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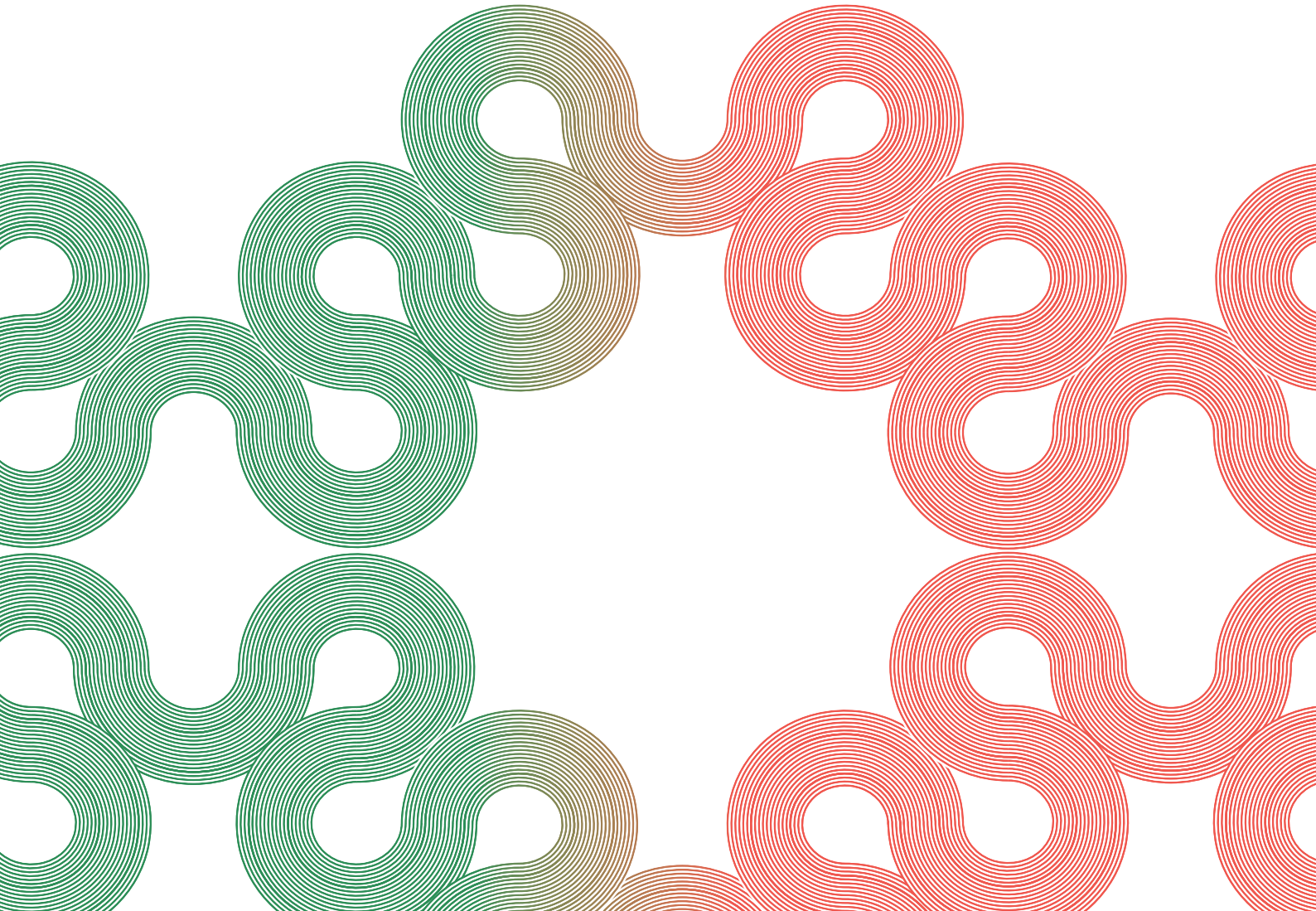
Investment Case for Tobacco Control in Madagascar

The case for scaling-up WHO FCTC implementation



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August 2019

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The Case for Investing in WHO FCTC Implementation in Madagascar

Prepared by
Ministry of Public Health, Madagascar
RTI International
United Nations Development Programme
WHO FCTC Secretariat
World Health Organization

August 2019

Funded by UK Government

Nearly **8,300** Malagasy die every year from tobacco-related illnesses.

Tobacco costs Madagascar

MGA 491 billion

every year, equivalent to

1.4% of its GDP

in 2017.

Investing now in four tobacco control measures will prevent

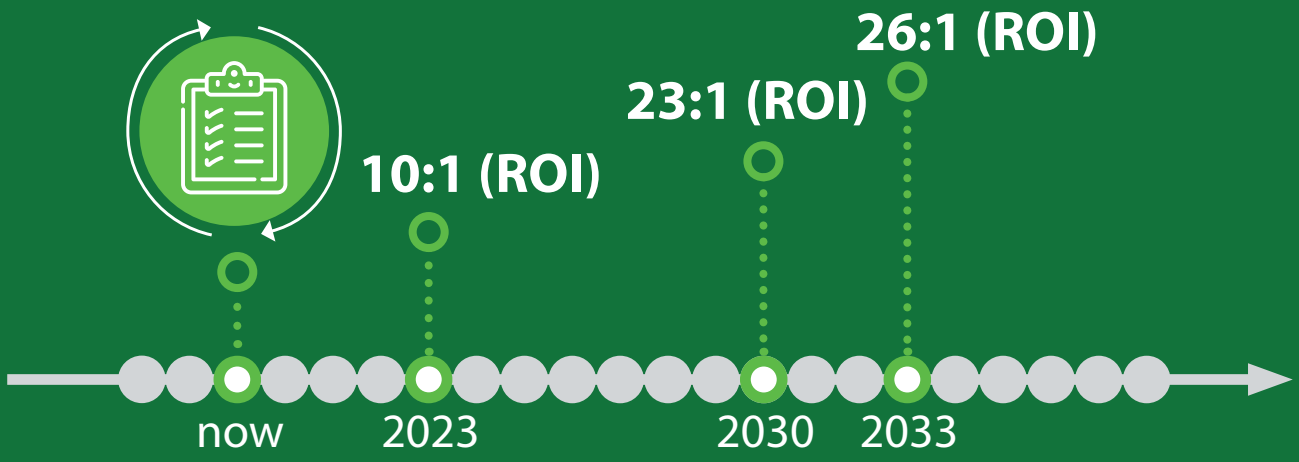
30,400 deaths

and avert

MGA 1.4 trillion

in health costs and economic losses by 2033.

By investing in four tobacco control interventions, Madagascar will receive a return on investment of **10:1** in averted costs and economic losses by 2023, and **26:1** by 2033.



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List of abbreviations

CCoLAT	Consultative Committee for Tobacco Control
CFA	West African Franc
CSR	corporate social responsibility
GDB	Global Burden of Disease Study
GDP	gross domestic product
MGA	Madagascar ariary
NCDs	non-communicable diseases
OFNALAT	National Office on Tobacco Control
OFMATA	Malagasy Office of Tobacco
OOP	out-of-pocket (healthcare expenditures)
ROI	return on investment
RTI	Research Triangle Institute
SFA	smoking attributable fraction
SDG	Sustainable Development Goals
RSE	Responsabilité Sociale des Entreprises
RSI	retour sur investissement
RTI	Research Triangle Institute
TAPS	tobacco advertising, promotion, and sponsorship
UNDP	United Nations Development Programme
USD	United States dollar
WHO	World Health Organization
WHO FCTC	World Health Organization Framework Convention on Tobacco Control

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The report recommends actionable steps, in addition to the modeled WHO FCTC provisions, that the Government of Madagascar can take to strengthen a whole-of-government approach to tobacco and its development consequences. Through the FCTC 2030 Project, the FCTC Secretariat, UNDP and WHO stand ready to support the Government of Madagascar to reduce the social, economic, and environmental burdens that tobacco continues to place on its country.

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1. Executive summary

Overview

Tobacco is a health and sustainable development issue. Tobacco consumption and production causes early death and disease, results in high health costs and economic losses, widens socioeconomic inequalities, and impedes progress against a range of Sustainable Development Goals.

This report presents the findings of the case for investing in tobacco control in Madagascar. In line with the WHO Framework Convention on Tobacco Control (FCTC) Global Strategy to Accelerate Tobacco Control and according to the stated priorities of the Government of Madagascar, it measures the costs and benefits—in health and economic terms—of implementing four priority tobacco control measures. The four measures are:

1. **Increase tobacco taxation to reduce the affordability of tobacco products.** (*FCTC Article 6*)
2. **Expand and enforce bans on smoking in public places to protect people from tobacco smoke.** (*FCTC Article 8*)
3. **Implement plain packaging.** (*FCTC Article 11 Guidelines*)
4. **Promote and strengthen public awareness about tobacco control issues and the harms of tobacco use through mass media information campaigns.** (*FCTC Article 12*)

Main findings

The investment case findings indicate that tobacco use in Madagascar is leading to enormous economic and health losses. These annual costs include a) MGA 25 billion in healthcare expenditures, and b) MGA 466 billion in lost productive capacities due to premature mortality, disability, and workplace smoking. The productivity losses from current tobacco use in Madagascar—95 percent of all tobacco-related costs—indicate that tobacco use impedes development in Madagascar beyond health; multisectoral engagement is required for effective tobacco control, and other sectors benefit substantially from supporting tobacco control investments.

Every year, tobacco use kills nearly 8,300 Malagasy, with 82 percent of these deaths among individuals under the age of 70. More than 2,300 lives lost from tobacco use are due to exposure to secondhand smoke, and 752 (9 percent) of all deaths from secondhand smoke are among children younger than 15 years old.

By acting now, the Government of Madagascar can reduce the burden of tobacco use. The investment case findings demonstrate that enacting and enforcing four FCTC tobacco-control measures would, over the next 15 years:

Avert MGA 1.4 trillion in economic losses. This would include MGA 1.3 trillion in economic output losses averted. The tobacco-control measures stimulate economic growth by ensuring that fewer people 1) drop out of the workforce due to premature mortality, 2) miss days of work due to disability or sickness, and 3) work at a reduced capacity due to smoking.

Lead to MGA 71.7 billion in savings through avoidance of tobacco-attributable healthcare expenditures. Of this, the Government would save MGA 38.7 billion in healthcare expenditures, and citizens would save MGA 15.8 billion in out-of-pocket health-care costs.

Save 30,400 lives and reduce the incidence of disease. The recommended WHO FCTC tobacco control measures contribute to Madagascar's efforts to achieve SDG Target 3.4 to reduce by one third premature mortality (under age 70) from NCDs by 2030. Enacting the FCTC measures would prevent almost 12,000 premature deaths from the four main NCDs by 2030, the equivalent of about 7 percent of the needed reduction in premature mortality to achieve SDG Target 3.4.

Provide economic benefits (MGA 1.4 trillion) that significantly outweigh the costs (MGA 0.05 trillion) of implementation. Each of the WHO FCTC provisions is highly cost-effective. Increasing cigarette taxes has the highest return-on-investment (126:1), followed by mass media campaigns (34:1), implementing plain packaging of tobacco products (21:1), and enforcing bans on smoking in public places (20:1).

Tobacco farming in Madagascar, main findings

- Tobacco farming is likely not profitable compared to alternative economic activities. Studies in other countries have shown that tobacco cultivation yields poor returns to labor, can lead to dependency and debt, and imposes health risks on farmers.
- Tobacco farming contributes to environmental destruction. Tobacco is a highly resource intensive crop which leads to soil and water degradation. Tobacco wood curing is often a leading factor of deforestation.
- There are low-cost interventions the Government can support to help tobacco farmers wishing to transition to other crops and/or non-agricultural activities.
- Tobacco farming spreads untaxed and cheap loose-leaf tobacco for roll-your-own cigarettes, which decreases the effectiveness of tobacco control measures, including taxes.

Recommendations

The results of the Madagascar FCTC Investment Case show that there is an evidence-based opportunity to reduce the health, economic and other development burdens of tobacco through preventative actions that target tobacco use. By investing now in tobacco control measures, Madagascar can accelerate its efforts towards achieving the Sustainable Development Goals, which call for a one-third reduction in premature mortality by 2030.

The report recommends actionable steps, in addition to the modeled WHO FCTC provisions, that the Government of Madagascar can take to strengthen a whole-of-government approach to tobacco and its development consequences. Through the FCTC 2030 Project, the FCTC Secretariat, UNDP and WHO stand ready to support the Government of Madagascar to reduce the social, economic, and environmental burdens that tobacco continues to place on its country.

1. **Strengthen the tobacco control legislative framework.**
2. **Strengthen multisectoral coordination and planning.**
3. **Increase tobacco taxes and reduce illicit trade.**
4. **Assist tobacco farmers who wish to transition from tobacco to alternative livelihoods.**

2. Introduction

Tobacco is one of the world's leading health threats, and a main risk factor for non-communicable diseases (NCDs) including cancers, diabetes, chronic respiratory disease and cardiovascular disease. In Madagascar, more than 5 million people use tobacco products, leading to an estimated 8,300 deaths every year.[1] Eighty-two percent of those deaths occur among those under age 70.[2]

Alongside the cost to health, tobacco imposes a substantial economic burden. In 2012, worldwide, health care expenditures to treat diseases and injuries caused by tobacco use totaled nearly six percent of global health expenditure.[3] Further, tobacco use can reduce productivity by permanently or temporarily removing individuals from the labor market due to poor health.[4] When individuals die prematurely, the labor output that they would have produced in their remaining years is lost. In addition, individuals with poor health are more likely to miss days of work (absenteeism) or to work at a reduced capacity while at work (presenteeism).[5, 6]

Tobacco use may displace household expenditure that would go to fulfilling basic needs, including food and education,[7, 8, 9] contributing to pushing some families into poverty and hunger.[10, 11] It imposes health and socio-economic challenges on the poor, women, youth and other vulnerable populations.[12] Meanwhile, tobacco production causes environmental damage including soil degradation, water pollution and deforestation.[13, 14, 15] Given the far-reaching development impacts of tobacco, effective tobacco control requires the engagement of non-health sectors within the context of a whole-of-government approach.

The 2030 Agenda recognizes that current tobacco use trends, in Madagascar and around the world, are incompatible with sustainable development. Through Sustainable Development Goal (SDG) Target 3.4., Agenda 2030 commits Member States to achieve a one-third reduction in premature mortality from NCDs (i.e. deaths between 30 and 70) by 2030. Accelerating progress on NCDs requires strengthened implementation of the World Health Organization Framework Convention on Tobacco Control (SDG Target 3.a). Tobacco control is not just a primary means to improve population health, but also a proven approach to reduce poverty and inequalities, grow the economy and advance sustainable development broadly. However, more work must be done to reverse the tobacco epidemic.

Madagascar ratified the WHO Framework Convention on Tobacco Control (WHO FCTC) in 2004 and became a member in 2005.[16] Since that time, Madagascar has made significant progress in tobacco control by raising tobacco taxes; mandating that large graphic warning labels appear on

tobacco packaging; banning tobacco advertising, promotion, and sponsorship; and expanding the list of public places where smoking is banned.[17, 18]

By legislating and funding these important measures, Madagascar is helping to curb the tobacco epidemic. Intensifying existing policies and implementing new measures can draw the tobacco use prevalence curve further downward and generate additional health and economic gains. For example, opportunities exist to conduct a nationwide anti-tobacco campaign and implement plain packing laws.[19] Realizing the full benefits of such measures depends on concerted and coordinated efforts from multiple sectors of government as well as high-level leadership and an informed public.

In 2018, the WHO FCTC Convention Secretariat, UNDP, and WHO undertook a joint mission to Madagascar to launch an investment case as part of the FCTC 2030 Project. The FCTC 2030 Project is a global initiative funded by the UK Government to support countries to strengthen FCTC implementation to achieve the Sustainable Development Goals (SDGs). Madagascar is one of the 15 countries worldwide receiving this dedicated project support.

An investment case analyzes the health and economic costs of tobacco use as well as the potential gains from scaled-up implementation of FCTC measures. It identifies which FCTC demand-reductions measures can produce the largest health and economic returns for Madagascar (the return on investment; ROI). In consultation with the Government of Madagascar, four key FCTC provisions were selected to model within the investment case:

Increase tobacco taxation to reduce the affordability of tobacco products. *(WHO FCTC Article 6)*

Enforce bans on smoking in all public places to protect people from tobacco smoke. *(WHO FCTC Article 8)*

Implement plain packaging of tobacco products. *(FCTC Article 11: Guidelines for Implementation)*

Institute mass media campaigns against tobacco use. *(FCTC Article 12)*

Section 3 of this report provides an overview of tobacco control in Madagascar, including tobacco use prevalence as well as challenges and opportunities. **Section 4** summarizes the methodology of the investment case (see *Annex* and *Technical Appendix*[1] for more detail). **Section 5** reports the main findings of the economic analysis, including the impact of tobacco cultivation on farmers. The report concludes under **Section 6** with a set of recommendations.

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1 Available upon request

3. Tobacco control in Madagascar: status and context

3.1 Tobacco use prevalence, social norms, and awareness-raising

In Madagascar, 48.9 percent of men and 21.1 percent of women age 15 to 49 use at least one form of tobacco.[20] Tobacco use varies by region, with the lowest rates found in the eastern and northeastern regions of the country (15.3 percent in Atsinanana and 15.3 percent in Sava) and the highest rates in the southeastern coastal provinces of Vatovavy Fitovinany (49.3 percent) and Atsimo Atsinanana (46.2 percent)[21], as shown in **Figure 1**.

The type of tobacco products consumed varies by gender. **Figure 2** shows that approximately half of male tobacco users consume cigarettes and half consume smokeless tobacco products. However, almost all female tobacco use is in the form of smokeless tobacco (chewing tobacco or snuff). Chewing tobacco, known as *paraky* in Malagasy, is a highly traditional practice that is readily available in local markets and on the streets, and is found mainly in rural areas.[22] It is believed that chewing tobacco has medicinal purposes and is used as a pain reliever, for stomach aches, and to cure cavities and tooth pain.[23]

Tobacco use is highly correlated with income. The poorest 20 percent of people in Madagascar use tobacco at a rate of 43 percent, while the wealthiest 20 percent of the population use tobacco at a rate of 23 percent.[24] This results in lower-income Malagasy suffering from a disproportionate share of the health and economic burden resulting from tobacco-attributable disease and mortality. Because the health and economic benefits of tobacco control accrue disproportionately to these

Fig. 1: Adult prevalence of tobacco use, by region

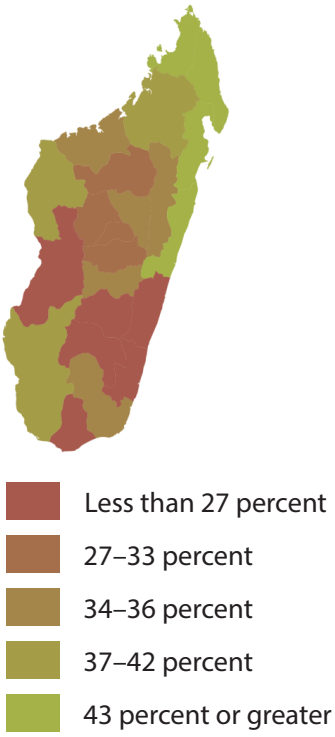
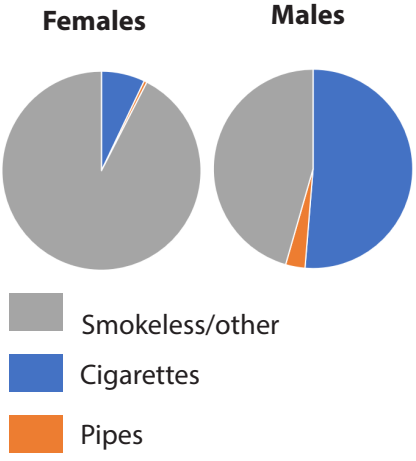


Fig. 2: Forms of tobacco use among adult tobacco consumers, by sex



lower-income groups, tobacco control is regarded as a pro-poor policy approach that accelerates progress towards SDG 10 on reducing inequalities.

3.2 Tobacco control regulatory measures

Strong fiscal and regulatory measures can powerfully influence norms by signaling to the population that tobacco use is harmful. Madagascar has not yet passed a comprehensive tobacco control law but has adopted a legislative and regulatory framework to implement tobacco control. Madagascar has passed a series of tobacco control policies to reduce demand for tobacco products and protect the health of its population. Laws require large graphic warning labels on tobacco products, restrict smoking in some public places, and ban tobacco advertising, promotion and sponsorship of tobacco products.[25] However, compliance and enforcement of some laws remains low including the ban on smoking in all public places, the sale to minors and by minors, and the prohibition of advertising or direct or indirect promotion at points of sale. To further protect the health of its population, Madagascar can honour its obligations as a Party to the FCTC by strengthening existing policies and implementing additional measures proven to reduce demand for tobacco.

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Taxation and Pricing

Madagascar currently has a total **tax rate** on cigarettes that accounts for 80.4 percent of the retail price of the most sold cigarette brand. Madagascar could further increase the tax rate, in line with WHO FCTC guidelines recommending that taxes represent ***at least*** 75 percent of the retail price of tobacco products. Specifically, Madagascar should increase the excise tax component which currently equals 63.6 percent of the retail price of cigarettes—below the WHO FCTC guidelines that excise taxes account for at least 70 percent of the retail price.

In addition, the excise tax in effect is an ad-valorem tax, and although there is a specific tax levied for the benefit of TAFITA, LOVAKO and OFNALAT, there is no specific excise tax on tobacco products.[26] Ad-valorem taxes are more difficult to administer and more susceptible to price undervaluation by the tobacco industry to reduce the taxable value of goods. Ad-valorem taxes also lead to price differences between lower and higher-priced brands, increasing the incentives for consumers to switch to cheaper brands. WHO FCTC Article 6 guidelines therefore recommend a tax regime of predominantly uniform specific excise taxes which lead to higher prices, even on low-priced brands.

In addition, not all tobacco products in Madagascar are taxed in a comparable way.[27] The current tax rate on smokeless tobacco products is 45.3 percent, well below the level recommended by WHO FCTC. Raising the tax rates for smokeless tobacco to similar levels as cigarettes is key, given that half of tobacco users use smokeless. This also represents the most significant opportunity to use tobacco control to provide revenue, a priority given the emphasis in Agenda 2030 on increasing domestic financing for sustainable development. The investment case examines the impact of doubling the cost of a pack of cigarettes over the first seven years, with additional incremental increases through 2033.

Smoking Ban in Public Places

Madagascar has enacted a **ban on smoking in all public places**. However, there are significant issues with compliance with the bans. Compliance is especially low in cafes, pubs, and bars; universities and other educational institutions; and government buildings.[28] There are several reasons cited for low compliance with the ban on smoking, including that there are no fines imposed on the owners; no funds allocated for the application of the smoking ban; no complaint system that requires investigation after a complaint; and no system to recover imposed fines.

Warning Labels and Packaging

In order to inform consumers about the harmful effects of tobacco, Madagascar mandates that cigarette and smokeless tobacco packaging carry four rotating **graphic warning labels** that cover 50 percent of packaging.[29] This is in line with the FCTC obligation for rotating graphic warning labels, which should cover 50 percent of tobacco packaging and is therefore not modeled under the investment case. However, Madagascar could strengthen the efficacy of warning labels by developing, pre-testing and implementing new culturally appropriate and effective graphic health messages; increasing the size and placing images on the top of packages; and increasing the frequency of rotation while aligning other features with FCTC Article 11 Guidelines.

Plain Packaging

Neutral colors, without branding and logos—is currently not mandated.[30] **Plain packaging** of tobacco products would enhance the impact of health warnings and eliminate the possibility of using the package as a vehicle for advertising.

Anti-tobacco Awareness Campaigns

The Government of Madagascar has not sponsored an **anti-tobacco mass media campaign** within the past five years.[31] Implementing mass media campaigns would promote and strengthen public awareness about tobacco control issues and the harms of tobacco use.

Tobacco Advertising, Promotion, and Sponsorship (TAPS)

Madagascar has enacted a comprehensive **ban on nearly all forms of tobacco advertising, promotion, and sponsorship** (TAPS), including direct advertising on major forms of media (e.g., TV, radio, print media, billboards, Internet) and most indirect forms of promotion and sponsorship (e.g., free distribution of tobacco products) except for point-of-sale product displays. Compliance with the bans is reported to be high,[32] and TAPS bans are not modeled under the investment case. However, the tobacco industry continues to sell its image by supporting so-called "corporate social responsibility" (CSR) activities.

Table 1 summarizes the existing state of FCTC demand-reduction measures and compares them against the FCTC target goals for each measure. Reaching target goals can further reduce tobacco consumption.

Table 1: Summary of the current state of FCTC demand reduction measures in Madagascar, and target goals

Tobacco Control Policy	Baseline	Target
Increase tobacco taxation to reduce the affordability of tobacco products. *(Article 6)*	Tax share equivalent to 80.4 percent of the retail price of the most sold brand of cigarettes, and 45.3 percent of the most sold brand of smokeless tobacco.	Further reduce affordability of tobacco by increasing taxes on cigarettes and smokeless tobacco. Harmonize taxes across tobacco products and increase the specific excise tax component to reduce the possibility of consumers switching to cheaper brands and products. Implement regular tax increases to outpace inflation and income growth.
Implement and enforce bans on smoking in all public places to protect people from tobacco smoke. *(Article 8)*	Smoking is banned in all indoor workplaces and indoor public places, but compliance with the law is low.	Currently meeting the FCTC guidelines for banning smoking in all indoor workplaces and public places. However, increasing enforcement and compliance with the ban would result in additional gains.

Tobacco Control Policy	Baseline	Target
Mandate that tobacco products and packaging carry large graphic health warnings describing the harmful effects of tobacco use. *(Article 11)*	Graphic warning labels are required to cover 50 percent of tobacco packaging and are required to be rotated.	**Currently meeting the FCTC size and rotation obligations.**
Mandate plain packaging of all tobacco products. *(Article 11: Guidelines)*	No law mandates plain packaging of tobacco products.	Implement a law requiring plain packaging.
Promote and strengthen public awareness about tobacco control issues and the harms of tobacco use through mass media information campaigns. *(Article 12)*	Madagascar has not held a nationwide anti-tobacco campaign within the past five years.	Implement a nationwide anti-tobacco mass media campaign that is researched and tested with a targeted audience; airs on TV and radio; and is evaluated for impact.
Enact and enforce a comprehensive ban on all forms of tobacco advertising sponsorship and promotion. *(Article 13)*	Advertising is banned on major forms of media (e.g., TV, radio, internet, billboards, print) as are most indirect forms of promotion and sponsorship. Tobacco industry corporate social responsibility activities are allowed in Madagascar.	**Currently meeting most of the FCTC obligations on banning tobacco advertisements, promotions, and sponsorships.** Madagascar should reinforce the global ban on TAPS, including "corporate social responsibility" and all forms of point-of-sale advertising.

*Information in this table is derived from the WHO Report on the Global Tobacco Epidemic: Country profile – Madagascar.[33]

3.3 National tobacco control legislation, strategy and coordination

The Government of Madagascar has taken progressive steps to enact tobacco control measures. However, there is no comprehensive tobacco control law, as tobacco is regulated only under bylaws. Government stakeholders have acknowledged the need to enact a comprehensive national tobacco control law to strengthen the legal framework.

Madagascar faces challenges in enforcement due to lack of resources and capacity. The national police and gendarmerie enforce bans on smoking in indoor public places, regulations on tobacco farming, and illicit trade in tobacco. However, low understanding of existing tobacco control law among the public and the agencies tasked with enforcement leads to low levels of enforcement

and compliance, particularly at the local levels of government. Stakeholders in Madagascar emphasize the need to engage regional and local governments to sensitize them on existing laws while building awareness among the public to increase compliance with the law.

In line with Article 5 of the WHO FCTC, the Government of Madagascar has established a national tobacco control programme under the Ministry of Health (OFNALAT) and a multisectoral national coordination mechanism (CCoLAT). While there is a high level of commitment from different sectors to address tobacco control and strengthen partnerships, stakeholders shared the view that CCoLAT lacks resources. The Government could fill the resource gap by increasing the special tobacco tax allocated to the Ministry of Health for tobacco control. This has been done recently in 2019 in Chad, where tobacco taxes were increased by 100 CFA Francs per package and allocated to the Ministry of Health.

The work plan of OFNALAT and CCoLAT should be based on priority actions as outlined in a national strategy for tobacco control (WHO FCTC Article 5.1). A multisectoral, costed, national strategy for tobacco control aligns sectors along common strategies, goals and targets, facilitates resource mobilization and enhances accountability and transparency. CCoLAT gathered in July of 2018 to draft a multisectoral national tobacco control strategy for 2019–2023. The process benefited from the meaningful input of all relevant sectors and the resulting action plan is time bound and costed, putting Madagascar a step ahead of many of its peers. The new national tobacco control strategy should also be linked to different sectoral and national development plans.

3.4 Tobacco industry interference

The tobacco industry lobby is strong in Madagascar. Cases of interference from the tobacco industry have been reported during the process of drafting and adopting regulatory texts and during their implementation. One instance of interference is the industry successfully lobbying for changing graphic health warning requirements towards less effective text and images. Madagascar does not have an official code of conduct to prevent industry interference, the industry is not monitored, and officials are generally not aware of Article 5.3 of the WHO FCTC which states that "in setting and implementing their public health policies with respect to tobacco control, Parties shall act to protect these policies from commercial and other vested interests of the tobacco industry in accordance with national law." Madagascar should therefore include obligations under Article 5.3 in anti-smoking legislation and adopt a code of conduct for civil servants while raising awareness of the need to protect public policy against the vested interests of the tobacco industry.

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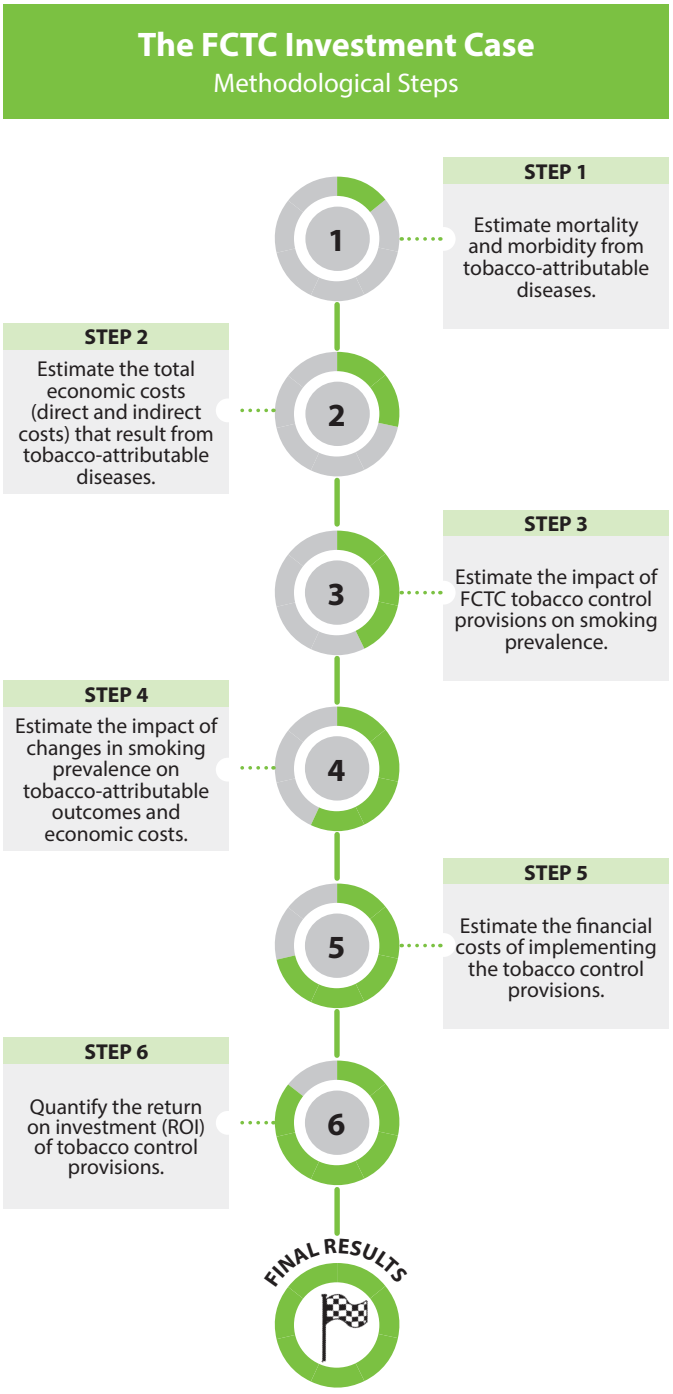
4. Methodology

The purpose of the investment case is to quantify the current health and economic burden of tobacco use in Madagascar (in the context of tobacco control measures that are currently in place); estimate the impact that implementing new tobacco control measures—or intensifying existing ones—would have on reducing this burden; and provide analysis of other impacts.

An RTI International-developed static model incorporating a population-attributable fraction approach was created to conduct the investment case and to perform the methodological steps in **Figure 3**. The tools and methods used to perform these steps are described in this report's Annex. Interested readers are also referred to this report's separate Technical Appendix for a more thorough account of the methodology.[2]

The investment case team worked with partners in Madagascar to collect national data inputs for the model. Where data was unavailable from government or other in-country sources, the team utilized publicly available national, regional, and global data from sources such as the World Health Organization (WHO), the World Bank database, the Institute for Health Metrics and Evaluation's (IHME) Global Burden of Disease (GBD) study, and academic literature. Within the investment case, costs and monetized benefits are reported in constant 2017 Madagascar ariary (MGA) and discounted at an annual rate of 3 percent.

Fig. 3: Building the FCTC investment case



2 Available upon request

5. Results

5.1 The burden of tobacco use: health and economic costs[3]

Tobacco use undermines economic growth. In 2017, tobacco use caused an estimated 8,295 deaths in Madagascar, 82 percent occurring among those under 70 years. These deaths amount to 182,154 years of life lost for people under the age of 70, which are lost productive years in which many of those individuals would have contributed to the workforce. The economic losses in 2017 due to tobacco-related mortality are estimated at MGA 225 billion.

While the costs of premature mortality are high, the consequences of tobacco use begin long before death. As individuals suffer from tobacco-attributable diseases (e.g. heart disease, strokes, cancers), expensive medical care is required to treat them. Spending on medical treatment for illnesses caused by smoking cost the Government MGA 13.3 billion in 2017 and caused Malagasy citizens to spend MGA 5.5 billion in out-of-pocket (OOP) healthcare expenditures. Private insurance and non-profit institutions serving households spent MGA 5.9 billion on treating tobacco-attributable diseases in 2017. In total, smoking generated MGA 24.8 billion in healthcare expenditures.

In addition to generating healthcare costs, as individuals become sick, they are more likely to miss days of work (absenteeism) or to be less productive at work (presenteeism). In 2017, the costs of excess absenteeism due to tobacco-related illness was MGA 39.2 billion and the costs of presenteeism due to cigarette smoking were MGA 117.9 billion.

Finally, even in their healthy years, working smokers are less productive than non-smokers. Smokers take an estimated ten additional minutes per day more in breaks than non-smoking employees[34]. If ten minutes of time is valued at the average workers' salary, the compounding impact of 1.9 million employed smokers taking ten minutes per day for smoke breaks is equivalent to losing MGA 83.5 billion in productive output annually.

In total, tobacco use cost Madagascar's economy MGA 490.7 billion[4] in 2017, or about 1.4 percent of Madagascar's 2017 GDP. **Figure 4** breaks down direct and indirect costs. **Figure 5** and **Figure 6** illustrate the annual health losses that occur due to tobacco use.

3 In assessing the 'current burden' of tobacco use, the economic costs of premature mortality include the cost of premature deaths due to any form of exposure to tobacco (including of smoking, second-hand smoke, and the use of other types of tobacco products). Only smoking-attributable (not tobacco-attributable) costs are calculated for healthcare expenditures, absenteeism, presenteeism, and smoking breaks. While other forms of tobacco may also cause losses in these categories, no data is available to pinpoint those losses.

4 Component parts may not add up exactly to 490.7 billion due to rounding.

The current burden of tobacco use

Fig. 4: Breakdown of the share of direct and indirect costs in 2017 (MGA billions)

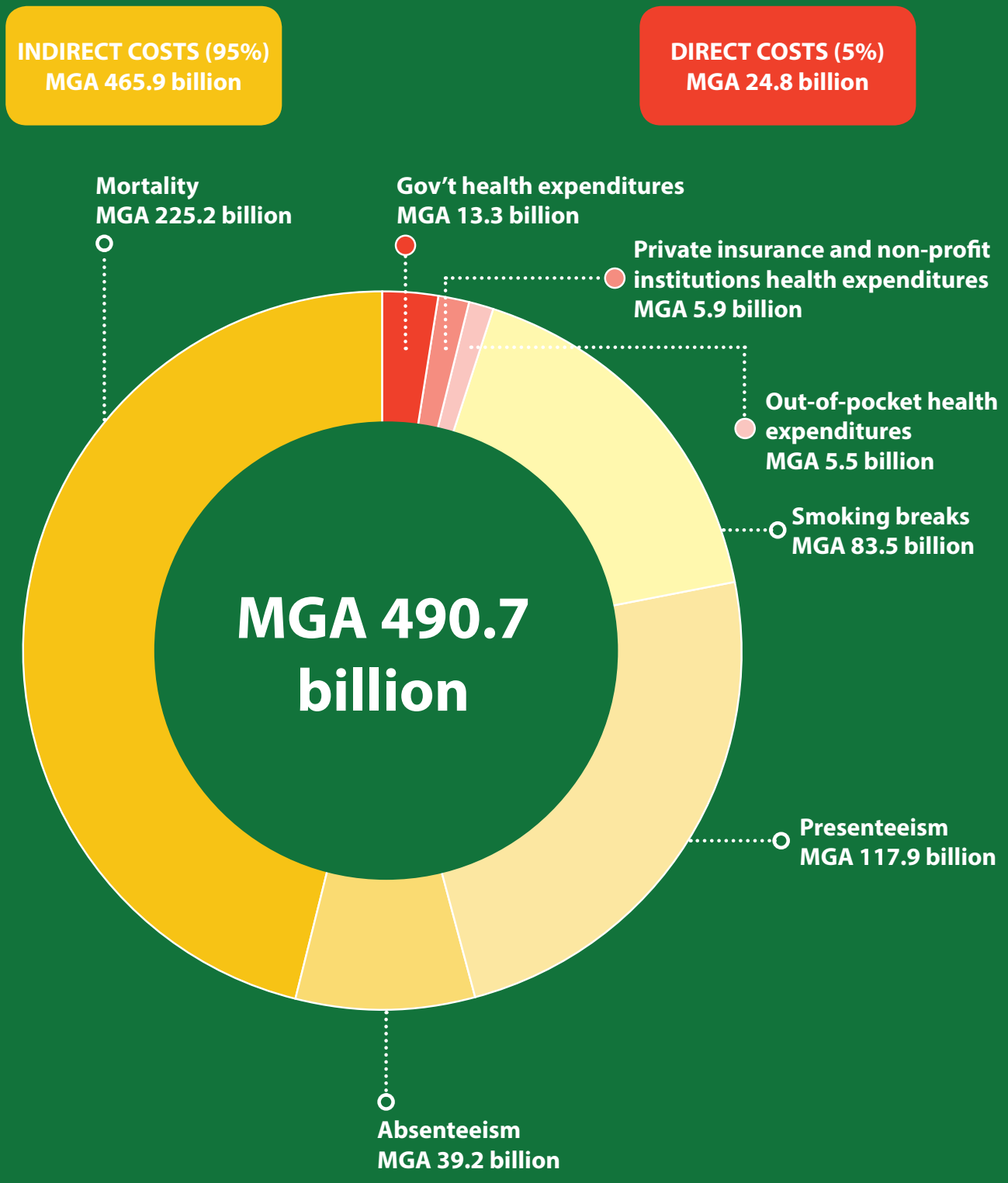


Fig. 5: Tobacco-attributable deaths by disease, 2017 *(Source: Results are from the IHME Global Burden of Disease Results Tool. Other diseases include Aortic aneurysm, Lip and oral cavity cancer, Peptic ulcer disease, Alzheimer's disease and other dementias, Larynx cancer, Colon and rectum cancer, Cervical cancer, Stomach cancer, Liver cancer, Leukemia, Breast cancer, Prostate cancer, Bladder cancer, Other pharynx cancer, Pancreatic cancer, Nasopharynx cancer, Atrial fibrillation and flutter, Gallbladder and biliary diseases, Rheumatoid arthritis, Kidney cancer, Peripheral artery disease, Multiple sclerosis, and Otitis media.)*

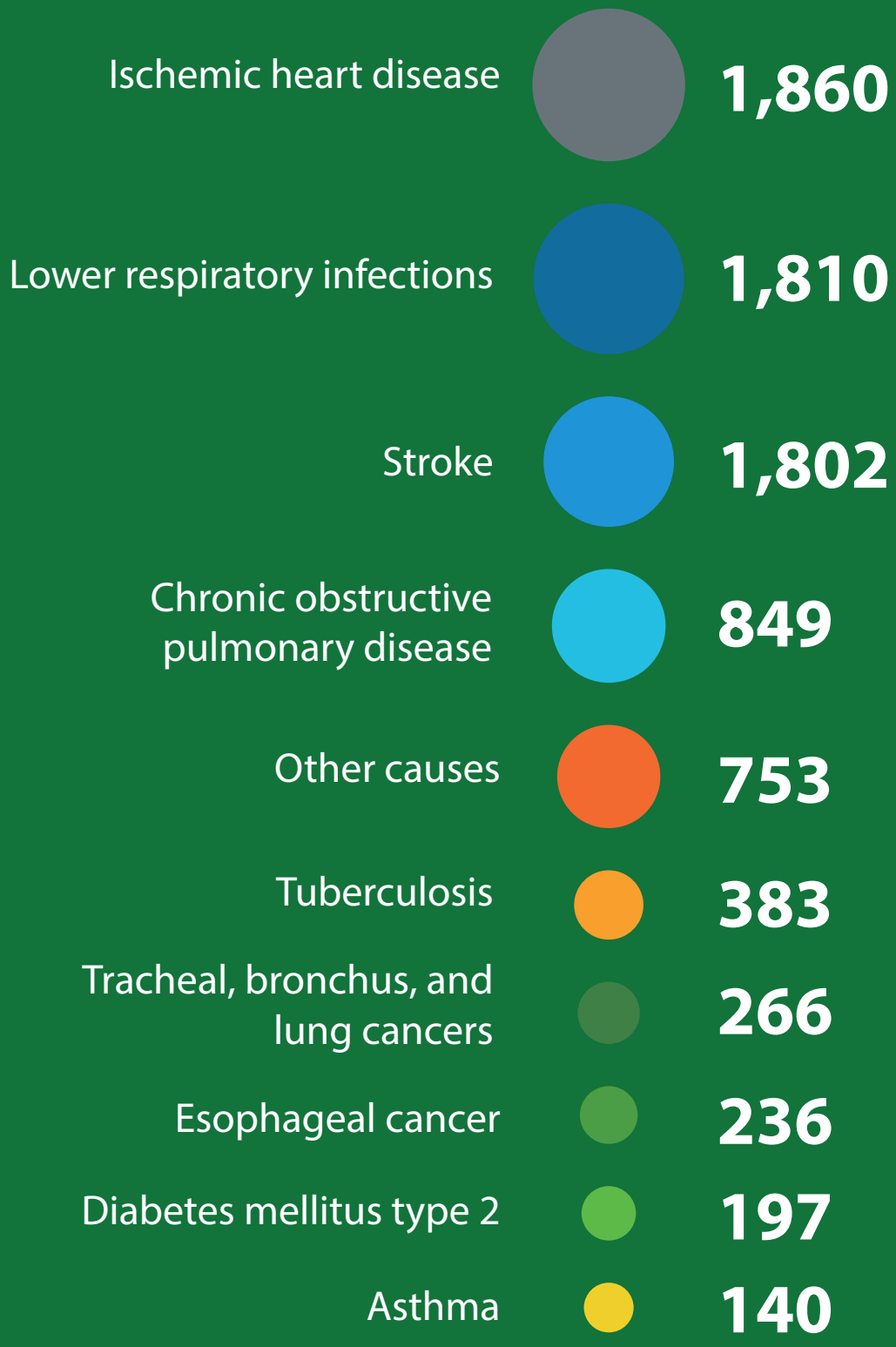
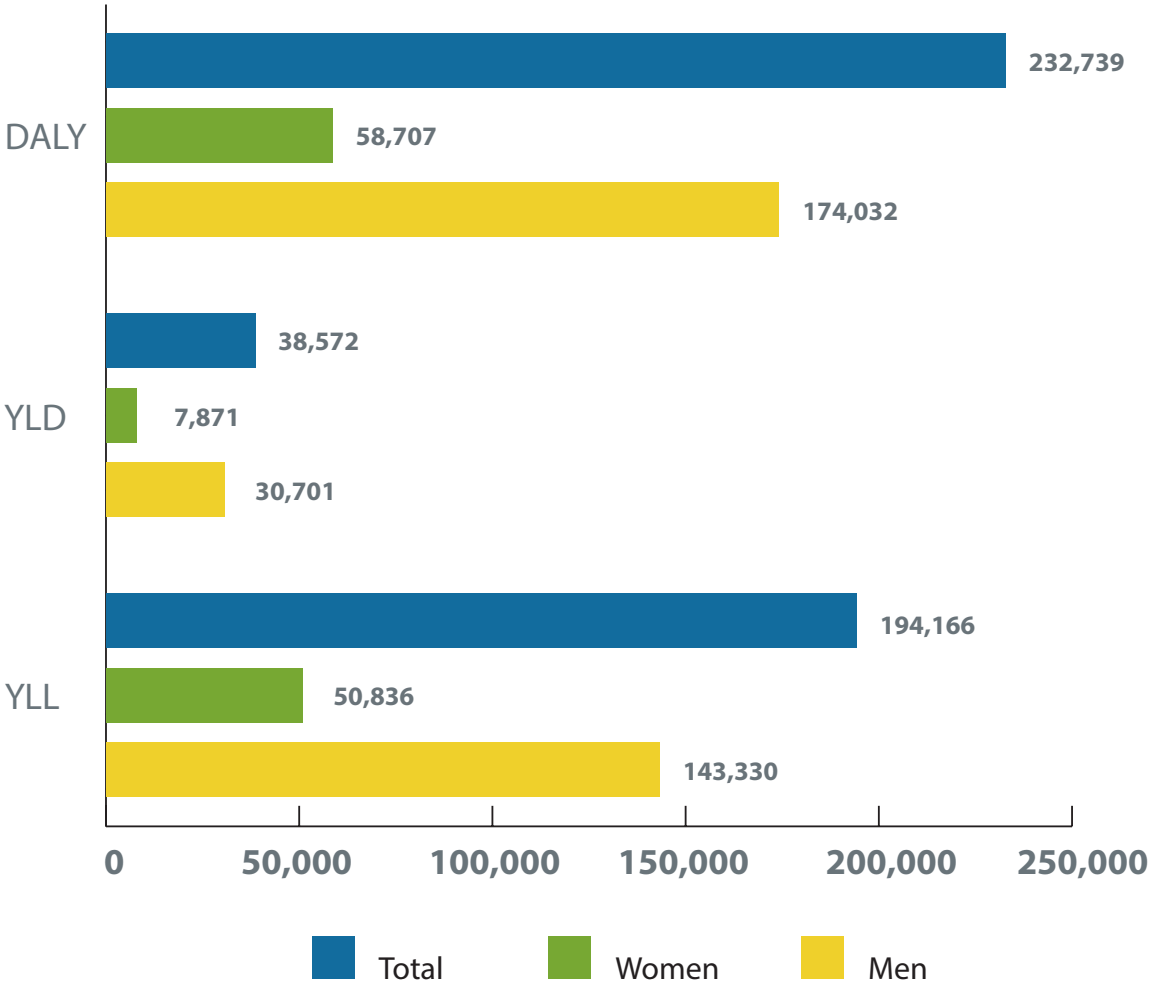


Fig. 6: Tobacco-attributable DALYs, YLDs and YLLs, 2017, by sex[5]



5.2 Implementing policy measures that reduce the burden of tobacco use

By implementing new FCTC policy measures, or intensifying implementation of existing ones, Madagascar can secure significant health and economic returns, and begin to reduce the MGA 490.7 billion in annual direct and indirect economic losses that occur due to tobacco use.

The next two sections present the health and economic benefits that result from four FCTC policy actions to: 1) increase cigarette taxation to reduce the affordability of tobacco products; 2) increase enforcement of the ban on smoking in public spaces; 3) run national anti-tobacco mass media campaigns to increase awareness about the harms of tobacco use, and; 4) implement plain packaging of tobacco products.

5 YLDs are "years lived in less than ideal health…[YLDs are] measured by taking the prevalence of a [disease] condition multiplied by the disability weight for that condition. Disability weights reflect the severity of different conditions." YLLs are "calculated by subtracting the age at death from the longest possible life expectancy for a person at that age." DALYs "equal the sum of YLLs and YLDs. One DALY equals one lost year of healthy life." Source: IHME. (2018). Frequently asked questions. Retrieved from <http://www.healthdata.org/gbd/faq#What%20is%20a%20DALY?>

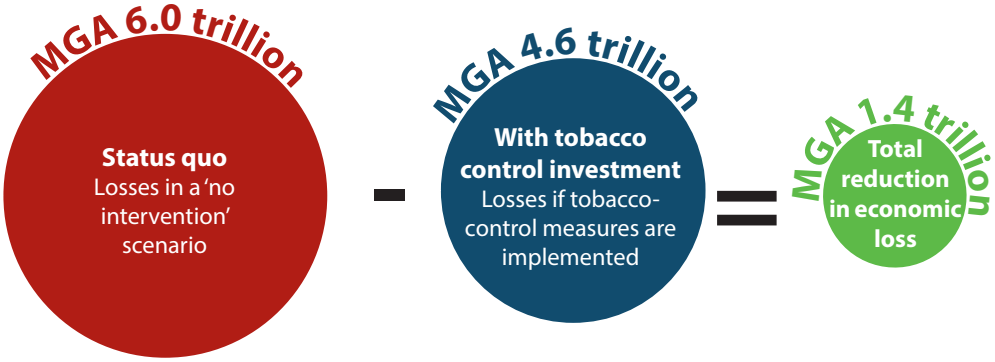
5.3 Health benefits—lives saved

Putting in place the full package of tobacco-control measures (inclusive of all four of the measures listed above) would lower the prevalence of tobacco use, leading to substantial health gains. Specifically, enacting the package would reduce the prevalence of cigarette smoking by 42.2 percent (in relative terms) over 15 years, saving 30,400 lives from 2019–2033, or 2,027 lives annually.

5.4 Economic benefits—costs averted

Implementing the tobacco control policy package would result in Madagascar avoiding 23 percent of the economic loss that it is expected to incur from smoking and secondhand smoke over the next 15 years. **Figure 7** illustrates the extent to which Madagascar can shrink the economic losses it is expected to incur under the status quo.

Fig. 7: Tobacco-related economic losses over 15 years: What happens if Madagascar does nothing, versus if the Government implements tobacco control measures to reduce demand for smoking?



In total, over 15 years Madagascar would save about MGA 1.4 trillion that would otherwise be lost if it does not implement the package of tobacco control measures, or the equivalent of about MGA 92.7 billion in annual avoided economic losses.

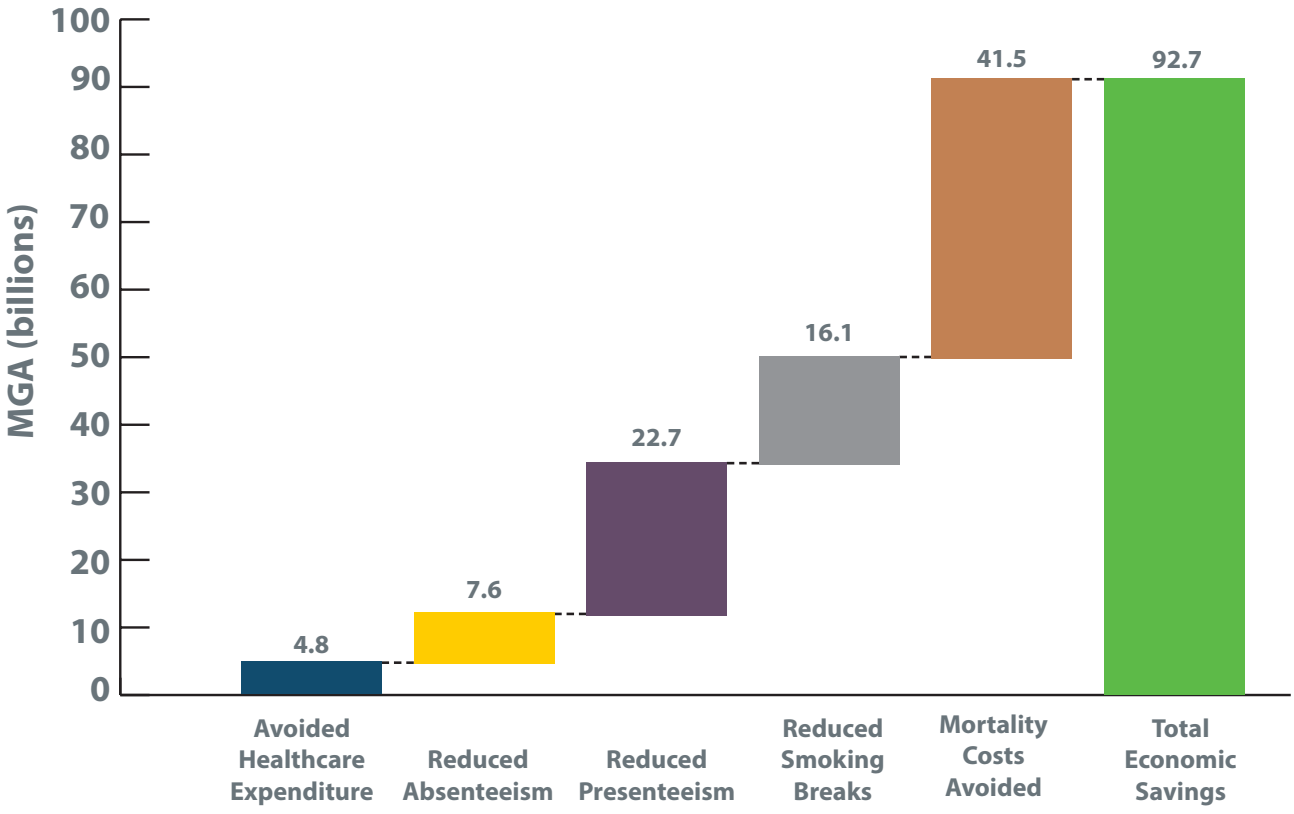
With better health, fewer individuals need to be treated for complications from disease, resulting in direct cost savings to the government and to citizens. In addition, better health leads to increased worker productivity. Fewer working-age individuals leave the workforce prematurely due to death. Laborers miss fewer days of work (absenteeism) and are less hindered by health complications while at work (presenteeism). Finally, because the prevalence of smoking declines, fewer individuals take smoke breaks in the workplace.

In addition to the savings from avoiding healthcare and productivity losses, equalizing the tax rates on smokeless tobacco products with the rate on cigarettes would generate significant additional revenue, that could be allocated to both the tobacco control measures recommended

here, as well as broader efforts to achieve the Sustainable Development Goals. The 2015 Addis Ababa Action Agenda on financing for development, adopted by consensus weeks before the formalization of the 2030 Agenda, specified increased tobacco taxes as key means to financing the 2030 Agenda for Sustainable Development. Those gains from additional revenue are not modeled as part of the economic savings from implementing the package recommended here, but that additional revenue would be just as concrete a benefit as the savings projected in this investment case.

Figure 8 breaks down the sources from which annual savings accrue. The largest annual savings result from avoiding premature mortality (MGA 41.5 billion). The next highest source of annual savings is reduced presenteeism (MGA 22.7 billion), followed by reduced numbers of smoking breaks (MGA 16.1 billion), reduced absenteeism (MGA 7.6 billion), and avoided healthcare expenditures (MGA 4.8 billion).

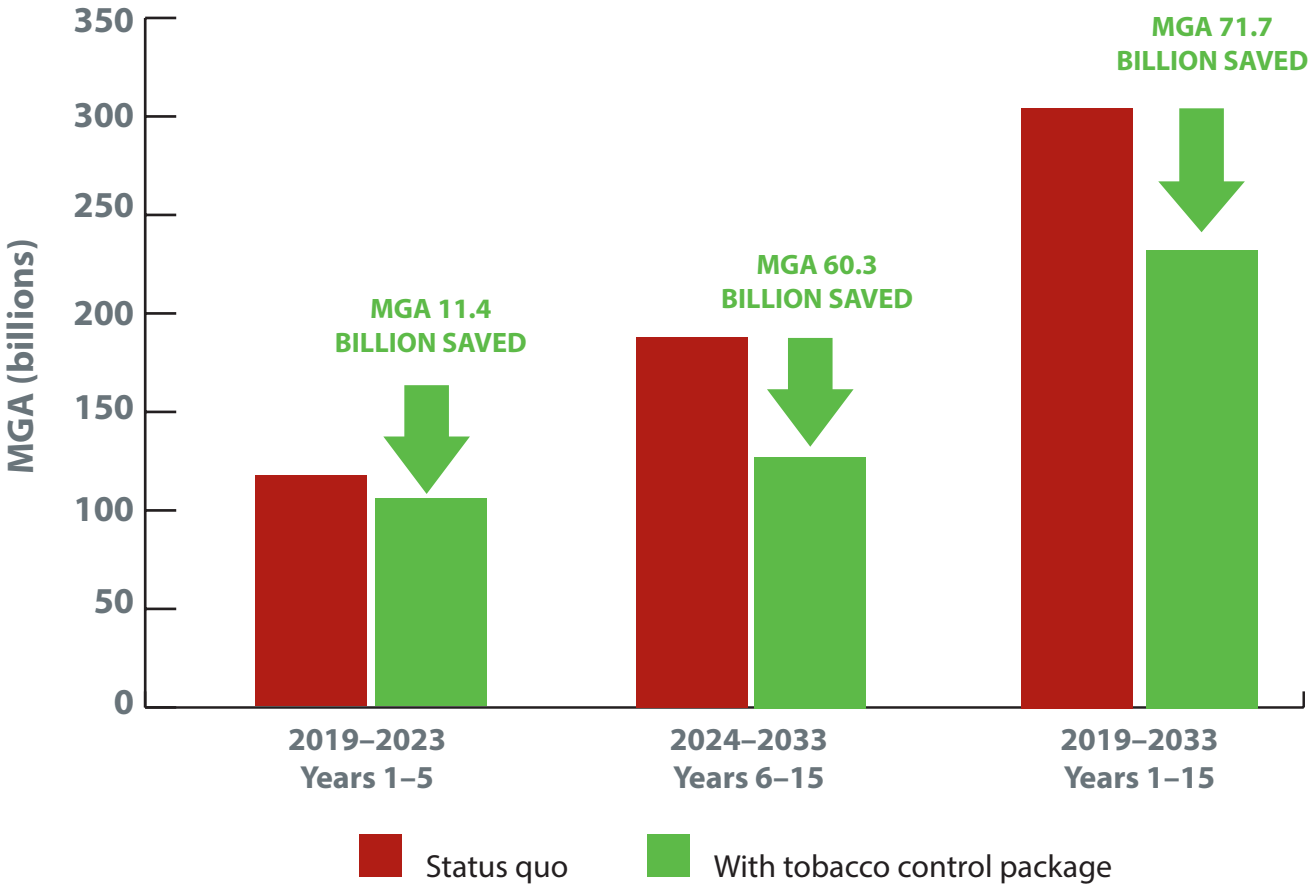
Fig. 8: Sources of annual direct and indirect economic savings as a result of implementing the tobacco control policy package



Implementing the package of tobacco control measures reduces medical expenditure for citizens and the Government. Presently, total private and public annual health care expenditures in Madagascar is about MGA 1.9 trillion, 1.3 percent of which is directly related to treating disease and illness due to tobacco use[35] (≈ MGA 24.8 billion).

Year-over-year, the package of interventions lowers tobacco use prevalence, which leads to less illness, and consequently less healthcare expenditure (see **Figure 9**). Over the 15-year time horizon of the analysis, the package of interventions averts 71.7 billion in healthcare expenditures, or 4.8 billion annually. Of this, 54 percent of savings accrue to the Government, and 22 percent accrue to individual citizens who would have purchased out-of-pocket healthcare. The remainder of savings goes to private insurance. Thus, from reduced healthcare costs alone, the Government stands to save about MGA 38.7 billion over 15 years. Simultaneously, the Government would successfully reduce the health expenditure burden tobacco imposes on Madagascar's citizens, supporting efforts to reduce economic hardship on families. Rather than spend on treating avoidable disease, these families would be able to invest more in nutrition, education and other inputs to secure a better future.

Fig. 9: Public and private healthcare savings over the 15-year time horizon



5.5 The return on investment (ROI)

An investment is considered worthwhile from an economic perspective if the gains from making it outweigh the costs. A return on investment (ROI) analysis measures the efficiency of the tobacco control investments by dividing the economic benefits that are gained from implementing the FCTC measures by the costs of the investments. For the Madagascar investment case, the ROI for

each intervention was evaluated in the short-term (period of five years), to align with planning and political cycles, and in the medium-term (period of 15 years) to align with the SDGs. The ROI shows the return on investment for each intervention, and for the full package of measures. Total benefits are a measure of which interventions are expected to have the largest impact. **Table 2** displays costs, benefits and ROIs by intervention, as well as for all interventions combined. All individual interventions deliver a ROI greater than one within the first five years, meaning that even in the short-term the benefits of implementing the interventions outweigh the costs. Depending on the intervention, over the first five years, the Government will recoup anywhere from six to 48 times its investment. The ROIs for each intervention continue to grow over time, reflective of the increasing effectiveness of policy measures as they move from planning and development stages, to full implementation.

Table 2: Return on investment, by tobacco control measure (MGA billions)

Return on investment, by tobacco control measure (MGA billions)	First 5 years (2019–2023)			All 15 years (2019–2033)		
	Total Costs (MGA billions)	Net Benefits (MGA billions)	ROI	Total Costs (MGA billions)	Net Benefits (MGA billions)	ROI
Tobacco control package* *(combined interventions)*	21	221	**10**	53	1,390	**26**
Raise cigarette taxes *(FCTC Article 6)*	3	122	**48**	6	781	**126**
Mass media campaign *(FCTC Article12)*	5	68	**13**	16	526	**34**
Plain packaging *(FCTC Article 11 Guidelines)*	3	18	**6**	7	144	**21**
Protect people from tobacco smoke *(FCTC Article 8)*	6	36	**6**	14	283	**20**

* The combined impact of all interventions is not the sum of individual interventions. To assess the combined impact of interventions, following Levy and colleagues' (2018), "effect sizes [are applied] as constant relative reductions; that is, for policy i and j with effect sizes PRi and PRj, (1-PR ii) x (1-PR j) [is] applied to the current smoking prevalence [[36], p. 454]. The costs of the tobacco package include the costs of the examined policies, as well as programmatic costs to implement and oversee a comprehensive tobacco-control program.

Over the 15-year period, raising cigarette taxes is expected to have the highest return on investment (126:1). Mass media campaigns have the next highest ROI (34:1), followed by plain packaging (21:1), and strengthening enforcement of smoking bans in public places (20:1).

5.6 Tobacco production and farmer livelihoods

The perception is that tobacco farmers are prosperous income earners, and that switching to alternative crops is not a viable option. Research across the globe has found the opposite to be true: tobacco farming is rarely as profitable as other crops, and it often presents unsustainable risks for farmers.[37] Beyond being unprofitable, tobacco production is also responsible for substantial social and environmental costs. Studies in other countries show that tobacco cultivation consistently yields poor return to labor;[38] leads to dependency and debt;[39] imposes health risks on farmers such as green tobacco sickness,[40] and; can even contribute to food insecurity[41] and environmental destruction, including soil and water degradation.[42, 43, 44] Indeed, tobacco growing "may be up to 10 times more aggressive" than all other factors of deforestation (e.g. maize farming) combined.[45] Deforestation destroys delicate ecosystems, endangering flora and fauna indigenous to Madagascar—some of the country's most valuable natural resources.

However, the economic desirability and sustainability of tobacco farming depends on many local factors, and it is not always clear to farmers nor agriculture sector planners what the costs and benefits are for farming households, or for the agricultural economy. This section discusses the current state of tobacco farming in Madagascar, and details the profitability of tobacco production and the viability of switching to alternative products through the lens of experiences in the sub-Saharan Africa region.

Table 3: Tobacco production of East African countries, 2017

Countries	Metric tonnes of tobacco produced
Zimbabwe	181,643
Zambia	131,509
Tanzania	104,471
Mozambique	91,128
Malawi	82,964
Uganda	31,222
Kenya	8,965
Rwanda	5,178
Ethiopia	2,064
Madagascar	1,578
Burundi	1,428
Mauritius	275
Somalia	142

5.6.1 Tobacco farming in Madagascar

The tobacco industry in Madagascar is managed by a state-owned monopoly, the OFMATA (Malagasy Tobacco Board). The OFMATA sets price floors for tobacco at the beginning of each harvest season, and it collaborates with Imperial Tobacco, the primary private sector tobacco firm operating in Madagascar, for the processing and sale of tobacco products.[46]

There are 30,000 registered tobacco farmers in Madagascar, comprising just one percent of the country's more than 2.4 million farming households.[47, 48] In addition to registered farmers, there is thought to be a sizeable (but unquantified) number of farmers who sell tobacco on the informal market.[49] Engagement in the informal market is encouraged by challenges with OFMATA providing timely payments, and by higher payments available in the informal market.[50] Tobacco sold on the informal market undermines tobacco control policies. It is more likely to escape taxation—meaning the government loses revenue—and it may also avoid regulations such as applying graphic warning labels to tobacco products.

Madagascar's tobacco production has fluctuated significantly over the last 45 years, but the declining trend in output is clear (see **Figure 10**).[51] Compared to other countries in the region, Madagascar is one of the smallest producers of tobacco by metric tonnes, producing less than one-third of the amount produced by Rwanda, which is over 22 times smaller than Madagascar (see **Table 3**).[52]

5.6.2 Tobacco farming: profit or risk?

A comprehensive assessment of tobacco farmer well-being from a social perspective must include both the direct household impacts, and social impacts. Little information exists on the benefits and/or risks that tobacco production provides to Malagasy tobacco farmers. However, evidence from the region demonstrates that tobacco is less profitable than alternative crops, and that it negatively impacts growers and the land that it is grown on.

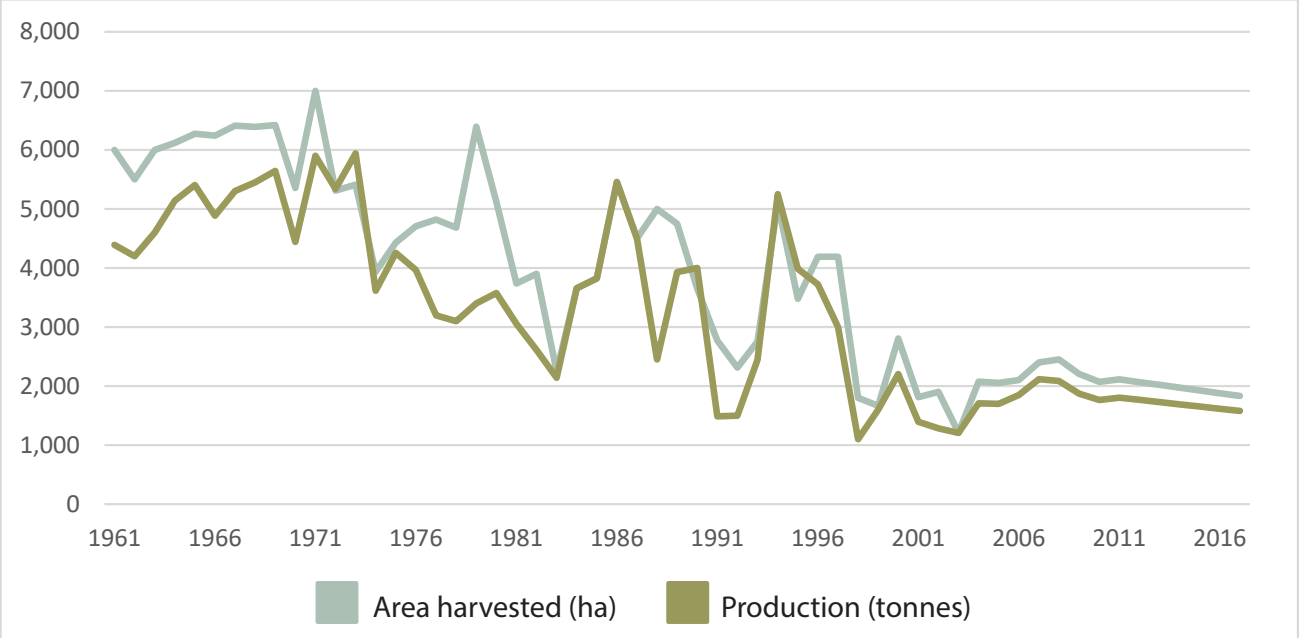
Examining net earnings, tobacco has been found to be less to be less profitable than alternative crops in several countries in sub-Saharan Africa. In Tanzania, a study examined the costs and profits associated with farming tobacco, maize, and groundnuts. The study finds that while the potential gross revenue from tobacco farming is higher than from maize and groundnuts, the costs associated with tobacco farming are disproportionately higher. Because of the high cost of tobacco, the analysis shows that net earnings from tobacco are 49.9 times less than net earnings from maize and 57.2 times less than from groundnuts, demonstrating that tobacco is the least economically viable of the three crops.[53]

In several African countries the majority of tobacco farmers are contract farmers who enter into agreements with tobacco leaf buyers in which they do not have to pay for inputs at the start of the growing season (seeds, fertilizers, etc.), in exchange for having a guaranteed buyer but not a guaranteed price at the end of the season. The costs of the inputs are deducted from the final sale price. This means that contract farmers must commit to paying the cost even while accepting the price risk. In Kenya, 71 percent of surveyed tobacco farmers reported that they were not satisfied with the prices they received for tobacco leaf under their contract, and more than 40 percent of farmers remained in debt to tobacco companies even after selling their yield.[54]

Research in Zambia indicates that without taking the cost of household labour into account, independent tobacco farmers make an average profit of approximately US$200 per acre, while contract farmers on average generate losses of US$200 per acre.[55] Including in the equation even a modest estimate of household labour greatly decreases profitability. Assigning tobacco farmers the regional minimum wage for agricultural workers for their time spent cultivating tobacco results in large losses for independent and contract farmers alike.[56] Facing cycles of debt and low income, many tobacco farming families are forced to employ their children as unpaid labour.

These examples do not necessarily mean that tobacco farming in Madagascar is not profitable —at least in some years. No data is available to ascertain overall profitability of tobacco farming in comparison to farming other crops; but, most evidence in other SSA countries indicates that similarly high levels of price risk and uncertainty exist for Malagasy tobacco farmers.

Fig. 10: Tobacco production (metric tonnes) and area under cultivation (hectares) in Madagascar, 1961–2017



5.6.3 Alternatives to tobacco production

Given low returns to tobacco farming, and the social and environmental costs of tobacco production, farmers may be interested in switching to alternative crops. Indeed, 60 percent of tobacco farmers in Zambia and 49 percent of tobacco farmers in Kenya indicate such interest.[57, 58]

Regional evidence demonstrates that switching is not only viable but can also be more profitable. For example, some Kenyan farmers have successfully transitioned from growing tobacco crops to growing bamboo. On average, non-tobacco farmers in Kenya earned US$198 more per year than tobacco farmers, a significant amount in rural areas, demonstrating the benefit of switching from tobacco to alternative crops. Furthermore, tobacco farmers spent US$35 more per year on healthcare than non-tobacco farmers, an indication of the health consequences associated with growing tobacco[59]. These findings support recommendations to switch out of tobacco farming, and suggest that doing so will improve the economic and health outcomes of farmers.

The FCTC seeks to promote economically viable alternatives to tobacco production, and to provide assistance to farmers who desire to transition to other crops. Opportunities exist that can enable tobacco farmers to switch to more sustainable, healthy, and profitable endeavors. The government has an important role to play, and Madagascar's government can take low-cost, proactive steps to support farmers. Such support may include investing in agricultural extension services to inform farmers how to grow other viable cash crops, improving access to small loans for smallholder tobacco farmers to try other crops, and developing markets and improved value and supply chains for non-tobacco crops so that farmers have more opportunity to sell their products.

Innovative programs can also support transition. For example, in Zambia a social impact bond (an innovative financing instrument that is also referred to as "pay-for-success" programme) is being developed by UNDP and the FCTC Secretariat to finance tobacco farmers' transition to more economically viable and environmentally sustainable alternatives.[60] Verifiable metrics of social and environmental outcome targets trigger payments to investors who provided capital to finance the transition project. In Taiwan, the government has used revenue from tobacco taxes to provide financial incentives for tobacco farmers to switch to alternative crops and to offer technical and secondary skills training in the trade and services sector to promote opportunities in non-agricultural employment.[61]

Together, these efforts can encourage and enable farmers to transition out of tobacco cultivation, promoting farmer livelihoods and their health, as well as protecting the environment from degradation.

5.7 The Sustainable Development Goals and the WHO FCTC

Enacting and strengthening four measures designed to reduce demand for tobacco will enable Madagascar to fulfill SDG Target 3.A to strengthen implementation of the WHO FCTC. Moreover, acting now will contribute to Madagascar's efforts to meet SDG Target 3.4 to reduce by one-third premature mortality from NCDs by 2030. These health gains will support development more broadly, including reduction of poverty and inequalities (SDGs 1 and 10, respectively) and economic growth (SDG 8).

In Madagascar in 2017, more than 45,000 premature deaths between the ages of 30 to 70 were caused by the four main NCDs (CVD, diabetes, cancer, and COPD). Roughly 10 percent of these premature deaths occurred due to tobacco use. Enacting the FCTC measures identified in the Investment Case would reduce tobacco use prevalence—a key risk factor driving NCD incidence—preventing almost 12,000 premature deaths from the four main NCDs over the next 12 years (2019 to 2030). Preventing those deaths contributes the equivalent of about 6.6 percent of the needed reduction in premature mortality to fulfill SDG Target 3.4.

SDG Target 3.4

By 2030 the FCTC measures would...

Lower the prevalence of tobacco use by two-fifths from present day levels.

Reduce economic costs due to tobacco use by MGA 1 trillion, including saving MGA 54.1 billion in healthcare expenditures.

Lead to savings (MGA 1 trillion) that significantly outweigh the costs (MGA 44.7 billion), with an overall return on investment of 23:1.

6. Conclusion and recommendations

Each year, tobacco use costs Madagascar MGA 491 billion in economic losses and causes substantial human development losses. Fortunately, the investment case shows that there is an opportunity to reduce the social and economic burden of tobacco in Madagascar. Enacting the recommended multisectoral tobacco control provisions would save over 2,000 lives each year and reduce the incidence of disease, leading to savings from averted medical costs and averted productivity losses. In economic terms, these benefits are substantial, adding to MGA 1.4 trillion over the next 15 years. Further, the economic benefits of strengthening tobacco control in Madagascar greatly outweigh costs of implementation (MGA 1.4 trillion in benefits versus just MGA 0.05 trillion in costs).

By investing now to intensify implementation of the four proven tobacco control measures modeled under this investment case, Madagascar would not only reduce tobacco consumption, improve health, reduce government health expenditures and grow the economy, it would also reduce hardships among Malagasy, particularly among those with low incomes. Many countries reinvest savings from healthcare expenditures and revenue from increased tobacco taxes into national development priorities such as universal health coverage.

The investment case offers compelling tobacco control investments that Madagascar can make. It offers compelling economic and social arguments to implement core WHO FCTC measures. Policymakers across sectors are encouraged to share the investment case findings broadly among all sectors of government, parliament, civil society, the public, development partners and academic institutions. Doing so will strengthen public and political support for tobacco control. An advocacy strategy with key messages, for example on how tobacco control can support economic growth and reduce hardships on the poor, can assist policymakers in disseminating the message.

The full benefits of the investment case are more likely to be realized if the following actions are pursued:

1 Strengthen the tobacco control legislative framework.

Madagascar has passed laws regulating many aspects of tobacco products. However, the tobacco control legal framework is mostly comprised of bylaws, and there remain gaps in tobacco control measures, including the ban on tobacco advertising, promotion and sponsorship which does not cover "corporate social responsibility" activities and display of tobacco products at the point-of-sale or over the internet. It is therefore recommended that the CCoLAT meet to decide on a review of existing laws and the regulatory framework for the possible establishment of a comprehensive tobacco control law and to strengthen the framework for implementation and enforcement. Madagascar should also include obligations under Article 5.3 in anti-tobacco legislation and adopt a code of conduct for civil servants while raising awareness of the need to protect public policy against the vested interests of the tobacco industry.

Enforcement of tobacco control laws in Madagascar remains a challenge. Low understanding of existing tobacco control law among the public and enforcement agencies, particularly at the regional and local levels of government, leads to low enforcement of and compliance with tobacco control laws. This is particularly true for bans on smoking in all public places, sales to minors and by minors, and the prohibition of advertising and direct or indirect promotions at points of sale. It is recommended that CCoLAT meet to develop a plan to fully enforce these provisions, including training of officers and dissemination of information among the public. To strengthen enforcement of the ban on smoking in public places, fines may be imposed on the owners of public places and a complaint and investigation system may be established.

2 Strengthen multisectoral coordination and planning.

By establishing the CCoLAT headed by OFNALAT, Madagascar has taken concrete steps to establish effective multisectoral coordination for tobacco control. However, CCoLAT and OFNALAT are hampered by a lack of resources, and the decentralized level of both has not been operationalized. Given the economic benefits of tobacco control demonstrated through this investment case, it is recommended that the Ministry of Health work with the Ministry of Finance to allocate a portion of increased tobacco tax revenue to OFNALAT and CCoLAT, and towards implementation of the new multisectoral national tobacco control strategy.

Increase tobacco taxes and reduce illicit trade.

Cigarette taxes in Madagascar equal 80 percent of the retail price of the most sold brand of cigarettes. However, most of the tax share (63.6 percent) is composed of an *ad-valorem* tax, which leads to price differences between higher and lower-priced tobacco products and therefore to consumers switching to cheaper brands of cigarettes and smokeless products (e.g. paraky). Consumers are especially likely to switch to smokeless products, because the tax share of smokeless tobacco products represents only 45 percent of the final retail price.

Madagascar can strengthen the effectiveness of taxes by restructuring the tax regime to have a greater share of specific excise taxes, in line with WHO FCTC Article 6 guidelines. Madagascar should also prioritize significantly increasing taxes on smokeless products to reduce the likelihood of consumers switching to cheaper brands of cigarettes and products such as paraky. Further, increasing taxes on tobacco products to reduce their affordability would achieve the mutually reinforcing objectives of reducing tobacco consumption (and thus improving health outcomes) and providing the public sector with additional revenue needed to invest in other sustainable development efforts.

Using part of tobacco excise tax revenues to finance tobacco control and national development priorities, as many countries are doing, is a viable option. Tax increases would not disproportionally burden lower income Malagasy; global evidence shows that cigarette tax increases benefit the poorest segments of society the most. This is especially true if—as many countries do—Madagascar reinvests savings from healthcare spending and revenue from increased tobacco taxes into poverty alleviation measures including universal health coverage.

Equally important is the development of a robust strategy and systems to combat illicit tobacco trade, to prevent the loss of tax revenue for the Government and the loss of lives. Madagascar signed the Protocol to Eliminate Illicit Trade in Tobacco Products in 2013 and ratified it in 2017, but has not yet adopted any law to implement the Protocol. It is therefore recommended that Madagascar accelerate the adoption of a tracking and tracing system to help eliminate illicit trade in tobacco products.

Assist tobacco farmers who wish to transition from tobacco to alternative livelihoods.

Tobacco production in Madagascar has been in decline over the past several decades and represents only a small fraction of the overall agricultural sector. Moreover, tobacco cultivation harms farmers' health, is generally not profitable to farmers when taking into account required inputs, and is associated with child labour and poverty. By taking action, Madagascar can assist those farmers who wish to transition while preserving its unique natural resources, as tobacco farming is a major driver of deforestation, as well as water, soil and air pollution.

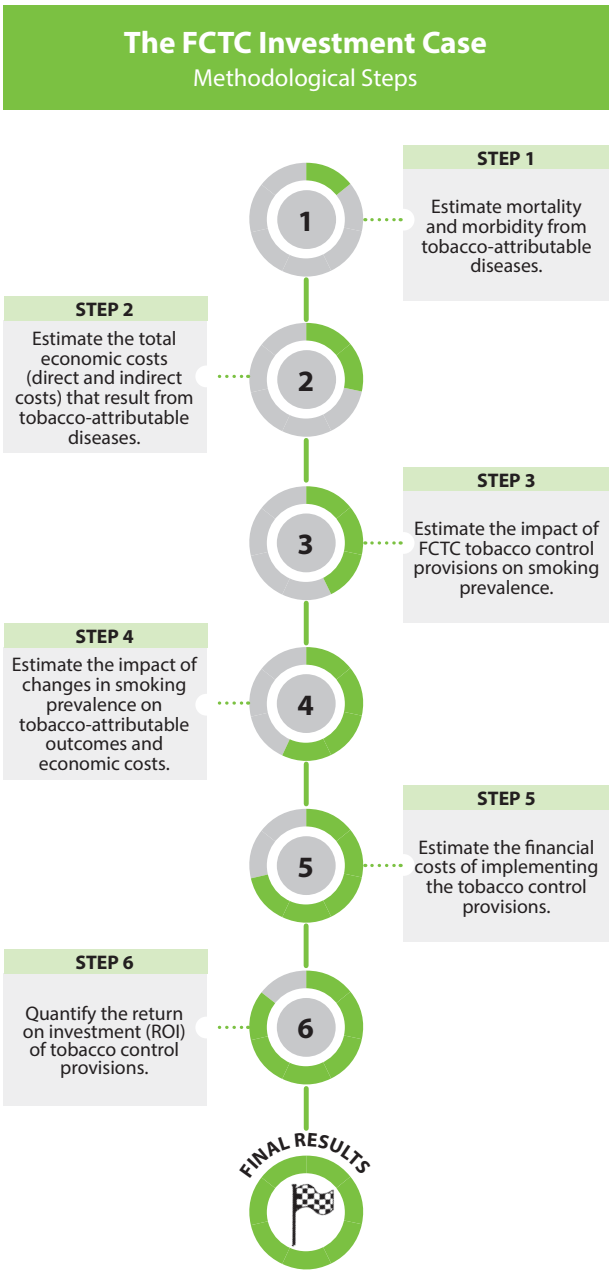
The WHO FCTC does not require Parties to slow or stop tobacco cultivation; rather, Article 17 of the WHO FCTC calls on Parties to promote economically viable and sustainable alternatives for tobacco growers, workers, and individual sellers searching for alternatives. The Government should adopt and implement policies and programmes that assist farmers in finding alternative livelihoods. This may include investments in agricultural extension services to inform farmers about how to grow other viable cash crops in their region and improving access to small loans for smallholder tobacco farmers to try other crops. The Ministry of Agriculture, together with other relevant Ministries and organizations, could also examine developing improved supply and value chains for non-tobacco crops.

7. Methodology annex

7.1 Overview

The economic analysis consists of two components: 1) assessing the current burden of tobacco use and 2) examining the extent to which FCTC provisions can reduce the burden. The first two methodological steps depicted in **Figure 11** are employed to assess the current burden of tobacco use, while methodological steps 3–6 assess the impact, costs, and benefits of implementing or intensifying FCTC provisions to reduce the demand for tobacco. The tools and methods used to perform these methodological steps are described in detail on the next pages.

Fig. 11: Steps in the FCTC investment case



7.2 COMPONENT ONE: CURRENT BURDEN

The current burden model component provides a snapshot of the current health and economic burden of tobacco use in Madagascar.

STEP 1

Estimate mortality and morbidity from tobacco-related diseases.

The investment case model is populated with country-specific data on tobacco attributable mortality and morbidity from the 2017 Global Burden of Disease Study (GBD).[62] The study estimates the extent to which smoking and secondhand tobacco smoke exposure contribute to the incidence of 37 diseases, healthy life years lost, and deaths, across 195 countries.

STEP 2

Estimate the total economic costs (direct and indirect costs) that result from tobacco-attributable diseases.

Next, the model estimates the total economic costs[6] of disease and death caused by tobacco use, including both direct and indirect costs. Direct refers to tobacco-attributable healthcare expenditures. Indirect refers to the value of lives lost due to tobacco-attributable premature mortality, and labor-force productivity losses: absenteeism, presenteeism, and excess smoking breaks.

Direct costs — Direct costs include tobacco-attributable public (government-paid), private (insurance, individual out-of-pocket), and other healthcare expenditures. The proportion of healthcare costs attributable to smoking was obtained from Goodchild et al. (2018), who estimate the smoking attributable fraction (SAF) of healthcare expenditures for most countries.[63] The SAF provided in the paper for Madagascar is 0.8 percent, however, based on consultations with country partners and tobacco control experts, this SAF was concluded to likely be too low. Instead, the average SAF of all low-income African countries (1.8 percent) was used. To calculate the share of smoking-attributable healthcare expenditures borne by public, non-profit, and private entities, it was assumed that each entity incurred smoking-attributable healthcare costs in equal proportion

6 In assessing the current burden of tobacco use, the economic costs of premature mortality include the cost of premature deaths due to any form of exposure to tobacco (including of smoking, secondhand smoke exposure, and the use of other types of tobacco products). Only smoking-attributable (not tobacco-attributable) costs are calculated for healthcare expenditures, absenteeism, presenteeism, and smoking breaks. While other forms of tobacco may also cause losses in these categories, no data is available to pinpoint those losses.

to its contribution to total health expenditure, as obtained from the WHO health expenditures database—from which government is shown to cover 54 percent of total health expenditures, private and nonprofit sources cover 24 percent, and households cover 22 percent through out-of-pocket expenses.[64]

Indirect costs — Indirect costs represent the monetized value of lost time, productive capacity, or quality of life as a result of tobacco-related diseases. Indirect costs accrue when tobacco use causes premature death, eliminating the unique economic and social contributions that an individual would have provided in their remaining years of life. In addition, tobacco use results in productivity losses. Compared to non-tobacco users, individuals who use tobacco are more likely to miss days of work (absenteeism); to be less productive at work due tobacco-related illnesses (presenteeism); and to take additional breaks during working hours in order to smoke.

- *The economic cost of premature mortality due to tobacco use* — Premature mortality is valued using the human capital approach, which places an economic value on each year of life lost. Using GBD data on the age at which tobacco-attributable deaths occur, the model calculates the total number of years of life lost due to tobacco, across the population. Each year of life is valued at 1.4 times GDP per Capita, following the "full income approach" employed by Jamison et al (2013).[65]

- *Productivity costs* — Productivity costs consist of costs due to absenteeism, presenteeism, and excess work breaks due to smoking. The model incorporates estimates from academic literature on the number of extra working days missed due to active smoking (2.6 days per year).[66] Presenteeism losses are obtained similarly, under research that shows that smokers in China, the US, and five European countries experience about 22 percent more impairment at work because of health problems compared to never-smokers[67]. Lost productivity due to smoking breaks is valued under the conservative assumption that working smokers take ten minutes of extra breaks per day.[68]

7.3 COMPONENT TWO: POLICY/INTERVENTION SCENARIOS

This component estimates the effects of FCTC tobacco control measures on mortality and morbidity, as well as on total economic costs (direct and indirect) associated with tobacco use.

The investment case employs a static model to estimate the total impact of the tobacco control measures, meaning that aside from smoking prevalence, variables do not change throughout the time horizon of the analysis. The model follows a population that does not vary in size or makeup (age/gender) over time in two scenarios: a status quo scenario in which smoking prevalence remains at present day rates, and an intervention scenario in which smoking prevalence is

reduced according to the impact of tobacco control measures that are implemented or intensified. Published studies have used similarly static models to estimate the impact of tobacco control measures on mortality and other outcomes.[69, 70]

Within the investment case, the mortality and morbidity, as well as economic costs that are computed in the intervention scenario are compared to the status quo scenario to find the extent to which tobacco control measures can reduce health and economic costs.

STEP 3

Estimate the impact of FCTC tobacco control provisions on smoking prevalence.

Selection of priority FCTC measures modeled within the investment case align with the Global Strategy to Accelerate Tobacco Control developed following a decision at the Seventh session of the Conference of the Parties (COP7) to the WHO FCTC. Under Objective 1.1 of the Strategy, Parties seek to accelerate WHO FCTC implementation by setting clear priorities where they will be likely to have the greatest impact in reducing tobacco use. This includes priority implementation of price and tax measures (Article 6) and time-bound measures of the Convention, including bans on smoking in all public places (Article 8), health warnings and plain tobacco packaging (Article 11), and comprehensive bans on tobacco advertising, promotion and sponsorship (Article 13). In addition, given the importance of awareness in behavior change and shaping cultural norms, the investment cases include instituting mass media campaigns against tobacco use (Article 12) as a measure modeled.

The impacts of implementing the FCTC provisions are obtained from the literature. The impact of enforcing smoke-free air laws, implementing plain packaging, intensifying advertising bans, and conducting mass media campaigns are derived from Levy et al. (2018)[71] and Chipty (2016),[72] as adapted within the Tobacco Use Brief of Appendix 3 of the WHO Global NCD Action Plan 2013–2020,[73] and adjusted based on assessments of Madagascar's baseline rates of implementation.

The impact of raising taxes on the prevalence of tobacco use is determined by the 'prevalence elasticity', or the extent to which individuals stop smoking as a result of price changes. Following evidence that the price elasticity of demand for cigarettes in low income countries in Africa is 0.56,[74] is the investment case assumes that the price elasticity of demand in Madagascar is -0.56, and that prevalence elasticity is approximately one-half of price elasticity (-0.281).[75] **Table 4** displays the impact sizes used within the investment case analysis. Additional information on their derivation can be found in the Technical Appendix.

Within the analysis, it is assumed that implementation or intensification of new tobacco control measures does not take place until year three. With the exception of taxes—the impact of which is dependent on the timing of increases in tax rates—the full impact of the measures is phased in over a five-year period. The phase-in period follows WHO assumptions[76] that two years of planning and development are required before policies are up and running, followed by three years of partial implementation that are reflective of the time that is needed to roll out policies, and work up to full implementation and enforcement. The investment case examines the impact of doubling the cost of a pack of cigarettes over the first seven years, with additional incremental increases through 2033 that raise the price to 2.8 times its 2019 baseline.

Table 4: Impact size: Relative reduction in the prevalence of current smoking by tobacco control policy/intervention, over a period of 15 years

WHO FCTC Measure	Relative reduction in the prevalence of current smoking	
	First 5 Years (2019–2023)	Over 15 Years (2019–2033)
Tobacco Control Package (all policies)	**24.4%**	**42.2%**
Increase taxes on cigarettes (FCTC Art.6)	12.3%	24.9%
Strengthen compliance with the ban on smoking in public places (FCTC Art.8)	4.2%	7.3%
Mandate that tobacco product packages carry large health warnings (FCTC Art. 11)	**Already fully implemented**	
Plain packaging of tobacco products (FCTC Art. 11: Guidelines)	2.1%	3.7%
Run a mass media campaign to promote awareness about tobacco control (FCTC Art.12)	8.0%	13.9%
Enact comprehensive bans on advertising, promotion, & sponsorship (FCTC Art.13)	**Already fully implemented**	

* The combined impact of all interventions is not the sum of individual interventions. Following Levy and colleagues' (2018) "effect sizes [are applied] as constant relative reductions; that is, for policy i and j with effect sizes PRi and PRj, (1-PR ii) x (1-PR j) [is] applied to the current smoking prevalence" [77, p. 454].

STEP 4

Estimate the impact of changes in smoking prevalence on tobacco-attributable health outcomes and economic costs.

To analyze the impact of policy measures on reducing the health and economic burden of smoking, the investment case calculates and compares two scenarios. In the status quo scenario, current efforts are 'frozen', meaning that, through the year 2033 (end of the analysis), no change occurs from the tobacco control provisions that are currently in place. In the 'intervention' scenario, Madagascar implements new tobacco measures or intensifies existing ones, to reduce the prevalence of smoking. The difference in health and economic outcomes in between the status quo and intervention scenarios represents the gains that Madagascar can achieve by taking targeted actions to reduce tobacco use.

The marginal effects of the policies are calculated using the status quo scenario as the comparison group. To calculate marginal effects, the model subtracts the outcome (risk factor attributable deaths, healthcare expenditures, etc.) under the intervention scenario from the same outcome under the status quo scenario. The difference between the two outcomes is the amount of change in the outcome associated with the policy.

Marginal Effects = Outcome Base Scenario — Outcome Intervention Scenario

Marginal effects are calculated as follows for each outcome:

- **Health outcomes:** To calculate the reductions in mortality and morbidity due to implementation of the policy measures, forecasted changes in smoking prevalence are applied directly to the GBD risk factor attributable outcomes from the status quo scenario. This means that the model adjusts the risk factor attributable outcomes for mortality and morbidity as reported by GBD based on year-over-year relative changes in smoking prevalence for each outcome.

- **For healthcare expenditures**, the model applies forecasted annual relative changes in smoking prevalence for each intervention scenario to the SAFs. SAFs are adjusted in proportions equal to the relative change in smoking prevalence for each intervention scenario.

- **Workplace smoking outcomes** are recalculated substituting actual (status quo) smoking prevalence for estimated annual smoking prevalence for each of the intervention scenarios that are modeled.

STEP 5

Estimate the financial costs of implementing the tobacco control policies and interventions modeled, both individually and collectively.

The financial costs to the government of implementing new measures—or of intensifying or enforcing existing ones—is estimated using the WHO NCD Costing Tool. Full explanations of the costs and assumptions embedded in the WHO NCD Costing tool are available.[78]

The Tool uses a 'bottom up' or 'ingredients-based' approach. In this method, each resource that is required to implement the tobacco control measure is identified, quantified, and valued. The Tool estimates the cost of surveillance, human resources—for program management, transportation, advocacy, and enacting and enforcing legislation—trainings and meetings, mass media, supplies and equipment, and other components. Within the Tool, costs accrue differently during four distinct implementation phases: planning (year 1), development (year 2), partial implementation (years 3–5), and full implementation (years 6 onward).

Across these categories, the Tool contains default costs from 2011, which are sourced from the WHO CHOICE costing study. Following Shang and colleagues, the Tool is updated to reflect 2017 costs by updating several parameters: the US$ to local currency unit exchange rate (2017), purchasing power parity (PPP) exchange rate (2017), GDP per capita (US$, 2017), GDP per capita (PPP, 2017), population (total, and share of the population age 15+, 2017), labor force participation rate (2017), gas per liter, and government spending on health as a percent of total health spending (2015) [[79], p. 5]. Unless government or other in-country parameters are received, data is from the World Bank database, with the exception of data on the share of government health spending and population figures. The share of government spending on health as a percent of total health spending is derived from the WHO Health Expenditures database, and population figures are from the UN Population Prospects.

STEP 6

Quantify the return on investment (ROI) for the various tobacco control policies and interventions modeled, both individually and collectively.

The return on investment (ROI) analysis measures the efficiency of tobacco control investments by dividing the discounted monetary value of health gains from investments by their discounted respective costs.

$$\textbf{Return on Investment (ROI)} = \frac{\text{Benefits of Intervention/Policy}}{\text{Costs of Implementing Intervention/Policy}}$$

ROIs were calculated for each of the four tobacco control policies modeled, and for the four interventions together as a package. Estimates from step 4 and 5, were used to calculate ROIs at 5- and 15-year intervals.

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