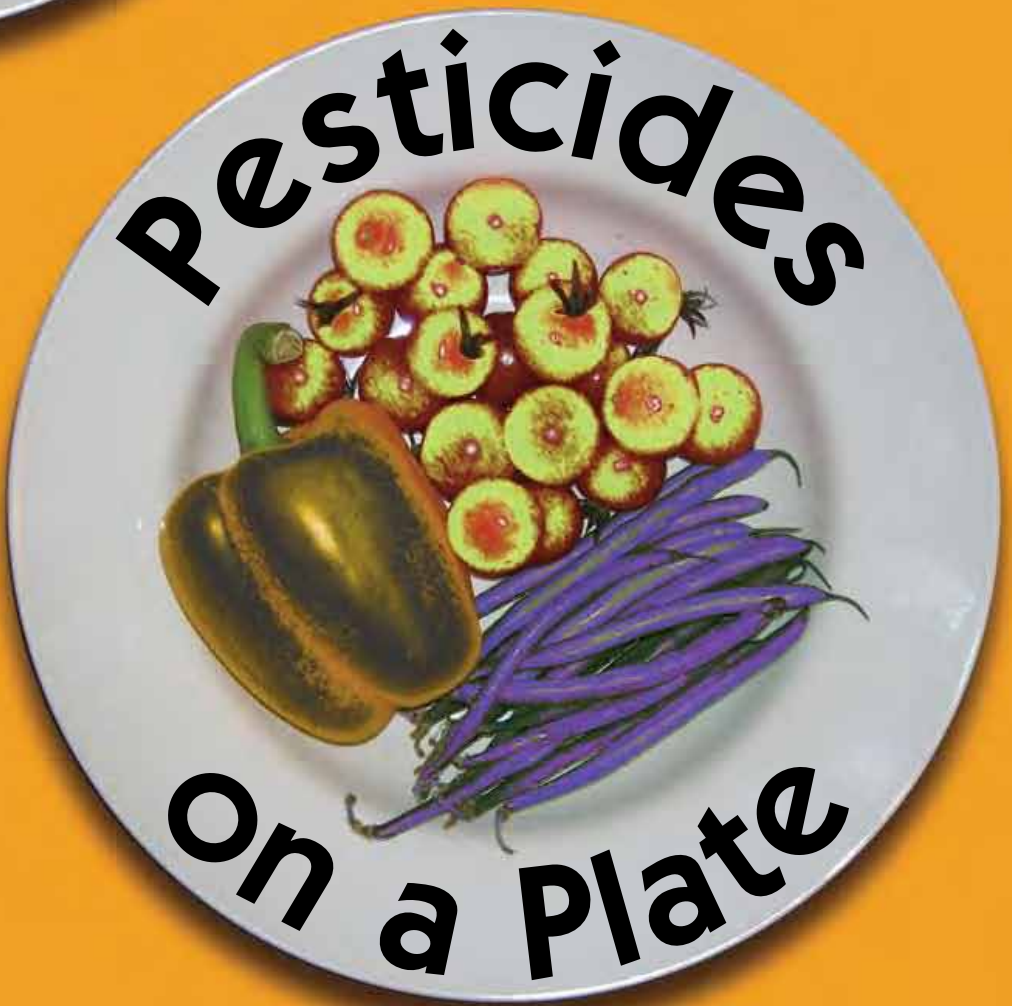
PESTICIDE ACTION NETWORK *UK*

Pesticides on a Plate



a consumer guide to pesticide issues in the food chain

Acknowledgements

Pesticides on a Plate:
a consumer guide to pesticide issues in the food chain

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PAN *UK*, London, 2007.

PAN *UK* is a registered charity (UK No. 327215)

This booklet has been produced with the financial assistance of theEuropean Community and the Rufford Maurice Laing Foundation for PAN *UK*'s project entitled Food & Fairness: Changing supply chains for African livelihoods and environment. The views expressed herein are those of PAN *UK* and can therefore in no way be taken to reflect the official opinion of the European Community.

ISBN: 978 0 9549542 6 0

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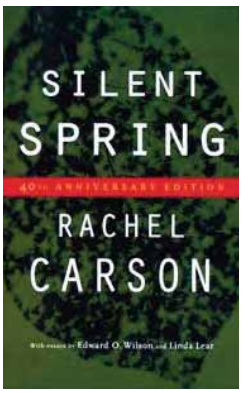
1. What are pesticides?

Hundreds of natural and man-made harmful or poisonous substances surround us in our 21st century world. Pesticides are just one group but they are unique in being the only chemicals designed and deliberately released into the environment by humans, to kill or damage other living organisms. You can tell this from their name- the ending '-cide' literally means 'killer' in Latin. The term pesticide covers a wide range of chemicals used to control insect pests (insecticides), plant diseases (fungicides), weeds (herbicides), rats and mice (rodenticides), slugs and snails (molluscicides) or other unwanted organisms. Several pesticides were originally developed as nerve poisons to be used as instruments of war. When peace came, their manufacturers found a ready new market for these products as pest control agents.

Today insecticides are sprayed on crops and in homes to kill unwanted insect pests, and fungicides to control microscopic organisms that cause diseases in crop plants or mould and rot on walls and timber. Herbicides (weed-killers) are often sprayed on fields, paths, pavements, along road and rail lines, golf courses and gardens to control plants growing in the "wrong place". And it is not only farmers that use them - many people use them in their homes and gardens or on their pets (e.g. flea collars) and pesticides may also be found in household products such as headlice treatment shampoos, bathroom mould cleaners, carpets, mothballs, anti-bacterial soaps and lawn feeds. Public and private organisations may use them in their buildings and surroundings,

usually without telling their staff, customers or other members of the public.

There are over 1,000 different pesticides used in the world today yet most people have probably only heard of the most notorious ones like DDT and Agent Orange. DDT was used in huge quantities for three decades after World War Two as a “miracle cure” for many insect pests in agricultural crops and against household and mosquito pests, until the first signs began to appear that it could have harmful effects on many other animals. Rachel Carson published her famous book Silent Spring in 1962 drawing public attention to the fact that DDT was harming birds and causing their numbers to decrease dramatically. DDT has been banned for 20 years now in Britain and many other countries but because it breaks down so slowly and builds up in the fatty tissue of all animals (and animal food products like meat, fish, butter and cheese) it has left a toxic legacy around the globe. Traces of DDT can be found in polar bears and seals in the Arctic, thousands of miles from where it was sprayed. Almost everyone on the planet now has DDT in his or her body and it gets passed to babies in breast milk.



Over 31million kg of pesticides were applied to UK crops in 2005, equivalent to 0.5kg per person living in Britain.

Helecopter spraying Agent Orange

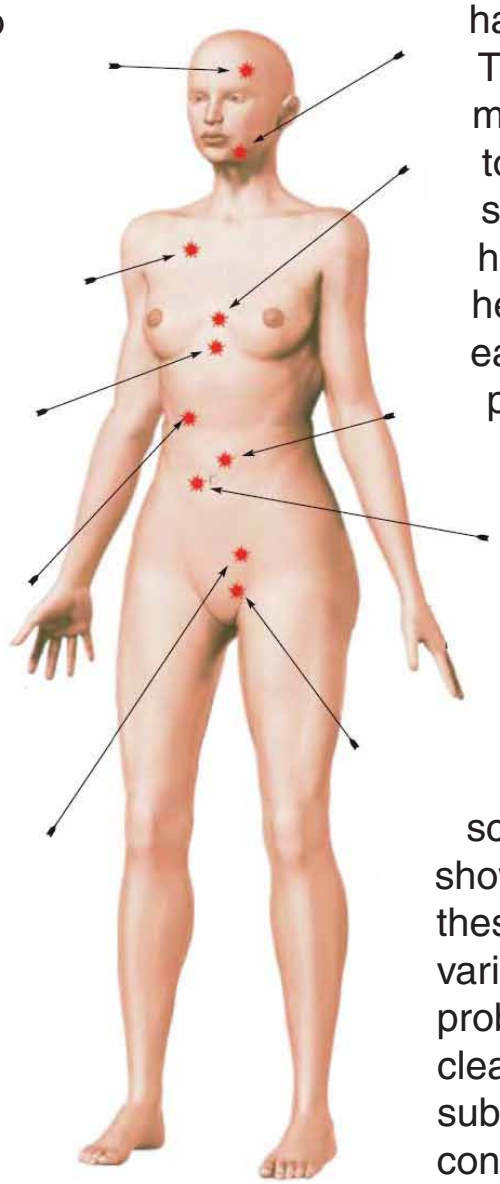
Pesticides regularly contaminate homes, schools, workplaces, countryside and urban public spaces, soil, water, air and wildlife – not to mention food and drink and humans themselves. This guide gives basic information on the unintended side effects of reliance on pesticides and suggestions on how to reduce your exposure to these expensive and harmful substances. PAN *UK* also works to promote safer alternatives for controlling pests, weeds and plant diseases and you can find out about non-toxic solutions for pest problems in your home and garden on the PAN *UK* website (see section 12).

Pesticides are often used where children play.

Photo: Patti Adair

2. Why should I be concerned?

People often do not realise that many commonly used pesticides are potentially harmful to human health. Some pesticides are immediately poisonous (acutely toxic) not only to the pests they target but also to humans and many other animals. For example, insecticides in the organophosphate group work by disrupting the nervous system of the target insects. However, the human nervous system works in much the same way as insect systems and so we are vulnerable to the same harmful effects. The herbicide paraquat is another highly toxic compound, responsible for thousands of human poisonings worldwide each year. Two people died in Britain in 2004 as a result of accidentally drinking paraquat stored in unlabelled bottles.



Targets of chronic pesticide toxicity

Other groups of pesticides may result in subtle, long-term harm to human health. These chronic effects may take many years to turn into noticeable symptoms so it is very hard to link a particular health problem to earlier exposure to pesticides. Weed-killers and fungicides target biological processes in plant and fungal tissues which are very different from animal biology, yet scientific research now shows that some of these may lead to a variety of health problems. It is becoming clearer that many substances used for pest control can lead to health problems such as different types of cancer,

Parkinson's disease, infertility, low birth weight of babies or disruption of normal sexual development, damage to tissues, cells and genetic material, and even behavioural or mental problems including depression, lower IQ and attention deficit disorder.

Many different groups of people are at risk from exposure to toxic pesticides, including consumers, farmers and farm workers and residents in rural areas. Millions of people per year worldwide experience some form of acute pesticide poisoning. The majority of these are poor farmers, their families and farm workers in developing countries, where there are unlikely to be effective controls on pesticide handling and where some of the most acutely toxic pesticides are frequently applied without any form of protective clothing. The numbers are imprecise because so few poisonings in developing countries are treated in hospital and therefore never enter official statistics. Estimates of chronic ill health are even harder to make. What is certain is that the most vulnerable groups at risk are the very young, the elderly, those with illnesses or poor nutrition and pregnant women and the unborn child.

BOX 1.

Pesticides can cause harm at very small doses. Many of the newer pesticides on the market work at incredibly small concentrations, measured in parts per million or even parts per billion, equivalent to less than a teaspoonful diluted in an Olympic-size swimming pool.

Tiny amounts can wreak havoc in the environment, for example, in 2001, just a quarter of a litre of the insecticide chlorpyrifos spilled by accident into a river in Sussex wiped out aquatic insects along a 20km stretch downstream and caused mass fish deaths.

People are not the only potential victims of pesticide poisoning: wildlife, livestock and household pets are also at risk. The increasing use of pesticides in UK agriculture has resulted in well documented declines in species of native British songbird, including the yellowhammer, corn bunting, partridge and skylark. There have also been numerous instances of other wildlife, such as birds of prey and foxes, being fatally poisoned by pesticides, either intentionally or accidentally; 455 birds of prey have been killed by pesticide poisoning in Scotland since 1999.

There are legal controls on spraying next to water courses but no such protection for people living in houses close to farmland. UK farmers are required to warn beekeepers 48 hours prior to spraying but rural residents usually get no warning.

Yellowhammer numbers have declined in the UK as a result of pesticide use.

Photo: RSPB images

Household pets are also prone to being poisoned as a result of directly ingesting pesticides, notably slug pellets, or indirectly by eating animals such as rats and mice that have been poisoned.

In the UK, there are regulations for safety measures and protective equipment for people handling pesticides professionally. However, pesticides can also affect the health of other people, who are exposed without any form of protection and may not even know that they are coming in contact with harmful substances. These include people living or working close to regularly sprayed fields, walking on public rights of way near sprayed areas or bringing pesticide traces into their homes on the soles of their shoes and other items which may be contaminated.

On average, 30% of the food purchased by the British public contains pesticide residues

Daily intake of a mixture of residues in tiny doses in ordinary food and drink is probably the commonest route of public exposure to pesticides. On average, 30% of the food purchased by the British public contains pesticide residues, according to government data. The following section looks at the issues for consumers.

3. How do I know what pesticides my food contains?

As a result of the widespread use of pesticides in all areas of food production, much of the produce available to buy may have pesticide residues present. The presence of residues is not confined to fresh fruit and vegetables but can also occur in fish, meat, dairy and processed goods such as cereal products, bakery items, tea, coffee, juice and chocolate.

The UK government has an ongoing programme of testing foods for pesticide residues, overseen by the Pesticide Residues Committee (PRC) which publishes quarterly reports on its findings. Samples are taken from a range of food outlets (mostly retail stores) across the UK. Some foods (for instance bread, potatoes and apples) are surveyed each year, others less frequently. In 2006 about 40 different foods were tested and the total number of samples analysed was 3,562. The amount of produce tested is only a tiny fraction of what is actually available and there is almost no testing of residues in the food service, restaurant and catering chains, with the exception of fresh fruit in schools.

Since 2005 PAN *UK* has used the PRC's reports to compile our own assessment of the monitoring data. We used the PRC's data from 2000 to 2006 to determine what foods have been tested and what pesticides were found.

Photo: Richard Sweet

We looked at how often pesticides at any level were detected, how frequently legal levels were exceeded and how often more than one pesticide was found on a sample. This information is provided on the PAN *UK* webpages Hidden Extras: Pesticides in Your Food at www.pan-uk.org/Projects/Food/

TABLE 1.

The top five fruits, vegetables and other foods most frequently contaminated by pesticides

Product	Number of samples	% with residues
Fruit		
Soft Citrus e.g. mandarins	167	100%
Citrus	512	91%
Pears	1066	73%
Bananas	205	71%
Strawberries	283	70%
Vegetables		
Speciality Beans	70	76%
Salads	70	74%
Celery	137	69%
Herbs	51	53%
Potato chips	48	48%
Other food items		
Barley, pearl	4	100%
Bran	107	98%
Rye	34	91%
Oats	34	85%
Wheat grain	137	82%

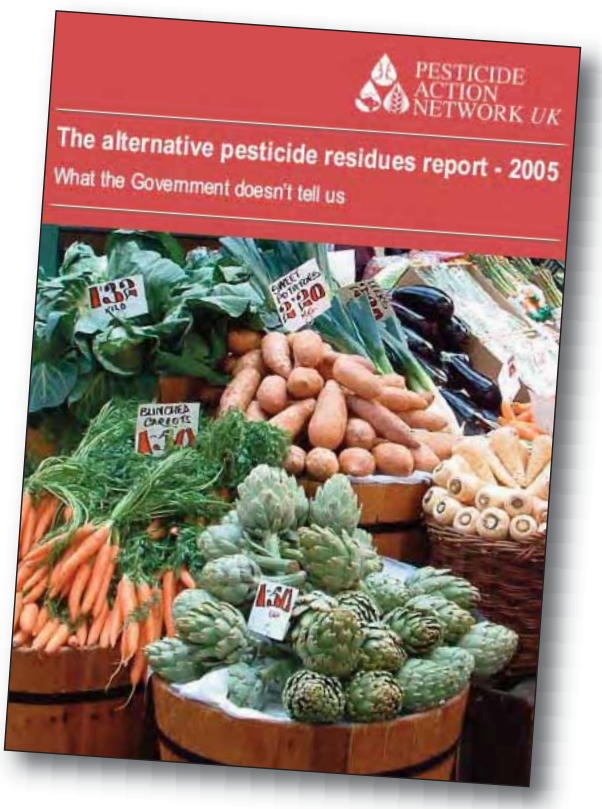
PAN *UK* undertakes this work for a number of reasons:

- **To provide a clearer and more user-friendly summary of the test results for the public**
- **To assess trends in the presence of residues on particular food items**
- **To identify which food items would result in the greatest consumption of pesticide residues**
- **To identify which pesticides most frequently occur as residues and to provide information on the potential health impacts of these substances**

Not all fruit and vegetables are equally likely to contain pesticide residues. PAN *UK*'s assessment has identified those foodstuffs with the highest amounts or that most frequently contain residues. This should not be taken as the last word in residue levels but merely as an indicator of the foods that might be best avoided and preferably sourced organically (see section 11 below). Table 1 details the top five most frequently contaminated fruits, vegetables and other foods, as of August 2007. This information is liable to change as new government testing results become available. For the most up to date information please regularly visit the PAN *UK* website. PRC surveys often include a few organic samples, and in the vast majority of these no residues are found.

UK Government data shows that from 2000 – 2006, of the apples tested for pesticide residues, 60% were found to contain residues. In total residues of 43 different pesticides were found on the samples.

While it is highly unlikely that UK consumers would suffer acute poisoning from the tiny concentrations of pesticides regularly found in food, it is the possible long-term consequences that are of concern. Current risk assessment by EU governments is done on a single chemical basis, yet the public are exposed to a daily diet of a mixture of pesticides, and scientists have very little understanding of how these 'cocktails' may act inside the human body. Some medical practitioners are concerned about subtle effects on the development of the nervous system of children under five years old and babies in the womb, linked to cumulative exposure to neurotoxic compounds with similar modes of action. Recent independent assessments of UK government residue data show that official safety limits for toddlers are exceeded in some samples. PAN *UK* disagrees with the government's judgement that such residue levels are "no cause for concern".



The alternative pesticides residues report

PAN *UK* conducted its own analysis of the 2005 PRC data to highlight some of the issues that are important to consumers.

4. How and why do pesticides end up in our food?

Use of synthetic pesticides, manufactured from petrochemical materials, has been the norm in most modern agriculture since the 1950s. These may be applied to food crops at any stage from before sowing the seed, during fruit or grain development and after harvest. Using these chemicals is one way of controlling pests, weeds and other undesirable organisms that can damage crop yield or quality. But there are other ways to manage these pests, as used in organic and IPM (Integrated Pest Management) systems (see section 5). Unfortunately, government policies on agriculture and food safety, and the industrial scale of farming and food retail systems in recent years, have tended to encourage the use of pesticides as the dominant form of pest control. The agrochemical manufacturers have profited handsomely from selling these products, while many farmers find it hard to see how they can reduce their reliance on these hazardous chemicals.

Although there are strict instructions on using pesticides on food crops, including specifying a safety period between application and harvest, residues of pesticides often remain on crops when they reach the consumer. This can happen even when farmers are following instructions precisely. Fresh fruit and vegetables are often contaminated, but contamination can also occur in wheat and other cereal grains milled and baked in bread or cakes, in dairy products, honey, and meat and fish. Processing and cooking may remove some but not all pesticide residues.

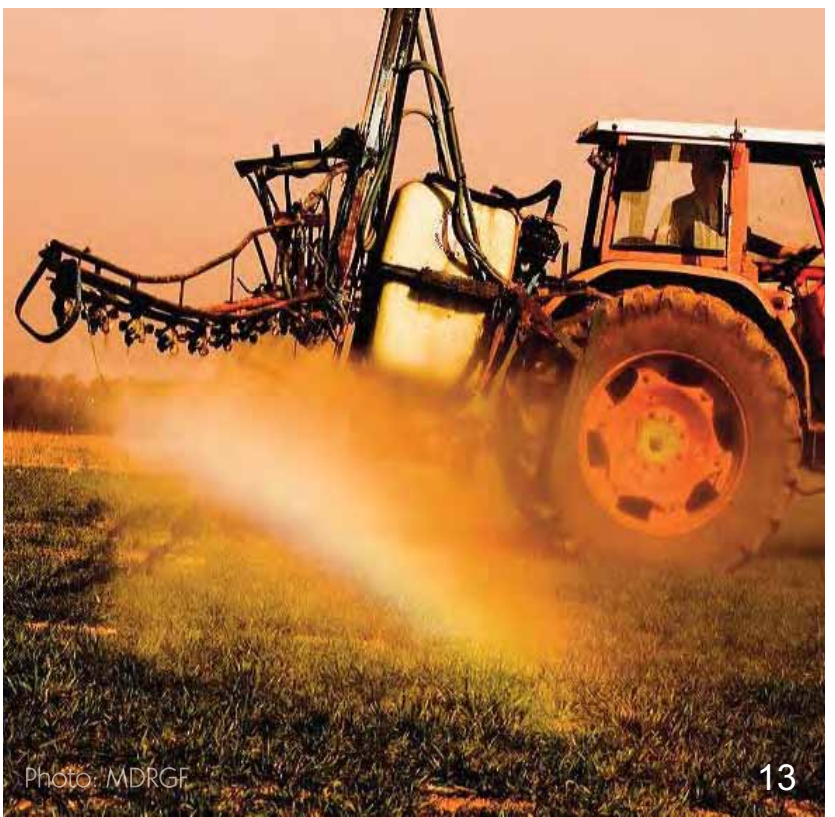


Photo: MDRGF

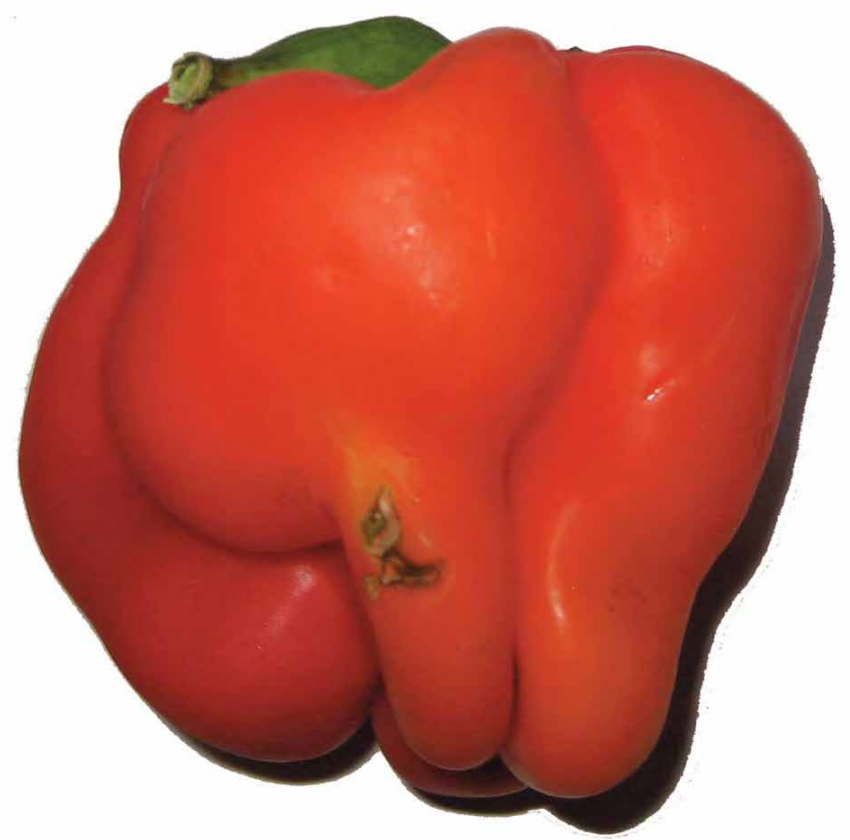
The amount of pesticide used, type and toxicity varies enormously between different crop types, farmer practice and regions. For some crops and pesticides, the residues are mainly found on the peel or skin, for example, citrus fruits are very commonly contaminated with residues of fungicides applied after picking, to prevent the fruit rotting (Box 2). Fungicide levels inside the flesh of the fruit are usually well below 10% of levels on the peel. In others, pesticides might be applied to the crop seed or the soil to protect the growing plants, and some of these can be absorbed into the entire plant tissue - leaves, fruit or seeds, and may remain for weeks. Some pesticides applied during the growing season may be broken down by the action of sunlight, water or bacteria within a week or so of spraying, and will not therefore lead to residues in the food produced. Others are more persistent, and can be detected weeks or months after application, on food crops and in the soil and water.

BOX 2.

To distribute fresh produce over thousands of miles and keep it fresh on the shelf for many days often means applying considerable amounts of fungicides after harvest to prevent rotting. Most conventionally grown citrus is treated in the packhouse with imazalil fungicide, which is routinely detected in residue monitoring. Imazalil is classified as moderately hazardous in terms of acute toxicity, and is suspected to have links with cancer, reproductive and developmental problems. Fungicides may be incorporated into the wax treatments given to citrus and other fruits to stop them drying out in transit. Sometimes information on such post-harvest treatment is given on fruit packs or shipping boxes. In contrast, organic citrus is not permitted to be treated at all after harvest. Wastage from rotting can be higher than in non-organic fruit, and the fruit may not last as long in top condition in your fruit bowl.

Today's demand from supermarkets and consumers for cosmetically perfect fresh fruit and vegetables is a further reason for current levels of residues in our food. People have grown accustomed to buying produce with no blemishes or variations in colour and of uniform size and shape. Supermarkets compete fiercely to persuade consumers that their produce is the best, with mainly Grade I produce stocked on the shelf. Grade II fruits and vegetables are equally good in terms of nutrition but may not quite make the visual grade. Citrus growers could definitely reduce the level of orchard spraying if customers were to accept a higher level of blemishes on the fruit; this would have a positive effect on farm worker health, environment and farmers' income. If food importers and supermarkets would accept a few more cosmetic defects and a little more wastage, post-harvest pesticide use could be reduced too, resulting in fewer residues on fruit.

The same is true for crops grown in the UK, like apples, where lower residues and reduced pesticide exposure of those in and around orchards could be achieved if consumers were more tolerant of minor blemishes or the occasional insect in their pack of fruit. Hard-pressed farmers would also benefit as they could take higher risks in pest and disease control methods, if they were not so pressurised to meet supermarket Grade I quality standards and by customer demands.



If consumers are prepared to buy produce that is less than 100% cosmetically perfect, this can help farmers to reduce pesticide use.

5. How can we avoid pesticides ending up in our food?

A number of UK and European surveys over recent years have regularly pointed to the fact that the majority of people would prefer to have food free of pesticide residues. Given the prevalence of pesticide use in food production how easy is this to achieve? This section explores some of the options for our food and farming systems, with more details for what you can do as an individual in section 11.

Organic

Buying organic produce, or growing your own, is perhaps the way in which one can be most confident of avoiding pesticide residues in food. Organic production does not allow the use of toxic synthetic pesticides. Instead, organic farmers use ecologically-based strategies for preventing and managing pests, such as pest or disease-resistant crop varieties, regular crop rotation to avoid the build up of pest problems, mechanical or thermal weeding, and conserving or introducing natural predators and parasites which feed on insect pests.

Organic food is in the vast majority of cases free of pesticide residues. There are, however, a very small number of instances in the test results provided by the PRC (see section 3) where residues have been found in organic produce, as a result of contamination from 'conventional' agriculture. Soils, farm buildings and equipment may be contaminated from the use of persistent pesticides such as DDT more than 20 years ago, sometimes transported in wind or rain, so it is impossible to escape contamination 100% of the time.

Other farming practices that reduce pesticide use and residues

Residue monitoring data shows that 70% of foodstuffs sold in the UK do not contain residues so it is perfectly possible for more farmers to grow residue-free food, although this is easier for some crops than others. It is also possible for the food and government sectors to address key problems together, for example, in the late 1990s residues levels on carrots in British supermarkets were so high

that the UK government issued a warning to the public to peel carrots before eating. Since 2003, concerted efforts in the food chain have resulted in a noticeable drop in residue levels in carrots. What is still lacking is more demand from consumers for safe food, and support from supermarkets and others to help farmers change to safer methods of pest management in all crops.

Integrated Pest Management (IPM) systems that only use synthetic pesticides as a last resort and under strict controls, when ecological methods of pest control have failed, can significantly reduce or eliminate the need for and use of pesticides. Whilst IPM does not stop the use of pesticides, significant reductions in use should mean much lower or no residues on the food produced. Some IPM systems prohibit the use of particular hazardous pesticides, again, with benefits for consumers and those on-farm. However, as there is currently no certification scheme for IPM in the UK (unlike organic certification with its strict standards and inspection system), it is not easy to tell which produce has been grown with reduced pesticide use, particularly if you are buying from a supermarket. It might be possible to find produce grown under IPM systems at your local farmers' market by talking to the people selling but this produce has no consumer label.

Ladybirds (insert) and other predatory insects can be released into commercial glasshouses to feed on pests like blackfly, reducing the need for insecticides.

6. What about the effects on farmers and farm workers?

Consumers are right to be concerned about pesticide residues in their own diets. Nevertheless, people working on farms the world over run the greatest risks of pesticide-related ill health. Hundreds of studies since the 1970s document poisonings of farmers and farmworkers, mainly in developing countries (Box 3). In industrialised countries higher levels of several chronic or life-threatening illnesses are found in farming communities exposed to pesticides, compared with the rest of the population.

For example, PAN partners in Chile estimate that 2,000-3,000 farm workers are made ill by pesticides each year, 70% of them women. Many of these workers are employed in Chile's important export agriculture sector, best known for apples, pears, table grapes and wine, some of which you can find on supermarket shelves in Britain. Chilean exporters take great pains to convince their buyers in Europe of the high quality of their produce, yet the health and welfare of the thousands of farm workers involved seems of less concern.

The insecticide endosulfan has caused several hundred acute and fatal poisonings among cotton farming communities in West Africa since its introduction in 1999.

In 2005, 73 people working in an apple orchard were taken ill with vomiting, nausea, serious skin irritation and breathing difficulties. The trees had been sprayed with the nerve toxin chlorpyrifos. In an earlier incident 22 seasonal farm workers became ill while harvesting beans. Mainly women, they suffered severe burning and sores on their skin, from handling plants still wet with pesticide spray; and several had to be hospitalised. Three years later, some of the women continue to suffer severe dermatitis over much of their body and are unable to work in the field. One Chilean member of parliament stated "It's shameful to admit that such conditions exist in Chile in the 21st century. Today an apple or a kiwi fruit is valued more than the workers who produce them".

It is not just in developing countries that pesticides can harm farming and rural communities. In 2005, US tomato company Ag-Mart was accused of one of the worst pesticide violations in North Carolina state history. State health officials are investigating whether pesticide exposure is to blame for three deformed babies lacking limbs or sex organs born to Ag-Mart fieldworkers. Inspectors say the company exposed workers to a host of poisonous chemicals, some linked to birth defects. One of the most dangerous pesticides they use was applied at over three times the legal limit. Ag-Mart failed to train its workers to handle pesticides safely, to supply them with proper safety equipment or adequate water to rinse their eyes. It also allowed employees to work in newly sprayed fields – fields that would not be safe to re-enter for up to a week after spraying. At least one study has linked the soil fumigant methyl bromide to cancer in farm workers and workers cannot, by law, be made to re-enter a treated field for 48 hours afterwards. Inspectors spoke to one worker who said he had been out in the fields while the methyl bromide was actually being applied.

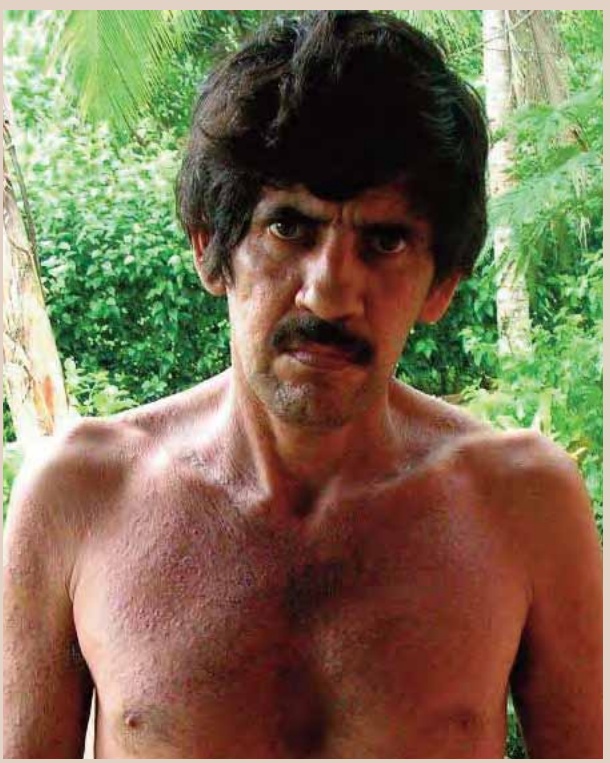
At least one study has linked the soil fumigant methyl bromide to cancer in farm workers

In Europe, one in five farm workers also consider they have suffered some form of ill health as a result of working with pesticides. PAN *UK* has been contacted by a considerable number of people adversely affected by pesticides in Britain with long-term, debilitating illnesses such as multiple chemical sensitivity and chronic fatigue syndrome. Some of them are farmers, farm workers or people who worked handling ornamental plants. People living close to farmland that is regularly sprayed – an increasing segment of the population as housing estates spread into the countryside – may also become affected. Unlike farmers who are generally inside tractor cabs and wearing proper protective equipment, these so-called "bystanders" are not protected at all from pesticide drifting into their homes, schools or workplaces and are not given prior warning of spraying.

With housing expanding into rural areas, more people now live close to fields that are regularly sprayed.

BOX 3. The health fall-out of banana plantations

The huge banana plantations of Latin America are notorious for intensive use of hazardous pesticides. In several long-running court cases, thousands of Central American banana workers continue to seek proper compensation for sterility and other serious health problems linked to the extremely toxic pesticide Nemagon, to which they were exposed in the 1980s. More recently, aerial spraying of fungicides in Costa Rica hit the headlines in relation to nearby peasant farming communities. Along with plantation workers, villagers near the Limon Coast plantations of Standard Fruit Company suffer very high rates of chronic dermatitis, respiratory problems and allergies. Miguel Angel Mora Rojas from Bananito Sur, who used to work as a flag marker for the spraying, is one of those affected, with severe skin rashes erupting periodically over his entire body and preventing him from normal work. In 2004, the local clinic concluded that pesticide exposure was 80-90% likely to be the cause but they refused to give him a written statement. "Unfortunately by the time I took action, it was too late to do anything" said Mr Mora. "What worries me most is the situation of my mother who suffers from arthritis and cannot protect herself from the wind which brings the chemicals into our house". The aerial spraying, which can be as frequent as 40-50 times per season, has contaminated villagers' crops, livestock and water sources. Cattle eating contaminated pasture have experienced spontaneous abortions and hair loss and there have been mass deaths of poultry and fish.



Mr Mora suffers chronic skin rashes following pesticide exposure.

Photo: RAPAL

7. What are supermarkets doing about this?

Over the last few years, European supermarkets have started to look very closely at safety aspects of the food they sell, including pesticide residues. This is particularly so in the UK, where the British government was the first to "name and shame" specific retail companies exceeding permitted levels of residues in food. Many retailers are now taking steps to at least keep residue levels below legal limits, but not all are making progress on reducing pesticide use in their supply chain. All major supermarkets do now stock some organic food.

Several UK supermarkets recently decided to prohibit some of the most hazardous pesticides throughout their supply chain, and to restrict the use of others, or phase these out over time. PAN *UK*'s Hidden Extras web pages provide links to some of the top UK retail chains and their actions and policy on pesticides. Apart from organic produce, there are some other consumer labelling schemes for specific certified crops or farm standards that include measures to reduce pesticide use. It is beyond the scope of this guide to go into detail about such consumer label schemes as Fair Trade, Rainforest Alliance, or less ambitious ones including British Assured Produce and LEAF. Other food sector initiatives and individual companies are also making progress on pesticide practice and alternatives in their supply chains which do not carry specific labels aimed at the consumer (see Further Reading).

However, supermarkets are only one link in our food supply chain. People also buy food from markets, corner shops and convenience stores, and, increasingly, eat outside the home in restaurants, take-aways, and cafes. Pesticide residue and use reduction programmes need to be developed in these other sectors of food supply.

PAN *UK* urges supermarkets to carry out the following actions:

- Publish their own residue testing results on their website
- Develop action plans for tackling the most serious residue problems
- Provide more information for consumers on pesticides used in their produce
- Commit to phasing out the most hazardous pesticides
- Provide concrete technical and financial support for farmers to reduce their reliance on pesticides
- Pay a fairer price to farmers, which will help them invest in more sustainable farming practices
- Collaborate with researchers, government agencies and farmer and consumer organisations to promote alternative methods of pest control
- Engage with their customers and take action on unnecessary, cosmetic use of pesticides
- Monitor and publish volumes of pesticides used in their food supply chain, and measure progress in reduction
- Phase out sale of home and garden pesticides and offer safe non-chemical alternatives
- Stock more organic produce, especially from the UK

8. Are pesticides in food and farming the only problem?

People often wrongly assume that pesticides are used only in the agriculture sector and that the most likely way for people to come into contact with them is via their food or from living next door to fields that are sprayed. However, pesticides are all around us in many of the things that we encounter on a day to day basis.

Gardening is one of the most popular pastimes in the UK: there are approximately 20 million gardens in the UK with 10 million regular gardeners. These numbers have grown with the boom in the number of people that are cultivating allotments. Given that there are an estimated 15 billion slugs in the UK as well as other garden pests, it is not surprising that many gardeners turn to substances on sale in garden centres and other shops that aim to tackle the problems.

Whilst the active substances found in pest control products available to the public are not as hazardous or as concentrated as agricultural pesticides, they do still

contain very unpleasant chemicals. For example, most slug pellets contain the active substance metaldehyde, which is acutely toxic to all organisms that swallow it. Slugs that die as a result of metaldehyde are often eaten by birds and other wildlife; the poison that killed the slug is still active and can lead to death or serious illness. Whilst slugs are a problem for many, perhaps most, gardeners, there are alternative methods for controlling them that do not require the use of toxic pesticides.

Another product that is commonly used in gardens to control weeds is the herbicide glyphosate, often marketed as Roundup. Whilst glyphosate is promoted as being a harmless substance, recent research has found it to be potentially harmful to human health as well as being toxic to aquatic life.

Non-agricultural pesticides are not limited to home gardening, they occur in a wide range of situations, including use on cut flowers, carpet treatments, woodworm and timber treatments, controlling head lice and in cat and dog flea powders and collars.

The bad news is that many of these substances are used indiscriminately under the assumption that they are the only course of action for the particular problem. The good news is that in many cases there are effective alternatives to chemicals available.

PAN *UK* provides information on its website about alternatives ways of controlling a variety of pests in the home and garden (see section 12).

Herbicides used to control weeds on pavements and roads often end up polluting water through the drainage system.

9. Who should pay to solve these problems?

Did you realise how often consumers end up paying for the hidden costs of pesticide damage or contamination? Some of these costs affect almost everyone, for example in relation to drinking water. Water companies in Britain spend around £100 million each year to remove pesticides from household water and these costs are passed on to consumers as part of their water bills.

When people suffer ill health from pesticide poisoning they may have to pay privately for specialist diagnosis and treatment, as well as using the National Health Service, which in turn costs the public as taxpayers. A very conservative cost estimate for British farmers, farm workers, rural residents and food consumers harmed by pesticides is £1.27 million per year and that does not take account of any long-term effects on health. It is impossible to put an economic value on the physical or mental suffering caused for an affected person and their family. Harm to fish, bees, pets, beneficial insects and wildlife due to pesticide pollution is a major cost, and taxpayers end up paying for government monitoring and control of pesticides. Pesticides also contribute to climate change because they are mainly manufactured from oil, using considerable energy. Overall, British society pays at least £163 million a year in these hidden costs of pesticides, equivalent to £7.43 for each kilo of pesticide sprayed.

Overall, British society pays at least £163 million a year in hidden costs of pesticides

The hidden costs can be even higher in poor countries – for farm families and for the country as a whole. Peasant farmers in Ghana estimated that they lost 20 days off sick each season after spraying toxic insecticides on cotton. Added to the costs of treatment this meant losing £27

per year, for families who earn less than £1 a day. Mali is one of the world's poorest countries and harm caused by cotton pesticides costs its citizens at least £6.3 million a year.

It is grossly unjust that while the agrochemical companies and the farming sector gain from selling and using pesticides, the costs of their negative side-effects are usually carried by other people. Latest data from the US estimate that for every US dollar spent on using pesticides, virtually a dollar's worth of hidden health and social costs are generated. PAN *UK* believes that all sectors need to take responsibility for these costs and look for ways to reduce them, starting with those who profit the most from hazardous pesticides. PAN *UK* supports the introduction of a pesticide tax as one element of a comprehensive programme for pesticide reduction. By taxing pesticides, governments could oblige pesticide manufacturers and users to start paying some of the costs of the side-effects. Such a tax should deliver benefits for farmers by helping to fund advice on pesticide reduction and alternatives. Making pesticide use more expensive also makes people think more carefully about how much they really need to use. Different sectors in the food chain, from farmers to supermarkets to consumers, all need to pay a share of the hidden costs. Consumers also have a vital part to play, not only by demanding safer food and farming practices, but also by being prepared to pay a little more for their food to allow for this.

Over 50,000 tonnes of old, unwanted pesticides are scattered across Africa in poorly maintained stores, leaking into soil and water. Removing this toxic waste will cost over US$ 150 million.

10. Some good news stories

But it is not all bad news, in fact, there are many, small positive steps being taken by millions of people all over the world to move away from pesticides. Growing and buying organic food and textiles is one obvious route, although it is still difficult for many farmers to make this shift and for many consumers to find or afford organic produce. PAN *UK* fully supports the organic ethos and also believes it is essential to push for change in the 97% of the farming sector that is non-organic and still relies on synthetic pesticides.

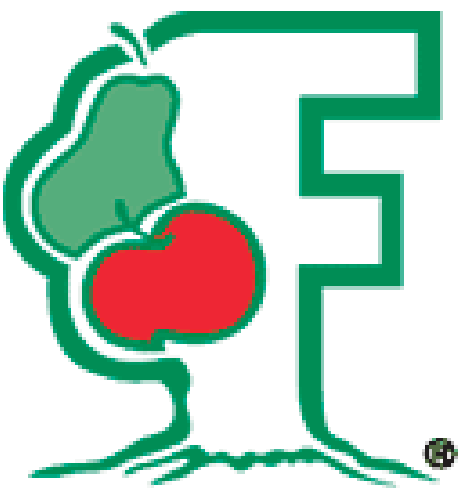
There are increasing numbers of encouraging initiatives and success stories. For example, in the last eight years, almost 2,000 small and medium scale farmers growing rice, vegetables, fruit and nuts in Iran have drastically cut back their use of insecticides, thanks to season-long, practical training in Farmer Field Schools. By learning about natural methods of pest management and experimenting with safer and more sustainable ways to grow a healthy crop and conserve soil and water, these farmers have also been able to save money, get

Organic Farmer Field School for vegetable farmers in Ghana.

better harvests and earn more income for their families. Rice farmers have cut the number of pesticide sprays from around nine per season, to just one or two, and some have managed to do without pesticides altogether. The trained farmers are now producing rice that is free of residues and are raising local consumer awareness about pesticide hazards and building demand for safe food and farming. An added bonus is that the dramatic reduction in pesticide water pollution is helping to protect the endangered Siberian Crane, a rare and beautiful bird that breeds in Iranian farmland.

In several African countries, farmers are getting involved in organic cotton production, as a healthier and more profitable farming system for their communities. PAN *UK* works with partners in Europe and Africa to build greater market demand for organic textiles and clothing, encouraging small and large businesses, fashion designers and consumers to opt for organic and to help support more environmentally friendly and socially just livelihoods for Africa's millions of poor cotton farmers.

In Europe too, some progressive companies and farmers' associations are cutting back on pesticides. The Walloon Integrated Production Fruitgrowers Association (GAWI) in Belgium, created 20 years ago, supports almost 50 apple and pear growers to reduce their use of pesticides and to manage their orchards to encourage wildlife and natural pest control. GAWI carries out training and research on sustainable orchard production. It markets members' fruit under a special FruitNet label, in one of the main Belgian supermarkets and through schools and farm shops.



The FruitNet label

BOX 4.

In Senegal, PAN *UK* and PAN Africa work with 2,000 farm families growing fruit and vegetables, either organically or with greatly reduced use of pesticides. Madame Jeanne Diatara of the Senegalese Network of Women in Organic Agriculture & Fair Trade promotes closer links between organic farmers and consumers in Senegal. She says "You can certainly taste the difference between our organic tomatoes and those on the local market that are full of chemicals. But only a few consumers really understand the difference so we farmers need to raise awareness of the Senegalese public of where their produce comes from and how it is grown". Mr Elhadji Hamath Hane, organic farmer and founder member of AGRINAT, which runs a weekly market stall, explains further: "Growing vegetables by organic or other methods that do not rely on pesticides certainly requires more time and effort but there is currently no market reward for safer food in Senegal. We need to develop market outlets that recognize the extra effort and expense in growing without hazardous pesticides". Five farmers associations trained in organic and IPM methods now plan to supply residue-free produce direct to Senegalese hospitals, as sick people deserve the healthiest food available. They plan to combine this with educational leaflets about the hazards of pesticides for consumers and for farming communities.

11. What can I do personally?

(1) Firstly, do not stop eating fruit and vegetables! Eating the recommended “five a day” is important to good nutrition.

(2) Consider, however, what foods you and your family eat most frequently. If you are unable to switch to a completely organic diet, start with buying organic produce for those foods which you eat most often or which are most likely to contain pesticide residues. Up to date assessment of pesticide residue data is available on the PAN *UK* web pages (details on page 34), but at the date of this booklet, the ten worst foods for residues during 2000-2006 were flour, potatoes, bread, apples, pears, grapes, strawberries, green beans, tomatoes and cucumbers. Conversely, foods which were least likely to contain residues were squash, cauliflowers, corn-on-the-cob, peaches and plums, so you would not need to prioritise buying organic versions of these. Note that this information is only accurate for food tested on sale in the UK. In other countries, the worst and least contaminated may be different.

(**3)** Wash non-organic fruit and vegetables well. Do not eat the peel of non-organic citrus fruit – that is where the highest concentration of residues is. If you are using the peel, buy organic.

(**4)** Buy fruit and vegetables that are not cosmetically perfect! They will taste the same, and be just as nutritious. Many pesticides' sole function is to produce the perfect fruit/vegetable. Only when consumers show that they are willing to buy blemished produce will supermarkets and growers have to stop hiding behind the argument that "it's what customers want" when asked about their pesticide policies.

(5) Organic box schemes for fruit and vegetables, and often other foods, are increasingly available across the UK. These are often supplied by local growers, so farmers tend to get better prices for their supplies, and the food miles of the goods can be lower:

all good reasons to support these schemes. Farmers' markets (another good choice for the support of local growers) usually sell conventional as well as organic produce; again, try to buy organic for those foods you eat most frequently. You can take advantage of direct contact with farmers to ask them about their pesticide practice.

(6) Ask questions of your local supermarket – what are they doing about reducing residues? Are they improving their labelling to give better information to consumers? Are they supporting growers who are making efforts to reduce or phase out pesticides? You can find suggestions on PAN *UK*'s Hidden Extras web pages for contacting your food retailers to demand change.

(7) Grow your own organic fruit and vegetables! This way, you will know that nothing toxic has been used on them. Even a window box can grow a crop of salad; a small patio can accommodate pots of tomatoes. Sign up to receive PAN *UK*'s regular tips for organic gardening. See section 12 for organisations which give detailed advice on growing organically.

(8) Cotton is the most pesticide intensive crop in the world and many poor cotton farming families and workers in Africa, Asia and Latin America suffer poisonings and fatalities. By purchasing organic cotton clothing, cotton wool and sanitary products, bed linen and other textiles, you are contributing to chemical-free, healthier and better livelihoods for a cotton-growing community. Unlike food, pesticide residues in non-organic cotton items are not monitored. Although these generally pose less risk than food residues, for many people with skin conditions, such as eczema, and small children, it makes sense to avoid all skin contact with harsh or harmful chemicals. You can find out which UK stores and companies now sell organic cotton products via PAN *UK*'s website *www.WearOrganic.co.uk.*

(9) Support organisations, such as PAN *UK*, Garden Organic and the Soil Association, who are campaigning to make real changes in the ways food is produced.

(10) Have your say as a concerned citizen on UK and EU pesticide, food and farming policies – you can contact your MP, relevant Ministers and your European Parliament representatives. Contact PAN *UK* for details of how to get active and get up to date via the information on the PAN Europe website *www.paneurope.info*

(11) Buy Fair Trade and Rainforest Alliance labelled produce, as these schemes take an important step in reducing or eliminating some of the most hazardous pesticides, therefore better protecting farmer and worker health, and encouraging farmers to shift to safer pest management.

(12) Finally, get better informed by reading some of the information in the list below and on our website.

Subscribe to PAN *UK*'s Gardening Tips for tips on pesticide free garening

12. Further reading and resources

A reference list for the information mentioned in this booklet can be accessed via the PAN *UK* website under Publications, and an electronic version of the booklet can be downloaded.

PAN *UK* Publications

Web pages accessible via PAN *UK* home page *www.pan-uk.org*

Hidden Extras: **the pesticides in your food.**
Detailed information on residues and monitoring.

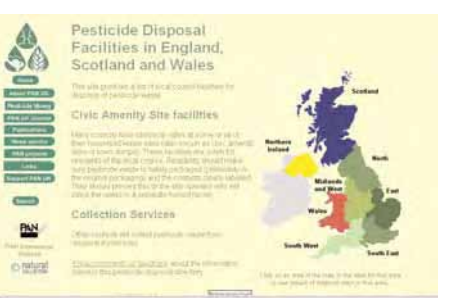
Food and Fairness: **Changing supply chains for African livelihoods and environment**
Issues of supporting small-scale farmers to shift to safer pest management and growing healthy food for African and European consumers

www.WearOrganic.org
All about organic cotton, including a directory of UK retailers, plus reports on pesticide problems in conventional cotton

Web directories

Disposal website
Info for UK householders on how to get rid of unwanted home and garden pesticides safely. *http://www.pesticidedisposal.org/*

Directory of least-toxic pest control solutions and products
Alternatives for home & garden use in the UK.
http://www.pan-uk.org/Projects/Local/alt~dir/a~z~pest.htm



Books and reports (*indicates those downloadable from the PAN *UK* website)

The Chemical Trap:
Stories from African fields
Colour booklet, 2007*.

My Sustainable T-shirt
Colour booklet, 2007*.

The deadly chemicals in cotton
Report, in collaboration with Environmental Justice Foundation, 2007*.

Living with Poison.
Problems of endosulfan in West African growing systems.
Report, 2006*.

The alternative residue report 2005:
what the government doesn't tell us.
Report, 2005*.

Pesticides in schools and how to avoid them!
2005.

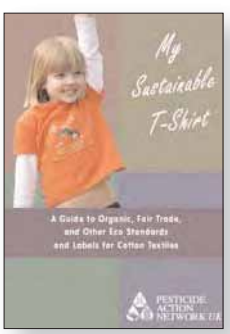
Pesticides in Your Food.
Poster, 2005*.

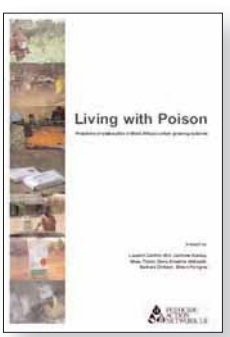
Exposed:
Rethinking pesticides in our homes, gardens and communities
Video for community groups, 2004.

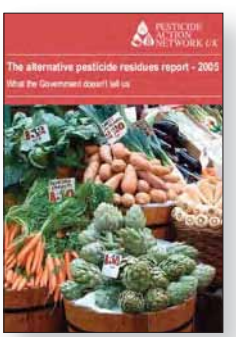
People's pesticide exposures:
Poisons we are exposed to everyday without knowing it
Report, 2004.

Pesticide exposure and health:
the PEX briefings
Set of leaflets, 2003*.

The Dependency Syndrome:
Pesticide use by African smallholders
Book, 126 pp, 2003.







The Pesticide Trail:
a student investigation
Video and workpack for secondary school students, 2003.

Silent Invaders:
pesticides, livelihoods and women's health
Book, 342 pp, 2003.

Learning to cut the chemicals in cotton
Training manual, 2000.

Organic cotton:
from field to final product
Book, 272 pp, 1999.

Gardening Tips
Pesticide-free gardening tips-electronic leaflet, every 6-8 weeks at *http://www.pan-uk.org/Info/gardening.htm* or email roslynmckendry@pan-uk.org to receive these by email

Books available from the PAN *UK* bookstore

The Pesticide Detox:
Towards a more sustainable agriculture
Ed. J Pretty, Earthscan, 2005.

Silent Spring
Rachel Carson. Latest edition of 1962 classic, Penguin, 2000.

Not on the Label:
What really goes into the food on your plate
Felicity Lawrence. Penguin, 2004.

Stop the 21st century killing you
Dr Paula Baillie-Hamilton. Vermillion, 2005.

Having Faith:
an ecologist's journey to motherhood.
Sandra Steingraber. Perseus Press, 2002.

Living Downstream:
a scientist's personal investigation of cancer and the environment Sandra Steingraber. Random House, 1998.

For details on how to obtain these and other printed publications, look at the web pages *http://www.pan-uk.org/Publications/index.htm* or contact admin@pan-uk.org.

Other resources on organic food and gardening without pesticides

Garden Organic
Garden Organic provides lots of simple advice on how to grow food and flowers organically in your garden and can help community groups and schools to start an organic plot.
www.gardenorganic.org.uk

Soil Association
The Soil Association promotes sustainable, organic farming and championing human health. Their site has lots of information on organic food and farming for consumers and producers.
www.soilassociation.org

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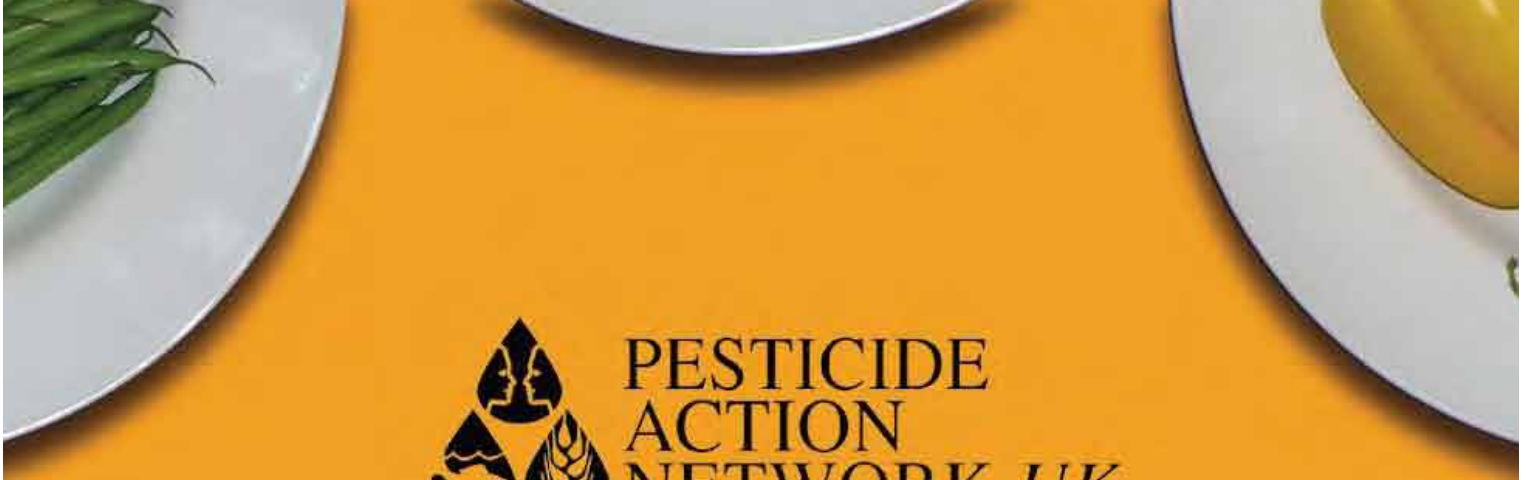
PESTICIDE ACTION NETWORK *UK*



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PAN *UK* works to eliminate the dangers of toxic pesticides, our exposure to them, and their presence in the environment where we live and work. Nationally and globally, we promote safer alternatives, the production of healthy food, and sustainable farming.

ISBN: 978 0 9549542 6 0