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HARDSHIP IN TUVALU

BASED ON ANALYSIS OF THE HOUSEHOLD
INCOME AND EXPENDITURE SURVEY DATA OF
THE 2022/23 LONG FORM CENSUS

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Contents

Acronyms and abbreviations	iv
List of figures	v
List of tables.....	vi
Acknowledgements	vii
Executive Summary	viii
1. Introduction	1
1.1. Country context	1
1.2. The 2022/23 Household Income and Expenditure Survey	2
1.3. Structure of this report.....	2
2. Monetary hardship and inequality snapshot.....	3
2.1. Monetary hardship – “cost of basic needs” method.....	3
2.2. Extreme hardship	4
2.3. Consumption inequality	4
2.4. Deprivation of basic infrastructure and education	6
3. Poverty profile.....	6
3.1. Geographic distribution.....	6
3.2. Age groups.....	7
3.3. Poverty and gender	8
3.4. Employment.....	8
3.5. Access to basic services.....	10
3.6. Spending patterns	11
4. Income source and cash receipts	13
4.1. Income source	13
4.2. Remittances.....	14
5. Typologies of the poor	15
6. Annexes	17
6.1. Food consumption groups	17
6.2. Regression parameters for imputed rent prediction.....	19
6.3. Methodology notes	20
<i>Introduction.....</i>	<i>20</i>
<i>6.3.1. Background to monetary poverty measurement.....</i>	<i>20</i>
<i>6.3.2. Sample used for poverty measurement.....</i>	<i>21</i>
<i>6.3.3. Consumption aggregate</i>	<i>21</i>
<i>6.3.4. Poverty line methodology</i>	<i>24</i>
6.4. Estimation of the correlates of consumption and poverty	25

Acronyms and abbreviations

AE	adult equivalent
AUD	Australian dollar
BNPL	basic needs poverty line
BNPR	basic needs poverty rate
FSM	Federated States of Micronesia
GNI	gross national income
HIES	Household Income and Expenditure Survey
HH	household
LFC	Tuvalu Long Form Census
PNG	Papua New Guinea
PSMB	Pacific Statistics Methods Board
SPC	Pacific Community
Tuvalu CSD	Tuvalu Central Statistics Division
USD	United States dollar

List of figures

Figure 1. Map of Tuvalu.....	2
Figure 2. Basic needs poverty rate and gap by location	4
Figure 3. Extreme hardship by area of residence	4
Figure 4. Gini index (based on consumption per capita)	4
Figure 5. Lorenz curves, by area of residence	5
Figure 6. Distribution of total population compared with distribution of the poor population, by residence area.....	7
Figure 7. Tuvalu’s population distribution, by age group and sex (derived from HIES data with weights collaborated to match the age and sex structure of the census)	7
Figure 8. (a) Distribution of the poor and (b) Poverty rate, by age group	8
Figure 9. Poverty rate by sex of household head and location	8
Figure 10. Hardship rate for population aged 15–64, by employment status and sex	10
Figure 11. Hardship rate by employment status of the household head.....	10
Figure 12. Hardship rate by access to basic services.....	11
Figure 13. Share of food consumption value, by food categories and wealth decile.....	13
Figure 14. Composition of household income, by area	14
Figure 15. Composition of household income, by wealth decile	14

List of tables

Table 1. Key monetary measures of living standards in Tuvalu.....	viii
Table 2. Hardship rate by location.....	3
Table 3. Gini index by location	5
Table 4. Inequality indices by area	5
Table 5. Non-monetary deprivations, by household consumption distribution	6
Table 6. Population distribution of Tuvalu	7
Table 7. Dependency ratio	7
Table 8. Labour force statistics of adults aged 15–64 years.....	9
Table 9. Distribution of the population aged 15–64 years, by status of employment, main activity, and sex	9
Table 10. Distribution of the population aged 15–64 years, by status of employment and area of residence	9
Table 11. Access to basic services	11
Table 12. Components of consumption by residence area	12
Table 13. Components of food consumption by residence area.....	12
Table 14. Household annual remittances.....	14
Table 15. Characteristics of poor households.....	16
Table 16. Food consumption groups	17
Table 17. Regression model for imputed rent	19
Table 18. Annual imputed rent in AUD by area.....	23
Table 19. Deflators of food consumption prices by location	23
Table 20. Food poverty line and BNPLs by reference population and method.....	25
Table 21. Food poverty rate and basic needs poverty rates by reference population and method.....	25
Table 22. Regression coefficients to estimate the correlates of consumption per adult equivalent and poverty.....	26

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Last, but most definitely not least, the effort put in by the staff at the Tuvalu Central Statistics Division (CSD) and the other departments in the Government of Tuvalu to successfully complete the 2022/23 LFC.

A handwritten signature in blue ink, consisting of a series of loops and a long horizontal stroke extending to the right. Below the signature is a dashed horizontal line.

Lae Peleti

Acting Government Statistician

Executive Summary

This report analyses monetary poverty (or hardship) and inequality in Tuvalu using data from the 2022 Household Income and Expenditure Survey (HIES). We use the words poverty and hardship interchangeably, with the former being used in theoretical applications of the term (e.g., poverty line), while we use hardship which is the preferred term used in Tuvalu to define poverty.

The proportion of Tuvalu's population considered poor due to low living standards, known as the "cost of basic needs poverty headcount ratio", was estimated to be 21.5%. This equates to 2,339 people considered poor in 2022. This hardship rate was derived from comparing consumption per adult equivalent (AE)¹ with a poverty line estimated at an annual amount of AUD 2,668 (approximately USD 1,850). The poverty line was calculated as the cost of basic needs for living, based on the HIES data. The poverty headcount ratio of 21.5% has reduced from 26.3% in 2010. This places Tuvalu with similar rates of hardship as its Pacific neighbours of Kiribati (21.9% in 2019), Samoa (21.9% in 2018), and Tonga (20.6% in 2021), and lower than Fiji (29.9% in 2019) and Micronesia (41.2% in 2013), but higher than Marshall Islands (7.9% in 2019), Solomon Islands (12.7% in 2013) and Vanuatu (15.9% in 2019).²

Inequality among individuals in Tuvalu is low compared to other upper middle-income countries, East Asian, and Pacific countries, with the Gini index, an indicator on the distribution of income or consumption among the population, with perfectly even distribution being 0 and perfect inequality being 1, estimated at 0.294 based on per capita consumption (**Table 1**).

Table 1. Key monetary measures of living standards in Tuvalu

Annual gross national income (GNI) per capita (2022, current local currency) ³	AUD 11,484
Mean (median) annual adult equivalent consumption	AUD 4,491 (AUD 3,887)
Basic needs poverty line (BNPL)	AUD 2,668
Basic needs poverty rate (BNPR)	21.5%
Gini index	0.294

Hardship varies by geographic location and labour market characteristics of the household.⁴ Outer islands are more prone to hardship (24.0% BNPR in rural areas, which includes all islands of Tuvalu, except Funafuti) than in the capital, Funafuti (20.0% BNPR). Even though the hardship rate on the most populous island, Funafuti, is relatively low, around six poor people in ten (57.3%) live on this island.

1 Adult equivalency measures are used to reflect the differing consumption needs for members of the household, depending on their age. Pacific countries use an adult equivalency scale, where a child aged 0–14 is considered to have one-half the consumption needs of an adult.

2 <https://pacificdata.org/>

3 <https://data.worldbank.org/indicator/NY.GNP.PCAP.CN?locations=TV>

4 From this point onwards, for simplicity in this section, the term poverty or hardship is used interchangeably to refer to the "cost of basic needs".

The poverty rate is higher for people living in female-headed households (32.1% against 19.7% for male-headed households). The gender gap is more prominent in urban areas where the poverty rate in female-headed households is double that of male-headed households (34.1% and 17.5%). Households with a head who works as an employee have lower rates of hardship. There is a positive relationship between hardship and household size.

Two distinct groups of the poor exist in Tuvalu: the urban poor and the rural poor. They are mainly characterised by their geographical location, which is also correlated with education, sources of income, and access to basic services. Poor households in urban areas have better access to services and higher levels of human capital than in outer islands. Beyond differences in locations, the two groups of poor people exhibit significant differences in their income sources: the share of income from employment is 70% for the urban poor, while it is only 41% for the rural poor. For both groups of poor people, remittances are insignificant in income.

A regression model was used to identify the specific relationship of each household characteristic and hardship. All other things being equal, the risk of being poor increases as the household size increases. The urban/rural gap is confirmed: people living in urban areas are less likely to be poor than those living in rural areas. Aspects of household structure such as the gender of the household head, the proportion of members by age groups, and the proportion of males do not have a significant impact on the risk of being poor.

1. Introduction

1.1. Country context

Tuvalu is a Polynesian island country located in the Pacific Ocean, spread out between the latitudes of 5° to 10° south and the longitudes of 176° to 180° west. Tuvalu consists of nine separate islands: six atolls and three reef islands. An atoll typically consists of several motus: Tuvalu has a total of 124 islands and islets. Each island is surrounded by a coral reef.

The soils of Tuvalu's islands are usually shallow, porous, alkaline and coarse-textured, with carbonate mineralogy and high pH values of up to 8.2 to 8.9. The soils are usually deficient in most of the important nutrients needed for plant growth.

Tuvalu's small, widely scattered atolls have a total land area of only about 26 square kilometres, making Tuvalu the fourth-smallest country in the world by land area, and one of the most densely inhabited with 369 people per square kilometre.

From 1993 to 2004, the sea level in Funafuti (the capital city) rose 14 cm,⁵ and it has been determined that rising sea levels are causing more wave energy to be transferred across reef surfaces, which has tended to push more sand onto island shorelines, increasing islands' land areas. Over a recent four-decade period, there was a net increase in the land area of the islets of 2.9% (73.5 ha) resulting from the wave energy, but also due to the land reclamation.⁶

Tuvalu's nine islands are Funafuti, Nanumea, Nanumaga, Niutao, Nui, Vaitupu, Nukufetau, Nukulaelae, and Niulakita. Tuvalu's population is approximately 10,864 (2022) people – about 61% of the total population resides in the capital city, Funafuti. The latter is the main island and the only urban area.

Tuvalu is an upper middle-income country with a gross national income (GNI) per capita of AUD 11,484 in 2022.⁷ The official currency used in Tuvalu is the Australian dollar (AUD), and the exchange rate was around AUD 1.4676 for USD 1.00 in December 2022.

The country is isolated, almost entirely dependent on imports, particularly for food and fuel, and vulnerable to climate change and rising sea levels, which pose significant challenges to development.

The public sector dominates economic activity in Tuvalu as the country has few natural resources, with the exception of fisheries. Earnings from fish exports and fishing licenses for Tuvalu's territorial waters are a significant source of government revenue.

5 https://sealevel.nasa.gov/internal_resources/519/Funafuti_Tuvalu_combined.pdf

6 Kench, P.S., Ford, M.R. and Owen, S.D., 2018. Patterns of island change and persistence offer alternate adaptation pathways for atoll nations. *Nature Communications*, 9(1), p.605.

7 <https://data.worldbank.org/indicator/NY.GNP.PCAP.CN?end=2023&locations=TV&start=2022>

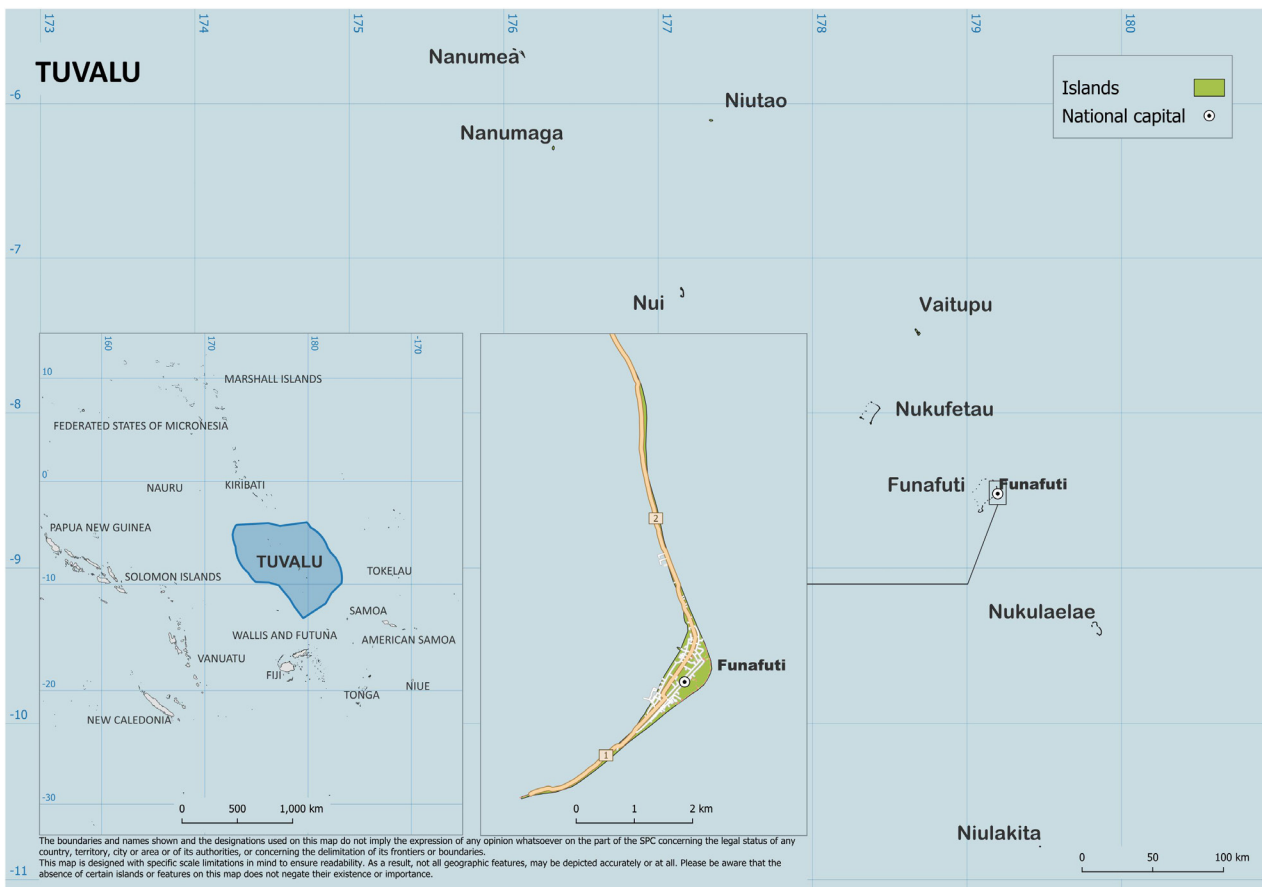


Figure 1. Map of Tuvalu

Note: <https://www.beautifulpacific.com/south-pacific-islands.php>

1.2. The 2022/23 Household Income and Expenditure Survey

Tuvalu's latest Household Income and Expenditure Survey (HIES) was conducted in 2022/23, from 11 December 2022 to 05 June 2023, and had a total sample size of 592 households (3,453 individuals). The survey was designed to produce data that provides representative income, expenditure, and consumption aggregates for urban (capital island, Funafuti) and rural areas (all inhabited outer islands). This 2022/23 HIES is the fourth conducted in Tuvalu, with the previous surveys occurring in 2000, 2010, and 2015/16. For analysis of hardship in Tuvalu, only 492 of the 592-household sample were used since

consumption data were not reliable for 100 households. This issue is further discussed in Annex 6.3.

The Tuvalu 2022/23 HIES was combined with a population and household census. This experimental operation was known as the Tuvalu Long Form Census (LFC).

1.3. Structure of this report

The first section presents the results of the analysis of the 2022/23 HIES on key dimensions related to hardship and household welfare. Section 2 presents the headline numbers on monetary poverty and inequality, as well as non-monetary dimensions of poverty. Section 3 is a

“profile of the poor” that compares poverty rates across several socio-demographic groups and compares the performance of poor and non-poor households across key non-monetary outcomes. Section 4 examines the income composition of households in Tuvalu to investigate the sources of household welfare and possible causes of different poverty rates by group. Section 5 concludes the analysis by synthesising the findings of the preceding sections to construct typologies of the poor to better inform stakeholders of the key decisions that would most affect hardship and inequality in Tuvalu.

2. Monetary hardship and inequality snapshot

2.1. Monetary hardship – “cost of basic needs” method

This chapter reports a snapshot of hardship and household welfare in Tuvalu for 2022/23. One in five people in Tuvalu lives in hardship. The hardship rate in Tuvalu for 2022, based on the national “cost of basic needs” poverty line (see **Box 1**), was 21.5% (**Table 2**). This measure is based on an annual per adult equivalent poverty line of AUD 2,668, which is around USD 1,850. The capital city Funafuti exhibits a lower poverty rate than the outer rural areas (20.0% against 24.0%).

In addition to the incidence of poverty, the “poverty gap” captures the depth of hardship, while the “squared poverty gap”⁸ reflects the severity of hardship. The poverty gap is slightly higher in rural areas with a 5.5% value versus 4.8% in urban areas (**Figure 2**).

Box 1. Cost of basic needs method

The “cost of basic needs” method is a way of measuring monetary poverty by calculating the threshold of consumption required to meet the minimum food and non-food needs, based on HIES data. The main steps of the “cost of basic needs” method are:

1. Estimate the minimum required consumption to meet food needs (“food poverty line”).
2. Estimate the minimum required consumption to meet non-food needs (“non-food poverty line”).
3. Add the food poverty line and non-food poverty line to produce the “basic needs poverty line” (BNPL).
4. Calculate the total value of goods and services consumed by each household (the “consumption aggregate”).
5. Compare the consumption aggregate (adjusted for household size and composition) to the BNPL; individuals in households with consumption below the BNPL are considered poor.

Detailed notes about methodological decisions in calculating the consumption aggregates and poverty lines are presented in the Annexes.

Table 2. Hardship rate by location

	Hardship (poverty) rate (%)	95% confidence interval	
		Lower band (%)	Upper band (%)
National	21.5	17.9	25.1
Urban	20.0	14.9	25.1
Rural	24.0	18.8	29.2

⁸ The squared poverty gap measures the gap to the poverty line in giving more weight to those living further away from the poverty line. It is also used as a measure of inequality since more weight is given to the poorest.

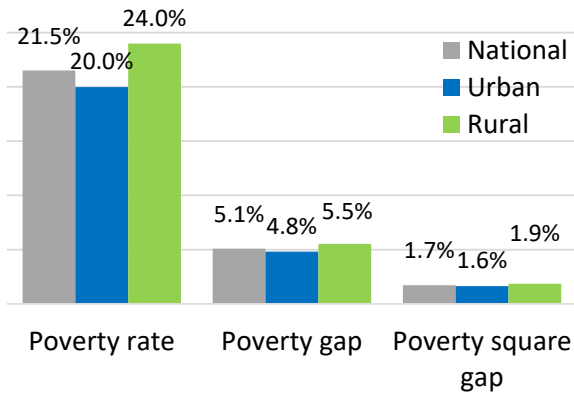


Figure 2. Basic needs poverty rate and gap by location

2.2. Extreme hardship

Tuvaluan people are hardly affected by extreme hardship: 1.6% of the population falls under the extreme poverty line, which is estimated to be AUD 1,256. There is no significant difference between urban and rural areas in terms of extreme hardship. Estimates of the extreme hardship rates were based on the food poverty line, defined as the cost of a food basket providing 2,100 kcal per day per capita.⁹ That is, it is the population with consumption below the food poverty line, or those with insufficient consumption to acquire 2,100 kcal per day (irrespective of non-food needs).

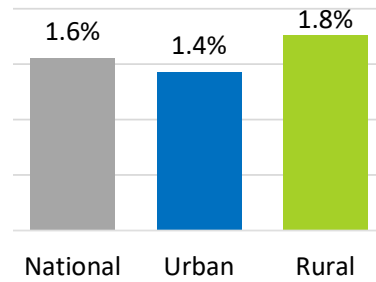


Figure 3. Extreme hardship by area of residence

2.3. Consumption inequality

Inequality in Tuvalu is similar to those in Kiribati and Tonga, but quite low compared to other countries in Asia and the Pacific. Based on consumption per capita, the Gini index, a measure of inequality that scales from 0 (a perfectly equal distribution of consumption across the population) to 1 (one person in the population holds all the consumption), was estimated at 0.293 for Tuvalu in 2022. This level of inequality compares favourably to many other Pacific Island countries and territories, as well as other middle-income countries in East Asia and the Pacific (**Figure 4**).

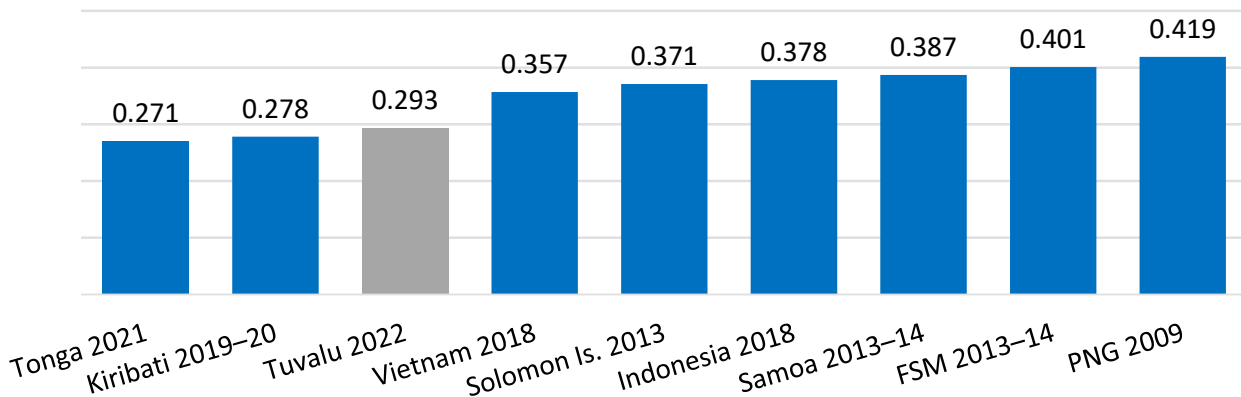


Figure 4. Gini index (based on consumption per capita)

⁹ To make the food poverty line consistent with the use of the adult equivalency scale (instead of household size) for the welfare aggregate calculation, the food poverty line was adjusted with a multiplier coefficient calculated as average (household size)/average (adult equivalent scale).

Inequality is higher in urban areas, as shown by higher estimated Gini index (**Table 3**) and as visually displayed by the Lorenz curves in **Figure 5**.

Table 3. Gini index by location

	Gini index	95% confidence interval	
		Lower band	Upper band
National	0.29	0.27	0.31
Urban	0.31	0.28	0.33
Rural	0.25	0.23	0.28

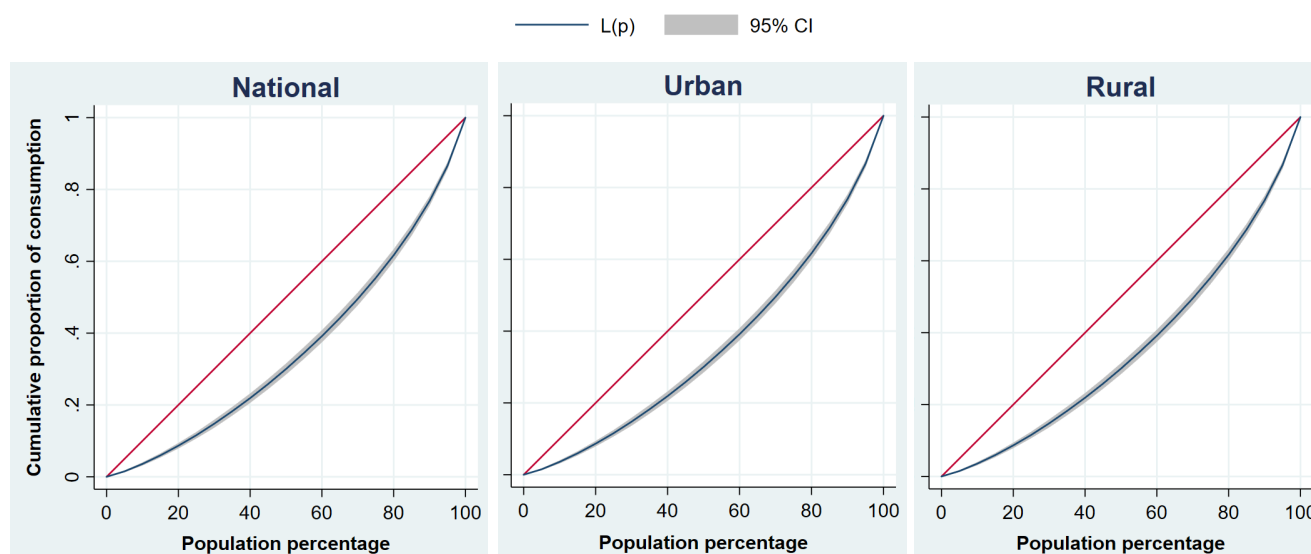


Figure 5. Lorenz curves, by area of residence

Other inequality measures confirm these results. Some of these measures are the shares of consumption held by different parts of the distribution, alongside the ratios of the share of the wealthiest population to the share of the poorest ones. Inequality is higher when the share of consumption by

the wealthiest is high and the share of the poorest is low. Also, inequality is higher when the ratio of the wealthiest share to that of the poorest is high. The share of the top 10% of consumers is 20.0% in rural areas and 21.2% in urban areas, indicating higher inequality in the latter (**Table 4**).

Table 4. Inequality indices by area

Area	Share of top 10%	Share of bottom			Ratio of top 10% to bottom		
		10%	30%	40%	10%	30%	40%
of per capita consumption							
National	23.2%	3.6%	14.8%	22.2%	6.4	1.6	1.0
Urban	21.2%	3.8%	14.2%	21.0%	5.6	1.5	1.0
Rural	20.0%	3.9%	16.9%	24.1%	5.2	1.2	0.8

The shares of poorer consumers tend to be higher in rural areas, confirming the higher level of inequality in urban areas. For example, the share of total consumption by the poorest

40% of consumers is 24.1% in rural areas and only 21.0% in urban areas. The diagnostics do not change with the ratios of the shares of consumption of the high consumers to the

poor ones. For example, the ratio of the top 10% to the bottom 10% is higher in urban areas (5.6 against 5.2 in rural areas).

2.4. Deprivation of basic infrastructure and education

To present the full breadth of challenges faced by households in Tuvalu, an analysis of non-monetary deprivation is important to complement the monetary dimension of poverty. Though household consumption is an important monetary welfare metric, it does

not provide a complete picture of household well-being, particularly in terms of access to the services. There are several ways to present non-monetary deprivation, among which is the approach used by the World Bank. This approach focuses on indicators related to deprivations in infrastructure (drinking water, sanitation, and electricity).

In Tuvalu, the poorest households in terms of monetary measures also tend to be more deprived in terms of non-monetary dimensions (**Table 5**).

Table 5. Non-monetary deprivations, by household consumption distribution

Type of household deprivation (Proportion of the population in households)	National	Top 60%	Bottom 40%
		of consumption	
Where at least one child aged 7–14 is out of school	36.0%	34.6%	38.1%
Without access to the electricity grid	12.2%	10.3%	15.1%
Where no adult (aged 15+) completed primary education	4.4%	4.7%	3.9%
Deprived of safely managed drinking water	20.8%	15.3%	29.1%
Deprived of safely managed sanitation facilities	3.1%	3.2%	2.9%

For three of the five non-monetary dimensions reported, the bottom 40% of consumption per capita exhibits a higher proportion of deprived people: 38.1% live in a household where at least one child aged 7–14 years is out of school, 15.1% do not have a connection to the public electricity grid, and 29.1% are deprived of safely managed water. For the top 60% of consumption per capita, these proportions are respectively 34.6%, 10.3%, and 15.3%. Although households in the bottom 40% of consumption exhibit a higher proportion of deprived people for the two other non-monetary dimensions (i.e., no adult having completed primary education, and no access to a safely managed sanitary facility), differences between households in the top

60% of consumption are relatively marginal and therefore may not be significant.

3. Poverty profile

3.1. Geographic distribution

In 2022, three in five of the 10,875 Tuvaluans (61.7%) lived in Funafuti (**Table 6**), the capital city and the only urban area of Tuvalu. The most populous of the seven outer islands was Vaitupu, accounting for 9.8% of the total population, while the least populous was Nanumaga, making up 2.4% of the total population.

Table 6. Population distribution of Tuvalu

	Population	Proportion
Tuvalu	10,875	100.0%
Main island (urban)	6,710	61.7%
Outer islands (rural)	4,165	38.3%
Outer islands	4,165	38.3%
Nanumea	546	5.0%
Nanumaga	261	2.4%
Niutao	669	6.1%
Nui	481	4.4%
Vaitupu	1,062	9.8%
Nukufetau	740	6.8%
Nukulaelae	407	3.7%

Even though the hardship rate (the head count ratio) was lower in urban areas (20% compared to 24% in rural areas), the number of total poor people living in urban areas was higher than in rural areas (**Figure 6**).

This is because a large fraction of the total population of Tuvalu lives in Funafuti; that is, the proportion of the poor living in Funafuti is low compared to the proportion in the population (57.3% of the poor population live in Funafuti, while the population share is 61.7%).¹⁰

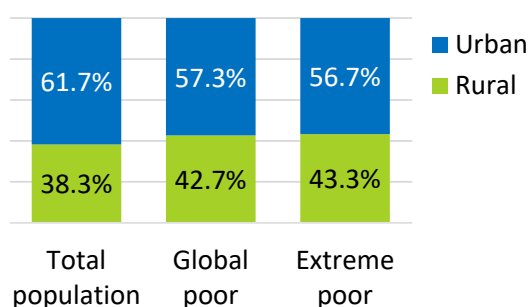


Figure 6. Distribution of total population compared with distribution of the poor population, by residence area

3.2. Age groups

The country’s population distribution (**Figure 7**) is pyramid-shaped, as more than 40% of Tuvalu’s population in 2022 is under the age of 20. Less than 3% of its population is aged 71+. Tuvalu has a relatively young population with a child dependency ratio (proportion of children aged 0–14 years to working-age adults) of 0.56 (**Table 7**).

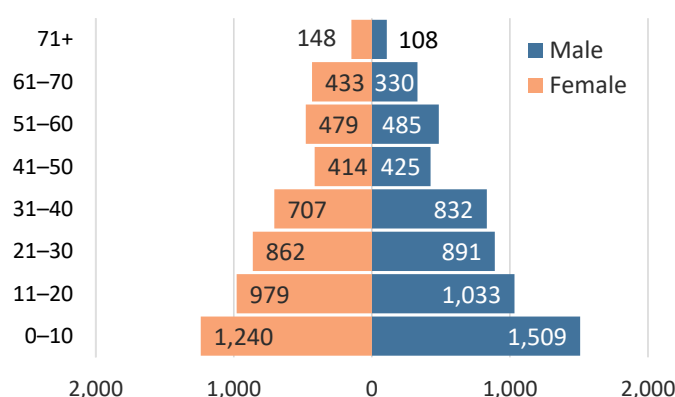


Figure 7. Tuvalu’s population distribution, by age group and sex (derived from HIES data with weights collaborated to match the age and sex structure of the census)

Table 7. Dependency ratio

Child dependency ratio	0.56
Elderly dependency ratio	0.09
Total dependency ratio	0.65

Tuvalu’s total dependency ratio is estimated to be 0.65 in 2022, meaning that for every 100 working-aged persons, there are 65 dependent persons (including children and elderly persons, aged 65+ years). The major contribution to dependency comes from children since the elderly dependency ratio is only 0.09. The sex ratio (the ratio of males to females) is surprisingly high for the population aged 0–10 (ratio of 1.22), and it

¹⁰ Statistics at the island level were not computed as a small number of households were sampled at this level.

decreases as the population ages with the ratio of males to females becoming lower from age 61 onwards. The high sex ratio for children is not unusual in the Pacific region and it could be a function of respondents omitting to report female children.

In Tuvalu, poverty primarily affects children and young adults. People under 20 years represent 46.2% of the poor while those aged 71+ count for 2.2% (**Figure 8**, panel (a)). The poverty rate is 22% to 23% for people under 20 years old, while it is 17% to 20% for people aged 21–50 years old (**Figure 8**, panel (b)). Poverty doesn't show a clear pattern across age distribution since poverty rates are around 20%, irrespective of age¹¹ (**Figure 8**, panel (b)).

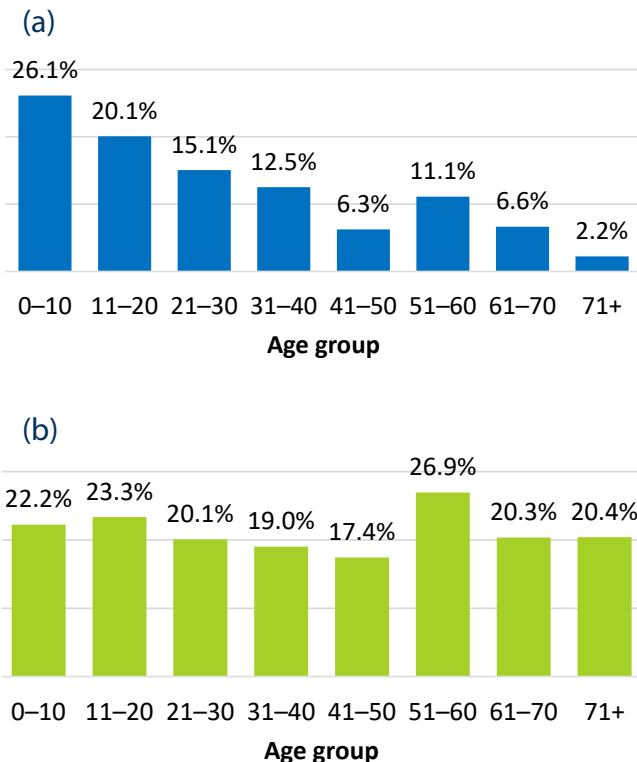


Figure 8. (a) Distribution of the poor and (b) Poverty rate, by age group

¹¹ The age groups 0–10 and 11–20 years count for 26.1% and 20.1% of the poor, respectively, amounting to 46.2% of the total poor.

¹² Working status includes working for someone else for pay (employee, working for salary, wage), working on their own farm, raising animals, fishing or gleaning for seafood, handicraft production, or working in any other kind of business activity (private business). Household duties and chores are not classified as working.

3.3. Poverty and gender

At the national level, the poverty rate is higher for people living in female-headed households (32.1% against 19.7% for those living in male-headed households, **Figure 9**). This result is consistent for both urban and rural areas; however, the gender gap is more prominent in urban areas since the poverty rate in female-headed households is double that of their male-headed counterparts (34.1% and 17.5%). People living in female-headed households are even poorer in urban areas than their peers in rural areas.

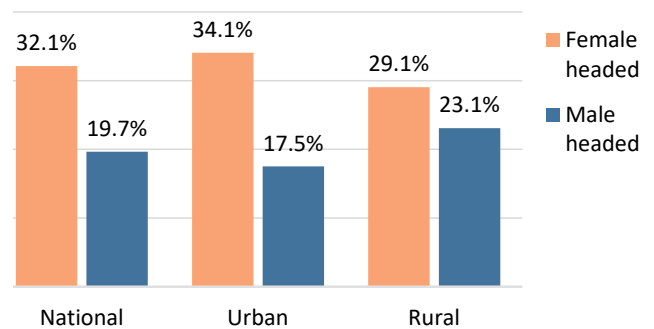


Figure 9. Poverty rate by sex of household head and location

3.4. Employment

The HIES questionnaire collected data to describe what the working age population were mainly doing in the previous week. The labour force is identified as people who were working,¹² or looking for work. Around 46% of adults, aged 15–64 years, participate in the labour force in Tuvalu (**Table 8**). Overall, females are less likely to be active in the labour force as their participation rate is 36.1% against 54.5% for males.

The rate of unemployment (people who were not working last week but were looking for work) is 5%, with no notable difference in unemployment rates by gender (5.0% for men versus 4.8% for women).

Table 8. Labour force statistics of adults aged 15–64 years

	All	Male	Female
Labour force participation rate (employed + unemployed/total population aged 15–64)	45.6%	54.5%	36.1%
Employment rate (employed/total population aged 15–64)	43.3%	51.8%	34.3%
Unemployment rate (unemployed/employed + unemployed)	5.0%	5.0%	4.8%

Working adults aged 15–64 years are almost all employees (85.2%), irrespective of gender: 84.1% for men and 86.9% for women (**Table 9**). The self-employed represent 10% of the adult population engaged in the labour force.

Table 9. Distribution of the population aged 15–64 years, by status of employment, main activity, and sex

	All	Male	Female
Working currently			
Employee	85.2%	84.1%	86.9%
In own or family business	10.2%	11.0%	9.1%
Other employment status	4.6%	5.0%	4.1%
Total	100.0%	100.0%	100.0%
Not currently working			
Looking for work	3.9%	5.6%	2.6%
Household duties, chores	74.0%	68.5%	78.4%
Long term illness, injury or disability	3.1%	4.9%	1.6%
Retired, pensioner	3.2%	4.8%	1.9%
Studying	15.8%	16.3%	15.4%
Total	100.0%	100.0%	100.0%

Adults aged 1,564 who are currently not working are mostly those involved in household duties and chores. Around four out of five non-working females are involved in household duties (78.4% of females, which is ten percentage points higher than that of males; **Table 9**). The remainder are mainly studying (around 15% for both males and females).

Working as an employee is more prevalent in Funafuti: 90.2% against 75.0% in the outer islands (**Table 10**). Of those who are not currently working, involvement in household duties and chores is common in residential areas, with a slight increase for people in rural areas (77% against 72% for urban areas).

Table 10. Distribution of the population aged 15–64 years, by status of employment and area of residence

	All	Urban	Rural
Working			
Employee	85.2%	90.2%	75.0%
In own or family business	10.2%	5.6%	19.6%
Other employment status	4.6%	4.2%	5.4%
Total	100.0%	100.0%	100.0%
All not working			
Looking for work	3.9%	2.7%	5.7%
Household duties, chores	74.0%	72.1%	77.0%
Long term illness, injury or disability	3.1%	2.0%	4.6%
Retired, pensioner	3.2%	4.1%	1.7%
Studying	15.8%	19.0%	10.9%
Total	100.0%	100.0%	100.0%

There are substantial differences in hardship incidence by employment status. Among the adults (aged 15–64 years), the rate of hardship is highest for those who are not working (25.8%), while

it is ten percentage points less for those who are working (**Figure 10**). Within the working population, there is no substantial gender difference, as the hardship rate is 15.6% for

men and 15.3% for women. Those who are looking for work exhibit the highest hardship rate, with the rate for women (60.1%) being more than double that for men (28.8%).

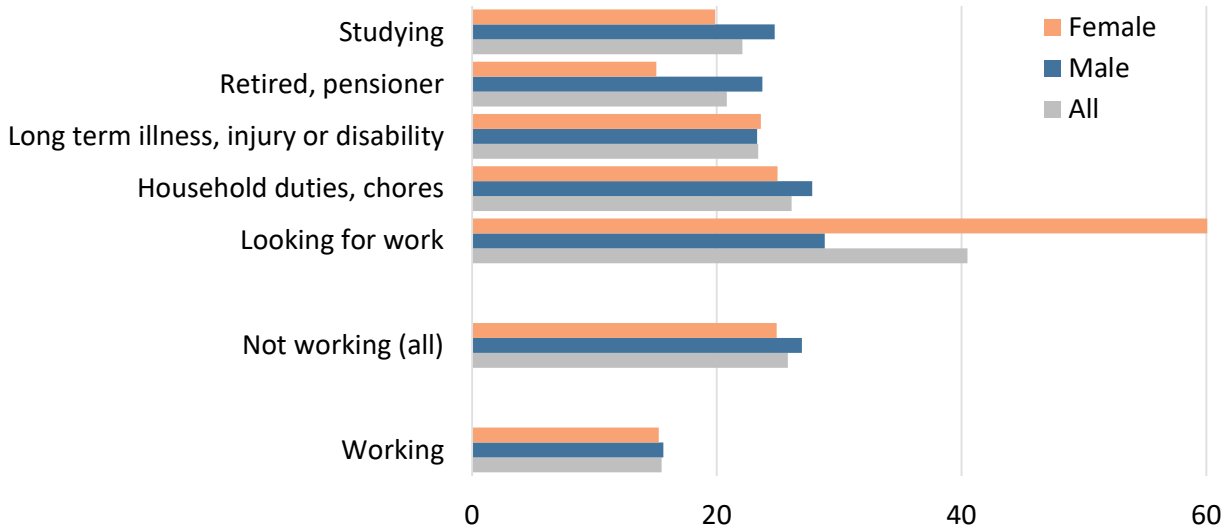


Figure 10. Hardship rate for population aged 15–64, by employment status and sex

At the population level, hardship appears to be significantly influenced by the employment status of the household head. When hardship rates are compared with the employment status of household heads, the rate is the highest where the household head operates his/her own business, or is employed in a family business (29.1%), and is surprisingly higher than the situation where the household head is not working (24.1%). The hardship rate is lower where the household head is an employee (**Figure 11**).

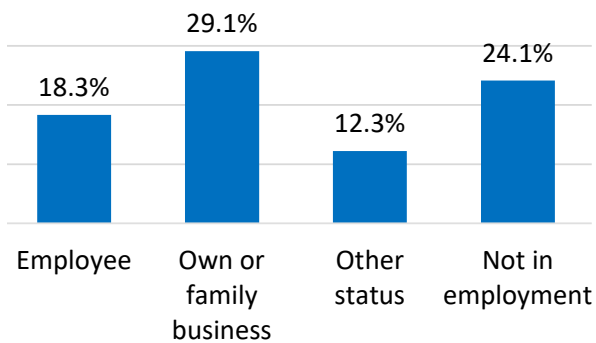


Figure 11. Hardship rate by employment status of the household head

3.5. Access to basic services

Improved drinking-water sources are defined as those that are likely to be protected from outside contamination and from faecal matter in particular.¹³ Around 95% of all households have access to improved water sources (91% in urban areas and 98% in rural areas; **Table 11**). A cistern piped into the dwelling, the most common improved source of drinking water in Tuvalu, is accessible to 78.4% of households. Around a quarter of rural households (25.2%) and 18.6% of urban households do not have access to water supplied through a cistern piped into the dwelling; however, those that do not have indoor piping often have access to an outdoor piped water supply that may or may not be shared with other households (16.3% in Tuvalu, 10.1% in Funafuti, and 23.8% in rural areas).

¹³ <https://www.who.int/data/nutrition/nlis/info/improved-sanitation-facilities-and-drinking-water-sources>

Connection to the electricity grid is very common in Tuvalu with around nine households in ten (86.0%) being connected in 2022 (89.0% in urban areas and 82.4% in rural areas). Other energy sources are used: rural areas use butane and liquid petroleum gas (7.6%), or solar panels (4.2%), as the main source of energy, while these figures are respectively 2.4% and 2.9% for urban households.

Access to flush toilets is very common in Tuvalu, as almost all households have them (95.7% national, 94.6% in urban and 97.1% in rural areas). These numbers are higher than those with access to piped water, so it is presumed that some of the dwellings with a flush toilet use a 'poured flush' toilet that is not piped (and they do not necessarily flush to a septic tank – they may flush to a pit latrine, a pit, or somewhere else, such as the ocean).

Table 11. Access to basic services

	National	Urban	Rural
Main source of drinking water by location			
Cistern piped into dwelling	78.4%	81.4%	74.8%
Cistern piped to dwelling yard	16.3%	10.1%	23.8%
Other drinking water source	5.3%	8.5%	1.4%
Total	100.0%	100.0%	100.0%
Main source of energy by location			
Electricity grid	86.0%	89.0%	82.4%
Solar panel	3.5%	2.9%	4.2%
Butane, liquid petroleum gas	4.8%	2.4%	7.6%
Other energy source	5.8%	5.8%	5.9%
Total	100.0%	100.0%	100.0%
Type of toilet by location			
Flush toilet	95.7%	94.6%	97.1%
Not flush toilet	4.3%	5.4%	2.9%
Total	100.0%	100.0%	100.0%

Poverty is negatively correlated with access to basic services. For example, 21.3% of those who have access to a flush toilet are poor, while 28.7% of those who do not have access to a flush toilet are poor (**Figure 12**). For access, or not, to a safe drinking water source, these figures are respectively 18.3% and 33.8%. The diagnostic is similar for access to the electricity grid, or not, where the hardship rates are respectively 21.1% and 24.1%.

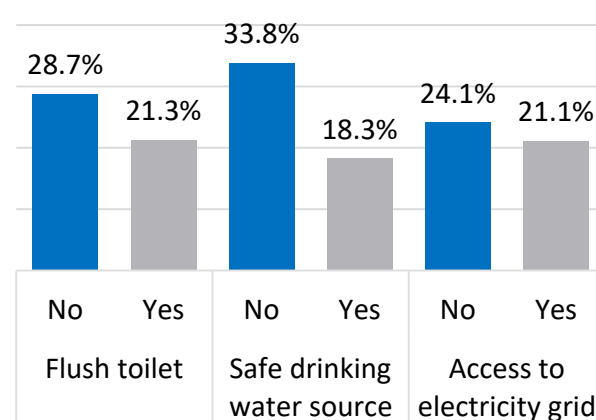


Figure 12. Hardship rate by access to basic services

3.6. Spending patterns

Food consumption accounts for nearly half of total household consumption expenditure in Tuvalu (**Table 12**). In-house food consumption accounts for 41.2% of total consumption, while the consumption of food away from home accounts for 5.1%. Food represents 51.5% of household consumption expenditure when including alcoholic beverage consumption. (Note that it is, however, excluded in welfare analyses). Imputed rent accounts for 15.1% of total consumption expenditure, and the consumption of fixed assets accounts for 5.5%. Non-food non-durable consumption accounts for 28.0% of consumption expenditure, which includes transport, communication, clothing, education, health,



and so on. The distribution of consumption expenditure does not show a significant difference between rural and urban areas.

Table 12. Components of consumption by residence area

	National	Urban	Rural
Consumption share			
Food in-house	41.2%	40.9%	41.9%
Food away from home	5.1%	5.6%	4.2%
Alcohol beverages	5.1%	4.2%	7.0%
Non-food non-durable goods and services	28.0%	28.6%	26.8%
Imputed rent	15.1%	15.2%	15.0%
Durable goods (fixed assets)	5.5%	5.6%	5.2%
Total	100.0%	100.0%	100.0%

Meat accounts for the largest share of the value of food consumption, accounting for 23.8%, followed by starchy staples which constitute 20.2% of consumption (**Table 13**). The other food categories lag far behind, accounting for less than 12%, with the consumption of food away from home making up 11.6% of total food consumption value, followed by dairy and oils (10.1%), beverages, snacks, and condiments (9.9%),

vegetables and fruit (9.2%), and seafood which makes up 8.5%.

The ranking of food categories is roughly similar between rural and urban areas. Meat and starchy staples are the top two food consumption classes in both urban and rural areas.

Table 13. Components of food consumption by residence area

	National	Urban	Rural
Consumption share			
Meat	23.8%	24.6%	22.2%
Starchy staples	20.2%	18.8%	22.7%
Food away from home	11.6%	12.8%	9.3%
Dairy and oils	10.1%	9.4%	11.5%
Beverages/ Snacks/ Condiments	9.9%	9.8%	10.1%
Vegetable/Fruit	9.2%	10.2%	7.4%
Seafood	8.5%	8.0%	9.5%
Prepared meals consumed at home	6.8%	6.5%	7.4%
Total	100.0%	100.0%	100.0%

The distribution of food categories changes across deciles (**Figure 13**). As expected, the share of starchy staples decreases across deciles in Tuvalu, in line with Bennett's Law

which states that, as people get wealthier, they start to eat relatively fewer calorie-dense starchy staple foods and relatively more nutrient-dense foods such as meats, fruits, and vegetables. In fact, the share of starchy staples, including rice and tubers, decreases from around 37% for the poorest consumption deciles to around 14% for

the wealthiest deciles. At the same time, the share of vegetables and fruits increases from around 7% to 12% from decile 1 to 10. However, the share of meat, which was expected to increase, is stable across each decile; (the items in each food consumption group are provided in the annexes; **Table 16**).

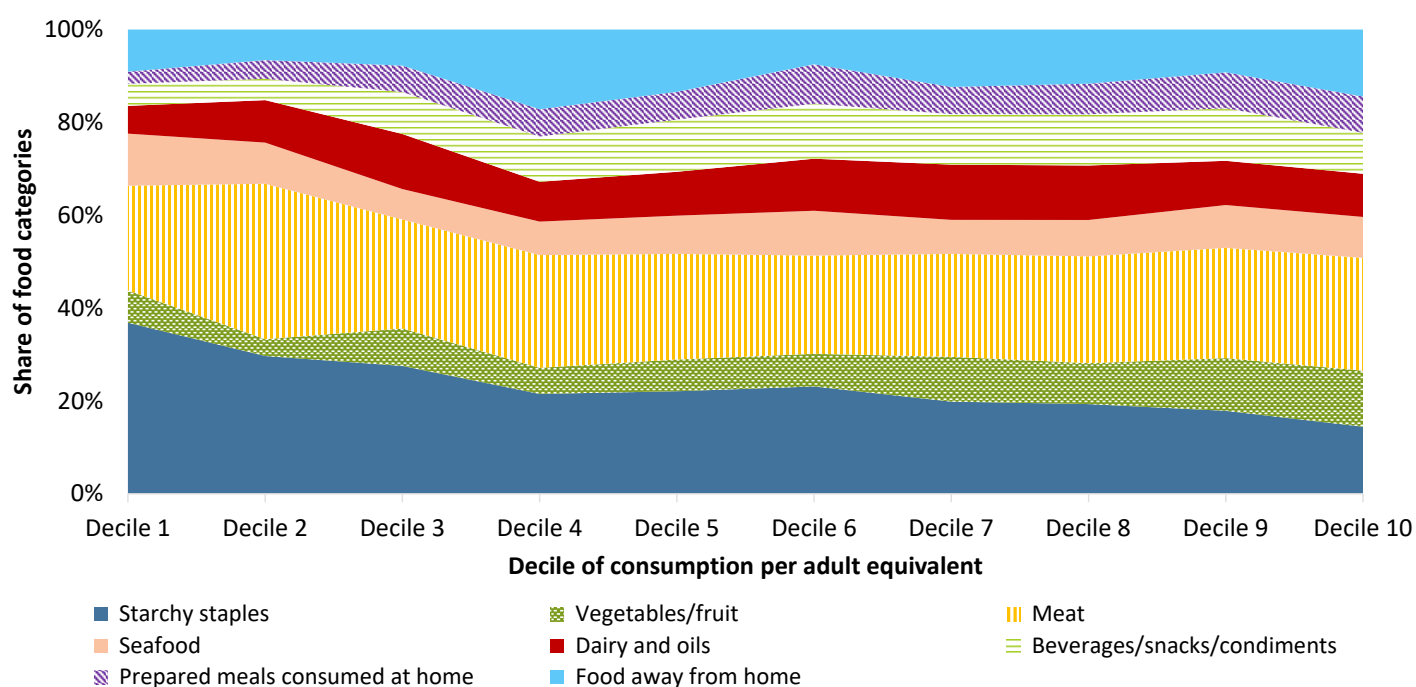


Figure 13. Share of food consumption value, by food categories and wealth decile

4. Income source and cash receipts

4.1. Income source

In Tuvalu, around 60% of household income comes from work or sales (**Figure 14**); the major share (56%) of this income comes from employment or business activities while 3.2% of this income comes from agriculture, fishing, livestock, and handicraft related-sales. Other important sources of income are imputed rent (14.7%) and in-kind gifts (10.9%), while in-kind cash receipts and remittances represent a relatively minor share

of income (almost 1%).

Income sources vary considerably across area. Income from employment comprises a much higher share of income in urban areas (66.6% of total income), which is nearly double that of rural areas (36.5%). For the latter, a substantial share of income comes from primary rural activities (i.e., agriculture, fishing, livestock, and handicraft), which provides cash income as well as means of subsistence. Cumulatively, cash and subsistence from these activities account for 10.7% of income in rural areas.

Hardship in Tuvalu

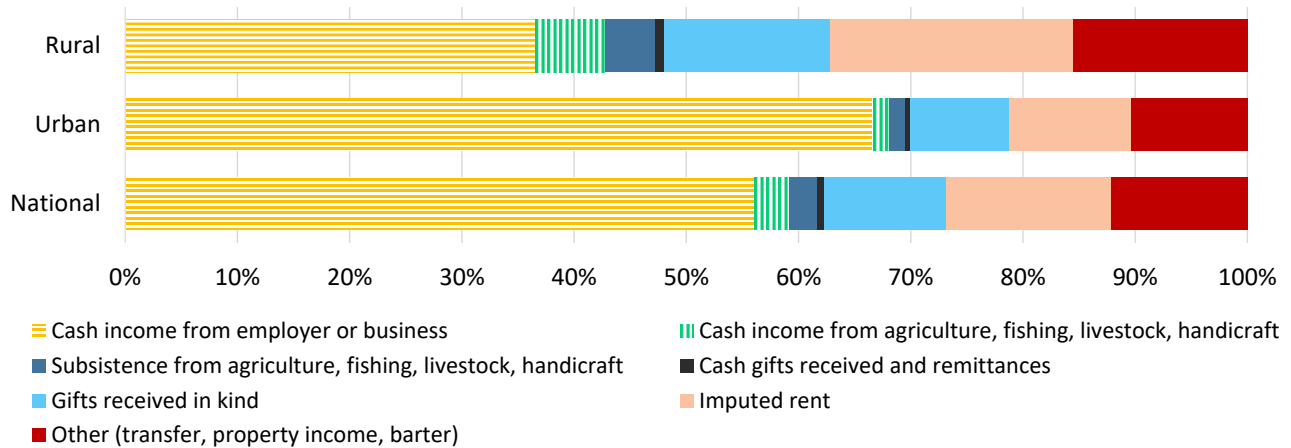


Figure 14. Composition of household income, by area

Income sources do not have a clear pattern across the consumption distribution. Cash income from an employer or business is lowest for deciles 5, 7, and 8, accounting for

around 50% of total income, while it accounts for more than 60% of income in deciles 2 and 6 (**Figure 15**).

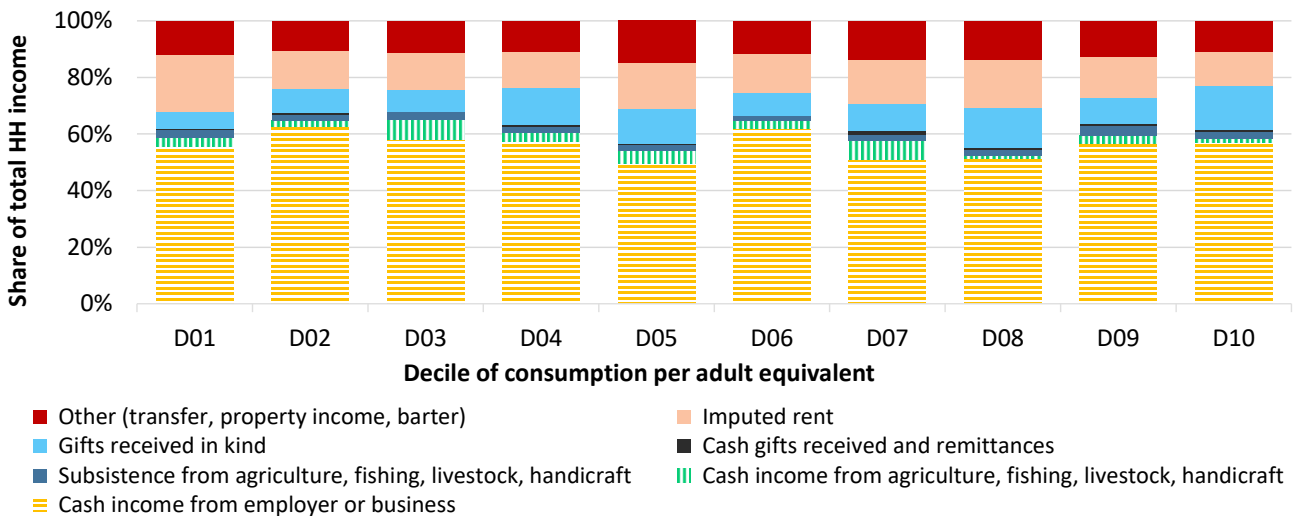


Figure 15. Composition of household income, by wealth decile

4.2. Remittances

In Tuvalu, one household in five received remittances in 2022 (**Table 14**), with a noticeably larger incidence in rural areas, where the proportion is twice that of urban areas, respectively 25% and 13%. Despite the lower proportion of households receiving remittances in urban areas, the average amount in the latter is significantly higher, with an average of AUD 1,406, which is

double the average income from remittances in rural areas.

Table 14. Household annual remittances

Area	Proportion of HHs who received remittance	Median	Average
		Total annual remittance (AUD)	
National	19%	500	995
Funafuti	13%	800	1,406
Outer islands	25%	500	735

5. Typologies of the poor

Poor households in Tuvalu are typically more deprived of basic services than non-poor households. For example, a lower proportion of poor households have access to the electricity grid (86.3% of non-poor households against 84.3% of poor households), to flush toilets (96.1% of non-poor against 93.8% of poor), and to piped water in the dwelling (81.4%

of non-poor against 61.3% of poor). Completion of secondary school is lower in poor households in Tuvalu, with 29.8% of household heads in poor households having completed secondary school against 33.6% of non-poor household heads.

Based on the previous analysis, two distinct groups of the poor emerge in Tuvalu: the urban poor and the rural poor. For the first group, which lives in the capital city, Funafuti, and accounts for 57.3% of the poor



population in Tuvalu, access to some basic services is common. Nine out of ten poor households have access to flush toilets and the electricity grid (respectively, 92.0% and 89.3%, against 95.6% and 88.9% of non-poor households), while access to an in-house drinking water source is more restricted at 70.1% against 83.3% for non-poor households. Nearly half of household heads in poor urban households have completed secondary school (45.1% against 42.4% of non-poor household heads), but only 1.0% work as employees (against 2.9% of non-poor household heads). On average, there are 2.4 working-aged adults earning an income in poor urban households (against 2.7 in non-poor households), and income from an employer or business represents 69.7% of total urban poor household income (against 66.2% for non-poor urban households).

The second group – the rural poor – make up 42.7% of the poor population in Tuvalu. Access to flush toilets is common (95.6%

of poor rural households against 97.4% of non-poor rural households); 79.7% of poor rural households have access to the electricity grid (against 83.0% of non-poor); however, access to in-house drinking water sources is limited to 56.5% for poor households (against 79.0% of non-poor households). Only 15.4% of poor household heads have completed secondary school (against 22.5% of non-poor rural household heads).

Beyond differences in location, the two groups of poor exhibit significant differences in their income sources. The share of total household income from employment is 69.7% for the urban poor, while it is only 41.2% for the rural poor. Across all these measures, poor households in urban areas have better access to services and higher levels of human capital than in outer islands. For both groups of the poor, remittances are insignificant with respect to total income (around 1%).

Table 15. *Characteristics of poor households*

	All	Funafuti	Outer islands
Distribution of poor	100.0%	57.3%	42.7%
Electricity grid connection	84.3%	89.3%	79.7%
Has flush toilet	93.8%	92.0%	95.6%
Has improved drinking water source (pipe/tap, bottle)	63.1%	70.1%	56.5%
Head of household completed secondary school	29.8%	45.1%	15.4%
Head of household works as employee	4.4%	1.0%	7.7%
Average number of household members earning income	2.3	2.4	2.3
Share of income from employer or business	57.7%	69.7%	41.2%
Share of income from cash sale of agriculture, fishing, livestock, handicraft	2.7%	0.9%	5.2%
Share of income from gifts received or remittances	0.6%	0.0%	1.3%

6. Annexes

6.1. Food consumption groups

Table 16. Food consumption groups

Vegetables/Fruit		
Starches (tapioca, sago and other starches)	Watermelon/Rock melon	Onion round
Apple	Fruit in a can/canned fruit salad	Garlic
Ripe banana	Capsicum	Mushroom
Cooking banana	Carrot	Tomatoes
Breadfruit	Corn	Chinese cabbage
Green coconut	Cucumber	Taro
Brown coconut	Green beans/peas	Yam
Lime/Lemon	Lettuce	Cassava
Orange	Potatoes	Kumala
Pandanus fruit	Pumpkin	Tinned tomatoes
Papaya/Pawpaw	English cabbage	Canned vegetables
Pineapple	Eggplant	Fruit salad
Beverages/Snacks/Condiments		
Sugar, unrefined or refined, powdered, crystallized or in lumps	Lollies/Candies	Condiments and spices (curry powder, masala, geera, chilli powder etc.)
Peanut butter	Chewing gum	Soy sauces
Other bakery products, e.g. nem, quiches, pizzas etc.	Chinese sweets (mango skin, pawpaw skin etc.)	Oyster sauce
Boiled crops (banana, kumala, taro)	Ice cream	Tomatoe sauce
Icing sugar	Ice block, icies, ice frubu etc.	Sweet chilli
Ginger	Ice cream cones	Vinegar
Jam, Jelly, Honey (pawpaw jam, coconut jam)	Cocoa-based food (e.g. Nutella, Marmite, Vegemite)	Snacks (pop corns, twisties, bongoes, chips)
Chocolate in bars or in slabs	Salt	Cocoa, cocoa powder
Starchy staples	Dairy and oils	Meat
Rice	Dairy liquid milk (Pauls, Anchor)	Beef meat (fresh or frozen) steak, minced, rump
Flour, wheat, maize	Soy milk	Pork meat (fresh or frozen) ribs, chop, leg
Bread (sliced, loaf, square, rolls, French)	Condensed milk with sugar (Carnation)	Lamb meat (fresh or frozen) chops, shanks, mutton flaps
Local bread	Powdered milk (Sunshine, Anchor)	Chicken meat (fresh or frozen) whole chicken, legs, wings, quarters, drumsticks

Starchy staples	Dairy and oils	Meat
Biscuits cracker (cabin)	Coconut cream	Turkey tails (fresh or frozen)
Biscuit sweet (chocolate flavoured, cookies)	Milk-based desserts (custard, pudding dairy-based)	Ham, bacon, pate etc
Breakfast cereal (rice pops, cornflakes, oatflakes, Weet-Bix and other cereal)	Cheese (Cheddar)	Tinned corned beef (ox-palm, beef stew, argentina, curry chicken etc)
Pancake/Pan-doughnut	Eggs	Sausages
Doughnuts	Butter	Other tinned meat
Noodles, pasta	Margarine	Liver, kidney (beef, pork)
Cakes	Cooking oil and fats	BBQ lamb
		BBQ chicken
Food away from house	Take away to home	Seafood
Bottled water away from home	Tea, black, bag	Isave
Breakfast away from home	Beverage, chocolate flavour, from base (Milo)	Lagoon and sand flat fish (fresh or frozen) – goatfish, silver biddy, mullet, bonefish, etc.
Burgers, sandwiches, hot dogs	Coffee beans or ground	Sharks (fresh or frozen)
Chinese food	Bottled water/spring water/mineral water	Oceanic fish (fresh or frozen) – tuna, wahoo, mahi mahi, etc.
Pizza, pasta, or similar	Soft drinks (e.g. Fizzy)	Deep sea fish (fresh or frozen) – Poulet fish, Red snapper etc.
Tea, black, brewed no milk no sugar	Fruit juice (apple, pineapple, tropical etc.	Reef fish (fresh or frozen) – emperor, snapper, parrotfish, surgeonfish, etc.
Lunch away from home	Cordial, syrup, not further specified	Frozen imported fish
Dinner away from home	Toddy syrup	Lobsters
Non-alcoholic drinks away from home		Land crab (mud crab, coconut crab etc.)
Hot drinks away from home		Clams
Packed food		Crabs
Snacks away from home		Tinned tuna
School meals		Tinned mackerel
		Other dried, canned or salted fish
		BBQ fish

6.2. Regression parameters for imputed rent prediction

Table 17. Regression model for imputed rent

Regression for imputed rent in urban area (based on actual rent)	
Urban area	Model on actual rent
Household detached	0.087
Floor in ceramic parquet	omitted
Floor in cement	0.562 ***
Floor in wood/sand	0.129
Wall in cement/cement block	omitted
Wall in plywood	0.305 *
Wall in wood leaves etc	-0.175
Water in-house	0.184
Constant	7.56 ***
Number of observations	89
Regression for imputed rent in rural area (based on self-reported rent)	
Rural area	Model on self-reported rent
Household detached	0.282
Wall in concrete material	0.422 ***
Floor in ceramic parquet	0.330
Floor in cement	0.164
Floor in wood/sand	omitted
Flush toilet	0.235
Nanumaga	-0.186
Niutao	-0.320
Nui	0.039
Vaitupu	0.166
Nukufetau	-0.088
Nukulaelae	0.229
Nanumea	Yes, only 34 observations with plywood omitted
Niulakita	omitted
Constant	7.007 ***
Number of observations	154

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%, not significant if no asterisk, omitted = variable omitted due to collinearity.

6.3. Methodology notes

Introduction

The analytical methods applied to the Tuvalu 2022/23 Household Income and Expenditure Survey (HIES) data are in line with the latest international and regional guidance from the Pacific Statistics Methods Board (PSMB) on the construction of a consumption aggregate and poverty measurement. These include guidance notes on “Monetary poverty measurement,”¹⁴ “Imputed rent in consumption aggregate”¹⁵ and ‘Use value of durable goods in consumption aggregate’.¹⁶

This methodology note details the key analytical choices made by the Tuvalu Central Statistics Division and the Pacific Community (SPC) that affect poverty measurement. In practice, the food consumption aggregate is calculated using the large set of data collected at the household level for the previous seven days of consumption. Since it is difficult to collect data on the consumption of non-food goods and services, expenditures are collected in the HIES and used to approximate the non-food consumption aggregate.

6.3.1. Background to monetary poverty measurement

Measuring poverty in monetary terms is best achieved with detailed household level consumption data, typically from a HIES or similar survey. The estimation of poverty requires three major steps, as follows:

- 1) A single dimensional, measurable welfare indicator is constructed that can be used to rank the population according to well-being (the “welfare aggregate”). Each household has its own consumption aggregate, which is based on a range of food and non-food items consumed. It is typical to exclude some categories of consumption for which there is data, such as lump/one-off expenditures (e.g., the purchase of expensive durables). In contrast, some consumption, such as accommodation (e.g., imputed rent), may not be directly measurable but must be accounted for.
- 2) An appropriate threshold of welfare is constructed based on the distribution of consumption aggregate, then used to classify individuals as poor or non-poor (the “poverty line”).
 - a. Selection of a food poverty line needs to be based on a local food basket (identified using the consumption patterns of a reference group of the population) and a minimum required caloric intake for the country. There may be only one food basket and poverty line for a country (the national poverty line), or there may be subnational poverty lines (e.g., for areas such as provinces).
 - b. A non-food component needs to be constructed to calculate the non-food poverty line. The BNPL is calculated as the sum of the food poverty line and non-food poverty line. This poverty line should be contextually

14 https://www.spc.int/DigitalLibrary/Doc/SDD/Capacity_Development/GN1_Monetary_Poverty_Measurement.pdf

15 https://sdd.spc.int/digital_library/gn4-imputation-housing-rent-consumption-aggregate

16 <https://www.spc.int/digitallibrary/get/cw3zk>

appropriate and allow policymakers to understand relative poverty within the country. In contrast, while the international poverty line allows countries to understand their relative level of poverty compared to the rest of the world, it is not based on local patterns of consumption or local needs.

- 3) The welfare indicator is combined with the poverty line to describe the poverty status of the population (the “poverty rate”). The poverty line crosses the consumption distribution, and all those living below the poverty line are considered poor. The poverty rate is always relative to the line used, with the national poverty line often being different to the international poverty line.

6.3.2. Sample used for poverty measurement

Consumption data was collected for all the 592 HIES sampled households using recall-based consumption questions. For the poverty analysis, only 492 households were used because consumption data were not reliable for 100 households. Data quality, as reported in the “LFC experiment” report¹⁷ includes both under-reporting and over-reporting of food consumption. In order to preserve the representativeness of the sample, a new set of sample weights was computed using household characteristics. The new weights were calculated using a margin calibration method known as CALMAR. The CALMAR method is used to adjust a sample through individual

re-weighting using available auxiliary information for a certain number of variables, known as calibration variables. The same 492 samples were used for the “Tuvalu food consumption profile”¹⁸ which provides a quick snapshot of the food consumption and nutrition status of the Tuvaluan population.

6.3.3. Consumption aggregate

The consumption aggregate construction for the 2022/23 HIES was based on the latest recommendations of the PSMB. This section outlines (1) the construction of the food consumption component of the aggregate, (2) the non-food component, and (3) the spatial deflation applied for poverty measurement and to reach the final poverty lines for Tuvalu.

a. Food consumption

The HIES collected information on food consumed in-house as well as food away from home (FAFH). The total monetary value of food consumption was not directly recorded in the survey; only the total quantity consumed over the previous seven days for each food type was collected. However, the quantity and value of consumption, by source of cash purchases, home production, and in-kind receipts were collected. The monetary value of food consumption was obtained by summing the reported values from different sources. When a reported value was not consistent, a new value was estimated by first converting reported quantities into standard units and then multiplying these by a price estimated from the survey or derived from a market survey, depending on data availability and perceived quality. Only food

17 *LFC experiment report*: <https://www.spc.int/digitallibrary/get/3h2qh>

18 <https://sdd.spc.int/news/2024/04/29/tuvalu-food-consumption-profile-2023>

consumed by the household was included, whether purchased via cash transaction, home-produced, or received as a gift. To prevent double counting of expenditure, the consumption aggregate does not include food purchased or produced by the household and then given away as a gift to another household.

b. Non-food consumption

Non-durables

Like food consumption, the consumption of non-food non-durable goods and services was calculated as the annualised value of reported transactions for individual and household expenditures in the questionnaire, with varying time periods reported for different types of consumption. For example, households were asked to recall health expenses for the past 12 months, while expenses on clothing for each household member were recalled for the past three months. Following the PSMB guideline, non-food gifts and transfers to other households and organisations, such as churches and schools, are not included in consumption aggregates to avoid double counting.

Durables

Durables are defined as items that are infrequently purchased by the household and have a lifetime that spans multiple years, such as motor vehicles or major household appliances (e.g., televisions, computers, and refrigerators). The PSMB guidance recommends the calculation of “annualised use values” for durable items owned by households, regardless of whether the items were purchased in the past year. To obtain the use value of each individual durable, an estimated current value of the durable needs

to be multiplied by an estimated depreciation rate applicable to that type of durable.

Semi-durables

Semi-durables are a sub-category of durable items that have utility for multiple years, but not as long as durables. Semi-durables tend to be purchased more frequently and are not as expensive as durables. There is no strict guidance on semi-durables in the PSMB recommendations. The National Statistical Office and SPC opted to include semi-durables in the consumption aggregate. The exception being semi-durables such as fishing nets, which were counted as intermediate expenditure.

Imputed rent

For households that rent their dwelling, the rental value is assigned as the “imputed rent” component of the consumption aggregate. The “imputed rent” was computed for owner-occupied and occupied-for-free dwellings using a predictive “hedonic” model. This is usually based on a range of variables, including tenure, physical dwelling characteristics (e.g., number of rooms, building materials for walls, floor, roofing, water connection, flush toilet, electricity grid connection, fuel for cooking, and fuel for lighting), and location characteristics (e.g., island, urban/rural). Two different models were applied: one for urban areas using the logarithm of the actual rent as the dependent variable, and the other for rural areas using the logarithm of the rental expectations. For the latter case, the number of renters was too small to compute the model based on actual rent. An ordinary least-squares model with a dependent variable of actual rents and rental expectations, controlled for household characteristics, and a dummy

variable for renter/non-renter status showed that the latter is highly statistically significant, meaning that actual rents and rental expectations should not be combined.

Deductions were made from the imputed rent for maintenance costs, with outliers corrected for two standard deviations. Renovations and expansion of the dwelling were categories under “maintenance costs” in the survey but could be more accurately described as lumpy expenditure for long-term investment in dwelling structures, so they are best excluded from the net rent calculation as well as the consumption aggregate.

Table 18. Annual imputed rent in AUD by area

	Number of HHs	Mean	S.D.	Min.	Max.
Tuvalu	492	3,404	1,672	420	12,000
Funafuti	236	4,108	1,832	576	12,000
Outer islands	256	2,562	910	420	4,356

c. Spatial and temporal deflation

To account for regional and seasonal differences in costs of living and to enable direct comparisons of household welfare across regions, a “deflator” was applied to the nominal consumption aggregate. Our initial plan was to apply the spatial–temporal deflator calculated by comparing regional and seasonal differences in the prices of food goods (assuming that these differences are consistent between food and non-food goods), weighted by the importance of those goods to the consumption basket of the reference group. The spatial disaggregation used was based on island group (Funafuti and the outer islands). All the outer islands were gathered in one group as the sample was too small. It was decided to apply only a spatial deflator (i.e., not a temporal one also) to the nominal consumption aggregate since almost all the households were surveyed in a short period: December 2022 (77%), January 2023 (10%), February

2023 (6%), and the remaining 7% from March to June 2023.

The reference population used for the consumption basket are individuals in the 11th to 40th percentiles of consumption per capita (**Table 20**). For “reference household” purpose, it is usual to exclude the queue of the food consumption distribution, for example 5% or 10%, as their consumptions are more likely to have been under-reported. To capture the “real” reference population rather than the nominal one, the deflators were estimated using an iterative approach, where households are re-ranked after deflators are applied, and the deflation is repeated (on the nominal aggregate) using the consumption shares of the “new” 11th to 40th percentile. This iterative process is repeated until the households in the reference population stabilise. In the case of Tuvalu only two iterations were required to stabilise the reference population. Tornqvist deflators were used to better account for outlier prices and consumption shares. The spatially deflated aggregates are rescaled to keep the same values for national averages and totals.

Table 19. Deflators of food consumption prices by location

	Laspeyres	Paasche	Fisher	Tornqvist
Funafuti	1.011	0.969	0.998	0.991
Outer islands	0.980	1.065	1.003	1.017

6.3.4. Poverty line methodology

A new BNPL was constructed for the 2022 HIES data. This new BNPL will be used for future rounds of poverty analysis, with the application of appropriate inflation adjustments. This section outlines (a) the use of adult equivalency scales, (b) issues with the construction of the food poverty line, (c) issues in the non-food poverty line selection, and (d) a sensitivity analysis.

a. Adult equivalency scales

It is necessary to account for differences in household composition when comparing welfare measures recorded at the household level. Two alternative ways to do this are: (1) per capita measures, which divide the household-level welfare aggregate by the number of household members, and (2) adult equivalent measures, which assign different weights to the household members depending on their age or sex. In the Pacific, countries that apply adult equivalent measures typically utilise a simple scale where household members aged 0–14 years (children) are given a weight of 0.5, with all the other household members given a weight of 1, with no differentiation by sex. The consumption aggregate used in Tuvalu was adult equivalent based on using the aforementioned weights.

b. Food poverty line construction

A single national food poverty line is constructed by computing the amount of monetary expenditure required to consume a daily calorie target using the real consumption patterns of a reference population. An expanded basket of 36 commonly consumed goods was used, which covers 90% of food expenditure. The calorie

target was set at 2,100 calories per capita per day. This is in line with the recommendation of the PSMB that, for countries that do not have solid evidence on the level of activity of the average person in the population, 2,100 calories per day can be considered the default. The cost per calorie of food items was computed using nutritional values from the Pacific Nutrient Database for each food item calculated according to the price/unit value assumed in the consumption aggregate.¹⁹ To make the food poverty line consistent with the use of the adult equivalency scale (instead of household size) for welfare aggregate calculation, the food poverty line was adjusted with a multiplier coefficient equal to the average (household size) divided by the average adult equivalised household size.

The reference population chosen is households in the 11th to 40th percentile based on real (deflated) per adult equivalent consumption.

c. Non-food poverty line construction

The non-food poverty line is computed as a multiplier of the food poverty line. For comparison, both a regression method and the non-parametric Ravallion lower-bound and Ravallion upper-bound lines were used to calculate the multiplier based on the food versus non-food consumption patterns of the population as they move up and down from the food poverty line. The Ravallion upper-bound method was chosen for Tuvalu, as the Ravallion lower-bound poverty line could not be computed since few households in the reference group have total consumption per adult equivalent near the food poverty line.

¹⁹ https://sdd.spc.int/digital_library/pacific-nutrient-database-pndb



d. Sensitivity analysis: comparing reference populations and BNPLs

For sensitivity analysis, several reference populations were checked with each of the two non-food poverty line methods (regression and Ravallion upper bound).

Table 20 reports the poverty lines by method and reference population, followed by **Table 21** which reports the poverty rates with each combination of reference population and non-food poverty line method.

Table 20. Food poverty line and BNPLs by reference population and method

Reference HHs percentile	Food poverty line	Regression	Ravallion upper bound
06–25	1,403	2,475	2,497
06–30	1,412	2,431	2,648
06–35	1,203	2,024	2,514
06–40	1,252	2,143	2,647
06–45	1,312	2,266	2,821
06–50	1,351	2,181	2,959
11–25	1,451	2,591	2,534
11–30	1,439	2,413	2,737
11–35	1,198	1,575	2,612
11–40	1,256	2,019	2,668
11–45	1,313	2,297	2,835
11–50	1,357	1,984	2,977

Table 21. Food poverty rate and basic needs poverty rates by reference population and method

Reference HH basket percentile	Extreme poor (%)	Regression (%)	Ravallion upper bound (%)
06–25	1.6	18.4	18.8
06–30	2.0	17.2	21.5
06–35	1.1	8.5	19.2
06–40	1.6	10.7	21.5
06–45	1.6	15.1	23.0
06–50	1.6	11.4	26.0
11–25	2.0	20.4	19.8
11–30	2.0	17.2	21.9
11–35	1.1	2.9	20.7
11–40	1.6	8.0	21.5
11–45	1.6	15.4	23.6
11–50	1.6	7.7	26.7

6.4. Estimation of the correlates of consumption and poverty

Descriptive statistics show that people with specific characteristics were more frequently poor. Some of these characteristics are correlated, such as household size and locality. For example, members of big households and those living in the rural areas exhibit a high proportion of poor, and rural households are bigger than urban ones.

An econometric regression model (logistic model) was used to identify the specific relationship of each household characteristic with poverty. The urban/rural gap is confirmed: people living in Funafuti are less likely to be poor than those living in the outer islands (**Table 22**). All other things being equal, the risk of being poor increases as household size increases. The household structure, such as the gender of the household head, the proportion of members by age groups, and the proportion of males, does not have a significant effect on the risk of being poor. The slight increase in poverty risk due to the proportion of young adults (15

to 30 years) is not very significant. The risk of being poor decreases as the household head is educated.

Using the same characteristics, a generalised linear regression model was applied on the log normalised distribution of consumption per adult equivalent. For most of the household characteristics, results are consistent with those of the logistic model applied on poverty. Consumption per adult equivalent decreases as household size increases and is higher in urban areas than in the outer islands.

Table 22. Regression coefficients to estimate the correlates of consumption per adult equivalent and poverty

	Coefficients of the variables	
	Model 1 (log of consumption per adult equivalent)	Model 2 (logit for poor/non-poor)
Funafuti	0.293 ***	-0.756 **
Outer island	ref	ref
Household size	-0.091 **	0.455 *
Head of HH male	0.037	-0.411
Head of HH female	ref	ref
Proportion of adults 15–30 years old	-0.276 **	1.824 **
Proportion of adults 30–64 years old	-0.162	1.282
Proportion of adults 65 years old/more	-0.188	0.334
Proportion of males in the household	-0.023	0.609
Number of HH members working in family business	ref	ref
Number of HH members working as employee	-0.037	-0.225
Number of HH members working as apprentice or other	-0.017	-0.083
Number of HH members working in own business	ref	ref
Number of HH members earning an income	0.080 ***	-0.257 **
Head completed primary school	0.201 ***	-0.906 ***
Head did not complete primary school	ref	ref
Constant	8.727 ***	-3.391 ***
Number of observations		492

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%, not significant if no asterisk, ref = reference group.



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