

Tobacco and the Environment

September 2021

Introduction

Tobacco kills up to half of its users, this equates to 8 million deaths a year globally and is currently the world's single biggest cause of preventable death.^{1 2} Tobacco use remains a significantly important public health issue. In addition to its harmful impact on human health, recent research has shown that smoking is also causing devastating environmental damage. In addition to research focussing on the direct effects of cigarette smoking on human health, greater attention must be attributed towards the harmful effects of tobacco on the environment and the ecosystem.

The environmental costs of tobacco production and consumption have not been extensively studied, however a growing body of evidence demonstrates that the tobacco industry is having a significant effect on the planet's natural resources and vulnerable ecosystem.^{3 4 5} Every stage of the tobacco supply chain poses serious environmental consequences, including deforestation, the use of fossil fuels and the dumping or leaking of waste products into the natural environment.^{3 4 5} Post consumption, cigarette butt littering represents not only a public nuisance but are exerting hazardous and toxic effects on the environment and ecosystems where they end up.

The tobacco industry's role in sustainability

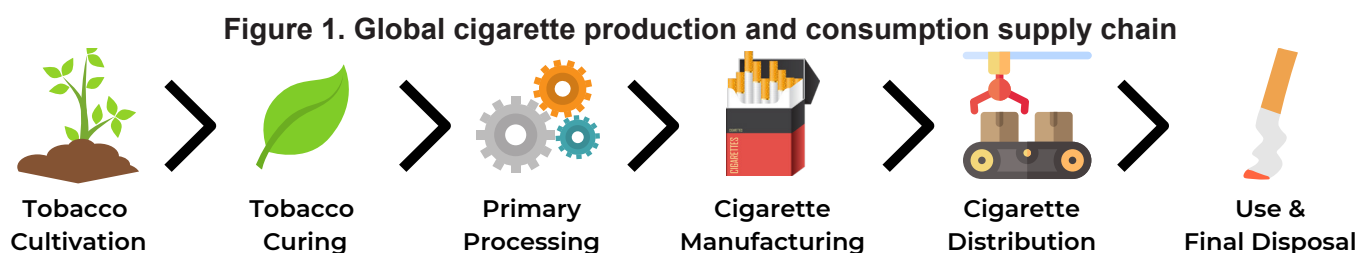
Assessing the environmental impact of the tobacco industry across the entire supply chain is complex. In the absence of mandatory guidelines to ensure open and transparent reporting of environmental data, companies can arbitrarily set environmental goals and choose not to fully disclose data.^{5 6 7 8} Consequentially this obscures the actual environmental impact, and does not make those responsible accountable for their environmental impact.⁷

Despite its enormous profitability, the industry bears few of the health and environmental costs caused by producing tobacco.^{7 8} China National Tobacco Company produces over 40% of all the world's cigarettes, yet does not provide comprehensive environmental data.^{8 9} This in effect means that almost half of the global environmental impact of tobacco is unaccounted for. In its 2020 sustainability report, British American Tobacco (BAT) stated one of its goals was to reduce emissions by 30% by 2025.¹⁰ However, on closer examination their emission target is only applicable to those under their "direct control", and excludes emissions embedded in the purchase of goods and services, transportation and distribution, capital goods, and activities influenced but not controlled by companies.^{7 10} One reason for this opacity is that it enables tobacco companies to avoid including emissions figures for farmers contracted through third parties,¹¹ accounting for a significant majority of their activity.^{7 10}

A report conducted by the United Nations Environmental Programme questions whether the profitability of major tobacco would still exist if they were held accountable and had to pay for the environmental impacts of their activities.¹¹ While smoking rates may be declining in many high-income countries, they are on the rise across many middle and low income countries. Consequentially as consumption increases so does the global environmental impact of the tobacco industry, this cannot be overstated.^{3 12} At present tobacco companies are not accountable for their environmental damage, nor the full costs of the environmental impact encompassing tobacco cultivation, product manufacturing or cleaning up post-consumer waste.^{3 5 11 12} In addition to avoiding full financial responsibility for the environmental impact of their business, tobacco companies are able to enhance their reputations and minimise harms through existing voluntary environmental data disclosure practices.^{3 5 11 12} It is unacceptable that the industry can continue to make billions in profits while washing its hands of the destructive environmental impacts of smoking.

The environmental impact of tobacco

Recent attempts to quantify the detrimental impact of the global tobacco industry were significantly advanced following an assessment conducted by Zafeiridou, Hopkinson & Voulvoulis, (2018)^{4 5} on behalf of the WHO Framework Convention on Tobacco Control (FCTC). For the first time, this report evaluated tobacco's global footprint across its entire supply chain. As can be seen in Figure 1 the tobacco supply chain in its entirety involves a number of stages each with divergent different environmental demands and consequences.^{4,5} The authors emphasised the stages of cultivation, curing, and manufacturing as being particularly resource intensive posing substantial environmental impacts.^{4 5} Each of these stages will be discussed in greater detail in the following sections.



The environmental footprint of a smoker

The environmental impact of being a smoker was also quantified at an individual level, highlighting the sizeable individual contribution of a single smoker, whereby even one cigarette is associated with an environmental burden.^{4 5}

The authors calculated the environmental impact of one person smoking a pack of 20 cigarettes every day for 50 years, these were quantified as:^{4 5 6}

- A total carbon footprint of 5.1t CO₂ equivalent emissions, which to offset, would require 132 tree seedlings planted and grown for 10 years.¹³
- A water footprint of 1,355 m³, which is equivalent to almost 62 years' water supply for any three people's basic needs.¹⁴
- Total fossil fuel depletion of 1.3 tonne oil equivalent, which is comparable to the electricity use of an average household in India for almost 15 years.¹⁵

Tobacco's efficiency and yield on resources was also highlighted, with the authors reporting that in comparison to the average consumer of sugar in one year a smoker contributes almost 5 times more to water depletion, nearly 10 times more to fossil fuel depletion and 4 times more to climate change.^{4 5} Research predicts that by 2025 cigarette consumption may rise from current levels of 6 trillion to 9 trillion sticks,¹⁶ this prediction has significant environmental consequences.^{3 5 16} This could result in required agricultural land use of 7.9 million hectares, water and fossil fuel depletion of 34 billion cubic metres and 5 Million tonnes oil equivalent respectively, and annual CO2 equivalent emissions reaching almost 130 Million tonnes.^{4 5} Summatively these findings have reinforced the ideal that smoking needs to be highlighted as a global problem affecting us all, not just smokers and those around them. Research evidence has irrefutably demonstrated the level of damage smoking is posing to the sustainability of our environment.^{4 5}

Assessing environmental impact during the lifecycle of tobacco

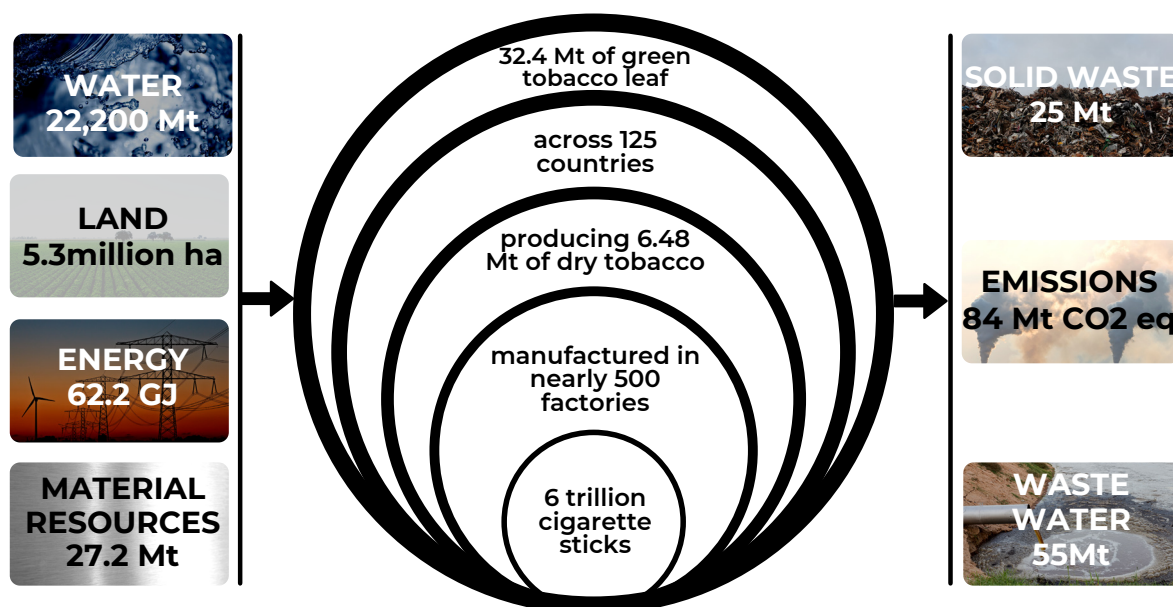
Key findings of research conducted by Zafeiridou, Hopkinson & Voulvoulis (2018) as illustrated in figure 2 were:^{3 4 5}

- The six trillion cigarettes manufactured each year globally take up some 5.3 million hectares of land and requires more than 22 billion tonnes of water.
- The cigarettes were manufactured in nearly 500 factories across 125 countries. The cultivation of 32.4 Million tonnes (Mt) of green tobacco, used for the production of 6.48 Million tonnes of dry tobacco in the six trillion cigarettes manufactured worldwide in 2014.
- All of this produced 25 megatons of solid waste, 55 megatons of waste water, almost 84 megatons of CO2 emissions to climate change – approximately 0.2% of the global total.

The authors' report utilises established life cycle analysis techniques to evaluate the global cigarette supply chain and consumption. To ensure rigour it incorporates available published data plus transparent assumptions based on international best practice where data gaps exist. Research findings report tobacco's total annual carbon footprint to be 84 million tonnes.^{4 5} To contextualise the magnitude of this, entire countries such as Peru and Israel have comparable emission levels. Similarly, findings reported 21 (Million tonnes oil equivalent) of fossil fuel were depleted on an annual basis, this is equivalent to the total primary energy consumption of New Zealand and Hungary. Parallel trends were also reported for water depletion, demonstrating water loss of 22,200 Million tonnes which is more than 2.5 times the annual water supply to the entire population of the UK.^{4 5 12 17 18}

The authors clearly demonstrated through their analysis that every stage of the global tobacco supply chain requires substantial resource inputs. Collectively, the environmental cost and impact posed by tobacco is vast. When considering the competing demands on our available natural resources, the value of tobacco as a commodity must be questioned. Zafeiridou, Hopkinson & Voulvoulis (2018) advocated that due to the detrimental environmental, health and economic tobacco poses, that it is incompatible with the global development agenda. The authors reiterated the importance of strategies aimed at dissuading uptake of smoking and reducing tobacco consumption levels.^{4 5}

Figure 2. Illustration of the annual mass flows across the global tobacco supply chain



Note: waste water excludes water losses at the farming and curing stages.⁵

TOBACCO CULTIVATION

Commercial tobacco farming takes place across 125 countries, primarily in Brazil, India and China.^{2 3 4 5} The global assessment of tobacco production reveals a massive imbalance.^{4 5} Tobacco companies have resultantly shifted 90% of their cultivation and production to lower income countries, in order to cut costs and circumvent regulation.^{5 8 19} To save money, tobacco plants are grown in monocultures – the practice of growing large amounts of one crop on an area of land.^{2 3 12 13 19} To combat the problems that arise from monocropping, the tobacco industry uses large quantities of chemicals and pesticides which pose hazardous risk to both the farmer and towards the environment.^{20 21 22 23} Every year between 1 and 5 million pesticide poisonings are reported which result in the deaths of an estimated 11,000 agricultural workers worldwide.²¹ For tobacco farming, irrigation and fertiliser use together drive more than 70% of the environmental damage across most impact categories.^{4 5}

Currently, 5.3 million hectares of fertile land is used to grow tobacco.^{4 5} There is evidence of substantial, and largely irreversible losses of trees.^{2 3 5} An estimated 1.5 billion hectares of forests have been lost worldwide since the 1970s, contributing to up to 20% of annual greenhouse gas increases.^{3 22} Due to the volatility of tobacco crop this land has a limited lifespan for tobacco production. Tobacco cultivation is promoted to farmers as a profitable venture, although recent years have seen increased costs of production along with declining global prices for tobacco.^{3 22 23} Not only is tobacco production labour and resource intensive, it is harmful to both the environment and farmers' health.³ Tobacco production also endangers food security, as growing tobacco diverts agricultural land that could otherwise be used to grow food.³ Under Articles 17 and 18 of the Framework Convention on Tobacco Control,³ parties are required to have due regard to the protection of the environment and to promote alternatives to tobacco growing.^{3 24} Policy recommendations were adopted by the 6th Conference of the Parties in November 2014.^{23 24} Zafeiridou, Hopkinson & Voulvoulis' (2018) research findings have provided clear and indisputable evidence that tobacco cultivation is not sustainable. Harmful impacts include pollution, soil degradation and deforestation, contributing to adverse climate change and biodiversity losses.^{3 4 6 12}

In addition to the health risks posed by using pesticides, tobacco growers are susceptible to the occupational illness "green tobacco sickness" (GTS).²⁵ The illness is caused by the absorption of nicotine through the skin from contact with wet tobacco leaves. Symptoms of GTS include headaches, nausea followed by vomiting,

weakness, dizziness and abdominal cramps, and occasional 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%. Children, who make up a significant proportion of tobacco farming workforces, are especially vulnerable to GTS. Not only because their body size is smaller relative to the dose of nicotine absorbed but they lack tolerance to the effects of nicotine, causing severe health problems.²⁵

TOBACCO CURING

To preserve tobacco leaves for storage, transport and processing after harvesting they must be cured (dried). “Sun” or “air” curing involves leaving the tobacco to dry naturally which can take several months. Many farmers “flue” cure their tobacco.^{3 25} During this process the leaves are hung and heated air removes water from the leaves. It is estimated that close to 50 million trees are cut down every year for that purpose.²⁵ Research has shown this process to be highly energy intensive with use of coal or wood contributing to greenhouse gas emission and deforestation.^{3 4 5 25} At the curing stage, the direct burning of wood and coal accounts for more carbon emissions than all other stages combined, releasing at least 45 Million tonnes CO2 equivalent globally in a year (that is excluding the deforestation impacts driven by the unsustainably sourced wood).^{4 5}

PROCESSING AND CIGARETTE MANUFACTURING

Zafeiridou, Hopkinson & Voulvoulis (2018) identified energy use as the focal contributor of the environmental impacts within cigarette manufacturing.^{4 5} Additionally, the choice of energy source can also affect the overall environmental footprint.^{4 5} The industry has admitted to its negative environmental impact. In its 2006 Corporate Social Responsibility (CSR) report, Imperial Tobacco stated: “Our greatest direct impact on the environment comes from our product manufacturing activities”.^{24 26} Research has previously reported that out of every dollar of industry costs, 43 cents are attributable to the manufacturing process, in contrast to only four cents spent on purchasing tobacco leaf itself.^{27 28}

PACKAGING

The resources used in the production of non-tobacco elements such as filters, cigarette paper, and packaging each pose their own environmental impact. Such impacts are exacerbated when considering the scale of quantities used in the manufacturing of 6 trillion cigarettes annually. Research has demonstrated that more than 1 Million tonne of filters and about 2.15 Million tonne of packaging are estimated to be used by the tobacco industry in a year (not including shipping requirements).^{4 5} Even packaging that relies on wood pulp, including ‘sustainable’ packaging that is used to replace plastic, poses a threat to forests.^{29 30 31} Following strong support, the UK Government committed to introduce packaging Extended Producer Responsibility which could include tobacco packaging and cigarette butts. If implemented, this could incentivise manufacturers to design tobacco packaging that is easy to recycle and ensure that they pay the full net cost of managing packaging and cigarette butts once they becomes waste.^{32 33}

USE AND FINAL DISPOSAL

Over the past two decades cigarette filters have been recorded as the most abundant litter item worldwide.²⁹ ³² Research has consistently demonstrated low levels of proper cigarette disposal, with an estimated 766,571 metric tons of cigarette butts being littered.^{29 33 34 35} Findings from a recent Department for Environment, Food and Rural Affairs commissioned survey conducted by Keep Britain Tidy reported that cigarette butts make up the vast majority of litter items (66%) when examining litter in terms of their numbers.³⁶ It is not just the volume of this waste that is a problem they have been shown to be an environmental hazard.^{31 33 34 35} Conventional filters are made from cellulose acetate.^{31 32 33 34 35} Research has shown that they only lose an average of 38% of mass in two years of decomposition,^{34 35} and contain multiple toxic substances which infiltrate the environment.^{33 34 35} Tobacco companies have since been exploring the prospect of biodegradable filters.²⁹

^{31 35} Evans-Reeves, Lauber & Hiscock recently urged that this assertion should be considered with caution, against claims from tobacco industry their products are “eco-friendly” or “green”.³¹ Little evidence exists to support this, as biodegradable filters would still leach harmful chemicals into the environment if discarded improperly.^{29 31 32} The fact that clean-up and disposal costs of tobacco use fall to the government and local authorities is a completely unsustainable situation.^{30 31} The tobacco industry should be held accountable for the costs of addressing the issue of cigarette litter in our environment.

The report has also proposed a number of recommendations to address issues highlighted. These include the need for standardised and complete environmental data, promotion of sustainable production and investment and the introduction of measures to ensure the industry are accountable for the environmental call of tobacco.^{4 5}

1. Strengthening the global evidence base

Research has clearly demonstrated that in the absence of robust environmental data from the tobacco sector, not only will the true environmental impact not be realised but it represents a massive challenge for policy makers to address and manage the issue effectively. Research has reinforced the need for the government to mandate for systematic and extensive reporting from the tobacco industry on all of their activities and operations across the entire supply chain.

2. Encouraging sustainable investment

Governments need to create the conditions and regulatory frameworks to encourage investment in sustainable alternatives rather than in tobacco.

3. Pricing of environmental externalities

To hold the industry accountable and encourage the move to more sustainable alternatives, the environmental externalities of tobacco must be reflected in tobacco taxing.

4. Tobacco waste and Extended Producer Responsibility

Extended Producer Responsibility regulations would make tobacco producers accountable for the post-consumer cigarette waste, obliging them to take responsibility for the prevention and mitigation of tobacco product waste.

5. Assist tobacco farmers in switching to alternative crops or activities

To encourage and help tobacco farmers switch to alternative crops or activities policies should support them in their transition, especially those with low skills and/ or tied by their outgrower contracts with the tobacco industry. Substantial work has already been carried out in this area by the WHO FCTC Conference of the Parties, as set out in COP decision FCTC/COP6(11) Economically sustainable alternatives to tobacco growing (in relation to Articles 17 and 18 of the WHO FCTC).

6. Minimising environmental damage on farms

To incentivise the adoption of more sustainable agricultural practices, it is important to provide farmers with the necessary knowledge and skills, and assist them with access to tools that will help them improve their productivity.

7. Empowering the public and changing consumer behaviours

The most effective way of reducing the supply of tobacco products would be to reduce the demand for them. Demand-side measures aimed at raising awareness among public of the devastating environmental impacts of smoking and ultimately changing consumer behaviours play a crucial part in tobacco control strategies.

8. Fostering cooperation through partnerships

Cooperation between public, private and academic partners, as well as the involvement of environmental activists, will be essential for a speedy transition from tobacco and to achieving the Global Goals.

Partnerships, implemented in line with Parties' obligations under Article 5.3 of the FCTC, can encourage the innovation needed to monitor and protect the health of the ecosystems affected by tobacco.

Conclusion

Irrespective of the issues with data disclosure from the tobacco industry, existing research demonstrates that the impacts of tobacco exist on a global scale.^{3 4 5} Zafeiridou, Hopkinson & Voulvoulis, (2018) have provided strong evidence of the negative environmental impact which tobacco cause.^{4 5} Collectively when combining the environmental cost with its proven detrimental health, social and economic impacts, this makes it incompatible with the global development agenda.^{4 5 31} Regardless of how efficient and regulated the tobacco industry becomes, just as there is no such thing as a risk free cigarette the tobacco industry will always pose environmental risks.^{3 4 5} Tobacco products aren't just a threat to your health, they are deeply unethical products that threaten the environment and trap those most in need in cycles of inequality.^{3 31} As we face ever more critical decisions about how to preserve our planet and sustain our future, this hugely damaging industry needs to face up to its inconvenient truths.

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