



**THE WORLD BANK**  
IBRD • IDA | WORLD BANK GROUP

# Using Taxation to Address Noncommunicable Diseases: Lessons From Tonga



Food and Agriculture  
Organization of the  
United Nations



Government of Japan



# Using Taxation to Address Noncommunicable Diseases: Lessons From Tonga

July 2019

<b>Regional Vice President:</b>	Victoria Kwakwa
<b>Country Director:</b>	Michel Kerf
<b>Global Practice Director:</b>	Muhammad Ali Pate
<b>Practice Manager:</b>	Enis Baris
<b>Primary Author:</b>	Sutayut Osornprasop

# Table of Contents

<b>EXECUTIVE SUMMARY</b>	<b>14</b>
<b>INTRODUCTION</b>	<b>22</b>
THE COUNTRY CONTEXT	24
THE NCD CRISIS AND DEVELOPMENT IMPACTS	25
NCD RISK FACTORS	26
Tobacco consumption	28
Unhealthy diet	30
Physical Inactivity	33
Harmful alcohol use	34
Obesity	35
THE GOVERNMENT'S NCD RESPONSE	36
MAKING THE MOST OF 'SIN TAXES'	40
<b>METHODOLOGY</b>	<b>41</b>
HOUSEHOLD SURVEYS	42
Sampling Design	42
Household characteristics of baseline data	44
Household characteristics of endline data	44
Data analysis	46
RETAIL SURVEYS	46
QUALITATIVE STUDY	46
Focus group discussions	47
Training of fieldwork staff and Pre-test of the Qualitative Materials	48
Implementation plan and variation	48
Participants	49
Key Informant Interviews	49
TOBACCO TAXATION SIMULATION MODELLING (TAXSIM)	50
KEY LIMITATIONS	50
Recall bias	50
Measuring FGD members' socio-economic status	51
<b>FINDINGS</b>	<b>52</b>
TOBACCO	53
Tonga's tobacco tax structure	53
Price elasticity	53
FOOD	62
Mutton flaps	66
Turkey tails	68
Chicken leg quarters	70
Ice cream	71
Imported instant noodles	73
Sugar-sweetened beverages	74

ALCOHOL	76
Beer	76
Spirits	79
EFFECTS OF CONSUMPTION TAX EXEMPTION ON IMPORTED HEALTHY PRODUCTS	81
Apples	82
Oranges	83
<b>VIEWS FROM COMMUNITIES</b>	<b>84</b>
FOOD	85
TOBACCO	90
ALCOHOL	91
FUTURE OF NCD TAX	92
<b>DISCUSSION</b>	<b>94</b>
HOW MUCH DID CONSUMERS RESPOND TO TAX-INDUCED PRICE CHANGES?	98
WHAT ARE THE KEY SUBSTITUTES TO TAXED PRODUCTS?	100
ILLICIT TRADE	101
HOW NCD TAX REVENUE IS USED	102
<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>104</b>
CONCLUSIONS	105
RECOMMENDATIONS	106
Tax structure	106
Monitoring NCD tax implementation	106
Transparency in use of NCD tax	108
Complementary (non-tax) measures	108
<b>BIBLIOGRAPHY</b>	<b>111</b>
<b>ANNEXES</b>	<b>114</b>
ANNEX 1	115
ANNEX 2	119
ANNEX 3	123
ANNEX 4	125
ANNEX 5	127

# List of Figures

Figure 1:	Map of Tonga	24
Figure 2:	Type 2 diabetes prevalence trend among adults ages 25–64 years, Tonga, 1978–2012	25
Figure 3:	GDP and health expenditure per capita, 2009–2014	26
Figure 4:	Prevalence of tobacco consumption in the Pacific in 2016	29
Figure 5:	Expenditure on unhealthy food, imported food, processed food, Pacific Island Countries (selected), 2014	31
Figure 6:	Percentage of the population with overweight and obesity ( $\geq 25$ kg/m <sup>2</sup> ) in Pacific Island Countries	34
Figure 7:	Tax per unit and retail price of imported cigarettes, T\$	54
Figure 8:	Tax per unit and retail price of locally manufactured cigarettes, T\$	56
Figure 9:	Tax revenue, all cigarettes, T\$	56
Figure 10:	Sales volume, all cigarettes, T\$	56
Figure 11:	Volume and tax revenue of imported cigarettes	57
Figure 12:	Production volume and tax revenue of locally manufactured cigarettes	57
Figure 13:	Cigarette affordability, 2013–2017	57
Figure 14:	Market share of different cigarette brands in Tonga, 2011–2017	58
Figure 15:	Reasons for behavior change	58
Figure 16:	Behavior change following FY2016–7 (baseline) tobacco tax increase and FY2017–8 (endline) tobacco tax increase	59
Figure 17:	Behavioral responses on cigarette consumption by wealth quintiles after the FY 2016/7 increase in excise tax	60
Figure 18:	Proportion of manufactured cigarette smokers	60
Figure 19:	Proportion of Tapaka Tonga smokers	60
Figure 20:	Retail prices of Tapaka Tonga and manufactured cigarettes over time	61
Figure 21:	Spending on manufactured cigarettes in the past week, T\$	61
Figure 22:	Spending on Tapaka Tonga, T\$	61
Figure 23:	Type of smokers in Tonga (November 2017)	62
Figure 24:	Price rises after the excise tax/import duty increase	64
Figure 25:	Awareness of the excise tax increase in July 2016 on selected food products as of June 2017	65
Figure 26:	Knowledge about food products subjected to tax increase in July 2016	65
Figure 27:	Notices about price changes of selected products by wealth quintiles	65
Figure 28:	Tax per unit and retail price of mutton flaps	66
Figure 29:	Consumption, tax revenue and total tax per unit of mutton flaps	67
Figure 30:	Change in consumption of mutton flaps (baseline)	67
Figure 31:	Change in consumption of mutton flaps (endline)	67
Figure 32:	Consumption behavior change following the imposition of tax on mutton flaps	67
Figure 33:	Reason for changing consumption behaviors of mutton flaps	68
Figure 34:	Frequency of consumption of mutton flaps (baseline and endline surveys)	68
Figure 35:	Tax per unit and retail price of turkey tails	69
Figure 36:	Consumption, tax revenue and total tax per unit of turkey tails	69
Figure 37:	Changed consumption behaviors of turkey tails at baseline	69
Figure 38:	Changed consumption behaviors of turkey tails at endline	69
Figure 39:	Behaviors following the imposition of tax on turkey tails	70

Figure 40:	Reasons for changing consumption behaviors of turkey tails	70
Figure 41:	Tax per unit and retail price of chicken legs	70
Figure 42:	Consumption, tax revenue and total tax per unit of chicken legs	71
Figure 43:	Changed consumption behaviors of chicken leg quarters at baseline	71
Figure 44:	Frequency of consumption of chicken leg quarters (baseline and end line surveys)	71
Figure 45:	Tax per unit and retail price of ice cream	72
Figure 46:	Consumption, tax revenue and total tax per unit of Ice cream	72
Figure 47:	Changed consumption behaviors of ice cream at baseline	72
Figure 48:	Changed consumption behaviors of ice cream at endline	72
Figure 49:	Frequency of consumption of ice cream (baseline and endline surveys)	72
Figure 50:	Tax per unit and retail price of imported instant noodles	73
Figure 51:	Consumption, tax revenue and total tax per unit of imported instant noodles	73
Figure 52:	Notice of price change of imported instant noodles at baseline	73
Figure 53:	Changed consumption behaviors of imported instant noodles at baseline	73
Figure 54:	Tax per unit and retail price of sugar-sweetened beverages	74
Figure 55:	Consumption, tax revenue and total tax per unit of SSBs	75
Figure 56:	Notice of price change of SSBs at baseline	75
Figure 57:	Changed consumption behaviors of SSBs at baseline	75
Figure 58:	Frequency of consumption of SSBs (baseline and endline surveys)	75
Figure 59:	Tax per unit of imported beer	77
Figure 60:	Tax per unit of local beer	77
Figure 61:	Tax per unit of beer	77
Figure 62:	Consumption, tax revenue and total tax per unit of imported beer	77
Figure 63:	Consumption and tax revenue, locally manufactured beer	78
Figure 64:	Consumption, tax revenue and total tax per unit of beer	78
Figure 65:	Changes in beer consumption frequency	78
Figure 66:	Weekly beer consumption	78
Figure 67:	Change in beer consumption behaviors	79
Figure 68:	Reasons for changing alcohol consumption behaviors	79
Figure 69:	Tax per unit of imported spirits	79
Figure 70:	Tax per unit of locally manufactured spirits	80
Figure 71:	Tax per unit of imported spirits	80
Figure 72:	Consumption, tax revenue and total tax per unit of imported spirits	80
Figure 73:	Consumption, tax revenue and total tax per unit of locally manufactured spirit	80
Figure 74:	Consumption, tax revenue and total tax per unit of spirits	81
Figure 75:	Consumption frequency of spirits	81
Figure 76:	Public knowledge of food products subject to tax exemption, July 2016	81
Figure 77:	Change in price after the tax exemption policy	82
Figure 78:	Quantity of apples following the tax exemption policy	82
Figure 79:	Apple consumption behaviors	82
Figure 80:	Elasticity of taxed products	98
Figure 81:	Elasticity of cigarettes	99
Figure 82:	Annual budget of the Government of Tonga (GOT) and Ministry of Health	103
Figure 83:	Distribution of households by island	123

# List of Tables

Table 1:	Factors influencing health status for males and females, STEPS surveys 2004 and 2012	27
Table 2:	Prevalence of tobacco use, 2004 and 2012	29
Table 3:	Share of food expenditure in selected Pacific Island Countries, 2005–2010	32
Table 4:	Fruit and vegetable consumption in Tonga, 2004 and 2012	32
Table 5:	Physical activity measurements, 2004 and 2012	33
Table 6:	Body mass index measurements in Tonga, 2012	35
Table 7:	Total sample size of baseline data	42
Table 8:	Total sample size of endline data	43
Table 9:	Descriptive statistics of baseline and endline data	45
Table 10:	Focus group discussion categories	47
Table 11:	Tonga's tobacco tax structure	53
Table 12:	Price and total tax of a pack of 20 cigarettes (most sold brand) as percentage of retail price, Tonga (compared with selected Pacific countries), 2016	55
Table 13:	Tax structure of food and SSB (July 2014–June 2018)	63
Table 14:	Tonga alcohol tax structure	76
Table 15:	Observed and desired behavior change and dietary outcomes	96
Table 16:	Key substitutes of taxed food products	100
Table 17:	Annual budget of the Government of Tonga (GOT)	103
Table 18:	Total sample size of baseline data	115
Table 19:	Total sample size of endline data	116
Table 20:	Descriptive statistics of baseline data	117
Table 21:	Baseline descriptive statistics by island	118
Table 22:	Descriptive statistics of endline data	119
Table 23:	Endline descriptive statistics by island	121
Table 24:	Head of household distribution by gender	123
Table 25:	Comparison of unweighted and weighted results	123
Table 26:	Gender distribution	124
Table 27:	Calculation of SSB elasticity	126



## List of Images

Picture 1:	Tongan lady with her home vegetable garden right in the middle of Nuku'alofa (capital of Tonga)	21
Picture 2:	The LDS Church introduces a “keyhole” technique for Tongan communities with limited space to grow vegetables	21
Picture 3:	Packs of Tapaka Tonga as sold in shops	61
Picture 4:	Pre-cooked mutton flaps	66
Picture 5:	Cooked mutton flaps	66
Picture 6:	Pre-cooked turkey tails	68
Picture 7:	Cooked turkey tails	68
Picture 8:	Apples sold above maximum price set by the Competent Authorities	83
Picture 9:	Oranges as commonly sold in Tonga – in bags and not weighed	83
Picture 10:	Oranges sold above the maximum price set by the Competent Authorities	
Picture 11 :	“Intercrop” home garden right behind the Central Bank of Tonga — lettuce, onions, and kava	110

## Photo Credit

Sutayut Osornprasop, Mona Palu, Sione Hufanga, Pita Feimoefiafi, Catherine Latu, Kevalin Saksiamkul, Don Mammoser, Shutterstock.com, Pinkgator Co. Ltd.

## List of Boxes

Box 1:	Government of Tonga tobacco control activities: a snapshot	37
Box 2:	The impact of food tax on consumption among different socio-economic groups	86
Box 3:	Response to the food tax – urban and rural differences	89
Box 4:	Impact of taxes on retailers	92
Box 5:	Women’s and men’s perspectives on NCD tax	93

## Currency Equivalents

Exchange rate effective as of 2017  
Currency unit = T\$ (Tonga Pa’anga)  
T\$2.21 = US\$1.00

# Abbreviations

BMI	Body Mass Index
CEO	Chief Executive Officer
CIF	Cost, Insurance, and Freight
COPD	Chronic Obstructive Pulmonary Disease
CNMI	The Commonwealth of the Northern Mariana Islands
CVD	Cardiovascular disease
DM	Diabetes Mellitus
DOS	Department of Statistics
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FSM	The Federated States of Micronesia
FY	Fiscal Year
GDP	Gross Domestic Product
GNI	Gross National Income
GOT	Government of Tonga
GPS	Global Positioning System
HIES	Household Income and Expenditure Data
IPC	Income Purchasing Capacity
LDS	The Church of Jesus Christ of Latter-day Saints
MCCTIL	Ministry of Commerce, Consumer, Trader, Innovation and Labour
MF	Ministry of Fisheries
MAFF	Ministry of Agriculture, Forestry and Food
MET	Metabolic Equivalent of Task
MFNP	Ministry of Finance and National Planning
MOH	Ministry of Health
NCD	Noncommunicable Disease
NHERC	National Health Ethics and Research Committee
NNCDC	The National NCD Committee
OECD	Organization for Economic Cooperation and Development
PCA	Principle Component Analysis
PCAE	Per Capita Calorie Intake Per Day
PIC	Pacific Island Country
PNG	Papua New Guinea
PPS	Probability Proportional to Size
RIP	Relative Income Price
SDA	Seventh-day Adventist Church
SI	Socio-economic Index
SMA	Special Management Area Program
SPC	The Pacific Community
SSB	Sugar-sweetened Beverage
STEPS	STEPwise approach to surveillance
TaXSIM	Tobacco Tax Simulation
TCC	Tonga Communications Corporation
TSDF	Tonga Strategic Development Framework
UN	United Nations
WB	World Bank
WHO	World Health Organization
WPRO	Western Pacific Region Office

# Glossary

Body mass index (BMI)	BMI is an index of weight-for-height commonly used to classify overweight and obesity on a large population basis, measured in a person's weight in kilograms divided by the square of his/her height in meters (kg/m <sup>2</sup> ). In adults, overweight is defined as a BMI of 25 or more, whereas obesity is a BMI of 30 or more.
Consumption tax	In general, consumption tax is a tax on the purchase of a good or service. Consumption taxes can take the form of sales taxes/value added tax, tariffs, excise, and other taxes on consumed goods and services. However, Consumption Tax applied in Tonga is equivalent to value added tax instead of the broad definition.
Customs duty or import duty	Customs duty, or import duty, is a tax paid for goods that are transported across international borders.
Excise tax	An excise tax is an indirect tax on the sale of a particular good or service such as fuel, tobacco and alcohol. Indirect means the tax is not directly paid by an individual consumer. Instead, it is levied on the producer or merchant, who passes it onto the consumer by including it in the product's price. Excise levied on cigarettes, alcohol and selected unhealthy products are sometimes called sin taxes because of high social cost of consuming this kind of goods.
Metabolic Equivalent of Task (MET)	MET is the objective measure of the ratio of the rate at which a person expends energy, relative to the mass of that person, while performing some specific physical activity compared to a reference, set by convention at 3.5 ml of oxygen per kilogram per minute, which is roughly equivalent to the energy expended when sitting quietly (equivalent to a caloric consumption of 1kcal/kg/hour). It is estimated that compared with sitting quietly, a person's caloric consumption is three to six times higher when being moderately active (3 — 6 METs) and more than six times higher when being vigorously active (>6 METs)
Noncommunicable diseases (NCDs)	Noncommunicable diseases (NCDs) in a broader sense means diseases of non-transmissible/infectious nature. They are more commonly referred to as chronic diseases that tend to be of long duration and are the result of a combination of genetic, physiological, environmental, and behavioral factors. The four main types of NCDs are cardiovascular disease, diabetes, cancer, and chronic lung disease; together they are collectively responsible for almost 70 percent of all deaths worldwide. We refer to NCDs related to diet and nutrition as diet-related NCDs, which includes cardiovascular disease (such as heart attacks and stroke, and often linked to high blood pressure), diabetes, and certain cancers. Unhealthy diets and poor nutrition are among the top risk factors for these diseases globally.

# Glossary

NCD-related taxes	NCD-related taxes are implemented as a way to use fiscal policies, particularly taxation, to alter retail prices in such a way that sales and consumption of tobacco, alcohol and foods that are associated with non-communicable diseases. For example, taxes are levied on tobacco, alcohol, and foods high in specific nutrients/ingredients (salt/fats/sugar) or otherwise classified as “unhealthy,” including sugar-sweetened beverages. It could also take a form of reduced taxes (or subsidies) to promote the increased consumption of healthier food items, such as fruits and vegetables.
Sin taxes	A sin tax is an informal term used to describe an excise or ad valorem tax specifically levied on certain goods deemed harmful to society and individuals — for example, alcohol, tobacco, sugar-sweetened/soda drinks, unhealthy food, and gambling, among others — to increase their price in an effort to lower their use and reduce the negative impacts of the taxed substance.
Sugar-sweetened beverages (SSBs)	Sugar-sweetened beverages (SSBs) are any liquids that are sweetened with added sugars (for example, brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, lactose, malt syrup, maltose, molasses, raw sugar, and sucrose), such as regular non-sugar-free soda, fruit/sports/energy drinks, sweetened waters, and coffee/tea beverages with added sugars. The calories in SSBs can contribute to weight gain and provide little to no nutritional value, and lead to other health risks including obesity, tooth decay, heart disease, and type 2 diabetes. SSBs are associated with minimal effect on hunger, so food intake does not decline when consuming sugary beverages. With an aim of reducing the consumption of SSBs, the sales of the defined products are regulated — for example, they are restricted in school premises, or taxed as an important public health measure.

# Acknowledgments

This report was prepared by Sutayut Osornprasop (Task Team Leader), Rong Zheng, Sione Hufanga, Catherine Latu, Kiatanantha Lounkaew, Jutta Krahn, Erling Ve’etutu, Sela Latailakepa, and Sarulchana Viriyataveekul. Yang Wang, Xiao Hu, Sione Saumaki, Kilifi Lolohea, and Pita Feimoefiafi provided research support. The study was conducted under the guidance of Enis Baris, Toomas Palu, Michel Kerf, and Lasse Melgaard. The team sincerely appreciates the excellent communication support from Jodie Brabin, valuable in-country liaison support from Tatafu Moeaki and Natalia Latu, as well as superb administrative and logistics support from Pimon Iamsripong, Elizabeth Ika, Roberto Belisario, Abigail Blenkin, Farazeen Amjad, and Kevalin Saksiamkul. The research team sincerely appreciates the overall support from the following individuals from the World Bank: Susan Ivatts, Patricio Marquez, Meera Sheekar, Maude Ruest, Aparnaa Somanathan, Venkatesh Sundararaman, Kim Edwards, Robert Utz, Lori Geurts, Sheila Dutta, Ashi Kathuria, Phoebe Folger, and Jesse Doyle. The team is grateful for the valuable comments provided by the following technical peer reviewers from the World Bank: Maria Eugenia Bonilla-Chacin (Lead Economist), Robert Johann Utz (Program Leader and Lead Economist), Caryn Bredenkamp (Senior Health Economist), and Alan Fuchs (Senior Poverty Economist).

The team sincerely appreciates the excellent collaboration with the Government of Tonga, which contributed to the completion of this study. The team highly values the support provided by the Ministry of Finance and National Planning (MFNP), Ministry of Revenue and Customs (MORC), Ministry of Health (MOH), Ministry of Internal Affairs (MIA),

Ministry of Agriculture, Forestry and Food (MAFF), Ministry of Fisheries (MF), Ministry of Commerce, Consumer, Trade, Innovation & Labour (MCCTIL), as well as the Department of Statistics (DOS) and Tonga Health Promotion Foundation. In addition, the team highly appreciates the valuable inputs from the National Food Council, church leaders, Tonga Family Health Association, Civil Society Forum of Tonga, and the Tonga Trust, as well as representatives from international organizations, development partners, and the private sector. We sincerely appreciate the people of Tongatapu and Vava’u who agreed to be part of the surveys and focus group discussions, as well as all the stakeholders from the government, private sector, church, civil society organizations, and development partners who participated and contributed to the stakeholder consultation meetings in Tongatapu and Vava’u.

The team highly appreciates the valuable support from the following individuals

## **Government of Tonga**

Ministry of Agriculture, Forestry and Food:  
Hon. Mrs. Losaline Ma’asi, Dr. Viliami Manu (CEO), Ms. Mele ‘Atuekaho, Mr. Metuisela Falesiva, Ms. Leody Vanikolo, Ms. Kakau Leander

Ministry of Commerce, Consumer, Trade, Innovation & Labour:  
Mr. Edgar Cocker (CEO), Mrs. Sandra Fifita, Mr. Anthony Cocker

Ministry of Education and Training:  
Hon. Mr. Penisimani Fifita, Mr. Sione Tokoma’ata

Ministry of Finance and National Planning:  
Hon. Rev. Dr. Pohiva Tu’l’onetoa (Minister), Mr. Tevita Lavemaau (Former Minister),

Ms. Balwyn Fa'otusia (CEO), Ms. Kilisitina Tuamei'api, Mr. Sione Faleafa, Ms. 'Ana Lotuma Falefehi Ika, Ms. Elizabeth Baker, Ms. Kilisitina Angahiki Puleiku, Mr. Semisi Faupula

Ministry of Fisheries:

Hon. Mr. Semisi Fakahau

Ministry of Health:

Hon. Dr. Saia Piukala (Minister), Dr. Siale 'Akau'ola (CEO), Mr. Semisi Fukofuka, Dr. 'Ofa Tukia, Mr. Sioape Kupu, Mr. Eva Mafi, Ms. Tinalasa Vunipola, Ms. Latu Fusimalohi, Mr. Tupou Tui'ilautala, Dr. John Lee Taione

Ministry of Infrastructure:

Mr. Petelo Sanele Ulupano

Ministry of Internal Affairs:

Hon. Dr. Saia Piukala (Minister), Mr. 'Onetoto 'Anisi (Acting CEO), Ms. Ana Bing Fonua (former CEO), Ms. 'Eva Tuipeatau - Tu'uholoaki, Mr. 'Alotaisi Takau, Mr. Penisimani Vainikolo, Ms. Malianive Finau, Mr. Kotonififita, Mr. Mapa Hafoka, Mr. Ula Kaufusi, Mr. Vava Lapota

Ministry of Police:

Mr. Taulango Tapueluelu

Ministry of Revenue and Customs:

Hon. Mr. Mateni Tapueluelu (Minister), Mr. Kelemete Vahe (CEO), Mr. Kulu 'Anisi Bloomfield (former CEO), Mr. Heiloni Latu, Mr. Vehitau Ma'ukie, Mr. Tupou Latava, Mrs. Melenaite Ma'ukie

Ministry of Tourism:

Mr. Bruno Toke

National Reserve Bank of Tonga:

Ms. 'Ana Soakai Takai

Parliament of Tonga:

Hon. Siaosi Sovaleni (Member of Parliament)

Vava'u Governor's Office:

Hon. Lord Fakatulolo

Tonga Department of Statistics:

Dr. Viliami Fifita (Government Statistician), Mr. Sione Lolohea, Mr. Winston Fainga'anuku

Tonga Health Promotion Foundation:

Ms. 'Ofeina Filimoehala (CEO), Ms. Seini Fili'ai (former CEO), Ms. Jeanie McKenzie, Mrs. Monica Tu'ipulotu

**Church leaders**

Pastor Saia Ve'a (President of the Seventh Adventist Church), Dr. Tu'ipulotu Katoanga (President of the Church of Tonga), Mr. Silongoatonga Samani (Head of Welfare and Humanitarian of the Church of Jesus Christ of Latter-day Saints), Rev. Dr. Mele'ana Puloka (President of Free Wesleyan Church Education), Rev. 'Etu'ate Manuofetoa (Free Wesleyan Church), Father Pauli Ta'ai (Catholic Church), Mr. Viliami Talivakaola (Church of Jesus Christ of Latter-day Saints)

**Development partners**

Food and Agriculture Organization of the United Nations:

Eriko Hibi, Ramani Wijesinha-Bettoni, Fiasili Lam, Pau Molevuka Likiliki

The Government of Australia's Department of Foreign Affairs and Trade:

H.E. Andrew Ford, Rebecca Dodd, Madeleine Scott, Chris Sturrock, Kirsty Dudgeon, Jane Pepperall, Debra Allan

The Government of New Zealand's Ministry of Foreign Affairs and Trade:

H.E. Tiffany Babington, Sumi Subramaniam, Elena Procuta, Olivia Fukofuka, Anna Pasikale, Sarah Johal

The Government of Japan:

H.E. Tetsuya Ishii, Yasushi Hayashi, Saito Sho

World Health Organization:

Yutaro Setoya, Wendy Snowdon

The Pacific Community (SPC): Paula Vivili, Sunia Soakai

### **Academics**

University of the South Pacific, University of International Business and Economics (China)

### **Civil Society Organizations**

Mrs. Mele Amanaki, Mrs. Papiloa Foliaki, Mrs. Amelia T. Hoponoa, Mr. Tevita Halahala, Ms. Fuiva Kavaliku, Mr. Sione Taumoefolau, Mr. Rhema Misa, Mr. Sione Fifita, Pastor Havili Sefesi, Mrs. Lisa Fanua, Mr. Siaso Moala

### **Private Sector**

Mrs. Maliana Tohi, Mr. Min Seng Cai, Ms. Elizabeth Cowley

The World Bank team very much appreciates the close collaboration with Ms. Ramani Wijesinha-Bettoni and team from FAO during the conceptualization and household questionnaire design stages, particularly in working together to publish *Effects of Food Taxation in Tonga: A Snapshot report* (<http://www.fao.org/3/a-i8052e.pdf>). The preliminary findings from the Snapshot have also been confirmed by this report.

The team is grateful for the funding support from the World Bank's Tobacco Control Program, the Government of Australia (Department of Foreign Affairs and Trade), the Government of New Zealand (Ministry of Foreign Affairs and Trade), and the Government of Japan through the Japan Trust Fund for Scaling Up Nutrition.



# Executive Summary





**Tonga has experienced a high burden of noncommunicable diseases (NCDs) in the past two decades.** Data indicate the continuing rise of four major NCDs – cardiovascular disease, diabetes, cancer, and respiratory diseases – as the leading causes of premature death and disability. According to latest data, NCDs accounted for four out of five leading causes of mortality in Tonga, and 99.9 percent of Tongan adults aged 25–64 are at moderate to high risk of developing an NCD.

**The increase in behavioral-related risk factors such as smoking, poor diet (e.g. high in sugar, salt, trans-fat and saturated fat, and low in fruit, vegetables, legumes, fish etc.), harmful alcohol intake, and physical inactivity are acknowledged as the major contributing factors to the rise in NCDs in Tonga.** According to its 2012 STEPS Survey, Tonga has one of the highest rates of overweight and obesity ( $\geq 25$  kg/m<sup>2</sup>) in the world – reaching 90.7 percent among some population groups. Both obesity and overweight are common at younger ages. Furthermore, almost one in two men smoke, and smoking appears to be increasing among young women.

**In response to the rise in NCDs, in recent years the Government of Tonga has gradually introduced taxation measures to influence consumption behaviors of the population, complementing existing regulatory and legislative interventions.** The increase in excise tax on imported manufactured cigarettes in July 2016 was of particular significance. Unlike the small, incremental increases of previous years, the excise tax in July 2016 was raised by nearly 50 percent to T\$380/1,000 sticks, compared with T\$255/1,000 sticks in the previous year. At the same time, the government waived consumption tax on imported fruits, in anticipation that the price would fall, and that the population would in turn increase its consumption of these more healthy products.

**This study aims to generate policy-relevant findings and insights on the implementation of taxation policy on tobacco, alcohol, and unhealthy food consumption behaviors; as well as pricing, government revenues, and the country's response to Tonga's rising NCD burden.** The findings are expected to help strengthen the monitoring and evaluation of NCD-related fiscal policies, not only of behavior change but also revenue generation. The findings also intend to help improve the design of future NCD-related fiscal policy – as well as other, non-fiscal policies – to address NCD challenges. These lessons from Tonga will also be relevant and beneficial to other Pacific Island Countries (PICs) that face similar NCD and obesity burdens.

**This study employs the following assessment tools and sources of data:** (i) government administrative data; (ii) baseline and endline household surveys, focusing on the impact of NCD tax on consumption behaviors in Tongatapu and Vava'u which account for over 85 percent of Tonga's population; (iii) retail surveys focusing on the impact of the NCD tax on prices; (iv) tobacco taxation simulation modeling (TaXSiM); (v) a qualitative study that includes focus group discussions and in-depth interviews.

**Positive impacts from the NCD tax policy have been observed. The excise tax resulted in a price increase across all the taxed products.** The excise tax made cigarettes less affordable and affected smokers' behaviors. Tax on cigarettes has a greater effect on "less well-off" smokers, as a larger number of less well-off smokers reduced consumption of manufactured cigarettes. This is consistent with the 2018 *Lancet* findings on the equity impacts of price policies. The study found that low-income households respond to price changes more readily than

higher income households. Furthermore, price policies affect the spending of a larger number of high-income households than low-income households, and any resulting price increase tends to be financed disproportionately by high-income households.<sup>1</sup> Price, rather than health, is the main reason among those who decided to change behaviors and reduce consumption.

**Nevertheless, the positive impacts of the tobacco tax policy in Tonga are diluted.**

There was a shift from more expensive brands of cigarettes to less expensive brands, particularly locally manufactured cigarettes, which are subject to less tax. But more importantly, there was a big shift from manufactured cigarettes to the untaxed local hand-rolled tobacco leaves called Tapaka Tonga. Today, most tobacco users in Tonga smoke Tapaka Tonga.

**Tapaka Tonga is no less harmful to health than manufactured cigarettes.**

Many Tongans wrongly believed Tapaka Tonga to be less harmful than manufactured cigarettes, and some even thought it was “healthy” given that it has been marketed as “organic tobacco”. However, according to a World Health Organization analysis, like manufactured cigarettes, Tapaka Tonga contains many toxic chemicals, including, nicotine, formaldehyde, acetaldehyde, acetone, acrolein, propionaldehyde, crotonaldehyde, butyraldehyde, and 2-butanone. The amount of nicotine in Tapaka Tonga is proportionately higher than that of manufactured cigarettes.<sup>2</sup>

**Tapaka Tonga – the main unhealthy product that smokers use as a substitute for manufactured cigarettes – is affordable and widely available in shops.** According to the Ministry of Revenue and Customs, over 90 percent of Tongan shops sell Tapaka Tonga. According to interviews, retailers buy Tapaka Tonga from manufacturers at T\$2-3 per pack, and retail it to consumers at T\$6-7. Tapaka Tonga is currently not taxed and is a very profitable product.

**Increased excise tax has led to decreases in the frequency and amount of alcohol products consumed; however, a shift to substitutes has been observed.** Significant numbers of drinkers have shifted to kava. There is also increased incidence of substance abuse, including marijuana, glue/petrol sniffing, and crystal methamphetamine, though it is not clear if this is related to the excise tax rise.

**Effects of excise tax on food are mixed.**

Excise tax on turkey tails, mutton flaps, and ice cream helped reduce consumption of these products – though the tax had very limited effects on the consumption of chicken leg quarters. In addition, the tax on chicken leg quarters appeared to have regressive effects on less well-off households. Despite the tax-induced price, chicken leg quarters remained the cheapest meat in the market, and less well-off households continue to buy it. Hence, the tax on chicken leg quarters took a proportionately greater amount of financial resources from those on lower incomes.

---

<sup>1</sup> Sassi, F., et al, Equity impacts of price policies to promote healthy behaviours, The Lancet Taskforce on NCDs and economics, Volume 391, Issue 10134, P2059-2070, May 19, 2018.

<sup>2</sup> Health Science Authority of Singapore report, 2 April 2013 (obtained from World Health Organization).

**The potential risks of swapping to other, cheaper, and/or low quality unhealthy food products are substantial, given the variety of food choices in Tonga.** While unhealthy food products which are subject to excise tax have become more expensive, there are still unhealthy food products which are not subject to excise tax, making them more affordable than the taxed products. Forty percent of mutton flap consumers reported shifting to substitutes – salted beef, tinned fish and corned beef. Salted beef and corned beef were not subject to excise tax, but they also contain high and unhealthy levels of salt and fat. The main substitutes of ice cream and instant noodles were identified as locally manufactured ice cream and instant noodles, which were not subject to excise tax at the time of the survey, making them cheaper than their imported counterparts. This demonstrates the importance of imposing unified tax rates for both imported and locally manufactured unhealthy products. Otherwise, people could easily shift to consuming locally manufactured unhealthy products, defeating the health outcome purpose of the tax.

**The availability and affordability of healthy food alternatives remain a major issue in Tonga.** Therefore, more policy interventions are needed to make healthy food more affordable and accessible. For example, fresh fish is highly desirable, but less well-off households reported that they cannot consume fresh fish on a regular basis due to the high price. Households in general are hard-pressed to consume healthy alternatives because of the lack of availability, accessibility, and high cost.

**The exemption of consumption tax on selected healthy products (e.g., imported fruits) resulted in neither lower retail prices nor higher consumption of these products.** Imported fruit prices remained the same, despite the removal of the 15 percent consumption tax. The benefits from the tax exemption went to traders rather than consumers.<sup>3</sup>

**Tax-induced price changes have caused Tongan consumers to reduce their consumption of unhealthy food products, albeit to different degrees.**

Instant noodles and chicken legs have price elasticity of -0.38 and -0.39 respectively. The negative sign indicates that price and consumption vary inversely. Thus, for instant noodles, a 1 percent increase in price will reduce instant noodle consumption by 0.38 percent; similarly, a 1 percent increase in the price of chicken legs will reduce consumption of chicken legs by 0.39 percent, which shows that consumption of these products did not change significantly as compared to changes in price. Elasticity of sugar-sweetened beverages is -0.93 which is within the ranges of WHO's findings, and is more sensitive to price change compared to the previous two products. The two products most responsive to price change are ice cream and mutton flaps with elasticity of -1.38 and -1.92 respectively.

**Smokers from lower wealth quintiles are more responsive to tax-induced price changes and are likely to reduce cigarette consumption as the price of cigarettes increases.** Overall elasticities of demand for cigarettes, following the July 2017 tax increase, was -0.39; a price increase of 1 percent will lower cigarette demand by 0.39 percent. However, there was great variation of behaviors of

---

<sup>3</sup> While Tonga has a price control mechanism for imported fruits, it seems the policy has not been effectively enforced.

smokers in different socio-economic groups. The elasticities of demand for cigarettes among smokers from the lowest wealth quintile was -0.63, compared with -0.21 from the highest wealth quintile. This means that smokers in lower wealth quintiles were more responsive to price change.

**To conclude, how much a consumer responded to price change depended on the characteristics of the product.**

For a product with a low price per unit, a change in price would not have a significant impact on total consumer and household expenditure; consumption of these products, therefore, would be less sensitive to price change. Products whose unit price occupied a noticeable proportion of household expenditure would be more sensitive to price change. Elasticity also depended on the nature of the product itself. Products which were considered a daily staple would be less sensitive to price change. Luxury products would be more sensitive to price change. Lastly, addictive products such as cigarettes would be less sensitive to change in price. When wealth quintile is taken into account, smokers from lower wealth quintiles are more likely to reduce their consumption behaviors as price increases. These results provide empirical support for the effectiveness of tax as an instrument to divert Tongan consumers from consuming products that are detrimental to their long-term health and well-being.

**While it cannot be concluded that tax increases were the sole reason for reduction in consumption of taxed products, the tax can be said to have had significant influence on the consumption pattern of Tongan consumers.** For example, around 76 to 79 percent of smokers said that they smoked less because of the price change. Similarly, around 98 to 99 percent of mutton flap consumers reduced their consumption because of the change in price. The

fact that, during the period of this study, there was no other variable that caused significant change to prices on these products also lends support to the claim that tax imposition was the major driver for lower consumption of the taxed products.

## **Recommendations**

### **Tax structure**

**Commercialized Tapaka Tonga should be subject to excise tax, as it is harmful to health yet cheap and readily available in shops.** The fact that Tapaka Tonga is not subject to excise tax also contributes to the reduction in government revenues from excise tax on tobacco products, as many smokers have substituted the more expensive taxed manufactured cigarettes with untaxed Tapaka Tonga.

### **Excise tax on chicken leg quarters should be removed for the following reasons:**

- Lack of global evidence that chicken legs are “unhealthy”, as their nutritional benefits depend on how they are cooked (e.g. remove fatty parts and skin, not deep-fried).
- Chicken leg quarters are an important source of protein for Tongan children and adults, and despite the tax-induced price hike they remain the cheapest meat option on the market.
- Most households continue to buy chicken leg quarters despite the price increase, creating a regressive effect on poorer households.

**The government should take a consistent approach and apply scientifically supported criteria across all food groups, including the use of nutrient profiling that indicates unhealthy threshold (e.g. levels of fat, salt, and sugar), in designing the NCD tax policy.** This should be done in close consultation with health and nutrition experts from the Ministry of Health, Ministry of Agriculture, Forestry and Food, Tonga Health Promotion Foundation, the National

Food Council, and relevant development partners. This should be applied to both food products subject to an increase in excise tax, as well as food products subject to consumption tax exemption.

**NCD-related unified excise tax should be applied to both imported and locally produced products (and at the same level), or its effects will be diluted.** For example, excise tax on sugar-sweetened beverages (SSBs) had earlier applied to only imported SSBs. Local businesses were quick to note the loophole and started to produce SSBs locally. Locally produced SSBs were not subject to NCD tax and have become cheaper than imported SSBs (locally produced SSBs cost approximately T\$1.5 while imported SSBs cost around T\$3.5 for a similar type and size of SSB), leading to higher consumption of locally produced SSBs. This also applied to instant noodles, whereby imported instant noodles were subject to excise taxes, while locally manufactured instant noodles were not, and have become cheaper than imported ones. In addition, the experience of imposing different excise tax rates on imported and locally manufactured cigarettes shows that it increases the price gap between imported and locally manufactured cigarettes, leading more smokers to switch to cheaper locally manufactured cigarettes. It is recommended that excise tax rates for imported and locally manufactured unhealthy products should be at the same level for the same products, e.g. imported cigarettes and locally manufactured cigarettes.

### **Monitoring tax policy implementation**

**Better monitoring of the prices of tax exempt, healthy food is needed to ensure that tax exemption achieves the goal of price reduction, and in turn higher consumption of healthy food products.** Most shops in Tonga do not use weighing scales for fruits and vegetables, making it difficult for consumers

to assess if the price per unit has decreased or increased. Use of weighing scales for selling fruits and vegetables should be enforced, and it will not only help the government in monitoring prices, but also empower consumers in ensuring that traders do not overcharge. The empowerment of consumers in this way is essential, given that the government may not have sufficient human resources to conduct price monitoring regularly throughout the country.

**The government needs to monitor the implementation of the NCD tax regularly and make sure that annual tax increases well-exceed increases in consumer prices and incomes to ensure effectiveness.**

Small, incremental increases in tax alone do not work. What drives behavior change is the “price shock” that comes after a large tax increase. After the large tax increase, small incremental increases can be used to sustain impact. But most importantly, the government needs to monitor regularly and make sure that annual tax increases well-exceed the increase in consumer prices and incomes. Evaluation of interventions or programs needs to be planned and designed before the start of interventions. Evaluation will generate evidence on impacts of the interventions and programs as well as lessons learned.

**There is room for improvement on communication, through relevant media channels, in particular mass media and social media as well as to organize public consultations to reach out to different stakeholders regarding the NCD-related taxation policy.** From the household survey,

there was a lack of knowledge among the majority of the population about the imposition and increase in NCD-related taxation that became effective in July 2016, and again in July 2017. Many people still do not have a clear idea of what unhealthy products are, what healthy options are, and how to access them. Consultations with key agencies, key stakeholders, church leaders, and representatives of the communities should be conducted prior to imposition of new taxation policy.

## **Transparent use of NCD tax revenues**

**In response to calls from the communities, the Government of Tonga may explore how it can demonstrate to communities that the revenues acquired from NCD-related taxes are used to support and promote healthy lifestyles among the population, as well as improve health care services.** Some of the key health promotion interventions that communities desired from the government include: making healthy food options cheaper, invigorating health promotion activities, and supporting production of healthy food products, etc.

## **Complementary (non-tax) measures**

**More policy interventions are needed to make healthy food more accessible and attractive, and also to encourage consumption of smaller portions of food.** For example, fresh fish is highly desirable, but less well-off households reported that they cannot consume fresh fish on a regular basis due to the high price. The Ministry of Fisheries' program that required foreign fishing vessels to off-load at least 3 tons of fish to sell to the community at T\$2.5-9 per kg has been very popular. However, it seemed to benefit only communities living close to where the fish were sold, e.g. Nuku'alofa. Communities from other areas of Tongatapu and Vava'u would like to benefit from a similar program. In addition, the overall portion of food that Tongans consumed each meal tend to be large and at times excessive. Hence, consumption of smaller portions of food should be encouraged and promoted.

**More studies should be conducted on home production initiatives to generate evidence and promote successful cases.** For example, the government could build on the successful Church of the Latter Day Saints-supported "keyhole garden"

initiative as an easy way to grow vegetables that can be afforded by every household, even with limited land area. A keyhole garden is a raised-bed system that requires minimal watering and fertilizer due to its ability to retain moisture and use compost. Its unique design allows farmers to irrigate their crops with recycled water from household washing. The keyhole structure also makes it easy for farmers to add soil or manure to the garden if crops need additional fertilizer. A raised bed is also particularly effective for those who have physical limitations, such as the elderly or people with disability. There are also good examples of intercrop home vegetable gardens led by households, even in the center of the capital Nuku'alofa, which provide good examples to Tongan communities. The government should also build on communities' requests to support access to markets to stimulate production, study experiences from poultry raising in other PICs (e.g. Fiji), and increase community mobilization and organizations (e.g. farmers' groups).

**Making healthy food more affordable and accessible is not in itself adequate. It is important to introduce parallel interventions to make healthy food attractive, "yummy" and ensure livestock farms are sustainable.** Making healthy food more affordable alone does not guarantee that the population will stop consuming unhealthy food and swap to healthy products. Communities in focus group discussions said they lacked knowledge of how to make vegetables more palatable at home, and requested cooking demonstration programs to increase the variety of dishes that could be eaten at home. Education programs on how to initiate and sustain chicken farms should also be introduced alongside livestock programs to ensure long-term access to healthy food.

**The increase in revenues from the NCD tax, particularly from food, SSBs, and alcohol tax, has increased fiscal**

**space that will help the Government of Tonga increase the resources to support health promotion/disease prevention activities as well as improve health care services to help the country achieve universal health coverage.** As highlighted in the Pacific NCD Roadmap, such complementary measures are essential to address the NCD crisis. This is even more important in light of the findings of this study, which show that without complementary measures, tax increases may merely result in a switch from one form of unhealthy consumption to another. There are lessons learned from several countries that use the revenue from sin taxes to support health promotion and health services, which help these countries achieve universal health coverage.

**It is important to engage political, social and community leaders to support social and behavior change to address the NCD crisis.** From the qualitative study it is clear that political, church, and community leaders are very influential, and their roles in promoting healthy lifestyles are critical. There are superb experiences in healthy eating and healthy lifestyles that have been implemented by selected churches and communities. Their lessons should be shared widely. Good examples include the introduction of healthy food at church conferences by the Seventh-day Adventist Church (SDA), which encouraged the use of healthy ingredients and discouraged overeating. The Church of Jesus Christ of Latter-day Saints (LDS) has also introduced the “keyhole garden” initiative as an easy way to grow vegetables that can be afforded by every household, even with limited land area as shown in Pictures 1 and 2.

**Multi-sectoral interventions are needed to address NCD burdens; fiscal/taxation policy alone is not adequate.** The fiscal/taxation policy needs to be complemented by other policy interventions from sectors including health, education,

agriculture and fisheries, accompanied by strong legislation, regulations, effective communication and campaigns, and an enabling environment. For example, the government could complement taxation intervention on Tapaka Tonga by regulating a requirement for large and clear warning labels on packets of Tapaka Tonga as well as providing support or incentives (knowledge and/or seeds) to encourage farmers to switch from growing tobacco to growing healthy cash crops.

**The National NCD Committee, its advisory bodies, The National Food Council, and Tonga Health Promotion Foundation should play an active role in promoting the multi-sectoral interventions to address the NCD crisis that are to be implemented by sectoral ministries.**

In the past two years the National NCD Committee and the National Food Council played a very limited role in the design, implementation, and monitoring of NCD tax and other health promotion activities. The concerted efforts by these bodies, combined with active implementation by relevant sectoral ministries, churches and civil societies can make a difference to Tonga and help address the NCD crisis.



Picture 1 : Tongan lady with her home vegetable garden right in the middle of Nuku'alofa (capital of Tonga)



Picture 2: The LDS Church introduces a “keyhole” technique for Tongan communities with limited space to grow vegetables

# Introduction





**Tonga's NCD burden is immense.** Data from the past two decades indicate the continuing rise of four major NCDs as the leading causes of premature death and disability in the country – cardiovascular disease, diabetes, cancer, and respiratory diseases. According to the latest data,<sup>4</sup> NCDs accounted for four out of five leading causes of mortality in Tonga, and 99.9 percent of Tongan adults ages 25–64 are at moderate to high risk of developing an NCD.

**The increase in behavior-related risk factors such as smoking, unhealthy diets, harmful alcohol intake, and physical inactivity are the major contributing factors to Tonga's rise in NCDs.** Unhealthy dietary practices in Tonga include high consumption of fats (including saturated fats from animal-based foods and trans-fatty acids from snacks and packaged foods), high intake of sugar and salt, as well as low consumption of fresh fruits, vegetables, and fresh fish. Tonga has one of the highest rates of overweight and obesity ( $\geq 25$  kg/m<sup>2</sup>) in the world, rising to as high as 90.7 percent among Tongan adults. Both obesity and overweight are common at younger ages. Furthermore, almost half of all men smoke, and smoking appears to be increasing among young women. These are all strongly linked to “unhealthy environments”, and require policies, regulations and legislation interventions, among others.

**In recent years the Government of Tonga has gradually introduced taxation measures to influence the population's consumption behaviors in order to address the rise in NCDs.** The increase in excise tax on imported manufactured cigarettes in July 2016 was

of particular significance. Unlike the small, incremental increases of previous years, excise tax in July 2016 rose by nearly 50 percent to T\$380/1,000 sticks, compared to T\$255/1,000 sticks in the previous year. At the same time, the government waived consumption tax on imported fruits (e.g. apples and oranges) in the hope that lower prices would encourage the population to consume more fresh fruit.

**In response to the significant tax rise in July 2016, the Government of Tonga asked the World Bank to study the impacts of these fiscal interventions.** The aim is to understand whether Tongan consumers are responding to price rises resulting from higher taxation on tobacco, alcohol, and selected unhealthy foods and beverages, and to lower-priced healthy foods as a result of the waived consumption tax. The aim is also to understand how best to improve the use of these fiscal policies to address NCDs in the future.

**This report presents findings and recommendations from the World Bank's *Improving the use of fiscal policy on tobacco, alcohol, food and beverages as a response to the NCD crisis in the Pacific: A country case study in Tonga*.** The study aims to generate policy-relevant insights into the implementation of Tonga's taxation policy in relation to tobacco, alcohol, food and beverages (hereafter referred to as “NCD tax policy”). These insights can enhance the discussion about the tax policy's effect on pricing, consumer behavior, and government revenues, and generate a better understanding of communities' viewpoints on the tax policy and measures other than fiscal interventions.

---

<sup>4</sup> Ministry of Health, Kingdom of Tonga Risk Factors STEPS Report, 2014.

**The findings and recommendations in this report are expected to help strengthen the monitoring and evaluation of NCD tax policy in relation to change in consumption behaviors and social norms, as well as in relation to broader government tax policy.** The study also contributes to the future design of NCD tax and non-tax policies to address the NCD challenge. Key lessons from Tonga may also be relevant to other Pacific Island Countries (PICs) that face similar health challenges in helping them design evidence-based policies to address NCDs and obesity.

### The country context

**Tonga is a small Pacific island nation with a population of 106,000 (see Figure 1).** It comprises over 170 islands and islets scattered over 800 km, of which around 36 are inhabited. About 70 percent of the population live on the main island of Tongatapu, where the capital, Nuku'alofa, is located. Tonga is a constitutional monarchy that has recently undergone democratic changes and is classified as an upper-middle-income country with a gross national income (GNI) per capita of US\$4,010 (US\$6,050 PPP).<sup>5</sup>

**Despite being an upper-middle-income country, Tonga's economy is fragile, and its economic growth potential is constrained by structurally high costs of living, exposure to economic and environmental shocks, as well as natural disasters.** Tonga is the world's most geographically remote nation from the major centers of economic activity.

Figure 1: Map of Tonga



Source: World Atlas (accessed May 11, 2019), <https://www.worldatlas.com>.

Similar to most other Pacific Island Countries (PICs), smallness and remoteness pose challenges to Tonga, pushing up the cost of economic activity and limiting both competitiveness in global markets and the scope for diversification. Average economic growth over the past five years has thus remained low by global standards, averaging 1.2 percent annually, and has been volatile.<sup>6</sup>

**The country remains dependent on external aid and remittances to offset a large trade deficit arising from a heavy reliance on imported foodstuffs, fuels, chemicals, machinery, and transport equipment.** There are limited opportunities for formal, salaried employment in Tonga and a large proportion of the population is engaged in subsistence agriculture and fishing. In recent years there has been significant migration of Chinese nationals

<sup>5</sup> World Development Indicators, World Bank, 2018.

<sup>6</sup> International Development Association program document for a proposed development policy grant to the Kingdom of Tonga for the Second Inclusive Growth Development Policy Operation, April 27, 2017.

to Tonga. Most have engaged in the commercial sector. Most shops in Tonga today are owned and/or run by Chinese families.

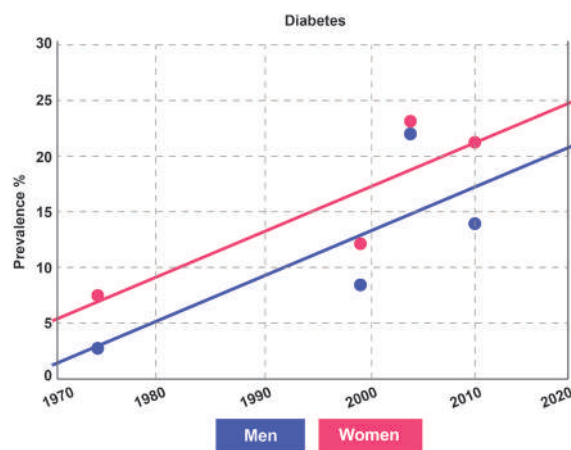
### **The NCD crisis and development impacts**

**Traditionally Tonga has had one of the best overall levels of health of all PICs and still retains good maternal and child health outcomes.** The country has seen a dramatic reduction in communicable diseases and maternal and child mortality since the 1950s. Relative to other small Pacific island states, Tonga has a sound primary health care system and public health infrastructure, and comprehensive antenatal and postnatal care, immunization, water, sanitation, and waste disposal programs.<sup>7</sup> According to the Human Capital Index, 98 out of 100 children born in Tonga survive to age 5. Only eight out of 100 children in Tonga have stunted growth.<sup>8</sup> While the total fertility rate remains high (3.6 in 2016), the maternal mortality rate is less than 40 per 100,000 live births.<sup>9</sup> This, on average, means there are fewer than two maternal deaths per year.

**Nevertheless, Tonga has seen a sharp rise in NCD prevalence, and NCDs now account for four of the top five causes of death – cardiovascular disease (CVD), diabetes, cancer, and respiratory diseases. Accompanying this is a significant increase in the number of premature deaths.** For example, the prevalence of diabetes has risen from less than 5 percent in 1970 to over 20 percent today (see Figure 2), with deaths from diabetes slightly more common in females. CVD is a major cause of premature mortality,

with almost half (48 percent) of all deaths occurring in the working-age population. This is especially the case for men, who account for 68 percent of overall CVD deaths. The incidence of cancer has also increased over time, with the high mortality rate due partly to late detection.<sup>10</sup>

**Figure 2: Type 2 diabetes prevalence trend in Tongan adults aged 25–64 years, 1978–2012**



Source: Lin, S. et al. 2016. Diabetes and obesity trends in Tonga over 40 years. *Asia Pacific Journal of Public Health* Vol 28(6): 475–485.

**NCDs and their treatment costs impose a significant burden not just on individual patients but also on households, communities, employers, health care systems, and the country's fiscal system.** While GDP per capita tends to rise and fall in Tonga, health expenditure per capita has seen a rising trend in recent years, with NCD treatment one of the major drivers (Figure 3). This presents many financing challenges and cost pressures to the country's fiscal system.

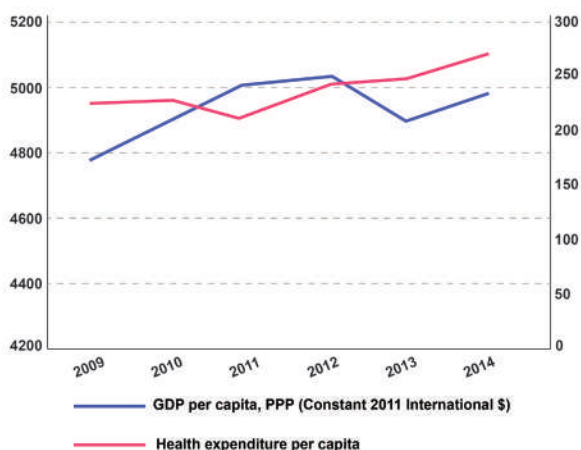
<sup>7</sup> Human Capital Index, World Bank, 2018.

<sup>8</sup> The Kingdom of Tonga Health System Review, *Health Systems in Transition*, Vol. 5, No. 6, 2015.

<sup>9</sup> Human Capital Index, World Bank, 2018.

<sup>10</sup> The Kingdom of Tonga Health System Review, *Health Systems in Transition*, Vol. 5, No. 6, 2015.

Figure 3: GDP per capita and health expenditure per capita, 2009–2014



Source: World Bank, Pacific Possible, 2017.

### Tonga's high NCD burden also affects labor productivity and economic growth.

NCDs affect not only the productivity of those they burden, but also that of healthy members of the workforce who need to take leave to care for them. And in terms of capital, the NCD burden not only leads to the loss of income, savings, and investment at individual and household levels, but also imposes significant costs to the government – diverting spending and investments from areas beneficial to the general public. Premature deaths from NCDs take members of the labor force away from their work at the height of their productivity, leaving families and children unsupported at a very early age.

## NCD risk factors

In Tonga, four key NCD risk factors have been identified: tobacco consumption, unhealthy diet, lack of physical activity, and harmful alcohol use. A combination of unhealthy diet and lack of physical activity also contributes to the high obesity burden. Comparison of data between the 2004 STEPS survey<sup>11</sup> and 2012 STEPS survey show alarming results, with poorer outcomes for several indicators (see Table 1). The percentage of adults with raised blood pressure rose from 23.1 per cent in 2004 to 27.6 per cent in 2012. The percentage of adults with impaired fasting glycaemia rose from 17.1 per cent in 2004 to 23.8 per cent in 2012, while the percentage of adults with raised fasting blood glucose doubled over the same period – from 16.4 per cent to 34.4 per cent. It is important to note that these risks have risen markedly for women. By 2012, the percentage of Tongan women with impaired fasting glycaemia<sup>12</sup> and raised blood pressure had risen to a similar level as men, while the number of women with raised fasting blood glucose had exceeded men by nearly 10 percentage points. The percentage of Tongan women with raised total cholesterol had also risen sharply, from 34.2 per cent in 2004 to 48.2 per cent in 2012. Trends in physical measurements (for example, body mass index) remained at a constantly high level over time.

<sup>11</sup> STEPS is abbreviation of STEPwise approach to surveillance. It is a simple, standardized method for collecting, analyzing and disseminating data in WHO member countries. There are currently two primary STEPS surveillance systems, the STEPwise approach to risk factor surveillance and the STEPwise approach to stroke surveillance.

<sup>12</sup> Impaired fasting glycaemia (IFG) is a type of prediabetes, in which a person's blood sugar levels during fasting are consistently above the normal range, but below the diagnostic cut-off for a formal diagnosis of diabetes.

Table 1: Factors influencing health status for males and females, STEPS surveys 2004 and 2012

Risk factor	2004			2012		
	Male	Female	Total	Male	Female	Total
Behavioral risk factors						
Current smoker (%)	46.2	14.3	29.8	46.4	13.4	29.3
Average daily consumption of <5 servings of fruit and/or vegetables (%)	91.4	92.9	92.2	72.4	73.7	73.1
Low levels of physical activity (1% with <600 Metabolic Equivalent of Task minutes per week)	33.3	53.7	43.9	15.1	31.7	23.7
Physical measurements						
Mean body mass index (BMI)(kg/m <sup>2</sup> )	31.7	34.9	33.3	31.3	34.8	33.1
Overweight (% with BMI ≥25)	89.2	94.9	92.1	87.3	94.0	90.7
Obese (% with BMI ≥30)	60.7	76.3	68.7	57.2	77.6	67.6
Overweight or obese (%)	89.2	94.9	92.1	87.3	94.0	90.7
Mean waist circumference (cm)	103.4	105.2	..	103.3	106.7	..
Mean waist to hip ratio (cm)	..	..	..	0.9	0.9	0.9
Raised blood pressure (%)	26.5	19.9	23.1	28.2	27.1	27.6
Biochemical markers						
Impaired fasting glycaemia (%)	20.0	13.8	17.1	23.9	23.8	23.8
Raised fasting blood glucose (%)	16.3	16.6	16.4	29.7	38.6	34.4
Raised total cholesterol (%)	66.1	34.2	49.7	49.3	48.2	48.8

Source: 2004 STEPS survey (MOH and WHO, 2012); 2011/2012 STEPS survey (MOH and WPRO, 2013); The Kingdom of Tonga Health System Review, Health Systems in Transition, Vol. 5, No. 6, 2015.

## **Tobacco consumption**

**Tonga is one of the PICs with high tobacco consumption prevalence.** As shown in Table 2, around 29.3 percent of the Tongan population smoke tobacco, with 26.7 percent smoking on a daily basis. Approximately half of Tongan adult males smoke. While there is no significant change in the prevalence of tobacco use between 2004 and 2012, the average age of starting smoking fell in 2012. Most smokers in Tonga in 2004 and 2012 smoked manufactured cigarettes, and each smoker consumed approximately 11 sticks per day. Prevalence of tobacco consumption in Tonga compared with other (selected) PICs is shown in Figure 4.

**Continuously high tobacco consumption and the rise in smoking among females suggest that tobacco control and prevention strategies used in the past may not have been as effective as hoped.**<sup>13</sup> It is

also important to note that the prevalence of tobacco use among school children has increased. According to the latest WHO data, the prevalence of tobacco use among school children ages 13–15 is around 35 percent, with 44.9 percent among male students and 28 percent among female students. The prevalence of tobacco use among female students is significantly higher than that of adult females. If this continues, the overall prevalence of tobacco use among Tongan adults may rise in the future.<sup>14</sup>

**The number of cases of lung and tracheal cancer has rapidly increased in the last 30 years, largely due to the high prevalence of smoking.** The World Tobacco Atlas estimates that 8 percent of female deaths and 7 percent of male deaths in Tonga are due to tobacco,<sup>15</sup> and the number of admissions for chronic obstructive pulmonary disease (COPD) is rising.



<sup>13</sup> The Government of Tonga has three different strands of tobacco control activity: its national taxation programme, bespoke national tobacco campaigns targeting issues such as second-hand smoking, and Ministry of Health-administered efforts such as quitline services for those willing to give up smoking.

<sup>14</sup> WHO, Report on the Global Tobacco Epidemic, 2017.

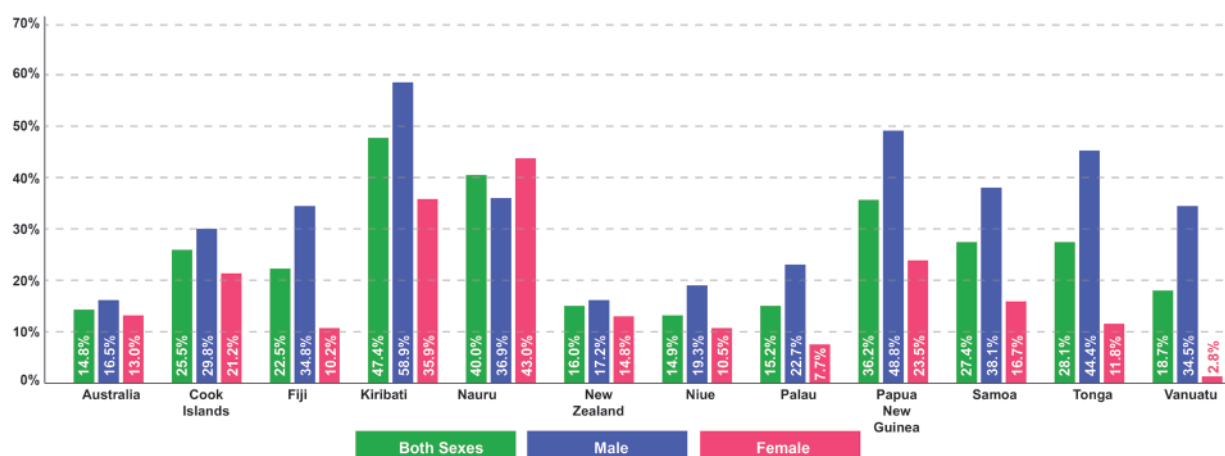
<sup>15</sup> The Kingdom of Tonga Health System Review, Health Systems in Transition, Vol. 5, No. 6, 2015.

Table 2: Prevalence of tobacco use, 2004 and 2012

Tobacco use for adults ages 25–64 years	Year	Total	Males	Females
Current smoker (%)	2012	29.3	46.4	13.4
	2004	29.8	46.2	14.3
Current daily smoker (%)	2012	26.7	42.1	12.4
	2004	26.4	41.5	12.2
For those who smoke tobacco daily				
Average age started smoking (years)	2012	18.6	17.5	22.2
	2004	19.7	18.7	22.7
Percentage of daily smokers smoking manufactured cigarettes	2012	85.2	81.8	95.9
	2004	82.5	82.8	81.4
Mean number of manufactured cigarettes smoked per day (by smokers of manufactured cigarettes)	2012	11.3	12	9.2
	2004	12.9	13.3	11.6

Source: 2004 STEPS survey (MOH and WHO, 2012); 2011/2012 STEPS survey (MOH and WPRO, 2013); Hufanga, S., Comparative Effectiveness of Interventions to Control Non-Communicable Diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.

Figure 4: Prevalence of tobacco consumption in the Pacific in 2016



Source: WHO Global report on trends in prevalence of tobacco smoking 2000–2025.

## **Unhealthy diet**

**Diet in Tonga, which plays an important role in Tongan culture and in fulfilling familial and traditional responsibility, has changed over time.** In the past, Tongans consumed locally grown and produced products, and strict specifications existed as to the appropriate food types for different traditional events. However, due to globalization and expanding international trade, imported and processed foods have become cheaper and even more affordable than many local products. Some of them have become very popular, e.g. corned beef, salted beef, mutton flaps, turkey tails, sausages and sugar-sweetened beverages (SSB). Hence, food consumption patterns have changed, with Tongans consuming high quantities of imported and processed foods, which contain high amounts of calories, fats, salt, and sugar. Small businesses that sell affordable fast food have also become popular in recent years, resulting in people consuming fewer home-cooked meals.

**While more imported and processed foods are consumed, Tongan society strongly maintains the tradition that associates big meal sizes and plentiful food with greeting each other and embracing social relationships in family and the community.** This has resulted in

a high consumption of unhealthy imported and processed products. A recent study examined household income and expenditure data in five countries in the Pacific—Kiribati, Samoa, Solomon Islands, Tonga, and Vanuatu. The study found that Tongans spent 42 percent of their expenditure on unhealthy food – significantly higher than the other four countries. Tongans were also the highest spenders on processed food, and spent over 50 percent of their expenditure on imported and non-traditional food (see Figure 5).<sup>16</sup>

**Unlike many other PICs, Tonga's food expenditure was primarily on imported and mostly unhealthy cuts of meat, particularly mutton flaps and processed meat.** While other Pacific Islanders spent most on rice, Tongans spent most on mutton, mostly in the form of high-fat mutton flaps (Table 3). Spending on mutton is nearly twice as high as poultry and cooked meat.<sup>17</sup> Mutton flaps, considered high in animal fat, have been identified in the 1992 Nutrition Survey as the most frequently consumed meat; 31 percent of the study population consumed mutton flaps every day, and 27 percent consumed it three or more times a week.<sup>18</sup>

---

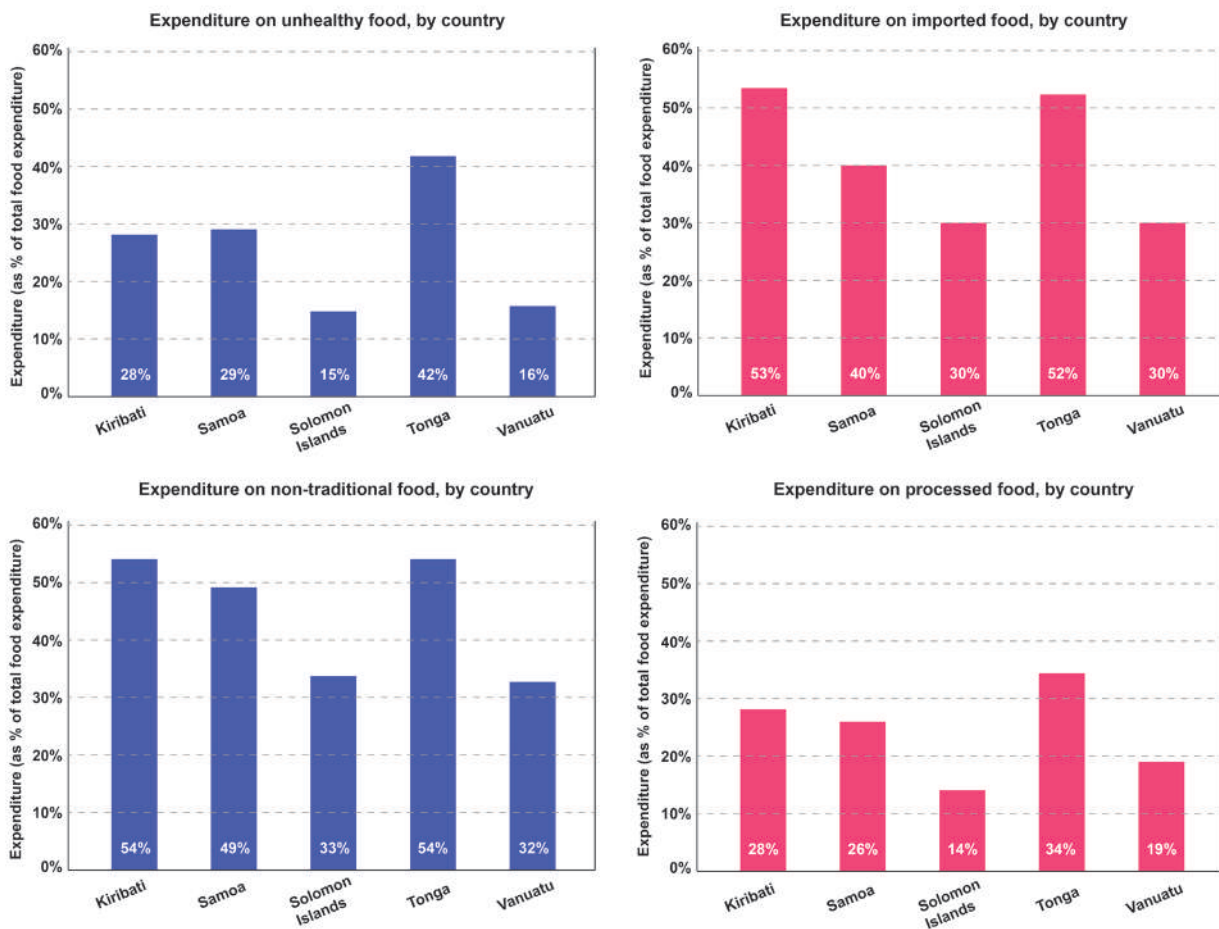
<sup>16</sup> Sahal S. et al, Trade as a structural driver of dietary risk factors for non-communicable diseases in the Pacific: an analysis of household income and expenditure survey data, 2014.

<sup>17</sup> Sahal S. et al, Trade as a structural driver of dietary risk factors for noncommunicable diseases in the Pacific: an analysis of household income and expenditure survey data, 2014.

<sup>18</sup> Hufanga, S., Comparative effectiveness of interventions to control non-communicable diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.



Figure 5: Expenditure on unhealthy food, imported food, processed food, Pacific Island Countries (selected), 2005–2010



Source: Sahal S. et al, Trade as a structural driver of dietary risk factors for noncommunicable diseases in the Pacific: an analysis of household income and expenditure survey data, 2014.

**While Tongans consume large amounts of fatty meat, consumption of fruits and vegetables is significantly below WHO recommendations.** As shown in Table 4, most Tongans do not consume fruits and vegetables on a daily basis. Fruits are consumed three days per week, and vegetables are consumed four days per week. While WHO recommends three servings of vegetables per day,

Tongans in 2012 consumed only two servings of vegetables per day. It is important to note however that there was significant reduction among Tongans who ate fewer than five servings of fruit and/or vegetables on average per day – from 92.2 percent in 2004 to only 73.1 percent in 2012.

**Table 3: Share of food expenditure in selected Pacific Island Countries, 2005–2010**

Country	Top 3 products (% of food expenditure)	Share of food expenditure on item out of total imported foods	Share of food expenditure on item out of total food expenditure	Top 3 products (kcal pcae/day intake)	Share of kcal intake per item out of total imported foods	Share of kcal intake per item out of total kcal intake
Kiribati	Rice	43%	23%	Rice	48%	34%
	Sugar	25%	13%	Sugar	27%	20%
	Flour	6%	3%	Flour	11%	8%
Solomon Islands	Rice	57%	17%	Rice	53%	10%
	Noodle	13%	4%	Flour	13%	3%
	Sugar	7%	2%	Sugar	12%	2%
Vanuatu	Rice	40%	12%	Rice	34%	6%
	Tinned tuna	10%	3%	Sugar	22%	4%
	Bread	7%	2%	Bread	12%	2%
Samoa	Rice	27%	11%	n/a	n/a	n/a
	Margarine	20%	8%	n/a	n/a	n/a
	Bread and Noodles	10%	4%	n/a	n/a	n/a
Tonga	Mutton	19%	10%	n/a	n/a	n/a
	Poultry	12%	6%	n/a	n/a	n/a
	Cooked meat	10%	5%	n/a	n/a	n/a

Source: Sahal S. et al, Trade as a structural driver of dietary risk factors for noncommunicable diseases in the Pacific: an analysis of household income and expenditure survey data, 2014.

**Table 4: Fruit and vegetable consumption in Tonga, 2004, 2012**

Measurements (population ages 25–64 years)	Year	Total	Males	Females
Mean number of days/week fruit consumed	2012	3.4	3.3	3.4
Mean number of servings of fruit consumed on average per day	2012	1.8	2	1.7
Mean number of days per week of vegetables consumed	2012	4.2	3.9	4.4
Mean number of servings of vegetables consumed on average per day	2012	2.1	2	2.2
Percentage who ate fewer than five servings of fruit and/or vegetables on average per day	2012	73.1	72.4	73.7
	2004	92.2	91.4	92.9

Source: 2004 STEPS survey (MOH and WHO, 2012); 2011/2012 STEPS survey (MOH and WPRO, 2013); Hufanga, S., Comparative Effectiveness of Interventions to Control Non-Communicable Diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.

## Physical Inactivity

**Physical activity is commonly defined as a combination of structured activity and exercise, lifestyle activity, and spontaneous physical activity which generally aims to improve fitness, performance, and health, and can provide a means of social interaction.**

It helps to maintain energy balance, reduce the risk of obesity, and improve general well-being.<sup>19</sup> Physical activity is measured by Metabolic Equivalent of Task (MET). MET is the objective measure of the ratio of the rate at which a person expends energy, relative to the mass of that person, while performing some specific physical activity, compared to a reference, set by convention at 3.5 ml of oxygen per kilogram per minute, which is roughly equivalent to the energy expended when sitting quietly (this is equivalent to a caloric consumption of 1 kcal/kg/hour and is defined as one MET). The WHO global recommendation on physical activity for health is to do at

least 150 minutes of moderate-intensity physical activity per week or 75 minutes of vigorous-intensity physical activity, or the equivalent combination of moderate and vigorous-intensity physical activity achieving at least 600 MET minutes per week.<sup>20</sup>

**Compared to the situation in 2004, there has been significant improvement in the level of physical activity in Tonga.** The proportion of adults with low levels of activity (defined as <600 MET minutes per week) decreased from 43.9 percent in 2004 to 23.7 percent in 2012, and the proportion of adults with high levels of activity (defined as ≥3,000 MET minutes per week) increased from 35.5 percent in 2004 to 52.4 percent in 2012. While improvement in physical activity is observed in both male and female adults, it is of note that only 36.3 percent of female adults engaged in high levels of activity, while 85.8 percent of them did not engage in vigorous activity.

Table 5: Physical activity measurements, 2004 and 2012

Measurements (population ages 25–64 years)	Year	Total	Males	Females
Percentage with low levels of activity (defined as <600 MET-minutes per week)	2012	23.7	15.1	31.7
	2004	43.9	33.3	53.7
Percentage with high levels of activity (defined as ≥3,000 MET minutes per week)	2012	52.4	69.7	36.3
	2004	35.5	48.3	23.6
Percentage not engaging in vigorous activity	2012	64.8	42.3	85.8
	2004	75.8	58.1	92.3

Source: 2004 STEPS survey (MOH and WHO, 2012); 2011/2012 STEPS survey (MOH and WPRO, 2013); Hufanga, S., Comparative Effectiveness of Interventions to Control Non-Communicable Diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.

<sup>19</sup> Mumuiheata, S., Nutrient Intake in the Kingdom of Tonga. Nuku'alofa, 2007.

<sup>20</sup> Ministry of Health, Kingdom of Tonga Risk Factors STEPS Report, 2014.

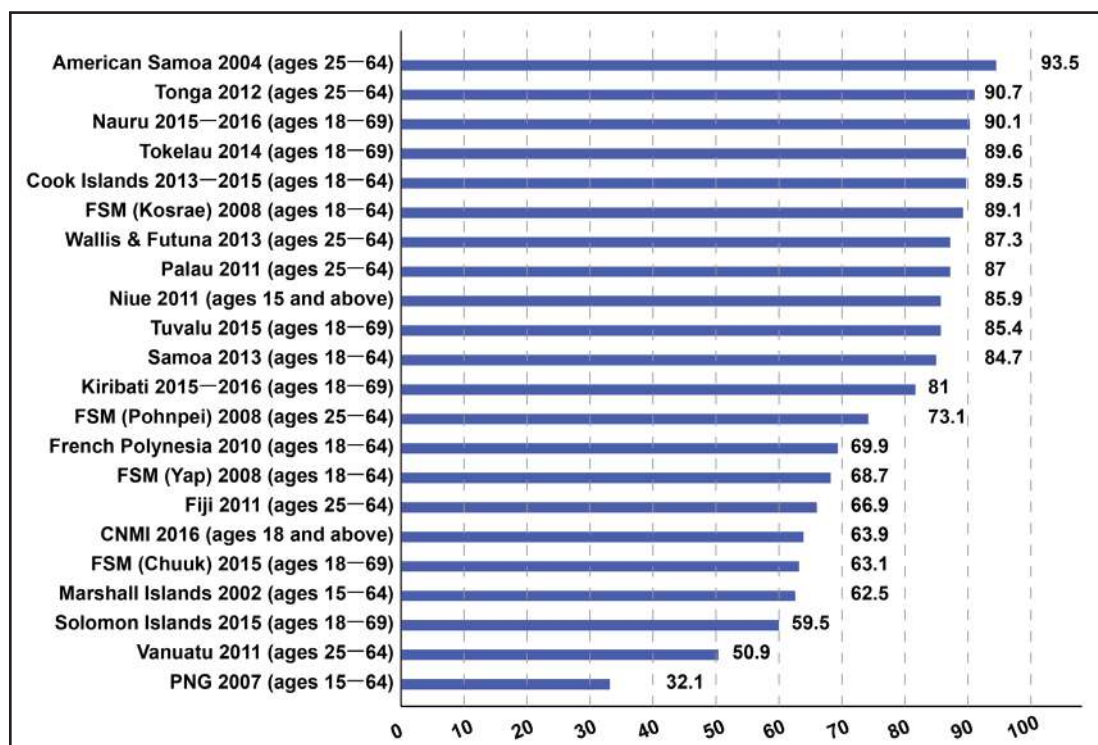
## Harmful alcohol use

There is a strong link between alcohol and NCDs, particularly cancer, cardiovascular disease, liver disease, pancreatitis, and diabetes. The harmful use of alcohol and more specifically heavy episodic drinking is related to many cardiovascular outcomes such as strokes and hypertension.<sup>21</sup> According to Tonga’s STEPS survey 2012, the overall prevalence of adult alcohol consumption (ages 25–64) in the last 30 days was estimated at 9.3 percent with considerable gender difference – 16 percent for male and 2.8 percent for female. Furthermore, current drinkers are more likely to be individuals ages 25–44

(men 19.7 percent; women 3.9 percent) than individuals ages 45–65 years (men: 9.3 percent; women 0.5 percent).

Heavy episodic drinking or binge drinking is still a major concern in Tonga. According to the STEPS survey 2012, 46.9 percent of the population (majority male) would drink more than six standard drinks in any one day. There is also anecdotal evidence of increased crime and road traffic accidents, with 2018 recording the highest number of deaths from road traffic accidents – the majority of which were alcohol related.<sup>22</sup>

Figure 6: Percentage of the population with overweight and obesity (≥25 kg/m<sup>2</sup>) in Pacific Island Countries



Source: WHO, STEPS surveys in respective countries except Wallis (SPC-led survey similar to STEPS) and CNMI (hybrid survey led by PIHOA).

<sup>21</sup> Parry, C. D., Patra, J., & Rehm, J. Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction* (Abingdon, England), 106(10), 1718-24. 2011.

<sup>22</sup> Parry, C. D., Patra, J., & Rehm, J. Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction* (Abingdon, England), 106(10), 1718-24. 2011.

## Obesity

**Obesity is a medical condition in which excess body fat has accumulated to an extent that it may impair health.** People

are generally considered obese when their body mass index (BMI), a measurement obtained by dividing a person's weight by the square of the person's height, is over 30 kg/m<sup>2</sup>; the range 25–30 kg/m<sup>2</sup> is defined as overweight. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended – most commonly due to a combination of excessive food intake and lack of physical activity. Obesity and overweight increase the likelihood of cardiovascular diseases (mainly heart disease and stroke), type 2 diabetes, musculoskeletal disorder, and several types of cancer. Childhood obesity is associated with a higher chance of obesity, premature death and disabilities, musculoskeletal disorder, and several types of cancer.<sup>23</sup>

**Tonga has the second highest prevalence of overweight and obesity (BMI ≥25 kg/m<sup>2</sup>) of all PICs.<sup>24</sup>** Prevalence

of overweight (BMI ≥25 kg/m<sup>2</sup>) is over 90 percent, while the prevalence of obesity (BMI ≥30 kg/m<sup>2</sup>) is 67.6 percent. According to the STEPS survey 2012, 87.3 percent of men and 94 percent of women were classified as either overweight or obese. As shown in Table 6, the prevalence of obesity has risen significantly among women – from an average weight of 73.9 kg in 1973 to 95 kg in 2004. The corresponding increase for males is from 79.1 kg to 95.7 kg over the same period. By 2012, 77.6 percent of women were obese while 57.20 percent of men were obese – a difference of nearly 20 percentage points. Both obesity and overweight are common at younger ages, with about 20 percent of Tongan boys and girls being obese.<sup>25</sup> As there is no significant change in the prevalence of overweight and obesity between STEPS surveys 2004 and 2012, more effective interventions to tackle overweight and obesity are needed.

**Table 6: Body mass index measurements in Tonga, 2012**

Measurements (population ages 25-64 years)	Year	Total	Males	Females
Mean BMI	2012	33.1	31.3	34.8
	2004	33.3	31.7	34.9
Percentage with BMI ≥25 kg/m <sup>2</sup>	2012	90.7	87.3	94.0
	2004	92.1	89.2	94.9
Percentage with obesity (BMI ≥30 kg/m <sup>2</sup> )	2012	67.6	57.2	77.6
	2004	68.7	60.7	76.3

Source: 2004 STEPS survey (MOH and WHO, 2012); 2011/2012 STEPS survey (MOH and WPRO, 2013); Hufanga, S., Comparative Effectiveness of Interventions to Control Non-Communicable Diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.

<sup>23</sup> Obesity and Overweight Key Facts, World Health Organization. 2018.

<sup>24</sup> American Samoa is the PIC with highest prevalence of overweight and obesity at 93.5 percent.

<sup>25</sup> The Kingdom of Tonga Health System Review, Health Systems in Transition, Vol. 5, No. 6, 2015.

## The government's NCD response

**In the past decade Tonga has joined other PICs in recognizing the NCD crisis, its impacts on economic development, and in mobilizing a response to the crisis.** In response to the UN-convened High-level Meeting on the Prevention and Control of NCDs in May 2011, the Pacific Island Forum Leaders meeting declared in September 2011 that the Pacific is currently experiencing an NCD crisis. It was stated that “75 percent of all adult deaths in the Pacific are due to NCDs, the majority of whom are in the economically active age bracket and that many more times this number suffer severe side effects that undermine their capacity to contribute further to economic development”.<sup>26</sup> At the direction of the Forum of Economic Ministers, the NCD Roadmap was prepared to guide PICs in the most effective use of resources to prevent and control NCDs. In 2014, at the inaugural Joint Forum Economic and Pacific Health Ministers Meeting, the ministers committed to five key measures:

- Strengthening tobacco control, including raising the excise duty to 70 percent of the retail price of cigarettes.
- Considering an increase in taxation of alcohol products as a way of reducing harmful alcohol consumption.
- Reducing consumption of food and drinks directly linked to obesity, heart disease and diabetes such as sugar-sweetened beverages (SSBs), salty and fatty food (including through tax measures).

- Improving the efficiency and impact of the health sector for prevention and early treatment.
- Strengthening the evidence case for better investment planning and program effectiveness.

**Tonga became the first PIC to launch a National Strategy for the Prevention and Control of NCDs and set up structures and processes for multisectoral collaboration.** The National NCD Committee (NNCDC) was also set up, chaired by the CEO of the Ministry of Health and comprising ministers from the Ministry of Education, Ministry of Internal Affairs, Ministry of Agriculture, Food, Forests, and Fisheries<sup>27</sup>, and the Ministry of Finance and National Planning. It also includes the Police Commissioner, CEO and Chairman of the Tonga Health Promotion Foundation, and representatives from the National Forum of Church Leaders, from the business sector, and from civil society. The NNCCDC has been supported by four advisory committees for Healthy Eating, Physical Activity, Alcohol, and Tobacco. The National Strategic Plan for NCDs is aligned with the Tonga Strategic Development Framework (TSDF II 2015–2025) which calls for more collaborative efforts across government ministries, civil society organizations and faith-based organizations.

---

<sup>26</sup> Tonga, National Strategy for Prevention and Control on Non-Communicable Diseases 2015-2020, 2016.

<sup>27</sup> This ministry was later separated into Ministry of Agriculture, Forestry, and Food; and Ministry of Fisheries

**The Government of Tonga has gradually introduced taxation measures to influence tobacco consumption in recent years.** For example, in mid-2013, excise tax on imported cigarettes was increased from T\$210 per 1,000 cigarette sticks to T\$250 – and T\$200 to T\$238 for locally manufactured cigarettes. At the same time the tobacco concession for inbound travelers was reduced from 500 cigarettes to 250 cigarettes. From July 2016 Tonga further increased taxes on cigarettes and alcohol, and imposed new excise taxes on a number of unhealthy food and beverage products, including selected fatty foods (in particular meat

products, including mutton flaps), sugar-sweetened food (e.g. ice cream, chocolates), instant noodles, and SSB, with the aim of increasing the price of these products, and in turn reducing consumption.

**The almost 50 percent increase in excise tax on imported cigarettes in July 2016 was particularly significant.** Unlike the small, incremental increases of previous years, the July 2016 hike resulted in the excise tax on imported cigarettes rising from T\$255 to T\$380 per 1,000 cigarette sticks (full details on the tax increase and its effects on the prices of different products are in the Findings section). A snapshot of tobacco control interventions appears as Box 1.

**Box 1: Government of Tonga tobacco control activities: a snapshot**

The Government of Tonga undertakes three main tobacco control activities, and across these activities there is a varying degree of success.

**Taxation policy**

Tonga's national taxation policy, which started in 2013, is among the strongest tobacco tax policies of any Pacific country, and applies excise tax, consumption tax and import duty on many tobacco products. As in other countries, Tonga's cigarette excise tax is the most important for determining the tax incidence and price of tobacco products and is imposed at the import and production level in the form of a specific tax. Consumption tax is imposed at import, production, wholesale and retail levels. Import duty has been applied on imported tobacco products since FY2015–6. The most significant intervention came in July 2016 as the government increased the excise tax on imported cigarettes by nearly 50%.

However, the positive impacts of Tonga's tobacco tax policy have been diluted by the availability of cheaper substitutes. There has been a shift from more expensive brands of cigarettes to cheaper brands, particularly locally manufactured cigarettes that are subject to less tobacco tax. But more importantly, there was a big shift from manufactured cigarettes to the untaxed Tapaka Tonga. Today, most tobacco users in Tonga smoke Tapaka Tonga.

**National tobacco control campaigns**

Tonga's Ministry of Health and the Tonga Health Foundation have to date run a single, two-phase campaign. The first phase was a mass-media campaign in June 2016 entitled 'Cigarettes are Eating Your Baby Alive', and highlighted the harms of second-hand smoking. It targeted the population ages 18–64 years.

A campaign evaluation revealed that there was a significant increase in the proportion of people avoiding places where they would be exposed to second-hand smoke,

in addition to greater awareness of the consequences of second-hand smoking. Nevertheless, smokers were shown to perceive that their right to smoking was a 'human right', of equal importance to the right to public health.

The second phase of the campaign in August 2017 aimed to increase awareness and knowledge of the consequences of cigarette smoking using the strapline 'Eating You Alive', and was linked to the Ministry of Health's Quitline services. The evaluation of this phase of the campaign found that those reached by the campaign felt it:

- Taught me something new (89.7%)
- Is relevant to me (88.7%)
- Encouraged me to discuss quitting with friends and family (87.6%)
- Motivates smokers to quit (85.9%)
- Increase the likelihood of smokers calling the Quitline (83.1%)

The campaign also identified two key factors motivating smokers to quit – factors that increased in importance after the campaign:

- Being healthy for family, from 30.8% (pre-campaign) to 36.6% (post-campaign)
- My own health or fitness, from 20.7% (pre-campaign) to 30.1% (post-campaign)

The evaluation also suggested that any future anti-tobacco campaign must include promoting a call to action by incorporating Quitline service information in all campaign advertisements.

#### **Enforcement and compliance**

Efforts to enforce and encourage compliance with tobacco-control measures such as preventing smoking in public and prohibited places, as well as providing quitline services for those who are willing to give up smoking, are mostly administered and delivered by the Ministry of Health.

Enforcement measures include visits by the Tobacco Control Unit Enforcement Team in order to conduct compliance checks of tobacco outlets and smoke free areas (SFA). The team visits locations such as shops, schools, town and church halls, kava clubs and bars.

One such visit to the community of Vava'u involved the team visiting 54 shops. They found that 16 shops were selling to minors and that none of the shops had signage explaining that sales to minors were illegal; 12 shops were illegally displaying tobacco; and 10 shops lost or misplaced their 'smoking kills' sign.

Most of the halls and kava clubs still allowed people to smoke inside. Clarification on the new Act was provided to owners and members, highlighting the infringement notice and penalty components of the Act. Verbal warnings were given as the outlets had not been fully aware of the Act, and in turn, proprietors gave assurances that they would comply with the Act in the future.



Enforcement activity needs to be strengthened and conducted, and training on the new Act is needed to raise awareness of how to comply on behalf of both employees and owners of shops, kava clubs, bars, and halls. Awareness raising is also needed among the general public.

**Summary report on quitline services provided during each anti-tobacco campaign as from 2016 –2018**

Year	Campaign phases	Number of Callers	Number of people registered with Quitline	Number of people who quit	Number of people still on the program	Number of people lost due to change of phone numbers/migrate
2016	Phase 1	167	171	69	123	48
2017	Phase 2	153	138	46	121	17
2018	Phase 3	207	167	51	143	24
2019	Phase 4*					
Total		527	476	166	387	89

\*Phase 4 will be launched in May 31, 2019 as highlight of the World No Tobacco Day celebration in Tonga

**Tonga has implemented a number of multi-sectoral interventions to address NCDs, and its tax interventions in particular have been recognized by WHO.** As well as becoming one of the first countries in the Pacific to introduce taxes on tobacco, alcohol, and unhealthy food and beverages, Tonga also abolished tax on imported fruit and vegetables in 2016, with the aim of increasing their consumption. The government has also strengthened the implementation of the WHO Framework Convention on Tobacco Control, launching mass media tobacco campaigns and cessation services in recent years, and joining forces with the church and communities to expand community-based physical activity initiatives. The Ministry of Fisheries has introduced a new policy that requires foreign fishing vessels to offload a certain amount of fish for sale through the government, to increase community access to fish as part of their diet. With assistance from Tonga Health among other

development partners, the Ministry of Fisheries also has focused on the special management area program (SMA) which aims to improve the health of reefs, marine and sea organisms, and ultimately result in the provision of healthier sources of food.

**In addition to its taxation measures, the Government of Tonga has also strengthened NCD-focused primary health care services.** Through the Ministry of Health it has introduced NCD nurses to provide complementary NCD services in rural health services, including health promotion activities, screening and follow-up, and care of NCD cases. The government has achieved WHO recognition for the work done in relation to tobacco taxation, and for interventions to increase women's and girls' physical activity through World No Tobacco Day awards in 2014 and the Kau Mai Tonga netball project which won a healthy island recognition award in 2013.

**The Government of Tonga is committed to strengthening monitoring and evaluation activities for its NCD response.** This study forms part of the government's efforts to understand the progress, impacts, challenges, and lessons learned from its tax policy implementation. However, as these policies have been implemented alongside other health promotion activities and campaigns described above, it is not possible to accurately attribute the impacts to solely one policy or activity.

### **Making the most of 'sin taxes'**

**Taxes have long been used to serve society, encouraging behaviors that the government favors with tax incentives and credits, while discouraging behaviors it considers undesirable with increased or additional taxes.** 'Sin taxes' are designed to discourage harmful behaviors and generate revenues. Traditionally, sin taxes were designed to control or curb vices perceived as undesirable, such as tobacco and alcohol use, and gambling. As our economies evolve, so too have these perceived vices, and governments (states and localities) have begun to specifically tax 'sin' items such as tobacco, sugary beverages, plastic bags and other potentially harmful products.

**In most countries sin taxes on traditional items such as tobacco, alcohol, and sugary beverages help reduce consumption.** However, attempts to tax unhealthy food products have not been as comprehensive as tobacco and alcohol taxes, as their design and application are usually more complex, given the many potential substitutes available.

**Tonga's unique dietary situation (where imported products account for a large part of the foodstuffs available) and pressing health conditions have pushed the government to be ambitious in taxing unhealthy food products, and it now has one of the most extensive lists of taxed food items in the world.** For this reason the monitoring and evaluation of Tonga's excise tax policy on unhealthy food products is of huge value to the scientific community, as it will generate important evidence on the effectiveness of taxes from which other countries can learn.



# Methodology



**This study employed a variety of assessment tools and data sources to obtain feedback from various stakeholders involved in Tonga’s tax policy implementation.** These included

(i) government administrative data, including import volumes, revenues, and the consumer price index; (ii) baseline and endline household surveys, focusing on the impact of NCD tax on consumption behaviors; (iii) retail surveys focusing on the impact of NCD tax on prices; (iv) tobacco taxation simulation modeling (TaXSiM); (v) a qualitative study, which includes focus group discussions and in-depth interviews. As required by the Ministry of Health, the World Bank team submitted the research proposal with a methodology and implementation plan to Tonga’s National Health Ethics and Research Committee (NHERC) for review. The research proposal was approved by NHERC in mid-2017, allowing the quantitative surveys to take place in 2017–2018 and the qualitative study to be carried out in 2018.

### **Household surveys**

**Baseline and endline household surveys were conducted to assess the pre-tax/post-tax consumption behaviors and to have preliminary understanding of potential substitutes.**

The baseline household survey was conducted in May 2017 to understand the consumption behaviors of consumers before the July 2016 taxation policy intervention (asking consumers to recall) and before the July 2017 taxation policy intervention (present behaviors). The questionnaires were carried out in the Tongan language. Consent forms/verbal

consent was acquired before the interviews, and interviewees could withdraw at any stage. The endline survey was conducted in November and December 2017. With the assistance of the Department of Statistics, the sample surveyed was distributed to ensure it was representative of households on the main islands of Tongatapu and Vava’u, which make up over 85 percent of Tonga’s population.

### **Sampling design**

**An initial sample of 1,400 individuals (respondents) ages 18–65 was chosen as household representatives to undertake the Tonga NCD Taxation Household Baseline Survey 2017.** Table 7 provides information of total sample size and island-wise distribution.<sup>28</sup>

Table 7: Total sample size of baseline data

Island division	Number of households	Required sample
Tongatapu	12,953	1,000
Vava'u	2,715	400
Total	15,668	1,400

Source: Baseline survey data (2017)

**The sampling in each area was then undertaken using a two-stage randomized sampling process.** The first stage involved the random selection of the required sample from each village using Probability Proportional to Size (PPS) sampling, with number of households as the size. For the second stage, a list of all households in every village included in the frame was taken from the Tonga National Population and Housing Census, 2016. ‘Head of households’ lists for all villages

<sup>28</sup> The sample was selected independently within each of the two target areas. Firstly, extremely remote areas were removed from the frame (and thus not offered for selection) as it was considered too costly to cover these areas. These areas only represented about 2.5 percent of Tonga’s total population, so the impact of their removal was minimal.

were sorted alphabetically and then a systematic sampling was used to draw out each required sample from each village with household names, including the names of household members who were currently smoking. This gave every household equal chance of getting selected.

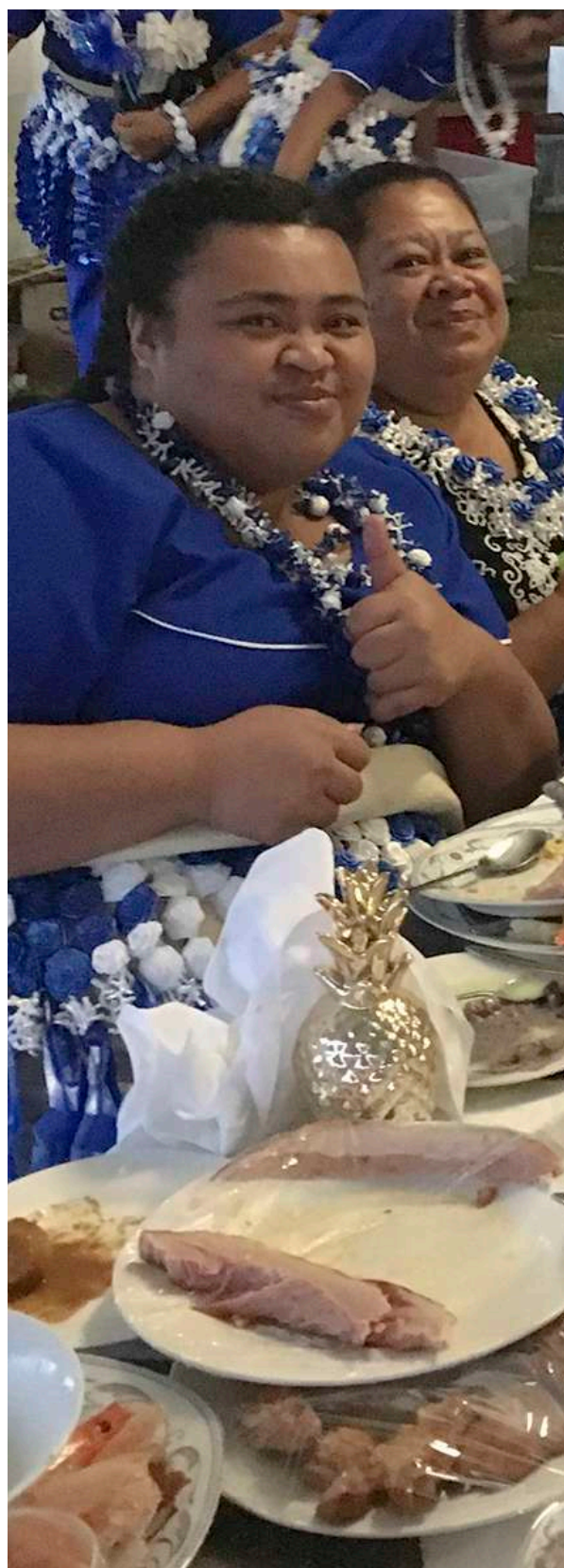
**GPS coordinates and maps were provided to help enumerators locate the households.** Enumerators interviewed the head of household or his/her representative. If that person did not smoke, then the name of the person who smokes given on the list would be called to answer the tobacco-related questions. The same process was applied to questions related to alcohol consumption.

**The above methodology was also used in the collection of endline data.** The sample for the endline survey 2017 was drawn from the Household List of the most recent Population and Housing Census, 2016. The sample was designed to cover 9 percent of all households in Tonga excluding the Ongo Niua island and some small islands due high transport cost. The total sample included 1,600 households – Table 8 shows the distribution between islands.<sup>29</sup>

Table 8: Total sample size of endline data

Island/ division	Number of households	Required sample
Tongatapu	12,944	1,000
Vava'u	2,503	400
Ha'apai	1,179	114
'Eua	885	86
<b>Total</b>	<b>17,511</b>	<b>1,600</b>

Source: Baseline survey data (2017)



<sup>29</sup> As the Department of Statistics is interested in understanding the consumption behaviors in the other two island groups, Ha'apai and 'Eua were added to the survey, as there are possibilities that the government may conduct follow-up surveys in these islands in the future.

### **Household characteristics of baseline data**

**The original dataset contains 1,402 household observations.** After dropping observations with missing values, there are 1,395 household observations to be used for subsequent analysis. There are 996 household observations from Tongatapu; the remaining 399 household observations are from Vava'u. Around 65 percent of the respondents are male, and the average age of respondents is 39.5. Their average monthly earnings total T\$996.60. The average monthly earning for a male is T\$1,005, slightly more than Tongan females who earn approximately T\$980 per month. Household sizes of both sexes are slightly above six members per household. However, there is a great variation in number of household members, ranging from 1 to 24. When examining marital status, 70.18 percent of respondents are married and 23.58 percent are never married. The proportion of never-married males is 6 percent higher than females. Island-wise descriptive statistics are shown in Table 20, Annex 1, and Table 9 provides descriptive statistics on respondents' socio-economic background.

### **Household characteristics of endline data**

**The original dataset contained 1,604 household observations.** After omitting observations (or data points) with missing values, 1,573 households were included for data analysis. It was possible that more than one member in a household was interviewed if various household members smoked or used alcohol. Thus, the actual number of persons interviewed was more than number of household observations. There are 1,475 individual observations from Tongatapu; there are 609 individual observations from Vava'u; 131 individual observations are from Ha'apai; and the remaining 86 individual observations are from 'Eua. Table 9 provides descriptive statistics on respondents' socio-economic background. Around 59 percent of respondents are male, and the average age of respondents is 43 years. Their average monthly earning is T\$1,285. The average monthly income for men is T\$1,321, which is slightly higher than the monthly income from women (approximately T\$1,233 per month). Average household size is slightly above six members per household. Island-wise descriptive statistics are shown in Table 22, Annex 2, and Table 9 provides descriptive statistics on respondents' socio-economic background. Approximately 80 percent of households in the baseline survey participated in the endline survey.<sup>30</sup>

---

<sup>30</sup> The data were not originally designed to be longitudinal given the logistics limitation. However, the team matched the households in the baseline and endline surveys and found that approximately 80 percent of the households in the baseline survey participated in the endline survey. This is considered pseudo-panel data. The team matched the households from both surveys using a three-step matching process: Step 1: matching observations by village names; Step 2: matched again by gender in the same villages; Step 3: for the same gender of the same village, we matched the data by the corresponding Wealth Index at two digit level.

Table 9: Descriptive statistics of baseline and endline data

Variable	Baseline			Endline		
	Male	Female	Overall	Male	Female	Overall
Gender	65.73%	34.27%	100.00%	58.89%	41.11%	100.00%
Age	39.73	38.85	39.43	43.11	42.12	42.70
Earning	1,005.32	979.88	996.60	1,321.12	1,233.04	1,285.11
Number of household members	6.14	6.69	6.33	6.0	6.4	6.19
<b>Education</b>						
No formal schooling	0.11%	0.00%	0.07%	1.47%	0.27%	0.98%
Primary school	2.18%	2.30%	2.22%	0.74%	0.53%	0.65%
Lower secondary	26.28%	15.69%	22.65%	23.66%	24.20%	23.88%
Upper secondary	54.53%	65.90%	58.42%	59.02%	61.97%	60.23%
Technical and vocational	11.12%	9.00%	10.39%	9.67%	7.71%	8.87%
Tertiary	5.23%	6.49%	5.66%	5.43%	5.32%	5.39%
Other	0.55%	0.63%	0.57%	-	-	-
<b>Marital status</b>						
Never married	25.63%	19.67%	23.58%	13.81%	12.50%	13.28%
Currently married	69.57%	71.34%	70.18%	82.32%	76.33%	79.87%
De facto or consensual marriage	0.44%	0.42%	0.43%	0.18%	0.67%	0.38%
Separated	0.98%	1.46%	1.15%	0.74%	1.46%	1.03%
Divorced	0.44%	1.88%	0.93%	0.74%	1.99%	1.25%
Widowed	2.94%	5.02%	3.66%	2.21%	7.05%	4.19%
Other	0.00%	0.21%	0.07%	-	-	-
<b>Occupation</b>						
Employer	3.16%	0.42%	2.22%	2.30%	1.20%	1.85%
Self-employed	13.96%	15.69%	14.55%	9.94%	13.56%	11.43%
Employee, working for wages (type 1)	9.60%	5.02%	8.03%	14.27%	6.38%	11.04%
Employee, working for wages (type 2)	24.65%	9.62%	19.50%	28.08%	10.20%	20.78%
Producing goods for own and/ or family	23.23%	3.77%	16.56%	25.69%	12.63%	20.30%
Unpaid family worker (family business)	5.56%	0.63%	3.87%	6.80%	6.50%	6.69%
Unpaid family worker (help with basic household activities)	1.74%	12.76%	5.52%	0.55%	2.66%	1.41%
Volunteer work	0.98%	0.00%	0.65%	1.01%	0.13%	0.65%
Student — full time	2.18%	1.88%	2.08%	0.46%	0.27%	0.38%
Student — part time	0.44%	0.63%	0.50%	0.74%	0.13%	0.49%
Home duties	12.43%	49.16%	25.02%	9.58%	46.01%	24.48%
Retired	1.53%	0.21%	1.08%	0.46%	0.27%	0.38%
None — did not pursue any activity	0.44%	0.21%	0.36%	-	-	-
Physically/mentally disabled	0.11%	0.00%	0.07%	0.09%	0.00%	0.05%
Total number of observations	917	478	1,395	1,355	946	2,301

Source: Baseline and endline survey data (2017).

**It is important to note that analysis is mainly carried out at household level.**

Hence, data representativeness should be examined at the household level. To assess the representativeness of the data, the team assessed two issues. The first relates to distribution of households among the four islands. The second relates to gender distributions. By and large, technical examination has revealed that the household endline data structure resembles that of the Household Income and Expenditure Survey 2016 of Tonga. This provides the team with a certain level of comfort in using the data for analysis. Detailed analysis of this issue appears as Annex 3.

### **Data analysis**

**Data were analyzed using descriptive statistics such as means, median, standard deviation, minimum and maximum value.** Analyses are done at both aggregate level, island-wise and by socio-economic background. To provide analysis beyond the mean of the data, differences in socio-economic background have also been analyzed by applying the method from Ebert and Welsh (2004) and OECD (2008). It begins with selecting a set of socio-economic variables that would capture key characteristics of a household. We use types of wall materials, source of lighting, types of fuel used for cooking, types of toilet facilities, car ownership, presence of a refrigerator, washing machine, desktop or laptop computer, and earnings and education of head of household as a set of information to capture households' socio-economic status. These variables are then analyzed by Principle Component Analysis (PCA) to obtain a statistical model. The model will contain information of relative importance of these variables in representing a household's socio-economic status. This model is used to predict a socio-economic score for each household.

**The next step is to calculate the socio-economic index (SI) for each household. This is done by the formula shown below.**

In this formula,  $hs_i$  is the socio-economic score for each of the households obtained from the PCA exercise above.  $\text{Min}(hs_i)$  and  $\text{Max}(hs_i)$  represent minimum and maximum socio-economic scores respectively. The value of SI will be between 0 to 1; a higher SI score denotes higher socio-economic status of the household. These values are then divided into quintiles for further data analysis. Further details of the method can be found in Annex 4.

$$SI_i = \frac{hs_i - \text{Min}(hs_i)}{\text{Max}(hs_i) - \text{Min}(hs_i)}$$

### **Retail surveys**

**The purpose of the retail surveys is to understand the prices of selected products affected by the increase in excise tax/import duty, as well as the products affected by the exemption of consumption tax.** Baseline surveys were conducted in May 2017 to understand the price of products before the July 2016 taxation policy intervention (asking the retailers to recall) and before the 2017 taxation policy intervention (actual price at that time). The implementation of the endline survey was delayed by Cyclone Gita. It was implemented in Vava'u in March 2018, and in Tongatapu in June 2018. The surveys were conducted in 35 shops in Tongatapu and 12 shops in Vava'u. The information from the retail surveys helped fill in the data gaps in the consumer price index, which covered only limited products and brands.

### **Qualitative study**

**A qualitative approach was used to ascertain more in-depth perspectives and opinions.** A qualitative study tool



including focus group discussions and key informant interviews was developed by the study team. It was then peer reviewed by local and international experts to support the assessment, as well as to triangulate and provide complementary evidence for the quantitative study.

**Semi-structured questionnaires were developed based on findings from the baseline household survey, the results of which were presented to stakeholders in a workshop in September 2017.** The study tools included key informant interviews with policymakers and focus group discussions with communities. The detailed qualitative tools and methodology were approved by Tonga NHERC.

### Focus group discussions

#### Focus group discussions (FGDs)

**were organized to elicit feedback from households and communities with different characteristics, taking into account gender, urban or rural, as well as socio-economic status.** Given the sensitivity in categorizing community members into poor and wealthy groups, the research team used well-off and less well-off categories based on the following four criteria: (i) sustainable weekly/monthly income from paid job (government/non-government); (ii) sustainable income from farming and/or handicrafts; (iii) sustainable income from fishing; (iv) sustainable income (remittance) from families and friends overseas. Participants were categorized as well-off if they matched at least two of the above four criteria, and were considered as participants with sufficient financial resources to meet basic needs in their community. Table 10 lists the FGD categories.

Table 10: Focus group discussion categories

Pre-test focus group					
No.	Place	Category	Socio-economic status	Sex	No. Attended
1	Pre-test (food consumption)	Food	Not well-off	Male	4
2	Pre-test (tobacco)	Tobacco	Not well-off	Female	4
Total					8
Focus group discussion					
No.	Vava'u	Category	Socio-economic status	Sex	No. Attended
1	Neiafu (Urban)	Food	Well-off	Male	5
2	Neiafu (Urban)	Food	Not well-off	Female	6
3	Neiafu (Urban)	Food	Not well-off	Male	8
4	Neiafu (Urban)	Food	Well-off	Female	9
5	Neiafu (Urban)	Tobacco/Alcohol	Combined due to limited numbers	Female	7
6	Neiafu (Urban)	Tobacco/Alcohol	Combined due to limited numbers	Male	5
7	Tu'anekeviale (Rural)	Food	Well-off	Female	9
8	Tu'anekeviale (Rural)	Food	Not well-off	Female	2
9	Tu'anekeviale (Rural)	Tobacco	Combined due to limited numbers	Female	5
10	Tu'anekeviale (Rural)	Tobacco	Not well-off	Male	7
11	Tu'anekeviale (Rural)	Tobacco	Well-off	Male	6
12	Ofu (Rural – outer island)	Food/Tobacco/Alcohol	Combined due to limited numbers	Female	9
13	Ofu (Rural – outer island)	Food/Tobacco/Alcohol	Combined due to limited numbers	Male	13
Total					91

Table 10: Focus Group Discussions

Focus group discussion categories (continued)					
No.	Tongatapu	Category	Socio-economic status	Sex	No. Attended
1	Houmakelikao (Urban)	Alcohol	Well-off	Male	6
2	Houmakelikao (Urban)	Alcohol	Not well-off	Female	4
3	Ma'ufanga (Urban)	Alcohol	Well-off	Female	4
4	Houmakelikao (Urban)	Food	Not well-off	Combined (Youth)	16
5	Fasi (Urban)	Alcohol	Not well-off	Male	7
6	Ma'ufanga (Urban)	Food	Well-off	Male	11
7	Ma'ufanga (Urban)	Food	Well-off	Female	6
8	Houmakelikao (Urban)	Food	Not well-off	Female (2 males)	10
9	Ha'asini (Rural)	Tobacco	Well-off	Female	6
10	Ha'asini (Rural)	Food	Well-off	Male	5
11	Ha'asini (Rural)	Food	Well-off	Female	5
12	Ha'asini (Rural)	Food	Not well-off	Male	8
13	Ha'asini (Rural)	Food	Not well-off	Female (2 males)	10
14	Ha'asini (Rural)	Tobacco	Well-off	Male	6
15	Ma'ufanga (Urban)	Tobacco	Not well-off	Male	7
16	Ma'ufanga (Urban)	Tobacco	Well-off	Male	6
17	Ma'ufanga (Urban)	Tobacco	Not well-off	Female	5
18	Ma'ufanga (Urban)	Tobacco	Well-off	Female	5
19	Ha'asini (Rural)	Alcohol	All	Male	12
20	Ha'asini (Rural)	Alcohol	All	Female	10
Total					149

### Training of fieldwork staff and pre-test of the qualitative materials

**A team of four research assistants was recruited to support implementation in the field, working with two Tonga-based senior consultants under overall guidance and supervision of the World Bank's Task Team Leader.** Fieldwork staff received general qualitative training and specific sessions on the qualitative study questionnaire. At the end of their training, a pre-test session was carried out in two groups (tobacco and food consumption) on February 27, 2018.

### Implementation plan and variation

**The original plan was to conduct the fieldwork straight after the pre-testing of questionnaires in the last week of**

**February 2018, for a period of three weeks at Tongatapu followed immediately by two weeks at Vava'u.** Fieldwork design was formulated in consultation with the Government Statistics Department as well as the Ministry of Internal Affairs. It was decided that Ma'ufanga village would represent the urban residences and Ha'ssini would represent the rural village of Tongatapu. It was also decided that Neiafu would represent urban households in Vava'u, Tu'anekeviale rural areas, and then the Island of Ofu would represent the smaller inhabited islands of Vava'u.

**However, a Category 4 tropical cyclone hit Tongatapu on February 12, 2018, causing severe damage and affecting the implementation of the qualitative study.** The damage was so great that the implementation plan had to be altered. This avoided bias in the focus group



discussion as a result of this tragic event, as well as observing the government's and the World Bank's recommendations to allow key government officials and communities to focus on recovery efforts following the cyclone. The implementation started in March in two villages and on the island of Vava'u, which were not directly affected. Following government advice, implementation of the qualitative study in Tongatapu started in late June 2018 and concluded in August 2018 for both focus group discussions and key informant interviews.

## Participants

**The research team worked closely with staff of the Local Government Division of the Ministry of Internal Affairs to identify and recruit participants for the focus group discussions.** An introductory session on the background of the overall impact study (and in particular the logistics

requirements to support the qualitative study in their respective communities) was provided by the research team for Ministry of Internal Affairs' administrative staff, and district and town officers.

**A total of 248 participants attended focus group discussions with 13 groups in Vava'u and 22 focus group discussions in Tongatapu, including two pre-test groups.** Of the participants, 46 percent were male, 48 percent were female, and 6 percent were youth under the age of 25 years. Audio recordings of the focus group discussions were then translated and transcribed, and shared with the research team for analysis.

## Key Informant Interviews

**As part of the qualitative study, key informant interviews were conducted with policymakers in relevant government agencies as well as NGO stakeholders, church leaders, community representatives, and private sector representatives.** The aim was to gain an in-depth understanding of the roles of different agencies and leaders in the design and implementation of the NCD tax policy. Interviews also aimed to solicit their feedback on the impacts, challenges, and lessons learned from the implementation of NCD tax policy. A semi-structured questionnaire was designed to support the key informant interviews and was approved by NHERC. The implementation of the key informant interviews was also affected by Cyclone Gita. Key informant interviews were planned to be conducted during the same period as the focus group discussions. However, following advice of the government, implementation of the key informant interviews was postponed to July and August 2018 in order not to disrupt the post-Cyclone Gita recovery efforts. The list of key informants interviewed is in Annex 5.

## **Tobacco taxation simulation modeling (TaXSiM)**

**The Tobacco Tax Simulation (TaXSiM) model is an innovative tool that can be used to describe the current market and tax situation for cigarettes in a particular country or tax jurisdiction, and to forecast the impact of tax changes on final consumer prices, cigarette consumption and government tax revenues.** A particular strength of the model is that it examines outcomes on a brand-wise basis, which highlights how different tax policies can affect different segments of the tobacco market. The TaXSiM Tonga model selects main cigarette brands which accounts for about 90 percent of Tonga's cigarette market. The selected brands include main imported cigarette brands (Pall Mall, Winfield, Long Beach) and locally produced cigarette brands (Palataisi, Halo). The TaXSiM Tonga model uses the market share of each brand to calculate the weighted average price, and to weight average tax incidence, etc.

**Data populated into TaXSiM included volumes of locally produced and imported cigarettes, tax revenue including import duty, excise tax, consumption tax, CIF and retail price – all sourced from internal data provided by the Ministry of Customs and Revenue.** Retail prices for FY2016–7 and FY2017–8 were sourced from retail surveys conducted under this study. Retail prices of previous years were sourced from local tobacco agents and consumer price index records provided by Tonga's Department of Statistics. It should be noted that the analysis results may not be robust for the years for which officially recorded retail prices are not available.

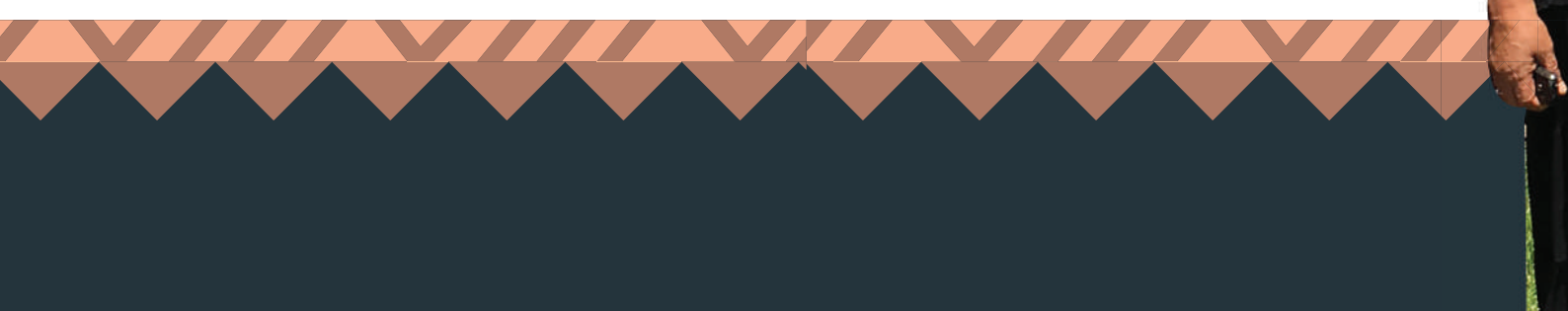
## **Key limitations**

### **Recall bias**

**The World Bank team acknowledged the limitation resulting from the recall bias that affected the baseline household survey.** The team received the request from the Government of Tonga at the end of 2016 to assess the impacts of the NCD tax policy introduced in July 2016. The recall bias affected all the products subject to the excise tax increase in July 2016. However, it does not affect assessment of alcohol consumption behaviors, as the excise tax on alcohol was increased in July 2017, and not July 2016.

**The team undertook several measures to minimize recall bias.** First, the team conducted an extensive literature survey related to addictive consumption. It was found that recall bias could significantly affect accuracy of consumers who consume the products sporadically. For those with high consumption intensity, however, the bias is small (McLaughlin et al., 1987; Krall et al., 1989; Giovannuci et al., 1993; Gmel and Daeppen, 2007). Based on the value reported in Figure 18, around 80 percent to 90 percent of smokers smoked daily, so any recall bias should not significantly influence results.

**For alcohol and other consumer products, we followed the approach adopted by Patrick et al. (1994), Fendrich et al. (2005), Weitkunat et al. (2013) which uses a range-based response for interviewees rather than asking them to provide an exact quantity.** This helped to increase the accuracy of the results.



**When possible, we compared and triangulated household survey data with Household Income and Expenditure Survey data, imported data (administrative data), retail survey data, and results from focus group discussions.** The results from this revealed a high degree of consistency across different datasets, providing a satisfactory level of comfort in the survey results.

### **Measuring FGD members' socio-economic status**

**The research team applied a unique means of measuring FGD members' socio-economic status in Tonga – a method the team strongly believes is rigorous and takes into account the constraints and observing country-specific sensitivities.** The team consulted the Department of Statistics in identifying poor/near-poor participants (the bottom 40 percent) and non-poor participants (the remaining 60 percent) for the qualitative study for the baseline and endline household surveys. However, the team was informed that identifying poor/near

poor households from household surveys for a qualitative study is a sensitive issue in Tonga. The team later found a solution by working with staff of the Local Government Division of the Ministry of Internal Affairs, particularly district and town officers, in identifying and recruiting well-off and not so well-off participants for focus group discussions. The team explicitly avoided the use of the terms “poor” and “near-poor”. Participants were categorized as well-off if they complied with at least two of the four criteria, namely sustainable weekly/monthly income from a paid job (government or non-government), sustainable income from farming and/or handicrafts, sustainable income from fishing, and sustainable income (remittances) from families and friends residing overseas. The participants in non well-off groups were mainly unemployed.



# Findings



## Tobacco

### Tonga's tobacco tax structure

Tonga has some of the strongest tobacco tax policies of any Pacific country, and applies excise tax, consumption tax and import duty on cigarette products. As in other countries, Tonga's cigarette excise tax is the most important part of the tax incidence and price of cigarette products and is imposed at the import and production level in the form of a specific tax. Consumption tax is imposed at import, production, wholesale and retail levels. Import duty has been applied on imported tobacco products since FY2015–6.

Tonga has significantly increased its excise tax on cigarettes in the past few years. Excise tax on imported cigarettes rose by 49 percent in FY2016–7 and by an additional 18 percent in FY2017–8. Excise tax on locally manufactured cigarettes increased by 16 percent in FY2016–7 and by 25 percent in FY2017–8.

### Price elasticity

There is lower sensitivity of cigarette demand to the variation of cigarette prices, with a 10 percent increase in cigarette prices leading to a 1.1 percent decrease in cigarette consumption. To estimate price elasticity of demand for cigarettes in Tonga 2011–17 we derived the price elasticity of demand by the following equation:

$$\ln(\text{Consumption}_t) = \alpha + \beta \ln(\text{Price}_t) + \varepsilon_t$$

where consumption represents the cigarette consumption in fiscal year t, price represents the weighted average price of cigarettes in fiscal year t.  $\beta$  is the price elasticity of demand of cigarette during FY2011–2 and FY2016–7. Using Stata MP (14.0) software, we estimated that  $\beta = -0.11$  (95 percent confidence interval -1.53 to 1.32), which indicates a 10 percent increase in cigarette prices, will lead to a 1.1 percent decrease in cigarette consumption – a rather lower sensitivity of cigarette demand to the variation of cigarette price.

Table 11: Tonga's tobacco tax structure

Year	Excise tax		Consumption tax		Customs duty
	Imported	Locally produced	Imported	Locally produced	Imported
Jul.2009-Jun.2010	T\$150/1,000 stick	T\$150/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2010-Jun.2011	T\$200/1,000 stick	T\$200/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2011-Jun.2012	T\$200/1,000 stick	T\$200/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2012-Jun.2013	T\$210/1,000 stick	T\$200/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2013-Jun.2014	T\$250/1,000 stick	T\$238/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2014-Jun.2015	T\$250/1,000 stick	T\$238/1,000 stick	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2015-Jun.2016	T\$255/1,000 stick	T\$240/1,000 stick	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2016-Jun.2017	T\$380/1,000 stick	T\$280/1,000 stick	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2017-Jun.2018	T\$450/1,000 stick	T\$350/1,000 stick	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%

Source: Compiled by authors based on tax legislation and confirmed by officers of Ministry of Revenue & Customs

The large increase in excise tax on imported cigarettes in July 2016 resulted in a 30 percent increase in price of the most popular imported cigarette brand in Tonga. The total tax per unit for all cigarettes (local and imported) rose from T\$292 per 1,000 sticks in FY2014–5 to T\$486.63 per 1,000 sticks in FY2017–8.

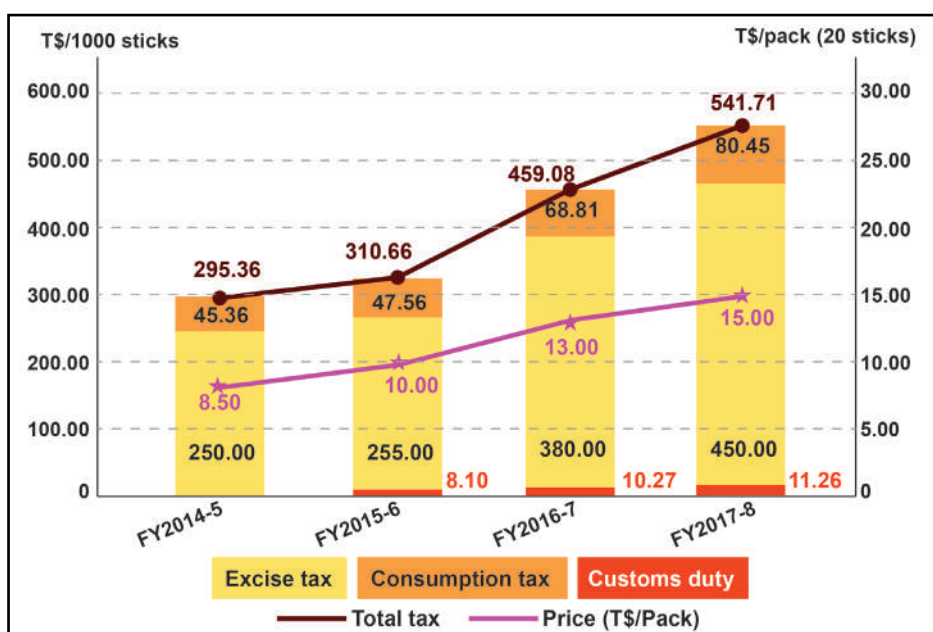
For imported cigarettes, a customs duty of 15 percent was introduced in FY2015–6, and excise tax rose from T\$250 per 1,000 sticks in FY2014–5 to T\$450 per 1,000 sticks in FY2017–8, resulting in an increase in total tax from T\$295.36 per 1,000 sticks to T\$541.71 per 1,000 sticks. The retail price of the most popular imported cigarette brand, Pall Mall, sourced from the retail survey in Tonga and from local tobacco agents, increased from T\$10 per pack (20 sticks) in FY2015–6 to T\$13 per pack in FY2016–7. With additional tax increases, the price rose further to T\$15 per pack (20 sticks) in FY2017–8 (see Figure 7).

Tonga leads the way among Pacific countries in adhering to WHO’s

recommendation for the excise tax to represent at least 70 percent of the retail price of tobacco products. According to the World Bank team’s analysis of the latest data, the significant tax rise in July 2016 raised the proportion of taxes as a percentage of price of the most sold brand of cigarettes to 85 percent, fully compliant with WHO’s recommendation.

Prices of locally produced cigarettes have also risen, though not as much because of lower excise tax increases applied to them. For locally produced cigarettes, excise tax rose from T\$238 per 1,000 sticks in FY2014–5 to T\$350 per 1,000 sticks in FY2017–8, resulting in an increase in total tax from T\$273.7 per 1,000 sticks in FY2014–5 to T\$402.5 per 1,000 sticks in FY2017–8. The retail price of the most popular locally manufactured brand, Palataisi, sourced from the retail survey and from the local tobacco agents, increased from T\$7.5 per pack (20 sticks) in FY2014–5 to T\$10 per pack in FY2016-7, and further increased to T\$12 per pack in FY2017–8 (see Figure 8).

Figure 7: Tax per unit and retail price of imported cigarettes, T\$



Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; retail price of FY2014-2015 to FY2016-2017 collected from local tobacco agents; retail price FY2017-2018 reproduced from the retail survey in Tonga.



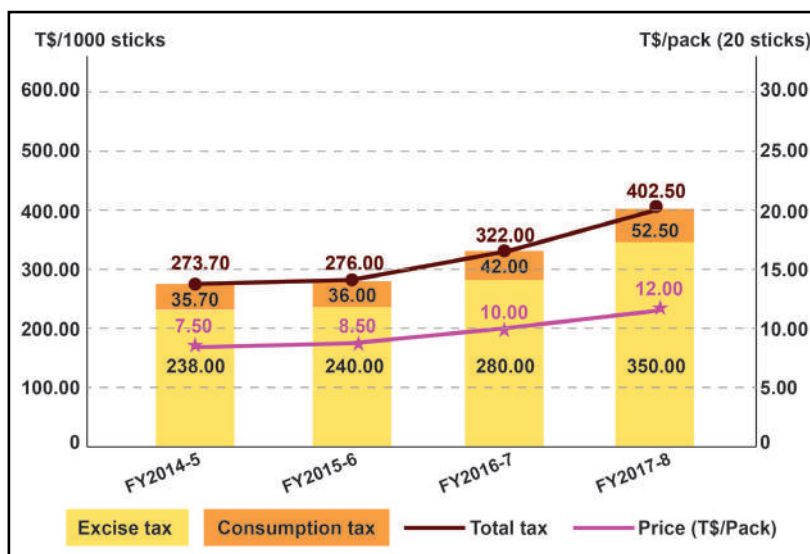
**Table 12: Price and total tax of a pack of 20 cigarettes (most sold brand) as percentage of retail price, Tonga (compared with selected Pacific countries), 2016**

Countries	Price of a pack of 20 cigarettes	Taxes as % of price of the most sold brand					
	International dollars (at purchasing power parity)	Specific Excise	Ad Valorem	Value added tax /sales tax	Import duties	Other taxes	Total tax
Australia	14.86	51.17%	0%	9.09%	0%	0%	60.27%
Cook Islands	-	63.59%	0%	10.43%	0%	0%	74.02%
Fiji	10.31	30.25%	0%	8.26%	0%	0%	38.51%
Kiribati	5.69	35.00%	0%	7.03%	0%	0%	42.03%
Marshall Islands	2.39	0%	0%	3.85%	40.00%	10.21%	54.06%
Micronesia (Federated States of)	2.41	0%	0%	20.00%	40.00%	0%	60.00%
Nauru	11.82	0%	0%	0%	50.51%	0%	50.51%
New Zealand	14.69	61.90%	0%	3.85%	13.04%	0%	74.94%
Niue	-	0%	0%	10.75%	58.10%	15.38%	84.23%
Palau	6.28	74.07%	0%	0%	0%	0%	74.07%
Papua New Guinea	9.81	27.78%	0%	9.09%	0%	0%	36.87%
Samoa	5.96	38.54%	0%	13.04%	0%	0%	51.58%
Solomon Islands	3.94	19.80%	0%	9.09%	0%	0%	28.89%
Tonga	7.46	63.33%	0%	1.91%	1.91%	0%	67.15% (85%) <sup>31</sup>
Tuvalu	2.95	0%	42.81%	2.03%	5.79%	0.01%	50.63%
Vanuatu	6.09	44.44%	0%	6.20%	1.83%	0%	52.48%

Source: [https://www.who.int/tobacco/global\\_report/2017/appendix-ix/en/](https://www.who.int/tobacco/global_report/2017/appendix-ix/en/).

<sup>31</sup> The latest data from WHO (2016) indicate that total tax represented 67.15% of price of the most sold brand cigarettes in Tonga. According to the World Bank research team analysis, which applied the latest data from FY2016-7, with additional increase in excise tax, the latest total tax represented as high as 85% of price of the most sold brand cigarettes in Tonga.

Figure 8: Tax per unit and retail price of locally manufactured cigarettes, T\$

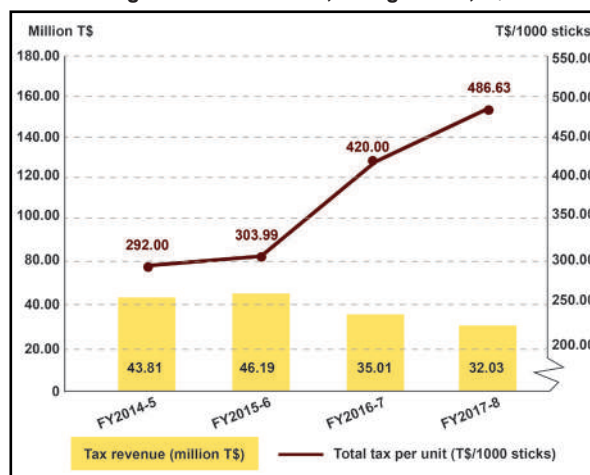


Sources: Excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; retail price of FY2014-5 to FY2016-7: collected from local tobacco agent; retail price of FY2017-8: reproduced from the retail survey in Tonga.

Overall, the large increase in prices of cigarettes in FY2016–7 produced a significant fall in consumption of imported and locally manufactured cigarettes, and a slight decrease in overall tax revenues from cigarettes.

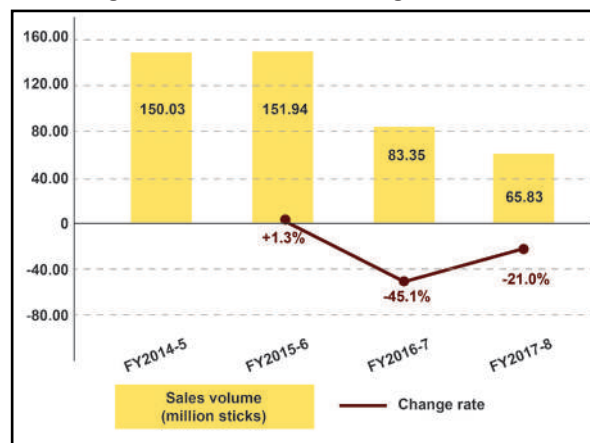
The total tax per unit levied on cigarettes increased sharply from T\$303.99 per 1,000 sticks in FY2015–6 to T\$420 per 1,000 sticks in FY2016–7, and to T\$486.63 per 1,000 sticks in FY2017–8 (see Figure 9). This resulted in a significant decrease in sales volumes. Between FY2015–6 and FY2016–7, the sales volume dropped sharply by 45 percent (see Figure 10). A further excise tax increase in FY2017–8, saw sales volumes drop by a further 21 percent. The tax intervention also resulted in a slight decrease in the overall tax revenue from all cigarettes – from T\$46.19 million in FY2015–6 to T\$35.01 million in FY2016–7, as shown on Figure 9. An additional increase in excise tax in FY2017–8 also resulted in further decrease in consumption and tax revenues, with tax revenue amounting T\$32.03, which represents 3.23 percent of GDP. Nevertheless, more in-depth analysis indicates different outcomes between imported cigarettes and locally manufactured cigarettes.

Figure 9: Tax revenue, all cigarettes, T\$



Sources: Tax revenue and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 10: Sales volume, all cigarettes, T\$



Sources: Sales volume: sourced from the Ministry of Revenue & Customs, Tonga; Change rate: calculated by authors.

**For imported cigarettes, significant price increases in FY2016–7 resulted in a large decrease in their consumption, imported volumes, and tax revenues.**

The approximate 30 percent increase in prices of imported cigarettes (Pall Mall as proxy) resulted in 51.4 percent decrease in imported volume from 122.69 million sticks in FY2015-6 to 59.59 million sticks in FY2016-7, as shown in Figure 11.

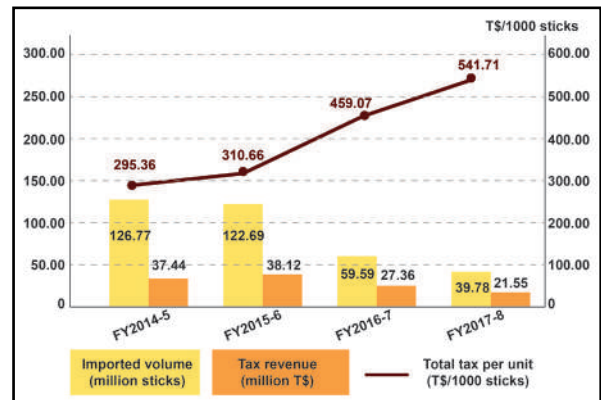
**Since locally manufactured cigarettes were subject to lower excise tax increases than imported cigarettes, their consumption actually increased, indicating the possibility that some smokers may have shifted from consuming imported cigarettes to cheaper, locally manufactured cigarettes.**

This also leads to higher tax revenue. The total tax per unit levied on locally manufactured cigarettes increased steadily from T\$273.7 per 1,000 sticks in FY2014–5 to T\$402.5 per 1,000 sticks in FY2017–8. There was an increase in tax revenue from T\$6.37 million to T\$10.48 million during the same period (see Figure 12).

**Cigarettes have become less affordable in Tonga following the country’s significant 2016 excise tax rise.**

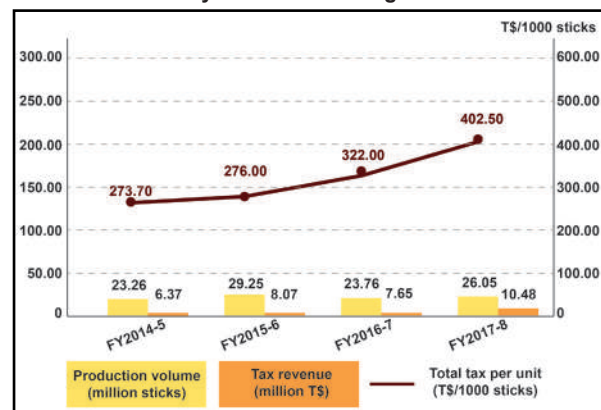
There are two indexes measuring cigarette affordability. The Income Purchasing Capacity (IPC) defines cigarette affordability as GDP per capita/price – the higher the IPC, the more affordable cigarettes are, and vice versa. The other is the retail index price (RIP), which defines cigarette affordability as the percentage of per capita GDP required to buy 100 packs of cigarettes. The higher the RIP, the less affordable cigarettes are, and vice versa. As shown in Figure 13, affordability of cigarettes in Tonga measured by these two indexes has declined as a result of increased excise tax and price.

Figure 11: Volume and tax revenue of imported cigarettes



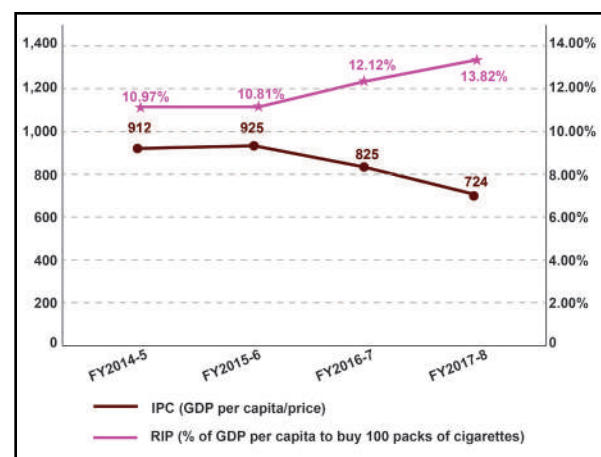
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 12: Production volume and tax revenue of locally manufactured cigarettes



Sources: Production volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 13: Cigarette affordability, 2013–2017



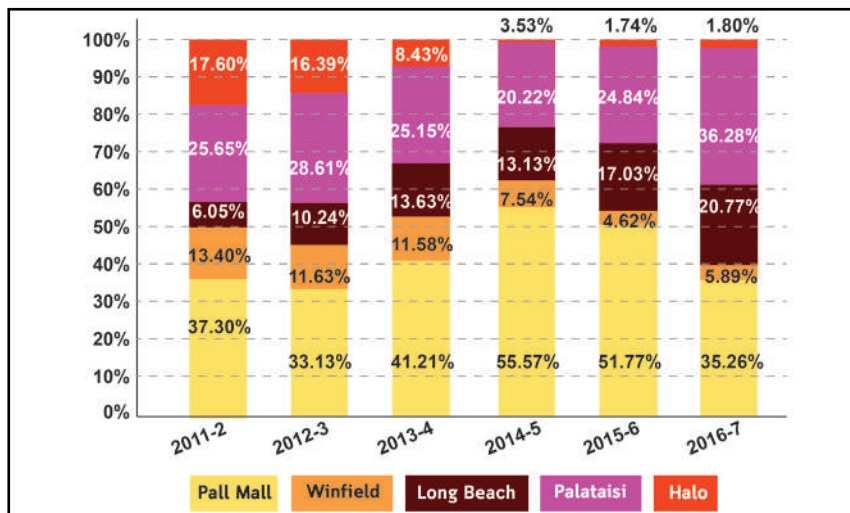
Sources: IPC and RIP: calculated from GDP per capita (sourced from World Bank Open Data) and retail price (reproduced from local tobacco agent and the retail survey in Tonga)

**Large tobacco tax rises are powerful enough to change the market share of the most popular cigarette brand in Tonga.** Prior to the large excise tax increase on imported cigarettes in FY2016–7, Pall Mall had been the most consumed cigarette brand in Tonga, with a market share of over 50 percent in FY2014–5 and FY2015–6. However, the large excise tax increase on imported cigarettes in FY2016–7 led to a price hike for imported cigarettes, and a significant number of smokers simply switched to cheaper, locally manufactured cigarettes. As shown in Figure 14, tax increases imposed on imported cigarettes in July 2016 allowed Palataisi, a locally manufactured cigarette brand with less tax imposed on it,

to overtake Pall Mall to become the most popular cigarette brand in Tonga.

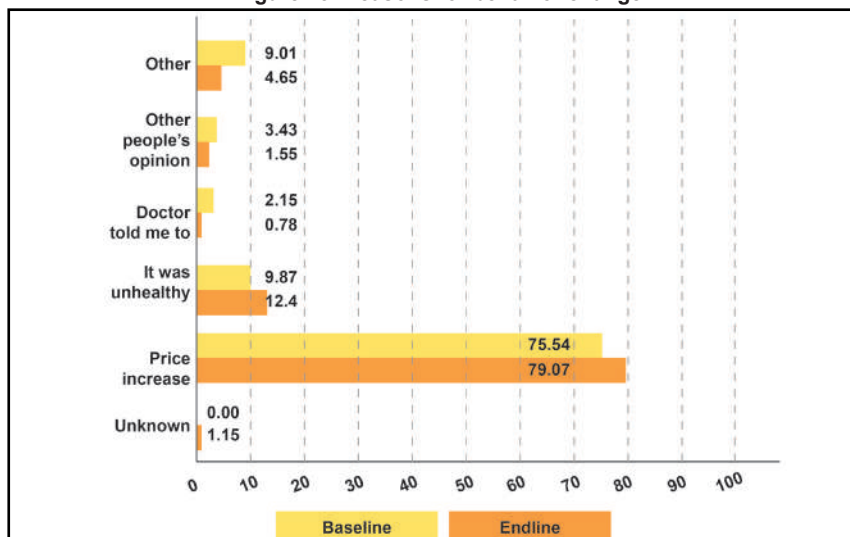
**Price, not health, is the main driver for smokers changing their tobacco consumption behaviors.** Among smokers who have decreased their consumption, over 70 percent indicated that price is the main reason for the changed behaviors. Only around 10 percent indicated that they changed behaviors because smoking was unhealthy (see Figure 15). This indicates that price interventions provide one of the most effective tools for tobacco consumption behavior change that countries should be applying, in addition to health promotion campaigns and activities, tobacco cessation programs, and others.

Figure 14: Market share of different cigarette brands in Tonga, 2011–2017



Sources: Ministry of Revenue & Customs, Tonga.

Figure 15: Reasons for behavior change



Source: Baseline and endline survey data (2017).

**The majority of smokers were aware of the tobacco tax increase, and knowledge about the tax has increased over time.**

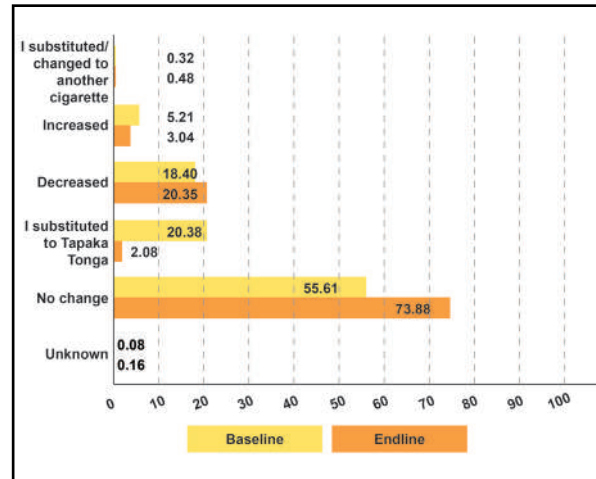
According to the baseline household survey, around 62 percent of tobacco users were aware of the increase in excise tax imposed in July 2016. Nevertheless, several of them suggested that they only learned about the price increase when they visited shops to purchase cigarettes. This recommendation for improving communication efforts regarding the tax was shared with the government by the research team. It is important to note that the knowledge about tobacco tax has increased over time. According to the endline survey, approximately 85 percent of smokers were aware of the July 2017 tobacco tax increase. This is likely a result of better communication efforts by the government, as well as the fact that it takes time for knowledge to reach all communities.

**The large tobacco excise tax increase in FY2016–7 led 18.4 percent of smokers to decrease their cigarette consumption, but 20 percent of smokers shifted from cigarettes to Tapaka Tonga.**

According to the household survey, approximately 18 percent of smokers decreased consumption of cigarettes, which indicates that the price intervention had a significant impact. However, 20 percent of cigarette smokers have shifted to Tapaka Tonga, which is dry loose tobacco leaves for roll-your-own. Tapaka Tonga is cheap, widely available in shops, and is not subject to excise tax. Nevertheless, the endline survey has shown that a further tobacco tax increase in FY2017–8 prompted an additional 20 percent of smokers to decrease smoking. The average number of manufactured cigarette sticks consumed by smokers per day was 16 during the baseline. This was reduced to only 8.8 sticks by the endline survey. The data also show that this substantial reduction is not significantly accounted for by switching to Tapaka Tonga.

Only an additional 2 percent of cigarette smokers shifted to Tapaka Tonga by the endline survey (see Figure 16).

**Figure 16: Behavior change following FY2016–7 (baseline) tobacco tax increase and FY2017–8 (endline) tobacco tax increase**

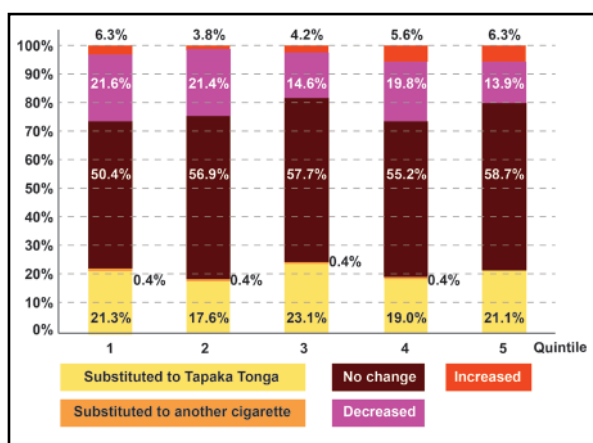


Source: Baseline and endline survey data (2017).

**The increase in excise tax on tobacco in FY2016–7 has greater impacts on the less well-off.**

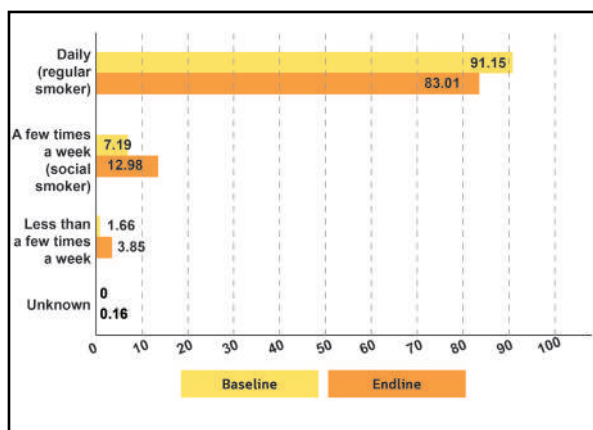
While approximately 18 percent of overall smokers decreased consumption of cigarettes, there is greater impact among smokers from lower socio-economic status. As shown in Figure 17, among smokers who are less well-off (quintile 1 and 2), over 21 percent decreased consumption of cigarettes. There is less impact among the wealthy group. Only 13.9 percent of quintile 5 decreased consumption of cigarettes and nearly 60 percent of them did not change behaviors, which may indicate that the wealthiest group is less sensitive to price changes. Nevertheless, it is important to note that Tapaka Tonga has become the major substitute for manufactured cigarettes across all socio-economic status groups.

**Figure 17: Behavioral responses on cigarette consumption by wealth quintiles after the FY 2016/7 increase in excise tax**



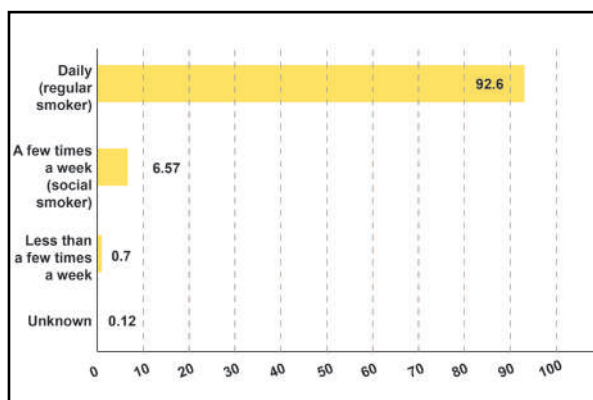
Source: Endline survey data (2017).

**Figure 18: Proportion of manufactured cigarette smokers**



Source: Baseline and endline survey data (2017).

**Figure 19: Proportion of Tapaka Tonga smokers**



Source: Endline survey data (2017).

There was a decrease in the number of daily smokers of manufactured cigarettes. However, most Tapaka Tonga users smoked on a daily basis. During the baseline survey, 91.15 percent of manufactured cigarette smokers smoked daily. However, by the endline survey, only 83 percent of them smoked daily (see Figure 18). It appears that some of these formerly daily smokers now smoked less frequently, and may have shifted to smoke a few times a week or less. However, it is important to note that 92.6 percent of Tapaka Tonga smokers smoked on a daily basis (Figure 19).<sup>32</sup>

Tapaka Tonga is cheap and widely available in shops. The shift among smokers from consuming manufactured cigarettes to consuming Tapaka Tonga is alarming, and will most likely dilute any potential positive effects on population health as a result of the NCD tax policy. Tapaka Tonga is currently not subject to excise tax, and is cheap and widely available in shops countrywide. Hence, it is crucial for the Government of Tonga to consider introducing fiscal interventions and other non-tax interventions to address this issue. A significant part of the Tongan population also mistakenly thought that Tapaka Tonga is not harmful (or is less harmful) to health than manufactured cigarettes. Moreover, it is common for Tapaka Tonga packaging to be labeled ‘organic’, which can be misleading, as shown in Picture 3.

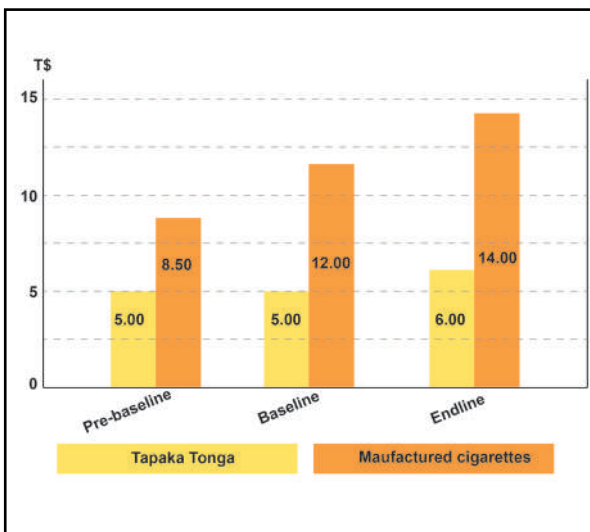
Tapaka Tonga has become increasingly affordable compared to manufactured cigarettes. While the price of manufactured cigarettes increased significantly as a result of the tobacco tax intervention, the price of Tapaka Tonga stayed mostly the same (see Figure 20). After July 2017 it rose slightly from T\$5 to T\$6 – largely due to higher demand.

<sup>31</sup> The World Bank research team became aware of the extent of Tapaka Tonga use during the analysis of the baseline household surveys, and hence more questions to understand the behaviors of Tapaka Tonga users were added for the endline survey.

Picture 3: Tapaka Tonga as sold in shops



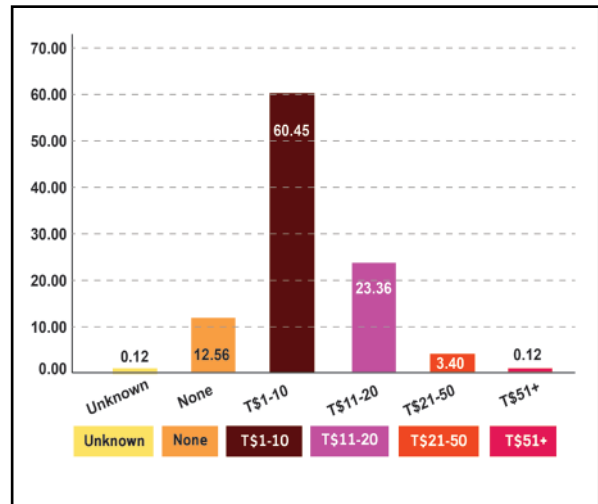
Figure 20: Retail prices of Tapaka Tonga and manufactured cigarettes over time



Source: Baseline and endline survey data (2017).

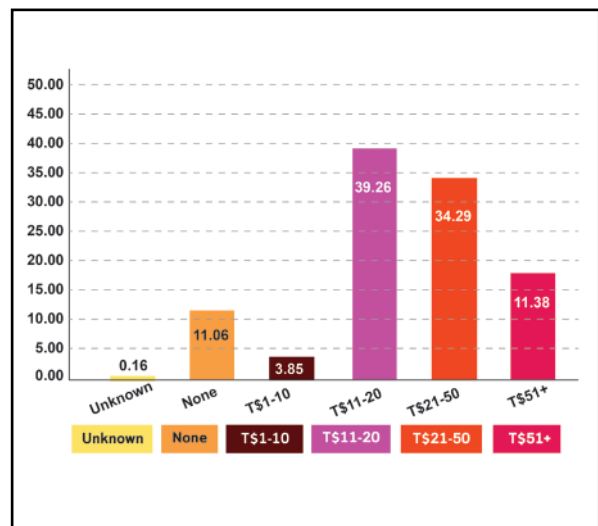
**Tapaka Tonga smokers spent much less than manufactured cigarette smokers.** The majority of manufactured cigarette smokers spent T\$11–20 per week, while over one-third spent as much as T\$21–50 per week. However, the majority of Tapaka Tonga smokers spent only T\$1–10 per week, indicating how cheap and affordable Tapaka Tonga is (see Figure 21 and Figure 22).

Figure 21: Spending on manufactured cigarettes in the past week, T\$



Source: Endline survey data (2017).

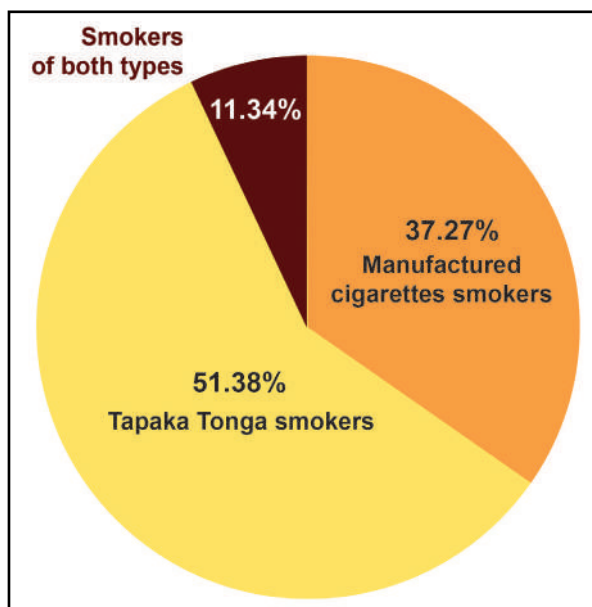
Figure 22: Spending on Tapaka Tonga, T\$



Source: Endline survey data (2017).

**There are now more Tapaka Tonga users than manufactured cigarette users.** There was very limited information on the proportion and behaviors of Tapaka Tonga users in the country before this study was conducted. Nevertheless, according to the STEPS survey 2012, 85.25 percent of daily smokers in Tonga smoked manufactured cigarettes, which may indicate that daily Tapaka Tonga smokers were the minority at that time. However, according to the endline survey conducted in late 2017, 51.38 percent of Tongan smokers smoked Tapaka Tonga, while 37.27 percent of smokers consumed manufactured cigarettes (see Figure 23). Around 11.34 percent consumed both Tapaka Tonga and manufactured cigarettes.

Figure 23: Type of smokers in Tonga (November 2017)



Source: Endline survey data (2017).

**In summary, Tonga has achieved much through its continuing tobacco tax and price increases.** Tax as a percentage of retail price is 85 percent, among the highest in world. The significant increase of excise and price, particularly in FY2016–7 and FY2017–8, reduced cigarette consumption dramatically. Tonga is also one of very few countries to see reduced revenue along with tax hikes – the result of flaws in the tobacco tax structure, which include: (i) differential excise rates on imported and locally produced cigarettes that enlarged the price gap between imported brands and local brands, and therefore encouraged smokers to switch to local brands when tax rose; (ii) the absence of tax on Tapaka Tonga, which has hampered government efforts to use tax and price measures to curb tobacco use. In order to achieve a win-win (less consumption of tobacco products and more revenue), it is necessary for Tonga to apply a unified excise tax rate on imported and locally manufactured cigarette brands, and Tapaka Tonga.

## Food

**Obesity and poor diet are the most significant risk factors contributing to the country's high NCD burden, and the government has prioritized food tax policy as a key way to address it.**

Tonga has pioneered the use of food tax policy in the Pacific to address demand for a number of products perceived as unhealthy, imposing excise tax and/or import duties designed to reduce the consumption of fatty foods (e.g. turkey tails, mutton flaps, chicken leg quarters), sugary foods (e.g. ice cream, chocolates, biscuits), sugar-sweetened beverages (SSB), and instant noodles. At the same time the government has abolished 15 percent consumption tax on imported fruits and vegetables perceived as healthy, in anticipation that the price of these products will fall and their consumption will rise.

**While the food tax policy covers many food products, the study team focused on just a few key products consumed by the majority of Tongans.** Among the food products subject to NCD tax, the study team selected turkey tails, mutton flaps, chicken leg quarters, ice cream, SSB, and instant noodles. Among the imported food products subject to the 15 percent tax exemption, the study team chose apples and oranges. The detailed tax structure of selected food and drinks is listed in Table 13.

**Prices have increased following the imposition of excise tax/import duty across all products.** For the excise tax to affect consumption behaviors, retail prices must be changed. According to the retail survey and consumer price index, retailers have responded to the imposition of excise, and prices have increased across all products (see Figure 24).



Table 13: Tax structure of food and SSBs (July 2014–June 2018)

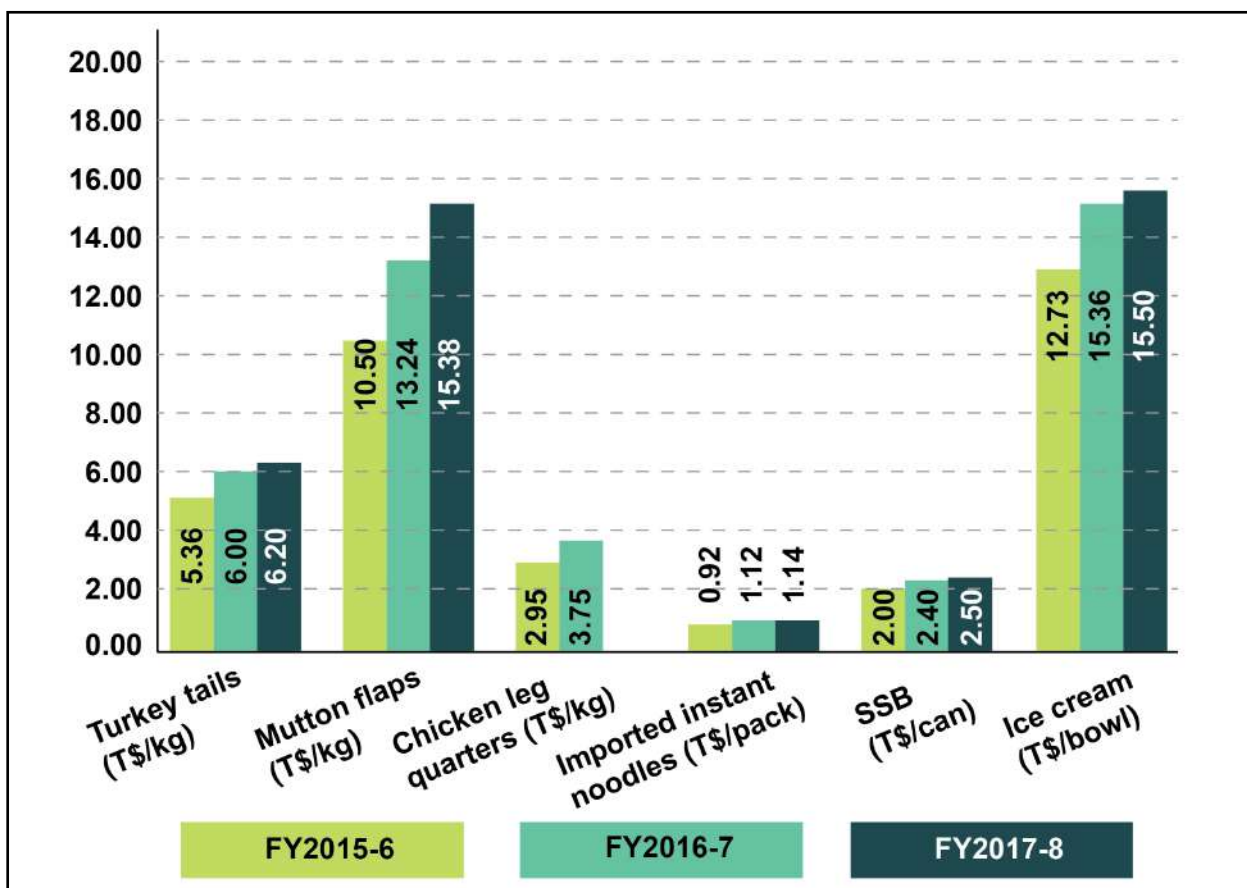
Product	Year	Excise tax		Consumption tax		Custom duty
		Imported	Locally produced	Imported	Locally produced	Imported
Turkey	Jul.2014-Jun.2015	Free	NA	15% imposed on (CIF+Customs Duty)	NA	Free
	Jul.2015-Jun.2016	Free	NA	15% imposed on (CIF+Customs Duty)	NA	15%
	Jul.2016-Jun.2017	T\$1.50/kg	NA	15% imposed on (CIF + Customs duty + excise tax)	NA	15%
	Jul.2017-Jun.2018	T\$1.50/kg	NA	15% imposed on (CIF + Customs duty + excise tax)	NA	15%
Ice cream	FY2014-2015	Free	NA	15% imposed on (CIF+customs duty)	NA	15%
	FY2015-2016	Free	NA	15% imposed on (CIF+customs duty))	NA	15%
	FY2016-2017	T\$1.5/liter	NA	15% imposed on (CIF+customs duty +excise tax)	NA	15%
	FY2017-2018	T\$1.5/liter	25 seniti/liter	15% imposed on (CIF+customs duty +excise tax)	NA	15%
Mutton flaps	Jul.2014-Jun.2015	Free	NA	15% imposed on (CIF+customs duty)	NA	Free
	Jul.2015-Jun.2016	Free	NA	15% imposed on (CIF+customs duty)	NA	Free
	Jul.2016-Jun.2017	Free	NA	15% imposed on (CIF+customs duty)	NA	15%
	Jul.2017-Jun.2018	T\$1.15/kg	NA	15% imposed on (CIF+customs duty)	NA	15%
Chicken leg quarters	Jul.2014-Jun.2015	Free	NA	15% imposed on (CIF+customs duty)	NA	Free
	Jul.2015-Jun.2016	Free	NA	15% imposed on (CIF+customs duty)	NA	Free
	Jul.2016-Jun.2017	40 seniti per kg	NA	15% imposed on (CIF+excise)	NA	Free
	Jul.2017-Jun.2018	40 seniti per kg	NA	15% imposed on (CIF+excise)	NA	Free
Instant noodles	Jul.2014-Jun.2015	Free	NA	15% imposed on (CIF+customs duty)	NA	15%
	Jul.2015-Jun.2016	T\$1/kg	NA	15% imposed on (CIF+customs duty)	NA	Free
	Jul.2016-Jun.2017	T\$1/kg	NA	15% imposed on (CIF+excise tax)	NA	Free
	Jul.2017-Jun.2018	T\$2/kg	NA	15% imposed on (CIF+excise tax)	NA	Free
Fruits	Jul.2014-Jun.2015	NA	NA	15% imposed on (CIF+customs duty)	NA	15%
	Jul.2015-Jun.2016	NA	NA	15% imposed on (CIF+customs duty)	NA	15%
	Jul.2016-Jun.2017	NA	NA	Free	NA	Free
	Jul.2017-Jun.2018	NA	NA	Free	NA	Free

Table 13: Tax structure of food and SSBS (July 2014–June 2018) (continued)

Product	Year	Excise tax		Consumption tax		Custom duty	
		Imported	Locally produced	Imported	Locally produced	Imported	
SSB	Jul.2012-Jun.2013	Free	NA	15% imposed on (CIF+customs duty)	NA	15%	
	Jul.2013-Jun.2014	.50/liter	NA	15% imposed on (CIF+customs duty)	NA	0%	
	Jul.2014-Jun.2015	.50/liter	NA	15% imposed on (CIF+customs duty)	NA	0%	
	Jul.2015-Jun.2016	.50/liter	NA	15% imposed on (CIF+customs duty)	NA	0%	
	Jul.2016-Jun.2017	1/liter	NA	15% imposed on (CIF+customs duty)	NA	0%	
	Jul 2017-Jun 2018	Sugar content not exceeding 5 gram per 100ml	0	NA	15% imposed on (CIF+excise Tax)	NA	15%
		Sugar content not exceeding 20 gram per 100ml	T\$1.50/liter	NA	15% imposed on (CIF+excise Tax)	NA	Free
Sugar content exceeding 20 gram per 100ml		T\$4/liter	NA	15% imposed on (CIF+excise Tax)	NA	Free	

Source: Compiled by authors based on tax legislation and confirmed by officers of Ministry of Revenue & Customs

Figure 24: Price rises after the excise tax/import duty increase

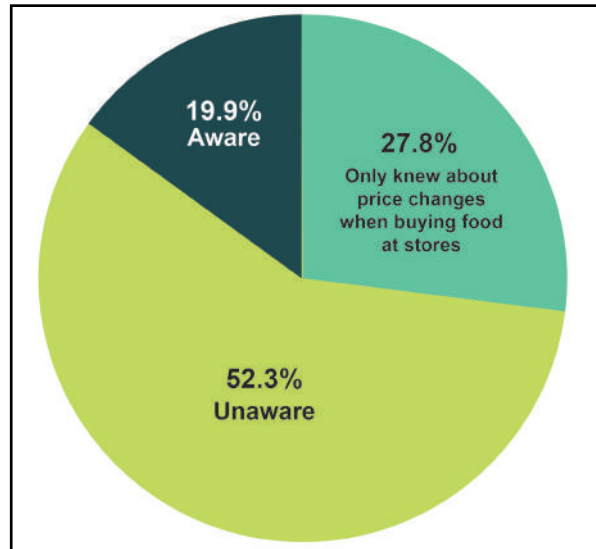


**While significant excise tax was imposed on a number of food products in July 2017, less than 20 percent of the population were aware of its implementation.** Over half of the population were not aware of the implementation of the food tax policy, while over a quarter only became aware of it when buying food at stores (see Figure 25). From focus group discussions, many households reported that they thought it was the Chinese shops that voluntarily increased the price to increase their profits.

**Among those who were aware of the food tax, most were aware of the excise tax on chicken leg quarters and mutton flaps.** Chicken leg quarters and mutton flaps are common meat consumed in Tonga, and it is understandable that more consumers were aware of the food tax being imposed on these products (see Figure 26). Substantially fewer Tongans were aware that there was an excise tax being imposed on other food products, including SSB and imported instant noodles, which were also popular products.

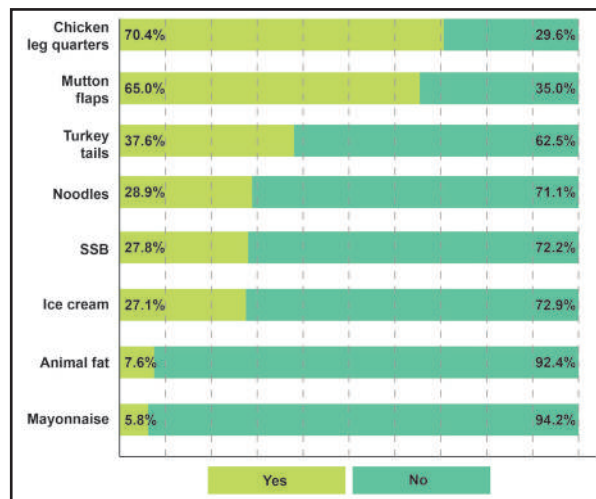
**Households in the “less well-off” category were more aware than their wealthier counterparts of the price increases on selected food products (not necessarily knowing that it was because of the tax), indicating this group’s greater price sensitivity.** From the household survey, more households in the less well-off category (wealth quintile 1 and 2) noticed the price increase in chicken leg quarters, mutton flaps, and turkey tails. Nevertheless, fewer of the least well-off households (wealth quintile 1) noticed the price change of ice cream, which could indicate that ice cream may not be a common food item among this particular group (see Figure 27).

Figure 25: Awareness of the excise tax increase in July 2016 on selected food products as of June 2017



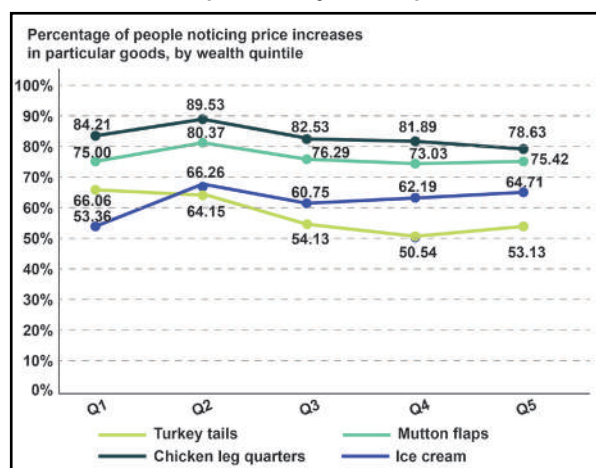
Source: Baseline survey data (2017).

Figure 26: Knowledge about food products subjected to tax increase in July 2016



Source: Baseline survey data (2017).

Figure 27: Notices about price changes of selected products by wealth quintiles



Source: Baseline survey data (2017).

## Mutton flaps

Mutton flaps are considered the fattiest part of lamb, and are one of the most popular dishes in Tonga. Mutton flaps are not produced domestically in Tonga, but are imported. Pre-cooked mutton flaps are shown in Picture 4. Mutton flaps cooked as Tongan dishes are shown in Picture 5.

A customs duty of 15 percent was imposed on mutton flaps in FY2016–7 and an excise tax of T\$1.15 per kg was introduced in FY2017–8, resulting in a significant increase in retail price.

The total tax per unit levied on mutton flaps increased from T\$0.98 per kg in FY2014–5 to T\$4.24 per kg in FY2017–8 (see Figure 28). The average retail price of mutton flaps, according to the consumer price index and retail survey, increased from T\$10.50 per kg in FY2015–6 to T\$15.38 per kg in FY2017–8.

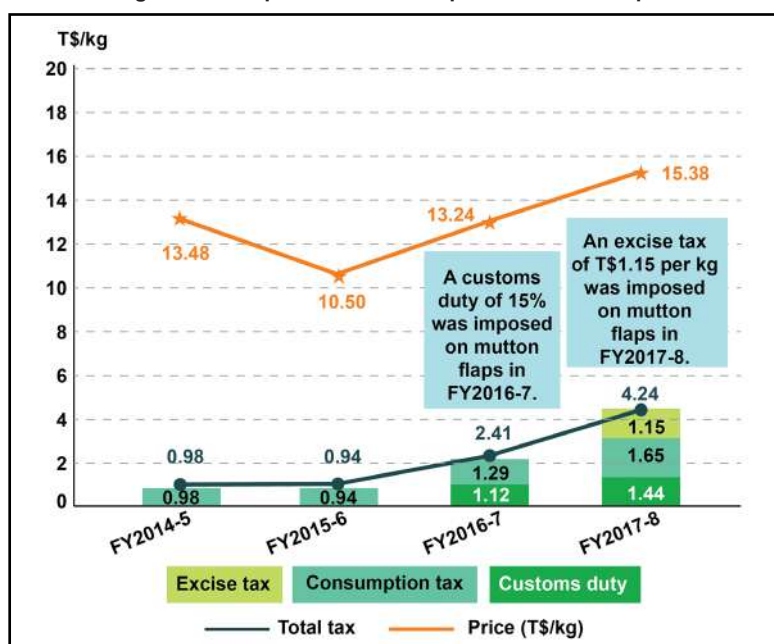
Import volumes of mutton flaps decreased following the import duty and excise tax. A drop in total tax in FY2015–6 drove up the imported volume



Picture 4: (left) Pre-cooked mutton flaps  
Picture 5: (right) Cooked mutton flaps as sold in shops

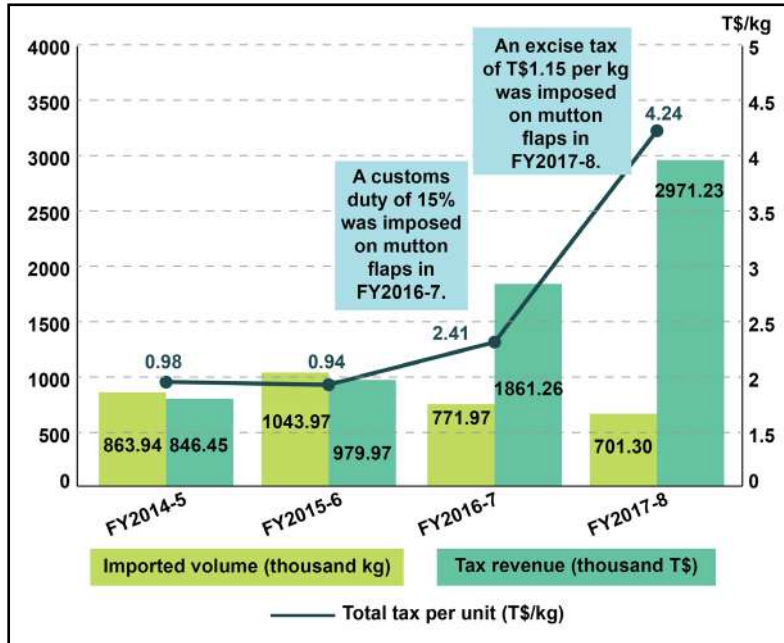
from 863,940 kg to 1,043,970 kg. However, once the 15 percent import duty was imposed in FY2016–7, the import volume of mutton flaps dropped by about 35 percent, and dropped again following the introduction of an excise tax of T\$1.15 per kg in FY2017–8, which generated a total tax of T\$4.24 per kg. It is important to note that despite lower import volumes, tax revenues from import duty and excise tax have increased by 90 percent in FY2016–7 and a further 59 percent increase in FY2017–8 (see Figure 29).

Figure 28: Tax per unit and retail price of mutton flaps



Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: sourced from the Ministry of Finance and National Planning, Tonga.

Figure 29: Consumption, tax revenue and total tax per unit of mutton flaps

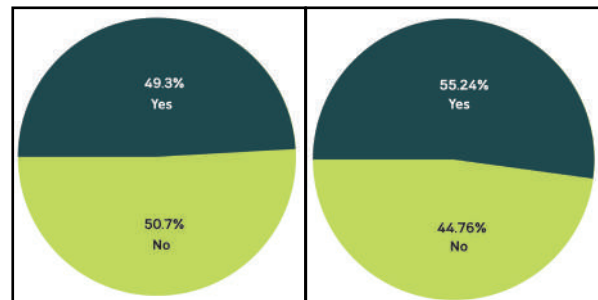


Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Approximately half of Tongans changed their consumption of mutton flaps after the tax policy (Figure 30). This number increased to 55.24 percent when the price further increased as a result of imposition of excise tax in July 2017 (see Figure 31).

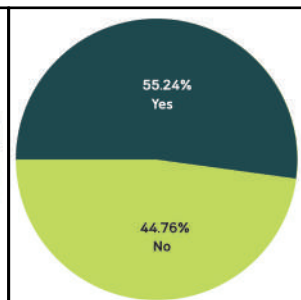
Over 78 percent of those who changed behaviors after the July 2016 tax reduced their consumption of mutton flaps, but gradually, more people shifted to alternative products. When the import duty was imposed in July 2016, most people reduced their consumption of mutton flaps, while around 16 percent opted for alternative products. Following the July 2017 tax increase, as much as 40 percent of the population no longer simply reduced consumption of mutton flaps but went for alternative products (see Figure 32). Salted beef is the main substitute for mutton flaps.

Figure 30: Change in consumption of mutton flaps (baseline)



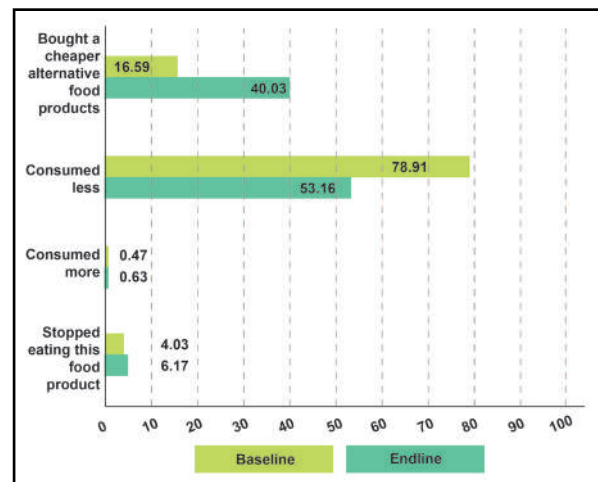
Source: Baseline survey data (2017).

Figure 31: Change in consumption of mutton flaps (endline)



Source: Endline survey data (2017).

Figure 32: Consumption behavior change following the imposition of tax on mutton flaps



Source: Baseline and endline survey data (2017).

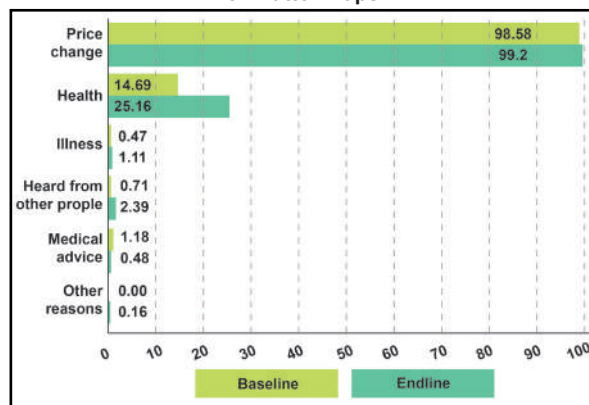
**Price is the main factor for the changed consumption behaviors of mutton flaps.**

From both baseline and endline survey, 98–99 percent of survey respondents cited price as the main reason for changing consumption behaviors of mutton flaps. Nevertheless, an increasing number of people during the endline survey cited health as a main reason for behavior change (see Figure 33).

**Tax has affected the behaviors of those who frequently consumed mutton flaps.**

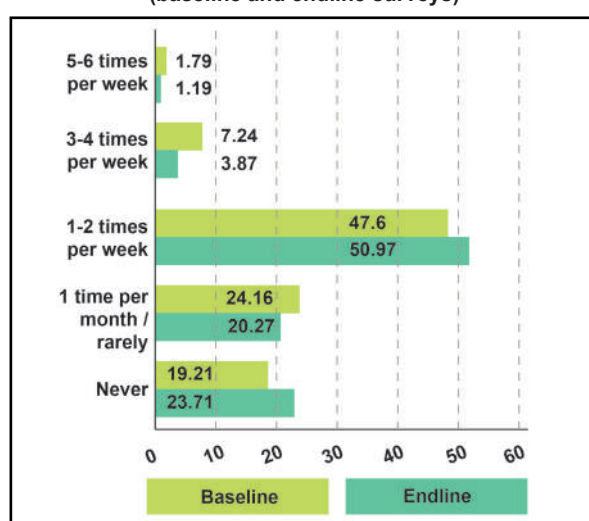
Following the imposition of import duty in FY2016–7, only 1.79 percent of the population consumed mutton flaps five to six times a week, and just over 7 percent consumed them three to four times a week. The number of frequent consumers of mutton flaps fell further following the increased tax in FY2017–8. The percentage of people not consuming mutton flaps rose from 19 percent to 24 percent during the same period. Nevertheless, about 50 percent of Tongans still consumed mutton flaps one or two times per week (see Figure 34).

Figure 33: Reason for changing consumption behaviors of mutton flaps



Source: Baseline and endline survey data (2017).

Figure 34: Frequency of consumption of mutton flaps (baseline and endline surveys)



Source: Baseline and endline survey data (2017).



Picture 6: (above) Pre-cooked turkey tails  
Picture 7: (below) Cooked turkey tails

**Turkey tails**

**Turkey tails are the fattiest part of turkey, and are one of the most popular dishes in Tonga.** Turkey tails are not produced domestically in Tonga, and hence all of them in Tongan markets are imported. Pre-cooked turkey tails are shown in Picture 6. Cooked turkey tails are shown in Picture 7.

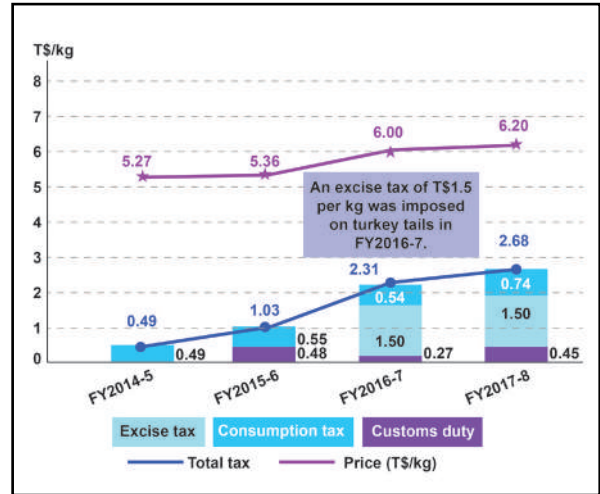
**An excise tax of T\$1.5 per kg of turkey tails was introduced in FY2016–7, resulting in a price rise of approximately 12 percent.** Prior to the introduction of excise tax, the government imposed an import duty in FY2015–6. This led to an increase in total tax from T\$1.03 per kg in FY2015–6 to T\$2.31 per kg in

FY2016–7. According to the retail survey and consumer price index, the retail price of turkey tails increased from T\$5.27 per kg in FY2014–5 to T\$6.2 per kg in FY2017–8 (see Figure 35). The largest increase in price, by 12 percentage points, was observed in FY2016–7 when the significant excise tax was introduced.

**Imports of turkey tails (a proxy for consumption) had fallen significantly since the import duty was imposed in FY2015–6, accompanied by a continuous rise in both price and tax revenue.** The total tax per unit levied on turkey tails increased steadily from T\$0.49 per kg in FY2014–5 to T\$2.68 per kg in FY2017–8, resulting in a decline in import volume from 412,390 kg to 147,720 kg, and an increase in tax revenue, from T\$201,430 to T\$396,620 (see Figure 36).

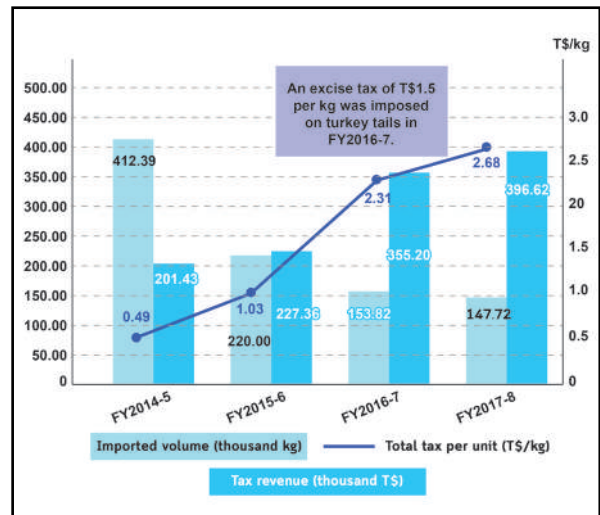
**Nearly half of Tongans changed their consumption behaviors of turkey tails following the July 2016 tax increase, with 82 percent of them consuming less turkey tails.** The number of people who changed behaviors increased by 10 percentage points by July 2017. Approximately 6–7 percent of Tongans stopped eating turkey tails following the tax intervention. Chicken is the main substitute for turkey tails. (see Figure 37, Figure 38, and Figure 39).

Figure 35: Tax per unit and retail price of turkey tails



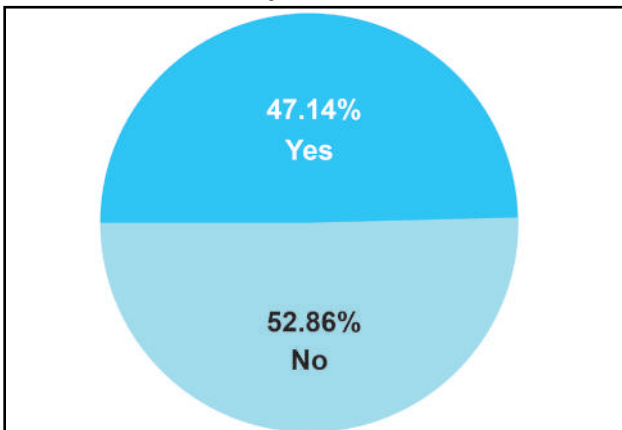
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price of FY2014-5, FY2015-6, and FY2017-8: sourced from the Ministry of Finance and National Planning, Tonga; Retail price of FY2016-7: reproduced from the retail survey in Tonga.

Figure 36: Consumption, tax revenue and total tax per unit of turkey tails



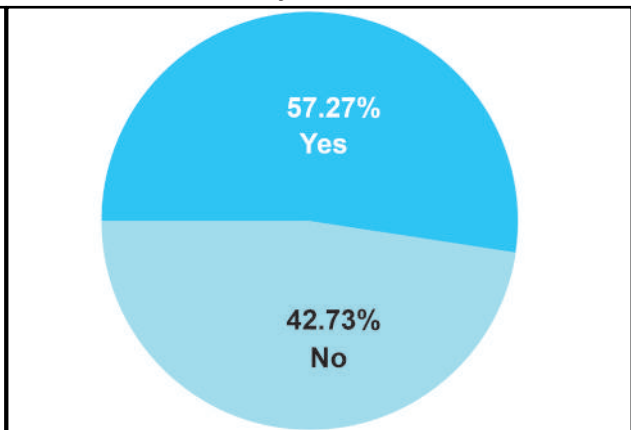
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 37: Changed consumption behaviors of turkey tails at baseline



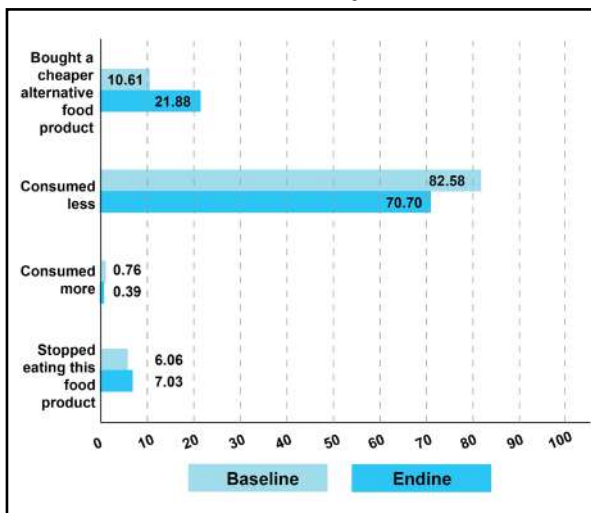
Source: Baseline survey data (2017).

Figure 38: Changed consumption behaviors of turkey tails at endline



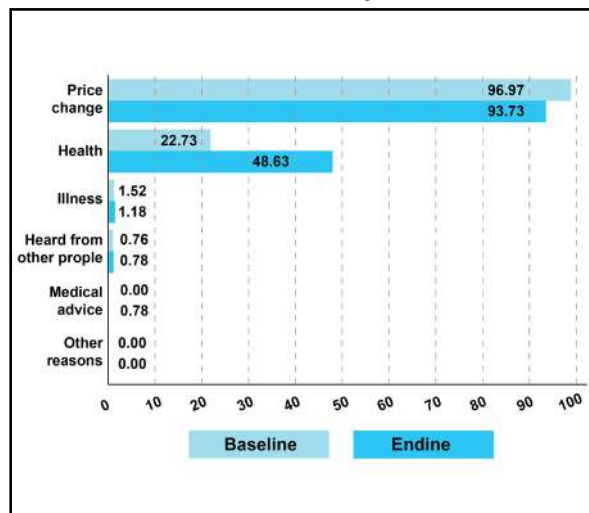
Source: Endline survey data (2017).

Figure 39: Behaviors following the imposition of tax on turkey tails



Source: Baseline and endline survey data (2017).

Figure 40: Reasons for changing consumption behaviors of turkey tails



Source: Baseline and endline survey data (2017).

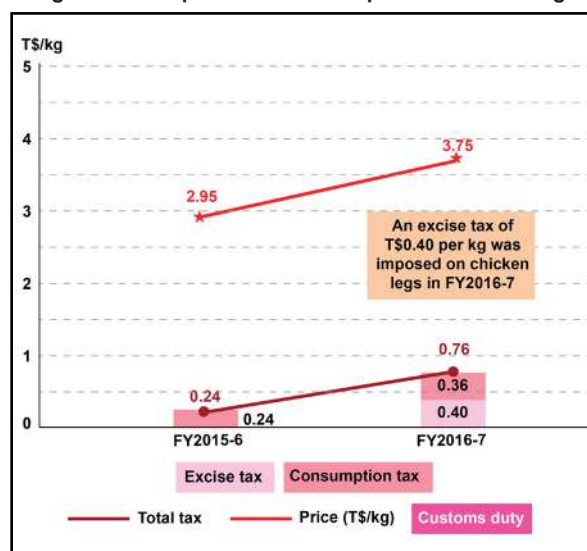
**Price is the main reason for changing turkey tails consumption behaviors.**

Over 90 percent of respondents cited that price was the main reason for changing turkey tails consumption behaviors (see Figure 40). While only a small minority cited health as a reason for changing consumption after the July 2016 tax intervention, this proportion increased to nearly 50 percent after the July 2017 tax intervention. This may indicate that the health awareness has gradually increased.

**Chicken leg quarters**

**An excise tax of T\$0.40 per kg was introduced in FY2016–7, resulting in a total tax increase from T\$0.24 per kg to T\$0.76 per kg, and a significant price increase.** No customs duty was levied on chicken legs from FY2014–5 to FY2016–7. The average retail price of chicken legs, according to the consumer price index and retail survey, increased by 27 percent, from T\$2.95 per kg in FY2015–6 to T\$3.75 per kg in FY2016–7 (see Figure 41).

Figure 41: Tax per unit and retail price of chicken legs



Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: sourced from the Ministry of Finance and National Planning, Tonga.

**While the price of chicken leg quarters increased by 27 percent following the imposition of excise tax, import volumes only slightly decreased.** The import volumes of chicken leg quarters decreased from 8,965,000 kg to 8,011,620 kg in FY2016–7. However, the revenue generated by the excise tax grew by 178 percent, from T\$2.175 million to T\$6.055 million during this period (see Figure 42).



**In contrast to mutton flaps and turkey tails, most people still consume chicken regularly, despite the price increase.**

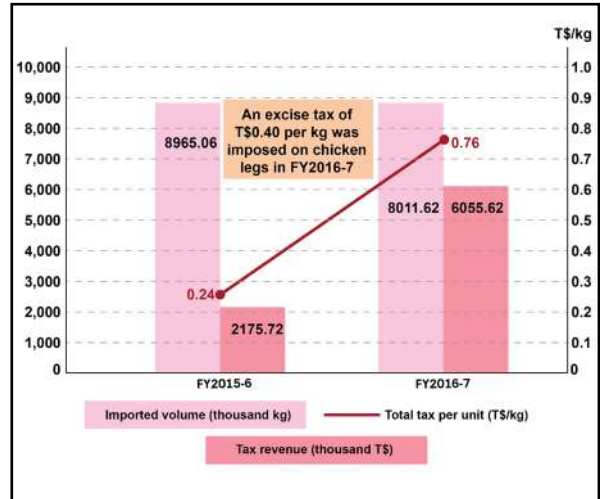
While most Tongans reduced consumption of mutton flaps and turkey tails following the tax intervention and price increase, over 70 percent of Tongans did not change their chicken leg quarters consumption behaviors, as shown in Figure 43. Most people still consumed chicken leg quarters three to six times a week, as shown in Figure 44. Among the minority who changed behaviors, most chose tinned fish as substitute, but some chose less healthy products like sausages, corned beef and salted beef.

**Ice cream**

**An excise tax of T\$1.5 per liter was introduced in FY2016–7, resulting in an increase in total tax from T\$0.98 per liter in FY2015–6 to T\$2.69 per liter in FY2016–7, and a significant price increase.** The average retail price of ice cream from the retail survey and consumer price index increased from T\$11.61 per bowl in FY2014–5 to T\$15.5 per bowl in FY2017–8. The price increased by over 20 percentage points after the introduction of excise tax in FY2016–7, from T\$12.73 to T\$15.36 (Figure 45).

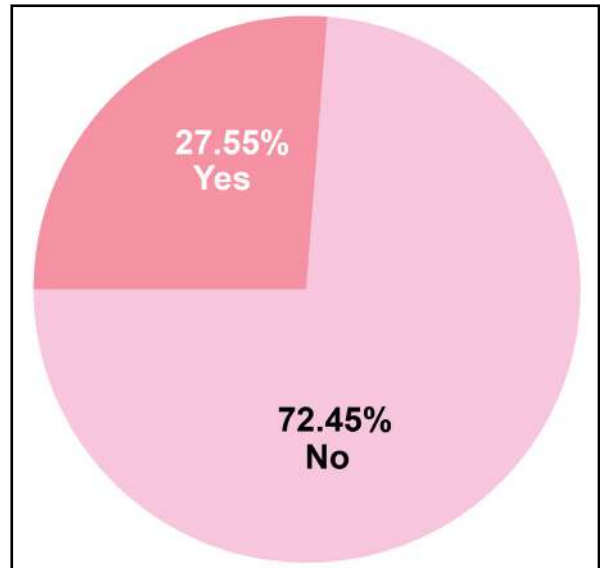
**The imposition of excise tax in FY2016–7 led to a decrease in imported ice cream and also contributed to government tax revenues.** The increase in excise tax on ice cream in FY2016–7 resulted in significant price increases and a significant reduction in the import volumes of ice cream. It also contributed to a significant increase in tax revenue, from T\$1,583,530 to T\$3,113,080. It is important to note that import volumes continued to decline in FY2017–8, indicating the effectiveness of the policy. Although this further decline in imported volume in FY2017–8 resulted in a decrease in tax revenue compared to the year before, the amount of revenue collected in FY2017–8

Figure 42: Consumption, tax revenue and total tax per unit of chicken legs



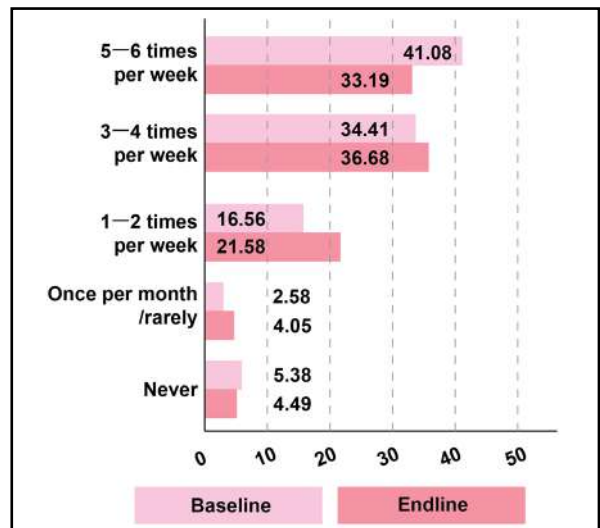
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 43: Changed consumption behaviors of chicken leg quarters at baseline



Source: Baseline survey data (2017).

Figure 44: Frequency of consumption of chicken leg quarters (baseline and endline surveys)



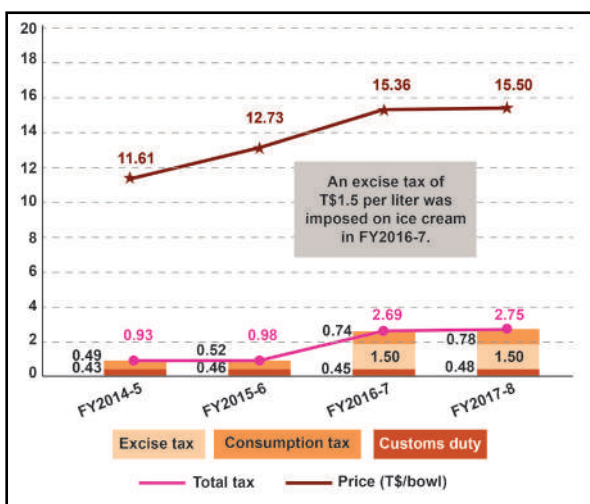
Source: Baseline and Endline survey data (2017).

was still significantly higher than that of FY2015–6 (before the introduction of the excise tax), as per Figure 46.

**Approximately 40 percent of ice cream consumers changed their behaviors in July 2016, and this proportion increased to 51 percent in July 2017 (see**

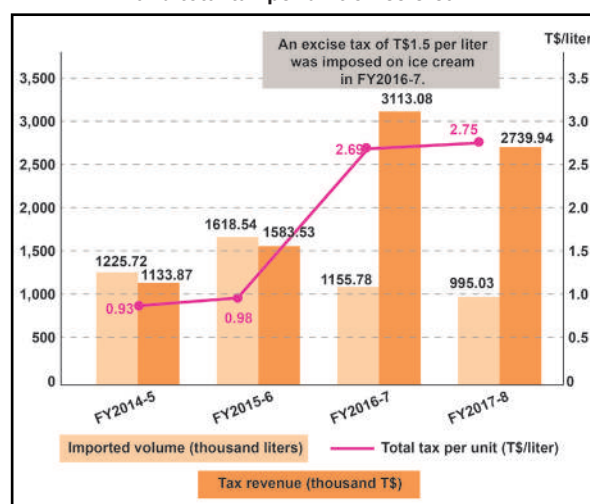
**Figure 47 and Figure 48).** Of those who changed behaviors, 90 percent reduced their consumption of ice cream. This reduction was observed particularly among those who consumed ice cream very frequently (three to six times per week), as per Figure 49.

Figure 45: Tax per unit and retail price of ice cream



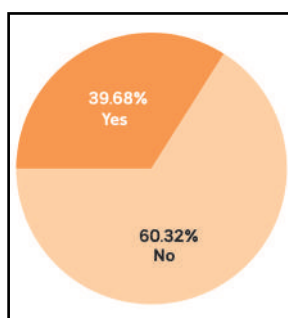
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: sourced from the Ministry of Finance and National Planning, Tonga.

Figure 46: Consumption, tax revenue and total tax per unit of ice cream



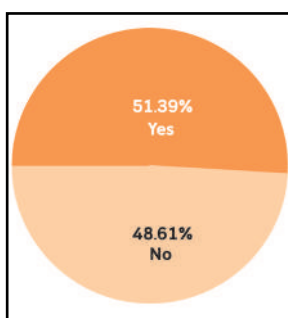
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 47: Changed consumption behaviors of ice cream at baseline



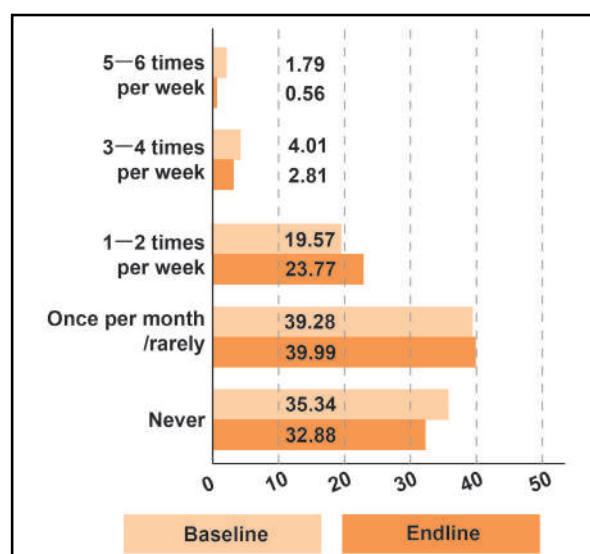
Source: Baseline survey data (2017).

Figure 48: Changed consumption behaviors of ice cream at endline



Source: Endline survey data (2017).

Figure 49: Frequency of consumption of ice cream (baseline and endline surveys)



Source: Baseline and endline survey data (2017).

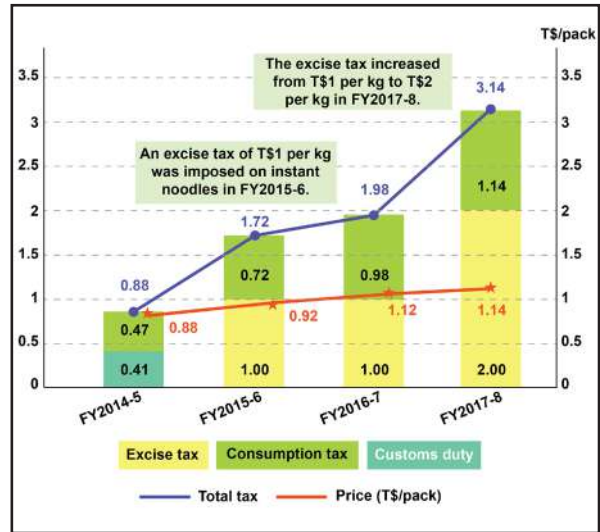
### Imported instant noodles

Customs duty has not applied to imported instant noodles since FY2015–6, but an excise tax of T\$1 per kg was introduced in FY2015–6, rising to T\$2 per kg in FY2017–8. The retail price of instant noodles, for example the “Supreme” brand from the retail survey, increased from T\$0.7 per pack in FY2016–7 to T\$1 per pack in FY2017–8. The average retail price of instant noodles (two-minute maggi), provided by the Ministry of Finance and National Planning of Tonga increased from T\$0.88 per pack in FY2014–5 to T\$1.14 per pack in FY2017–8. The total tax per unit levied on instant noodles increased from T\$0.88 per kg in FY2014–5 to T\$3.14 per kg in FY2017–8 (see Figure 50).

While the imposition of excise tax in FY2015–6 initially led to a significant decline in the import of instant noodles, imports during FY2017–8 were nearly the same as during FY2015–6. The increase in excise tax on imported instant noodles in FY2015–6 resulted in a sharp decrease in imports from 2,083,410 kg to 885,280 kg, and a further decline continued in FY2016–7. However, the imported volume rebounded from 438,290 kg in FY2016–7 to 805,540 kg in FY2017–8, even though the excise tax was doubled to T\$2 per kg in that year (see Figure 51).

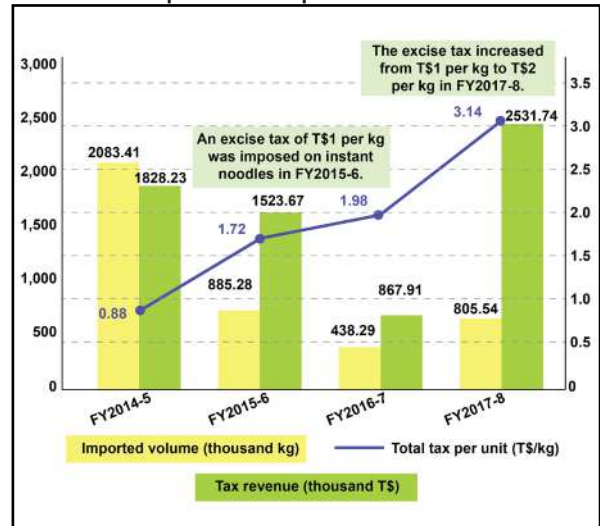
While two-thirds of Tongans were aware of the price increase of imported instant noodles, few people changed their consumption behaviors following the tax interventions. According to the household survey, over 66 percent of the population were aware of the price increase of imported instant noodles. However, less than 30 percent of the population changed or reduced consumption of imported instant noodles, following the tax intervention (see Figure 52 and Figure 53). The low price base and small changes in prices may be the key factor.

Figure 50: Tax per unit and retail price of imported instant noodles



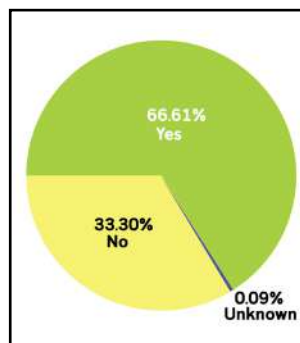
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: sourced from the Ministry of Finance and National Planning, Tonga.

Figure 51: Consumption, tax revenue and total tax per unit of imported instant noodles



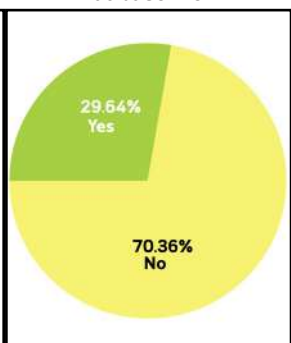
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 52: Notice of price change of imported instant noodles at baseline



Source: Baseline survey data (2017).

Figure 53: Changed consumption behaviors of imported instant noodles at baseline



Source: Baseline survey data (2017).

## Sugar-sweetened beverages

An excise tax of T\$0.5 per liter was introduced on sugar-sweetened beverages (SSB) while customs duty was abolished in FY2013–4; excise tax was increased to T\$1 in FY2016–7, and a new tax formula based on sugar content was introduced in FY2017–8.

This resulted in an increase in total tax from T\$0.37 per liter in FY2012–3 to T\$0.73 per liter in FY2013–4, and to T\$1.85 per liter in FY2017–8. The retail price of SSB, reported from the retail survey, for example Coca-Cola, increased from T\$2 per can in FY2015–6 to T\$2.4 per can in FY2016–7, and further to T\$2.5 per can in FY2017–8 (Figure 54).

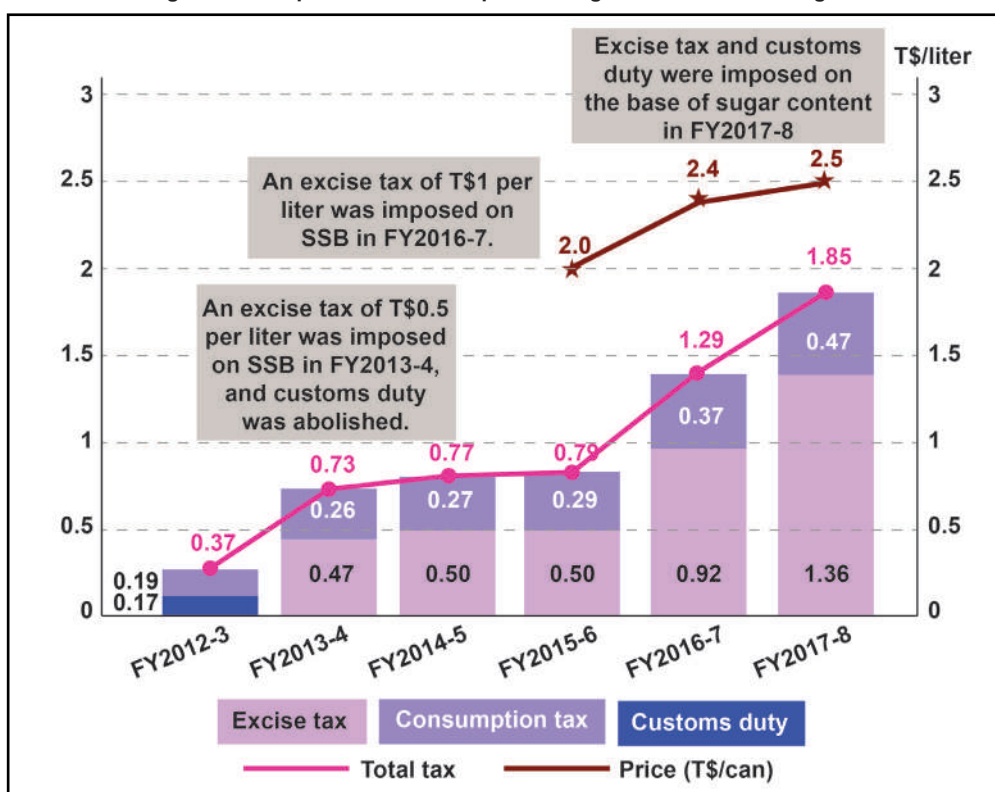
While there was a 20 percent price increase in FY2016–7, the imported volume of SSB dropped slightly, but rebounded in FY2017–8. The steady increase in SSB tax rates from T\$0.37

per liter in FY2012–3 to T\$1.85 per liter in FY2017–8 resulted in an increase in tax revenue from T\$1,543,000 to T\$8,413,000. While the import volume dropped in FY2016–7, it increased significantly in FY2017–8 (see Figure 55).

While over three-quarters of Tongans were aware of the price increase of SSB, far less than half of the population changed their consumption behaviors following the tax interventions.

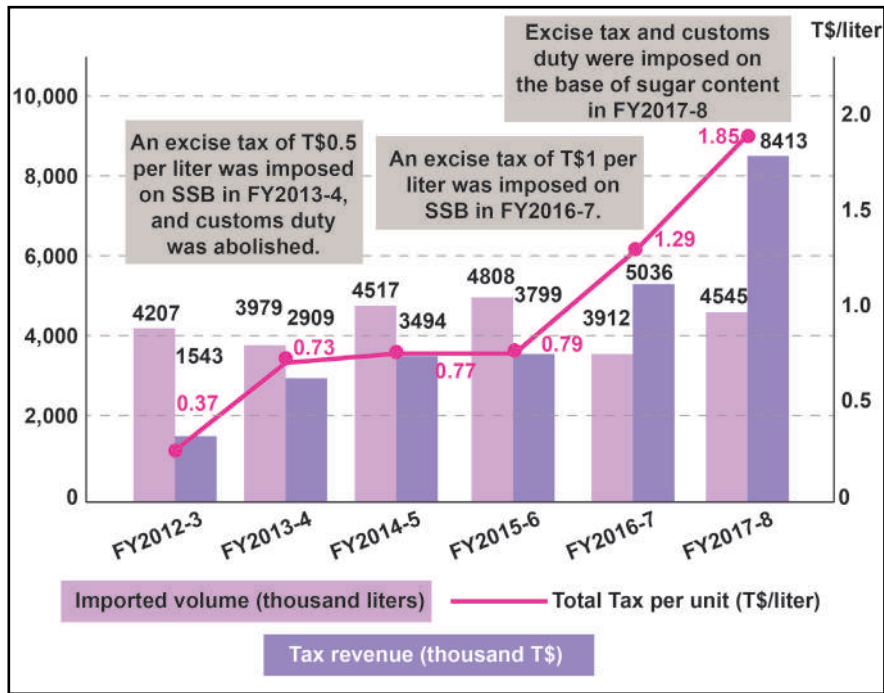
According to the household survey, nearly 76 percent of the population were aware of the price increase of SSB (see Figure 56), but just 38 percent of the population changed and reduced their consumption (see Figure 57). It is important to note that over one-third of Tongans do not consume SSB. Among SSB consumers, most consumed them once or twice per week (see Figure 58).

Figure 54: Tax per unit and retail price of sugar-sweetened beverages



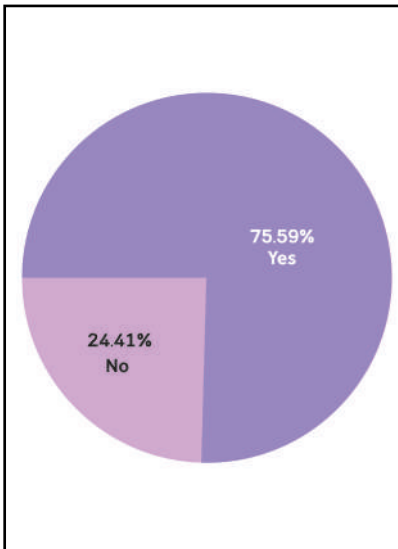
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: reproduced from the retail survey in Tonga.

Figure 55: Consumption, tax revenue and total tax per unit of SSBs



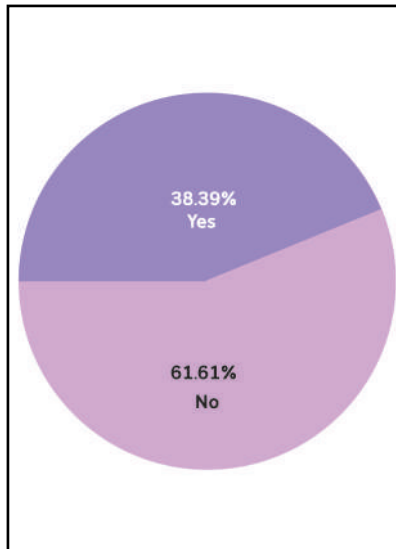
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 56: Notice of price change of SSB at baseline



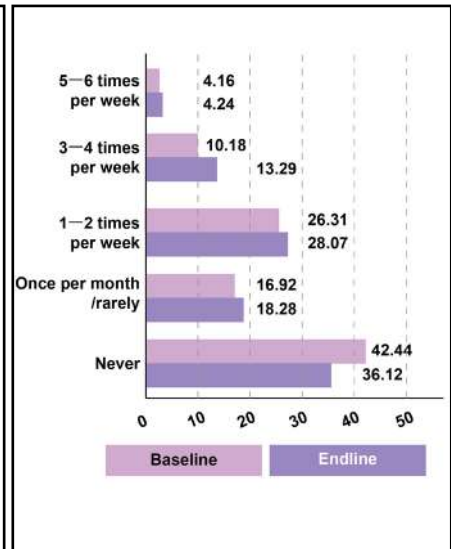
Source: Baseline survey data (2017).

Figure 57: Changed consumption behaviors of SSB at baseline



Source: Baseline survey data (2017).

Figure 58: Frequency of consumption of SSBs (baseline and endline surveys)



Source: Baseline and endline survey data (2017).

## Alcohol

**Alcohol in Tonga is subject to excise tax, consumption tax and import duty, with the aim of reducing harmful alcohol consumption.** Beers and spirits are subject to two different excise rates, while

locally manufactured beers and spirits have lower excise rates than their imported counterparts. Customs duty was imposed on imported alcohol in FY2015–6 (see Table 14).

Table 14: Tonga alcohol tax structure

Year	Excise tax		Consumption tax		Customs duty
	Imported	Locally produced	Imported	Locally produced	Imported
Jul.2014-Jun.2015	T\$50/Lal	T\$10/Lal	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2015-Jun.2016	T\$50/Lal	T\$15/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2016-Jun.2017	T\$50/Lal	T\$15/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2017-Jun.2018	T\$60/Lal	T\$20/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
<b>Tongan spirits tax structure (whisky, rum, gin, vodka, liqueurs)</b>					
Jul.2014-Jun.2015	T\$42/Lal	T\$21/Lal	15% imposed on (CIF+excise tax)	15% imposed on excise	Free
Jul.2015-Jun.2016	T\$50/Lal	T\$25/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2016-Jun.2017	T\$50/Lal	T\$25/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
Jul.2017-Jun.2018	T\$60/Lal	T\$30/Lal	15% imposed on (CIF+Customs duty +excise tax)	15% imposed on excise	15%
*Lal: Liters of alcohol contained in a mixture					

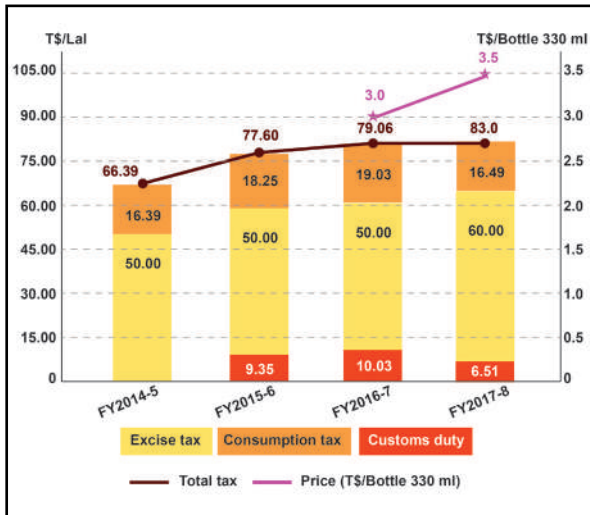
Source: Compiled by authors based on tax legislation and confirmed by officers of Ministry of Customs and Revenue.

## Beer

**An increase in excise tax on imported beer saw a rise from T\$50/Lal in FY2014–5 to T\$60/Lal in FY2017–8, with a customs duty of 15 percent being introduced in FY2015–6, leading to price increases.** This resulted in an increase of total tax from T\$66.39 per Lal in FY2014–5 to T\$83 per Lal in FY2017–8 (see Figure 59). The retail price of beer, taking Heineken as an example from the retail survey, increased from T\$3 per bottle in FY2016–7 to T\$3.5 per bottle in FY2017–8, which is approximately 16 percent increase in price.

**For locally manufactured beer, excise tax increased from T\$10/Lal in FY2014–5 to T\$15/Lal in FY2015–6, and further increased to T\$20/Lal in FY2017–8.** This resulted in an increase in total tax from T\$11.5 per Lal in FY2014–5 to T\$23 per Lal in FY2017–8 (Figure 60). The retail price of a bottle of local beer, according to the retail survey, increased from T\$2.50 to T\$2.80, which is 12 percent increase in price.

Figure 59: Tax per unit of imported beer



Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: reproduced from the retail survey in Tonga.

Figure 60: Tax per unit of local beer



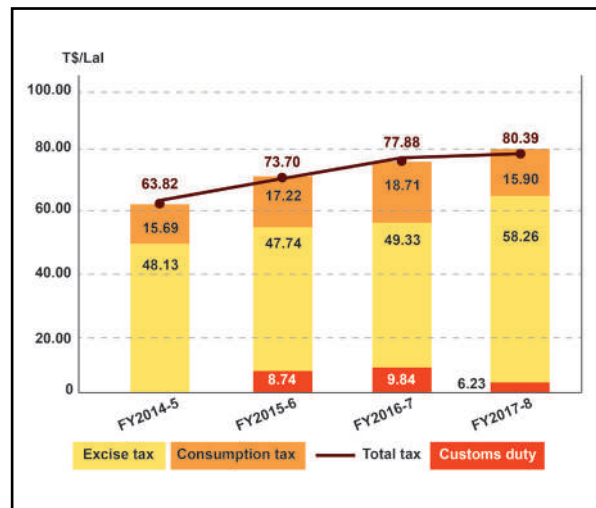
Sources: Excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga; Retail price: reproduced from the retail survey in Tonga.

The total tax per unit of imported and locally manufactured beer increased from T\$63.82 per Lal in FY2014–5 to T\$80.39 per Lal in FY2017–8 (see Figure 61).

The total tax per unit levied on imported beer increased steadily from T\$66.39 per Lal in FY2014–5 to T\$83 per Lal in FY2017–8, resulting in a decrease in imported volume and an increase in tax revenue in FY2017–8 from T\$5,547,600 to T\$6,626,400. The import volume in FY2016–7 also reduced from 98,000 Lal to 79,830 Lal, as per Figure 62.

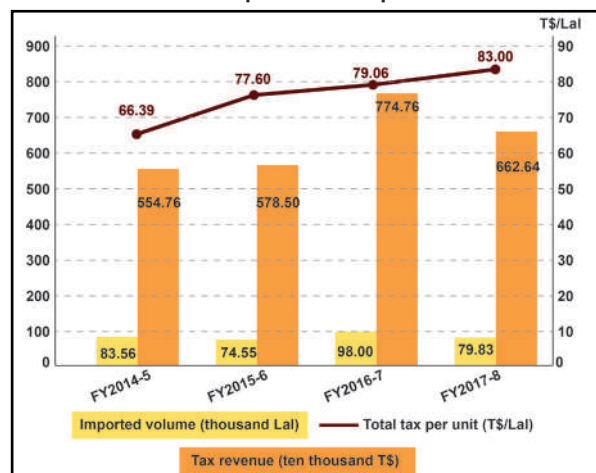
The total tax per unit levied on local beer increased steadily from T\$11.5 per Lal in FY2014–5 to T\$23 per Lal in FY2017–8, resulting in an increase in tax revenue, from T\$472,000 to T\$837,000. Comparing FY2014–5 and FY2017–8, the production volume decreased slightly from 4,100 Lal to 3,640 Lal (see Figure 63). The volume of locally produced beer is significantly smaller than that of imported beer, and has fluctuated in recent years due to disruptions in the production and manufacturing process.

Figure 61: Tax per unit of beer



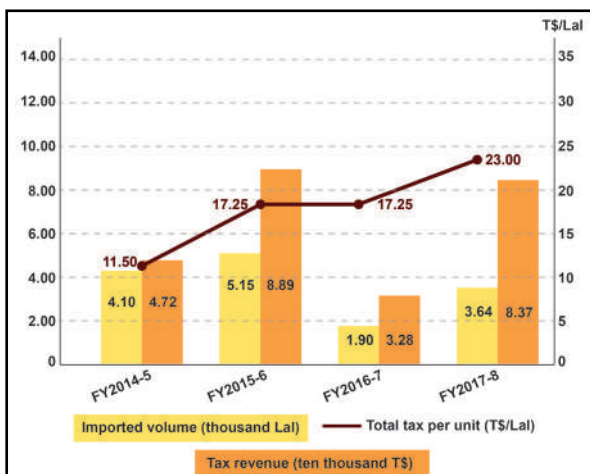
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 62: Consumption, tax revenue and total tax per unit of imported beer



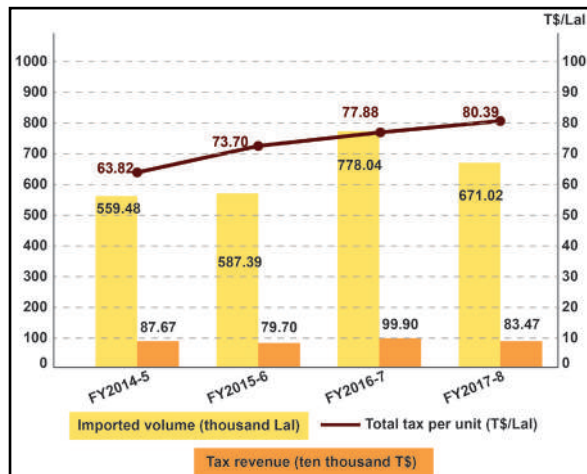
Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 63: Consumption and tax revenue, locally manufactured beer



Sources: Producing volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 64: Consumption, tax revenue and total tax per unit of beer



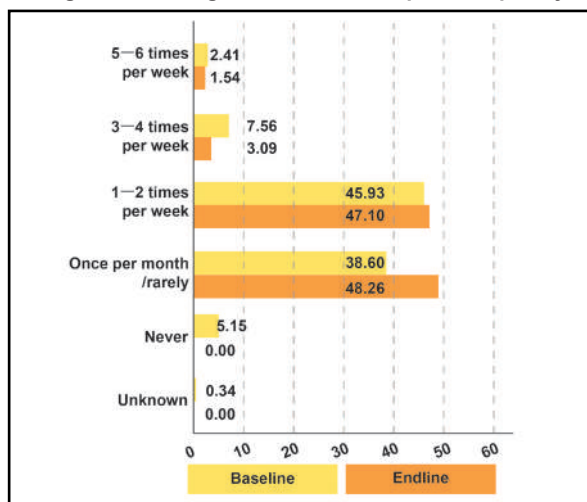
Sources: Sales volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

The total tax per unit levied on beer increased steadily from T\$63.82 per Lal in FY2014–5 to T\$80.39 per Lal in FY2017–8, resulting in drop in sales. However, tax revenue from alcohol sales increased (see Figure 64).

Higher beer prices meant people consumed beer less frequently. For example there were fewer alcohol drinkers consuming it five to six times per week and three to four times per week following the FY2017–8 alcohol tax increase, and there was a 10 percentage point increase among those who drink alcohol once per month (see Figure 65).

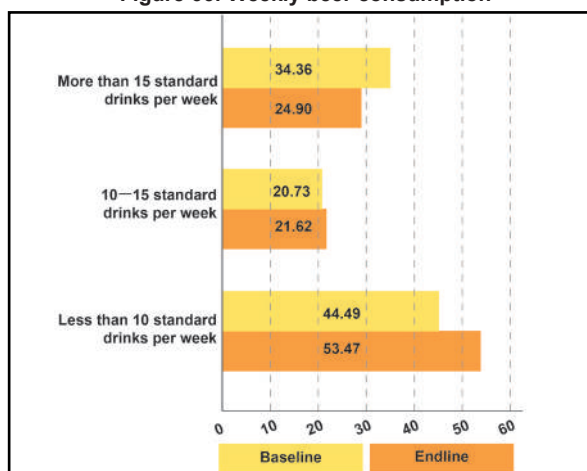
People also consumed less beer overall. Prior to the FY2017–8 tax increase, 34 percent of beer drinkers consumed more than 15 standard drinks per week. This proportion reduced to 24.9 percent following the tax increase (see Figure 66). It appears that this group may have shifted to drinking less than 10 standard drinks per week, as there was a proportionate increase among this group following the FY2017–8 tax intervention.

Figure 65: Changes in beer consumption frequency



Source: Baseline and endline survey data (2017).

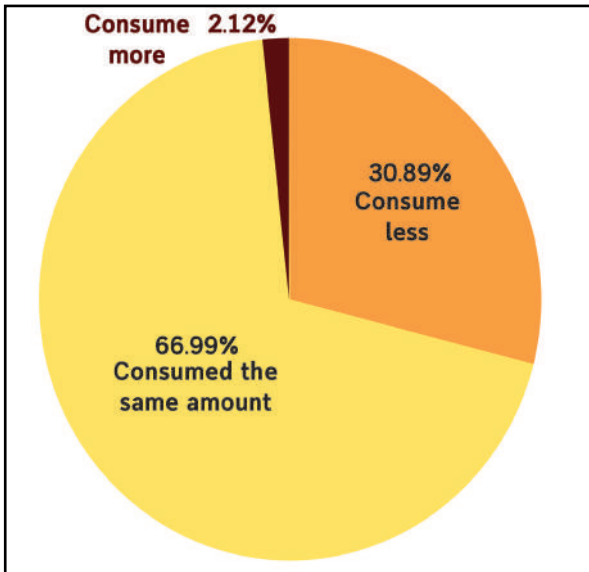
Figure 66: Weekly beer consumption



Source: Baseline and endline survey data (2017).

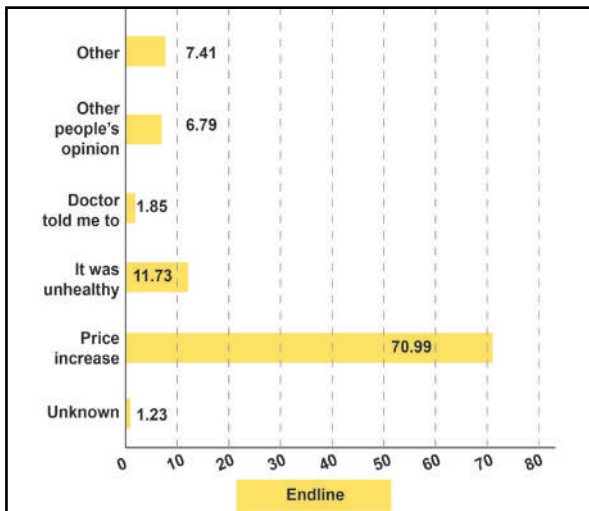


Figure 67: Change in beer consumption behaviors



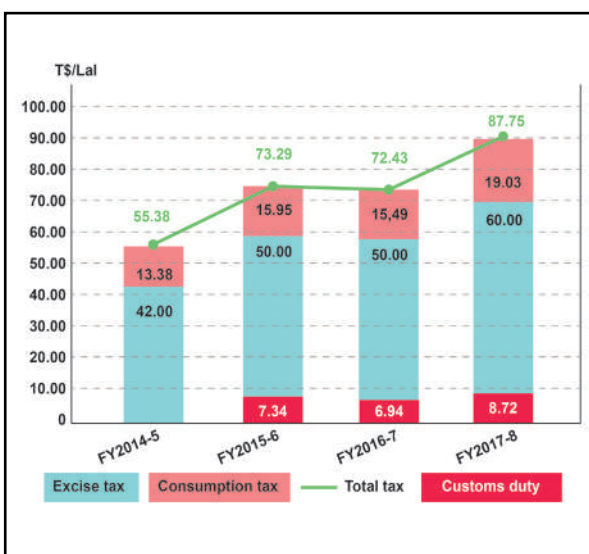
Source: Endline survey data (2017).

Figure 68: Reasons for changing alcohol consumption behaviors



Source: Endline survey data (2017).

Figure 69: Tax per unit of imported spirits



Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Overall, 30 percent of beer drinkers consumed less. The main reason for this behavior change was price (see Figure 67, Figure 68). Nevertheless, it is important to note that 67 percent of beer drinkers did not change behaviors during this period, and continued drinking.

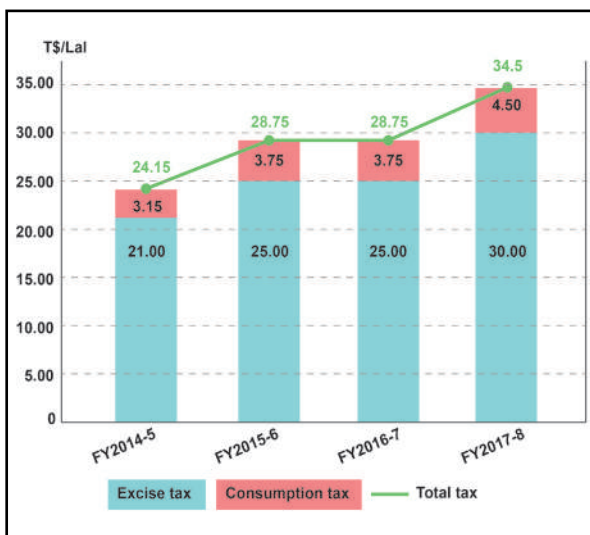
### Spirits

A customs duty of 15 percent was introduced for imported spirits in FY2015–6. Excise tax increased from T\$42/Lal in FY2014–5 to T\$50/Lal in FY2015–6, and further increased to T\$60/Lal in FY2017–8. This resulted in an increase in total tax from T\$55.38 per Lal in FY2014–5 to T\$87.75 per Lal in FY2017–8 (see Figure 69).

For locally produced spirits, excise tax increased from T\$21/Lal in FY2014–5 to T\$25/Lal in FY2015–6, then increased to T\$30/Lal in FY2017–8. This resulted in an increase in total tax from T\$24.15 per Lal in FY2014–5 to T\$34.5 per Lal in FY2017–8, (see Figure 70). The retail price of alcohol, taking Spirit Crown as an example from the retail survey, increased from T\$25 per bottle in FY 2016–7 to T\$26 per bottle in FY2017–8. In total, the total tax per unit of imported and local manufactured spirits increased from T\$52.54 per Lal in FY2014–5 to T\$79.62 per Lal in FY2017–8 (see Figure 71).

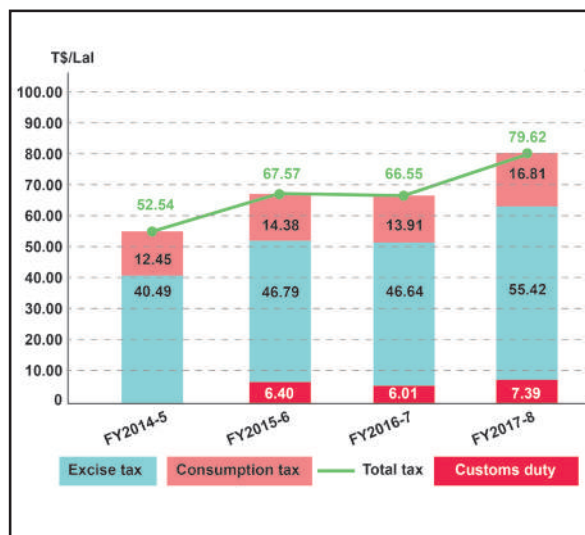
The total tax per unit levied on imported spirits increased steadily from T\$55.38 per Lal in FY2014–5 to T\$87.74 per Lal in FY2017–8. This resulted in an increase in tax revenue, from T\$2,536,700 to T\$4,204,700. Nevertheless, the amount of imported volumes decreased from 50,250 Lal in FY2016–7 to 47,920 Lal in FY2017–8, reflecting the tax increase (see Figure 72).

Figure 70: Tax per unit of locally manufactured spirits



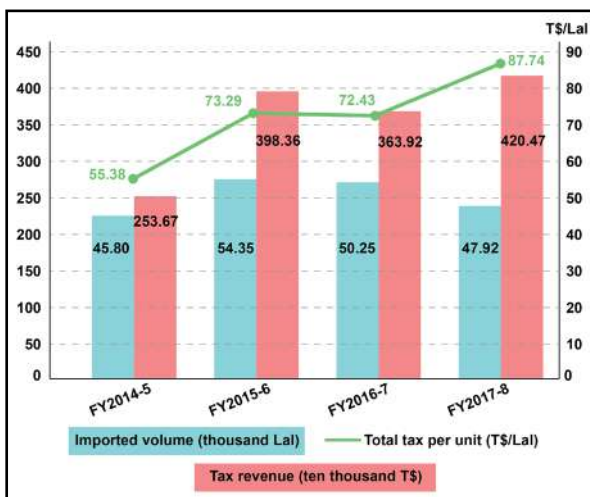
Sources: Excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 71: Tax per unit of imported spirits



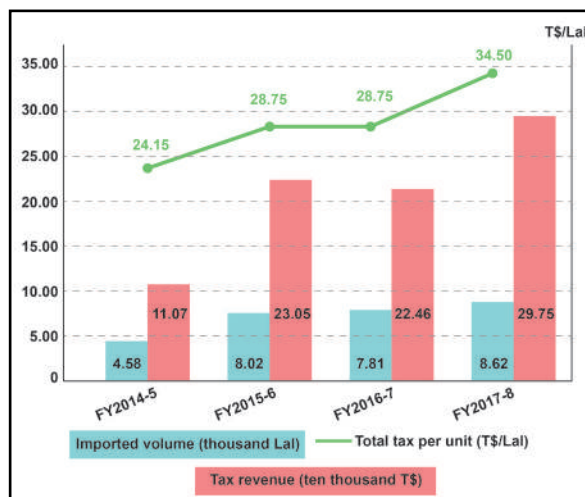
Sources: Customs duty, excise tax, consumption tax, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 72: Consumption, tax revenue and total tax per unit of imported spirits



Sources: Imported volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 73: Consumption, tax revenue and total tax per unit of locally manufactured spirit



Sources: Producing volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

The total tax per unit levied on locally manufactured spirits increased steadily from T\$24.15 per Lal in FY2014–5 to T\$34.50 per Lal in FY2017–8. This resulted in an increase in tax revenue, from T\$110,700 to T\$297,500. The production volume has also increased during the same period (see Figure 73). This could be due to the fact that locally produced spirits were subject to lower proportion of tax increases, and hence they remained cheaper than imported spirits.

The total tax per unit levied on spirits increased steadily from T\$52.54 per Lal in FY2014–5 to T\$79.62 per Lal in FY2017–8. This resulted in an increase in tax revenue, from T\$2.64 million to T\$4.50 million. However, the sales volume decreased from 58,060 Lal to 56,540 Lal (see Figure 74).

**There was a reduction in the frequency with which spirits were consumed.**

Prior to the FY2017–8 tax increase there were more drinkers consuming spirits three to four times and five to six times a week. Following the tax increase, the number of drinkers in these frequency groups fell to just 1.42 percent and 0.41 percent respectively. There were more drinkers shifting behaviors to drink once a month or rarely (see Figure 75).

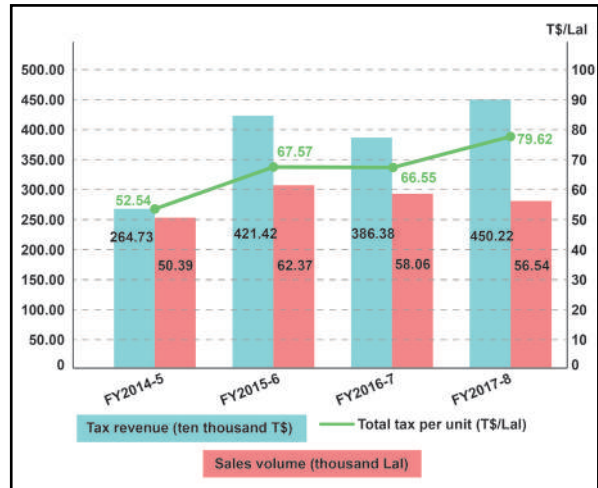
**Effects of consumption tax exemption on imported healthy products**

The Government of Tonga introduced consumption tax exemption on a number of products perceived as healthy in July 2016 in anticipation that the price of these products would fall and their consumption would rise. Key products subject to consumption tax exemption in July 2016 are listed in Figure 76.

Nevertheless, very few people were aware of the consumption tax exemption policy. Only 12.6 percent of consumers were aware that the government had exempted imported fruits and vegetables from consumption tax and even fewer were aware of the tax exemption on other food products. It is also interesting to note that not all products introduced for the tax exemption in July 2016 were healthy, e.g. sausages and ham.

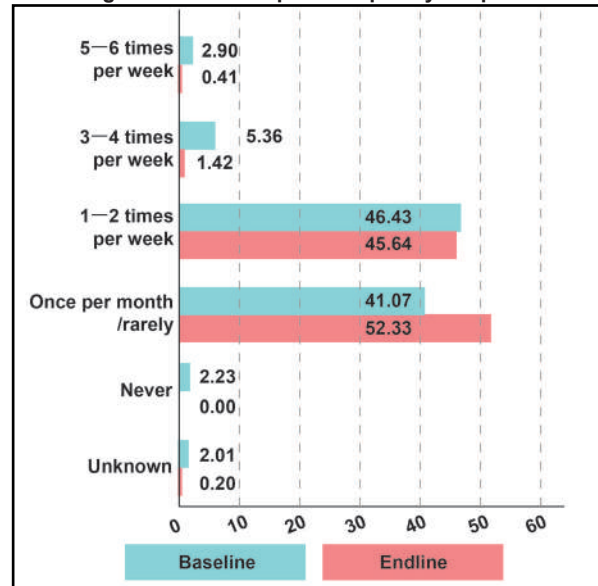
The World Bank research team decided to focus on imported fruits, which are easily accessible to Tongans from markets, and used the household survey as the main tool to assess the impact of consumption tax exemption policy. Apples and oranges are the most common and accessible imported fruits in Tonga, and were selected as the proxy of imported fruits.

Figure 74: Consumption, tax revenue and total tax per unit of spirits



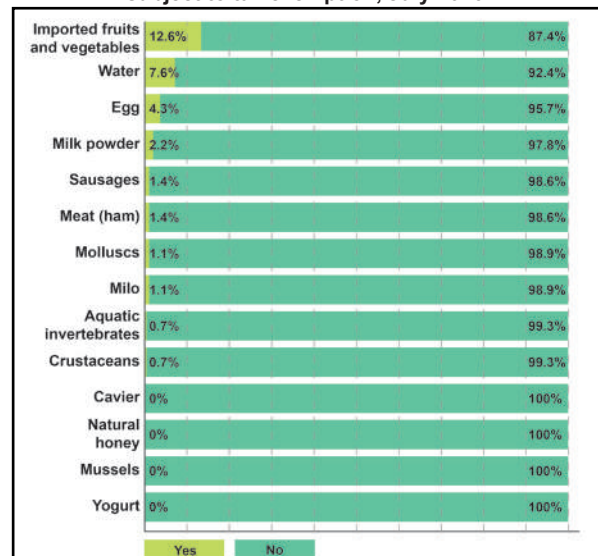
Sources: Sales volume, tax revenue, and total tax: sourced from the Ministry of Revenue & Customs, Tonga.

Figure 75: Consumption frequency of spirits



Source: Baseline and endline survey data (2017).

Figure 76: Public knowledge of food products subject to tax exemption, July 2016



Source: Baseline survey data (2017).

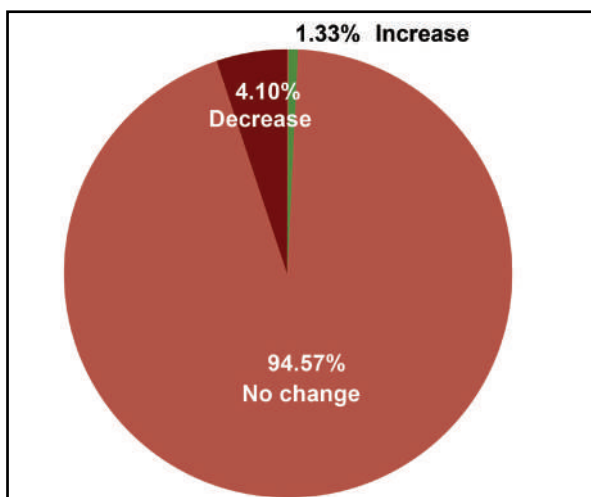
## Apples

**Consumption tax exemption was not passed on to consumers – prices stayed the same despite consumption tax exemption.** Before the tax exemption, a bag of four or five apples cost T\$5 per bag. Following the tax exemption, 94 percent of Tongans reported that the price remained the same (see Figure 77), while nearly half stated that the amount of apples decreased (see Figure 78).



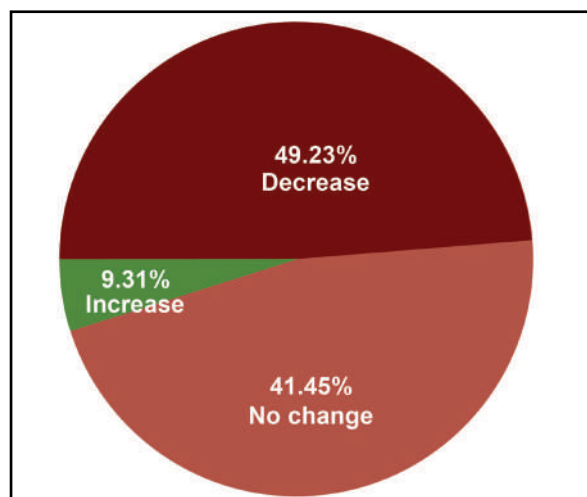
Picture 8: Apples sold above maximum price set by the Competent Authorities

Figure 77: Change in price after the tax exemption policy



Source: Baseline survey data (2017).

Figure 78: Quantity of apples following the tax exemption policy

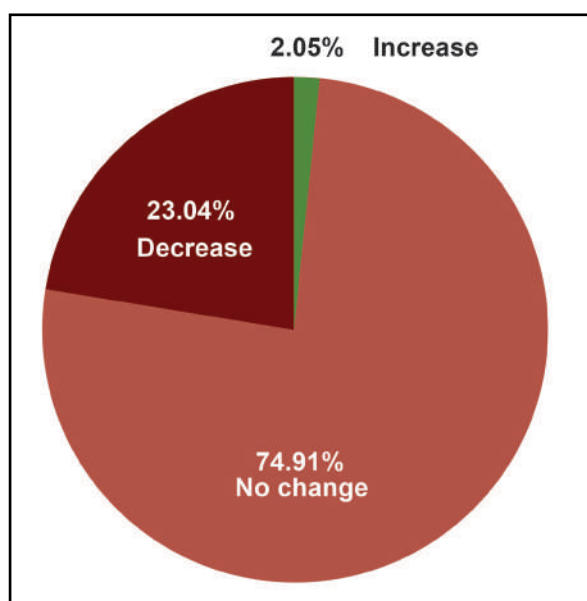


Source: Baseline survey data (2017).

**Most people did not change behaviors in consuming imported apples.** As the price did not change, 75 percent of Tongans' apple consumption behaviors also remained the same, and approximately 23 percent decreased their apple consumption.

**Several shops sold apples above the maximum price set by the Competent Authorities.** The maximum price for apples set by the Competent Authorities for July 2018 was T\$3.89 per kg. However, the price of apples sold in markets was found to be above this maximum price during the same period. As an example, a shop in Nuku'alofa sold the bag of apples in Picture 8 for T\$5, though the bag weighed only 950 grams.

Figure 79: Apple consumption behaviors



Source: Baseline survey data (2017).

## Oranges

### Most Tongans did not change their behaviors in consuming oranges.

Like apples, oranges in Tonga are sold by the bag and not weighed as shown in Picture 9. While the number of oranges inside a bag may have varied, the price of a bag of oranges did not change. It was T\$5 before the tax exemption policy, and remained the same after the tax exemption policy.

### Several shops sold oranges above the maximum price set by the Competent Authorities.

The maximum price for oranges set by the Competent Authorities for July 2018 was T\$5.7 per kg. However, the price of oranges sold in markets was found to be above this maximum price during the same period. As an example, a shop in Nuku'alofa sold the bag of oranges in Picture 10 for T\$5, though the bag weighed only 600 grams.



Picture 9: Oranges as commonly sold in Tonga – in bags and not weighed



Picture 10: Oranges sold above the maximum price set by the Competent Authorities



# Views from Communities



**This chapter presents key findings from focus group discussions with communities in Tongatapu and Vava'u, and takes into account gender, urban/rural, and socio-economic status aspects.**

## **Food**

**The majority of rural and urban women and men in Tongatapu and Vava'u were not aware of the NCD food tax implementation in 2016 and 2017, or why it happened.** Most said they only noticed a price increase when they went shopping but did not know about the new taxes. When asked what was driving the tax reform they thought it was to finance civil servants' salaries, to enhance revenues to fund government activities, and/or to reduce consumption of unhealthy foods, tobacco and alcohol.

**There was confusion and misunderstanding about price changes made by individual retailers, with many consumers initially blaming retailers for raising their prices.** It was shared during a focus group discussion in Neiafu that "Chinese shop owners decide by themselves on price increases and when they come into effect. People sometimes blame the government, but in some ways it is the Chinese business people. Government is straightforward." Similarly, an interviewed Principal Enforcement Officer at the Ministry of Commerce reported more incidents of retailers charging more than the price rise recommended by the Price and Wage Control Act.

**Most of those who knew of the NCD tax policy learnt about it through radio broadcasts such as live Parliament sessions, although the communities would have liked the policy to be communicated through multiple media channels and be given an opportunity to provide feedback before the tax**

**came into force.** Those who learned about the tax policy from the radio said they felt that the broadcast information did not make it clear which goods were taxed and which were not. It was suggested that the information about NCD tax should be communicated more clearly and not only through television and radio, but also via Facebook, the churches, and newspapers. Facebook was seen as an important form of communication. Reference was made to a Facebook page called "Tonganow". Other suggestions included: voicemails, door-to-door messaging, and village meetings. Village workshops with face-to-face discussions were also proposed, in particular to avoid potential misunderstandings. Reference was made to the Tongan Communications Corporation which uses mobile phones for public information alerts such as cyclone warnings.

**Reactions on the food tax were mixed.** While many participants partly supported the government's move, viewpoints differed between locations, socio-economic status, and by the availability of healthier food options (e.g. seafood). Where households catch fish and seafood themselves, or have access to affordable fish and seafood, people welcomed the tax. While many see the potential health benefits and reduced mortalities (or premature death) as a result of increasing tax, many believed that an economic approach alone cannot solve behavioral problems related to food consumption.

**Box 2: The impact of food tax on consumption among different socio-economic groups**

Communities made it clear that the food tax increase affected poor communities in three ways. First, not so well-off households struggled to make ends meet due to the increase, which in some cases led to delayed payments of household bills. Second, the increase in the price of chicken meat and the absence of affordable fresh fish, seafood, or plant protein pushed people to turn to unhealthy alternatives (e.g. corned beef and salted beef). Third, tight household budgets did not allow households to explore new ways of eating (e.g. buying more fruit). It was reported that rising food prices were particularly difficult for families with large numbers of children. Coping mechanisms were in place for those able to prepare traditional foods or vegetarian meals and with access to home grown produce or seafoods. In comparison, well-off households could afford to continue to eat as before.

Regardless of socio-economic status, all Tongan people are united by their culinary traditions which include taste preferences for fatty foods, large portions and feasts. Fruit and vegetable consumption was found to be low throughout all socio-economic groups before the tax policies.

More effective nutrition education on adequate portion sizes and healthier ways of cooking (e.g. with more vegetables and smaller amounts of meat) may be the way forward to bring about positive, affordable dietary change across all socio-economic groups. Cases of positive behavior change and innovative thinking have been observed across all socio-economic groups. However, healthier dietary change usually takes place first among well-off groups (trend setters) with spill-over effects to other groups at a later stage.

**Many focus group discussion participants in Tongatapu and Vava'u were concerned with the effects of tax increases on poor communities and the unemployed who cannot afford to buy healthy food alternatives.** They compared the situation with policy measures in other countries, stating that in other countries expensive meats can be substituted with quality food. In comparison, they claimed, Tongans do not have healthy affordable food choices. They gave an example that ex-patriates and government workers can eat T\$50 dishes of quality food. "Poor and less well-off families, in turn, could only afford T\$5 [poor quality] take-aways." Not well-off women in Neiafu reported that it is difficult to make ends meet, which includes late payment of bills and late repayment of loans. It was found the situation was particularly difficult for families with large numbers of children. People think of fishing and planting pele (a type of spinach) or economizing (e.g. preparing simple pancakes

made from flour, sugar and oil) as coping strategies. "In this way it keeps us out of hardship and deficiency," one woman said.

**Mutton flaps and turkey tails were eaten less often and in smaller amounts, with increased prices being the main factor for reduced consumption.** Many stated that before the price increase they were able to buy 1–3kg mutton flaps several days per week, but now they could only afford to buy mutton flaps to consume on Sundays. Rural and less well-off men in Tongatapu reported lower consumption of mutton only because of the scarcity of money. "Once we have money, it is better for us to eat a tiny amount of mutton, rather than a kilogram of chicken or other meat." Similar to mutton flaps, turkey tails are still popular and people would buy turkey tails if they could afford them: "If we got some more [money], there would be more consumption [of turkey tails]." It is important to note that youth eat differently; they rarely eat mutton flaps and turkey tails.



**Mutton flaps and turkey tails are mainly replaced by chicken, while beef and fish are also alternatives.** People reported that instead of buying 1 kg of mutton they would buy 3 kg of chicken, which can feed a whole family for the same price. The price of chicken varies along the retail chain. Price ranges were reported of between T\$2-3 in Tongatapu and T\$4-5 in Vava'u. Canned fish was found to be another popular alternative to fatty meat. It is important to note that low-income earners reported that they were negatively affected by increasing chicken prices, yet chicken remains the cheapest meat on the market.

**Instant noodle consumption has not decreased and instant noodles remain popular.** Women in Tongatapu said the price of instant noodles was still low, with one trader reporting “[they] turn over fast in my shop”. Yet prices are rising. Rural men in Tongatapu reported that noodles are very easy to prepare which is attractive, while not so well-off women from Neiafu reported that noodles “cause health problems”. Some people had stopped eating them, and some said the government should prohibit noodles all together. Women also suggested a return to diet of the past and a stop to making expensive food choices.

**Children in particular are hooked on noodles and artificial flavors. Previously, noodles were not common, but it was observed that as a result of the presence of Chinese traders, Chinese foods were introduced.** Over time, noodles became very popular, particularly among children. Children eat them raw, for breakfast (as a meal), or as snack or for lunch. It was reported that children do not favor traditional foods. Focus group discussion participants gave an example: “If we offer la'ipele (Tongan spinach) children do not like it.” By contrast, when serving imported or local noodles, “they devour [them]”, both local and

imported noodles alike. Men in Ma'ufanga pointed out local noodles are not as popular as imported ones.

**Sodas remain popular, yet as the price increased, consumers chose cheaper brands.** Sprite and Coca Cola (at T\$2.50 per bottle) do not sell well anymore, but locally manufactured SSB (e.g. South Star), which is T\$1.50 per bottle, has become very popular. In particular, children have an appetite for flavored drinks high in refined sugar, and SSBs are still very popular during meetings and church gatherings.

**The majority of participants reported that fresh fish has become expensive, though consumption behaviors varied. All participants want fresh fish to become cheaper.** The well-off group in Tongatapu said: “Fish is expensive, but we know it is safe and good. We don't go for cheap, we only go for what is safe (for consumption).” The less well-off in Tongatapu find fresh fish too expensive and eat canned fish instead. If fish were cheaper, the common view was that it would be more popular. Rural women in Tongatapu were not aware of the Ministry of Fisheries program to sell fish at T\$5 per kg. They thought the program “only benefits Nuku'alofa residents who have easy access to this program”, stating that they themselves had to buy fish at a higher price.

**Middlemen may contribute to higher prices among healthy products.** For example, some farmers prefer to retain their crops and then export them or bring them to middlemen. Not so well-off men in Ha'asini said some farmers “will only sell their produce locally if there is a pressing need for cash. Farmers who sell [produce] at the market, say a bag of yams for T\$20, are bought out by middle-men (called 'kau hali'). They raise the prices ridiculously, up to T\$50—70. These middle men should be paying lots of taxes.” It was reported that introducing business licenses may

not be an easy solution as financial benefits for middlemen are high, e.g. a fine may cost just T\$5 while financial gains from sales may be as high as T\$100.

**Dietary choices are driven by taste rather than nutrient content.** Well-off people in Ma'ufanga highlight that people “don't think about nutrients. People go for sugary and salty taste”. Yet, this group in Ma'ufanga was able to give an example of a healthy and sweet food which they said is tasty: banana and oats in the morning, providing evidence that innovation in diets can occur.

**Having a big meal is part of Tongan culture and being obese is accepted.** One respondent coined it like “eat till you can't fit through the door”. There is also the culture to encourage others to eat more. They noticed that people in other countries eat differently and less heavily. In Tonga, they claimed, each meal is exceptionally large, and people have an “appetite” for fatty food, which “requires fatty food to quench”. People also reported that they grew up with mutton flaps and developed a taste for it. Overall, people reported that while buying and consumption patterns may change as a result of price increases, the “craving” remained. Nevertheless, communities also reported the generational difference in meat preference – while adults prefer red meat, “children love chicken”.

**The church can provide a positive influence on congregations.** Traditionally, church gatherings that could last up to a week offered excessive food and provided up to five or six meals a day. Today the practice is perceived as ‘unhealthy’ and in recent years behavior has changed. For example, traditional feasts now serve food in individual bowls (instead of at buffets), and there are vegetarian feasts, and watermelon juice instead of SSBs. Church leaders and nobles are seen as



“influencers” and people tend to follow their examples. However, traditions are not easy to change for everybody. When asked how it would be to show up at a funeral with vegetables, it was reported that one would be subject to ridicule: “Your descendants would carry the shame, [and people] would throw the veggies at you.”

**While consumption of unhealthy food is prevalent in Tonga, there are examples of healthy eating among some Tongans.** Many have older relatives and observed that their traditional diets kept them healthy. “We didn't hear of diabetes amongst our mothers and fathers, they lived into their 90s on meals of crops and la'ipele (Tongan spinach) boiled with coconut cream. I still have that meal, but my children have no appetite for it. I tell them to eat as I do. I don't eat noodles, I never will.” Another woman recalled her mother eating vegetables such as plantain and sweet potato cooked with the skin. “So I have [lived] on that. I ask my children to do so. My grandmother who lived to her 90s had the same meal. The challenge is that we cannot make a



return to that kind of meal. We have now moved to an age where we are driven by taste. [People] want a big piece of fatty meat. If we [were] to return to the past and eat vegetables, Tonga [would] be a healthy nation again.” Some also observed that foreigners eat a lot of vegetables. One woman reported that she started to grow vegetables for sale, and also for home consumption which – according to her – is much better than buying “all sorts of high fat meats”. Another woman said: “I challenge you ladies to make a return to traditional foods – pawpaw (papaya) and coconut in the morning, taro

leaves with coconut cream without chicken. Let’s return to the traditional foods, what we were used to, if we can do it for our children, then diabetes will be on the decline and medications will not be needed.”

**Some people expressed the need to introduce culinary innovations and voiced demand for fresh local produce.**

A group of rural men said: “If we continue to cling to the old ways we will miss out on many things. It is important for us to examine how change is happening. We can try something new, say replace meats with taro leaves and other things.” In order to replace SSBs, some people were using natural ingredients such as kola limes, water melon, coconut, and lemongrass to make drinks. Sweetened ice blocks, coffee and tea were reported as substitutes for ice cream. Also, it was reported that some women had started using eggplant, which was not considered edible in the past. On the supply side, one retailer reported selling home-made caramel sauce and coconut cream instead of manufactured versions.

**People recalled the late king HM Tupou IV and his efforts to lose weight. It is known that he undertook physical exercise, in particular cycling.** He died of natural causes at the aged 86 years. People see this as evidence that NCDs can be addressed successfully.

**Box 3: Response to the food tax – urban and rural differences**

**Urban areas**

The overall impact of the policy intervention was considered to be minimal for well-off urban families, while not well-off urban families lowered their consumption of unhealthy food (particularly mutton flaps, etc.). Demand for instant noodles remained the same because of the absence of a good replacement for young people.

**Rural areas**

In rural areas, the impact of the policy intervention was observed in both well-off and not well-off families. Healthy alternative food is more available to rural families compared to urban areas (families use more local foods such as taro leaves, local spinach ‘Pele’ and even seafood).

## Tobacco

**The majority of smokers across Tonga reported shifting to use Tapaka Tonga and buying fewer manufactured cigarettes.** This effect was more pronounced among men and in rural areas. Not many female smokers in Vava'u reported the shift to Tapaka Tonga, as they did not like the taste; instead, they bought fewer cigarettes. More women in Tongatapu appeared to shift to Tapaka Tonga, like men.

**A pack of Tapaka Tonga lasts much longer than a pack of cigarettes.** Smokers in Tongatapu reported that in the past they bought two packs of cigarettes a day (T\$14–15 per pack) but the tax prompted a shift to Tapaka Tonga – a bag of which costs T\$5 per pack and lasts for one week. In Vava'u, people reported that a packet of Tapaka Tonga lasted for three days, while a pack of manufactured cigarettes would only last for one evening at a kava party.

**People reported unfair business practices by traders.** They recalled one instance in 2018 when a shortage of cigarette rolling papers was perceived as a move to encourage people to buy imported Palataisi cigarettes. Also, it was reported that some Chinese traders placed a high mark-up on the price of cigarette rolling paper. It was reported that several Chinese-owned shops do not provide receipts and have no cash register machines, while others do not keep sales records. Chinese shops are reported “to set mark-ups as they please. Sugar is allowed a 10 percent [price increase], but [they] apply 15 percent. This contributes to price fluctuations and confuses consumers on the real reasons why prices are increasing”.



**There was mixed feedback on women’s experience of the tobacco tax.** Some said they smoked when they had enough money, and if there were a shortage of money, they would sacrifice their cigarettes in favor of buying food. However, one woman reported, “my children know that smoking is very important for me, they would rather give back to me their lunch money so I can smoke”. Another said: “I don’t care if they don’t have lunch, I would rather smoke and stay at home and get my work done, if not I won’t get anything done as I really need my cigarettes.”

**It was also reported that smoking caused marital problems.** For example a woman from Tongatapu said: “Because my husband can sacrifice in order for our family to have food, I will return from the shop with a pack of Pall Mall. And then we have an argument. They can go ahead and eat, I will sit and smoke, that’s more important.” Similarly, another woman stated that “the cigarette is like a big and important thing for me. If we were to record our daily shopping, we would notice that cigarettes make up a big portion of the expenses even to the extent of cutting down on family needs in order to save money for a pack of smokes”.

**Many smokers did not appreciate anti-smoking TV ads.** Some women believed that everyone already knows the risks to health, but they still smoked: “It is a waste of time and effort to have programs to create awareness.” The concept of ‘let’s eat and let’s talk’ is preferred. “Now”, one woman explains “when there’s something on TV, I turn the TV off and go do something else. That’s the truth.” Another woman said: “I could damage the TV for broadcasting anti-tobacco programs. My father has the same attitude.”

**There is a recommendation for anti-smoking efforts to focus on youths:** “We ‘old dogs’ can’t learn new tricks”, said a man from Ma’ufanga, Tongatapu. The group suggested that the Government used the resources to target youth, and to get youth to address the problem of teen/young adults smoking.

## Alcohol

**Overall, consumption of beer and spirits has fallen.** Occasional drinkers and daily drinkers reacted differently to the alcohol tax. Occasional drinkers reduced their consumption while daily drinkers hardly changed their consumption behaviors.

**Alcohol consumption needs to be seen in the larger social context and requires more research.** Though the overall purchase of alcohol has fallen, some people who do not (or cannot) buy alcohol themselves were offered or given drinks by other people. For example, those on low incomes who want a drink rely on friends to provide it. This practice is common and has the name “piggybacking” (‘namu’). Also, some said alcohol consumption is not on the decline, but rather increasing and needs to be better surveyed. The increased consumption is not observed in people drinking in groups (or public), but rather in private, e.g. in their vehicles or at home, as reported by men from Ha’asini. Information on youth- and alcohol-related offences could also be sought. Participants also questioned why government functions still plentifully served alcoholic drinks.

**For men, kava is a main substitute.**

Urban, well-off men said that in the past, alcohol was cheap and affordable, while these days, “one is more selfish. Say for me, I will buy just one drink and leave it at home, then I’ll go to the kava party and drink kava. At the end of that session, I’ll go home and finish off with my beer”. And though the price of kava Tonga has risen from T\$25 to T\$150 per kg, consumption has not fallen.

**There are also reports of the uptake of dangerous substitutes.**

Some people have switched to home brewed alcohol, while others have switched to marijuana and ice (crystal methamphetamine). Under the influence of ice, people reported they do not really know what they are doing (e.g. they could “commit murder without knowing”

or “say offensive words to parents”). Increased tobacco prices have also seen younger people shifting to sniffing glue bought at repair shops. Glue sniffing was reported also among primary students. Meanwhile, other Tongans have switched to smoking Tapaka Tonga.

**Future of NCD tax**

**Most participants in the focus group discussions did not support further increases in food taxation, mainly for economic reasons.** The few who did express support mentioned health as the main reason. Non-smokers are generally supportive of the tobacco tax, while smokers are not satisfied with the increased tax on tobacco.

**Box 4: Impact of taxes on retailers**

Most retail stores had heard about the tax increases in July 2016 and July 2017. They heard about the tax via newspapers and television.

All retail stores increased their price mark ups as a result of the tax. However, they also reported difficulties in maintaining their customer base while having to raise prices. Several retailers shared that they faced challenges of fluctuating prices, which were passed on to them by Chinese middlemen.

Most retailers faced reduced sales of key products that were subject to the tax increase, particularly manufactured cigarettes, mutton flaps, turkey tails, and ice cream. According to small retail stores, they used to sell one carton of cigarettes per day prior to the tax increase, but “nowadays one carton lasts two days.” Another retail store reported that before the tax they sold one carton of mutton flaps a day, “now it [one carton of mutton flaps] lasts two days”. At the same time, sales of Tapaka Tonga have risen significantly. Retailers also reported that customers brought significantly fewer mutton flaps and turkey tails, so they had to stock fewer of these products, and that customers substituted mutton flaps and turkey tails with chicken.

Several retail stores reported that the NCD tax negatively impacted their sales and incomes. A retail store in Tongatapu said: “[Tax] had a big impact. When prices increase, customers leave and goods don’t turn over, and we don’t get profit. Our cash flow is slow.” Several retailers in Tongatapu reported that customers thought they (the retail stores) raised the price for their own ends, and “asked why”.

While sales of many products that are subject to NCD tax dropped, sales of cheaper goods that are not subject to NCD tax were unaffected. While NCD tax made cigarettes, mutton flaps, and turkey tails more expensive and their sales dropped, sales of cheaper products such as imported instant noodles remained high, as their price is still low.

**While the NCD tax is generally not popular, the communities would be more supportive if the government could demonstrate that revenue from the NCD tax was going to the following areas:**

- Support for health-promotion activities and making healthy food cheaper, including subsidizing the price of fish.
- Engagement with the private sector to make healthy food more accessible and providing tailored support to Tongan retailers to help them stay competitive.
- Creating scholarships for young people to have advanced study abroad and come back to serve the country.

- Support for domestic vegetable production or chicken farms.
- Support for medical equipment, improving medical service delivery.
- Developing public sports facilities and annual health weeks/programs.
- Support for retirement benefits.

**Communities advised that the following can have a strong (either positive or negative) influence on healthy lifestyles:**

- Cultural obligations and traditions
- Church leaders
- Community leaders and nobles

#### Box 5: Women's and men's perspectives on NCD tax

##### Food

Female focus group discussion participants are a lot more eager than men to introduce healthy diets to their families if healthy choices are made available through government support. Male participants are more curious to know how the NCD tax revenues are used by the government, and in what way that will allow for more healthy diets and choices for the public (e.g. subsidizing the fuel of local fishermen). In rural areas, female participants are very specific in their needs for family empowerment to introduce healthy behaviors such as providing cooking classes, supporting home gardening, chicken and sheep farming.

Male participants would like to see more visible government commitments in terms of supporting rural communities, specifically on health education, benefits from the Ministry of Fisheries' healthy initiatives, support for subsistence farming and greater engagement in discussion of health policy interventions.

##### Tobacco and alcohol consumption

Policy interventions yielded limited benefits for well-off women in both urban and rural areas. Higher priced tobacco and alcohol products are not a significant barrier for well-off women regardless of where they live. These products are still affordable for well-off women, while the Tobacco Quitline support services, in their current form, may not be appealing to well-off women.

There are differences in the shift to Tapaka Tonga between men and women. Significant numbers of men, regardless of their socio-economic status and where they are from (both Tongatapu and Vava'u) shifted to Tapaka Tonga, though this affected less well-off men more. In Vava'u, more men shifted from manufactured cigarettes to Tapaka Tonga. Female smokers in Vava'u appeared to resist the shift to Tapaka Tonga as they did not like its strong taste. However, in Tongatapu, more women also shifted to Tapaka Tonga, though well-off women kept smoking manufactured cigarettes.

Men are more inclined to look for and use alternatives for alcohol products such as homebrew, sniffing glue (outer island boys at high-school age), and drugs (youth in both rural and urban areas of Tongatapu). Some women and men are prepared to sacrifice their family's financial commitments such as school fees, bills etc. in order to fulfill their personal desire for tobacco and alcohol.

# Discussion





**Positive impacts from the NCD tax policy have been observed.** The excise tax resulted in price increases in all taxed products, made cigarettes less affordable and affected the behaviors of smokers. Tax on cigarettes had a greater effect on “less well-off” smokers, as more less well-off smokers reduced consumption of manufactured cigarettes. This is consistent with the *Lancet* findings on the equity impacts of price policies. Price, rather than health, is the main reason among those who decided to change behaviors and reduced consumption.

**Nevertheless, the positive impacts of the tobacco tax policy in Tonga have been diluted by the availability of cheaper substitutes.** There was a shift from more expensive brands of cigarettes to cheaper brands, particularly locally manufactured cigarettes that are subject to less tobacco tax. But more importantly, there was a big shift from manufactured cigarettes to the untaxed Tapaka Tonga. Today, most tobacco users in Tonga smoke Tapaka Tonga.

**Tapaka Tonga is no less harmful to health than manufactured cigarettes. Many Tongans misunderstood that Tapaka Tonga is less harmful than manufactured cigarettes, and some even thought that it was “healthy” given that it has been marketed as “organic tobacco”.** However, according to WHO analysis, like manufactured cigarettes, Tapaka Tonga contains many toxic chemicals, including nicotine, formaldehyde, acetaldehyde, acetone, acrolein, propionaldehyde, crotonaldehyde, butyraldehyde, and 2-butanone. The amount of nicotine in Tapaka Tonga is proportionately higher than that of manufactured cigarettes.<sup>33</sup>

**Tapaka Tonga is the key unhealthy substitute to manufactured cigarettes; and is cheap and widely accessible in shops.** According to the Ministry of Revenue and Customs, over 90 percent of Tongan shops sell Tapaka Tonga. According to interviews, retailers pay manufacturers just T\$2-3 per pack of Tapaka Tonga, and retail it to consumers at a price of T\$6-7. Tapaka Tonga is currently not taxed and is very profitable to retailers.

**Increased excise tax has led to a decrease in the frequency and amount of alcohol products consumed, however, a shift to substitutes has been observed.** Significant numbers of drinkers have shifted to kava. There is also an increased incidence of substance abuse, including marijuana, glue/petrol sniffing, and crystal methamphetamine, though it is not clear whether this is related to the increased excise tax.

**Food consumers do not always respond to price increases.** While excise tax on turkey tails, mutton flaps, and ice cream helped reduce consumption of these products, it had very limited effects on the consumption of chicken leg quarters. In addition, the tax on chicken leg quarters appeared to have regressive effects on less well-off households. Despite the price increase due to tax, chicken leg quarters remained the cheapest meat in the market, and less well-off households did not have access to cheaper or more healthy options in the market. Consequently, the tax on chicken leg quarters took a proportionately greater amount of financial resources from those with lower incomes.

<sup>33</sup> Health Science Authority of Singapore report, 2 April 2013 (obtained from World Health Organization).

**Lack of affordable healthy food alternatives remain a major issue in Tonga.** More policy interventions are needed to make healthy food more affordable, accessible and tasty. For example, fresh fish is highly desirable, but less well-off households reported that they cannot consume fresh fish on a regular basis due to the high price. Canned fish, which is currently consumed instead of fresh fish, often contains added oil and salt and the lining in cans could also include unhealthy chemicals (e.g. BPA).<sup>34</sup>

**The exemption of consumption tax on selected healthy products (e.g., imported fruits) did not result in lower retail prices or higher consumption of these products.** The price of imported fruits remained the same, despite the removal of the 15 percent consumption tax, meaning that the benefits of the tax exemption went to traders, not consumers.<sup>35</sup>

**The promise of changes in diet as a result of excise taxes on unhealthy products is there, but more dramatic changes in local diets are needed.** The findings from the focus group discussions suggest an overall reduction in the quantity and frequency of the consumption of mutton flaps, turkey tails, and a general shift toward the consumption of chicken leg quarters and tinned fish. However, to effectively address NCDs, a more significantly reduced intake of calories, total fat, animal-based protein, refined sugar, and salt is needed, together with an increased intake in polyunsaturated fats, fiber, vitamins, and phytonutrients (see Table 15).

Table 15: Observed and desired behavior change and dietary outcomes

Observed behavior change	Dietary outcome
Reduction in quantity and frequency of consumption of mutton flaps and turkey tails and general shift toward consumption of chicken leg quarters and tinned fish	Likely reduction in intake in saturated fats, however, with the continuous consumption of large amounts of animal-based food on a daily basis, overall intake of calories, total fat, protein and salt would need further reduction
Limited reduction in quantity of consumption of ice cream, SSBs and some increased consumption of local juices, water and coconut water (e.g. at church meetings)	Small reduction in caloric intake, in particular of sugar
No change in consumption of fresh fruits and vegetables	No increase in intake of fiber, vitamins, minerals, etc.
Desired behavior change	Dietary outcome
Significantly reduced consumption of animal-based protein, removal of fatty animal parts (e.g. skin), and increased consumption of fresh fish or plant-based protein alternatives (e.g. beans) – paired with healthy vegetable oils and minimal salt used during food preparation	Significant reduction in intake of calories, saturated fat, animal-based protein and increased intake of polyunsaturated fatty acids
Increased consumption of fresh fruits and vegetables, in particular of green leafy vegetables – all year round	Increased intake of fiber, vitamins, minerals, and phytonutrients (e.g. antioxidants)
Significant reduction in consumption of manufactured ice cream and SSBs and increased consumption of locally made sweets and snacks with local low caloric ingredients (e.g. ice cream made from fruits) as well as of local fruit juices or herbal infusions	Significant reduction in caloric intake, in particular of sugar and trans-fatty acids

<sup>34</sup> Bisphenol A (BPA) has been shown to affect lipid metabolism and promote weight gain in animal studies, but also human populations. See for example, Health Promot Chronic Dis Prev Can. 2017 Dec; 37(12): 403–412.

<sup>35</sup> The makers of this policy wanted imported fruits to be affordable so that school children can buy an apple for T\$0.30-0.40 instead of instant noodles. Tonga has a price control mechanism for imported fruits; however, it seems that the policy has not been effectively enforced.



**The design of the excise tax policy in 2016 was led by the Ministry of Revenue and Customs, with limited involvement of other relevant stakeholders.** According to in-depth interviews with policymakers, the Ministry of Revenue and Customs took the lead in designing the new excise tax policy introduced in July 2016, including identifying which products to tax. There were limited consultations with experts and key stakeholders within the government and outside during the tax design phase. Several high-level officials from relevant ministries (e.g. MOH, MAFF, MCCTIL) reported that they were not consulted during the design phase, and only learned about the proposed tax policy when it was submitted to the cabinet for review and approval.

**Lack of proper consultation with key stakeholders and experts, particularly nutrition experts, during the design phase may have limited the positive health impacts that the policy could have generated and misleadingly sent the message that the government was more interested in revenue generation than health. This was demonstrated by**

**the fact that the list of products to be subject to the NCD tax policy in July 2016 was suboptimal.** Some products which were not supposed to be “unhealthy”, e.g. chicken, were included in the list of products to be subject to tax, while many unhealthy products with much higher levels of salt, fat, and sugar were not included. At the same time, products not considered “healthy”, such as ham and sausages, were included in the list of products to be tax exempt. Furthermore, MCCTIL was not adequately consulted during the tax design phase, though the government expected the ministry to help monitor the price of products that were subject to exemption.

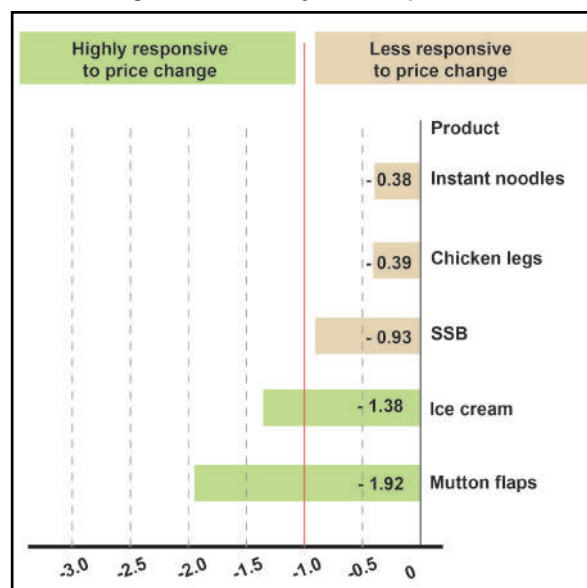
**Throughout this study the World Bank research team has highlighted the importance of consultations with relevant experts and key stakeholders during the design phase.** This not only supports evidence-based tax policy design, but also supports the implementation of the tax policy, e.g. in price monitoring. As a result, consultations with key ministries and stakeholders during the tax design phase in the later years has been significantly improved.

## How much did consumers respond to tax-induced price changes?

**Consumers' responsiveness to changes in price led by the imposition of excise tax/import duty varied from product to product.** The World Bank research team conducted a quantitative measurement of consumers' responsiveness to changes in price led by the imposition of tax. The measure is based on the consumption elasticity concept; it is calculated as the percentage change of consumption relative to the percentage change in price. The pre- and post-tax data were taken from before July 2015 to June 2016 and July 2016 to June 2017, respectively. Import volume data were based on the import volumes provided by the Ministry of Revenue and Customs. Price data were drawn from the consumer price index and retail surveys. Figure 80 reports elasticity of the taxed products.

**As can be seen in Figure 80, tax-induced price changes caused Tongan consumers to reduce their consumption of taxed products to differing degrees.** Instant noodles and chicken legs had price elasticity of -0.38 and -0.39 respectively. The negative sign indicates that price and consumption vary inversely. Thus, for instant noodles, one percent increase in price will reduce instant noodles consumption by 0.38 percent; similarly, 1 percent increase in the price of chicken legs will reduce consumption of chicken legs by 0.39 percent, which shows that consumption of these products did not change significantly compared to changes in price. Elasticity of SSB is -0.93 which is within the ranges of WHO's findings and is more sensitive to price change compared to chicken legs and instant noodles. Two products most responsive to price change are ice cream and mutton flaps, with elasticity of -1.38 and -1.92 respectively.

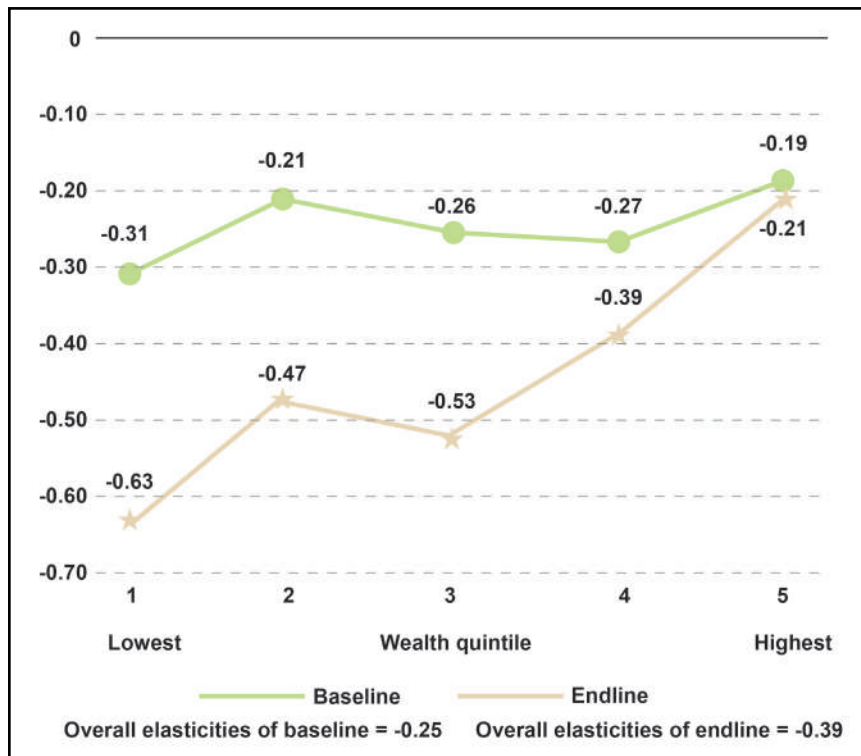
Figure 80: Elasticity of taxed products



Source: Endline survey data 2017.

**Smokers from lower wealth quintiles are more responsive to price changes and are likely to reduce cigarette consumption as the price of cigarettes increases.** Figure 81 provides elasticity values of cigarettes by wealth quintile. The estimates are based on baseline and endline survey smokers reporting “decreased” and “no change” in their smoking. Prior to the calculation of elasticities, the value of 0 elasticity was assigned to those whose smoking did not change. Quintile-wise, elasticities showed that a more affluent smoker was less responsive to price change. In addition, elasticity figures from endline data were more responsive to price changes. This implied that as time went by, consumers began to reduce their smoking frequency – a result consistent with the aims of this tax initiative.

Figure 81: Elasticity of cigarettes



Source: Baseline and endline survey data 2017.

**While it cannot be concluded that the tax increase was the sole reason for the reduction in consumption of taxed products, the tax can be said to have had significant influence on the consumption pattern of Tongan consumers.** For example, around 76 to 79 percent of smokers said that they lowered their smoking because of the price change (see Figure 15). Similarly, around 98 to 99 percent of mutton flap consumers reduced their consumption because of the change in price (see Figure 33). The fact that, during the period of this study, there was no other variable that caused significant change prices on these products also lends support to the claim that the tax was the major driver for lower consumption of the taxed products.

**To conclude, how much a consumer responded to price change depended on the characteristics of the product.** For a product whose price per unit was low, a change in price would not have significant impact on total consumer (and household) expenditure. Consumption of

these products, therefore, would be less sensitive to price change. Products whose unit price occupied a significant proportion of household expenditure would be more sensitive to price change. Elasticity also depended on the nature of the product itself. Products considered as a daily staple would be less sensitive to price change. Luxury products would be more sensitive to price change. Lastly, addictive products such as cigarettes would be less sensitive to change in price. When wealth is taken into account, smokers from lower wealth quintiles are more likely to reduce their consumption behaviors as price increases. The results shown in this section provide empirical support for the effectiveness of the use of tax as an instrument to divert Tongan consumers away from consuming products that are detrimental to their long-term health and well-being.

## What are the key substitutes to taxed products?

The potential risks of swapping to other, cheaper and/or low-quality unhealthy food products are substantial, given the variety of food choices in Tonga. While unhealthy food products that are subject to excise tax have become more expensive, there are still unhealthy food products that are not subject to excise tax, making them more affordable than the taxed products. Therefore, it is possible that people may switch from the more expensive taxed products to cheaper unhealthy products not subject to NCD tax, diluting the effects on health outcomes, which are the primary goal of NCD tax policy. Hence, it is crucial to monitor the substitution effects of the taxed products.

Based on the endline household survey data, while consumption of mutton flaps reduced significantly due to higher prices resulting from the tax policy, over 40 percent of respondents reported shifting to alternative, cheaper products. The most popular alternatives were salted beef, followed by tinned fish and corned beef (see Table 16). It is important to note that salted beef and corned beef were not subject to excise tax at the time of this survey, but they also contained high and unhealthy levels of salt and fat. For turkey tails, consumers chose more healthy products like tinned fish and chicken. The excise tax on SSB also led 23 percent of respondents to go for an alternative healthy product – water, the main substitute of SSB.

Table 16: Key substitutes of taxed food products

Taxed products	Key substitutes
Mutton flaps	Salted beef, tinned fish, corned beef
Chicken leg quarters	Tinned fish
Turkey tails	Tinned fish, chicken
SSB	Water
Ice cream	Local ice cream
Instant noodles	Local instant noodles

Source: Endline survey data (2017).



**It is important to note the main substitutes for ice cream and instant noodles were identified by respondents as locally manufactured ice cream and locally manufactured instant noodles.** Before the imposition of excise tax on ice cream and instant noodles, nearly all ice cream and all instant noodles in Tonga were imported, and hence the tax was only imposed on imported ice cream and instant noodles. This provided a large loophole that allowed local businesses to set up small factories manufacturing instant noodles and ice cream. As these locally manufactured products were not subject to tax, it became cheaper than the taxed, imported products. This demonstrates the importance of imposing unified tax rates for both imported and locally manufactured unhealthy products. Otherwise, people can easily shift to consuming locally manufactured unhealthy products, defeating the whole purpose of improving health outcomes' with 'the tax strategy.

### **Illicit trade**

**Illicit trade refers to any practice related to distributing, selling, or buying products subject to excise tax that is prohibited by law, including tax evasion (sale of the products without payment of applicable taxes), counterfeiting, disguising the origin of products, and smuggling.** Illicit trade can be undertaken both by illicit players who are not registered with relevant government agencies, as well as by legitimate entities whose business operations are contrary to applicable laws and regulations. In most cases,

the prices of illicit products are lower than the retail price of legal products, in order to make them more attractive to consumers.<sup>36</sup> Hence, illicit trade is one of the major risks that could undermine the purpose of the NCD tax to reduce consumption of unhealthy products for better health outcomes.

**Given the significant excise tax being imposed on a number of unhealthy products in Tonga, the risks of illicit trade, particularly smuggling of tobacco products, is substantial.** According to interviews with Tevita Lavemaau, former Minister for Revenue and Customs and 'Anisi Bloomfield, former CEO of Ministry of Revenue and Customs during the qualitative study, smuggling of cigarettes was high in the past, but not much in evidence in recent years. According to 'Anisi, it changed because of the efficiency of Ministry of Revenue and Customs staff, and high penalties.

**Nevertheless, there are still potential risks of smuggled goods and black markets, including from offshore fishing boats, container ships and yachts that visit Tonga for brief periods.** The Ministry of Revenue and Customs has a large scanning machine to scan containers at the airport and port of entry. According to business leaders in Tonga, there might still be smuggling of cigarettes into Tonga. However, the amount tends to be small, and to be Chinese-made cigarette brands Zhonghua and Double Happiness, which are not popular among Tongans but are popular among the small Chinese community in Tonga (around 3,000 Chinese people live in Tonga).

<sup>36</sup> World Bank. 2019. *Confronting Illicit Tobacco Trade : a Global Review of Country Experiences* (English). WBG Global Tobacco Control Program. Washington, D.C. : World Bank Group.

## **How NCD tax revenue is used**

**One of the most important concerns about the NCD tax policy raised by communities is how the revenues are used.** In Tonga, all revenues generated by the NCD tax policy go to the government's general revenue, and it is up to the Ministry of Finance and National Planning to decide how funds are used.

**Communities across Tonga have made it clear that they want the NCD tax policy revenues to return to the communities, particularly to support and promote health.** The NCD tax policy, particularly the food side, is not popular among communities as it made food more expensive. However, communities expressed that they would be convinced about the usefulness of the tax if the government could demonstrate that the revenues are used to support and promote communities' health and their lifestyles. Some popular examples of how the NCD tax revenue is used include making healthy food options cheaper, strengthening health promotion and disease prevention activities, supporting production of healthy products, and improving health care services, etc.

**Many countries have used the revenues generated from sin taxes or NCD-related taxes to support social and health goals.** For example, Thailand imposed a surcharge of 2 percent above the existing excise taxes on tobacco and alcohol to support health promotion fund. In the Philippines, revenues from the 2012 tobacco and alcohol excise tax reform are also earmarked (soft earmark) for specific programs. While 15 percent of additional tobacco tax revenues is allocated toward programs to help tobacco farmers and workers find livelihood alternatives, 100 percent of additional alcohol tax revenues and 85 percent of additional

tobacco tax revenues were allocated to health, particularly to fund universal health care, upgrade medical facilities, and train doctors and nurses. Within the first year of introducing sin taxes in the Philippines, the country raised more than US\$1.2 billion and allowed the Philippines to provide health care to an additional 14 million families, or roughly 45 million Filipinos. Nevertheless, there have also been challenges. The Government's capacity cannot absorb the sudden increase in the budget for universal health care, and hence structural reforms in the health service delivery systems is required before the increased coverage will lead to better access to quality health services.<sup>37</sup>

**While revenue from the NCD tax has increased significantly in FY2016–7 and FY2017–8, particularly from the food tax, there is no evidence of a proportionate rise in the funds allocated to health care.** According to Figure 82, the proportion of total Ministry of Health budget out of total Government of Tonga (GoT) budget dropped from 13 percent to 11 percent in FY2014–5 and has remained so for the past four years.

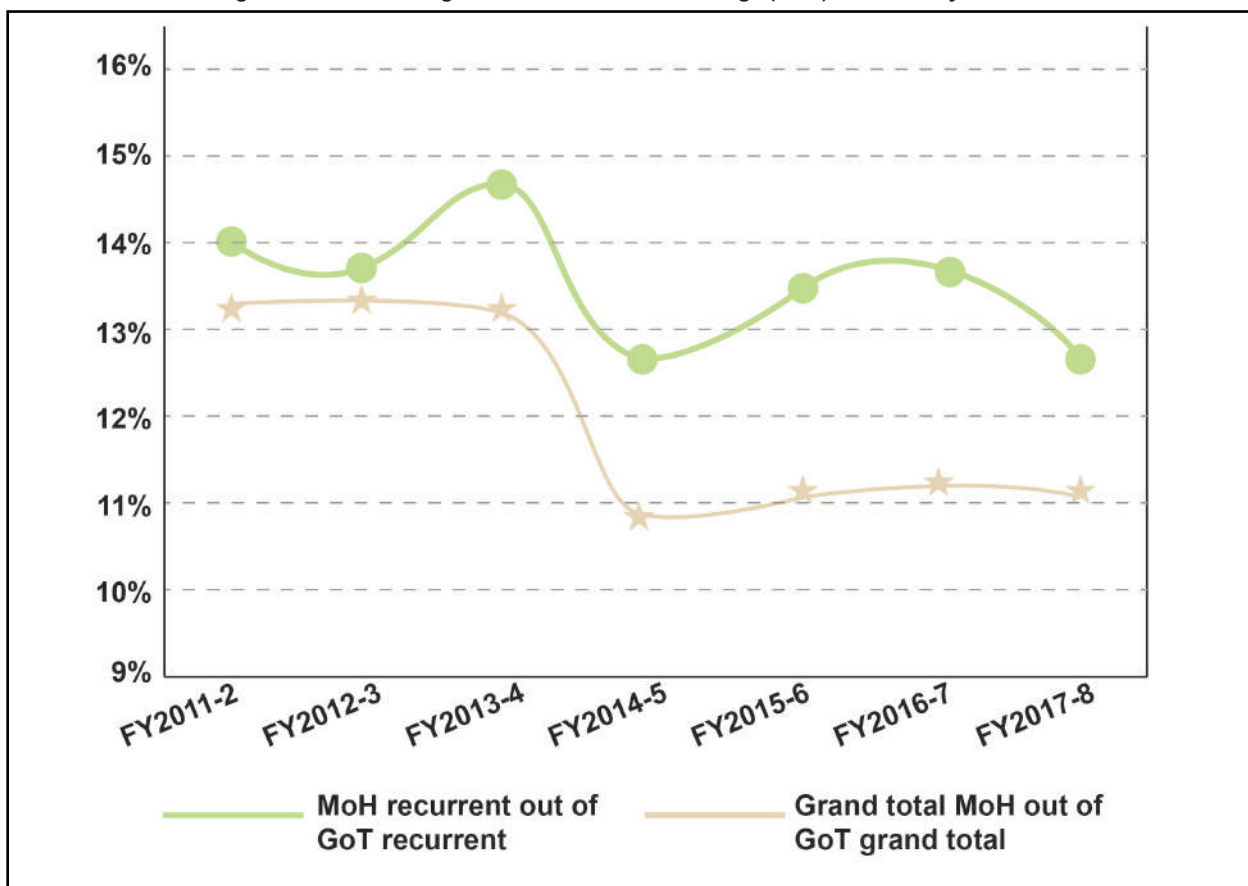
**The proportion of the government budget that goes to health promotion has always been very small, and has fallen in the past four years, despite higher NCD tax revenue.** Tonga Health Promotion Foundation is the key public authority leading multi-sectoral health promotion and disease prevention work in Tonga. Its budget allocation has always been low, and in recent years has actually decreased. In FY2018–9, government funds for the Tonga Health Promotion Foundation accounted for only 0.16 percent of total government budget.

---

<sup>37</sup> World Health Organization. Sin Tax Expands Coverage in the Philippines, May 2015, <http://www.who.int/features/2015/ncd-philippines/en/>



Figure 82: Annual budget of the Government of Tonga (GOT) and Ministry of Health



Source: GOT published budget statements, Package of Essential Health Services and Sustainable Health Financing Workshop, Nukua'lofa, 29-30 August 2018.

Table 17: Annual budget of the Government of Tonga (GOT)

FY	2015–6	2016–7	2017–8	2018–9
Government of Tonga (GoT) budget (T\$)	263,700,500	285,460,800	344,557,300	365,982,600
Tonga Health Promotion Foundation (GoT allocation) (T\$)	500,000	500,000	600,000	600,000
% of Tonga health budget per total GOT budget	0.19	0.18	0.17	0.16

Source: GOT published budget statements.

**The increase in revenue from the NCD tax – particularly from food, SSBs, and alcohol tax – has increased fiscal space that will facilitate the Government of Tonga to increase the resources to support health promotion/disease prevention activities as well as improving health care services, as appropriate.** The possibility of increasing the overall health and health promotion budget and/or introducing earmarked taxes for health may

also be explored, including considering lessons learned from different countries. This is all the more important given the uncertainty and potential decreases in external funding for health from development partners introducing earmarked taxes for health may also be explored, including considering lessons learned from different countries. This is all the more important given the uncertainty and potential decreases in external funding for health from development partners.

# Conclusions and recommendations



## **Conclusions**

**The implementation of NCD-related taxation policy in Tonga has led to a decline in consumption of almost all taxed items.** This shows that most Tongans are sensitive to prices. Tonga's status as an isolated economy with a very small manufacturing sector may also limit the availability of substitutes. The government has also acknowledged that smuggling of taxed goods has not been a major issue in recent years.

**What drives behavior change is the “price shock” following a large tax increase.**

Household surveys provide a clear indication that “price” is the most important factor for changing consumption behaviors. After the large tax increase, small incremental increases can be used to sustain these impacts. Small, incremental increases in tax alone (without a prior large tax increase) do not work, as consumers can easily adjust their behaviors to the incremental price increase. The government needs to monitor the implementation of the NCD tax regularly and make sure that annual tax increases well exceed increases in consumer prices and incomes.

**The selection criteria for food products upon which NCD tax was imposed in Tonga is not consistent.**

The use of thresholds based on nutritional content could be an option to avoid this. A good example is Chile, which applied thresholds for sodium, fat and sugar for processed food products.<sup>38</sup> While the thresholds are used for labeling and advertising purposes, they serve the objective of clearly identifying unhealthy foods. Samoa also develops Nutrition Profiles with thresholds of fat, saturated fat, salt, and sugar, in order to identify unhealthy food products.

**The potential risks of substitution with other, cheaper unhealthy food products are substantial, given the variety of food choices in Tonga.**

While unhealthy food products that are subject to excise tax have become more expensive, there are still unhealthy food products that are not subject to excise tax, making them more affordable than the taxed products. Forty percent of mutton flaps consumers reported shifting to substitutes – salted beef, tinned fish and corned beef. Salted beef and corned beef were not subject to excise tax, but they also contained high and unhealthy levels of salt and fat. The main substitutes of ice cream and instant noodles were locally manufactured ice cream and instant noodles, which were not subject to excise tax at the time of the survey, making them cheaper than their imported counterparts. This demonstrates the importance of imposing unified tax rates for both imported and locally manufactured unhealthy products. Otherwise, people could easily shift to consuming locally manufactured unhealthy products, defeating the health outcome purpose of the tax.

**The increase in revenues from the NCD tax, particularly from food, SSBs, and alcohol tax has increased fiscal space that will help the Government of Tonga to increase the resources to support health promotion and disease prevention activities. Improving health care services as appropriate, to help the country achieve universal health coverage.**

As highlighted in the Pacific NCD Roadmap, such complementary measures are essential to address the NCD crisis. This is even more important in light of the findings of this study, which show that without complementary measures, tax increases may merely result in a switch

---

<sup>37</sup> Global Delivery Initiative ([http://www.globaldeliveryinitiative.org/sites/default/files/case-studies/wb\\_food\\_labeling\\_chile\\_2-1-19\\_web.pdf](http://www.globaldeliveryinitiative.org/sites/default/files/case-studies/wb_food_labeling_chile_2-1-19_web.pdf)).

from one form of unhealthy consumption to another. There are lessons learned from several countries that use the revenue from sin taxes to support health promotion and health services, which help these countries accelerate the achievement of universal health coverage.

## **Recommendations**

### **Tax structure**

**Commercialized Tapaka Tonga should be subject to excise tax as it is cheap, widely available and harmful to health.**

The fact that Tapaka Tonga is not subject to excise tax also contributes to the reduction in government revenues from excise tax on tobacco products, as many smokers have substituted the more expensive, taxed manufactured cigarettes with untaxed Tapaka Tonga.

**The government should take a consistent approach and apply scientifically supported criteria across all food groups, including the use of nutrient profiles, in designing the NCD tax policy, in close consultation with health and nutrition experts from the Ministry of Health, Ministry of Agriculture, Forestry and Food, Ministry of Fisheries, Tonga Health Promotion Foundation, the National Food Council, and relevant development partners.** This should be applied to both food products subject to the increase in excise tax, as well as food products exempt from the NCD tax. Policymakers can ask questions such as why impose tax on chicken leg quarters while corned beef and salted beef were not taxed? And why exempt consumption tax on sausages and ham, which are not considered healthy food products?

**The excise tax on chicken leg quarters should be removed.** There is a lack of global evidence that meat from chicken legs is “unhealthy”, as it is more about how they are cooked to make them healthier

(e.g. by removing the fatty skin, not deep-fried). Chicken meat is an important source of protein for Tongan children and adults and remains the cheapest meat on the market. Most households continue to buy chicken leg quarters despite the price increase. The study findings suggest regressive effects from the tax on chicken leg quarters on poorer households.

**Unified excise tax should be applied to both imported and locally produced unhealthy products (at the same level), or its effects will be diluted.** For example, excise tax on SSBs had earlier applied to only imported SSBs. Local businesses were quick to note the loophole and start to produce SSBs locally. Locally produced SSBs were not subject to NCD tax and have become much cheaper than imported SSBs, leading to higher consumption of locally produced SSBs. This also applied to instant noodles, whereby imported instant noodles were subject to excise taxes, while locally manufactured instant noodles were not, and have become cheaper than imported ones. In addition, the experience of imposing different excise tax rates on imported and locally manufactured cigarettes showed that using differential rates enlarged the price gap between imported and locally manufactured cigarettes, leading more smokers to switch to the cheaper locally manufactured cigarettes. It is recommended that excise tax rates for imported and locally manufactured unhealthy products should be at the same level for the same products, e.g. imported cigarettes and locally manufactured cigarettes. This will also support Tonga’s commitments to the World Trade Organization.

### **Monitoring NCD tax implementation**

**More effective monitoring of the price of healthy food products subject to tax exemption is needed to ensure that the policy of tax exemption has achieved the goal of price reduction, and in turn**

**higher consumption of healthy food products.** Most shops in Tonga do not use weighing scales for fruits and vegetables, making it difficult for consumers to assess if the price per unit has decreased or increased. Use of weighing scales for selling fruits and vegetables should be enforced, and it will not only help the government in monitoring prices, but also empower customers in ensuring that traders do not overcharge. The empowerment of customers in this way is essential, given the fact that the government may not have sufficient human resources to conduct price monitoring regularly throughout the country. The government should also strengthen measures to address overcharging across all islands effectively (digitized price information systems, equipping officers with weighing scales, validating urban price lists in rural contexts, monitoring road stalls, etc.).

**The Government needs to have a clear monitoring and evaluation framework for the implementation of NCD tax and to make sure that annual tax increases exceed increases in consumer prices and incomes to ensure effectiveness.** Evaluation of interventions or programs needs to be planned and designed before the start of interventions. Evaluation will generate evidence on impacts of the interventions and programs as well as lessons learned. But most importantly, the government could use available data to monitor the change in prices and import/sales volumes of taxed products and potential substitutes. Existing import volume and tax collection data from the Ministry of Revenue and Customs could provide a proxy for sales volumes. The CPI exercise could be used to support the monitoring of NCD tax policy by adding items that are subject to NCD tax and potential substitutes into the CPI basket (if they are not already in the basket), which will help the government monitor price data on a monthly basis. Moreover, there is a

need to have an evaluation plan before the policy is put in place to support the collection of baseline data before implementation.

**In addition to strengthening monitoring and evaluation mechanisms, further research is needed to fill knowledge gaps and to inform future design and implementation of food taxation policy.** For example, currently very limited data about Tapaka Tonga use is available. More data needs to be collected to understand the number of Tapaka Tonga users, the frequency and quantity of Tapaka Tonga consumption, and Tapaka Tonga sales volumes. This will enable forward-looking scenario simulation analysis to inform the possible improvement and expansion of current policies. More research in the areas of behavioral economics, nudging, as well as social and behavior change communication may also be useful to promote consumption of healthy products and decrease consumption of unhealthy products. More studies to understand factors and determinants that can influence the change of social norms to promote healthy lifestyles will be beneficial.

**There is room for improvement on communication, through relevant media channels, in particular mass media and social media as well as to organize public consultations to reach out to different stakeholders regarding the NCD-related taxation policy.** From the household survey, there was a lack of knowledge among the majority of the population about the imposition and increase in NCD-related taxation that became effective in July 2016, and again in July 2017. Many people still do not have a clear idea of what unhealthy products are, what healthy options are, and how to access them. Consultations with key agencies, key stakeholders, church leaders, and representatives of the communities should be conducted prior to imposition of new taxation policy.

## **Transparency in use of NCD tax**

**In response to calls from communities, the Government of Tonga may explore how it can demonstrate that revenue gained from NCD-related taxes is used to support and promote healthy lifestyles among the population, as well as improving health care services.** Some of the key health promotion interventions for which communities would like to receive government support include: making healthy food options cheaper, invigorating health promotion activities, supporting production of healthy food products, and food preparation, etc.

## **Complementary (non-tax) measures**

**Political, social and community leaders must be engaged to support social and behavior change to address the NCD crisis.** From the qualitative study, it is clear that political leaders, church leaders, and community leaders are very influential, and their roles in promoting healthy lifestyles are critical. There are also superb experiences in healthy eating and healthy lifestyles that have been implemented by selected churches and communities. Their lessons should be shared widely. Good examples include the introduction of healthy food at church conferences by SDA, which encouraged the use of healthy ingredients and discouraged overeating. This is a good practice for other churches.

**More efforts are needed to create an enabling environment to unite the Tongan people around the urgency to address NCDs and to establish new social norms and values (e.g. creating the confidence that it is acceptable to make offerings with smaller meals yet still able to receive blessings, creating the demand for “feeling healthy”).** It is also important to explore how counselling services can be made more effective to strengthen one-to-one communication. The government can also build on the country’s high literacy rates.

**Multi-sectoral interventions are needed to address NCD burdens; fiscal/taxation policy alone is not adequate.** Fiscal/taxation policy needs to be complemented by other policy interventions from health, education,



agriculture/fisheries sectors, with strong legislation, regulations, effective communication and campaigns, as well as an enabling environment. For example, the government could complement taxation interventions on Tapaka Tonga by regulating and enforcing large and clear warning labels on packets of Tapaka Tonga, to educate the population on the harm of Tapaka Tonga (to eliminate the general misperception that Tapaka Tonga is not harmful to health), as well as providing support or incentives (knowledge and/or seeds) to encourage farmers to switch from growing tobacco to growing healthy cash crops. In addition it will be important for the Ministry of Health to be more involved in aligning fiscal policy with nutritional information (nutritional value of foods, dietary requirements, etc).

**The National NCD Committee, its advisory bodies, the National Food Council, and Tonga Health Promotion Foundation should play an active role in promoting multi-sectoral interventions to address the NCD crisis that are to be implemented by sectoral ministries.**

In the past two years, the National NCD Committee and the National Food Council played a very limited role in the design, implementation, and monitoring of NCD tax and other health promotion activities. The concerted efforts by these bodies, combined by active implementation by relevant sectoral ministries, churches and civil societies can make a difference to Tonga and help address the NCD crisis.

**More policy interventions are needed to make healthy food more accessible and attractive, and also to encourage consumption of smaller portions of food.**

For example, fresh fish is highly desirable, but less well-off households reported that they cannot consume fresh fish on a regular basis due to the high price. The Ministry of Fisheries' program that requires foreign fishing vessels to offload at least three tons of fish to sell to the community at T\$2.5-9 per kg has been very popular. However, it seemed to benefit only communities living close to where the fish was sold, e.g. Nuku'alofa. Communities from other areas of Tongatapu and Vava'u would like to benefit from a similar program. There is the need to increase production of local vegetables and fruits as well as to raise local livestock (e.g. poultry for meat and eggs) and farm fish. Subsidies to strengthen the local food system could be considered. In addition, smaller portions of food at meal times should be encouraged and promoted.



**More studies should be conducted on home production initiatives to generate evidence and promote successful cases.**

For example, the government could build on the successful Church of the Latter Day Saints-supported “keyhole garden” initiative as an easy way to grow vegetables that can be afforded by every household, even with limited land area. A keyhole garden is a raised-bed system that requires minimal watering and fertilizer due to its ability to retain moisture and use compost. Its unique design allows farmers to irrigate their crops with recycled water from household washing. The keyhole structure also makes it easy for farmers to add soil or manure to the garden if crops need additional fertilizer. A raised bed is also particularly effective for those who have physical limitations, such as the elderly or people with disability. There are also good examples of intercrop home gardens, as shown in Picture 11. The government should also build on communities’ requests to support access to markets to stimulate production, study experiences from poultry raising in other PICs (e.g. Fiji), and increase community mobilization and organizations (e.g. farmers’ groups).

**Making healthy food more affordable (supply side) alone is not adequate. It is important to introduce innovative ideas to make healthy food attractive,**



Picture 11 : “Intercrop” home garden right behind the Central Bank of Tonga – lettuce, onions, and kava

**tasty, and popular (demand-side), accompanied by nutritional education, as well as social and behavior change communication initiatives.**

Many Tongans over the years have developed a taste for unhealthy, fatty products. Hence, making healthy food more affordable alone does not guarantee that the population will stop consuming unhealthy food and turn to healthy products. From focus group discussions, communities have expressed that they like the taste of vegetables cooked and served at Chinese restaurants. However, they do not know how to cook vegetables and make them palatable at home. Hence, communities expressed a desire for cooking demonstration programs with recipes and techniques for cooking healthy products that they can learn to cook by themselves at home. In this way, affordable dietary change can occur across all socio-economic groups.

**Guidelines on healthy foods should be promoted, while cooking programs should include training on dietary needs and portion size per age group, as well as ways to introduce simple changes that can be incorporated into daily cooking routines without too much effort.**

For example, this could include cooking the same meals (e.g. lu sipi), but with less meat and more vegetables; washing canned fish to reduce salt content; making home-made ice cream from frozen fruit and coconut milk; preparing breakfast with breadfruit. A focus on plant-based well-being programs could also be explored. During feasts or other events, pre-arranged packages with adequate portion sizes could be served. If such initial demand-side changes were found to be successful, at a later stage, certifications of shops/restaurants with “healthy food licenses” could be introduced on the supply side (e.g. as in Thailand or Singapore).



# Bibliography



- Cortinovis, I., Vela, V. and Ndiku, J. (1993). Construction of a socio-economic index to facilitate analysis of health in data in developing countries. *Social Science and Medicine*, Vol. 36. Page 1087–1097.
- Ebert, U. and Welsh, H. (2004). Meaningful Environmental Indices: A Social Choice Approach. *Journal of Environmental Economics and Management*, Vol. 47, issue 2, 270–283.
- Fendrich, M., M.E. Mackesy-Amiti, T.P. Johnson, A. Hubbell, and J.S. Wislar. (2005). Tobacco-Reporting Validity in an Epidemiologic Drug-Use Survey. *Addictive Behavior*, Vol. 30:175–181.
- Food and Agriculture Organisation of the United Nations and the Fiji National University Pacific Research Centre for the Prevention of Obesity and Non-communicable Diseases (C-POND).
- Effects of food taxation in Tonga: A Snapshot. Rome. (2017). Giovannucci E., Stampfer M.J., Colditz G.A., Manson J.E., Rosner B.A., Longnecker M.P., Speizer F.E., and Willett W.C. (1993). Recall and selection bias in reporting past alcohol consumption among breast cancer cases. *Cancer Causes Control*, Vol. 4(5):441–8.
- Global strategy on diet, physical activity and health. Geneva. World Health Organization. 2004.
- Gmel, G. and Daepfen, JB. (2007). Recall bias for seven-day recall measurement of alcohol consumption among emergency department patients: implications for case-crossover designs. *Journal of Studies on Alcohol and Drugs*, Vol 68(2):303–10.
- Hufanga, S., Comparative Effectiveness of Interventions to Control Non-Communicable Diseases in the Kingdom of Tonga, Draft Ph.D. Dissertation, University of New South Wales, 2018.
- Human Capital Index, World Bank. 2018.
- International Development Association program document for a proposed development policy grant to the Kingdom of Tonga for the Second Inclusive Growth Development Policy Operation, April 27, 2017. The World Bank. Kingdom of Tonga Risk Factors STEPS Report. Fiji. World Health Organization. Ministry of Health, Kingdom of Tonga. 2014.
- Krall, E.A., Valadian, I., Dwyer, J.T., and Dardner, J. (1989). Accuracy of recalled smoking data. *American Journal of Public Health*, Vol 79(2): 200–202.
- McLaughlin, J.K., Dietz, M.S., Mehl, E.S., and Blot, W.J. (1987). Reliability of surrogate information on cigarette smoking by type of information. *American Journal Epidemiology*, Vol. 126: 144–146.
- Ministry of Health, Kingdom of Tonga Risk Factors STEPS Report. 2014.
- Mumuiheata, S. (2007). Nutrient Intake in the Kingdom of Tonga. Nuku'alofa.
- National Strategy for Prevention and Control on Non-Communicable Diseases 2015–2020. Government of Tonga. 2016.
- Nicholson. C. and Snyder, W. (2016). *Microeconomics: Basics, Principles and Extensions*. Cengage Learning, Singapore.
- Obesity and Overweight Key Facts, World Health Organization. 2018.
- OECD. (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*.
- Parry, C. D., Patra, J., & Rehm, J. (2011). Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction (Abingdon, England)*, 106(10), 1718–24.
- Patrick, D.L., A. Cheadle, D.C. Thompson, P. Diehr, T. Koepsell, and S. Kinne. (1994). The Validity of Self-Reported Smoking: A Review and Meta-Analysis. *American Journal of Public Health*, Vol. 84: 1086–1093.

The Kingdom of Tonga Health System Review. Health Systems in Transition. Vol. 5, No. 6, 2015. Manila: WHO Regional Office for the Western Pacific.

Sahal S. et al. (2014). Trade as a structural driver of dietary risk factors for non-communicable diseases in the Pacific: an analysis of household income and expenditure survey data.

Sassi, F. et al. Equity impact of price policies to promote healthy behaviours. The Lancet Taskforce on NCDs and economics, Volume 391, Issue 10134, P2059-2070, May 19, 2018.

Vyas, S. and Kumaranayake, L. (2006). Constructing socio-economic status indices: how to use principal component analysis. Health Policy and Planning, Vol. 21, issue 6, 459–468.

World Health Organization. Sin Tax Expands Coverage in the Philippines, May 2015, <http://www.who.int/features/2015/ncd-philippines/en/>.

World Development Indicators, World Bank, 2018.

Weitkunat R., Coggins, C., Sponsiello-Wang, Z., Kallischnigg, G., and Dempsey, R. (2013). Assessment of cigarette smoking in epidemiologic studies. Contributions to Tobacco Research, Vol. 25(7): 638–648.

WHO Report on the Global Tobacco Epidemic, 2017: Monitoring tobacco use and prevention policies. Geneva. World Health Organization.

World Bank. (2019). Confronting Illicit Tobacco Trade: a Global Review of Country Experiences: Confronting Illicit Tobacco Trade: a Global Review of Country Experiences (English). WBG Global Tobacco Control Program. Washington, D.C.: World Bank Group.

# Annexes



## Annex 1

### Data

#### 1.1 Sampling Design

An initial sample of 1,400 individuals (respondents) ages 18–65 was chosen as household representatives to undertake the Tonga NCD Taxation Household Baseline Survey 2017. These households were from the two main islands, Tongatapu and Vava'u. Table 18 provides information of the total sample size and island-wise distribution. The sample was selected independently within each of the two target areas. Firstly, extremely remote areas were removed from the frame (and thus not given a chance of selection) as it was considered too costly to cover these areas. These areas only represented about 2.5 percent of the total population for Tonga, so the impact of their removal was minimal.

Table 18: Total sample size of baseline data

Island division	Number of households	Required sample
Tongatapu	12,953	1,000
Vava'u	2,715	400
<b>Total</b>	<b>15,668</b>	<b>1,400</b>

The sampling in each area was then undertaken using a two-stage process. The first stage involved the selection of required sample from each village using Probability Proportional to Size (PPS) sampling with Number of Household as the size. For the second stage, a list of all households in every village included in the frame was provided from the Tonga National Population and Housing Census 2016. Head of Households lists for all villages were sorted by alphabetical order and then a systematic sampling was used to draw out each required sample from each village with their name, and even with a name of a household member who identified as a smoker. This gave every household equal chance of getting selected, and selected households are well representative of the general households. GPS coordinates were provided to help enumerators to locate the households. The enumerator interviewed the Head of household or someone who was capable of answering the questions. If that person did not smoke, then the name of the smoker given on the list would be called to continue the tobacco question; the same process was applicable to questions on alcohol consumption. The above methodology was used in the collection of endline data. The sample for the NCD Taxation Endline Survey 2017 was drawn from the master sample frame of Household List from the most recent Population and Housing Census, 2016. The sample was designed to cover 9 percent of the households for all Tonga excluding the Ongo Niuas and some small islands due to the cost of getting to these islands. As such, the sample size is recorded to be 1,600 with the above distribution between the Islands. Details of the number of households by Islands are shown in Table 19.

**Table 19: Total sample size of endline data**

Island/division	Number of households	Required sample
Tongatapu	12,944	1,000
Vava'u	2,503	400
Ha'apai	1,179	114
'Eua	885	86
<b>Total</b>	<b>17,511</b>	<b>1,600</b>

## 1.2 Descriptive statistics of baseline data

The original dataset contains 1,402 household observations. After dropping observations with missing values, 1,395 household observations could be used for subsequent analysis. There are 996 household observations from Tongatapu; the remaining 399 household observations are from Vava'u. Table 20 provides descriptive statistics on socio-economic background of the respondents. Around 65 percent of the data relate to males. Average age of respondents is 39.43. Their average monthly earnings are 996.60 Tongan Pa'anga. Average monthly earnings for males is 1,005 Tongan Pa'anga which is slightly more than females, whose earnings are approximately 980 Tongan Pa'anga per month. Household sizes of both genders are slightly above six members per household. However, there is a great variation of number of household members ranging from one to 24. When examining marital status, 70.18 percent are married and 23.58 percent are never married. Proportion of males with never-married status is higher than females by 6 percent. Island-wise descriptive statistics are shown in Table 21.

Table 20: Descriptive statistics of baseline data

Variable	Male	Female	Overall	Min	Max
Gender	65.73%	34.27%	100.00%	-	-
Age	39.73	38.85	39.43	18	65
Earning	1,005.32	979.88	996.6043	0	50,000
Number of household members	6.14	6.69	6.33	1	24
<b>Education</b>					
No formal schooling	0.11%	0.00%	0.07%	-	-
Primary school	2.18%	2.30%	2.22%	-	-
Lower secondary	26.28%	15.69%	22.65%	-	-
Upper secondary	54.53%	65.90%	58.42%	-	-
Technical and vocational	11.12%	9.00%	10.39%	-	-
Tertiary	5.23%	6.49%	5.66%	-	-
Other	0.55%	0.63%	0.57%	-	-
<b>Marital status</b>					
Never married	25.63%	19.67%	23.58%	-	-
Currently married	69.57%	71.34%	70.18%	-	-
De facto or consensual marriage	0.44%	0.42%	0.43%	-	-
Separated	0.98%	1.46%	1.15%	-	-
Divorced	0.44%	1.88%	0.93%	-	-
Widowed	2.94%	5.02%	3.66%	-	-
Other	0.00%	0.21%	0.07%	-	-
<b>Occupation</b>					
Employer	3.16%	0.42%	2.22%	-	-
Self-employed	13.96%	15.69%	14.55%	-	-
Employee, working for wages (type 1)	9.60%	5.02%	8.03%	-	-
Employee, working for wages (type 2)	24.65%	9.62%	19.50%	-	-
Producing goods for own and/ or family	23.23%	3.77%	16.56%	-	-
Unpaid family worker (family business)	5.56%	0.63%	3.87%	-	-
Unpaid family worker (help with basic household activities)	1.74%	12.76%	5.52%	-	-
Volunteer work	0.98%	0.00%	0.65%	-	-
Student – full time	2.18%	1.88%	2.08%	-	-
Student – part time	0.44%	0.63%	0.50%	-	-
Home duties	12.43%	49.16%	25.02%	-	-
Retired	1.53%	0.21%	1.08%	-	-
None – did not pursue any activity	0.44%	0.21%	0.36%	-	-
Physically/mentally disabled	0.11%	0.00%	0.07%	-	-
Total number of observations	917	478		1,395	

Table 21: Baseline descriptive statistics by island

Variable	Tongatapu					Vava'u				
	Male	Female	Overall	Min	Max	Male	Female	Overall	Min	Max
Gender	65.96%	34.04%	100.00%	-	-	65.16%	34.84%	100.00%	-	-
Age	39.35	38.82	39.17	18	65	40.7	38.91	40.08	18	64
Earning	1,124.13	1,072.12	1,106.30	0	50,000	705.12	754.91	722.46	100	20,000
Number of household members	6.31	6.89	6.5	1	23	5.73	6.2	5.89	1	24
<b>Education</b>										
No formal schooling	-	-	-	-	-	0.38%	0.00%	0.25%	-	-
Primary school	1.98%	2.95%	2.31%	-	-	2.69%	0.72%	2.01%	-	-
Lower secondary	21.92%	12.68%	18.78%	-	-	37.31%	23.02%	32.33%	-	-
Upper secondary	56.77%	65.19%	59.64%	-	-	48.85%	67.63%	55.39%	-	-
Technical and vocational	13.55%	11.50%	12.85%	-	-	5.00%	2.88%	4.26%	-	-
Tertiary	5.02%	6.78%	5.62%	-	-	5.77%	5.76%	5.76%	-	-
Other	0.76%	0.88%	0.80%	-	-	-	-	-	-	-
<b>Marital status</b>										
Never married	25.57%	22.42%	24.50%	-	-	25.77%	12.95%	21.30%	-	-
Currently married	69.56%	67.55%	68.88%	-	-	69.62%	80.58%	73.43%	-	-
De facto or consensual marriage	0.61%	0.29%	0.50%	-	-	0.00%	0.72%	0.25%	-	-
Separated	1.07%	1.47%	1.20%	-	-	0.77%	1.44%	1.00%	-	-
Divorced	0.46%	2.65%	1.20%	-	-	0.38%	0.00%	0.25%	-	-
Widowed	2.74%	5.31%	3.61%	-	-	3.46%	4.32%	3.76%	-	-
Other	0.00%	0.29%	0.10%	-	-	-	-	-	-	-
<b>Occupation</b>										
Employer	2.28%	0.59%	1.71%	-	-	5.38%	0.00%	3.51%	-	-
Self-employed	14.61%	14.16%	14.46%	-	-	12.31%	19.42%	14.79%	-	-
Employee, working for wages (type 1)	9.59%	4.13%	7.73%	-	-	9.62%	7.19%	8.77%	-	-
Employee, working for wages (type 2)	28.77%	9.44%	22.19%	-	-	14.23%	10.07%	12.78%	-	-
Producing goods for own and/ or family	17.20%	2.65%	12.25%	-	-	38.46%	6.47%	27.32%	-	-
Unpaid family worker (family business)	3.81%	0.29%	2.61%	-	-	10.00%	1.44%	7.02%	-	-
Unpaid family worker (help with basic household activities)	1.52%	0.88%	1.31%	-	-	2.31%	41.73%	16.04%	-	-
Volunteer work	0.61%	0.00%	0.40%	-	-	1.92%	0.00%	1.25%	-	-
Student – full time	3.04%	2.65%	2.91%	-	-	-	-	-	-	-
Student – part time	0.46%	0.88%	0.60%	-	-	0.38%	0.00%	0.25%	-	-
Home duties	15.53%	64.01%	32.03%	-	-	4.62%	12.95%	7.52%	-	-
Retired	1.98%	0.00%	1.31%	-	-	0.38%	0.72%	0.50%	-	-
None – did not pursue any activity	0.61%	0.29%	0.50%	-	-	-	-	-	-	-
Physically/mentally disabled	-	-	-	-	-	0.38%	0.00%	0.25%	-	-
Total number of observations	657	339	996			260	139	399		

Source: Baseline survey data (2017).



## Annex 2

### Data

#### Descriptive statistics of endline data

The original dataset contains 1,604 household observations. After dropping observations with missing values, 1,573 household observations can be used for subsequent analysis. It was possible that more than one member in a household was interviewed if the person smoked or drank alcohol. Thus, the actual number of persons interviewed was more than number of household observations. There are 1,475 individual observations from Tongatapu; there are 609 individual observations from Vava'u; 131 individual observations are from Ha'apai; and the remaining 86 individual observations are from Eua. Table 22 provides descriptive statistics on socio-economic background of the respondents. Around 59 percent of the data relate to males. Average age of respondents is 42.70. Their average monthly earnings are 1,285 Tongan Pa'anga. Average monthly earnings for males is 1,321 Tongan Pa'anga, which is slightly more than female earnings that are approximately 1,233 Tongan Pa'anga per month. Household sizes of both genders are slightly above six members per household. However, there is a great variation in the number of household members, ranging from 1 to 22. When examining marital status, 79.87 percent are married and 13.28 percent are never married. The proportion of males with never married status is higher than female by 1 percent. Island-wise descriptive statistics are shown in Table 23.

Table 22: Descriptive statistics of endline data

Variable	Male	Female	Overall	Min	Max
Gender	58.89%	41.11%	100.00%	-	-
Age	43.11	42.12	42.70	18	76
Earning	1,321.12	1,233.04	1,285.11	9	200,000
Number of household members	6.0	6.4	6.19	1	22
<b>Education</b>					
No formal schooling	1.47%	0.27%	0.98%	-	-
Primary school	0.74%	0.53%	0.65%	-	-
Lower secondary	23.66%	24.20%	23.88%	-	-
Upper secondary	59.02%	61.97%	60.23%	-	-
Technical and vocational	9.67%	7.71%	8.87%	-	-
Tertiary	5.43%	5.32%	5.39%	-	-
Other	-	-	-	-	-
<b>Marital status</b>					
Never married	13.81%	12.50%	13.28%	-	-
Currently married	82.32%	76.33%	79.87%	-	-
De facto or consensual marriage	0.18%	0.67%	0.38%	-	-
Separated	0.74%	1.46%	1.03%	-	-
Divorced	0.74%	1.99%	1.25%	-	-
Widowed	2.21%	7.05%	4.19%	-	-
Other	-	-	-	-	-

Table 22: Descriptive statistics of endline data (continued)

Variable	Male	Female	Overall	Min	Max
<b>Occupation</b>					
Employer	2.30%	1.20%	1.85%	-	-
Self-employed	9.94%	13.56%	11.43%	-	-
Employee, working for wages (type 1)	14.27%	6.38%	11.04%	-	-
Employee, working for wages (type 2)	28.08%	10.20%	20.78%	-	-
Producing goods for own and/ or family	25.69%	12.63%	20.30%	-	-
Unpaid family worker (family business)	6.80%	6.50%	6.69%	-	-
Unpaid family worker (help with basic household activities)	0.55%	2.66%	1.41%	-	-
Volunteer work	1.01%	0.13%	0.65%	-	-
Student – full time	0.46%	0.27%	0.38%	-	-
Student – part time	0.74%	0.13%	0.49%	-	-
Home duties	9.58%	46.01%	24.48%	-	-
Retired	0.46%	0.27%	0.38%	-	-
None – did not pursue any activity	-	-	-	-	-
Physically/Mentally Disabled	0.09%	0.00%	0.05%	-	-
Total number of observations	1,355	946		2,301	

Table 23: Endline descriptive statistics by island

Variable	Tongatapu					Vava'u				
	Male	Female	Overall	Min	Max	Male	Female	Overall	Min	Max
Gender	60.00%	40.00%	100.00%	-	-	59.61%	40.39%	100.00%	-	-
Age	43.28	42.16	42.84	18	76	43.49	42.92	43.26	18	69
Earning	1,467.34	1,267.23	1,387.64	9	200,000	1,126.18	1,132.40	1,128.60	9	5,366
Number of household members	6.23	6.84	6.47	1	22	6.07	5.9	6	1	20
<b>Education</b>										
No formal schooling	2.28%	0.43%	1.54%	-	-	-	-	-	-	-
Primary school	0.57%	0.43%	0.51%	-	-	1.08%	1.13%	1.10%	-	-
Lower secondary	20.83%	16.77%	19.21%	-	-	29.86%	49.15%	37.36%	-	-
Upper secondary	57.49%	69.25%	62.18%	-	-	61.87%	40.68%	53.63%	-	-
Technical and vocational	11.70%	7.74%	10.12%	-	-	4.68%	4.52%	4.62%	-	-
Tertiary	7.13%	5.38%	6.43%	-	-	2.52%	4.52%	3.30%	-	-
Other	-	-	-	-	-	-	-	-	-	-
<b>Marital status</b>										
Never married	13.98%	12.04%	13.21%	-	-	11.51%	13.56%	12.31%	-	-
Currently married	82.31%	76.34%	79.93%	-	-	84.89%	79.10%	82.64%	-	-
De facto or consensual marriage	0.29%	0.22%	0.26%	-	-	-	-	-	-	-
Separated	0.71%	1.51%	1.03%	-	-	0.72%	1.69%	1.10%	-	-
Divorced	0.86%	1.72%	1.20%	-	-	0.72%	0.56%	0.66%	-	-
Widowed	1.85%	8.17%	4.37%	-	-	2.16%	5.08%	3.30%	-	-
Other	-	-	-	-	-	-	-	-	-	-
<b>Occupation</b>										
Employer	3.00%	0.86%	2.14%	-	-	1.08%	1.13%	1.10%	-	-
Self-employed	9.42%	14.41%	11.41%	-	-	12.23%	12.99%	12.53%	-	-
Employee, working for wages (type 1)	14.98%	4.30%	10.72%	-	-	11.15%	7.91%	9.89%	-	-
Employee, working for wages (type 2)	30.81%	11.40%	23.07%	-	-	26.26%	7.91%	19.12%	-	-
Producing goods for own and/ or family	19.69%	14.41%	17.58%	-	-	38.49%	3.39%	24.84%	-	-
Unpaid family worker (family business)	4.99%	0.86%	3.34%	-	-	4.32%	0.56%	2.86%	-	-
Unpaid family worker (help with basic household activities)	0.86%	4.09%	2.14%	-	-	0.00%	0.56%	0.22%	-	-
Volunteer work	1.14%	0.00%	0.69%	-	-	1.08%	0.00%	0.66%	-	-
Student — full time	0.71%	0.22%	0.51%	-	-	0.00%	0.56%	0.22%	-	-
Student — part time	1.00%	0.00%	0.60%	-	-	0.00%	0.56%	0.22%	-	-
Home duties	12.84%	49.25%	27.36%	-	-	4.68%	63.84%	27.69%	-	-
Retired	0.43%	0.22%	0.34%	-	-	0.72%	0.56%	0.66%	-	-
None — did not pursue any activity	-	-	-	-	-	-	-	-	-	-
Physically/Mentally Disabled	0.14%	0.00%	0.09%	-	-	-	-	-	-	-
<b>Total number of observations</b>	<b>885</b>	<b>590</b>	<b>1,475</b>			<b>363</b>	<b>246</b>	<b>609</b>		

Table 23: Endline descriptive statistics by island (continued)

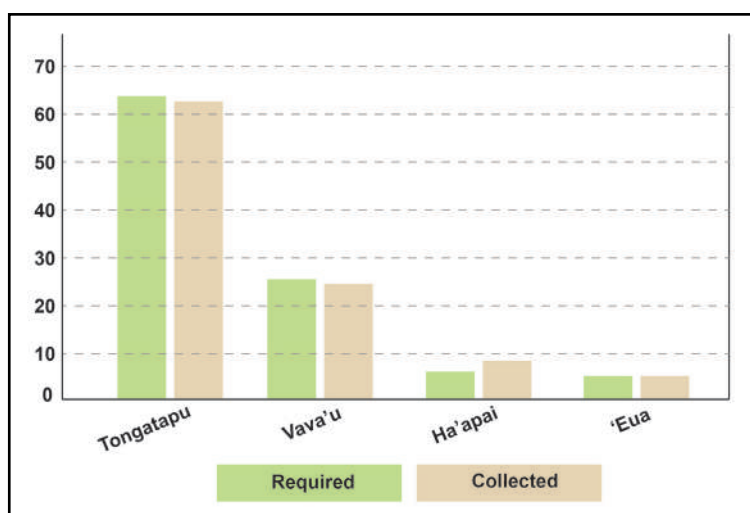
Variable	Ha'apai					Eua				
	Male	Female	Overall	Min	Max	Male	Female	Overall	Min	Max
Gender	61.07%	38.93%	100.00%	-	-	31.40%	68.60%	100.00%	-	-
Age	40.86	41.02	40.92	20	65	39.07	39.32	39.24	18	65
Earning	701.88	1,101.37	857.4	100	6,000	1,366.67	1,380	1,375.81	150	3,000
Number of household members	4.55	5.08	4.76	1	12	4.04	5.25	4.87	1	11
<b>Education</b>										
No formal schooling	-	-	-	-	-	-	-	-	-	-
Primary school	1.25%	0.00%	0.76%	-	-	-	-	-	-	-
Lower secondary	26.25%	15.69%	0.76%	-	-	25.93%	15.25%	18.60%	-	-
Upper secondary	68.75%	70.59%	0.76%	-	-	40.74%	61.02%	54.65%	-	-
Technical and vocational	2.50%	0.00%	0.76%	-	-	29.63%	23.73%	25.58%	-	-
Tertiary	1.25%	13.73%	0.76%	-	-	3.70%	0.00%	1.16%	-	-
Other	-	-	-	-	-	-	-	-	-	-
<b>Marital status</b>										
Never married	16.25%	17.65%	16.79%	-	-	25.93%	8.47%	13.95%	-	-
Currently married	77.50%	74.51%	76.34%	-	-	70.37%	69.49%	69.77%	-	-
De facto or consensual marriage	-	-	-	-	-	0.00%	6.77%	69.76%	-	-
Separated	-	-	-	-	-	3.70%	1.69%	2.33%	-	-
Divorced	0.00%	3.92%	1.53%	-	-	0.00%	6.78%	4.65%	-	-
Widowed	6.25%	3.92%	5.34%	-	-	0.00%	6.78%	4.65%	-	-
Other	-	-	-	-	-	-	-	-	-	-
<b>Occupation</b>										
Employer	-	-	-	-	-	3.70%	5.08%	4.65%	-	-
Self-employed	6.25%	7.84%	6.87%	-	-	11.11%	13.56%	12.79%	-	-
Employee, working for wages (type 1)	20.00%	11.76%	16.79%	-	-	11.11%	13.56%	12.79%	-	-
Employee, working for wages (type 2)	16.25%	11.76%	14.50%	-	-	11.11%	6.78%	8.14%	-	-
Producing goods for own and/ or family	36.25%	15.69%	28.24%	-	-	18.52%	23.73%	22.09%	-	-
Unpaid family worker (family business)	21.25%	52.94%	33.59%	-	-	37.04%	28.81%	31.40%	-	-
Unpaid family worker (help with basic household activities)	-	-	-	-	-	-	-	-	-	-
Volunteer work	-	-	-	-	-	0.00%	1.69%	1.16%	-	-
Student — full time	-	-	-	-	-	-	-	-	-	-
Student — part time	-	-	-	-	-	3.70%	0.00%	1.16%	-	-
Home duties	-	-	-	-	-	3.70%	6.78%	5.81%	-	-
Retired	-	-	-	-	-	-	-	-	-	-
None — did not pursue any activity	-	-	-	-	-	-	-	-	-	-
Physically/Mentally Disabled	-	-	-	-	-	-	-	-	-	-
Total number of observations	80	51		131		27	59		86	

## Annex 3

### Detailed information on the representativeness of household surveys

To assess the representativeness of the data, distribution of households among the four islands, and gender distribution, had to be examined. Figure 83 provides graphic assessment of data representativeness of households. As can be seen, the actual proportion collected closely resembles the required proportion of observations of these islands as suggested by the Department of Statistics.

Figure 83: Distribution of households by island



Source: Endline survey data (2017).

The issue of gender was explored in two steps. The first was to assess the gender distribution of household heads. Then the team examined the of gender distribution of all the respondents. Data from the Household Income and Expenditure Survey 2016 (HIES) was used as a benchmark against the endline data (see Table 24). It can be seen that proportion of household head in the HIES is 79.98 percent and proportion in the endline is 83.28 percent; proportions of female for HIES and the endline are 20.02 and 16.72, respectively.

Using selected variables of interest, Table 25 illustrates how much the gender distributional differences influence the survey results. The weight assigned to males is calculated by dividing the male proportion in the HIES by the male proportion in the endline; female weight is calculated in similar fashion. Unweighted and weighted earnings differ only slightly; the same is true for the proportion of those who heard about the July 2017 food tax and biscuits price. These results should provide some confidence in using the endline data for further analysis.

Table 24: Head of household distribution by gender

Gender	HIES	Endline
Male	79.98	83.28
Female	20.02	16.72
<b>Total</b>	<b>100.00</b>	<b>100.00</b>

Source: HIES (2016) and endline survey (2017).

Table 25: Comparison of unweighted and weighted results

Variable	Unweighted	Weighted
Earning	1320.129	1360.481
Heard about July 2017's Food Tax	48.97	50.72
<b>Biscuits price</b>	<b>5.39</b>	<b>5.90</b>

Source: HIES (2016) and endline survey (2017).

Table 26 shows that the gender distributions of the first person in the household for males and females are 56.26 and 43.74 percent, respectively. According to the 2016 Tongan Census, there were 50,255 males and 50,396 females in Tonga, making the proportion approximately 50:50. If we look at gender distributions of the first person in the household from the survey, it is 56.26 for males and 43.74 for females. This may not resemble gender-wide population distribution because the first person is head of the household, thus the distribution should depart from the population at large; however, the deviation is not too significant to be of concern.

When we examine gender-wide distribution of all persons in the household, the proportion of males increases to 62.18 percent, with the remaining 37.82 percent being female. At first glance, one might expect the distribution to resemble population characteristics, but the significant difference occurs because, once the first person in the household was interviewed, the interviewer asked if there were any other household member who used tobacco or alcohol. If there is such a person, the interviewer proceeded to interview the person on smoking and drinking behavior.

Table 26: Gender distribution

Gender	First person in the household	All persons in the household
Male	56.26	62.18
Female	43.74	37.82
<b>Total</b>	<b>100.00</b>	<b>100.00</b>

Source: HIES (2016) and endline survey (2017).

## Annex 4

### Data Analysis

#### **Construction of wealth index**

Data are analyzed using descriptive statistics such as means, median, standard deviation, minimum and maximum value. Analyses are done at both aggregate level, island-wise and by socio-economic background. To provide analysis beyond the mean of the data, differences in socio-economic background must be taken into account. The method employed here follows Ebert and Welsh (2004) and OECD (2008). It begins with selecting a set of socio-economic variables that would capture key characteristics of a household. We use types of wall materials, source of lighting, types of fuel used for cooking, types of toilet facility, cars, presence of refrigerator, washing machine, desktop computer, laptop computer, earning and education of head of household as a set of information to capture socio-economic status of a household. These variables are then analyzed by principle component analysis (PCA) to obtain a statistical model.

In essence, PCA is a multivariate statistical method that helps to reduce the number of variables in a dataset into a smaller dimension. This is achieved by converting a set of correlated variables of interest into a set of uncorrelated components. In doing so, PCA enables researchers to determine the most appropriate weightings option for each variable; consequentially, an index that captures maximum variables can be derived. Further technical discussion of PCA and its application to wealth index construction can be found in Cortinovis, Vela and Ndiku (1993) and Vyas and Kumaranayake (2006). In the context of this study, the model contains information on relative importance of the variables mentioned above in representing a household's socio-economic status. This model is used to predict a socio-economic score for each of the household.

The next step is to calculate the socio-economic index (SI) for each household  $i$ . This is done by the formula shown below. In this formula  $hs_i$  is socio-economic score for each of the household obtained from PCA exercise above.  $\text{Min}(hs_i)$  and  $\text{Max}(hs_i)$  represent minimum and maximum socio-economic scores respectively. This the value of SI will be between 0 to 1; higher SI score denote higher socio-economic status of the household. These values are then divided into quintiles for further data analysis.

$$SI_i = \frac{hs_i - \text{Min}(hs_i)}{\text{Max}(hs_i) - \text{Min}(hs_i)}$$

#### **Elasticity calculation**

Elasticity is a measure of consumers' responsiveness to changes product prices, including tax-induced price changes. To ensure that the measures are comparable across different product categories whose measurement units differ, elasticity values must be unit-free. The formula used to calculate the value is the following:

$$\text{elasticity} = \frac{\% \text{change in quantity}}{\% \text{change in price}}$$

Typically, the value of price elasticity is negative – i.e. when a consumer reduces their consumption when there is a price rise. Since tax increases product price, we can use the above formula to measure the effect of tax imposition. The assumption underlying the empirical accuracy of the elasticity estimate is that price increase is solely due to tax increase. For further discussion, refer to Nicholson and Snyder (2016).

The accuracy of cigarette demand elasticity estimates depends on data quality. Several factors influence elasticity values. Some of these factors have already been explained in the previous section. In addition, factors related to socio-economic status also play a role in determining the magnitude of elasticity. To obtain reliable estimates of elasticity, one of two approaches must be adopted. The first approach is to take these variables into account; this can be achieved by using a multivariate statistical model. The second approach, which we adopted, focuses on controlling the influence of these variables.

When estimating tax elasticities, we used individual-level data. While the baseline and the endline data were not designed to be longitudinal, we succeeded in creating panel data using the following method:

Step 1: We created household-level wealth index.

Step 2: The wealth index was divided into quintiles.

Step 3: For each quintile, we match these two datasets using island, village, and head of the household name.

Step 4: We calculate elasticity for individuals, using price and consumption data.

Step 5: (Wealth) Quintile-wise elasticities were calculated as the average of individual elasticities of the same wealth quintile.

The creating of panel data helped to ensure that the influence of socio-economic factors was minimal, thereby increasing the accuracy of elasticity estimates. When combined with our attempts to minimize recall bias, we believe that our results are valid.

For the calculation of commodity elasticity, import quantities and price data before and after tax imposition were used. Table 27 provides an example of the use of import quantities and prices to estimate elasticity for SSBs. Note that all values reported in Figure 80 used this method to calculate elasticity. Prior to adopting this approach, we consulted with Tonga's Ministry of Finance officials to ensure that there was no other factor that would affect prices of products under our interest during the period that fell within the scope of this study.

Table 27: Calculation of SSB elasticity

Price change			Quantity change			Elasticity
After-tax price	Before-tax price	% Change in price	After-tax	Before-tax	%Change	
2.4	2	20.00	3,912	4,808	-18.6	-0.93



## Annex 5

### List of key policymakers and stakeholders who participated in the key informant interviews.

No.	Participants
<b>Government Ministers and Former Minister</b>	
1	Rev. Dr. Pohiva Tu'l'onetoa, Minister for Finance and National Planning
2	Hon. Dr. Saia Piukala, Minister for Health
3	Hon. Semisi Fakahau, Minister for Agriculture, Forestry, Food and Fisheries
4	Hon. Penisimani Fifita, Minister of Education and Training
5	Mr. Tevita Lavemaau, Member of Parliament, Former Minister of Finance and National Planning
<b>Government CEOs and Former CEO</b>	
6	Mrs. Balwyn Fa'otusia, CEO, Ministry of Finance and National Planning
7	Dr. Siale 'Akau'ola, CEO, Ministry of Health
8	Mr. Kelemete Vahe, CEO, Ministry of Revenue and Customs
9	Mr. Kulu 'Anisi Bloomfield, former CEO, Ministry of Revenue and Customs
<b>Non-Government Organizations</b>	
10	Ms. Ofeina Filimoeaha, CEO, Tonga Health Promotion Foundation
11	Ms. Jeanie McKenzie, Tonga Health NCD Adviser
12	Mrs. Mele Amanaki, National Food Council
13	Mrs. Papiloa Foliaki, T.C.D.T (Tonga Trust)
14	Mrs. Amelia T. Hoponoa, Executive Director, Tonga Family Health Association
15	Mr. Tevita Halahala, Civil Society
<b>Government Senior Technical Staff</b>	
16	Mr. Heiloni Latu, Ministry of Revenue and Customs
17	Mr. Sione Faleafa, Ministry of Finance and National Planning
18	Ms. Sandra Fifita, Ministry of Commerce, Consumer, Trade, Innovation and Labour
19	Mr. Sioape Kupu, Ministry of Health
20	Mr. Anthony Cocker, Principal Consumer Affairs Officer Commerce Division
21	Mr. Metuisela Falesiva, Head of Food Division
22	Mr. Eva Mafi, Health Promotion Unit, Ministry of Health
<b>Church Leaders</b>	
23	Pastor Saia Vea, President, Seventh-day Adventist Church
24	Dr. Tuípulotu Katoanga, President, Church of Tonga
25	Mr. Silongoatonga Samani, Head of Welfare and Humanitarian, Tonga, Church of Jesus Christ of Latter-day Saints
26	Dr. Meleána Puloka, President, FWC Education
<b>Community Representative</b>	
27	Mr. Álotaisi Takau, District Officer, Kolofoóu
<b>Private Sector</b>	
28	Mr. Min Seng Cai, Local Tobacco Company
29	Mrs. Maliana Tohi, Molisi Supermarket Manager/ CEO



**World Bank**

1818 H Street, NW  
Washington, DC 20433  
USA

[eastasiapacific@worldbank.org](mailto:eastasiapacific@worldbank.org)

**World Bank Tonga**

The World Bank Group, Level 3,  
National Reserve Bank of Tonga Building,  
Salote Road, Nuku'alofa, Tonga

Tel : +676 22 251 [WBG: 5740 6448]

Fax: +676 29 290  
[nlatu@worldbank.org](mailto:nlatu@worldbank.org)