

Tobacco and the environment

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Introduction



The life cycle of a cigarette takes a heavy toll on the environment from growing the tobacco plant to the disposal of butts and packaging. Although the ecological impacts of tobacco are overshadowed by its devastating effects on human health, they are nevertheless considerable and a cause for concern.

-  Tobacco cultivation is responsible for biodiversity losses, land pollution through the use of pesticides, as well as soil degradation, deforestation and water pollution.¹
-  Tobacco plants consume nutrients at a higher rate than most crops.¹
-  Cigarette-manufacturing machines use up to four miles of paper an hour to roll and package cigarettes.²
-  Cigarette butts are washed into rivers, lakes and the ocean where they are eaten by birds, animals and fish.³
-  While the global share of agricultural land used for tobacco growing is less than 1%, its impact on global deforestation is 2–4%, making a visible footprint for climate change.¹

The Framework Convention on Tobacco Control recognises the need for “due regard to the protection of the environment and the health of persons in relation to the environment in respect of tobacco cultivation.”⁴


Tobacco growing and pesticides


Tobacco plants are sensitive and prone to many diseases. Consequently, tobacco farmers are forced to use large amounts of fertiliser, herbicide and pesticides. Among the pesticides commonly used are imidacloprid, chlorpyrifos, 1,3—dichloropropene, aldicarb, dithane DF and methyl bromide:


-  Aldicarb is extremely toxic. Less than one one-thousandth of an ounce is a lethal dose for a human and the agricultural formulation of aldicarb contains dichloromethane which is a known carcinogen.⁵ Aldicarb, which is also toxic to birds, fish, bees and earthworms,⁶ has been found in the groundwater of 27 states in the US.⁵ In the United States it was licensed for use on tobacco plants as recently as 2007.⁷
-  Imidacloprid is a relatively new pesticide which is chemically related to nicotine and works by blocking the central nervous system of insects. It is also highly toxic to birds, fish and bees. According to the US

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Environmental Protection Agency, imidacloprid has the potential to leach into groundwater.⁸

 Chlorpyrifos affects the nervous system and has been associated with human birth defects as well as genetic damage to human blood and lymph cells.⁶ In the United States, chlorpyrifos was re-registered for use by the Environmental Protection Agency in 2006 and is expected pass a Registration Review being conducted in 2009.⁹

 1,3-Dichloropropene (also known as 1,3-D or Telone) is a highly toxic soil fumigant which causes respiratory problems, skin and eye irritation and kidney damage. It is widely used amongst tobacco growers in the United States.¹⁰

 Methyl bromide, an ozone-depleting chemical, was commonly used to fumigate the soil prior to planting tobacco seedlings until the end of the 1990s. In 1997, over 5.5 million pounds of methyl bromide were applied to tobacco fields worldwide.¹¹ Under the “Montreal Protocol on Substances that Deplete the Ozone Layer” use of this chemical will be phased out by 2015.^{12 13}

In developing countries, where the majority of tobacco is grown, environmental laws are often non-existent, and farmers lack protective equipment or training in the handling of hazardous pesticides.¹⁴ Not only are tobacco growers at risk from exposure during the application and storing of the pesticides but the chemicals leach into soil, find their way into streams and rivers and contaminate drinking supplies and food chains.³⁰ These substances may also be indirectly causing the genetic selection of pesticide-resistant mosquitoes or flies, making the control of diseases such as malaria much more difficult.¹⁵

In western countries laws exist to protect farm workers from exposure to pesticides. However the use of these chemicals still poses a threat to human health and ecosystems. Pesticides used in tobacco production have been found in surface and groundwater in the United States^{16 17} and are believed to be responsible for wildlife deaths.⁵

The WHO has expressed concern about neuropsychiatric effects among tobacco workers of exposure to organo-phosphate pesticides, with studies indicating increased rates of depression and suicides in Brazil among tobacco farmers.^{18 19} A recent study of children working on tobacco farms in Mexico found that the children were exposed to toxic levels of pesticides and had high rates of depression and anaemia.²⁰

Despite actively encouraging tobacco growers to use chemical pesticides in the early 1990s,²¹ tobacco companies now claim to be taking steps to reduce the amount of pesticides used. According to BAT, changes in farming practice have resulted in “only 1.3kg of pesticide being applied per hectare of tobacco plants in Brazil”.²²

Green tobacco sickness


In addition to the health risks posed by using pesticides, tobacco growers are susceptible to an occupational illness known as “green tobacco sickness” (GTS). The illness is caused by the absorption of nicotine through the skin from contact with wet tobacco leaves. Symptoms of GTS include nausea, weakness, dizziness and abdominal cramps, and fluctuations in blood pressure and heart rates. A review of 31 studies of health risks associated with tobacco farming found that seasonal prevalence of GTS ranged from 8% to 89%. Incidence was reported to be


1.9 cases per 100 person days.²³ Other studies have found that around a quarter of tobacco pickers have suffered from GTS at least once.^{24 25 26} A study by children's rights organisation, Plan, found that children who work as tobacco pickers are particularly prone to GTS and may absorb up to 54mg of nicotine a day, causing severe health problems.²⁷


Philip Morris USA is now distributing information about green tobacco sickness to tobacco growers.²⁸


Tobacco and deforestation


In the developing world, trees are often cut down to make room for tobacco crops and more trees are cut down for use during the curing process. After harvesting, tobacco must be cured (dried), to preserve it for storage, transport and processing. "Sun" or "air" curing involves leaving the tobacco to dry naturally but can take several months. Many farmers "flue cure" their tobacco, which means it is "hung in specialized curing barns where heated air removes water from the leaves".²⁹ This process takes a week and farmers generally burn wood to heat the air. Trees are also felled for the construction of curing barns.


 Around 600 million trees are cut down every year to produce tobacco products.³⁰

 In Brazil, the 200,000 tobacco-growing families use an average of 3 kilograms of wood to cure 1 kilogram of tobacco.³¹ According to the WHO, the negative consequences of tobacco farming are "clearly visible in the form of forest devastation, erosion and abnormally low water levels."³²

 Between 1990 and 1995, tobacco growing accounted for 26% of deforestation in Malawi.³³

 In semi-arid areas, where tobacco thrives, the additional loss of trees can make land even more vulnerable to desertification and unfit for agriculture. For example, in the tobacco growing Aura district of north west Uganda, sheet erosion is now very evident and much of the topsoil has been washed away.³⁴

 In the Urambo tobacco-growing region of Tanzania land clearing for tobacco planting is responsible for 3.5% of annual deforestation while farmers use an average of 23m³ of stacked wood per season for curing. This adds another 3% of deforestation.³⁵

 Tobacco growing in the Tabora Region of Tanzania has decimated the Miombo Forests.³⁶

Faced with dwindling sources of wood fuel, the tobacco industry has attempted to address the problem by encouraging tobacco farmers to plant trees.³⁷ However, the plantations set up by British American Tobacco in Kenya, for example, consist largely of non-native, fast-growing eucalyptus and cypresses which adversely affect biodiversity and can lower the water table.

Impact on food production

When farmers grow tobacco, there is less land available for food crops. Even though tobacco growing is rotational, with different crops being planted in alternate years, tobacco soil is prone to wind and water erosion which means that soil which has been used to grow tobacco is sometimes unsuitable for food crops.³⁸ In addition to this, tobacco plants use more nutrients than many other crops, which leads to further degradation of the soil.³⁹ It has been estimated that 10 to 20 million people could be fed by food crops grown instead of tobacco.¹⁵

The tobacco industry argues that tobacco farming brings economic benefits to developing countries. However, the World Health Organisation disputes this, saying that the “overwhelming majority of the profits go to the large companies, while many tobacco farmers find themselves poor and in debt.”⁴⁰ For further information about tobacco and the developing world see: [ASH Fact Sheet: Tobacco and the Developing World](#)

Pollution Cigarette and cigar manufacturing results in large quantities of waste in the form of tobacco slurries, solvents, oils, paper, wood, plastics, packaging materials and airborne pollution.⁴¹

Cigarette manufacturing produces liquid, solid, and airborne waste, all of which are cause for environmental concern, but it is the chemical waste which is the greatest threat to the environment.⁴¹ In the United States it was reported in 1992 that tobacco manufacturing produced more than 27 million kilograms of hazardous chemical waste. 2.2 million kilograms of this waste was released into the environment. At that time the tobacco industry was rated 18th in the list of industrial chemical waste producers.⁴²

Cigarette smoke is a known environmental pollutant and classified as a Class A carcinogen by the US Environmental Protection Agency. It also contains small amounts of radioactive material. Lead-210 and polonium-210 are absorbed from the soil by the leaves of the tobacco plant and remain during the curing and manufacturing process. Some phosphate fertilizers favoured by the tobacco industry also contain radioactive materials which contribute to increased radioactive levels in the soil.⁴³ Radiation is not only released into the atmosphere when a cigarette is smoked but leached into soil and waterways from cigarette stubs discarded by smokers.

Cigarette filters are made from cellulose acetate, a type of plastic that can take up to 12 years to decompose. The estimated 4.5 trillion cigarette ends discarded across the world each year are believed to kill millions of birds, fish and other animals^{44 45 46} and are sometimes eaten by young children.⁴⁷ Cigarette butts are the most littered item in the world with an estimated 4.5 trillion cigarettes being littered each year across the globe according to The Ocean Conservancy, a group that monitors marine pollution. Their 2009 report, *A Rising Tide of Ocean Debris*, found that cigarette materials constituted 28% (3,216,691 items) of the total amount of debris collected in their 2008 international coastal cleanup. This was more than twice the amount of any of the other 43 debris items listed in the report.^{44 48}

Studies from numerous countries confirm that cigarette waste is the most prevalent form of street litter.^{49 50 51} In the UK cigarettes are also the principal source of street litter, accounting for 70% - 90% of all litter in urban areas. According to the Department for the Environment, Food and Rural Affairs, cigarette litter can be found on 79% of UK streets.⁵² An estimated 200 million cigarette butts are dropped every day, amounting to 122 tonnes of rubbish.⁵³

Cigarettes and fire risk Cigarettes and matches are a common cause of fire. Between 1995 and 2005 there were on average 4,300 house fires a year started by smokers' materials. In 2005, smokers' materials caused the deaths of 110 people in homes, accounting for one third of all deaths in domestic fires in the UK.⁵⁴ It has been estimated that the average cost of a domestic house fire in the

UK is £24,9000.⁵⁵

A survey carried out by the European Commission of 14 members states and Norway carried found that 11,000 fires causing € 13 million of material damage, 1,600 injuries and 520 deaths occur each year.⁵⁶





In the United States fires caused by smoking materials are the number one cause of fire-related deaths, killing 780 people and injuring 1,600 others in 2006. Eighty-nine percent of the deaths and 82 percent of the injuries were in home fires.⁵⁷ Property losses from these fires total hundreds of millions of dollars each year.⁵⁷

There is even a documented case in the UK of a lit cigarette being used by a bird making a nest which led to a shop being destroyed by fire.⁵⁸

Tobacco and climate change

All stages of cigarette production and consumption contribute to global warming, from the growing and curing of tobacco (and associated deforestation) to manufacturing and promotion and to the smoking and disposal of tobacco products. Global warming is now widely believed to be the single biggest environmental threat facing the planet.⁵⁹ Global warming is caused by increased levels of carbon dioxide and other polluting gases in the atmosphere. These gases are released by the burning of fossil fuels and cutting down of forests and are believed to contribute to the so-called “greenhouse effect”. Some scientists believe that global warming has led to irreversible climate change.

Cigarette production is contributing to climate change because:

-  The cutting and burning of wood or other fuels for curing tobacco adds to the greenhouse effect.
-  Tobacco farmers often burn trees when clearing land. This burning releases large quantities of carbon dioxide into the atmosphere.⁶⁰
-  Deforestation has meant there are fewer trees available to absorb the excess carbon dioxide.
-  Smoke from cigarettes contains carbon dioxide and methane. Smoking releases about 2.6 billion kilograms of carbon dioxide in the air worldwide every year. It also releases about 5.2 billion kilograms of methane every year.⁶⁰

Industry response

Internal tobacco industry documents released through litigation in the United States have revealed that the tobacco industry was involved in initiatives that cast doubt on the evidence supporting climate change and may have hindered progress towards tackling the problem.⁶¹ However, all the major companies now have plans in place to reduce carbon dioxide emissions and they acknowledge the potential harm that climate change could have on their businesses and the environment.^{62 63 64} BAT has calculated the intensity of total emissions per unit of production volume (per million cigarette equivalent measure). In 2006 the company’s emissions per million cigarettes equivalent produced was 0.79 T Co2e. BAT claims to have reduced its CO2 emissions per unit produced by 43% over the past 5 years.⁶² In 2006 BAT produced 689 billion cigarettes.⁶⁵ Thus the equivalent output in carbon dioxide was approximately half a million tonnes.

Further information

[British American Tobacco’s Policy on Environmental Management](#)
[Philip Morris USA website: “Reducing our environmental impact”](#)

References

- 1 World Health Organization. Study group on economically sustainable alternatives to tobacco growing (in relation to Articles 17 and 18 of the Convention). Conference of the Parties to the WHO Framework Convention on Tobacco Control. South Africa 2008. [\[View paper\]](#)
- 2 University of California, Berkeley. Tobacco and the Environment. Health and Human Services Department website. <http://www.ci.berkeley.ca.us/publichealth/tobacco/envIRON.html>
- 3 Ocean Conservatory. International Coastal Cleanup: a rising tide of ocean debris. 2009 [\[View report\]](#)
- 4 The WHO Framework Convention on Tobacco Control (Part V, Article 18: Protection of the Environment) <http://www.fctc.org/> [\[View treaty text\]](#)
- 5 Cox, C. Aldicarb. Journal of Pesticide Reform, Summer 1992.
- 6 Pesticide Action Network North America. <http://www.panna.org/files/tobacco.dv.html>
- 7 US Environmental Protection Agency website. Aldicarb Re-registration Eligibility Decision; Notice of Availability. October 12, 2007. <http://www.epa.gov/EPA-PEST/2007/October/Day-12/p20105.htm>
- 8 Pesticide Action Network UK: Imidacloprid <http://www.pan-uk.org/pestnews/Actives/imidaclo.htm>
- 9 Chlorpyrifos Protects website. (Dow Agrosciences) EPA Registration Review [\[View website\]](#)
- 10 Southeast Farm Press website. Telone shortage sends growers searching for alternatives. 1 April 2009. [\[View website\]](#)
- 11 Pesticide Action Network North America website: Tobacco, farmers and pesticides.2 1998 [\[View website\]](#)
- 12 United Nations Development Programme. Phasing Out Ozone Depleting Substances and Safeguarding the Global Climate [\[View website\]](#)
- 13 United Nations. Handbook for the Montreal Protocol on substances that deplete the ozone layer. 7th edition. 2006. [\[Download handbook\]](#)
- 14 Golden leaf, barren harvest. The costs of tobacco farming. Campaign for Tobacco Free Kids. Washington DC, 2001
- 15 Barry, M. The influence of the US Tobacco industry on the health, economy, and environment of developing countries. New England J Medicine 1991; 324: 917-9
- 16 Harned, D.A. Pesticides in surface and ground water at four sites of intensive tobacco cultivation in the Piedmont of North Carolina: Proceedings of the American Water Resources Association, National Symposium on Water Quality, AWRA TPS-94-4, Chicago, Illinois, November 1994. (p. 275-283) [\[View article\]](#)
- 17 North Carolina Cooperative Extension Service. Burley Tobacco Guide 2009. North Carolina University Center for Integrated Pest Management. 2009. [\[View document\]](#)
- 18 Salvi RM et al. Neuropsychiatric evaluation in subjects chronically exposed to organophosphate pesticides. Toxicological Sciences 2003; 73: 267-271
- 19 Jamal GA et al. A clinical neurological, neurophysiological, and neuropsychological study of sheep farmers and dippers exposed to organophosphate pesticides. Occupational and Environmental Medicine 2002; 59: 434-441.
- 20 Gamlin J, Diaz Romo P, Hesketh T. Exposure of young children working on Mexican tobacco plantations to organosphorous and carbamic pesticides, indicated by cholinesterase depression. Childcare Health Development 2007; 33(3):246-8. [\[View abstract\]](#)
- 21 Tobacco--The Smoke Blows South. Panos Media Briefing No. 13, September 1994. [\[Download briefing\]](#)
- 22 Sleeping with the enemy? Special Report on Biodiversity. World Tobacco March 2005
- 23 Schmitt N et al. Health risks in tobacco farm workers – a review of the literature. J Pub Health 2007; 15: 255-264 [\[View abstract\]](#)
- 24 Wall Street Journal Online. Tackling green tobacco sickness. 24 March 2009. [\[View article\]](#)
- 25 Arcury TA. et al. The incidence of green tobacco sickness among Latino farmworkers. J Occup Environ Med 2001; 43:601-609.
- 26 Arcury TA, Quandt SA, Preisser JS: Measuring occupational illness incidence and prevalence in a difficult to study population: green tobacco sickness among Latino farmworkers in North Carolina. J Epidemiol Community Health 2001; 55:818-824

- 27 Hard work, long hours and little pay. Research with children working on tobacco farms in Malawi. Plan, 2009. [View report](#)
- 28 Philip Morris/Altria USA: "Green tobacco sickness" http://www.altria.com/responsibility/4_5z_2_1_GreenTobaccoSickness.asp
- 29 Philip Morris website. "From seed to curing". 2009 <http://www.philipmorrisinternational.com/PMINTL/pages/eng/community/farming.asp>
- 30 Farrell, B. Tobacco stains. The global footprint of a deadly crop. In These Times. October 2007 [\[View document\]](#)
- 31 Geist H, Chang K-t, Eteges V, Abdallah JM. Tobacco growers at the cross-roads: Towards a comparison of diversification and ecosystem impacts. Land Use Policy 2009; 26 (4): 1066-1079
- 32 Assistance and Management of Studies about Nature. Human Development and Agro-Ecology, 2007 Submission to the Public Hearing on Agricultural Diversification and Crop Alternatives to Tobacco for the WHO FCTC (Brasilia, Brazil, 26 February 2007)
- 33 Millington A and Jepson W. (eds), Land-change science in the tropics: Changing agricultural landscapes. Springer: New York. 2008. Ch 14.
- 34 BAT's Big Wheeze. The alternative British American Tobacco social and environmental report. ASH, Christian Aid and Friends of the Earth, 2004
- 35 Mangora, M. Ecological impact of tobacco farming in miombo woodlands of Urambo District, Tanzania. African Journal of Ecology. 2006. 43:4: 385-391. Published online 13 Jan 2006. [\[View abstract\]](#)
- 36 Waluye, J. Presentation at the 13th Annual World Conference on Tobacco or Health. [\[View website\]](#)
- 37 The British American Tobacco Biodiversity Partnership <http://www.batbiodiversity.org/>
- 38 Horticultural crops: tobacco. Ontario Ministry of Agriculture, Food and Rural Affairs website. 5 June 2009. <http://www.omafra.gov.on.ca/english/environment/hort/tobacco.htm>
- 39 World Health Organization. Study group on economically sustainable alternatives to tobacco growing (in relation to Articles 17 and 18 of the Convention). Conference of the parties to the WHO Framework Convention on Tobacco Control. South Africa 2008. [\[View paper\]](#)
- 40 Tobacco increases the poverty of individuals and families. WHO 2004 http://www.who.int/tobacco/communications/events/wntd/2004/en/factsindividuals_en.pdf
- 41 Novotny TE, Zhao F. Consumption and production waste: another externality of tobacco use. Tobacco Control 1999; 8: 75-80. [\[View abstract\]](#)
- 42 Dorgan CA. Statistical record of the environment, 3rd ed. New York. 1995.
- 43 Tobacco smoke. US Environmental Protection Agency. 21 May 2009. [\[View website\]](#)
- 44 International Coastal Cleanup: a rising tide of ocean debris. Ocean Conservatory, 2009 [\[View report\]](#)
- 45 Litter Lookout Summary Report: Hey Nova Scotia, it's time to clean up! 2008. Nova Scotia Department of the Environment. [\[View report\]](#)
- 46 Roe, D. Marine debris: killers in our oceans. National Parks Journal. Dec 2007 - Jan 2008; 51(6) [\[View article\]](#)
- 47 US Department of Health and Human Services. Ingestion of Cigarettes and Cigarette Butts by Children -- Rhode Island, January 1994-July 1996. Morbidity and Mortality Weekly Review. February 14 1997. 46. 6: 125-128.
- 48 Cigarette litter remains a beach bane. CBS News 7 June 2007 [\[View article\]](#)
- 49 Moriwaki H, Kitajima S, Katahira K. Waste on the roadside, 'poi-sute' waste: Its distribution and elution potential of pollutants into environment. Waste Management March 2009; 29(3):1192-7.
- 50 Oigman-Pzczol SS, Creed JC. Quantification and classification of marine litter on beaches along Armacao dos Buzios, Rio de Janiero, Brazil. Journal of Coastal Research. March 2007; 23 (2): 421-428. [\[View abstract\]](#)
- 51 Martinez-Ribes L, Basterretxea G, Palmer M, Tintor J. Origin and abundance of beach debris in the Balearic Islands. Scientia Marina. June 2007. 71(2): 305-314. [\[View document\]](#)
- 52 Department for the Environment, Food and Rural Affairs. Preventing cigarette litter in England: guidelines for local authorities. DEFRA 2007. [\[View document\]](#)
- 53 Encams Facts and Figures [\[View research\]](#) [accessed 28 Nov 2007]
- 54 Fire Statistics United Kingdom, 2005. National Statistics, 2007. [\[View report\]](#)

- 55 Office of the Deputy Prime Minister. The Economic Cost of Fire. ODPM. April 2006. [[View document](#)]
- 56 Vogelsang J. European Commission Presentation to Harvard School of Public Health December 2006
- 57 Coalition for Firesafe Cigarettes. "Fast facts"
<http://firesafecigarettes.org/itemDetail.asp?categoryID=86&itemID=1188&URL=Research/Fast%20facts>
- 58 <http://www.dailymail.co.uk/news/article-1172603/The-sparrow-turned-village-shop-ashtray-taking-lit-cigarette-nest.html>
- 59 Friends of the Earth website: "Safe climate" [[View website](#)]
- 60 Florida State University Research Foundation. "Science, tobacco and you: global warming." [[View website](#)]
- 61 Monbiot, G. The denial industry. The Guardian, 19 September 2006 [[View article](#)]
- 62 BAT response to Carbon Disclosure Project [[View response](#)]
- 63 Japan Tobacco. Response to the Carbon Disclosure Project, 2004 [[view response](#)]
- 64 Imperial Tobacco Group. Response to the Carbon Disclosure Project 29 Feb 2004 [[View document](#)]
- 65 BAT Annual Review and Summary Financial Statement 2006

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