



Luka 1:1 E v̄e ona iloa e koe, e tokalahi nā tino kua taumafai ke ki lātou fakamaumaua ki lalo nā mea kua uma te fakataunukugia....
(Many have done their best to write a report of the many things that have taken place among us....)

How much do Tokelauans consume –and throw away – in one year?

A study of 2014 imports by the Tokelau National Statistics Office, 2015/16, summary version 2

The question how much Tokelauans consume and throw away in one year can be answered in a relatively straightforward way. This is because there is only a single co-operative and a single bulk store in each of the three villages Atafu, Nukunonu and Fakaofo. The vast majority of food, drink, cigarettes, fuel and building materials is purchased through these stores. And these in turn are supplied by the Tokelau Apia Liaison Office (TALO) in Apia where accurate records of all financial transactions are kept. In a special statistics research project, these detailed invoices were analysed for the year 2014. The result is a unique snapshot for a Pacific country, with cause for concern.

While the data are derived from shops' invoices, they have been able to be confirmed to a high degree of accuracy by "shipping manifests". These are official Customs documents that accompany each shipment. They describe in general terms the volumes and weights of the cargo, and in detail also the amount of cigarettes and alcohol (for taxation purposes). Manifests also include shipments of vehicles, water tanks, and personal effects (when moving house) that are of less interest here.

Imported quantities for 2014 are provided, and related to Tokelau's overall population (1,383 at December 2013 population count). A confidential appendix provides details for individual atolls. The paper covers 55 shipments in 2014 from Apia in Samoa, the nearest port, by the vessels *PV Matua*, *Lady Naomi*, *Samoa Express*, and *Southern Phoenix*. Not yet in operation were *Fasefulu* and *Mataliki*.



Interpretation of the 2014 imports data

This paper deals with five main areas of interest: food and non-alcoholic drinks, alcoholic drinks, cigarettes, fuel, and solid waste. Unfortunately the news is not so good. Tokelauans live in a potentially very healthy environment that supplies plenty of fish, breadfruit and coconuts. Yet their food preferences are all of the kinds that are now considered “bad” in nutritional terms: high in saturated fat, sugar, starch and salt; and very low on fresh vitamins and dietary fibre. Average smoking and drinking habits are at the unhealthy end of the spectrum. All these contribute to the high risk and prevalence of Non-Communicable Diseases (NCDs) in the population, for the young and the old – especially when combined with very little physical activity.

The food consumption also produces much solid waste that needs to be disposed of. On the positive side, recycling of organic waste is excellent, all being fed to pigs. Tokelau is now also practically self-sufficient in terms of solar energy. This has much reduced the need for using diesel on the islands.

The present paper does not provide recommendations for improving the life style and consumption patterns of Tokelauans. Yet it provides for the first time an accurate and reliable baseline of imports. That can be used by for example the Department of Health (DoH), and the Department of Economic Development Natural Resources and Environment (EDNRE) to develop appropriate policies; and then to monitor the effect of those policies by comparison with these data in due course.



The total sum of imports by the cooperative and bulk stores was NZ\$5,239,523. The Food and non-alcoholic beverages component was NZ\$2.0 million, Alcoholic beverages and tobacco NZ\$1.4 million.

This presentation offers only an overview for general interest and notification. The full imports story is documented in two technical reports. The first was released by the Council for the Ongoing Government of Tokelau in November 2015, and is available on the Tokelau website:

<http://www.tokelau.org.nz/Tokelau+Government/Government+Departments/Office+of+the+Council+for+the+Ongoing+Government+OCOG/Tokelau+National+Statistics+Office/Tokelau+imports+from+Samoa.html>

The second report with supplementary data and further analyses is to be released in due course.

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Discussion with Professor Elaine Rush, Auckland Technical University, is gratefully acknowledged.

Food and non-alcoholic drinks

The main starch staple food in Tokelau is dry white Rice (62.4 metric tonnes imported in 2014), potatoes (17.3 t) coming second. Taro are not captured in the stores invoices. Other vegetables are Onions (8.0 t) and Carrots (0.9 t). Fresh fruit comprises Oranges (3.4 t) and Apples (3.0 t). Canned fruit salad in syrup (1.8 t nett) is popular, but a poor alternative given its high sugar content.

The main forms of protein purchased in 2014 in the store by far, are Chicken leg quarters (54.1 tonnes), supplemented by Chicken wings (8.6 t), Corned beef (7.1 t), Salt beef (6.1 t), Lamb chops (5.7 t), Lamb necks (4.1 t), Mutton flaps (3.7 t), and various types of sausages (13.4 t).

The import of Mackerel in oil (8.1 tonnes) and of Tuna in oil (5.0 t) is surprising given the large local fish catch – which is being quantified in the current Household Income and Expenditure Survey.

In baking and cooking ingredients, the list is topped by Brown sugar (49.4 tonnes), Baker's and normal flour (25.6 t), and Cooking oil (21.0 cubic metres). Instant noodles are very popular (8.7 t).

The main non-alcoholic drinks are Milk (49.2 tonnes) and Milk powder (4.7 t), followed by Bottled water (32.0 cubic metres), Just Juice (15.3 cubic metres), and Zap chocolate drink (12.9 cubic metres). All non-alcoholic carbonated soft drinks have since 2014 been banned in all three villages – a reason for the WHO to present Tokelau with a special award in 2015.



Examples of Tokelau guesthouse breakfast (fried bread, bacon, canned spaghetti); lunch (sausages and chips); dinner (chicken curry on rice): big portions high in fatty meat and starch, low in vitamins.

Unfortunately the demonstrated food preferences are all of the kinds that are now considered “bad” in nutritional terms: high in fat, sugar, starch and salt; and very low in vitamins and dietary fibre such as found in fresh fruit and vegetables. Combined with very little physical activity and relatively large food portions, all this contributes to the high risk and prevalence of Non-Communicable Diseases (NCDs) in the Tokelau, obesity in particular.

To get an overall idea of individual consumption, the stores food and drink imports in 2014 have been divided by the total population count (1,383) and also by people of legal working age (15-64 years old, 852 individuals) who will have the biggest appetite. This results in a realistic range of average weekly consumption per individual, e.g. **Main staples** – Dry white rice: 0.87-1.41 kilogram per week (this equates to 1.89 to 3.07 kg cooked rice/wk), Potatoes: 0.24-0.39 kg/wk; **Main other carbohydrate sources** - Brown sugar: 0.69-1.12 kg/wk, Flour: 0.36-0.58 kg/wk; **Main protein source (excluding local fish)** - Chicken leg quarters: 0.74-1.20 kg/wk; **Fat**: Cooking oil is the main ‘pure’ source: 0.29-0.47 litres per week. Note that not all cooking oil is bad (if unsaturated) nor will this volume be consumed (although high in fried bread products and batter); a much greater source of fat will be hidden in protein sources such as chicken, tinned fish, lamb/mutton, corned beef, and sausages.

Alcohol: imports of wine, beer and spirits

Alcohol use is of concern in Tokelau, as evidenced by the fact that all Taupulega have measures in place to limit its consumption. For example:

- Fakaofu has banned the sale of spirits but not of beer (daily, men only)
- Nukunonu store sells beer and spirits on Monday, Wednesday and Friday
- Atafu store sells beer and spirits on Monday, Thursday and Friday, with beer now limited to 2 large bottles for females and 3 large ones for males.
- Villagers must purchase their alcohol through the co-op stores and not on-sell it. They may now bring in two bottles of spirits upon arrival from Samoa.



Wine: At only about 500 litres in 2014, consumption of wine in Tokelau is negligible – indeed the bulk of this is altar wine taken for religious ritual and for entertainment. No further analysis is done.

Beer: Beer was a major import item in 2014. The shops' invoices indicate a volume imported of 72,000 litres whereas manifests calculations from bottle numbers and sizes lead to a total of 68,000 litres; in further discussion the midpoint of 70,000 litres is used.

The population has 949 individuals over 15 years of age (population count December 2013), so their average beer consumption amounts to 74 litres per annum, or 1.4 litres per week. This equates to about 5 standard drinks per week from beer averaged over all 15+ year-olds.

Spirits: A total of 11,000 litres of spirits were documented to be imported into Tokelau in 2014. The shipping manifests provide a more reliable guide here than the stores invoices as the latter do not include private imports. Such parallel imports are considerable: both in Atafu and Nukunonu where spirits are sold through the stores, as well as in Fakaofu where they are not.

Again for 949 individuals age 15 or over, this averages to 11.6 litres per person per year or 223 ml per week.

So averaged over all 15+ people, Tokelauans have 1.8 standard drinks per day. (That equates to approx. 612 kJ per person per day from alcohol alone - the equivalent of large piece of chocolate cake!).

However the 2015 STEPS survey shows that 57.3% of adults drinks alcohol regularly, so the average drinker would in fact consume 26.4 standard drinks per week. NZ guidelines recommend a maximum of 10 standard drinks a week for women and 5 for men (2 standard drinks per day for women and 3 for men, with two drink-free days each week (<http://alcohol.org.nz/help-advice/advice-on-alcohol/low-risk-alcohol-drinking-advice>)).

This calculation shows that alcohol drinking rates in Tokelau are almost twice the recommended maximum; this is also a potential contributor to the obesity and other non-communicable diseases.

Alcohol data for individual villages are further split out in the (confidential) appendices to this paper.

Cigarettes

Analysis of Tokelau cigarette imports paints a picture that is rather disturbing from a national health perspective, at least compared to New Zealand where 15 percent of the adult population still smokes, and a smoker there averages 7 cigarettes per day (StatisticsNZ 2013).

Tokelau data from both the shop invoices and the shipping manifests indicate that over 3 million cigarette sticks were imported in 2014. In December 2013, there were 949 people in Tokelau at or above the age of 15 years. In the Tokelau Census 2011, 47.8 percent of the 15+ population indicated they smoked regularly.

Three 3 million cigarette sticks per year over 365 days and 949 people divided by 47.8% equals over 18.4 cigarettes per day on average by people who smoke. The 2014 STEPS survey (WHO unpublished) indicated that of the 18- to 69-year-old respondents, 54.4% smoked regularly, resulting in 19.3 cigarettes per day. But STEPS respondents (70%) estimated their own smoking to be on average 13.3 cigarettes per day, it is not unusual for such self-assessments to be under-reported. So a realistic assessment of the average smoking rate in Tokelau would be about a packet of 20 cigarettes per smoker per day.

The above data have informed the Department of Health's "Tokelau Tobacco Control Policy Project", which proposes to reduce children's exposure to smoke and smoking to 0% and all adults' smoking to less than 5% in the year 2021.



Monitoring stores' imports of cigarettes data will provide a good mechanism for assessing the success of such policies (even though minor personal cigarette imports still may take place).





Fuel

While Atafu and Nukunonu have one village on their atoll, Fakaofo has both Fale (the main village with meeting house and churches) and Fenuafala (with hospital and the schools). Of the three atolls, Atafu has the smallest lagoon and Nukunonu the biggest. About 8.8% of total import invoices is taken up by fuel, mostly petrol. It is used for boat transport and so the differences in fuel purchased through the stores between Fakaofo (NZ\$187k in 2014), Atafu (\$121k*), and Nukunonu (\$153k) are significant and easily explained. These results indicate that differences between villages for other items such as food, drinks and smokes will also be real, not artificial.

*possibly 17% under-estimated due to difference in tax calculation during part of 2014, hence perhaps \$141k.

	Atafu	Fakaofo	Nukunonu	Grand Total	All Tokelau	COICOP group	AA	FF	NN
\$	120,619	\$ 186,626	\$ 152,714	\$ 459,959	8.78%	7.2 Personal transport (petrol)	7%	12%	9%

100 solar %?
95... 90... 85 ...

Power use
up 25 %

The bulk of diesel use on-atoll had until recent years mostly been used for power generation. The installation of solar power plants on each of the three atolls has reputedly reduced diesel consumption to only 10 percent of previous levels (just backup for cloudy days, maintenance etc.). Although touted as a “100% solar nation”, indications are that percentage coverage has recently dropped to 90 percent and possibly below. Simultaneously, power use appears to have increased by about 25 percent.

It is difficult to reconcile the stores’ invoices with the shipping manifests for diesel, as the fuel is often transported in the ships’ tanks then pumped into drums on the barges that come and meet the ship. Such volumes do not feature on the shipping manifests and are not further discussed here.

Solid waste

The food consumption also produces much solid waste that needs to be disposed of. On the positive side, recycling of organic waste is excellent, all being fed to pigs. But packaging is a major pollutant.

Tokelau has already identified waste management as a priority, and several measures for disposal are in place in the various villages. There is a Memorandum of Understanding (MOU) with Samoa by which the latter will take and dispose of solid waste shipped back in. Much of the rubbish however is still burnt on-atoll and some is left to pollute the environment, visually as well.

Examples of items and numbers imported in 2014 that need disposing of are: foam plates (34,000), foam cups (63,000), plastic spoons (35,000), plastic bowls of instant noodles (125,000); batteries (10,000), cigarette lighters (4,900) plastic/aluminium Bongo snacks wrappers (74,000), Zap drink minicartons (55,000); pieces of bubble gum (143,000); nappies (123,000), ladies' sanitary pads (17,000); hair shampoo and conditioner bottles (6,000), water bottles (31,000), cooking oil bottles (21,000). Spirits bottles (11,000) and small beer bottles (30,000) are dumped; apparently only the large beer bottles (80,000) recycled.

There are 7 food items in cans with over 1 metric tonnes imported nett in 2014. They are Mackerel in oil, Tuna in oil, Spaghetti, Coconut cream, Fruit salad, Condensed milk, and Pineapple crush/slice totalling 24 tonnes nett in 72,000 tins. With an average tin weight of 40 grammes, that's c. 3 tonnes of metal waste for these items alone. What percentage of this is in fact recycled, is unknown.

The Tokelau Department of Economic Development, Natural Resources and Environment (EDNRE) may wish to further peruse the data made available here. Clearly the stores' imports into Tokelau present a potentially large environmental problem that needs to be addressed in a sustainable way. The above figures could be used to monitor the success of solid waste recovery operations, etc.



"God created the world in 6 days, then took a day's rest, and then tidied up." (a SPREP colleague)

Where to from here?

It's the statistician's job to describe the world in numbers, not to change the world. But the intention is that the numbers provided here are a solid baseline from which change can be monitored.

For example, the Department of Health is proposing policies to reduce smoking by reducing imports to nil in 2021, from 3 million cigarette sticks in 2014 (a 20-pack of cigarettes per smoker per day).

We now know quite accurately how much alcohol is being imported into Tokelau, both by the co-operative stores and individuals. An average of 26.5 standard drinks per week on average for people who drink is high, both in terms of alcohol intake as well as in energy intake that needs to be burnt off. Better policies could be developed to curb drinking, because current ones may not be working (for example preventing the sale of spirits in the Fakaofu store has not stood in the way of significant parallel imports by individuals; permitted beer sales per person in Atafu are 3 times the recommended maximum consumption for women and men).

In terms of food, Tokelauans supplement their fish catch by large amounts of protein sources that are considered unhealthy because of the high fat content, and they consume high levels of sugar and refined carbohydrate with low fibre content. The calculated sugar intake, including that hidden in other foods and non-alcoholic beverages, averages to a range of 0.83 to 1.35 kg per person per week. This is equivalent to 207 to 336 teaspoons per week. Note the recent recommendation by WHO for adults to derive their energy from less than 84 to 168 teaspoons per week (children 42 to 84). So adults in Tokelau consume at least twice the daily recommended maximum free sugar intake.

Combined with large food portions and lack of much physical exercise, obesity is the inevitable result. This was confirmed by the STEPS survey taken in 2014. Using the body mass index (BMI: body weight in kilogrammes divided by square of length in metres) shows that 23% of the population is overweight (BMI 25-30) and 67% is obese (BMI>30) – a serious situation for adults, let alone for children. The food rankings and quantities provided here can be used to monitor change over time that healthy living policies may instigate and so remove impediments to quality of life.

The rankings of this study may also be used to address food security issues in clarifying what food in what quantities need to be stockpiled for situations where imports are impeded. Because Tokelau life is entirely dependent on food imports from Samoa, this too is where the present study can provide baselines. Importing parboiled rice instead of dry white rice may be worth investigating.

Other aspects touched upon relate to the use of fuel, but these stores and manifest data are inconclusive. They could not be used in assessing Tokelau's Intended Nationally Determined Contributions (INDC), an international obligation under the COP21 agreement on climate change. The indications are that diesel use by passenger and supply ships to and from Tokelau far outweigh any local consumption, and will be hard to change.

Environmental impacts are addressed, particularly in relation to food packaging, drink bottles, and disposable single-use materials. There is clearly scope for improving current practices.

Because the imports study also incorporated building materials supplied to the bulks stores, it was possible to get a handle on the financial side. Further analysis is possible but was not undertaken. Once again, the 2014 data are now here to provide useful comparative material for future studies.

Luka 1:3 Kua manatu ao foki la au, ona kua uma te kō hukehukeagia lelei o nā mea uma iēnei mai te kāmataga, ke kō tuhituhia fakalelei ki lalo nā mea iēnei mo tau afioga, (And so, Theophilus, because I have carefully studied all these matters from the beginning, I thought it good to write an orderly account for you.)

