



Mapping to the Sustainable Development Goals Foundation for a Smoke-Free World

INTRODUCTION

This report elaborates on the relationships depicted in the visual illustrating the Foundation's work vis-à-vis the United Nation's Sustainable Development Goals¹ (herein referred to as SDGs). The 2030 Agenda for SDGs provides a shared blueprint for peace and prosperity for people and the planet. The blueprint is predicated on goals and targets that seek to balance the three dimensions – economic, social, and environmental – of sustainable development and is reviewed using a set of well-defined global indicators.² The Foundation's SDG map and this legend identify relevant goals and within them specific targets and associated indicators the Foundation aims to materially impact.

The purpose of the Foundation for a Smoke-Free World (herein referred to as "the Foundation") is to improve global health by ending smoking in this generation, while mitigating the effects of this transformation on tobacco farmers and tobacco-dependent economies. The Foundation's Strategic Plan³ is supported by three core initiatives: Health, Science, and Technology; Agriculture and Livelihoods; and Industry Transformation. All three initiatives naturally intersect with several of the SDGs. The SDGs thus provide a valuable framework to assess the coherency and interdependence of the Foundation's core initiatives. This report provides an overview of each the Foundation's initiatives, along with relevant background, and maps them against pertinent SDGs.

Health, Science, and Technology (HST)

The Foundation's primary focus is on SDG 3, "Ensure healthy lives and promote well-being for all at all ages," executed through SDG 17, "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development." The Foundation will fund innovative research and support collaborative initiatives to accelerate progress in reducing smoking-related harm and premature deaths worldwide by focusing on smoking cessation and harm reduction. The Foundation will explore solutions to address challenges facing developing countries as it aims to eliminate smoking. SDG 3 includes Target 3.a, "Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control (WHO FCTC)⁴ in all countries, as appropriate" as measured by Indicator 3.a.1, "Age-standardized prevalence of current tobacco use among persons aged 15 years and older." The need for such efforts is clear.

Implementation of FCTC rules remains uneven,⁵ smoking cessation efficacy remains low (12%-23% at one year), and the drug development pipeline is lackluster.⁶ Adult smokers are increasingly demanding less harmful options, and technology-driven change is occurring faster than regulators can keep pace with. Data gathered by the *WHO Report on the Global Tobacco Epidemic 2017*⁷ show that electronic nicotine delivery systems were banned in 30 of the 195 WHO member states globally (about 15%). Our work supports and advocates for WHO FCTC provisions and aims to accelerate the progress achieved by FCTC.

Areas of focus within SDG 3 include Target 3.4, "By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote

mental health and well-being,” through Indicator 3.4.1, “Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease.” In addition, a relevant indicator for our work in developing countries is Indicator 3.3.2, “Tuberculosis incidence per 100,000 population.” Tobacco use greatly increases the risk of tuberculosis⁸ disease and death. Another relevant target is Target 3.d, “Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.”

The Foundation’s work will engage all stakeholders, scientists across academia, governments, and industry, and support public-private partnerships. Therefore, on an ecosystem-wide basis and through the HST strategy, the Foundation’s work intersects strongly with SDG 17. The Foundation will work with a broad range of international partners to accelerate its impact. For example, we will work with organizations focused on strengthening research capability in low- and middle-income (LMIC) country settings, innovators focused on making needed products and services accessible and affordable for low-income populations, and investors keen to drive industry transformation toward greater sustainability.

Agriculture and Livelihoods (AG-L)

As the Foundation makes progress toward its vision of a smoke-free world, the demand for tobacco will continue to decline. The effect of this decline will be substantial on the estimated 15 million tobacco farmers who work roughly 3.4 million farms and 3.8 hectares of land across 40 countries to produce the vast majority of the world’s annual tobacco supply.^{i,ii,9,10} The focus of the AG-L strategy is to mitigate the effects of this fallout for farmers and tobacco-dependent economies, such as Malawi. To that end, the AG-L strategy seeks to convene stakeholders, forge partnerships, promote research and innovation, and disseminate best practices to help establish a diverse array of sustainable and alternative livelihoods for smallholder tobacco farmers.

In doing so, the Foundation seeks to primarily advance SDG 2, “End hunger, achieve food security and improved nutrition and promote sustainable agriculture.” The Foundation also, albeit to a lesser extent, seeks to advance SDG 8, “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all,” and SDG 15, “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

Industry Transformation (IT)

The Foundation’s IT strategy aims to attain transformation of the global tobacco industry and nicotine ecosystem in support of the overarching purpose. The tobacco industry sells a deadly product—cigarettes. Some consumers are rejecting that product, but the transformation of the tobacco industry can provide an enormous and crucial acceleration to the process of eliminating combustible tobacco. The Foundation believes that the appropriate way to influence industry is

ⁱ Note that there are currently no reliable, complete, or publicly available data for the number of tobacco growers, globally or in Malawi.

ⁱⁱ Note that these data are for harvested not cultivated land. In other words, land where the crop was lost due to weather or crop failure is not included.



indirectly through SDG 17, “Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.” In particular, we believe the investor community is a powerful, yet mainly underutilized, lever with which to influence company management.

As such, the Foundation is committing resources toward Target 17.3, “Mobilize additional financial resources for developing countries from multiple sources,” to launch a program to develop and implement the means to critically evaluate global industry progress and to assess actions taken to undermine progress toward a smoke-free world. Findings will be reported in the Smoke-Free Index[®]. The Foundation’s work in this area thus directly intersects with SDG 9, “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation,” that is, industry innovation. These changes are much needed as technological disruption is now well underway in the tobacco industry and nicotine ecosystem. The objective is to incentivize scientific research and development for the advancement of products for the benefit of public health and potentially millions of adult smokers, particularly in developing countries.

Gender Equality (SDG 5)

According to the global indicator framework for the SDGs and targets, SDG indicators should be disaggregated, where relevant, by income, sex, age, race, ethnicity, migratory status, disability, and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics.¹¹ In light of this guidance, the Foundation operationalizes gender principles through its Strategic Plan such that gender-specific impact and sex-specific data are integrated within its initiatives by:

- Encouraging research that addresses the gender dimensions of smoking (from the behavioral, epidemiological, and clinical perspectives), intervention design, and researchers’ engagement.
- Supporting agricultural programs and the development of alternative livelihoods that explicitly address the role of women as smallholder farmers and separately, as mothers; and actively encourage women to take leadership roles in the development of alternative livelihoods.
- Stimulating all grantees to further the leadership role of women in programs the Foundation supports through its HST, AG-L, and IT strategies.

SECTION 1 – HEALTH, SCIENCE, AND TECHNOLOGY, AND THE SUSTAINABLE DEVELOPMENT GOALS

The purpose of the Foundation, to improve global health by ending smoking in this generation, intersects directly with SDG 3, “Ensure healthy lives and promote well-being for all at all ages.” The Foundation’s HST agenda¹² heavily leverages SDG 17, “Strengthen the means of implementation and revitalize Global Partnership for Sustainable Development,” to achieve a smoke-free world.

Quick Facts on the Scale and Scope of Tobacco-Related Disease

More than 1 billion people smoke worldwide, and tobacco use is the most preventable cause of morbidity and mortality.¹³ Each year tobacco use is responsible for more than 7.1 million¹⁴

deaths worldwide and 480,000¹⁵ deaths in the United States. The WHO estimates that by the end of the current century, one billion¹⁶ people will have succumbed to a smoking-related disease if the status quo is maintained. Notably, the main causes of mortality are attributed to three noncommunicable diseases: cardiovascular disease, cancer, and respiratory disease, which are all closely associated with cigarette smoking.¹⁷ In addition, 7.9% of tuberculosis cases worldwide, one of the top 10 causes of death worldwide, are attributable to smoking.⁸

The demographics of smoking have changed. Today, more than 80%¹⁸ of smokers live in LMICs. For instance, approximately 300 million live in China, 100 live million in India, and 70 million live in Indonesia.¹⁹ These countries with a vast majority of smokers have limited ability to implement and enforce tobacco control policies. The overwhelming use of smokeless tobacco²⁰ is concentrated in India and Bangladesh. Across 21 countries, there are 248 million smokeless tobacco users, of which 232 million are from India and Bangladesh. In India, the prevalence is 33% among men and 18% among women, compared with 26% among men and 28% among women in Bangladesh.

According to the Centers for Disease Control and Prevention,²¹ in a high-income country such as the United States, smoking is highly concentrated among individuals living below the poverty line, and people with poor educational attainment, psychiatric disorders, disabilities, and other vulnerabilities. In most countries, an estimated 15% to 50% of the population is exposed to second-hand smoke; in some countries, second-hand smoke exposure affects as much as 70% of the population.²² The resulting cost of smoking-related diseases in terms of health care and lost productivity worldwide is estimated by the WHO to be USD \$1 trillion annually.¹⁶

The State of Harm Reduction

According to Euromonitor, in 2011, an estimated seven million people were regular, dual, or sole users of e-cigarettes and vapor products around the world. That figure rose to around 35 million in 2016 and is estimated to rise to around 55 million by 2021.²³ Studies of e-cigarettes,²⁴ heat-not-burn products,²⁵ and snus²⁶ have shown substantial reductions in exposure to a wide range of chemicals and toxins compared with cigarette smoking. A review of the evidence reviewed by Public Health England (PHE)²⁷ led the agency to conclude that “e-cigarettes are at least 95% less harmful than smoking.” Moreover, in terms of second-hand smoke, “there is no side-stream vapor emitted from the end of an e-cigarette, just the exhaled vapor entering the atmosphere.”²⁸ More recent studies leave the PHE conclusion from 2015 unchanged.^{29,30}

SDG 3 – Ensure healthy lives and promote well-being for all at all ages

WHO FCTC interventions are being implemented slowly and inconsistently across various countries. As the *WHO Report on the Global Tobacco Epidemic 2017*⁷ indicates, “nearly two thirds of countries (121 of 194) – comprising 63% of the world’s population – have introduced at least one MPOWER measure at the highest level of achievement.” Despite these steps, only one country has implemented all policies at the highest level, and 73 have implemented none. Moreover, global progress³¹ in FCTC implementation of provisions on research, cessation, and harm reduction appears to be lagging even further behind. This situation is further complicated by governments’ ambivalence toward vaping and other noncombustible products, which are unquestionably part of the solution.



The Foundation's primary focus is on health (SDG 3), executed through partnerships (SDG 17). The targets we intend to positively affect are the following:

1. *Target 3.a -- Strengthen the implementation of WHO FCTC in all countries, as appropriate. Progress toward this endeavor is measured through Indicator 3.a.1, Age-standardized prevalence of current tobacco use among persons aged 15 years and older.*

WHO FCTC remains the main framework for directing tobacco control activities. That said, almost all of the focus today is on the subset of FCTC articles covered by the MPOWER³² framework. In this approach, the main factors guiding improvement are policy levers, and governments are the main agents of change. In order to drive the ecosystem-wide transformation, it will be necessary to implement all elements of FCTC, and also to further influence industry. In this light, the Foundation's Strategic Plan³ identifies opportunities where there are gaps in implementing FCTC and other elements of ecosystem-wide transformation. The gaps are related to smoking, tobacco farming, and industry.

2. *Target 3.4 -- By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. Progress toward this target is measured through Indicator 3.4.1, Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease. An additional relevant indicator for our work in developing countries, we believe, is Indicator 3.3.2, Tuberculosis incidence per 100,000 population. Tobacco use greatly increases the risk of tuberculosis⁸ disease and death.*

The need to rapidly drive down death and disability from smoking is clear, and there are a number of avenues to pursue: smoking cessation, prevention of smoking initiation, and harm reduction. Harm reduction, for people who cannot quit or do not want to quit using nicotine, must be explored, especially in light of recent technological innovation and the rapid pace of change in this area.

3. *Target 3.d -- Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.*

As with all consumer-oriented approaches, the Foundation's HST agenda will focus largely on the levers of consumer perceptions, product characteristics, and price. For smokers to more quickly reduce their health risks by quitting or switching to the least harmful product (or a combination of reduced-harm products) that meets their individual needs, they require support in these three key areas – particularly in developing countries.

SDG 17 – Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

On an ecosystem-wide basis, and through the HST agenda, the Foundation's work intersects strongly with SDG 17 in striving toward the execution of its purpose.

1. *Target 17.6 -- Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology*



facilitation mechanism.

The Foundation will support work to understand the underlying reasons for low innovation in the smoking cessation field, and to stimulate innovation to more rapidly develop smoking cessation tools and reduced-harm products that are highly effective, acceptable from a consumer's point of view, and affordable in LMIC settings.

2. *Target 17.9 -- Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation.* Progress toward this target is measured through Indicator 17.9.1, *Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries.*

The Foundation will fund research primarily through major multi-year grants to research institutions and global research networks. These entities will be free to design their own detailed research programs under the supervision of their scientific advisory and institutional review boards, in order to find robust and reliable answers to the high-level questions on our research agenda. The Foundation will also fund different approaches in parallel to explore the same research question.

3. *Target 17.3 -- Mobilize additional financial resources for developing countries from multiple sources.* Progress toward this endeavor is measured through Indicator 17.3.1, *Foreign direct investment, official development assistance and South-South cooperation as a proportion of total domestic budget.*

The environment for smokers in many countries is changing rapidly. It will be important to have up-to-date data available and analyzable at national and subnational levels to track progress and to inform the actions of consumers, regulators, and other stakeholders, and to continually refine the Foundation's own activities. In addition, 80% of smokers today live in LMICs, but most research today is led by centers in the United States and Europe. Funding for research is also limited, particularly outside the United States. Of the \$31.4 billion in development assistance³³ for global health in 2011, only \$68 million went to tobacco control. In 2015, low-income countries received only 0.3% of direct grants⁵ for health research.

SDG 10 – Reducing inequality within and among countries

The Foundation's work also intersects with SDG 10 *Reduce inequality within and among countries*. We look to ensure that the developing world has equitable access to new technologies and approaches for the purpose of smoking cessation and harm reduction. The Foundation's HST work will focus heavily on smokers to understand their needs and wants; engage them in research, product design, and policy discussions; help them quit or switch as part of a broader effort to improve their overall health; and promote solutions that are appropriate for older adults, for both men and women, and for different vulnerable populations. Much of the Foundation's work will focus on LMICs and the smokers (and farmers) who are often among the most vulnerable populations within our societies.

- *Target 10.1 -- By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average.* This target is measured

through Indicator 10.1.1, *Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population.*

In LMICs, where most smokers live, this problem is compounded by the poor availability and affordability of existing smoking cessation products. A similar picture is expected for reduced-harm products. The Foundation will support work to stimulate innovation to more rapidly develop smoking cessation tools and reduced-harm products that are highly effective, acceptable from a consumer's point of view, and affordable in LMIC settings.

SECTION 2 – AGRICULTURE AND LIVELIHOODS AND THE SUSTAINABLE DEVELOPMENT GOALS

As the Foundation makes progress toward its vision of a smoke-free world, the global demand for tobacco will decline. The effect of this decline will be substantial on the estimated 15 million tobacco farmers that work roughly 3.4 million farms and 3.8 hectares of land across 40 countries to produce the vast majority of the world's annual tobacco supply.^{i,iii,9,10}

The focus of the AG-L strategy is to mitigate the effects of a global decline in the demand for tobacco on smallholder tobacco farmers and the tobacco-dependent economies in which they reside. Our initial focus is on Malawi, where tobacco exports account for more than 20% of all foreign exchange earnings and nearly 59% of its total merchandise export earnings, making Malawi one of the most, if not the most, tobacco-dependent countries in the world.³⁴

The vast majority of these farmers in Malawi and in the region are smallholder tobacco farmers who cultivate less than one hectare and are arguably the most disadvantaged and least compensated link of the tobacco value chain.^{35,36,37,38} Many smallholder farmers operate under contracts that allow buyers to circumvent certain risksⁱⁱⁱ while exerting substantial control over the inputs, access to credit, and purchase price of the resulting leaf.^{34,39} As a result, the farmers themselves are often forced to reside on thin margins.^{34,36,40} The sector, which provides an estimated 451,000 jobs in Malawi, is likely to be hit hardest as the demand for tobacco falls.¹⁰ Malawi is ready to diversify. Tobacco farmers are struggling, and producer prices have reached new lows.^{10,34}

Specifically, the Foundation's AG-L strategy seeks to convene stakeholders, forge partnerships, facilitate policy change, promote research and innovation, and disseminate best practices to help establish a diverse array of sustainable alternative livelihoods for smallholder tobacco farmers. Its primary means of doing so is through the Agricultural Transformation Initiative (ATI)⁴¹ which serves as a hub for a series of interrelated programs and research. These include the:

- Center for Agricultural Transformation (CAT) in Malawi – The CAT will serve as hub of innovation and change by stimulating, incubating, and evaluating alternative crop and livelihood options, supportive technologies, novel infrastructure, and new farming models for smallholder tobacco farmers in Malawi.
- Investment Support Facility (ISF) for Smallholder Inclusive Transactions in Malawi – The ISF serves as a forum to engage members of the business community in developing commercial

ⁱⁱⁱ Such risks include, for instance, land ownership – along with its associated disputes and supervision.

models that incorporate more sustainable and alternative livelihoods for smallholder tobacco farmers in Malawi.

- Central Region Milk Producers Association (CREMPA) Grant – CREMPA provides seed funding to an association of dairy farmers with an eye toward scaling their operations to provide smallholders in Malawi with a more viable alternative to tobacco farming.
- Michigan State University Capacity Support Program (MSU CSP) – The MSU CSP leverages the experience and expertise of MSU in policy formulation, communication, and facilitation in Malawi and the region to identify policy bottlenecks and opportunities to catalyze agricultural transformation in Malawi.

In addition to the programs above, the ATI also has several open requests for proposals (RFPs) that seek to secure:

- Commercially Driven Solutions – To help identify commercially driven alternatives for smallholder tobacco farmers with an emphasis on technology-enhanced smallholder extension models, access to markets for specific value chains, business models for improved nutrition, and off-farm enterprises and support services.
- Fellowship and Scholarship Fund – To build capacity, expertise, and experience in areas pertinent to agricultural transformation by supporting graduate studies and postdoctoral fellowships in relevant fields.

Given that the overarching aim of the AG-L strategy is to establish a diverse array of sustainable and alternative livelihoods for smallholder tobacco farmers, the Foundation’s work in this area most directly intersects SDG 2 and, to a lesser extent, SDGs 8 and 15.

SDG 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The work of AG-L contributes to three targets underlying this goal.

- *Target 2.2 -- By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.* Progress toward this target is measured through Indicator 2.2.1, *Prevalence of stunting (height for age \leq -2 standard deviations from the median of the World Health Organization [WHO] Child Growth Standards) among children under 5 years of age*, and Indicator 2.2.2, *Prevalence of malnutrition (weight for height \geq +2 or \leq -2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight).*

A disproportionate number of countries that grow tobacco have high levels of malnutrition and undernourishment. This correlation has become easier to discern in recent years as production has shifted to LMICs. In sub-Saharan Africa, for instance, several countries – including Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe – are global leaders in tobacco production. All of them except for Zimbabwe have a higher prevalence of growth stunting, thought to be secondary to malnutrition and undernourishment, than their regional neighbors that do not grow large quantities of tobacco.⁴² In Malawi, where the ATI is currently focusing its efforts, more than one of every three children under age five are stunted according to the country’s Demographic and Health Survey.⁴³

Additional evidence of the interplay among tobacco production, food insecurity, hunger, and malnutrition comes from surveys in Bangladesh, which revealed that tobacco farmers experienced higher levels of food insecurity than farmers testing alternative mixed cropping systems.⁴⁴ The Foundation seeks to address undernutrition and malnutrition by directly mobilizing its resources, through for instance, its open RFPs as illustrated above to support market-oriented solutions that improve nutrition.

- *Target 2.3 -- By 2030, double the agricultural productivity and incomes of small-scale food producers including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment. Progress toward this target is measured through Indicator 2.3.2, Average income of small-scale food producers, by sex and indigenous status.*

Providing smallholder tobacco farmers with better-paying, sustainable, and alternative livelihoods is the primary aim of the AG-L strategy. The initiative takes a farmer-focused, locally tailored, systems-level approach to identifying innovative and profitable alternative crop and livelihood options for farmers through agronomy research institutes, and enhancing productivity through the CAT, while commercializing and scaling solutions. To do so, the ATI will work with a diverse array of stakeholders to locate new markets and develop sustainable business models, conduct local policy analysis, build in-country capacity, unlock capital, and create viable alternatives for smallholder farmers.

- *Target 2.a -- Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries. Progress toward this target is measured through Indicator 2.a.2, Total official flows (official development assistance plus other official flows) to the agriculture sector.*

The ATI has already made multimillion-dollar commitments to the agricultural sector in Malawi. A second round of funding is currently underway with the goal of promoting technology-enhanced smallholder extension models that improve farmer productivity and profitability, establish infrastructure and ease of access for key agriculture value chains, and support off-farm enterprises. Moreover, the CAT will serve as an anchor institution for additional investment, research, and technical assistance to the agriculture sector in Malawi with a focus on smallholder farmers.

SDG 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

The work of AG-L contributes to one target underlying this goal.

- *Target 8.2 – Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors. Progress toward this target is measured through Indicator 8.2.1, Annual growth rate of real gross domestic product (GDP) per employed person.*

By seeking better-paying, sustainable, and alternative livelihoods for smallholder tobacco farmers in tobacco-dependent economies, the AG-L strategy is committed to improving economic productivity through diversification, technological upgrading, and innovation. In Malawi, the Foundation has already convened key stakeholders, and is in the process of disbursing funds and catalyzing research to this effect. The programs and research, ranging from various grants to the CAT, represent the seeds of projects that, if successful and scaled, will contribute to economic diversification and growth.

SDG 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

The work of AG-L contributes to one of the targets underlying this goal.

- *Target 15.3 -- By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world. Progress toward this target is measured through Indicator 15.3.1, Proportion of land that is degraded over total land area.*

Lowering tobacco production and transitioning to alternative crops may help sustainably manage forests, reverse land loss, and halt biodiversity loss. The relationship between tobacco production and biodiversity is twofold. First, many tobacco farms rely on land-clearing practices that directly result in loss of 6,500 hectares of forest a year.⁴⁵ Deforestation is associated with an abrupt loss of habitat that accelerates the loss of biodiversity in the affected area.^{46,47} Between 1990 and 2007, for instance, Malawi lost 13,400 hectares of land while Brazil lost 74,400 hectares.⁴⁵ Moreover, given the relatively high nutrient demands of tobacco, its cultivation necessitates the use of agrochemicals at every stage of the process. Runoff containing growth regulators, fertilizers, and pesticides percolate through the local environment, disrupting local ecosystems and undermining biodiversity as well as intensifying desertification in areas of improper soil management.⁴⁸

SECTION 3 – INDUSTRY TRANSFORMATION AND THE SUSTAINABLE DEVELOPMENT GOALS

The Foundation’s IT strategy aims to attain transformation of the global tobacco industry and nicotine ecosystem, thereby accelerating the elimination of combustible tobacco. The objective is to positively interact with millions of smokers who want to quit or switch to reduced-harm products. The Foundation’s primary focus in this area is on SDG 9, “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation,” executed through SDG 17, “Strengthen the means of implementation and revitalize Global Partnership for Sustainable Development.”

SDG 17 – Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

The Foundation believes that the appropriate manner in which to influence industry is *indirectly* through strategic partnerships. As such, the Foundation is committing resources toward Target 17.3, “Mobilize additional financial resources for developing countries from multiple sources.” The objective is to launch a program to develop and implement the means to critically evaluate



global industry progress and to assess actions taken to undermine progress toward a smoke-free world. Findings will be reported in the Smoke-Free Index[®].⁴⁹ The Foundation will engage with various stakeholder groups – tobacco control, investor community, academics, policy makers, nongovernmental organizations, industry participants – to acquire input toward the development of the Smoke-Free Index[®] process design and evaluation criteria, and to gather consensus regarding the appropriate role for the tobacco industry.

In particular, we believe the investor community is a powerful, yet mainly underutilized, lever. Public company management has a fiduciary responsibility to maximize shareholder value. Therefore, investors have significant influence on management. Two case studies applied toward the development of the Smoke-Free Index[®] are the Access to Medicine Index⁵⁰ and the Access to Nutrition Index.⁵¹

Current Smoke-Free Index[®] operating model assumptions include (a) extensive upfront stakeholder engagement, including grantees' engagement with subject companies and state monopolies during the development of measurement criteria; (b) an outsourced working model; and (c) a degree of independence and accountability by the grantees, including implementation of an advisory panel and/or expert committee(s) without any industry involvement in advisory structures.

SDG 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The Foundation estimates⁵² that total global retail sales of nicotine delivery products in 2017 were USD \$785 billion, with combustible tobacco products and cigarettes representing 95.8% and 89.1%, respectively. Smokeless tobacco products made up about 1.6% of sales, followed by open and closed vaping systems 1.5%, heated tobacco products 0.8%, and nicotine replacement therapy (NRT) smoking cessation aids 0.3%. Retail sales figures include taxes applied to the final purchase price.

On the basis of cigarette stick equivalents across the multiple product categories, we estimate total retail volume of approximately 6.1 trillion cigarette stick equivalents for 2017. Factoring in illicit trade and locally manufactured combustible tobacco products yields a global total approaching 7.1 trillion cigarette stick equivalents. We estimate that the six largest tobacco companies generated approximately 80% of the nicotine-related product retail volume globally during 2017. China National Tobacco Corporation is the largest producer at 38% volume share, followed by the five publicly traded tobacco companies headquartered in Europe, Japan, and the United States.⁵²

The work of IT contributes to one target underlying SDG 9.

- *Target 9.5 -- Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per one million people and public and private research and development spending. Progress is measured through Indicator 9.5.1, Research and development expenditure as a proportion of GDP, and Indicator 9.5.2, Researchers (in full-time equivalent) per million inhabitants.*



Many dirty and unhealthy legacy industries can change, and are changing, by undergoing a transformation⁵³ to cleaner activities and products. At the heart of change, companies are using technological innovations to alter their core businesses.

Technological disruption is now well underway in the tobacco industry and nicotine ecosystem. We believe now is the right time for industry innovation, as unprecedented and innovative technologies are reducing the health risks associated with nicotine delivery compared with those of emissions found only in combustible cigarettes. The Smoke-Free Index[®] will objectively measure the nature of the tobacco companies' allocation of capital, research and development, marketing, product sales, regional variations, production decisions, violations, and more. The objective is to incentivize scientific research and development for the advancement of product innovations for the benefit of public health and potentially millions of adult smokers, particularly in developing countries. The intention is for the Smoke-Free Index[®] to evaluate and objectively report the actions of the largest nicotine delivery companies in the world.

¹ United Nations. Sustainable Development Goals Knowledge Platform.

<https://sustainabledevelopment.un.org/sdgs>. Accessed January 17, 2019.

² United National General Assembly. Resolution adopted by the General Assembly on 6 July 2017. Published July 10, 2017. <https://undocs.org/A/RES/71/313>. Accessed January 17, 2019.

³ Foundation for a Smoke-Free World. Context for FSFW 2019-21 Strategic Plan.

https://www.smokefreeworld.org/sites/default/files/uploads/documents/context_for_fsfw_strategic_plan_01519.pdf. Accessed January 24, 2019.

⁴ World Health Organization. WHO Framework Convention on Tobacco Control. <https://www.who.int/fctc/en/>. Accessed January 17, 2019.

⁵ World Health Organization Executive Board. Implementation of the 2030 Agenda for Sustainable Development. http://apps.who.int/gb/ebwha/pdf_files/EB144/B144_11Rev1-en.pdf. Published December 28, 2018. Accessed January 18, 2019.

⁶ EY-Parthenon. Smoking Cessation Products and Services: Global Landscape Analysis.

https://www.smokefreeworld.org/sites/default/files/ey-p_smoking_cessation_landscape_analysis_key_findings.pdf. Published August 2018. Accessed January 18, 2019.

⁷ World Health Organization. *WHO Report on the Global Tobacco Epidemic 2017: Monitoring Tobacco Use and Prevention Policies*. Geneva, Switzerland: World Health Organization; 2017.

https://www.who.int/tobacco/global_report/2017/en/. Accessed January 18, 2019.

⁸ World Health Organization. Tuberculosis – Key Facts. <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>. Published September 18, 2018. Accessed January 18, 2019.

⁹ Phillip Morris International. Tobacco Economics. <https://www.pmi.com/our-business/about-us/products/tobacco-economics>. Accessed January 18, 2019.

¹⁰ Food and Agriculture Organization (FAO) of the United Nations. FAOSTAT. <http://www.fao.org/faostat/en/>. Accessed January 18, 2019.

¹¹ UNECE. Fundamental Principles of Official Statistics. <http://www.unece.org/?id=3207>. Accessed January 24, 2019.

¹² Foundation for a Smoke-Free World. Preliminary Health, Science, and Technology Agenda.

<https://www.smokefreeworld.org/health-science-technology/preliminary-health-science-technology-agenda>. Accessed January 18, 2019.

¹³ World Health Organization. Global NCD Target: Reducing Tobacco Use. <https://www.who.int/beat-ncds/take-action/ncd-tobacco-target.pdf>. Published July 2016. Accessed January 18, 2019.

¹⁴ Drope J, Schluger NW, Cahn Z, et al. Deaths. In: *The Tobacco Atlas*. 6th ed. Atlanta, GA: American Cancer Society and Vital Strategies; 2018:28-29. <https://tobaccoatlas.org/topic/deaths/>. Accessed January 18, 2019.

- ¹⁵ US Department of Health and Human Services. *The Health Consequences of Smoking – 50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014. <https://www.surgeongeneral.gov/library/reports/50-years-of-progress/full-report.pdf>. Accessed January 18, 2019.
- ¹⁶ Drope J, Schluger NW, Cahn Z, et al. *The Tobacco Atlas*. 6th ed. Atlanta, GA: American Cancer Society and Vital Strategies; 2018. https://tobaccoatlas.org/wp-content/uploads/2018/03/TobaccoAtlas_6thEdition_LoRes_Rev0318.pdf. Accessed January 18, 2019.
- ¹⁷ Shapiro H. *No Fire, No Smoke: Global State of Tobacco Harm Reduction 2018*. London, England: Knowledge-Action-Change; 2018. <https://gsthr.org/downloads/GSTHR%20Report/Global-State-of-Tobacco-Harm-Reduction-2018.pdf>. Accessed January 18, 2019.
- ¹⁸ Hosseinpoor AR, Lucy AP, Tursan d'Espaignet E, Chatterji S. Social determinants of smoking in low-and middle-income countries: results from the World Health Survey. *PLoS One*. 2011;6(5):e20331.
- ¹⁹ World Health Organization. *WHO Global Report on Trends in Prevalence of Tobacco Smoking 2000–2025*. 2nd ed. Geneva, Switzerland: World Health Organization; 2018. <http://apps.who.int/iris/bitstream/handle/10665/272694/9789241514170-eng.pdf?ua=1>. Accessed January 18, 2019.
- ²⁰ The GATS Atlas. GTSS: Global Tobacco Surveillance System. <http://gatsatlas.org/>. Accessed January 18, 2019.
- ²¹ Centers for Disease Control and Prevention. Smoking & Tobacco Use: Current Cigarette Smoking Among Adults in the United States. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm. Last updated September 24, 2018. Accessed January 18, 2019.
- ²² National Cancer Institute and the World Health Organization. *The Economics of Tobacco and Tobacco Control*. National Cancer Institute Tobacco Control Monograph No. 21. NIH Publication No. 16-CA-8029A. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Cancer Institute; and Geneva, Switzerland: World Health Organization; 2016. https://cancercontrol.cancer.gov/brp/tcrb/monographs/21/docs/m21_exec_sum.pdf. Accessed January 18, 2019.
- ²³ Euromonitor International. Global Tobacco: Key Findings Part 2: Vapour Products. <https://www.euromonitor.com/global-tobacco-key-findings-part-2-vapour-products/report>. Published August 2016. Accessed January 18, 2019.
- ²⁴ Shahab L, Goniewicz ML, Blount BC, et al. Nicotine, carcinogen, and toxin exposure in long-term E-cigarette and nicotine replacement therapy users: a cross-sectional study. *Ann Intern Med*. 2017;166(6):390-400.
- ²⁵ Haziza C, de La Bourdonnaye G, Merlet S, et al. Assessment of the reduction in levels of exposure to harmful and potentially harmful constituents in Japanese subjects using a novel tobacco heating system compared with conventional cigarettes and smoking abstinence: a randomized controlled study in confinement. *Regul Toxicol Pharmacol*. 2016;81:489-499.
- ²⁶ Sarkar M, Liu J, Koval T, et al. Evaluation of biomarkers of exposure in adult cigarette smokers using Marlboro snus. *Nicotine Tob Res*. 2010;12(2):105-116.
- ²⁷ McNeill A, Brose LS, Calder R, Hitchman SC, Hajek P, McRobbie H. E-Cigarettes: an Evidence Update: a Report Commissioned by Public Health England. PHE publications gateway number: 2015260. <https://www.gov.uk/government/publications/e-cigarettes-an-evidence-update>. Published August 2015. Accessed January 18, 2019.
- ²⁸ Dockrell M. Clearing up some myths around e-cigarettes. <https://publichealthmatters.blog.gov.uk/2018/02/20/clearing-up-some-myths-around-e-cigarettes/>. February 20, 2018. Accessed January 18, 2019.
- ²⁹ Glasser AM, Collins L, Pearson JL, et al. Overview of electronic nicotine delivery systems: a systematic review. *Am J Prev Med*. 2017;52(2):e33-e66.
- ³⁰ Zwack LM, Stefaniak AB, LeBouf RF. Evaluation of Chemical Exposures at a Vape Shop. Cincinnati, OH: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for

- Occupational Safety and Health; 2017. Health Hazard Evaluation Report No. 2015-0107-3279. <https://www.cdc.gov/niosh/hhe/reports/pdfs/2015-0107-3279.pdf>. Accessed January 18, 2019.
- ³¹ Chung-Hall J, Craig L, Gravely S, Sansone N, Fong GT. Impact of the WHO FCTC over the first decade: a global evidence review prepared for the Impact Assessment Expert Group. *Tob Control*. 2018. doi: 10.1136/tobaccocontrol-2018-054389. [Epub ahead of print]. <https://tobaccocontrol.bmj.com/content/early/2018/08/17/tobaccocontrol-2018-054389>. Accessed January 18, 2019.
- ³² World Health Organization. MPOWER: Advancing the WHO Framework Convention on Tobacco Control (WHO FCTC). https://www.who.int/cancer/prevention/tobacco_implementation/mpower/en/. Accessed January 18, 2019.
- ³³ Bollyky T, Fidler D. Has a global tobacco treaty made a difference? *Atlantic*. <https://www.theatlantic.com/health/archive/2015/02/has-a-global-tobacco-treaty-made-a-difference/386399/>. Published February 28, 2015. Accessed January 18, 2019.
- ³⁴ Observatory of Economic Complexity (OEC). Malawi. OEC website. <https://atlas.media.mit.edu/en/profile/country/mwi/>. Published 2016. Accessed September 10, 2018.
- ³⁵ Makoka D, Appau A, Lencucha R, Drope J. *Farm-Level Economics of Tobacco Production in Malawi*. Lilongwe, Malawi: Centre for Agricultural Research and Development and Atlanta, GA: American Cancer Society; 2016. <https://www.cancer.org/content/dam/cancer-org/research/economic-and-healthy-policy/farm-level-economics-of-tobacco-production-in-malawi-full-report.pdf>. Accessed January 22, 2019.
- ³⁶ Hu TW, Lee AH. Tobacco control and tobacco farming in African countries. *J Public Health Policy*. 2015;36(1):41-51.
- ³⁷ Leppan W, Lecours N, Buckles D, eds. *Tobacco Control and Tobacco Farming: Separating Myth From Reality*. New York, NY: Anthem Press; 2014.
- ³⁸ Kibwage JK, Odondo AJ, Momanyi GM. Assessment of livelihood assets and strategies among tobacco and non-tobacco growing households in south Nyanza region, Kenya. *Afr J Agric Res*. 2009;4(4):294-304.
- ³⁹ Otañez M, Graen L. Gentlemen, why not suppress the prices: global leaf demand and rural livelihoods in Malawi. In: Leppan W, Lecours N, Buckles D, eds. *Tobacco Control and Tobacco Farming: Separating Myth From Reality*. New York, NY: Anthem Press; 2014:61-96.
- ⁴⁰ Sejjaaka S. From seed to leaf: British American tobacco and supplier relations in Uganda. In: Bird F, Herman SW, eds. *International Businesses and the Challenges of Poverty in the Developing World: Case Studies on Global Responsibilities and Practices*. London, England: Palgrave Macmillan; 2004:111-123.
- ⁴¹ Foundation for a Smoke-Free World. Agricultural Transformation Initiative. <https://www.smokefreeworld.org/agriculture-livelihoods/agricultural-transformation-initiative>. Accessed December 1, 2018.
- ⁴² The World Bank. Dt Indicators. <https://data.worldbank.org/indicator>. Accessed September 15, 2018.
- ⁴³ National Statistical Office (NSO) of Malawi and ICF. *Malawi Demographic and Health survey 2015-16*. Zomba, Malawi, and Rockville, MD: NSO and ICF; 2017. <https://www.dhsprogram.com/publications/publication-fr319-dhs-final-reports.cfm>. Accessed January 22, 2019.
- ⁴⁴ Chung-Hall J, Craig L, Gravely S, Sansone N, Fong GT. *Impact of the WHO Framework Convention on Tobacco Control on the Implementation and Effectiveness of Tobacco Control Measures: A Global Evidence Review*. The International Tobacco Control Policy Evaluation Project. Waterloo, Ontario, Canada: University of Waterloo; 2016. <https://itcproject.org/files/WHO-FCTC-ITC-Global-Evidence-Review.pdf>. Accessed October 2, 2018.
- ⁴⁵ Zafeiridou M, Hopkinson NS, Voulvoulis N. *Cigarette Smoking: an Assessment of Tobacco's Global Environmental Footprint Across Its Entire Supply Chain, and Policy Strategies to Reduce It*. Geneva, Switzerland: World Health Organization; 2018. Accessed October 5, 2018.
- ⁴⁶ Novotny TE, Bialous SA, Burt L, et al. The environmental and health impacts of tobacco agriculture, cigarette manufacture and consumption. *Bull World Health Organ*. 2015;93(12):877-880.
- ⁴⁷ Geist HJ. Global assessment of deforestation related to tobacco farming. *Tob Control*. 1999;8(1):18-28.
- ⁴⁸ Farrell B. Tobacco stains: the global footprint of a deadly crop. *In These Times*. http://inthesetimes.com/article/3324/tobacco_stains. Published October 1, 2007. Accessed October 2, 2018.

⁴⁹ Foundation for a Smoke-Free World. Request for Proposal: Advancing Industry Transformation – Smoke-Free Index. https://www.smokefreeworld.org/sites/default/files/uploads/fsfw_rfp_advindustrytrans_090518_1.pdf. Accessed January 18, 2019.

⁵⁰ Access to Medicine Index. <https://accesstomedicinefoundation.org/access-to-medicine-index>. Accessed January 18, 2019.

⁵¹ Access to Nutrition Index. <https://www.accesstonutrition.org/>. Accessed January 18, 2019.

⁵² Foundation for a Smoke-Free World. Global Trends in Nicotine. <https://www.smokefreeworld.org/sites/default/files/fsfw-report-trends-in-nicotine-1005201811.pdf>. Published 2018. Accessed January 18, 2019.

⁵³ Foundation for a Smoke-Free World. Business Transformation: An Analysis of Case Studies Relevant to Achieving a Smoke-Free World. https://www.smokefreeworld.org/sites/default/files/fsfw_business_transformation_white_paper.pdf. Accessed January 18, 2019.