World Health Organization

TOBACCO: POISONING OUR PLANET

Throughout its life cycle, tobacco pollutes the planet and damages the health of all people.

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TOBACCO HARMS THE PLANET

Tobacco harms our health directly through use and exposure to second-hand smoke and through its negative impact on the environment. Tobacco's impact on the environment occurs at various stages, including growing and cultivation, manufacturing, distribution, use and disposal of tobacco products *(1)*. Each of these stages has negative implications for the environment, including the use of precious resources such as water and trees and the creation of pollutants through manufacturing. Production and consumption of tobacco also contributes to global warming, releasing 80 million tonnes of carbon dioxide (CO_2) into the environment each year, the equivalent of driving 17 million gasoline-powered cars each year.[1]

Tobacco's long history of negative implications for health is well known, including the increased risk of cardiovascular diseases, cancers and respiratory illnesses, but what is less often discussed is the harmful effects it has on the health of our planet. Long before these deadly products reach the consumer, they already leave a trail of destruction in their wake. Tobacco growing destroys forests, damages soil and depletes water supplies, while manufacturing contributes to the production of toxic waste.

Tobacco use pollutes the air we breathe, while also leaving residual nicotine and other harmful chemicals on indoor surfaces, thereby exposing non-smokers to second-hand and third-hand smoke toxins. Cigarette butts and other forms of tobacco product waste poison rivers, oceans and marine life, contaminate beaches and waterways and foul our urban living spaces *(2)*.

The environmental insult associated with tobacco production and use is a growing concern, complicated by newer electronic smoking devices and nicotine delivery products. These devices contain metals, plastics and batteries which are classified as toxic hazardous waste, whether they are littered into the environment or properly disposed of in a waste bin.

Finally, tobacco production affects the air we breathe, even before the tobacco is smoked. The tobacco product life cycle produces a significant amount of CO_2. Approximately 14 grams of CO_2 are emitted per cigarette over its whole life cycle *(1)*.

Tobacco control works but the adoption of effective tobacco control measures is often slowed down or impaired by policy-makers, who are still not fully aware of the environmental damage caused by tobacco growing, manufacture, distribution and post-consumer tobacco waste.

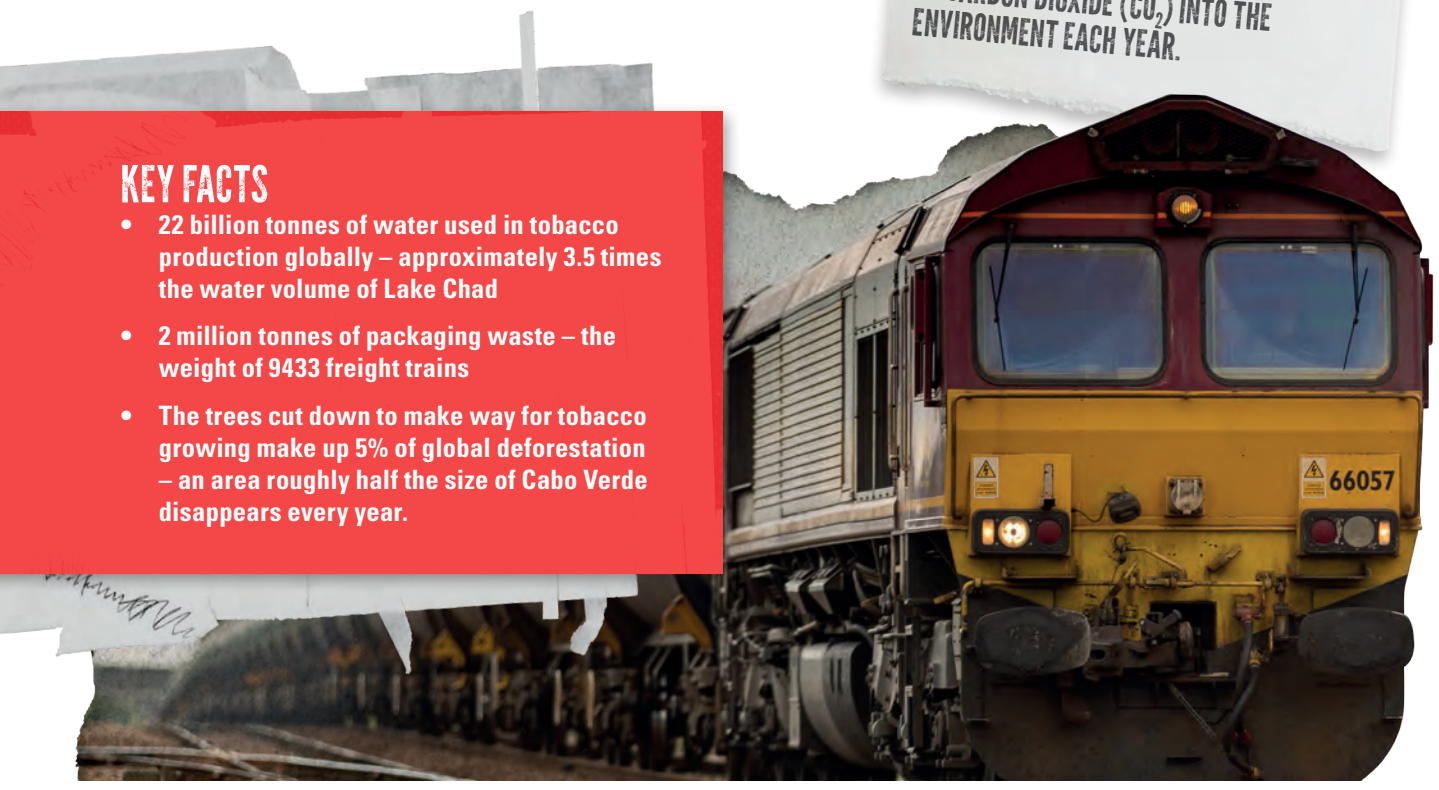
PRODUCTION AND CONSUMPTION OF TOBACCO ALSO CONTRIBUTE TO GLOBAL WARMING, RELEASING

80 MILLION TONNES

OF CARBON DIOXIDE (CO_2) INTO THE ENVIRONMENT EACH YEAR.

KEY FACTS

- **22 billion tonnes of water used in tobacco production globally – approximately 3.5 times the water volume of Lake Chad**
- **2 million tonnes of packaging waste – the weight of 9433 freight trains**
- **The trees cut down to make way for tobacco growing make up 5% of global deforestation – an area roughly half the size of Cabo Verde disappears every year.**



[1] A typical passenger vehicle emits approx. 4.6 tonnes of CO_2 per year (assuming a fuel economy of approx. 22 miles per United States gallon (0.0038 tonnes) and an annual mileage of 11 500 miles (18 508 kilometres (km)). Every gallon of gasoline burned creates about 8887 grams of CO_2.

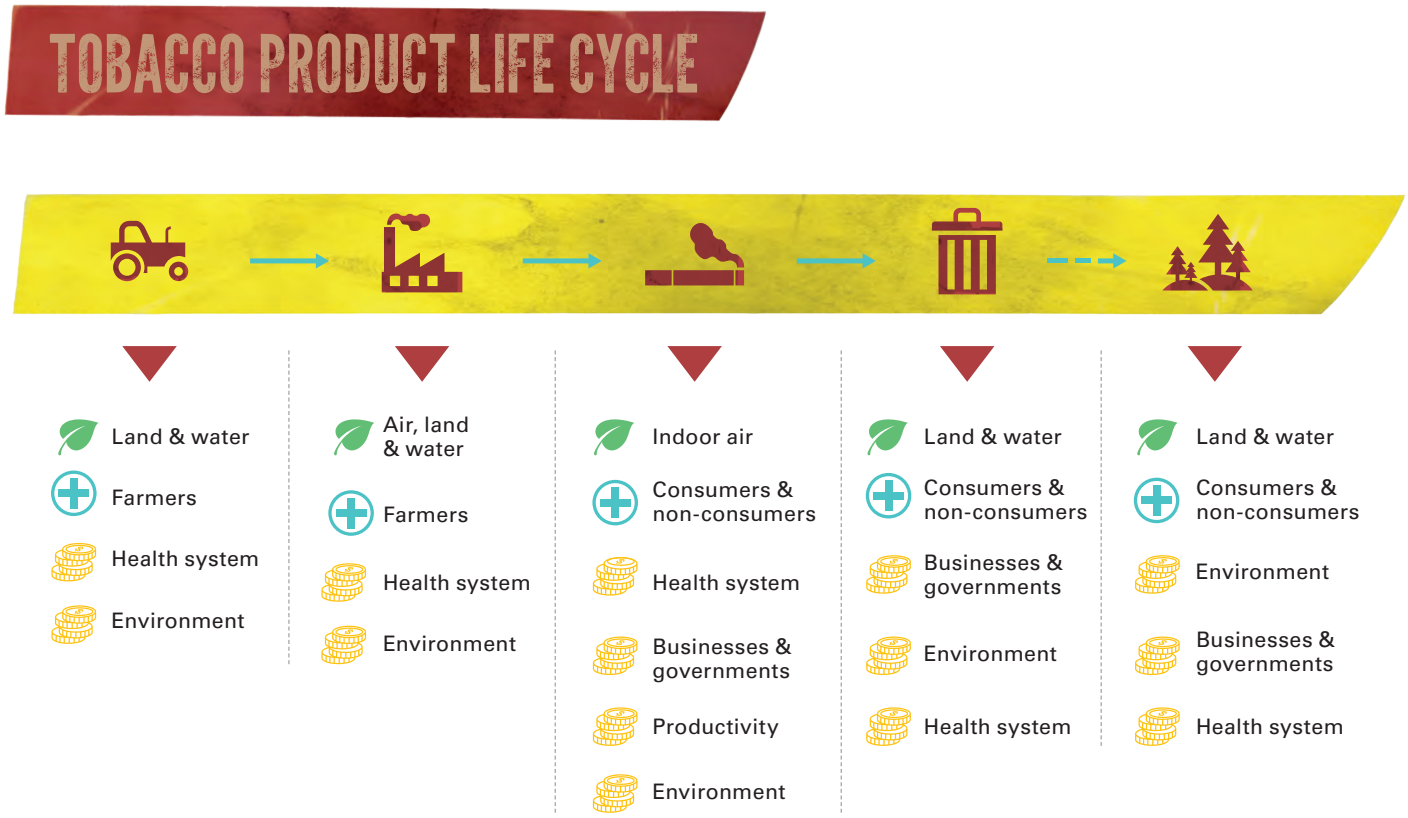


FIG 1. **IMPACT OF TOBACCO LIFE CYCLE ON HEALTH, ENVIRONMENT AND ECONOMICS**

Fig. 1 summarizes the impact of each of the five stages of the tobacco production and consumption life cycle (farming/cultivation, production, consumption, disposal and "residual" tobacco waste that remains in the environment) on our health, environments and economies. The figure illustrates how every stage of the tobacco life cycle impacts several different factors, contributing to long-lasting and persistent adverse effects *(1–4)*.

FARMER LIVELIHOOD AND HEALTH

Tobacco farmers and their families are exposed to several health risks. As many as 25% of tobacco farmers *(5)* are affected by green tobacco sickness (nicotine poisoning), a disease caused by nicotine absorbed through the skin from the handling of tobacco leaves. Tobacco farmers are exposed daily to "tobacco dust" and other chemical pesticides. A tobacco farmer who plants, cultivates and harvests tobacco may absorb as much nicotine as is found in 50 cigarettes *(6)*. In addition to direct exposures, tobacco farmers often bring harmful exposures back home on their bodies, clothes or shoes, leading to secondary harmful exposures for their families.

Children are particularly vulnerable, given their body weight relative to the proportion of nicotine absorbed through their skin *(6)*. Pregnant women are disproportionally affected by the harmful effects of tobacco farming and face a higher risk of miscarriage *(5)*. From a socioeconomic perspective, tobacco farmers are often under contractual arrangements with the tobacco industry and are trapped in a vicious circle of debt incurred in the purchase of seeds and chemicals, making the farmer unable to benefit fully from the lucrative tobacco market. Tobacco farmers may also earn less than other farmers in the agricultural sector, and agricultural land may be diverted from food growing to the tobacco cash crop.

AGROCHEMICAL USE

Tobacco growing is resource-intensive and requires heavy use of pesticides and fertilizers, which contribute to soil degradation *(7–10)*. These chemicals escape into the aquatic environment, contaminating lakes, rivers and drinking water. Land used for growing tobacco then has a lower capacity for growing other crops, such as food, since tobacco depletes soil fertility. The economic lure of tobacco as a cash crop may not offset the damage done to sustainable food production in low- and middle-income countries *(8)*.

WATER DEPLETION

Depletion of precious water resources is another harmful consequence of tobacco production. A single cigarette requires the use of about 3.7 litres (L) of water over its life cycle, from growing/cultivation, manufacturing, transportation and use to

disposal *(1)*. Every year, about 22 billion tonnes of water are used in tobacco production globally *(1)*. This is the equivalent of 15 million Olympic-sized swimming pools, or roughly the volume of water discharged by the Amazon, the largest river by water flow in the world, in one day.

Tobacco requires up to eight times more water than, for example, tomatoes or potatoes. For every kilogram (kg) of tobacco that is not produced, consumed and disposed of, the potable water needs of one person can be met for an entire year *(11)*.

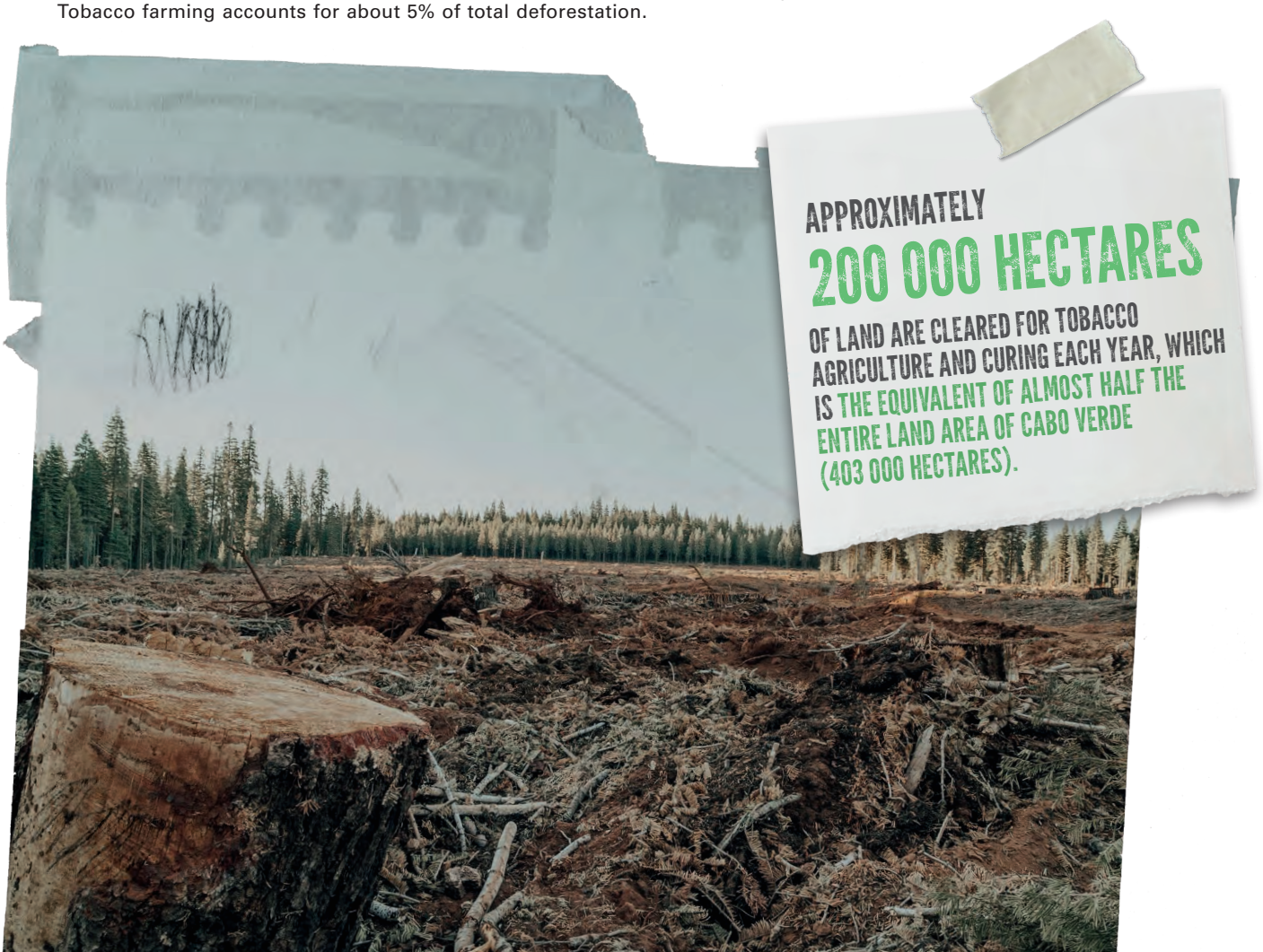
These water-use estimates are likely an underestimate. A large proportion of tobacco product waste, which consists mostly of cigarette butts, finds its way into bodies of water and water sources, primarily through storm water systems, seepage from landfills, or direct littering into water or area near water (for example, beaches or parks). If we conservatively assume that one cigarette butt can pollute as much as 100 L of water (estimates range from 30 L to 1000 L, depending on a variety of factors), even if only 25% of the global 4 trillion littered butts per year make into bodies of water, this would result in another 100 trillion litres of water consumed by the tobacco product life cycle, which, combined with the 22 billion tonnes associated with farming and manufacturing, would be equal to about 3.5 times the water volume of Lake Chad in central Africa.

DEFORESTATION AND LAND DEGRADATION

Deforestation and soil depletion and erosion are also a serious concern. To make space for tobacco growing and to obtain wood for curing, trees must be cut down and land cleared. Approximately one tree is needed to make 300 cigarettes. Tobacco farming accounts for about 5% of total deforestation. Most of the deforested land is in the very high-risk group in the desertification tension zones *(12)*, including southern Africa, the Middle East, south and east Asia, Latin America and the Caribbean *(13)*. Approximately 200 000 hectares (ha) of land are cleared for tobacco agriculture and curing each year *(14)*, which is the equivalent of almost half the entire land area of Cabo Verde (403 000 ha). Wood is required to flue-cure or dry the tobacco leaves after harvesting. Compared with other agricultural activities such as maize growing and even livestock grazing, tobacco farming has a far more destructive impact on ecosystems as tobacco farm lands are more prone to desertification. Against this background, taking legal measures to reduce tobacco growing and help farmers to move into the production of other food seems to be more efficient than other well intentioned initiatives.

CARBON EMISSIONS

The manufacturing and distribution of tobacco products are environmentally damaging steps in the tobacco life cycle because of their extensive use of energy, water and other resources. Overall, these processes generate a substantial amount of carbon emissions, estimated to equal 3 million transatlantic flights *(15)*. They include energy and water use for growing tobacco, shredding and reconstituting the tobacco leaf, freezing and artificially expanding the surface area of reconstituted tobacco, producing paper used in commercial cigarettes or as rolling paper used by the consumer, producing cigarette filters and producing packaging and advertising materials. The logistics of leaf importation and distribution from manufacturers to wholesalers and retailers by truck, boat, rail or other means of transport creates an additional carbon footprint *(16)*.

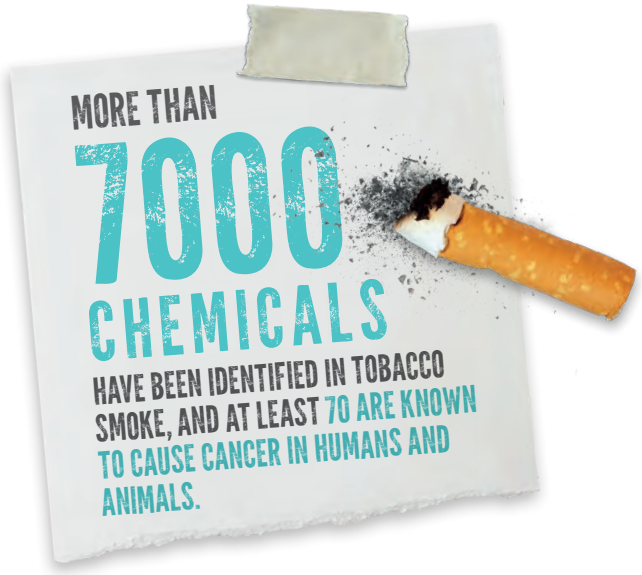


HEALTH RISKS OF TOBACCO

Tobacco use, whether it involves smoked or smokeless tobacco, is associated with a substantial human and economic burden. Smoking is associated with increased risk of cardiovascular disease, respiratory illness, cancer, diabetes, hypertension and more *(17–19)*. Health-care expenditures due to smoking-attributable diseases amounted to US$ 422 billion in 2012, or 5.7% of global health expenditures *(20)*. The total economic cost of smoking (health expenditures plus productivity losses) amounted to US$ 1436 billion in 2012, equivalent in magnitude to 1.8% of the world's annual gross domestic product. About 40% of this cost occurred in developing countries.

DIRECT, SECOND-HAND AND THIRD-HAND SMOKE EXPOSURE

Tobacco smoking in indoor public places and workplaces, including homes, contributes to toxicants in the air breathed by occupants, and these toxicants can cause disease in those who do not use tobacco themselves. More than 7000 chemicals have been identified in tobacco smoke, and at least 70 are known to cause cancer in humans and animals *(21)*. Third-hand smoke is the residue of tobacco smoke and its constituent chemicals that remains on surfaces and in dust after tobacco has been smoked indoors. These substances contaminate surfaces and ambient air, and they react with oxidants and other compounds in the environment to yield secondary pollutants. This contamination results in significant costs to remove residues, and can harm the health of infants and toddlers living in the home. School-aged children exposed to the harmful effects of second-hand smoke are also at risk for asthma, owing to lung inflammation caused by second-hand smoke exposure *(15)*.



ENVIRONMENTAL FOOTPRINT OF TOBACCO ACROSS THE SUPPLY CHAIN

POLLUTION FROM PACKAGING AND TRANSPORTATION

The transport of tobacco products also contributes to CO_2 pollution, and the use of plastics in filters and packaging material is an environmental concern. An estimated 6 trillion cigarettes are manufactured every year, and these are marketed in about 300 billion packages composed of paper, ink, cellophane, foil and glue. The waste from cartons and boxes used for distribution and packing of tobacco products in 2021 produced waste of at least 2 million tonnes, which equals the weight of 9433 freight trains or 17 000 times the weight of the Bell of Good Luck in Henan Province, China – the heaviest bell in the world.

Smokeless tobacco, in forms such as chewing tobacco and nicotine pouches, are made of single-use plastic and metal for packaging, which produces solid waste and results in additional pressure on landfill, as well as toxic chemical leakage into the environment from landfill.

TOXIC WASTE POLLUTING WATER AND MARINE LIFE

The vast majority of waste produced throughout the tobacco product life cycle is hazardous. About 4.5 trillion discarded cigarette butts present a danger to the environment, as well as the millions of tonnes of greenhouse gas emissions they produce *(1)*. Cellulose-acetate-based cigarette filters do not biodegrade and can remain in the environment for very long periods of time in the form of microplastics *(22–24)*, which could cause significant harm to the marine environment *(25–28)* and lake, river, estuary and wetland aquatic environments *(29)* through their uptake in the aquatic environment and ecosystem *(28)*. The filters also release into ecosystems nicotine, heavy metals and other chemicals that they have absorbed. This in turn affects the livelihood and health of fishing communities living in coastal areas, and those who consume seafood products affected by the contamination.

AIR POLLUTION

Tobacco smoke contains three major greenhouse gases (CO_2, methane and nitrous oxides), in addition to other air pollutants. Tobacco smoke produces higher particulate matter pollution than diesel exhaust *(30)*. Discarded cigarettes also remain an important cause of accidental fires, wildfires and fire deaths *(15)*. In 2010, one cigarette butt ignited a major fire in India, which led to the burning of 60 ha of forest *(14)*.

ABOUT

4.5 TRILLION

DISCARDED CIGARETTE BUTTS PRESENT A DANGER TO THE ENVIRONMENT, AS WELL AS THE MILLIONS OF TONNES OF GREENHOUSE GAS EMISSIONS THEY PRODUCE.

SOURCE: *(31)*.

KEY FACTS

- **In 2014, 22 200 megatons of water, 5.3 million ha of land, 62.2 petajoules of energy and 27.2 megatons of material**

ELECTRONIC WASTE FROM NOVEL AND EMERGING PRODUCTS