



TUVALU AGRICULTURE AND FISHERIES REPORT

BASED ON THE ANALYSIS OF THE
2017 POPULATION AND
HOUSING CENSUS

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HOUSING CENSUS**

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Foreword

This report was mainly produced to address the demands on agriculture statistics received by FAO from the Government of Tuvalu, and in particular the Ministry of Local Government and Agriculture.

This analytical report provides important agricultural data collected by integrating some key agricultural questions on the Population and Housing Censuses in 2012 and 2017. A total of nineteen (19) questions were included in the 2017 Mini-Census, addressing issues of cropping and livestock activities, household fishing and handicraft activities as well as details of climatic and natural disaster events impacting on households.

The report is supplemented by agriculture-related information collected in the 2012 Population and Housing Census and the 2015-16 Tuvalu Household Income and Expenditure Survey (HIES).

Statistically sound data and information is fundamental in accounting for the full potential of the country and its population, understanding developmental opportunities, as well as vulnerabilities particularly in measuring a country's progress towards sustainable development and the eradication of hunger, malnutrition and poverty. It is hoped that planners, policy-makers, the business community and Non-Governmental Organizations will make good use of the report to formulate policies that will improve the social and economic developments of Tuvalu.

I would like to express the deep appreciation to the following: Xiangjun Yao (FAO Sub Regional Coordinator for the Pacific) for her support for the project and activities under which this report is funded; Rasmiiya Aliyeva (FAO Statistician for the Pacific) for coordinating the project and publication process. Lots of thanks goes to David Brereton, an International Consultant, that was recruited by FAO to prepare this report and the Pacific Community Statistics for Development Division, especially Olivier Menaouer for the amazing work in processing and tabulation the data needed for the analysis.

The report was funded by FAO through the UNJP/TUV/001/UNJ project on 'Enhancing food security and building socio-economic resilience to COVID-19 in Tuvalu'.

And to conclude, I must acknowledge that this report would not have been successfully produced without the efforts and supports offered technically and financially that were all indicated.

Fafetai kae fakamaalo mo galuega gali,



Ms. Grace Alapati
Government statistician

Abbreviations

AUD or A\$	Australian Dollars (currency)
CAPI	Computer-assisted personal interviewing
CSD	Central Statistics Division, Ministry of Finance, Government of Tuvalu
CSPro	Census and Survey Processing System
EA	Enumeration Area
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GOT	Government of Tuvalu
GPS	Global Positioning System
HIES	Household Income and Expenditure Survey
NSSD	Tuvalu National Strategy for Sustainable Development 2005-2015
NPHC	National Population and Housing Census
SIDS	Small Island Developing States
SDG	United Nations Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
TKIII	Te Kakeega III (TKIII), Tuvalu National Strategy for Sustainable Development 2016-2020

EXECUTIVE SUMMARY

Background

This report provides an analysis of the agricultural data derived from the 2017 Tuvalu Population and Housing Mini-Census (hereafter referred to as the Census), which was conducted on 12th November 2017.

The Census questionnaire included a number of specific agriculture questions, that allowed the classification of households engaged in agriculture and its sub-sectors (cropping, livestock, fishing and handicrafts), the level of agricultural activity, type of crops planted, types of livestock raised, buying and selling of fish as well as the making and selling of handicrafts. Also included were questions relating to climatic and natural disaster events and land erosion which had impacted on household dwellings in the five years prior to the Census. These questions were included as Questions H16 to H30 in the Household Section of the 2017 Census questionnaire.

In general, the information gathered from the agricultural questions provides an assessment of the current state of the agriculture sector in Tuvalu, including information on the characteristics of the households engaged in the agriculture sectors and its subsectors.

Details of the analysis are presented in different chapters. The first chapter is an introduction that describes the current state of the agriculture sector and its contribution to the Tuvalu economy. Chapter 2 discusses the demographic details of the sector, with results from the agriculture questions and the subsector analysis presented in Chapters 3 to 7. Chapter 8 discusses issues of food security, Chapter 9 covers the affect of climatic and natural disaster events on Tuvaluan households while the final chapter discusses the main findings, conclusions and recommendations from the Census. The report concludes with the household questionnaire used in the 2017 Tuvalu Population and Housing Mini-Census.

About Tuvalu

Tuvalu is a Polynesian island nation located in the Pacific Ocean, midway between Hawaii and Australia, and its nine (9) islands comprise small, thinly populated atolls and reef islands. Tuvalu's nearest Pacific Nation neighbours are Kiribati, Nauru, Samoa and Fiji.

In terms of physical land size, at just 26 square kilometres (10 sq miles), Tuvalu is the fourth smallest country in the world. The coral islands of Tuvalu are small even by 'low' island standards; none exceeds five square kilometers in size and the maximum elevation above sea level is around 4.6 metres (15 ft) on the island of Niulakita.

Because Tuvalu is so small in terms of land area, the islands are often measured in hectares to provide a clearer picture of the actual land size and density. In 2017, the whole country consisted of about 2 563 hectares. Vaitupu was the largest island at 560 hectares or 22 percent of the country's land area, Nanumea was next at 387 hectares (15 percent), Funafuti with 299 hectares or 12 percent and Niulakita was the smallest, at 42 hectares or 2 percent of Tuvalu's land area.

The islands of Tuvalu have poor soil and the tiny atoll and reef island ecosystems have quite limited potential for supporting human population. Fresh water supplies are restricted to shallow sub-surface lenses and the soils are on the margins of fertility. The range of plant species which can survive in such a habitat is severely restricted, even though drought is not such a problem in Tuvalu.

The economy of Tuvalu is constrained by its remoteness and lack of economies of scale, its limited potential for economic development, absence of exploitable resources and its vulnerability to external economic and environmental shocks.

2017 Census Findings

The 2017 Census estimated a total population of 10 645 people and 1 626 households across Tuvalu. This represented a decrease of 1.3 percent in the population count and a 7.7 percent reduction in the number of households compared with results from the 2012 Population and Housing Census.

Tuvalu's capital and most populated island is Funafuti, with 849 households (52 percent of all households) and a reported population of 6 716, or sixty-three (63) percent of the nation's population. Females accounted for 48.5 percent of the total population and 28 percent of all households were headed by a female.

The largely subsistence nature of Tuvalu's agricultural sector is evidenced by the number of households in the Census who reported undertaking some form of agricultural activity. Of the 1 626 total households,

1 464 (90 percent) reported some type of agricultural activity, including livestock raising (reported by 84 percent of all households), crop growing (69 percent), buying or selling fish (60 percent) and handicrafts (35 percent).

These numbers were considerably higher on most of the Outer Islands, with over 95 percent of households engaged in agricultural activities of some kind. Understandably, there was less crop production (48 percent of households) and livestock raising (76 percent of households) reported on the more densely populated Funafuti, where the population density is approximately 2,800 people per square kilometre.

The following table provides a summary of the key findings on population, households and the agriculture sector in the 2017 Census.

TABLE 1
Tuvalu and agriculture sector at a glance, 2017

Total number of households	1 626 households	
Total population	10 645	
Male population	5 486	
Female population	5 159	
Median age of population	25.1 years	
	Number	Percentage
Households engaged in agriculture	1 464	90.0
Male-headed households engaged in agriculture	1 076	73.5
Female-headed households engaged in agriculture	388	26.5
Heads of households engaged in agriculture – level of education attained		
No qualification	337	23.0
Still in school	7	0.5
Primary school	377	25.8
Secondary school	315	21.5
Form 7/AFP	41	2.8
Vocational	222	15.2
Tertiary	154	10.5
Crop production		
Households engaged in crop production	1 121	69.0
Male-headed households engaged in crop production	829	74.0
Female-headed households engaged in crop production	292	26.0
Number of household members whose main activity was growing crops	96	
Livestock raising		
Households engaged in livestock raising	1 362	83.8
Male-headed households engaged in livestock raising	1 014	74.4
Female-headed households engaged in livestock raising	348	25.6
Number of household Members whose main activity was raising livestock	60	

SOURCE: 2017 Census

TABLE 1
Tuvalu and agriculture sector at a glance, 2017 (continued)

	Number	Percentage
Households engaged in crop production by crop type		
Banana/pata/fuamaulalo	776	47.7
Coconut/niu	694	42.7
Pawpaw/olesi	624	38.4
Breadfruit/mei	540	33.2
Toddy	437	26.9
Pandanus/fala	395	24.3
Swamp taro/pulaka	394	24.2
Taro/talo	300	18.5
Pumpkin/squash/panikeni	231	14.2
Cabbage/kapisi saina	201	12.4
Households engaged in cutting toddy		
Number of households engaged in cutting toddy	437	26.9
Average litres of toddy collected	4.7 litres	
Households raising livestock and number of livestock		
	Number	Number of livestock
Pigs	1 242	10 894
Chickens	682	15 443
Ducks	150	1 209
Dogs	294	391
Cats	540	1 206
Households engaged in buying or selling fish		
Number of households buying or selling fish	976	60.0
Number of households buying reef fish	246	15.1
Number of households buying pelagic fish	852	52.4
Number of households buying deep sea fish	83	5.1
Number of households selling reef fish	44	2.7
Number of households selling pelagic fish	85	5.2
Number of households selling deep sea fish	20	1.2
Households engaged in handicrafts		
Number of households engaged in handicrafts	571	35.1
Number of handicraft items produced	60 014	

SOURCE: 2017 Census



CHAPTER 1

AN OVERVIEW OF THE AGRICULTURE SECTOR IN THE TUVALU ECONOMY

1.1 Overview

Tuvalu is a Polynesian island nation located in the Pacific Ocean, midway between Hawaii and Australia, with a total land area of 26 square kilometers (km²) covering nine coral atolls and reef islands. The small, thinly populated atolls and reef islands are spread across more than 900 000 km² of Pacific Ocean. Tuvalu's nearest Pacific Nation neighbours are Kiribati, Nauru, Samoa and Fiji.

Land resources are few and of poor quality and with the highest point of land is less than five meters above sea level.

In 2017 there were an estimated total population of 10 645 people and 1 626 households across Tuvalu. Tuvalu's capital and most populated island is Funafuti, with 849 households (52 percent of all households) and a reported population of 6 716, or sixty-three (63) percent of the nation's population.

FIGURE 1
Map of Tuvalu



SOURCE: WorldAtlas.com

The nation's small size, isolation from markets, and a harsh physical environment are significant constraints to the country's development. The low-lying atolls face occasional cyclones and the prospect of marine inundation in the event of rising sea levels. Higher sea levels already threaten the country's underground water table and the future habitation by the people of Tuvalu.

Whilst Funafuti dominates the job opportunities in the public sector, almost all fishing, agriculture, and handicraft manufacturing take place on the outer islands. There is a growing concern that traditional skills are being lost, as the younger generation is reluctant to engage in the hard work of the traditional subsistence lifestyle and there is a need to document traditional practices and techniques. Slowing the migration of population to Funafuti, and improving the quality of life and income earning opportunities for those on the outer islands remains a high priority.

The largely subsistence nature of Tuvalu's agricultural sector is evidenced by 90 percent of households reporting undertaking some type of agricultural activity in 2017, including livestock raising (reported by 84 percent of all households), crop growing (69 percent), buying or selling fish (60 percent) and handicrafts (35 percent).

Agriculture and fisheries remain important for food security, sustainable livelihoods and for national economic growth. Agriculture and fisheries development were emphasized as priorities in the Tuvalu National Strategy for Sustainable Development (NSSD) 2005-2015. The NSSD identified the following key issues, concerns and challenges which had been expressed:

- Poor agricultural extension services in the outer islands;
- Often poor cooperation between Falekaupule and agricultural extension staff;
- Lack of proper facilities to keep and market poultry and livestock which has resulted in an increasing reliance on imported products;
- Lack of suitable land for gardening, especially on Funafuti, limiting the possibilities for cash crop production, or growing fruit and vegetables for household consumption; and
- Diminishing traditional knowledge of farming pulaka and taro; and deteriorating growing conditions in many pulaka pits through environmental changes including salination.

As a result of these findings, the key objectives of the Agriculture Sector in the NSSD included:

- Reversing the decline in subsistence agricultural production;
- Increasing the availability of land for agricultural production;
- Increasing production and consumption of local produce; and
- Mitigating climate change-related agricultural impacts.

Agriculture has traditionally been the preoccupation of Tuvaluan people and involves the cultivation of trees and crops and raising a limited number of pigs and chickens. Crop production is primarily for subsistence, crops comprising coconut, babai (swamp taro), taro, breadfruit, pandanus, banana, pumpkin, sweet potatoes and pawpaw. Home gardening is practiced but constrained by damage caused by roaming animals (pigs and chickens), the lack of inputs and water availability.

The traditional farming system is characterized by groves of coconut trees with various layers of crops inter-planted between the trees. Tuvalu is an atoll country and consequently does not have the same soil composition and food crop varieties as volcanic countries like Fiji and Tonga. The soil is highly porous and holds very few nutrients. Tuvalu's forebears had to dig pits that went down to the groundwater level and compost them by adding fertilizers in order to grow Tuvalu's staple root crop – the giant swamp taro, *Cyrtosperma chamissonis*. This method is the traditional way of cultivating the giant swamp taro, or pulaka, and is among the best forms of organic farming techniques in the world. The use of fertilizers in conventional farming techniques has boosted food production locally, but this practice could eventually harm the groundwater and surrounding lagoon.

All the islands of Tuvalu have land that has been dug and used as pulaka pits and these were the main source of food. The pits are rich in compost and usually store brackish water throughout the year. It is only during droughts that the pits dry up and the pulaka crops start dying. The challenge, therefore, has been to have abundant water available for irrigation purposes should the need arise. Seawater had infiltrated a sizeable amount of pulaka pits resulting in a decline in production and abandonment of a number of pits. The coconut tree dominates agricultural production both for household purposes and commercial activity.

Livestock production in the country is also at a subsistence level, with pigs and free-range chicken being the main livestock kept. Most households on the outer islands keep a few pigs and a number of local chickens. There is opportunity for some import substitution through improved livestock management and production. A decisive factor determining increased livestock production is the availability and cost of animal feed since such feed has to be imported.

The introduction and promotion of imported foods has led to changes in people's tastes and diets, and Tuvalu, like most other Pacific nations, today depend to some extent on imported foods. The increased consumption of imported foods, especially white rice, refined flour and other highly processed packaged foods, has been linked to the growing problem of non-communicable diseases across the region (for example, diabetes, obesity and micronutrient deficiencies).

In 2015/16, it was estimated that over one-third of Tuvaluan households' expenditure on food and non-alcoholic beverages was on imported goods including chicken (fresh and frozen), rice, sugar and biscuits.

1.2 Agriculture sector contribution to Tuvalu's gross domestic product

Agriculture continued to be the largest single sector in the Tuvalu economy in 2017, with a total value of Australian Dollars (AUD) 10.5 million, ahead of the Public Administration and the Construction Sectors. Between 2007 and 2010 the Agriculture, hunting, forestry, fishing sector's contribution to National Gross Domestic Product (GDP) rose from 23.2 percent to 26.6 percent, before declining annually to 18.7 percent at the time of the Mini-Census in 2017.

In terms of the Agriculture sub-sector components of National GDP, the Crop sub-sector's value in 2017 was AUD 3.7 million (or 6.6 percent), the Livestock sub-sector accounted for AUD 2.7 million (4.8 percent), while the Fisheries sub-sector contributed AUD 4.1 million (7.3 percent). In addition, the manufacturing of handicrafts by the informal (or household) sub-sector was valued at AUD 0.4 million (0.7 percent).

1.3 Agriculture exports

Tuvalu is a significant nett importer and has not exported any animal or vegetable products since 2011 and in 2017 exported less than AUD 20 000 of prepared foodstuffs and beverages.

1.4 Agricultural employment

According to the Census results, there were 7 143 persons of working age (15 years old and over) in Tuvalu in 2017, of whom 3 518 (49.3 percent) were in the labour force. Of those in the labour force, 2 517 (72 percent) were employed and 1 001 (28 percent) were unemployed persons.

The 2 517 employed persons in 2017 compares with 2 562 estimated in the 2012 Population and Housing Census. Eleven (11) percent of those employed in 2017 reported Agriculture, Forestry and Fishing as their main industry, second only to the Public Administration and Defence industry represented by 16 percent of employed persons.

Of those workers reported in the Agriculture, Forestry and Fishing industry, 87 percent were males and over half (54 percent) were aged in the 25 to 44 year range, with a median (average) age of 37.3 years (Table 2 and Figure 2).

Comparing the various industries of employment between 2012 and 2017, shows that the proportion of persons employed in the Agriculture, forestry and fishing Industry increased from 3.8 percent to 10.7 percent, with increases also recorded in the Manufacturing and Construction Industries. These were offset by reductions in Public Administration and defence, Wholesale and retail trade and Household activities for home use.

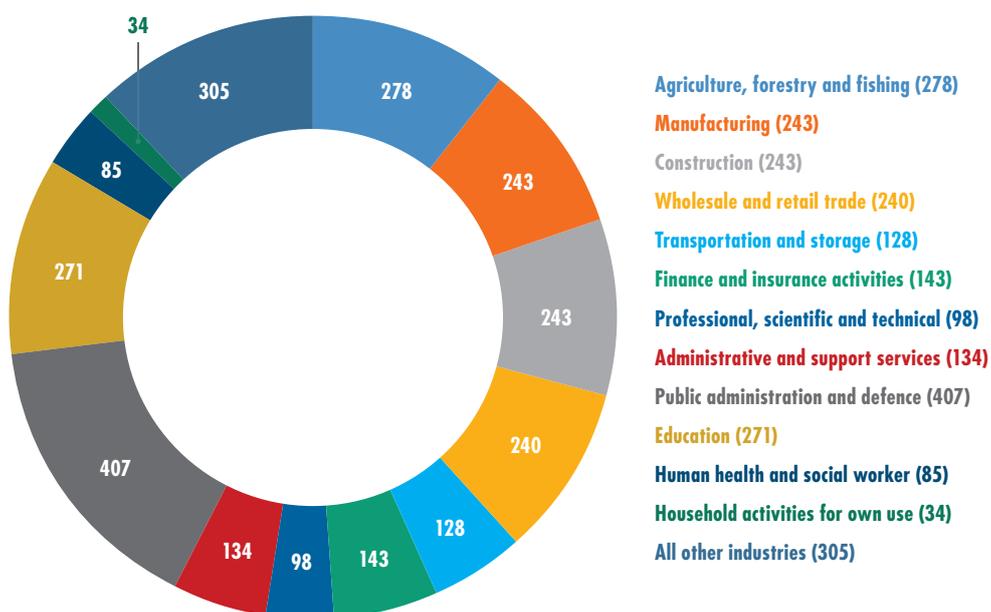
It is possible that in the previous 2012 Census some people engaged in the agriculture and fishing industry may have responded under the 'Household activities for home use' category. This may possibly account for the significant decrease in persons reporting under the 'Household activities for home use' category in 2017 and the corresponding increase in persons reporting under the agriculture and fishing industry category (Table 3 and Figure 3).

TABLE 2
Number of persons by main industry, gender and age, Tuvalu: 2017

Industry	Total	Sex		Age					Average age
		Male	Female	15 to 19	20 to 24	25 to 44	45 to 59	60 or more	
Total	2 609	1 613	996	67	315	1 478	621	128	37.4
Agriculture, Forestry and fishing	278	243	35	10	35	149	75	9	37.3
Manufacturing	243	180	63	6	30	110	78	19	39.6
Construction	243	240	3	11	34	141	45	12	35.4
Wholesale and retail trade	240	129	111	15	39	132	43	11	35.0
Transportation and storage	128	115	13	4	14	80	30	0	35.5
Finance and insurance activities	143	60	83	7	20	90	23	3	33.8
Professional, scientific and technical	98	48	50	0	13	51	23	11	39.5
Administrative and support services	134	60	74	2	20	68	38	6	39.4
Public administration and defence	407	249	158	2	43	255	85	22	37.4
Education	271	71	200	1	19	174	63	14	38.2
Human health and social worker	85	22	63	0	5	51	27	2	39.2
Household activities for own use	34	2	32	1	2	13	11	7	46.2
All other industries	305	194	111	8	41	164	80	12	37.7

SOURCE: 2017 Census

FIGURE 2
Employed Persons by Main Industry, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 3

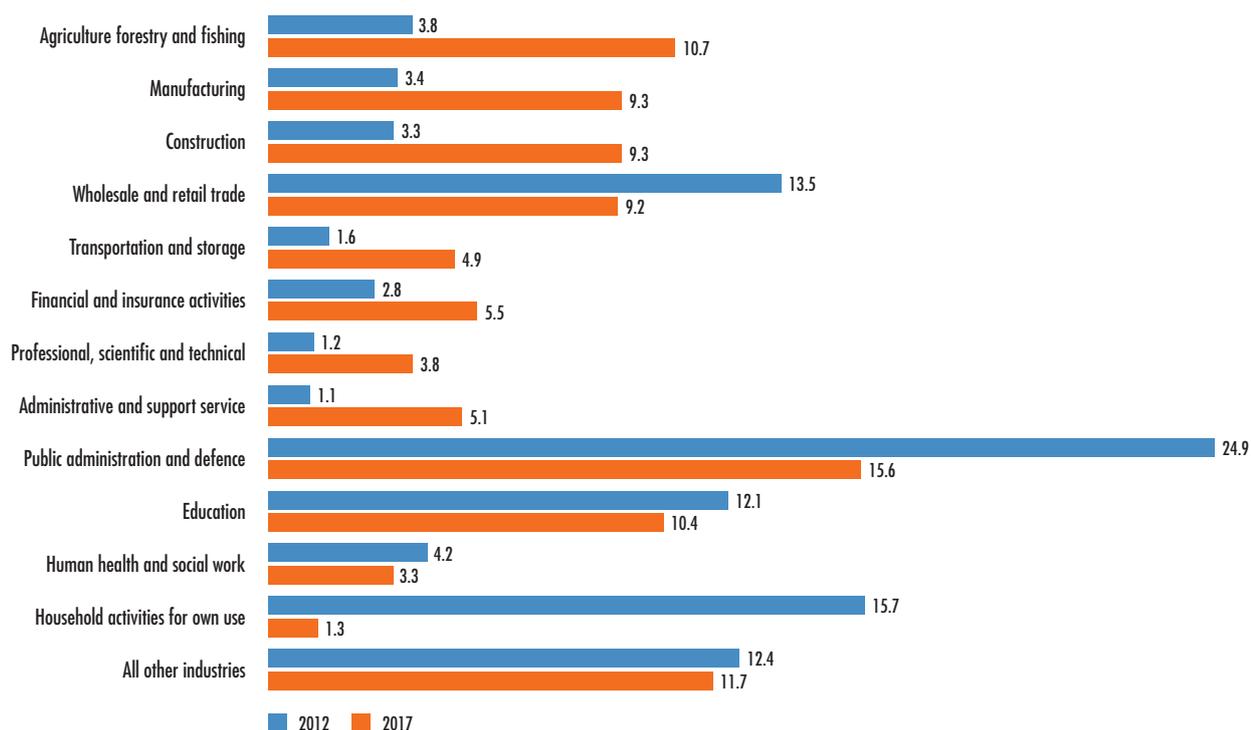
Proportion of employed persons by main industry and gender, Tuvalu: 2012 and 2017

Industry	Total (%)		Males (%)		Females (%)	
	2012	2017	2012	2017	2012	2017
Total	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, Forestry and fishing	3.8	10.7	6.1	15.1	0.7	3.5
Manufacturing	3.4	9.3	2.6	11.2	4.6	6.3
Construction	3.3	9.3	5.6	14.9	0.2	0.3
Wholesale and retail trade	13.5	9.2	14.2	8.0	12.6	11.1
Transportation and storage	1.6	4.9	2.4	7.1	0.6	1.3
Finance and insurance activities	2.8	5.5	2.2	3.7	3.5	8.3
Professional, scientific and technical	1.2	3.8	1.1	3.0	1.3	5.0
Administrative and support services	1.1	5.1	1.5	3.7	0.5	7.4
Public administration and defence	24.9	15.6	26.5	15.4	22.7	15.9
Education	12.1	10.4	6.8	4.4	19.3	20.1
Human health and social worker	4.2	3.3	1.7	1.4	7.6	6.3
Household activities for own use	15.7	1.3	18	0.1	12.5	3.2
All other industries	12.4	11.7	11.3	12.0	13.8	11.1

SOURCE: 2012 and 2017 Censuses

FIGURE 3

Proportion of employed persons by main industry, Tuvalu: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

1.5 Tuvalu sustainability development strategy

In March 2016, the Government of Tuvalu launched Te Kakeega III, its National Strategy for Sustainable Development 2016 – 2020. Te Kakeega III (TKIII) aligns with the goals of the UN Sustainable Development Agenda, the Small Island Developing States Accelerated Modalities of Action (Samoa) Pathway, the achievements of TKI and TKII, and the objectives of recent Government Roadmaps.

Spanning the years 2016 to 2020, TKIII's medium term focus sets the broad direction for future development. Projecting specific development plans over even a five-year period is problematic.

Focus can easily shift away from specific policies and projects, or other tangible development initiatives. While TKIII embodies a long-term outlook consistent with Sustainable Development Goals (SDG) targets through to 2030, TKIII's initial emphasis was much shorter-term, through to 2020.

In spite of TKIII's focus on food security, improved nutrition, and agriculture in general (UN SDG 2), agriculture in Tuvalu faces a long list challenges that constrain prospects for agricultural development much beyond present levels. Long-standing supply-side constraints on food production include:

- Harsh climate;
- Very poor soils;
- Narrow product base with few options to widen the base;
- Land tenure systems that limit land availability;
- Labour intensive production restricted to small plots;
- Poor inter-island transport links;
- Dependence on imported agricultural inputs; and
- Lack of infrastructure to support non-subsidised agricultural development beyond subsistence.

One of the goals of TKIII was to “Maximize social and economic returns from the management and sustainable use of Tuvalu’s natural resources”. With this in mind, the following Key Performance Indicators were identified specifically relating to the fishing and agriculture sector:

1. Sustained increase in fisheries contribution to government budget.
2. Increase in Tuvaluan employment on fishing boats that operate in Tuvalu’s EEZ (Exclusive Economic Zone).
3. Increase in fish stocks/coastal marine life for artisanal and semi-subsistent fishermen.
4. Increase in detection and prosecution of illegal fishing and amount of fines they pay.
5. Increase in quantity and quality of locally produced food for markets.
6. Increase farmer productivity: traditional crops, vegetables, biodiversity food, including:
 - 30% production increase in local plants/crops,
 - 30% increase in home vegetable produce, and
 - Conduct study on incentives to boost local food production
7. Number of farmer-entrepreneurs and school gardens assisted by Ag. Extension.
8. Open market for local products in Funafuti.
9. Land available for business and residence on Funafuti.
10. Number of Agricultural Associations registered with the Department of Agriculture.
11. Gauge the potential to mine deep seabed minerals.
12. TUVLIS database available online.
13. Coastline shifts and acreage loss due to erosion in the year.

CHAPTER 2

AGRICULTURAL QUESTIONS IN THE 2017 TUVALU MINI-CENSUS

The 2017 Tuvalu Population and Housing Mini-Census was the first census to be held in Tuvalu within a 5 year period, as previously most followed a 10 year time-frame since the country's independence in 1978. It was called a 'Mini-Census' as it did not cover all of the usual processes required by censuses.

2.1 Objectives

The objectives for collecting agricultural data in the 2017 Tuvalu Mini-Census were primarily to:

- Provide data on the demographic structure of agricultural households;
- Provide data on the key agricultural activities of households; and
- Provide methodological alternatives and designs for future agricultural censuses or surveys.

2.2 Methodology of data collection

In conducting the 2017 Mini-Census, the country was divided into Enumeration Areas (EA), the smallest statistical unit in which complete enumeration of all households was conducted. Enumerators used the Interview method to collect data from the household respondent.

The Census workforce comprised 34 Enumerators, 13 Supervisors and 6 Headquarters staff. Each Enumerator was allocated about 50 households on Funafuti and about 80 households on the outer islands.

Enumerators were primarily accountable for enumerating every person and households in their enumeration areas during the 2 weeks assigned for census fieldwork (13 November 2017 – 1 December 2017). The Supervisors were responsible for checking their appointed Enumerator's work to ensure that they did not miss out on anyone in their respective enumeration areas. When the Supervisor was satisfied with the collected data, they would synchronize the data to the Headquarters for the final check on all the information collected.

All fieldworkers were provided with a Computer-assisted personal interviewing (CAPI) device, a list of households, maps and control forms of their corresponding enumeration areas to ensure that none of the residents and households would be missed during the census fieldwork.

(CAPI) is an interviewing technique in which the interviewer (in this case the Enumerator) uses an electronic tablet device to answer the questions.

2.3 Coverage and Scope

The Coverage of the census was the whole of Tuvalu.

The scope of the agricultural questions covered all subsectors of agriculture in which households were engaged, including crop production activities, livestock rearing, fishing and handicraft production.

The Census questionnaire included specific agriculture questions, that allowed the classification of households engaged in agriculture and its sub sectors (cropping, livestock, fishing and handicrafts). These questions were included as Questions H16 to H30 in the Household section of the 2017 Census questionnaire, and included:

1. Crop production activity;
2. Types of crops grown or harvested in the previous 12 months;
3. Main purpose of crop activity;
4. Frequency of crop harvesting;
5. Collection of toddy;
6. Livestock raising activity;
7. Type and number of livestock currently owned;

8. Main purpose of livestock activity;
9. Type of livestock housing used;
10. Disposal of livestock waste;
11. Buying/selling fish activity in previous 30 days;
12. Frequency of buying/selling fish;
13. Handicraft activity;
14. Types of handicrafts made;
15. Main purpose of handicraft activity;
16. Climatic and natural disaster events impacting on household dwelling in the previous five years; and
17. Loss of land due to soil erosion in the previous five years.

2.4 Data processing and data analysis

The Central Statistics Division, in the Ministry of Finance and Economic Development was responsible for the enumeration, coding, editing, verification and processing of all household questionnaires collected during the Census. Technical assistance and support (questionnaire design, sampling methodology, GPS and mapping, CAPI design and training, data processing and analysis) was provided by the Secretariat of the Pacific Community.

The data items were encoded and processed using the Census and Survey Processing System (CSPRO) software package. Data analysis was undertaken using the Statistical Package for Social Sciences (SPSS) software.

2.5 Limitations of data and caution on use

The agricultural questions in the 2017 Census explicitly covered the agricultural sub-sectors of livestock, crops, fishing and handicrafts.

As with data collected in any census and survey, data reported here from the National Population and Housing Census 2017 are subject to different forms of measurement errors, including coverage errors, non-response errors, response errors and other errors such as coding and data entry errors.

Such errors can arise out of a lack of understanding of concepts by field enumerators, response fatigue, recall lapse, reporting bias, measurement errors, and data editing and processing errors. The 2017 Census is no exception to this.

Coverage errors

Coverage errors may occur due to difficulties in reaching certain geographical areas or confusion in delineating the boundary of some enumeration areas. It may also occur due to failure in identifying certain eligible persons in the household, for example, lodgers, domestic workers or other non-family members of the household. It can also happen due to incorrect data on personal characteristics, for example, if the age of the person is incorrectly recorded as below the age set for measuring labor force characteristics (under-coverage error), or vice versa the age is incorrectly recorded as above the threshold age (over-coverage error).

Non-response errors

Non-response errors occur due to the failure to obtain the required information from the household (unit non-response) or failure to obtain some items of information for the household (item non-response). Unit non-response may occur due to inaccessibility of certain dwellings or because no one was at home during the repeated visits of the census enumerator, or for other reasons. Unit non-response tends to be single-person households, as they are more likely to be missed in census enumerations.

Response errors

Response errors can occur due to a variety of reasons, including unclear questioning by the interviewer, misunderstanding of questions or the provision of wrong answers by the respondent. They can also occur due to memory failures, for example, forgetting to report an event or misreporting the timing of its occurrence, and thus reporting incorrect duration of the event.

There were some specific limitations with the agriculture-related data collected in the Census, of which data users should be aware:

- Many of the agricultural questions referred to the previous 12 months as the reference period, which, for some household heads, may have been difficult to recall and report accurately, particularly when the main focus of the census was not on agriculture.

- In agricultural censuses, livestock raising activity would usually be assessed over the previous 12 months, with the livestock population counted on a specific date, i.e. Census night. In this Census, both the “livestock raising” activity and the “livestock population” were collected “currently”, i.e. as at the date of enumeration. This could mean that some households that usually raised livestock, but were not currently doing so at the time of the Census, were not counted as a “livestock raising” household.
- While the Census data do provide an indication of the scale and livelihood dependence on certain crops, they do not lend themselves to be used for estimation of crop production.
- It is also not possible to provide a precise measure of the quality of data collected through the Census agricultural (and fisheries) questions. No Post-Enumeration Survey was carried out following the main Census enumeration.
- Despite the known and unknown limitations, the data presented in this report can indeed serve a very useful purpose in agriculture policy-making, until such time as a more detailed and scientifically designed Agricultural Census or Survey, focusing on crop, livestock, fish, rural and environmental activities is carried out in the country. An Agricultural Census will entail objective measurement of crop fields to obtain precise measurements of agricultural land and crop area under cultivation, crop production levels, more specific land tenure information as well as identifying constraints to improving agricultural production and productivity across Tuvalu.

2.6 Schedule of Activities

Although the 2017 Census night was 12th November 2017, enumeration fieldwork occurred between 13th November and 1st December 2017.

The Census agricultural questions that related to activity during the last twelve (12) months refer to the 12-month period prior to 12th November 2017 (Census night) and similarly the questions on the buying and selling of fish refer to the 30 days prior to Census night.

The ‘current’ ownership of livestock question related to the number of livestock owned on Census night, i.e. 12th November 2017.



CHAPTER 3

STRUCTURE OF HOUSEHOLDS ENGAGED IN AGRICULTURE

This chapter summarizes the key Census findings about the structure of households undertaking some form of agriculture activity in Tuvalu in 2017. The chapter also includes discussion on the demographics of heads of household, and household level and purpose of agriculture activities.

3.1 Households engaged in agriculture and fisheries

The 2017 Census revealed that of the total 1 626 households enumerated in Tuvalu, 1 464 households (90 percent) were engaged in agricultural activities, either crop production, livestock raising, buying/selling fish or handicrafts. Of the households engaged in agricultural activities, 1 121 households (69 percent) were growing crops and 1 362 households (84 percent) were raising livestock.

The Census also reported that 976 households (60 percent) of all Tuvaluan households were engaged in the buying and selling of fish, while a further

571 households (35 percent) were engaged in handicrafts (Table 4 and Figure 4).

Of the 202 households that did not grow any crops or engage in livestock raising across the country, the majority were located in Funafuti, where 140 households (16 percent) of the Island's total 849 households were not involved in any form of agricultural activity.

The story was much different on the Outer Islands, where more than 95 percent of all households were engaged in agriculture activity of some kind, the exception being Niulakita with 90 percent (Figure 5).

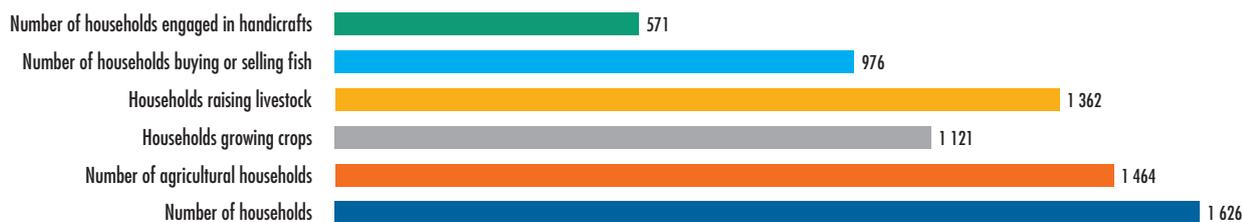
TABLE 4
Number of households by type of agriculture/fishing activity and island: 2017

Island	Number of households	Number of agricultural households	Households growing crops	Households raising livestock	Number of households buying or selling fish	Number of households engaged in handicrafts
TUVALU	1 626	1 464	1 121	1 362	976	571
Nanumea	105	102	97	95	85	59
Nanumaga	93	89	88	87	71	31
Niutao	116	115	112	109	64	87
Nui	97	97	97	92	73	77
Vaitupu	187	178	151	173	156	51
Nukufetau	112	109	107	102	93	86
Funafuti	849	709	409	644	397	132
Nukulaelae	57	56	52	53	37	47
Niulakita	10	9	8	7	0	1

SOURCE: 2017 Census

FIGURE 4

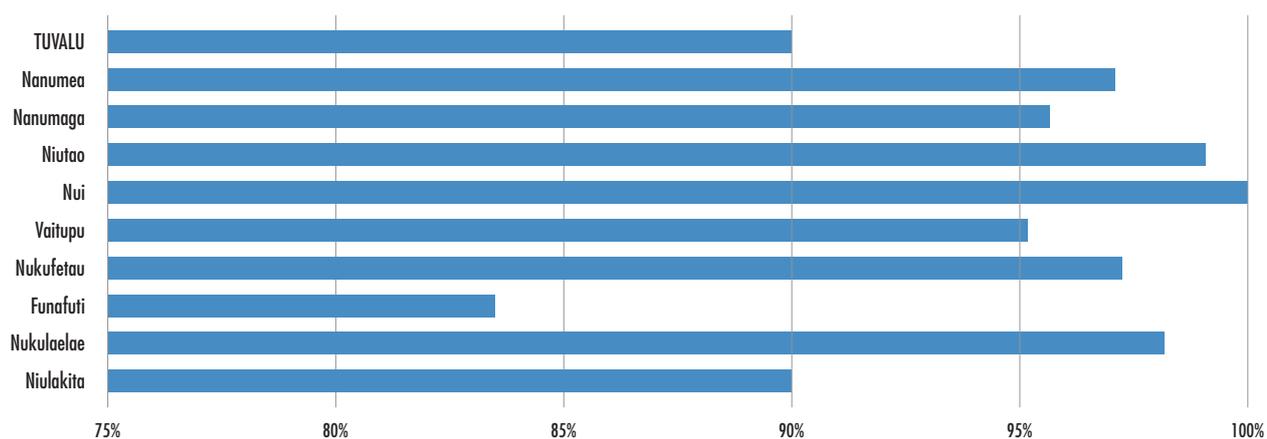
Number of households by type of agriculture/fishing activity, Tuvalu: 2017



SOURCE: 2017 Census

FIGURE 5

Number of households engaged in Agriculture by island: 2017



SOURCE: 2017 Census

3.2 Subsector activities

While the Census identified that raising livestock and crop production were the main agricultural activities in Tuvalu, it also found that many households were engaged in mixed farming activities, i.e. in at least two or more of the sub-sectors of livestock raising, crop production, fishing and handicrafts. This is particularly evidenced by the high proportion of households on the Outer Islands reporting various forms of agricultural activity. For example, of the 112 households on Nukufetua, 96 percent were growing crops, 91 percent were raising livestock, 83 percent were buying or selling fish and 77 percent were engaged in handicraft activities (Table 4 above).

Other islands to report high proportions of households undertaking multiple agriculture activities were Nanumea, Niutao, Nui and Nukulaelae.

3.3 Level of agricultural activities

The level of agricultural activity is a broad indicator of the extent to which agricultural households are participating in the market economy. The Census queried the main purpose for the various agricultural activities undertaken by households, namely: home consumption; for sale; mainly home consumption but some sale; mainly for sale but some home consumption; or other (i.e. customary).

3.3.1 Crop production

Of the 1 121 households who reported growing crops in 2017, the vast majority of crops were grown for home consumption, i.e. subsistence. Some 64 households (or 6 percent) grew crops mainly for home consumption but also sold some of their produce, specifically bananas, toddy and pawpaw. Less than 2 percent of cropping households grew their crop mainly for sale but had some home consumption. These crops were bananas, cucumbers and pawpaw (Table 5).

TABLE 5
Number of households growing crops by crop type and purpose, Tuvalu: 2017

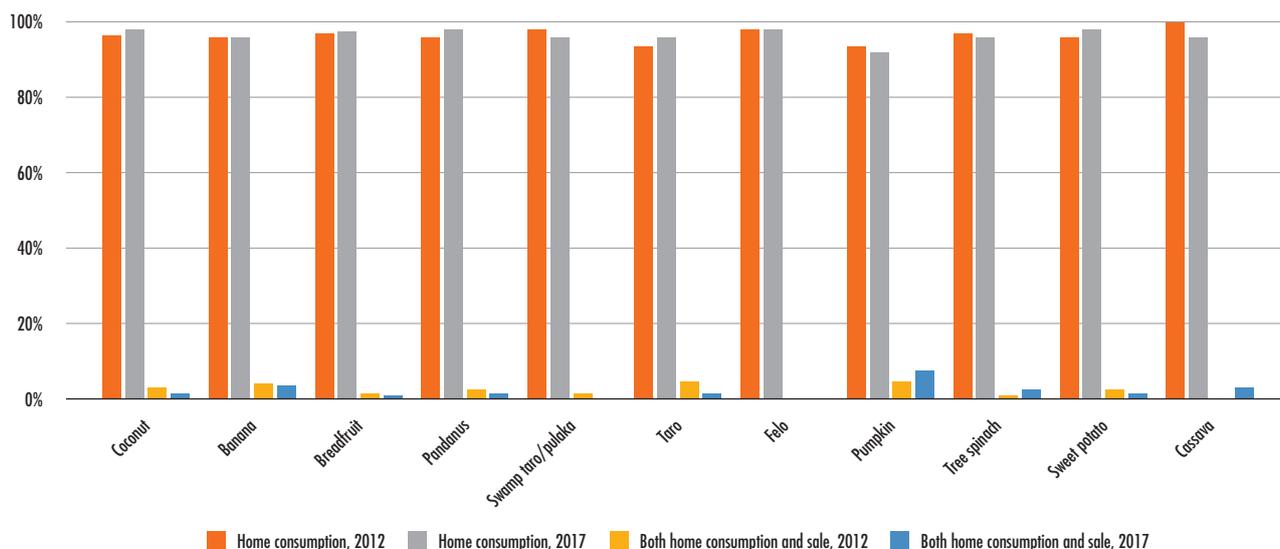
Crop	Number of households growing crop	Purpose of growing crop				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other
Total	1 121	1 118	7	64	16	38
Beans (string, long, green, star)/piini	11	10	0	0	1	0
Tree spinach/bele/pele	134	129	0	3	2	0
Bell pepper/capsicum/pepa	68	62	0	3	3	0
Cabbage/kapisi Saina	201	186	0	8	6	1
Chili pepper/tili	59	56	0	0	3	0
Corn/koni	3	2	0	1	0	0
Cucumber/kukama	163	149	1	5	7	1
Egg plant/paigani	9	8	0	1	0	0
Lettuce/letisi	19	15	0	4	0	0
Spring/green onion/aniani	4	2	0	2	0	0
Tomato	106	93	0	7	6	0
Melons (water, rock)/meleni	30	25	0	5	0	0
Pumpkin/squash/panikeni	231	212	2	12	4	1
Banana/pata/fuamaulalo	776	743	2	23	8	0
Breadfruit/mei	540	530	0	5	5	0
Coconut/niu	694	682	0	8	3	1
Pandanus/fala	395	387	0	5	3	0
Pawpaw/olesi	624	604	1	12	6	1
Sweet potato/kumala/pateta	132	129	0	2	1	0
Swamp taro/pulaka	394	380	0	2	0	12
Taro/talo	300	288	2	5	1	4
Cassava/tapioka	59	57	0	2	0	0
Felo	82	81	0	0	0	1
Gie	26	26	0	0	0	0
Laukatafa	30	30	0	0	0	0
Tiale	190	165	1	2	0	22
Toddy	437	411	1	23	1	1
Other	33	33	0	0	0	0

SOURCE: 2017 Census

There is very little evidence of increasing commercialization of crop growing throughout Tuvalu. In the 2012 Census, households reported on three main purposes of growing these crops: 'subsistence', 'commercial' and 'both subsistence and commercial (i.e. semi commercial farming – where households sell the excess production from their home garden)'. However, due to the extremely small number of responses in the 'commercial' category, these were omitted from the 2012 Census findings. It was therefore felt that the category 'both' or semi-commercial was adequate to cover the very minimal results for purely commercial activity.

To enable some comparisons between the 2012 and 2017 Censuses, data for 2017 has also been combined into the two categories: 'home consumption' (or subsistence) and 'both' (home consumption/ subsistence plus sales). Figure 6 below indicates that there has been minimal change in the commercialization of crop production in the five years between the 2012 and 2017 Censuses, with the vast majority of households still growing these main crop types for their home consumption. In fact, for several crop types, the proportion of households growing crops for home consumption has increased slightly, which would indicate a lesser focus or interest in growing crops commercially.

FIGURE 6
Purpose for growing crop by main crop type, Tuvalu: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

TABLE 6
Number of households raising pigs by purpose and island: 2017

Island	Number of households raising pigs	Purpose of raising pigs				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	1 242	1 155	3	73	1	10
Nanumea	89	87	0	2	0	0
Nanumaga	80	78	0	2	0	0
Niutao	97	89	0	7	0	1
Nui	90	79	0	11	0	0
Vaitupu	173	166	0	6	0	1
Nukufetau	97	70	3	20	0	4
Funafuti	557	532	0	21	1	3
Nukulaelae	52	47	0	4	0	1
Niulakita	7	7	0	0	0	0

SOURCE: 2017 Census

What was obvious from the 2017 Census data was the significant reduction in households growing crops compared with estimates from the 2012 Census. While the total number of households across Tuvalu decreased from 1 761 to 1 626 between 2012 and 2017, an overall reduction of 135 households (or 7.7 percent), the actual number of households growing traditional crops decreased from 30 percent to 55 percent for individual crops. These reductions are detailed further in Chapter 5.

3.3.2 Livestock Raising

Of the 1 242 households who reported raising pigs in 2017, 1 155 or 93 percent did so for home consumption. Some 73 households (6 percent)

reported raising pigs mainly for home consumption but some for sale, while only 3 households reported raising pigs solely for sale (Table 6).

The high proportion of households raising livestock for home consumption was also reflected in the estimates for chickens and ducks, with 91 percent of households raising both these poultry types for home consumption. A further 8 percent of households raising chickens mainly for home consumption also sold some of their production (Table 7). For households raising ducks, 7 percent raised ducks for sale, which was a higher proportion than households with pigs or chickens (Table 8). Most of these households were located on Niutao.

TABLE 7
Number of households raising chickens by purpose and island: 2017

Island	Number of households raising chickens	Purpose of raising chickens				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	682	619	2	55	4	2
Nanumea	86	82	0	3	1	0
Nanumaga	81	79	0	2	0	0
Niutao	102	84	0	17	0	1
Nui	63	52	0	9	2	0
Vaitupu	137	135	0	2	0	0
Nukufetau	69	50	1	18	0	0
Funafuti	93	90	1	1	0	1
Nukulaelae	45	41	0	3	1	0
Niulakita	6	6	0	0	0	0

SOURCE: 2017 Census

TABLE 8
Number of households raising ducks by purpose and island: 2017

Island	Number of households raising ducks	Purpose of raising ducks				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	150	137	0	11	1	1
Nanumea	10	9	0	0	1	0
Nanumaga	40	39	0	1	0	0
Niutao	79	68	0	10	0	1
Nui	2	2	0	0	0	0
Vaitupu	5	5	0	0	0	0
Nukufetau	1	1	0	0	0	0
Funafuti	10	10	0	0	0	0
Nukulaelae	3	3	0	0	0	0
Niulakita	0	0	0	0	0	0

SOURCE: 2017 Census

TABLE 9
Households engaged in fishing activities by strata: 2012

Island	Collecting on reef flat	Collecting on lagoon flat	Collecting on ocean flat	Reef fishing	Lagoon fishing	Ocean fishing
Funafuti	175	212	84	314	461	207
Outer islands	365	129	190	657	471	468
TUVALU	540	341	274	971	932	675

SOURCE: 2012 Census

TABLE 10
Number of households by method of fishing and gathering activity in past 3 months by strata: 2016

Location	Total		Urban		Rural	
	Number of household	Percentage	Number of household	Percentage	Number of household	Percentage
Total number of household	1 872		870		1 002	
Fishing						
Open ocean	291	15.5	74	8.5	217	21.6
FAD fishing (including buoy)	25	1.3	18	2.1	6	0.6
Reef	452	24.1	94	10.8	357	35.7
Lagoon	402	21.5	170	19.6	232	23.2
Other	0	0.0	0	0.0	0	0.0
Other sea gathering						
Mangrove	6	0.3	0	0.0	6	0.6
Reef – lagoon	121	6.5	32	3.7	89	8.8
Beach	108	5.8	7	0.8	101	10.1
Coastal reef – outside	105	5.6	5	0.5	101	10.1
Other	0	0.0	0	0.0	0	0.0

SOURCE: 2016 HIES

Unlike the 2017 Census, the previous 2012 Census did not ask any specific questions in relation to the purpose of raising livestock. Similar to the situation with cropping households, there was a downward trend in the number of households raising livestock in 2017 compared with 2012, with estimates of less households raising each livestock type.

Whilst the reduction in livestock households between Censuses was not quite to the same level as with crop growing households, nonetheless there was a 13 percent decrease in households raising pigs, a 28 percent decrease in chicken raising households and 44 percent less households raising ducks. These reductions are detailed further in Chapter 4.

3.3.3 Fishing

The 2012 Census questionnaire included several questions on whether household members were engaged in fishing activities and if so the fishing methods used, the fishing location and whether the fishing was for subsistence, commercial purposes or both.

Unfortunately, the fishing-related questions on the 2017 Mini-Census referred specifically to the buying and selling of fish in the previous 30 days, the frequency of buying/selling fish and the type of fish bought or sold, i.e. reef, pelagic or deep sea fish. Therefore, any comparison of the household fishing activities between the two Censuses is not possible. However, some comparison at the sector level is

possible with data from the 2015/16 Tuvalu Household Income and Expenditure Survey (HIES) which asked similar questions to the 2012 Census.

The 2012 Census reported that 75 percent of Tuvaluan households were engaged in some form of fishing activity, including 85 percent of households on the Outer Island households and 64 percent of Funafuti households. The most common type of fishing activities were reef and lagoon fishing with more than 50% of the total households engaged in these activities. On the Outer Islands, reef fishing was the more popular activity with 72 percent of households engaged in this activity, whilst 51 percent of households were engaged in either lagoon or ocean fishing (Table 9).

In 2012, 55 percent of Funafuti households were engaged in lagoon fishing, followed by 37 percent engaged in reef fishing and 24 percent in ocean fishing. Also 31 percent of households engaged in the collection of shellfish on reef flats and 19 percent collected shellfish on lagoon flats.

The 2016 HIES also estimated the most prevalent fishing activity was reef and lagoon fishing, with similar preferences for reef fishing on the rural (or outer) islands, and lagoon fishing in the urban (Funafuti) area, although not at the same level of households as reported in 2012. The HIES also reported sea gathering on lagoon, beaches and coastal reefs, but again at a much lower level of around 6 percent of households (Table 10).

TABLE 11
Number of households engaged in handicrafts by purpose and island: 2017

Island	Number of households	Number of households engaged in handicrafts	Purpose of making handicrafts				
			Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	1 626	571	327	127	53	38	26
Nanumea	105	59	43	6	1	2	7
Nanumaga	93	31	7	10	4	9	1
Niutao	116	87	63	5	19	0	0
Nui	97	77	42	7	10	7	11
Vaitupu	187	51	38	5	3	4	1
Nukufetau	112	86	57	14	8	6	1
Funafuti	849	132	42	80	3	6	1
Nukulaelae	57	47	34	0	5	4	4
Niulakita	10	1	1	0	0	0	0

SOURCE: 2017 Census

3.3.3 Handicrafts

Of the 1 626 total households nationally, 571 households (or 35%) indicated that they were involved in handicraft activity. Over half (57 percent) of these households produced handicrafts for their household use, 127 households (22 percent) produced handicrafts for sale and 91 households (16 percent) reported a combination of home consumption and sales (Table 11).

Given the two most common handicrafts produced were brooms and mats, both of which are common household requirements, the high incidence of home consumption (or home use) of these handicrafts is not surprising.

Unfortunately handicraft purpose data from 2012 was not published, however the Census Report did indicate, with the exception of necklace-making, most households stated that their production of handicrafts was mainly for subsistence purposes (own consumption or use) and not for commercial purposes. It was suggested that the difference in purpose for necklaces may be attributed to the high demand on Funafuti for necklaces as gifts for passengers on outgoing weekly flights.

The number of households involved in handicraft production in 2017 was also down significantly when compared with 2012 Census data. For example, in 2012 it was reported that 45 percent of households (58 percent of Outer Island households and 32 percent of Funafuti households) were producing brooms. In 2017, broom-producing households was reported as 23 percent nationally, comprising 45 percent of Outer Island households and only 3 percent of Funafuti households. These decreases

were similarly reflected across all other handicraft types, except basket production on the Outer Islands, which increased slightly from 8 percent to 11 percent of households (Figure 7).

3.4 Heads of household demography

This section presents the demographics of the heads of households engaging in agriculture in Tuvalu as reported in the Census. The analysis includes gender and education levels achieved, as well as the number of household members.

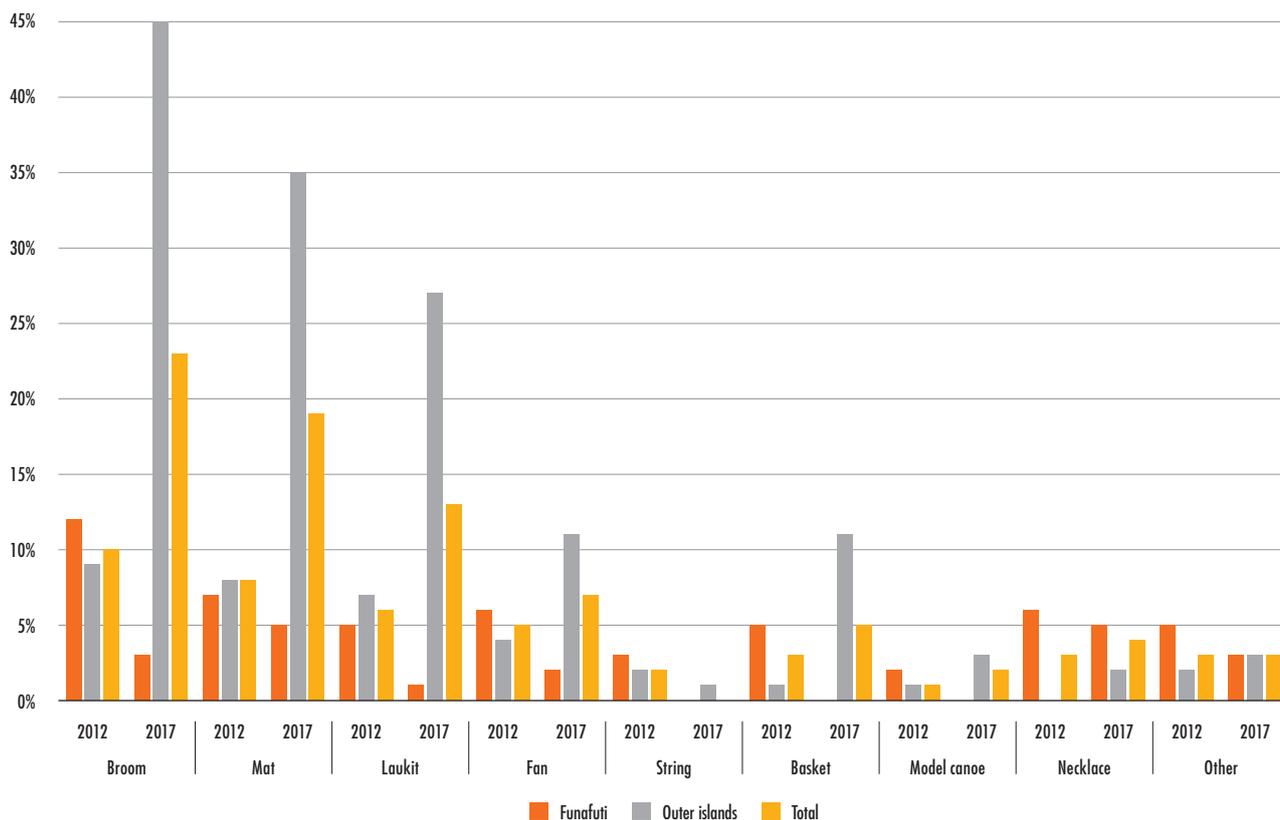
3.4.1 Gender

Of the 1 626 total households across Tuvalu, 1 168 (72 percent) were headed by males and 458 (28 percent) by females. Of those households, 1 464 (90 percent) indicated they were engaged in agriculture with 73 percent headed by males and 27 percent by females.

Niulakita (44 percent), Funafuti (32 percent) and Niutao (30 percent) all reported higher than the national average of female-headed agriculture households, while Nukulaelae (7 percent) and Nui (14 percent) reported the lowest percentage (Table 12).

Limited gender data is available from the 2012 Census, other than it was reported that “Three-quarters of householders were headed by males while one quarter were headed by females”. The 2017 data would indicate a slight increase in the total number of female-headed households across the nation.

FIGURE 7
Proportion of households by handicraft item produced and strata: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

TABLE 12
Number and proportion of households engaged in agriculture by gender of household head and island: 2017

Island	Total households	Agricultural households				
		Total	Male head	Female head	% Female	
TUVALU	1 626	1 464	1 076	388	73	27
Nanumea	105	102	79	23	77	23
Nanumaga	93	89	71	18	80	20
Niutao	116	115	81	34	70	30
Nui	97	97	83	14	86	14
Vaitupu	187	178	134	44	75	25
Nukufetau	112	109	86	23	79	21
Funafuti	849	709	485	224	68	32
Nukulaelae	57	56	52	4	93	7
Niulakita	10	9	5	4	56	44

SOURCE: 2017 Census

The number of households raising livestock was 1 362, with 74 percent headed by males and 26 percent by females. Interestingly, almost identical proportional splits were evident in the number of male and female-headed households engaged in crop production, the buying and selling of fish and handicraft production (Tables 4 and 13 and Figure 8).

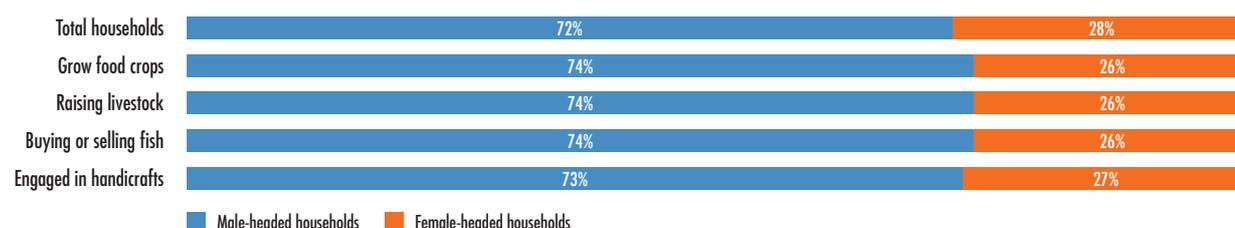
The highest proportions of female-headed households engaged in crop growing were recorded in Niulakita (50 percent), Funafuti (34 percent) and Niutao (30 percent), while only 6 percent of crop growing households on Nukulaelae and 14 percent on Nui were headed by females (Figure 9).

TABLE 13
Number of households by agricultural activity, gender of household head and island: 2017

Island	Gender of household head									
	Male					Female				
	Total households	Growing food crops	Raising livestock	Buying or selling fish	Engaged in handicrafts	Total households	Growing food crops	Raising livestock	Buying or selling fish	Engaged in handicrafts
TUVALU	1 168	829	1 014	723	417	458	292	348	253	154
Nanumea	80	75	76	65	47	25	22	19	20	12
Nanumaga	75	70	70	58	23	18	18	17	13	8
Niutao	82	78	78	45	59	34	34	31	19	28
Nui	83	83	80	60	67	14	14	12	13	10
Vaitupu	138	115	130	116	40	49	36	43	40	11
Nukufetau	88	85	83	74	72	24	22	19	19	14
Funafuti	564	270	445	270	66	285	139	199	127	66
Nukulaelae	53	49	49	35	43	4	3	4	2	4
Niulakita	5	4	3	0	0	5	4	4	0	1

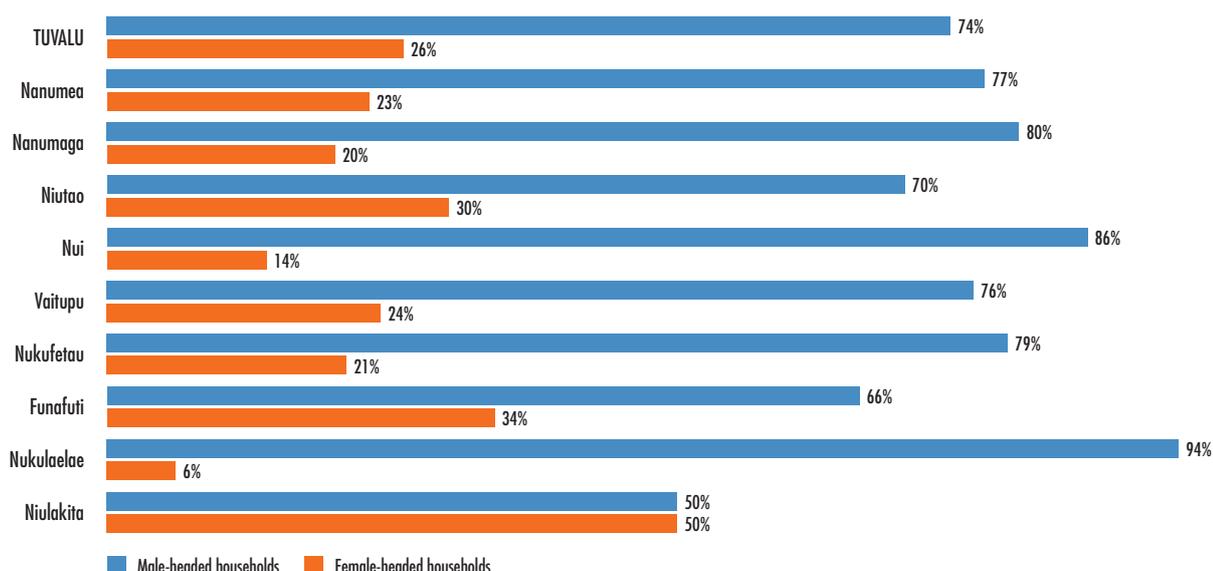
SOURCE: 2017 Census

FIGURE 8
Proportion of Households Engaged in Agriculture Activity by Gender of Household Head, Tuvalu: 2017



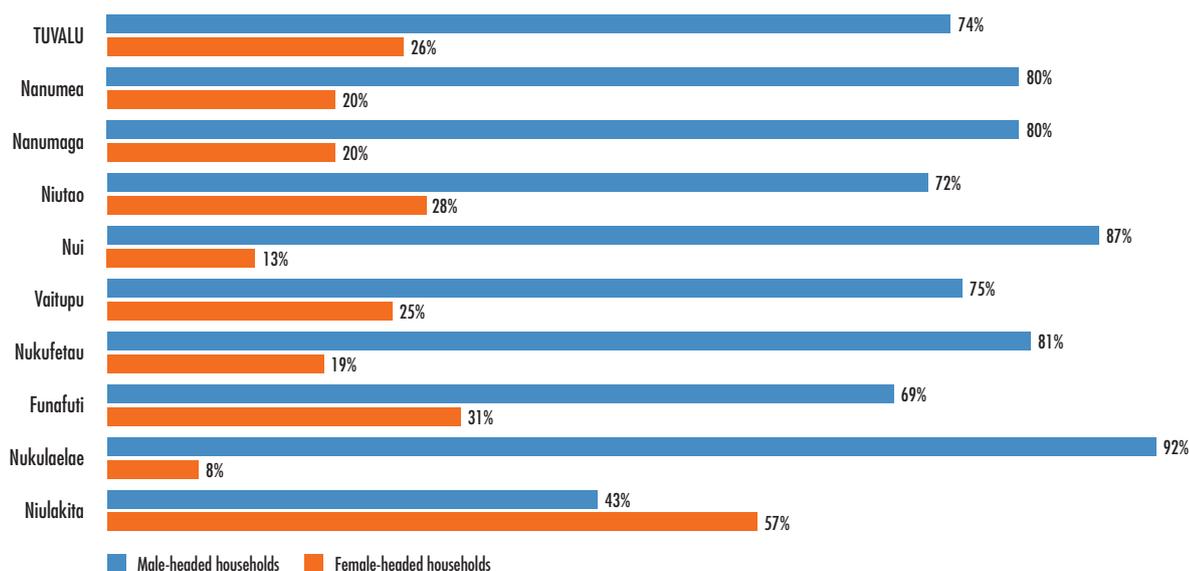
SOURCE: 2017 Census

FIGURE 9
Percentage of households engaged in growing food crops by gender of household head and island: 2017



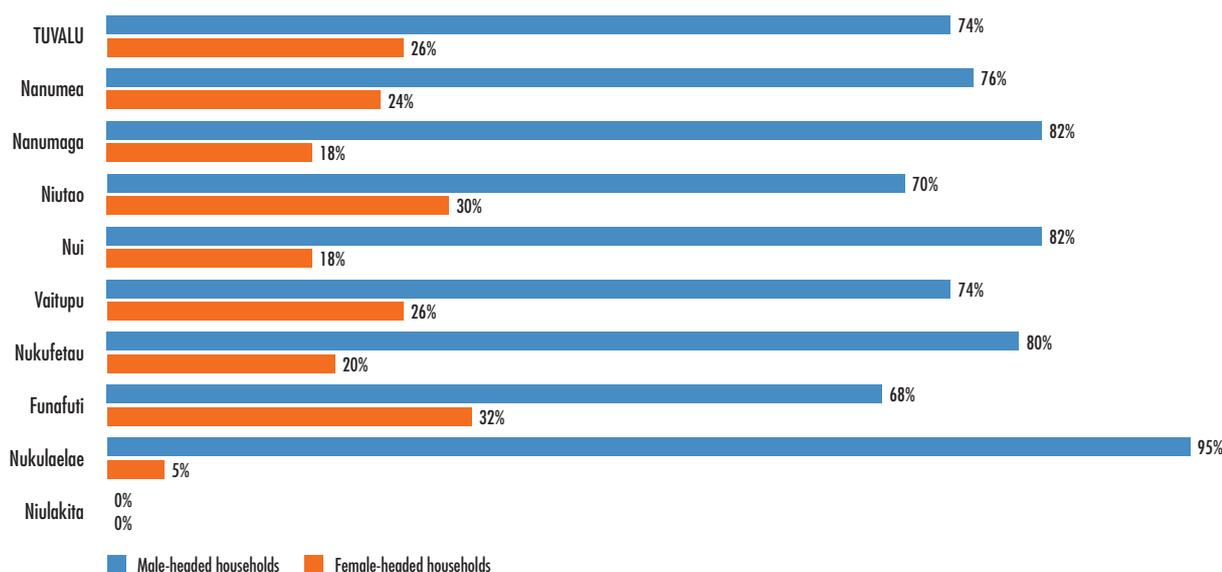
SOURCE: 2017 Censuses

FIGURE 10
Percentage of households engaged in livestock raising by gender of household head and island: 2017



SOURCE: 2017 Censuses

FIGURE 11
Percentage of households engaged in buying or selling fish by gender of household head and island: 2017



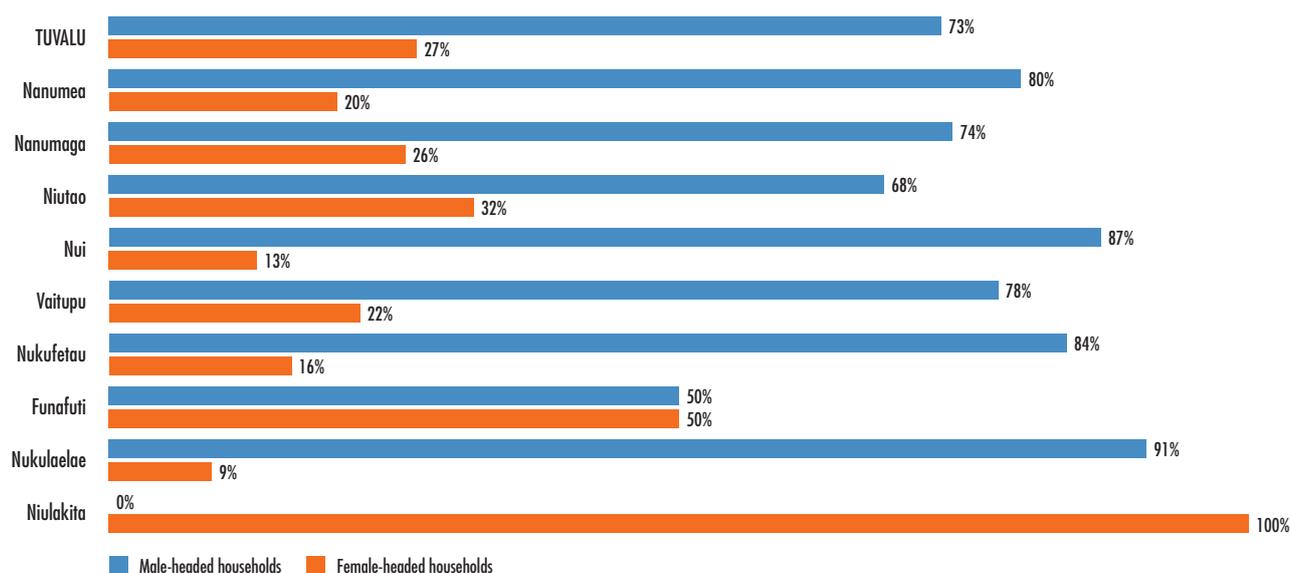
SOURCE: 2017 Censuses

The smallest island in terms of household and population numbers, Niulakita, reported that 57 percent of households raising livestock were headed by a female. The next highest proportions of female-headed households raising livestock were Funafuti (31 percent), Niutao (28 percent) and Vaitupu (25 percent). Nukulaelae reported only 8 percent and Nui (13 percent) of households raising livestock were headed by females (Figure 10).

The gender data for households buying and selling fish effectively mirrored those of the crop growing and livestock raising households, with Nukulaelae (95 percent), Nanumaga and Nui (both 82 percent) predominantly with male-headed households engaged in buying and selling fish (Figure 11). The sparsely populated island of Niulakita reported that no households bought or sold fish in the previous twelve months, which would indicate that these households operated on a subsistence basis catching and consuming their fish intake.

FIGURE 12

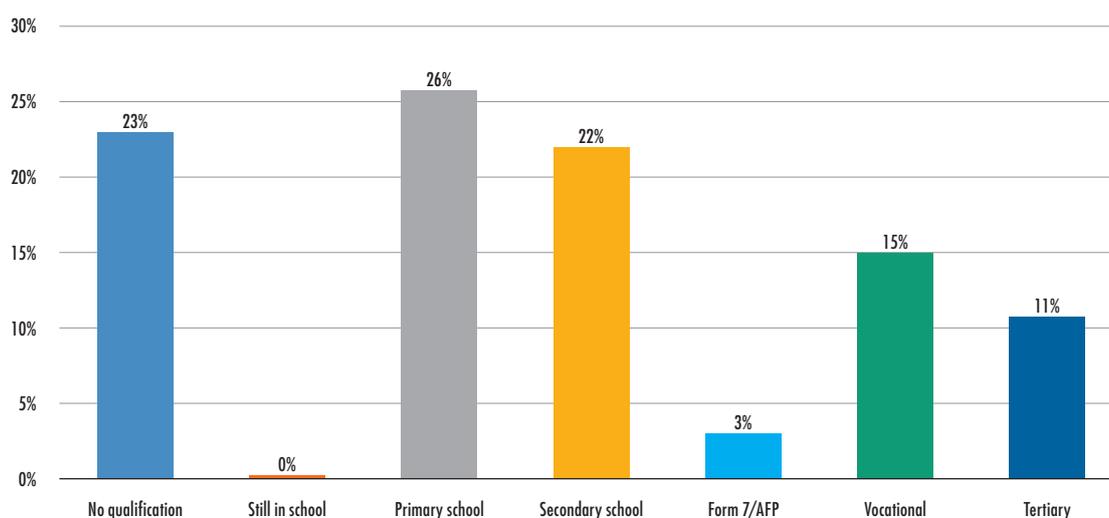
Percentage of households engaged in handicrafts by gender of household head and island: 2017



SOURCE: 2017 Censuses

FIGURE 13

Proportion of agriculture household heads by highest education level attained, Tuvalu: 2017



SOURCE: 2017 Censuses

The other important agricultural activity is related to households producing handicrafts. While the gender split of handicraft-producing households across the whole of Tuvalu was consistent with the other types of agricultural activity, there were significant differences across Funafuti and the outer islands. Funafuti reported a 50:50 split of households by gender, while islands including Nanumea (80 percent), Vaitupu (78 percent) and Nukufetau (84 percent) reported a higher proportion of male-headed households producing handicrafts than their respective proportion of male-headed households growing crops.

Of the outer islands, Niulakita (100 percent), Niutao (32 percent) and Nanumaga (26 percent) reported the highest proportion of female-headed households produced handicrafts (Figure 12).

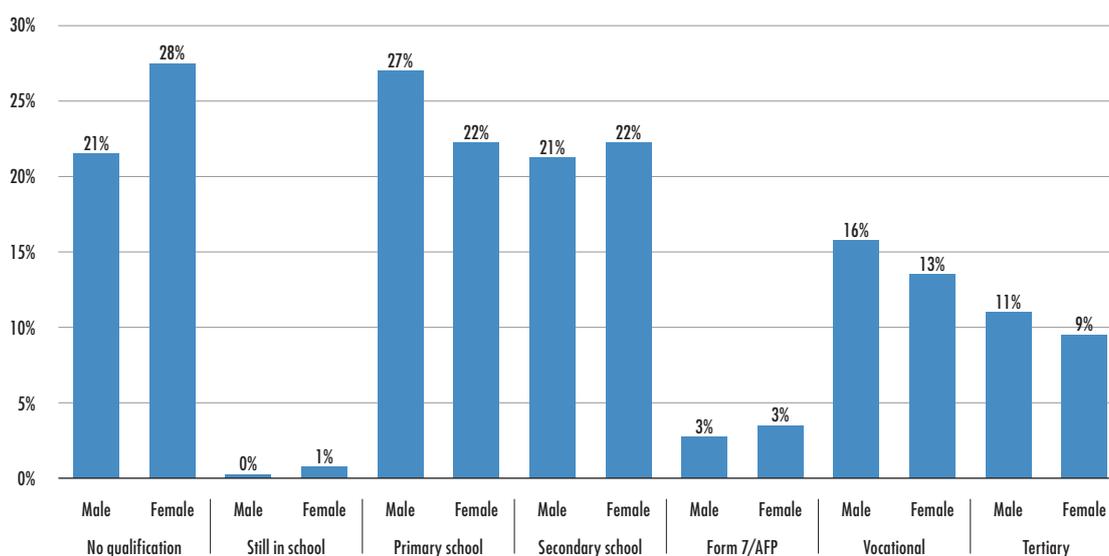
3.4.2 Education levels

Over 77 percent of household heads engaged in agriculture reported having some formal schooling from primary to tertiary levels, while 23 percent had no formal schooling or qualifications. Of those who had formal schooling, 26 percent completed their primary school education, 22 percent completed secondary school, 3 percent Form 7/AFP, 15 percent held a vocational qualifications and 11 percent held tertiary qualifications (Figure 13 and Table 14).

TABLE 14
Number of agriculture household heads by highest education level attained, gender and island: 2017

Island	Number of agricultural household heads															
	Total		No qualification		Still in school		Primary school		Secondary school		Form 7/AFP		Vocational		Tertiary	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
TUVALU	1 076	388	230	107	5	2	291	86	229	86	28	13	170	52	118	36
Nanumea	79	23	20	8	0	0	21	7	20	4	2	0	11	4	5	0
Nanumaga	71	18	53	13	0	0	9	2	1	2	0	0	5	1	3	0
Niutao	81	34	52	18	5	2	13	11	9	5	0	0	0	0	1	0
Nui	83	14	12	2	0	0	41	3	12	9	1	1	11	1	5	0
Vaitupu	134	44	14	11	0	0	35	8	48	1	5	0	23	12	9	4
Nukufetau	86	23	7	5	0	0	36	13	15	1	1	0	24	1	2	3
Funafuti	485	224	61	46	0	0	118	39	117	62	17	12	80	33	90	29
Nukulaelae	52	4	11	2	0	0	16	1	5	2	1	0	16	0	3	0
Niulakita	5	4	0	2	0	0	2	2	2	0	1	0	0	0	0	0

SOURCE: 2017 Census

FIGURE 14
Proportion of agriculture household heads by gender and highest education level attained, Tuvalu: 2017

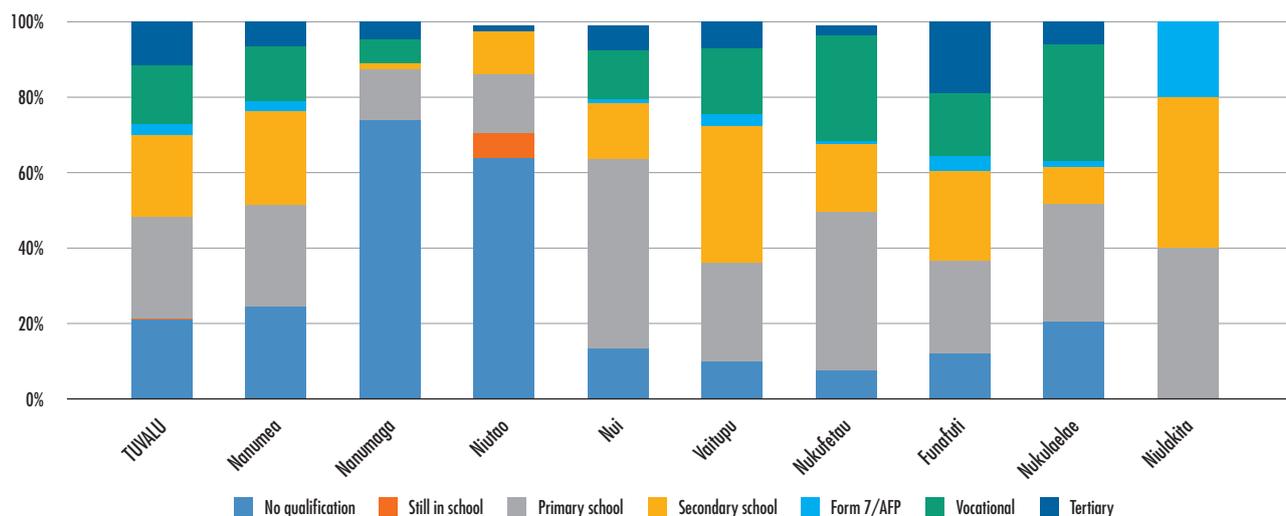
SOURCE: 2017 Censuses

A greater proportion of female agriculture household heads (28 percent) reported having no educational qualifications in the 2017 Census, compared with 21 percent of male agriculture household heads. More male agriculture household heads also completed primary school (27 percent compared to 22 percent), but from secondary school level through to the higher vocational and tertiary education levels, the gender differences were less pronounced (Figure 14).

The northern islands of Nanumaga, Nanumea and Niutao reported the highest levels of agriculture household heads having no educational qualifications. Of the agriculture household heads on Nanumaga, 75 percent of males and 72 percent of females held no qualification, with a further 13 percent and 11 percent respectively completing primary school level (Table 15, Figures 15 and 16). On Niutao, almost 90 percent of both male and female household heads either held no qualification or had only completed primary school level.

FIGURE 15

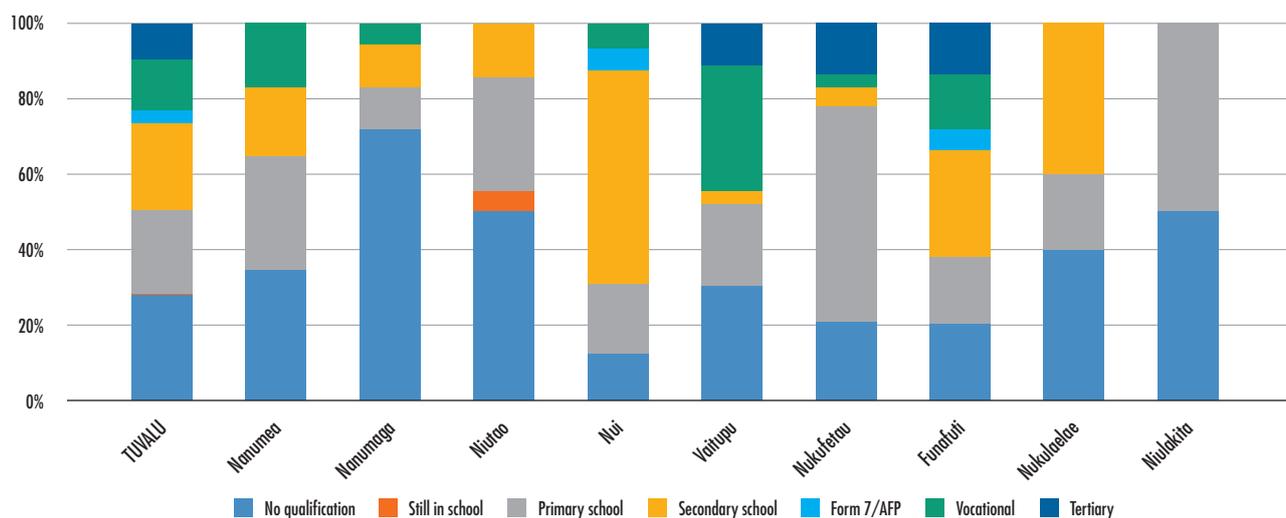
Proportion of male agriculture household heads by highest education level attained and island: 2017



SOURCE: 2017 Census

FIGURE 16

Proportion of female agriculture household heads by highest education level attained and island: 2017



SOURCE: 2017 Census

Over 70 percent of female agriculture household heads on Nui had either completed second school or Form 7/AFP levels, while Vaitupu, Nukufetau, Funafuti and Nukulaelae household heads reported having undertaken higher levels of vocational education. Tertiary education levels were highest on Funafuti, with 19 percent and 13 percent of male and female agriculture household heads respectively, having achieved this level. Funafuti accounted for over three quarters of Tuvalu's male agriculture household heads educated to tertiary level.

3.4.3 Household demographics

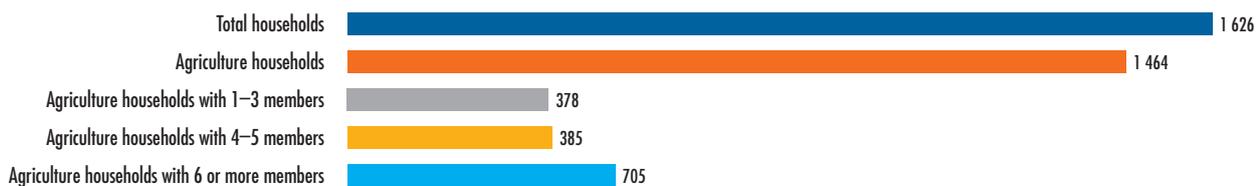
In 2017 there were an estimated 705 Tuvaluan households (48 percent) engaged in agricultural

activities where the number of household members was six (6) or greater. A further 385 households (26 percent) reported having either four (4) or five (5) members, whilst 374 households (25 percent) reported having one (1) to three (3) household members (Figure 17 and Table 15).

The average household size across the country was 6 members, ranging from 3.7 members on Niutao and Niulakita to 7.6 members on Funafuti. Two-thirds of Funafuti's agriculture households had 6 or more members. These larger households in Funafuti is reflective of people moving from the outer islands to the capital and tending to stay with relatives for either education or employment opportunities.

FIGURE 17

Number of households engaged in agriculture by household size, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 15

Number of households engaged in agriculture by household size and island: 2017

Island	Total households	Households Engaged in Agriculture					Average household size
		Total	Number of household members				
			1 to 3	4 to 5	6 or more		
TUVALU	1 626	1 464	374	385	705	6.0	
Nanumea	105	102	29	38	35	4.8	
Nanumaga	93	89	44	20	25	4.0	
Niutao	116	115	61	33	21	3.7	
Nui	97	97	26	32	39	5.1	
Vaitupu	187	178	50	67	61	4.7	
Nukufetau	112	109	40	35	34	4.6	
Funafuti	849	709	99	138	472	7.6	
Nukulaelae	57	56	20	20	16	4.6	
Niulakita	10	9	5	2	2	3.7	

SOURCE: 2017 Census

TABLE 16

Number of households engaged in agriculture by household size, gender of household head and island: 2017

Island	Male-headed households engaged in agriculture					Female-headed households engaged in agriculture				
	Total	Number of household members			Average household size	Total	Number of household members			Average household size
		1 to 3	4 to 5	6 or more			1 to 3	4 to 5	6 or more	
TUVALU	1 076	266	301	509	5.9	388	108	84	196	6.2
Nanumea	79	20	31	28	4.9	23	9	7	7	4.3
Nanumaga	71	33	18	20	4.0	18	11	2	5	3.7
Niutao	81	38	24	19	4.1	34	23	9	2	2.9
Nui	83	22	27	34	5.1	14	4	5	5	4.9
Vaitupu	134	38	48	48	4.8	44	12	19	13	4.5
Nukufetau	86	27	31	28	4.8	23	13	4	6	3.7
Funafuti	485	68	102	315	7.4	224	31	36	157	7.8
Nukulaelae	52	16	20	16	4.8	4	4	0	0	2.3
Niulakita	5	4	0	1	3.2	4	1	2	1	4.3

SOURCE: 2017 Census

The average size of female-headed agriculture households (6.2 members) was slightly higher than the national average and above that of male-headed households (5.9 members). This was primarily due to the number of larger household sizes on Funafuti

where the average size of female-headed agriculture households was 7.8 members (Table 16). Niulakita was the only other island where the average household size was greater for female than male-headed agriculture households.

TABLE 17
Number of household members whose main activity is growing crops by gender, age and island: 2017

Island	Number of household members main activity growing crops	Males							Females						
		Total males	Age						Total females	Age					
			15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age		15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age
TUVALU	96	88	2	18	44	20	4	36.1	8	0	0	5	3	0	38.0
Nanumea	14	14	0	2	10	1	1	33.2	0	0	0	0	0	0	–
Nanumaga	7	7	0	2	2	2	1	39.7	0	0	0	0	0	0	–
Niutao	6	6	0	2	3	1	0	34.5	0	0	0	0	0	0	–
Nui	9	7	0	0	5	2	0	40.1	2	0	0	1	1	0	40.5
Vaitupu	11	9	0	1	8	0	0	33.4	2	0	0	0	2	0	47.5
Nukufetau	9	9	1	3	4	0	1	30.4	0	0	0	0	0	0	–
Funafuti	18	14	0	3	5	5	1	39.3	4	0	0	4	0	0	32.0
Nukulaelae	18	18	1	5	4	8	0	37.1	0	0	0	0	0	0	–
Niulakita	4	4	0	0	3	1	0	39.0	0	0	0	0	0	0	–

SOURCE: 2017 Census

TABLE 18
Number of household members whose main activity is raising livestock by gender, age and island: 2017

Island	Number of household members main activity raising livestock	Males							Females						
		Total males	Age						Total females	Age					
			15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age		15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age
TUVALU	60	54	5	10	17	17	5	40	6	1	0	4	1	0	34
Nanumea	6	6	2	1	2	1	0	31	0	0	0	0	0	0	–
Nanumaga	12	8	0	1	4	2	1	40	4	0	0	3	1	0	37
Niutao	1	1	0	0	0	1	0	54	0	0	0	0	0	0	–
Nui	0	0	0	0	0	0	0	–	0	0	0	0	0	0	–
Vaitupu	6	5	0	1	2	2	0	40	1	1	0	0	0	0	19
Nukufetau	4	4	0	2	0	1	1	41	0	0	0	0	0	0	–
Funafuti	7	6	0	2	2	2	0	36	1	0	0	1	0	0	39
Nukulaelae	21	21	3	3	5	7	3	42	0	0	0	0	0	0	–
Niulakita	3	3	0	0	2	1	0	40	0	0	0	0	0	0	–

SOURCE: 2017 Census

3.5 Main activity

3.5.1 Main activity – crop growing

The number of persons whose main activity was growing crops was estimated to be 96, with 88 (or 92 percent) of those being males and predominantly in the 25 to 44 year age group. Only eight females reported their main activity as growing crops, with half of these located in the capital, Funafuti (Table 17).

3.5.2 Main activity – livestock raising

A total of 60 household members indicated that their main activity was livestock raising, 54 male and 6 female. Nukulaelae and Nanumaga Islands accounted for over half (55 percent) of these livestock workers (Table 18).

3.5.3 Main activity – fishing

Of the 159 persons who indicated that their main activity was fishing, 105 (or 66 percent) were located in Funafuti, once again were predominantly male and 58 percent were in the 25 to 44 year age group (Table 19).

TABLE 19
Number of household members whose main activity is fishing by gender, age and island: 2017

Island	Number of household members main activity fishing	Males							Females						
		Total males	Age						Total females	Age					
			15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age		15 to 19	20 to 24	25 to 44	45 to 59	60 or more	Average age
TUVALU	159	144	4	14	83	42	1	37	15	1	3	10	1	0	30
Nanumea	9	7	0	1	4	2	0	40	2	0	1	1	0	0	28
Nanumaga	5	3	0	0	0	3	0	49	2	0	0	1	1	0	37
Niutao	4	3	0	0	2	1	0	44	1	0	0	1	0	0	31
Nui	10	9	0	1	2	6	0	45	1	0	0	1	0	0	36
Vaitupu	10	9	0	1	3	5	0	44	1	0	0	1	0	0	26
Nukufetau	2	0	0	0	0	0	0	-	2	0	1	1	0	0	27
Funafuti	105	99	4	9	67	18	1	34	6	1	1	4	0	0	29
Nukulaelae	14	14	0	2	5	7	0	40	0	0	0	0	0	0	-
Niulakita	0	0	0	0	0	0	0	-	0	0	0	0	0	0	-

SOURCE: 2017 Census

TABLE 20
Number and percentage change of households by agriculture income source and island: 2012 and 2017

Island	Total households		Agriculture income source											
			Handicraft sales			Fish sales			Livestock/animal sales			Crop sales		
	2012	2017	2012	2017	% change	2012	2017	% change	2012	2017	% change	2012	2017	% change
TUVALU	1 761	1 626	405	277	-31.6	162	108	-33.3	65	113	73.8	50	80	60.0
Nanumea	115	105	19	15	-21.1	8	8	0.0	1	5	400.0	1	5	400.0
Nanumaga	116	93	37	25	-32.4	9	9	0.0	2	3	50.0	0	1	0.0
Niutao	123	116	58	34	-41.4	10	9	-10.0	8	17	112.5	4	10	150.0
Nui	138	97	59	47	-20.3	28	5	-82.1	26	19	-26.9	25	9	-64.0
Vaitupu	226	187	17	14	-17.6	15	8	-46.7	1	6	500.0	0	8	0.0
Nukufetau	124	112	38	32	-15.8	20	27	35.0	10	33	230.0	3	13	333.3
Funafuti	845	849	163	97	-40.5	61	26	-57.4	13	23	76.9	14	24	71.4
Nukulaelae	67	57	12	13	8.3	10	16	60.0	4	7	75.0	2	9	350.0
Niulakita	7	10	2	0	-100.0	1	0	-100.0	0	0	0.0	1	1	0.0

SOURCE: 2012 and 2017 Censuses

3.6 Source of agriculture income

The 2017 Mini-Census also collected information on households' sources of income, including from the sale of crops, livestock/animals, fish or handicrafts. The most common source of agriculture income in 2017 was from the sale of handicrafts, with 17 percent of all households reporting this income source. Next was income from livestock/animal sales and fish sales, both reported by 7 percent of all households, and only 5 percent of households reported receiving income from crop sales (Table 20).

The number of households reporting income from livestock/animal or crop sales increased between 2012 and 2017 by 74 percent and 60 percent

respectively, while the number of households deriving income from handicrafts or fish sales declined in the same period by more than 30 percent.

Nukulaelae was the only island which reported increases in households deriving income from selling across all four sub-sectors between the two Censuses, while Nukufetau reported increases in households deriving income from all sub-sectors except handicrafts. All islands except Nui reported increases in households deriving income from livestock/animal or crop sales, while the number of Nui households deriving income from handicraft and fish sales decreased by 20 percent and 82 percent respectively.

CHAPTER 4

LIVESTOCK

Along with crop production, livestock raising is one of the most important agricultural activities in Tuvalu, playing a key role in supporting household livelihoods and providing income, particularly in rural areas. Households were defined as engaging in livestock raising if any member of the household was currently raising livestock at the time of the Census in November 2017. Similarly, livestock counts were defined as those animals that were currently owned by households at the time of the Census.

The 2017 Census agriculture questions recorded livestock numbers for pigs, chickens, ducks and goats. Counts of domestic animals such as dogs and cats were also included in the Census.

4.1 Households engaged in livestock raising

Of the total 1 626 households in Tuvalu reported in the 2017 Census, 1 362 households (84 percent) reported raising livestock. There were 1 242 households (76 percent) raising pigs, 682 (42 percent) raising chickens and 150 (9 percent) raising ducks (Figure 18). As was the case in the 2012 Census, no goats were reported in 2017. Almost 300 households reported owning one or more dogs and 540 households owned cat(s).

There were overall downward trends in the number of households raising each livestock type in 2017 compared with 2012, including a 13 percent decrease in households raising pigs, a 28 percent decrease

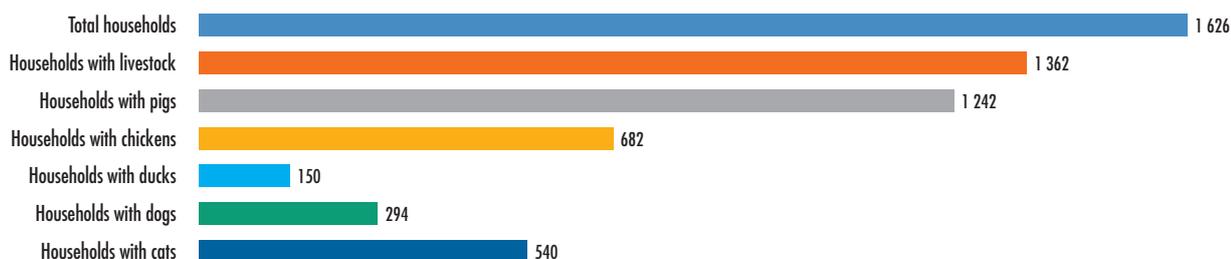
in chicken raising households and 44 percent less households raising ducks (Table 21).

Household reductions were recorded across every island and each livestock type. The only livestock household increases reported were a 5 percent increase in Niutao households raising ducks and a 28 percent increase in Nukufetau households owning cats.

Nui households reported a reduction of 31 percent in households raising pigs, with other significant decreases on Nanumaga (21 percent) and Vaitupu (17 percent). The reduction in households raising chickens was more dramatic, with four Islands (Nui, Nukufetau, Vaitupu and Funafuti) all recording decreases over 30 percent. In fact, the lowest reductions were still in excess of 10 percent, namely Niutao (11 percent) and Nanumea (13 percent).

The number of households raising ducks also saw a dramatic decrease of 44 percent nationally, with several of the nine (9) islands reporting reductions in excess of 66 percent between 2012 and 2017.

FIGURE 18
Number of households by type of livestock raised, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 21
Number and percent change of households raising livestock by livestock type and island: 2012 and 2017

Island	Number of households raising:								
	Pigs			Chickens			Ducks		
	2012	2017	% change	2012	2017	% change	2012	2017	% change
TUVALU	1 425	1 242	-13	944	682	-28	268	150	-44
Nanumea	101	89	-12	99	86	-13	11	10	-9
Nanumaga	101	80	-21	109	81	-26	61	40	-34
Niutao	107	97	-9	115	102	-11	75	79	5
Nui	130	90	-31	125	63	-50	24	2	-92
Vaitupu	208	173	-17	196	137	-30	26	5	-81
Nukufetau	111	97	-13	104	69	-34	3	1	-67
Funafuti	603	557	-8	133	93	-30	29	10	-66
Nukulaelae	57	52	-9	56	45	-20	34	3	-91
Niulakita	7	7	0	7	6	-14	5	0	-100

SOURCE: 2012 and 2017 Censuses

TABLE 22
Number and percent change of households with domestic animals by type and island: 2012 and 2017

Island	Number of households with:					
	Dogs			Cats		
	2012	2017	% change	2012	2017	% change
TUVALU	550	294	-47	713	540	-24
Nanumea	0	0	-	45	40	-11
Nanumaga	38	17	-55	54	36	-33
Niutao	63	43	-32	67	64	-4
Nui	26	11	-58	51	46	-10
Vaitupu	97	0	-100	113	83	-27
Nukufetau	29	13	-55	32	41	28
Funafuti	297	210	-29	325	224	-31
Nukulaelae	0	0	-	21	6	-71
Niulakita	0	0	-	5	0	-100

SOURCE: 2012 and 2017 Censuses

Decreases in households with domestic animals were also observed, with the number of dog owning households on the Outer Islands decreasing by 67 percent from 253 in 2012 to 84 in 2017 (Table 22). Four islands: Nanumea, Vaitupu, Nukulaelae and Niulakita reported having nil dogs in 2017, with Niulakita also reporting nil cats. Of the five (5) remaining islands reporting households with dogs, three (3) reported decreases of over half compared with 2012.

All islands, except Nukufetau, reported a drop in households owning cats, with four (4) reporting decreases in excess of 27 percent.

Funafuti, which recorded the highest number of households with dogs or cats in 2012 and again in 2017, reported a considerable reduction of 29 percent

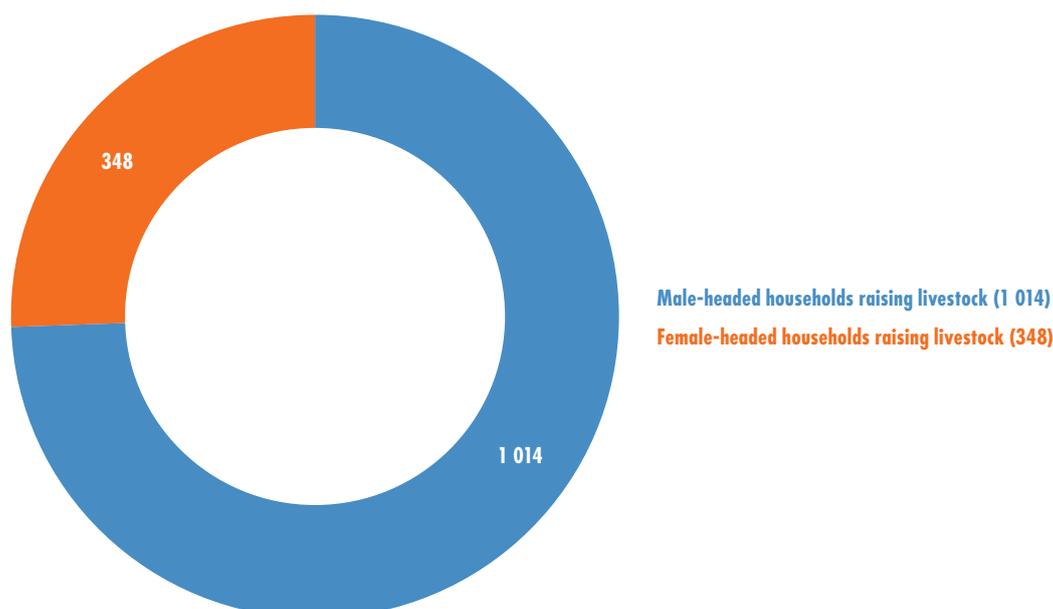
and 31 percent in dog and cat households respectively between 2012 and 2017. However, in 2017, Funafuti households still accounted for 71 percent of dog-owning households and 41 percent of cat-owning households nationally.

4.2 Livestock household gender characteristics

Of the households engaged in livestock raising, 74 percent were headed by men, with 26 percent headed by women (Figure 19). The islands reporting the highest proportion of male-headed households engaged in livestock raising were Nukulaelae (92 percent) and Nui (87 percent) while Niulakita (57 percent) and Funafuti (31 percent) reported the highest proportion of female-headed households raising livestock (Table 23 and Figure 20).

FIGURE 19

Number of households raising livestock by gender of household head, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 23

Number of households raising livestock by gender of household head and island: 2017

Island	Gender of household head					
	Total		Male		Female	
	Total households	Raising livestock	Total households	Raising livestock	Total households	Raising livestock
TUVALU	1 626	1 362	1 168	1 014	458	348
Nanumea	105	95	80	76	25	19
Nanumaga	93	87	75	70	18	17
Niutao	116	109	82	78	34	31
Nui	97	92	83	80	14	12
Vaitupu	187	173	138	130	49	43
Nukufetau	112	102	88	83	24	19
Funafuti	849	644	564	445	285	199
Nukulaelae	57	53	53	49	4	4
Niulakita	10	7	5	3	5	4

SOURCE: 2017 Census

4.3 Number of livestock

The census recorded a total 27 546 livestock and poultry (chickens and ducks) in Tuvalu in November 2017. This included 10 894 pigs, 15 443 chickens and 1 209 ducks (Table 24).

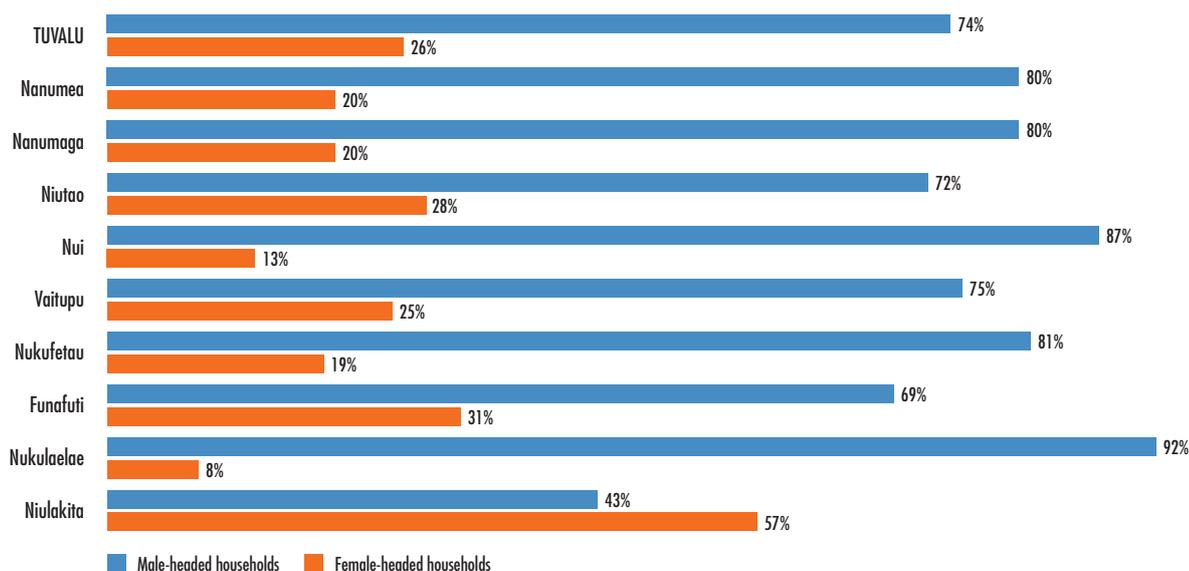
When compared with livestock counts reported in the previous 2012 Census, the number of pigs and poultry all declined. Poultry flock numbers

experienced the largest decline, with chicken numbers decreasing by 20 percent between 2012 and 2017, and duck numbers experiencing a decline of 34 percent (Figure 21). These reductions were reflective of the reduced number of poultry households reported in 2017.

The reduction in pig numbers nationally was less dramatic at 1 percent.

FIGURE 20

Percentage distribution of households raising livestock by gender of household head and island: 2017



SOURCE: 2017 Censuses

TABLE 24

Number of livestock/poultry raised by type and island: 2017

Island	Number of livestock/poultry raised		
	Pigs	Chickens	Ducks
TUVALU	10 894	15 443	1 209
Nanumea	1 552	1 619	50
Nanumaga	930	2 651	407
Niutao	795	2 824	637
Nui	941	1 263	4
Vaitupu	1 683	3 472	22
Nukufetau	690	959	4
Funafuti	3 772	1 735	56
Nukulaelae	490	813	29
Niulakita	41	107	0

SOURCE: 2017 Censuses

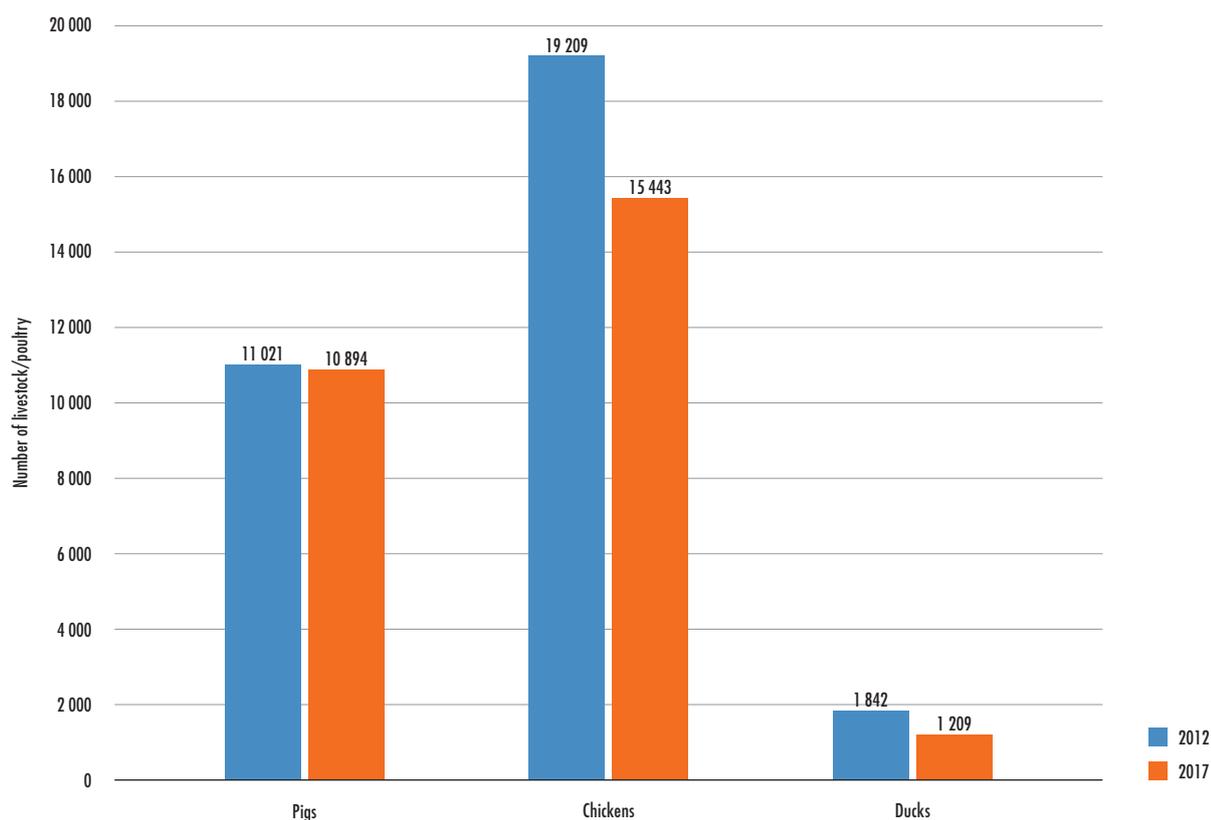
TABLE 25

Number of livestock households, livestock numbers and average livestock holdings by type of animal housing, Tuvalu: 2017

Type of Animal Housing	Households			Total livestock number			Average livestock number			Proportion of households (%)		
	Pigs	Chickens	Ducks	Pigs	Chickens	Ducks	Pigs	Chickens	Ducks	Pigs	Chickens	Ducks
Total	1 242	682	150	10 894	15 443	1 209	8.8	22.6	8.1	100.0	100.0	100.0
Modern	819	136	75	6 517	3,463	634	8.0	25.5	8.5	65.9	19.9	50.0
Local	218	49	18	2 141	1 415	132	9.8	28.9	7.3	17.6	7.2	12.0
Both	102	31	14	1 020	859	112	10.0	27.7	8.0	8.2	4.6	9.3
No housing	103	466	43	1 216	9,706	331	11.8	20.8	7.7	8.3	68.3	28.7

SOURCE: 2017 Censuses

FIGURE 21
Livestock and poultry numbers, Tuvalu: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

TABLE 26
Pig numbers by island: 2012 and 2017

Island	Number of livestock raised pigs		
	2012	2017	% Change
TUVALU	11 021	10 894	-1
Nanumea	1 907	1 552	-19
Nanumaga	929	930	0
Niutao	771	795	3
Nui	948	941	-1
Vaitupu	1 602	1 683	5
Nukufetau	590	690	17
Funafuti	3 937	3 772	-4
Nukulaelae	292	490	68
Niulakita	45	41	-9

SOURCE: 2012 and 2017 Censuses

Most of the pigs were penned, either in modern pens (60 percent) or locally constructed pens (20 percent) or both (9 percent) (Table 25). Just over eight (8) percent of households reported having no housing for the eleven (11) percent of pigs they owned. Those units with no pig housing owned an average of 11.8 pigs, higher than the national average of 8.8 pigs per household.

Almost 70 percent of households with chickens did not house their chickens in pens, allowing their poultry to free range. The less than 20 percent of households who reported keeping their chickens in modern housing had an average of 25.5 chickens, more than the national average of 22.6 chickens. Half of the 150 duck-owning households kept their average of 8.5 ducks in modern pens.

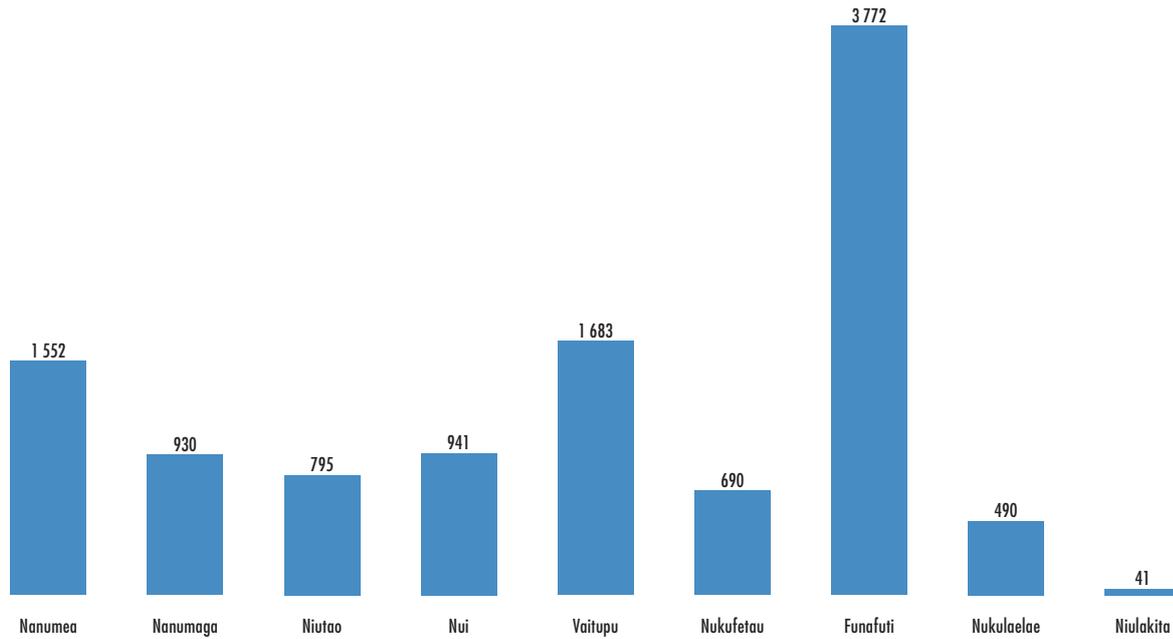
4.4 Pigs

4.4.1 Pig numbers

Pig numbers were largely steady between 2012 and 2017 on Nanumaga, Nui and Niutao, but fell across four islands, with the largest reduction reported on Nanumea (355 less pigs or 19 percent) and Funafuti (165 less pigs or 4 percent). These decreases were partially offset by increases in pig numbers on Nukulaelae (198 pig increase or 68 percent) and Nukufetau (100 pig increase or 17 percent) (Table 26).

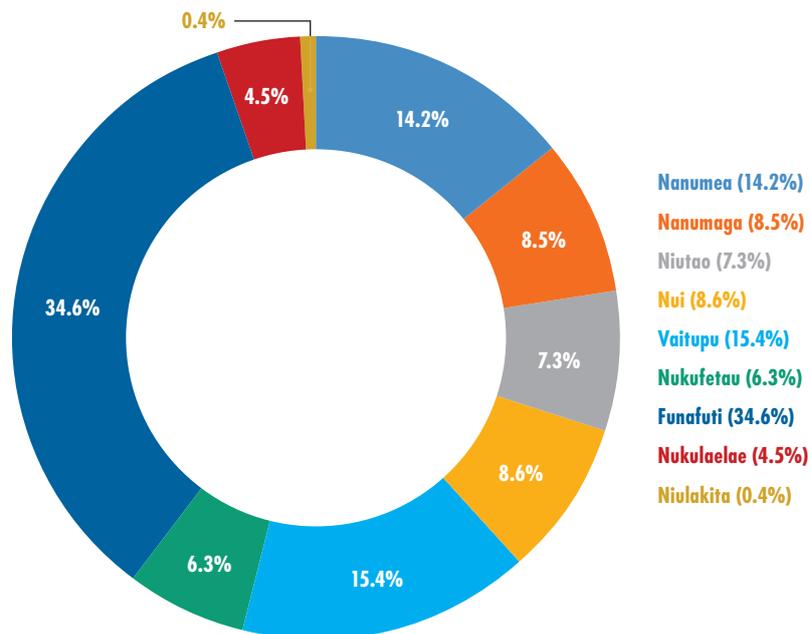
Funafuti continued to have the most pigs, with 3 772 or 35 percent of the nation's total, and together with Vaitupu (15 percent) accounted for half of the pigs in Tuvalu (Figures 22 and 23).

FIGURE 22
Pig numbers by island: 2017



SOURCE: 2017 Censuses

FIGURE 23
Percentage distribution of pigs by island: 2017



SOURCE: 2017 Census

While the total number of households with pigs and total pig numbers both decreased between 2012 and 2017, the average number of pigs per pig household rose slightly, from 7.7 head in 2012 to 8.8 head in 2017.

Nanumea households reported the highest average pig holdings of 17.4 pigs, double the national average of 8.8 pigs per household (Table 27). Almost half of

Nanumea households reported having more than 20 pigs, with over 20 percent owning between 30 and 49 pigs. The smallest (Niulakita) and largest (Funafuti) islands reported the lowest number of pigs per holding at 5.9 and 6.8 pigs respectively. This is not surprising, particularly on Funafuti, where population density and farming land availability limits both livestock and cropping activities on any large scale.

TABLE 27
Number of households raising pigs by size of pig holding and island, 2017

Island	Number of households raising pigs	Size of pig holding									Average pig holding*
		1	2	3 to 5	6 to 9	10 to 14	15 to 19	20 to 29	30 to 49	50 and over	
TUVALU	1 242	58	91	308	379	203	89	86	28	0	8.8
Nanumea	89	1	3	6	12	17	9	23	18	0	17.4
Nanumaga	80	1	4	10	23	20	9	8	5	0	11.6
Niutao	97	0	6	16	48	17	7	2	1	0	8.2
Nui	90	2	5	13	29	21	10	10	0	0	10.5
Vaitupu	173	11	9	38	48	30	14	19	4	0	9.7
Nukufetau	97	6	4	34	31	11	8	3	0	0	7.1
Funafuti	557	36	58	177	167	74	27	18	0	0	6.8
Nukulaelae	52	1	1	12	18	12	5	3	0	0	9.4
Niulakita	7	0	1	2	3	1	0	0	0	0	5.9

NOTE: * Average pig holding refers to the average for households raising pigs.

SOURCE: 2017 Census

TABLE 28
Number of households raising pigs by purpose and island: 2017

Island	Number of households raising pigs	Purpose of raising pigs				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	1 242	1 155	3	73	1	10
Nanumea	89	87	0	2	0	0
Nanumaga	80	78	0	2	0	0
Niutao	97	89	0	7	0	1
Nui	90	79	0	11	0	0
Vaitupu	173	166	0	6	0	1
Nukufetau	97	70	3	20	0	4
Funafuti	557	532	0	21	1	3
Nukulaelae	52	47	0	4	0	1
Niulakita	7	7	0	0	0	0

SOURCE: 2017 Census

4.4.2 Production Purpose

The vast majority (93 percent) of households with pigs reported home consumption (subsistence) as their main purpose for raising pigs. A further 6 percent of households indicated that while mainly for home consumption, the household also sold some of their pigs (Table 28). The Census responses indicated that there was no large scale commercialization of pig farming within Tuvalu.

4.4.3 Pig housing and waste disposal

Most pigs were penned, either in modern pens (819 of the 1 242 households with pigs – 66 percent), in locally constructed pens (18 percent) or both (8 percent) (Table 29 and Figure 24). A further 103 households (8 percent) of households reported no housing, presumably the pigs were tethered or allowed to free range. The units with no housing reported an average of just under 12 pigs per holding, above the average holding size of penned pigs.

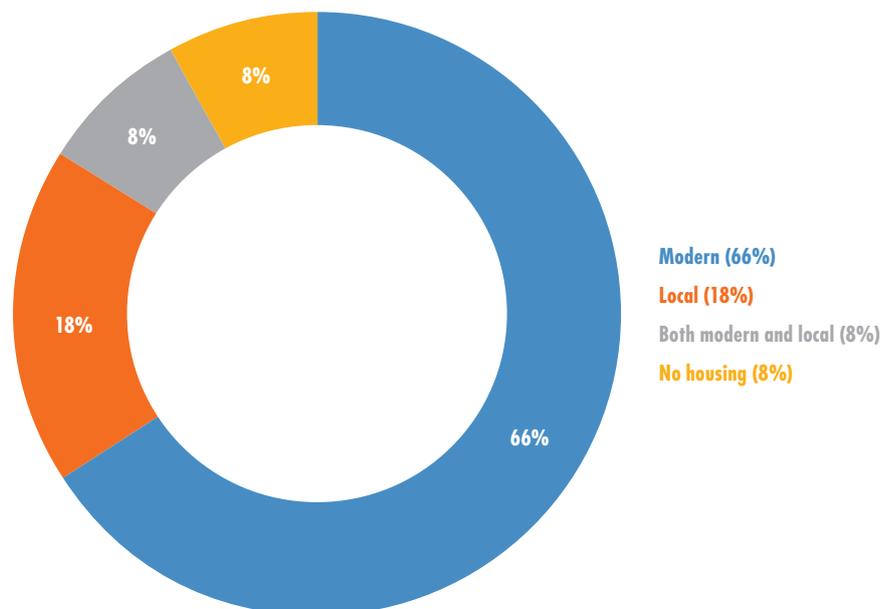
Households on most of the islands utilized modern pig pens, the exceptions being Nanumea and Vaitupu, where households mostly used local pens or had no pig housing.

TABLE 29
Number of households raising pigs by type of animal housing, waste disposal and island: 2017

Island	Number of households raising pigs	Type of animal housing				Type of animal waste disposal				
		Modern	Local	Both modern and local	No Housing	Pit	Septic tank	Open flush	Composting	Other
TUVALU	1 242	819	218	102	103	118	45	847	103	26
Nanumea	89	1	51	7	30	5	1	52	1	0
Nanumaga	80	40	9	25	6	2	0	33	14	25
Niutao	97	93	2	2	0	0	8	85	4	0
Nui	90	60	6	23	1	0	0	52	37	0
Vaitupu	173	17	84	7	65	38	3	54	12	1
Nukufetau	97	83	7	6	1	50	0	33	13	0
Funafuti	557	492	49	16	0	23	29	483	22	0
Nukulaelae	52	32	8	12	0	0	4	48	0	0
Niulakita	7	1	2	4	0	0	0	7	0	0

SOURCE: 2017 Census

FIGURE 24
Percentage distribution of households raising pigs by type of animal housing, Tuvalu: 2017



SOURCE: 2017 Census

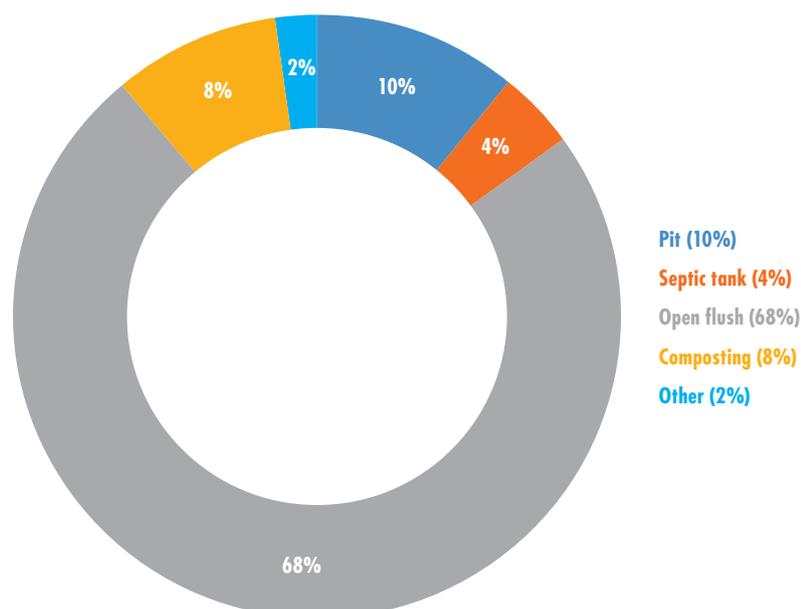
The majority of the households on each island used open flush to dispose of the pig waste, with some use of pits on Nukufetau, Vaitupu and Funafuti and septic tanks were also used in Funafuti (Table 29 and Figure 25). With most of the pig pens on Funafuti located around the banks of the Tafua pond, the borrowed pit pond and the Fakaifou settlement, the open flush method is most commonly used to flush animal waste into these ponds. Composting of animal waste was also reported across several islands, with over 40 percent of households on Nui adopting this method of pig waste management.

4.5 Chickens

4.5.1 Chicken Numbers

Chicken numbers decreased on all islands except Niutao (up 508 birds or 22 percent) and Nanumea (up 6 percent) between 2012 and 2017. The largest reduction in chicken numbers occurred in Funafuti where 1 095 less chickens were reported, a reduction of 39 percent since 2012. Other islands to experience significant reductions in flock numbers were Nui (954 less chickens or 43 percent), Vaitupu (almost 900 birds less or 20 percent) and Nukufetau which reported 671 less birds, a reduction of 41 percent where the flock decreased by 20 percent and almost 900 birds (Table 30).

FIGURE 25
Percentage distribution of households raising pigs by type of waste disposal, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 30
Chicken numbers by island: 2012 and 2017

Island	Number of livestock raised chickens		
	2012	2017	% Change
TUVALU	19 209	15 443	-20
Nanumea	1 527	1 619	6
Nanumaga	3 043	2 651	-13
Niutao	2 316	2 824	22
Nui	2 217	1 263	-43
Vaitupu	4 349	3 472	-20
Nukufetau	1 630	959	-41
Funafuti	2 830	1 735	-39
Nukulaelae	1 070	813	-24
Niulakita	227	107	-53

SOURCE: 2012 and 2017 Censuses

Households in Vaitupu, Niutao and Nanumaga accounted for almost 60 percent of the nation's chicken population in 2017 (Figures 26 and 27).

In term of productivity, the Census also reported the average number of poultry owned by households rearing each livestock type. It showed that the average number of chickens owned by households with poultry was 22.6 birds, an almost 40 percent increase on the 16.3 bird average reported in 2012.

This would indicate that while there was a significant reduction in households with chickens between 2012 and 2017, those households that did own poultry in 2017 had, on average, larger flock sizes.

A significant number of households in Vaitupu, Niutao and Nanumaga reported owning more than 30 chickens and the largest average holdings, of between 25.3 and 32.7 birds per household (Table 31). Nukufetau and Niulakita reported the lowest average chicken holdings of 13.9 and 17.8 birds respectively, well below the national average of 22.6 birds.

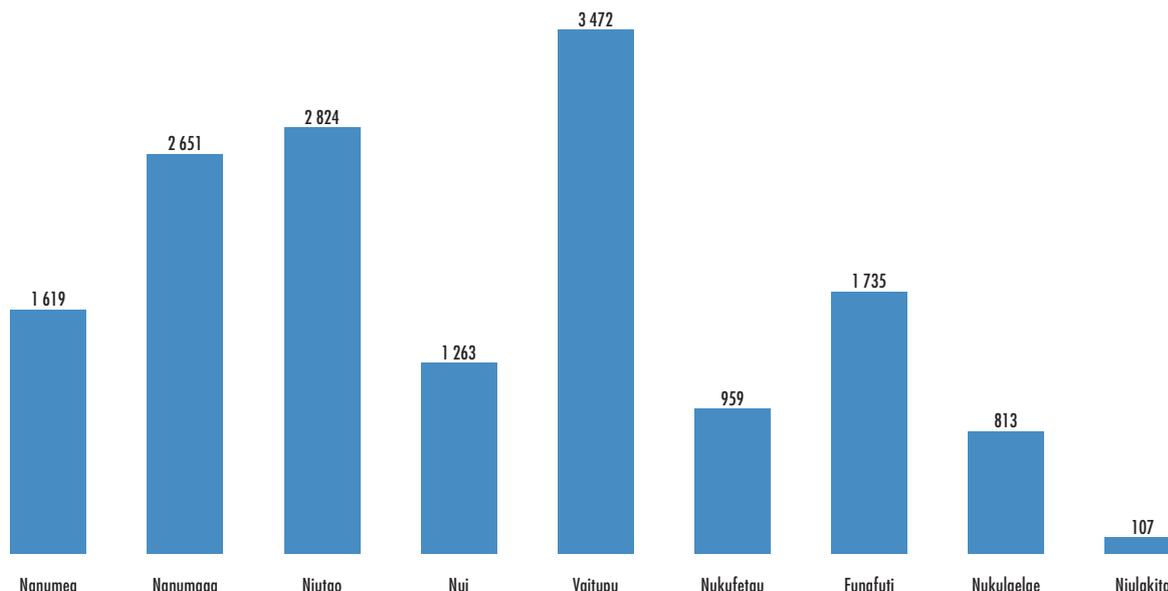
4.5.2 Production Purpose

As was the case with pig households, the majority (91 percent) of households with chickens reported home consumption (subsistence) as their main purpose (or reason) for raising chickens. A further 8 percent of households indicated that while mainly raising chickens for home consumption, the household also sold some (Table 32). Less than 1 percent of households indicated that their main reason for raising chickens was to sell them. This would confirm that there was no large scale commercialization of chicken farming within Tuvalu.

4.5.3 Chicken housing and waste disposal

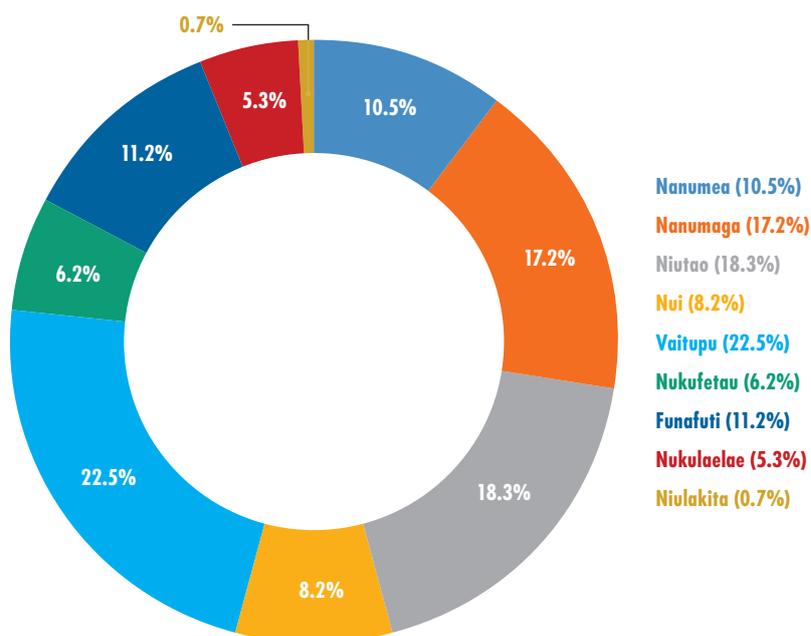
Over two-thirds (68 percent) of households with chickens reported that their flocks had no housing, with only 25 percent having either modern housing or a combination of modern and local housing for their flock. The remaining 7 percent of households had local housing only (Table 33 and Figure 28).

FIGURE 26
Chicken numbers by island: 2017



SOURCE: 2017 Censuses

FIGURE 27
Percentage distribution of chickens by island: 2017



SOURCE: 2017 Census

Niutao reported the highest proportion (72 percent) of households with modern chicken housing, with the next highest being Nukulaelae with 24 percent, followed by Nanumaga and Funafuti, both 22 percent. None of the 69 households with chickens on Nukufetau reported any modern bird pens.

Not all households responded to the chicken waste disposal question, most likely because their flocks are free range and the household therefore has no specific method of waste disposal. Of those households that did respond, more than three-quarters employed open flush waste disposal, 6 percent disposed waste into a pit and 5 percent into a septic tank (Figure 29).

TABLE 31
Number of households raising chickens by size of chicken holding and island, 2017

Island	Number of households raising chickens	Size of chicken holding									Average chicken holding*
		1	2	3 to 5	6 to 9	10 to 14	15 to 19	20 to 29	30 to 49	50 and over	
TUVALU	682	13	16	58	55	82	75	153	167	63	22.6
Nanumea	86	1	3	10	8	12	16	20	12	4	18.8
Nanumaga	81	1	1	0	2	7	1	13	41	15	32.7
Niutao	102	0	0	2	2	10	9	32	35	12	27.7
Nui	63	3	2	7	5	10	7	15	8	6	20.0
Vaitupu	137	2	4	3	6	5	23	36	48	10	25.3
Nukufetau	69	3	2	15	11	11	7	12	5	3	13.9
Funafuti	93	3	3	14	15	15	6	15	12	10	18.7
Nukulaelae	45	0	1	7	6	10	5	7	6	3	18.1
Niulakita	6	0	0	0	0	2	1	3	0	0	17.8

NOTE: * Average local chicken holding refers to the average for households raising chickens.

SOURCE: 2017 Census

TABLE 32
Number of households raising chickens by purpose and island: 2017

Island	Number of households raising chickens	Purpose of raising chickens				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	682	619	2	55	4	2
Nanumea	86	82	0	3	1	0
Nanumaga	81	79	0	2	0	0
Niutao	102	84	0	17	0	1
Nui	63	52	0	9	2	0
Vaitupu	137	135	0	2	0	0
Nukufetau	69	50	1	18	0	0
Funafuti	93	90	1	1	0	1
Nukulaelae	45	41	0	3	1	0
Niulakita	6	6	0	0	0	0

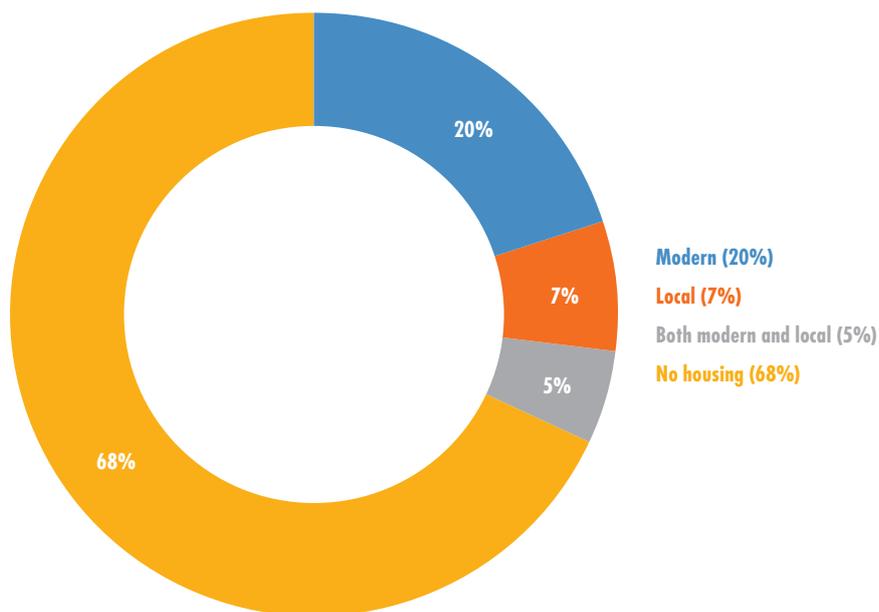
SOURCE: 2017 Census

TABLE 33
Number of households raising chickens by type of bird housing, waste disposal and island: 2017

Island	Number of households raising chickens	Type of bird housing				Type of bird waste disposal				
		Modern	Local	Both modern and local	No Housing	Pit	Septic tank	Open flush	Composting	Other
TUVALU	682	136	49	31	466	13	2	166	11	24
Nanumea	86	6	17	1	62	2	0	21	1	0
Nanumaga	81	18	9	20	34	3	0	22	0	22
Niutao	102	73	3	2	24	0	2	73	3	0
Nui	63	3	0	5	55	0	0	7	1	0
Vaitupu	137	4	8	0	125	7	0	4	0	1
Nukufetau	69	0	2	0	67	0	0	1	1	0
Funafuti	93	20	6	1	66	1	0	20	5	1
Nukulaelae	45	11	4	2	28	0	0	17	0	0
Niulakita	6	1	0	0	5	0	0	1	0	0

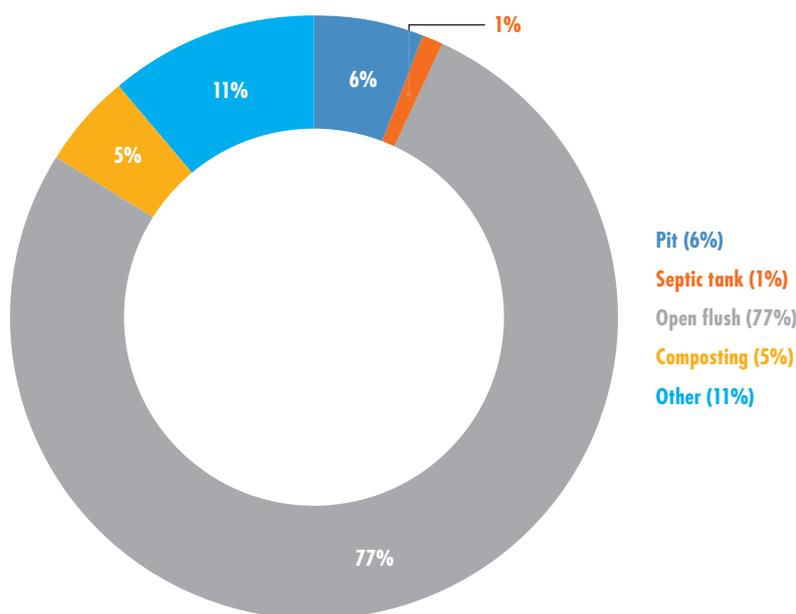
SOURCE: 2017 Census

FIGURE 28
Percentage distribution of households raising chickens by type of bird housing, Tuvalu: 2017



SOURCE: 2017 Census

FIGURE 29
Percentage distribution of households raising chickens by type of waste disposal, Tuvalu: 2017



SOURCE: 2017 Census

4.6 Ducks

4.6.1 Duck Numbers

The estimated duck population in 2017 was 1 209 compared with 1 842 five years earlier, a decrease of 34 percent (Table 34). Decreases were observed on all islands except Niutao (increase of 101 birds or 19 percent). Niulakita households reported nil ducks

in 2017 while other islands to experience significant flock reductions were Nui (down 96 percent), Vaitupu (89 percent) and Nukulaelae (87 percent).

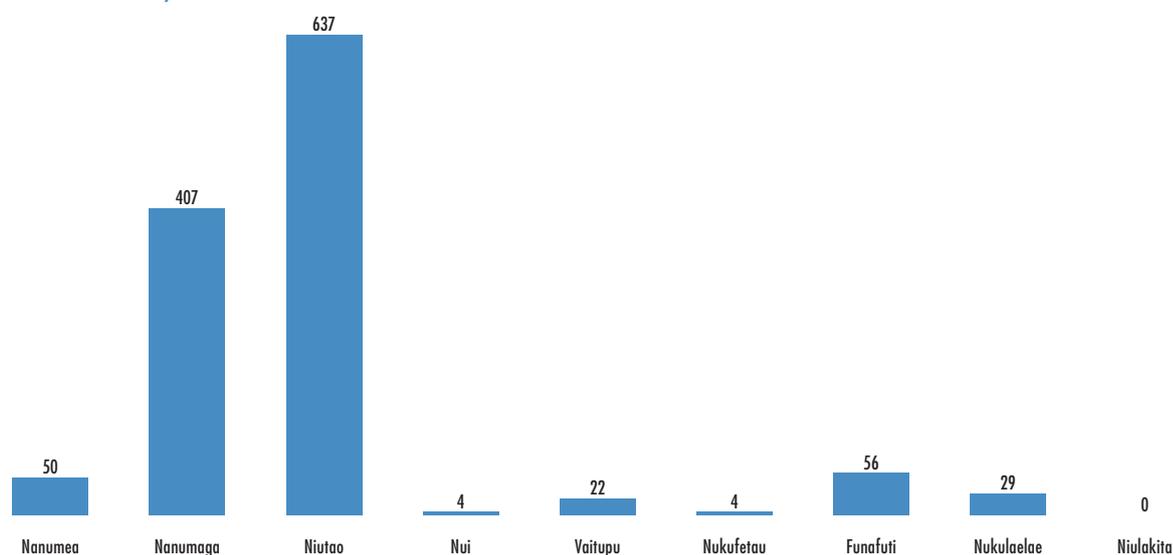
As was the case in 2012, Niutao and Nanumaga households again owned the largest number of ducks in 2017, comprising over 86 percent of total duck numbers across Tuvalu, up from 55 percent in 2012 (Figures 30 and 31). All of the remaining seven (7) islands reported totals of less than 60 ducks each.

TABLE 34
Duck numbers by island: 2012 and 2017

Island	Number of livestock raised ducks		
	2012	2017	% Change
TUVALU	1 842	1 209	-34
Nanumea	83	50	-40
Nanumaga	471	407	-14
Niutao	536	637	19
Nui	98	4	-96
Vaitupu	193	22	-89
Nukufetau	11	4	-64
Funafuti	158	56	-65
Nukulaelae	225	29	-87
Niulakita	67	0	-100

SOURCE: 2012 and 2017 Censuses

FIGURE 30
Duck numbers by island: 2017



SOURCE: 2017 Censuses

Only 150 households or 9 percent of total households reported owning at least one duck in 2017 (Table 35). The average duck numbers per household was 8.1, this compared with 7.7 ducks per household in 2012. Nanumaga households had average holdings of 10.2 ducks while Niutao households had 8.1 ducks. Of the 76 households who reported owning ten (10) or more ducks, over 90 percent were located on either Niutao or Nanumaga.

4.6.2 Production Purpose

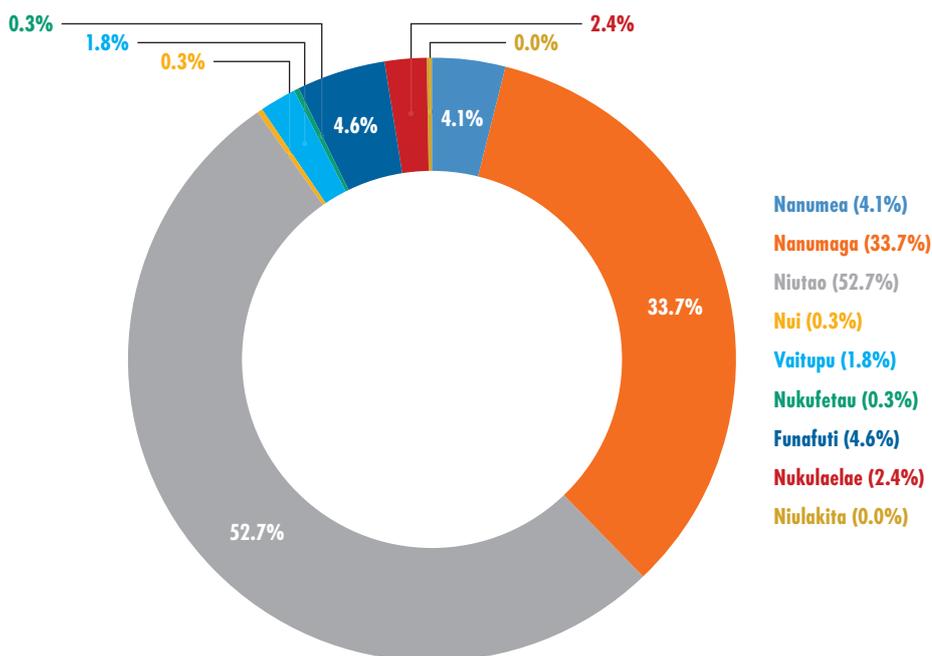
As was the case with pig and chicken households, the majority (91 percent) of households with ducks reported home consumption (subsistence) as their main purpose for raising ducks. A further 7 percent of

households indicated that while mainly raising ducks for home consumption, the household also sold some (Table 36). Only 1 household reported raising ducks mainly for sale. There is no large scale commercialization of duck farming within Tuvalu.

4.6.3 Duck housing and waste disposal

Households with ducks reported that over 70 percent utilized some form of pen for housing their ducks, with the most common being modern pens (50 percent), followed by local pens (12 percent) and households with a combination of modern and local pens (9 percent) (Table 37 and Figure 32). The remaining 29 percent of households raising ducks did not provide any housing for their ducks.

FIGURE 31
Percentage distribution of ducks by island: 2017



SOURCE: 2017 Census

TABLE 35
Number of households raising ducks by size of duck holding and island: 2017

Island	Number of households raising ducks	Size of duck holding							Average duck holding*
		1	2	3 to 5	6 to 9	10 to 14	15 to 19	20 and over	
TUVALU	150	7	6	37	24	71	0	5	8.1
Nanumea	10	2	0	4	2	2	0	0	5.0
Nanumaga	40	0	1	9	8	17	0	5	10.2
Niutao	79	2	2	17	11	47	0	0	8.1
Nui	2	1	0	1	0	0	0	0	2.0
Vaitupu	5	1	1	2	0	1	0	0	4.4
Nukufetau	1	0	0	1	0	0	0	0	4.0
Funafuti	10	1	2	3	1	3	0	0	5.6
Nukulaelae	3	0	0	0	2	1	0	0	9.7
Niulakita	0	0	0	0	0	0	0	0	0.0

NOTE: * Average local duck holding refers to the average for households raising ducks.

SOURCE: 2017 Census

Consistent with the number of households using pen housing for their ducks, the open flush method was the most commonly used method of waste disposal, adopted by 76 percent of households with ducks (Figure 33). ‘Other’ was the next common method reported by 14 percent of households, reflective of those households allowing their ducks to range freely and therefore no formal method of waste disposal is used. There was minimal use of pits or composting waste disposal by households with ducks.

4.7 Domestic Animals

4.7.1 Dog Numbers

Decreases in households with domestic animals were also observed between 2012 and 2017. Nationally, dog numbers almost halved between 2012 and 2017. Funafuti, which recorded the highest number of dogs in 2012 and again in 2017, reported a reduction of 35 percent in dog numbers between 2012 and 2017 (Table 38).

TABLE 36
Number of households raising ducks by purpose and island: 2017

Island	Number of households raising ducks	Purpose of raising ducks				
		Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	150	137	0	11	1	1
Nanumea	10	9	0	0	1	0
Nanumaga	40	39	0	1	0	0
Niutao	79	68	0	10	0	1
Nui	2	2	0	0	0	0
Vaitupu	5	5	0	0	0	0
Nukufetau	1	1	0	0	0	0
Funafuti	10	10	0	0	0	0
Nukulaelae	3	3	0	0	0	0
Niulakita	0	0	0	0	0	0

SOURCE: 2017 Census

TABLE 37
Number of households raising ducks by type of bird housing, waste disposal and island: 2017

Island	Number of households raising ducks	Type of bird housing				Type of bird waste disposal				
		Modern	Local	Both modern and local	No Housing	Pit	Septic tank	Open flush	Composting	Other
TUVALU	150	75	18	14	43	5	1	81	5	15
Nanumea	10	0	4	0	6	1	0	3	0	0
Nanumaga	40	14	3	11	12	2	0	11	0	15
Niutao	79	56	5	3	15	0	1	60	3	0
Nui	2	0	0	0	2	0	0	0	0	0
Vaitupu	5	1	2	0	2	2	0	0	1	0
Nukufetau	1	0	0	0	1	0	0	0	0	0
Funafuti	10	3	4	0	3	0	0	6	1	0
Nukulaelae	3	1	0	0	2	0	0	1	0	0
Niulakita	0	0	0	0	0	0	0	0	0	0

SOURCE: 2017 Census

In 2017, Funafuti households still accounted for 289 dogs, or 74 percent of dogs nationally (Figures 34 and 35). The number of dogs on the Outer Islands also decreased significantly (by 68 percent) from 317 in 2012 to 102 in 2017. Four islands: Nanumea, Vaitupu, Nukulaelae and Niulakita reported having nil dogs in 2017, and a further three (3) islands reported decreases of more than 50 percent compared with 2012.

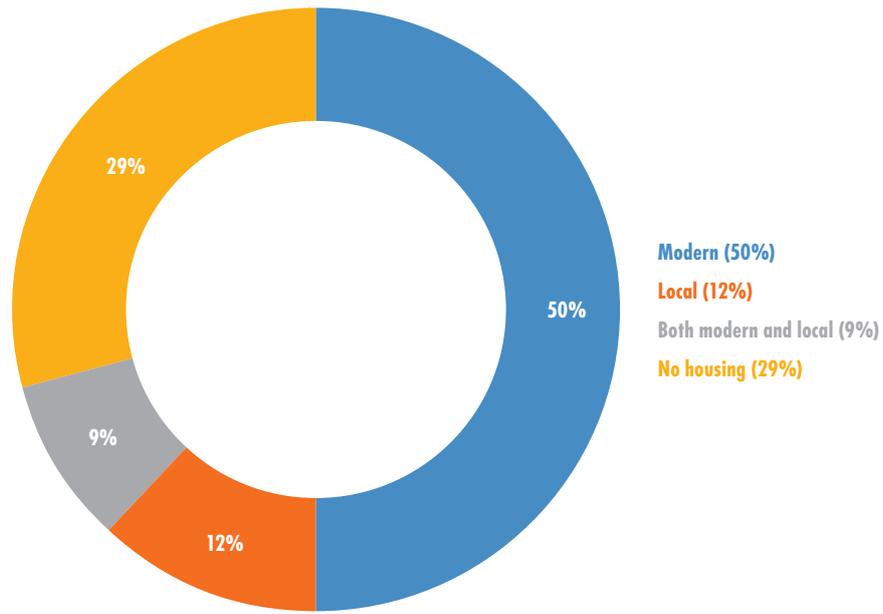
4.7.2 Cat Numbers

Decreases in households with domestic animals were also observed, with the number of cats decreasing by 21 percent between 2012 and 2017.

Large decreases were reported on the Outer Islands of Niulakita (100 percent reduction), Nukulaelae (71 percent) and Nanumaga (37 percent) and were offset by a substantial increase in Nukufetau (74 percent) and minor increases on Niutao and Nui (Table 39).

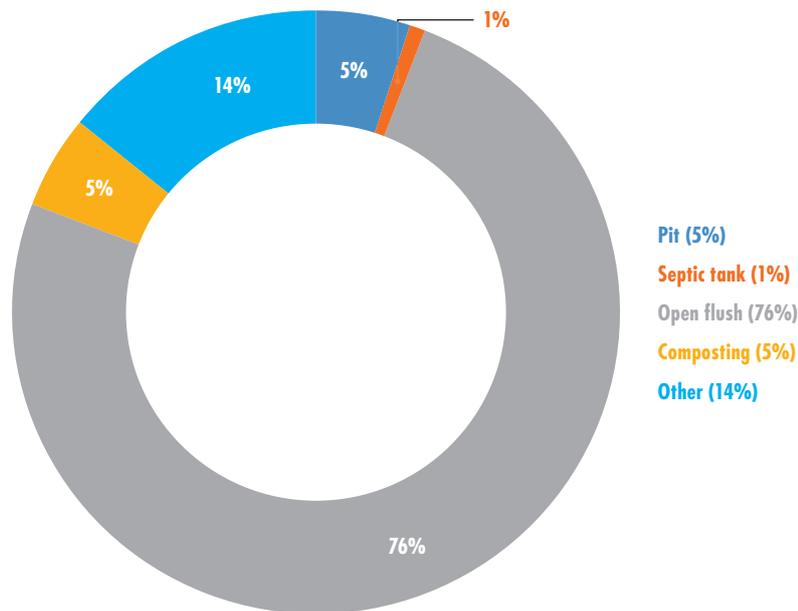
Niulakita was the only island to report nil cats in 2017. Funafuti, which also recorded the highest number of households with cats in 2012 and again in 2017, reported a reduction of 33 percent in cat numbers between 2012 and 2017. In 2017, Funafuti households still accounted for 37 percent of cat numbers nationally (Figures 36 and 37).

FIGURE 32
Percentage distribution of households raising ducks by type of bird housing, Tuvalu: 2017



SOURCE: 2017 Census

FIGURE 33
Percentage distribution of households raising ducks by type of waste disposal, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 38
Dog numbers by island: 2012 and 2017

Island	Number of owned dogs		
	2012	2017	% Change
TUVALU	761	391	-49
Nanumea	0	0	0
Nanumaga	47	20	-57
Niutao	77	57	-26
Nui	32	11	-66
Vaitupu	125	0	-100
Nukufetau	36	14	-61
Funafuti	444	289	-35
Nukulaelae	0	0	0
Niulakita	0	0	0

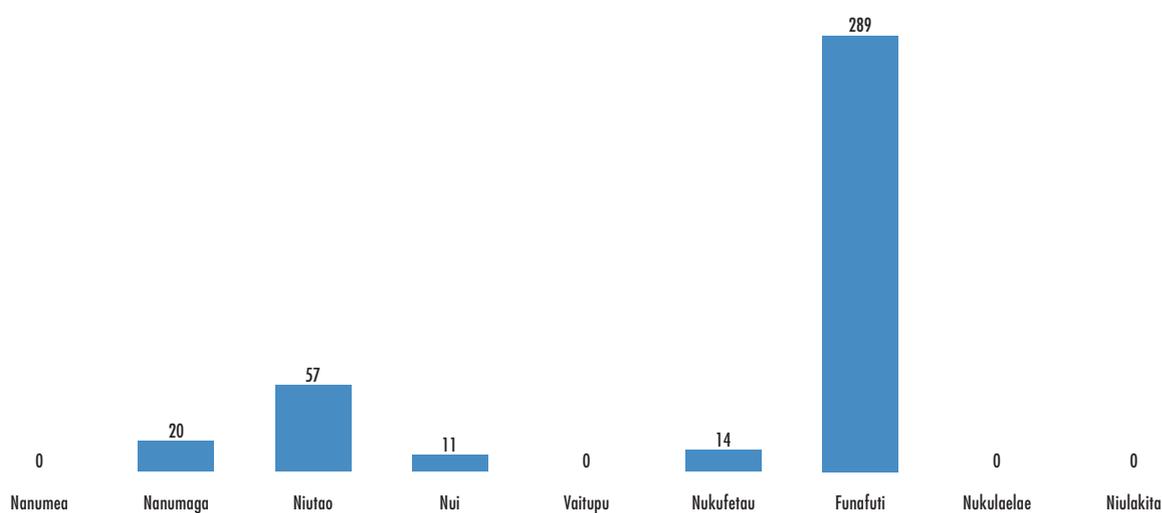
SOURCE: 2012 and 2017 Censuses

TABLE 39
Cat numbers by island: 2012 and 2017

Island	Number of owned cats		
	2012	2017	% Change
TUVALU	1 534	1 206	-21
Nanumea	125	101	-19
Nanumaga	131	83	-37
Niutao	145	157	8
Nui	113	117	4
Vaitupu	219	210	-4
Nukufetau	47	82	74
Funafuti	661	444	-33
Nukulaelae	41	12	-71
Niulakita	52	0	-100

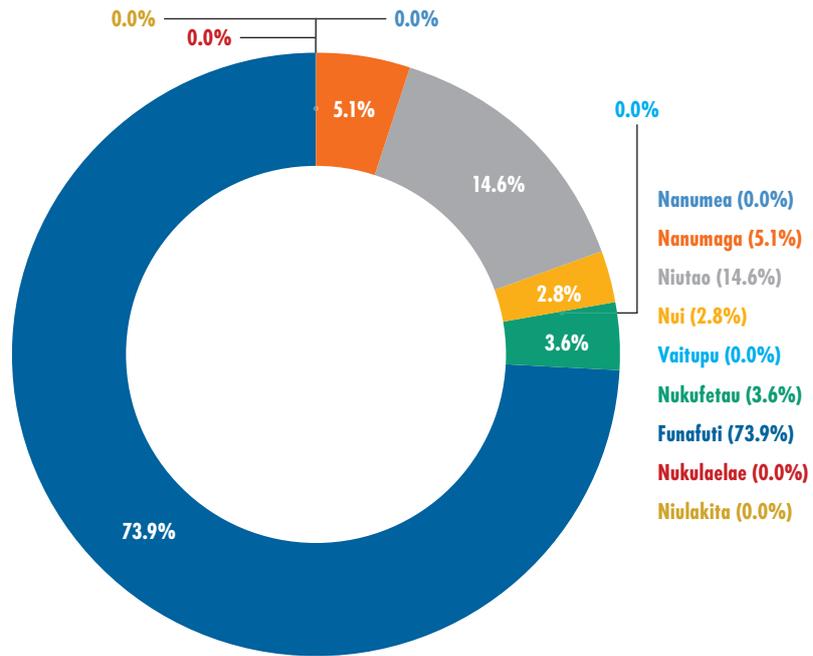
SOURCE: 2012 and 2017 Censuses

FIGURE 34
Dog numbers by island: 2017



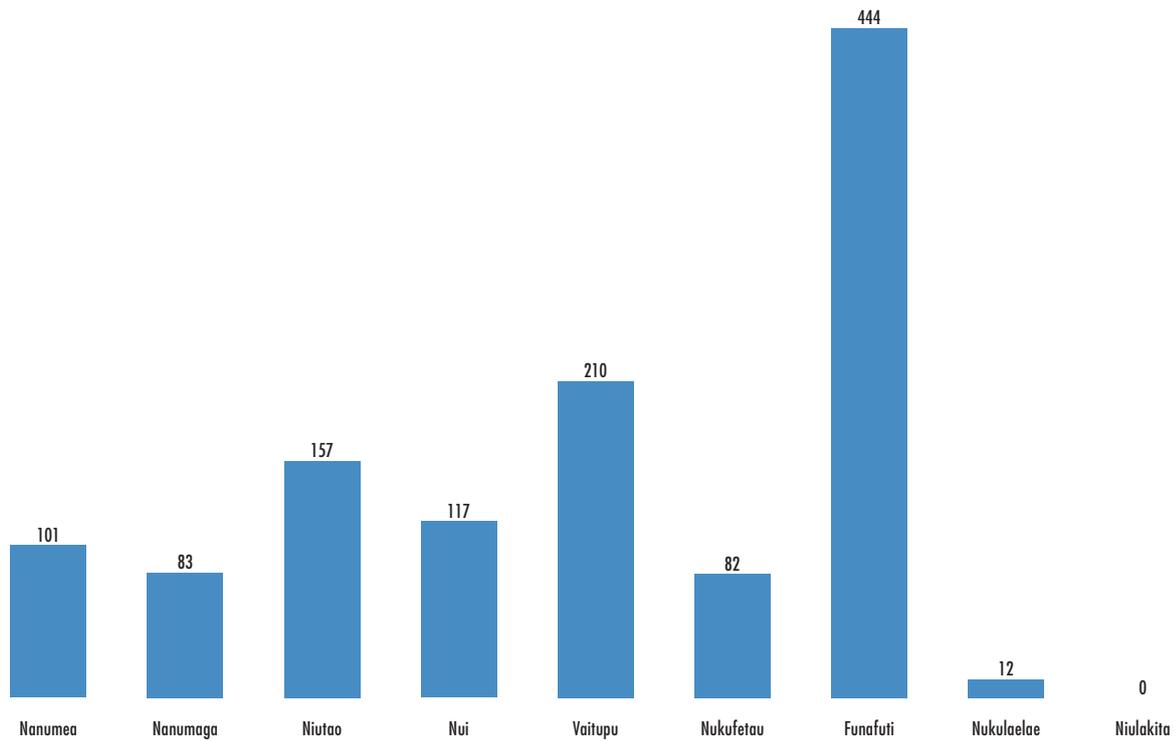
SOURCE: 2017 Censuses

FIGURE 35
Percentage distribution of dogs by island: 2017



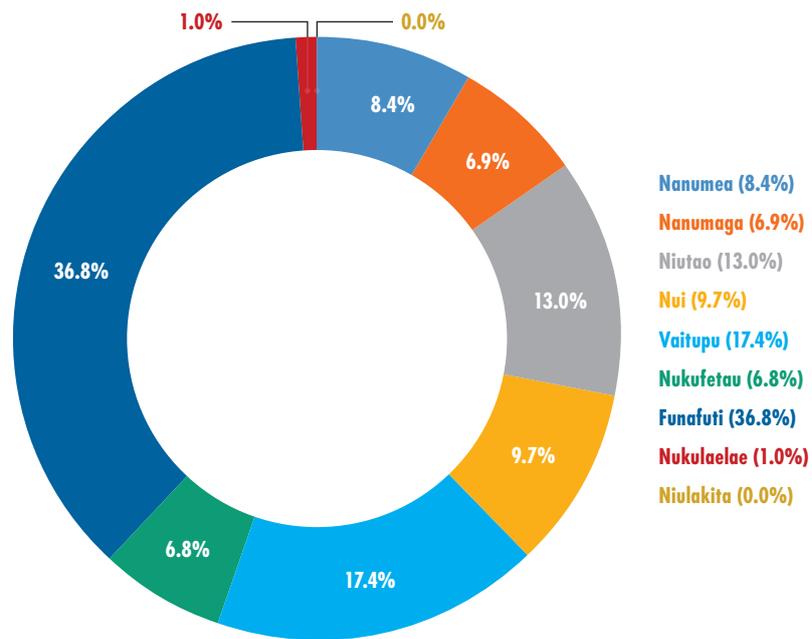
SOURCE: 2017 Census

FIGURE 36
Cat numbers by island: 2017



SOURCE: 2017 Censuses

FIGURE 37
Percentage distribution of cats by island: 2017



SOURCE: 2017 Census



CHAPTER 5

CROPS

Agricultural production mainly revolves around subsistence, with some cash production mostly for the domestic market. Tuvalu’s small land area and unproductive soils limit the opportunities for export diversification. Crop production has primarily been carried out for subsistence, and comprised coconut, pulaka, breadfruit, pandanus, banana and more recently, taro, sweet potatoes and pawpaw.

Along with livestock raising, producing crops is another extremely important agricultural activity undertaken by many households in Tuvalu. Crops, both traditional and introduced, grown or harvested during the 12 months prior to the 2017 census day were all enumerated.

The purpose of this section is to analyze the type of crops grown by each household, the purpose of their cultivation, frequency of harvest, comparisons with cropping data collected in the 2012 Census and the identification of any trends.

5.1 Households engaged in crop production

The 2017 Mini-Census estimated that 1 121 households were engaged in some form in crop production across the country. This represented 69 percent of all households in Tuvalu. However, crop growing households were much more predominant on the Outer Islands, where 92 percent

of all households reported growing crops, compared with 48 percent of households in the capital, Funafuti (Table 40).

The five (5) most commonly grown crops in 2017 were bananas (grown by 776 households or 48 percent), coconuts (694 households or 43 percent), pawpaw (624 households or 38 percent), breadfruit (540 households or 33 percent) and pandanus (394 households or 24 percent) (Figure 38).

As expected, Funafuti, with almost 40 percent of the country’s crop-growing households, headed the list of the most growers of a number of crop type. This was particularly evident for the smaller leafy vegetables including cabbage, bell pepper, chili pepper, cucumber and lettuce, where Funafuti households made up more than half of the growers. Less popular vegetables with Funafuti households were root crops such as sweet potato, swamp taro, taro and felo, possibly due to a lack of suitable cropping area (Table 41).

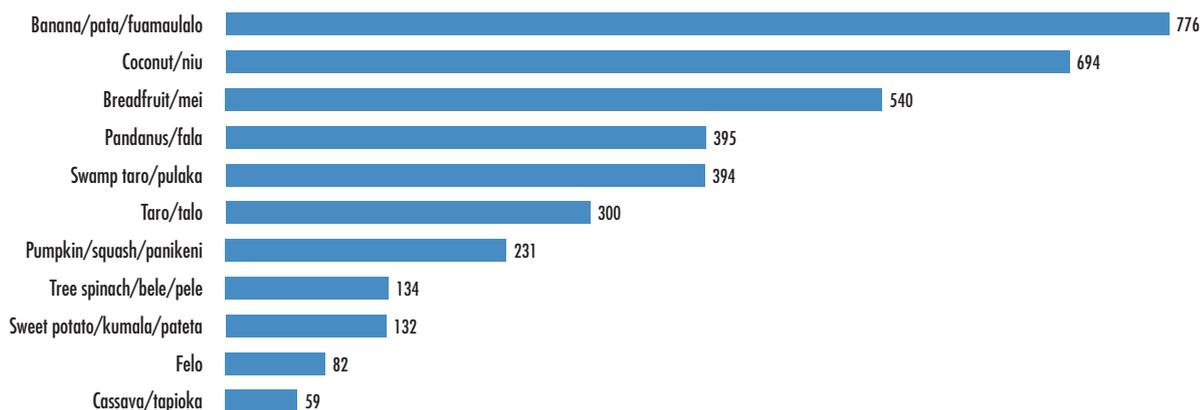
TABLE 40
Number of households growing crops by island: 2017

Island	Number of households	Number of agricultural households	Households growing crops	Percentage of crop growing households
TUVALU	1 626	1 464	1 121	69
Nanumea	105	102	97	92
Nanumaga	93	89	88	95
Niutao	116	115	112	97
Nui	97	97	97	100
Vaitupu	187	178	151	81
Nukufetau	112	109	107	96
Funafuti	849	709	409	48
Nukulaelae	57	56	52	91
Niulakita	10	9	8	80

SOURCE: 2017 Census

FIGURE 38

Number of households by type of main crop grown and island: 2017



SOURCE: 2017 Census

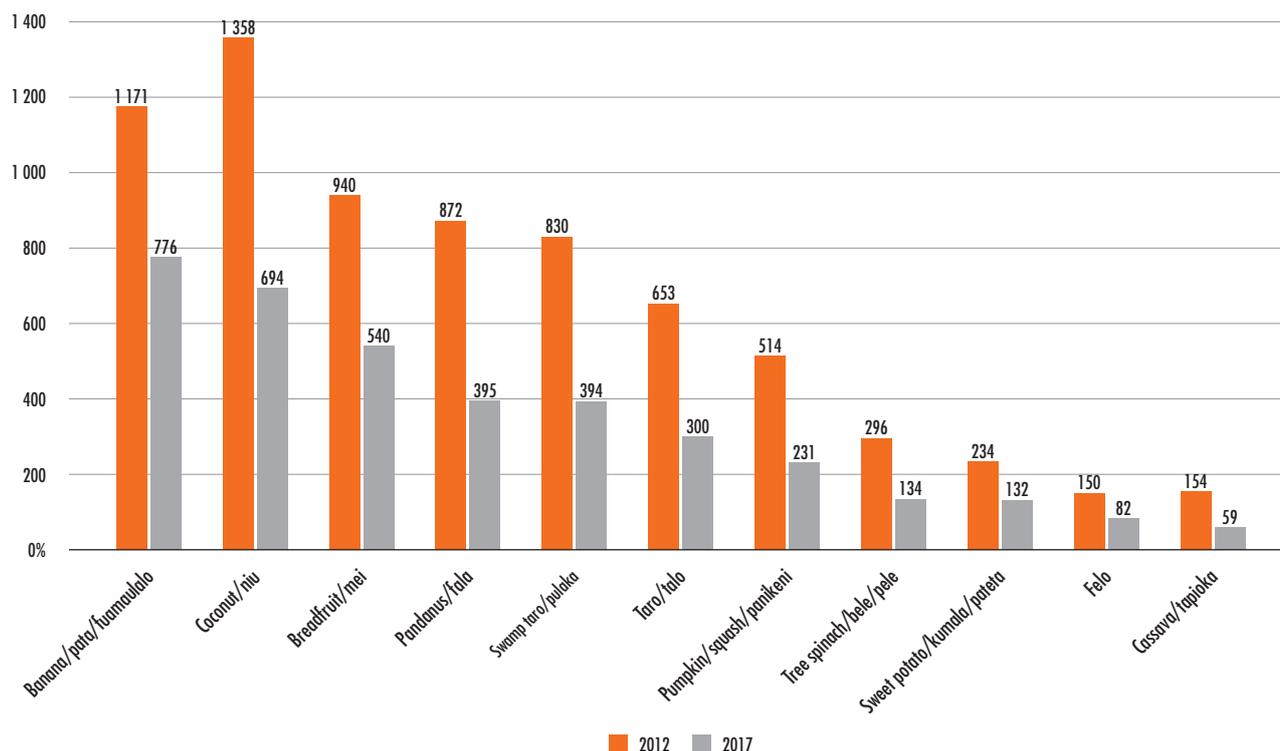
TABLE 41

Number of households by type of crop grown and island: 2017

Crop	Number of households growing crop									
	Total	Nanumea	Nanumaga	Niutao	Nui	Vaitupu	Nukufetau	Funafuti	Nukulaelae	Niulakita
Total	1 121	97	88	112	97	151	107	409	52	8
Beans (string, long, green, star)/piini	11	0	0	2	1	0	5	3	0	0
Tree spinach/bele/pele	134	9	2	9	14	7	29	62	1	1
Bell pepper/capsicum/pepa	68	5	1	0	7	6	9	34	6	0
Cabbage/kapisi saina	201	11	3	8	7	15	24	113	18	2
Chili pepper/tili	59	3	1	2	3	4	5	37	4	0
Corn/koni	3	0	0	0	0	0	0	2	0	1
Cucumber/kukama	163	7	1	8	12	14	21	82	16	2
Egg plant/paigani	9	1	0	0	2	0	0	4	0	2
Lettuce/letisi	19	1	0	0	1	2	2	12	0	1
Spring/green onion/aniani	4	0	0	0	0	1	1	2	0	0
Tomato	106	2	1	2	7	15	15	53	10	1
Melons (water, rock)/meleni	30	1	0	3	5	5	2	7	5	2
Pumpkin/squash/panikeni	231	16	7	43	40	8	46	54	15	2
Banana/pata/fuamaulalo	776	66	68	83	77	91	95	263	28	5
Breadfruit/mei	540	55	41	90	60	58	91	110	30	5
Coconut/niu	694	71	61	97	94	64	104	159	38	6
Pandanus/fala	395	59	34	40	76	43	62	66	13	2
Pawpaw/olesi	624	58	59	64	81	62	94	184	20	2
Sweet potato/kumala/pateta	132	4	33	25	11	6	15	16	22	0
Swamp taro/pulaka	394	50	62	23	75	51	91	11	31	0
Taro/talo	300	40	57	17	70	57	29	20	10	0
Cassava/tapioka	59	5	18	6	8	4	1	12	4	1
Felo	82	0	5	10	44	3	13	7	0	0
Gie	26	0	0	1	23	0	2	0	0	0
Laukatafa	30	0	0	0	2	0	28	0	0	0
Tiale	190	14	9	21	55	45	12	32	1	1
Toddy	437	50	50	27	68	85	78	31	40	8
Other	33	3	2	0	16	0	4	8	0	0

SOURCE: 2017 Census

FIGURE 39
Number of households by type of main crop grown, Tuvalu: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

Fruit crops, including banana, breadfruit, coconut, pandanus and pawpaw were generally popular amongst most households on the outer islands, as were the abovementioned root crops. Also, collecting toddy was an important activity on most islands, with over 50 percent of outer island households collecting this liquid. This was particularly evident on Niulakita, Nukulaelae and Nukufetau where 100 percent, 77 percent and 73 percent of households respectively collected toddy on a regular basis.

The least grown crops were corn, spring or green onions, egg plant, beans and lettuce, with less than twenty (20) households growing these nationally.

What was most evident from the 2017 Census data was the significant reduction in households growing crops compared with estimates from the 2012 Census. While the total number of households across Tuvalu decreased by 7.7 percent between 2012 and 2017 from 1 761 to 1 626, the actual number of households growing the traditional main crops decreased between 33 percent and 62 percent for each crop type (Figure 39 and Table 42).

Nationally, the number of households growing coconuts decreased by almost half, with the largest reductions in Funafuti (down 72 percent), Vaitupu (down 66 percent) and Nanumaga (down 40 percent). While some islands reported minimal increases in

households growing crops such as taro, felo, pandanus, breadfruit and cassava, on Funafuti and Vaitupu there were less households growing any of the main crops. The reduced crop production on the more heavily populated Funafuti is a concern, and unless addressed will increase reliance on crop production from the outer islands or importation from other countries with the additional burden and cost of transportation.

There were decreases in banana growing households across all islands except Nanumea, while only Nukulaelae and Niulakita reported an increase in breadfruit-growing households. In the case of pandanus, pulaka and talo, it was estimated that more than half the number of households growing these crops in 2012 were not growing them in 2017. Pandanus saw decreases on all islands except Nukufetau.

Every single island reported a decrease in households growing swamp taro, pumpkin or tree spinach.

Traditional farming techniques are in decline, yet, particularly on the outer islands, they contribute to agricultural diversity and food security and better diets. The use of home-grown food crops constitutes a form of import substitution, which is particularly important owing to Tuvalu's significant and long-term trade deficit.

TABLE 42
Number of households by type of main crop grown and island: 2012 and 2017

Crop	Total households			Number of households growing crop								
				Nanumea			Nanumaga			Niutao		
	2012	2017	% diff	2012	2017	% diff	2012	2017	% diff	2012	2017	% diff
Total	1 761	1 626	-7.7	115	105	-8.7	116	93	-19.8	123	116	-5.7
Banana/pata/fuamaulalo	1 171	776	-33.7	59	66	11.9	74	68	-8.1	88	83	-5.7
Coconut/niu	1 358	694	-48.9	105	71	-32.4	101	61	-39.6	115	97	-15.7
Breadfruit/mei	940	540	-42.6	79	55	-30.4	92	41	-55.4	101	90	-10.9
Pandanus/fala	872	395	-54.7	71	59	-16.9	78	34	-56.4	79	40	-49.4
Swamp taro/pulaka	830	394	-52.5	97	50	-48.5	63	62	-1.6	92	23	-75.0
Taro/talo	653	300	-54.1	90	40	-55.6	13	57	338.5	27	17	-37.0
Pumpkin/squash/panikeni	514	231	-55.1	23	16	-30.4	35	7	-80.0	45	43	-4.4
Tree spinach/bele/pele	296	134	-54.7	23	9	-60.9	27	2	-92.6	26	9	-65.4
Sweet potato/kumala/pateta	234	132	-43.6	26	4	-84.6	56	33	-41.1	31	25	-19.4
Felo	150	82	-45.3	16	0	-100.0	39	5	-87.2	20	10	-50.0
Cassava/tapioka	154	59	-61.7	19	5	-73.7	61	18	-70.5	13	6	-53.8

SOURCE: 2012 and 2017 Censuses

TABLE 42
Number of households by type of main crop grown and island: 2012 and 2017 (continued)

Crop	Number of households growing crop								
	Nui			Vaitupu			Nukufetau		
	2012	2017	% diff	2012	2017	% diff	2012	2017	% diff
Total	138	97	-29.7	226	187	-17.3	124	112	-9.7
Banana/pata/fuamaulalo	126	77	-38.9	183	91	-50.3	98	95	-3.1
Coconut/niu	124	94	-24.2	187	64	-65.8	116	104	-10.3
Breadfruit/mei	114	60	-47.4	147	58	-60.5	92	91	-1.1
Pandanus/fala	111	76	-31.5	153	43	-71.9	52	62	19.2
Swamp taro/pulaka	126	75	-40.5	202	51	-74.8	115	91	-20.9
Taro/talo	121	70	-42.1	193	57	-70.5	88	29	-67.0
Pumpkin/squash/panikeni	56	40	-28.6	64	8	-87.5	53	46	-13.2
Tree spinach/bele/pele	32	14	-56.3	30	7	-76.7	32	29	-9.4
Sweet potato/kumala/pateta	13	11	-15.4	12	6	-50.0	13	15	15.4
Felo	15	44	193.3	15	3	-80.0	14	13	-7.1
Cassava/tapioka	3	8	166.7	5	4	-20.0	0	1	-

SOURCE: 2012 and 2017 Censuses

The continuing emigration from the outer islands to the capital, Funafuti or urban drift, the availability of suitable labour on the outer islands, coupled with a declining interest on the part of young people in traditional agricultural farming practices, has reduced the production of traditional crops. It will remain important to raise awareness amongst youth and community leaders on the value of traditional agricultural and land management systems and knowledge.

Another possible reason for the significant reductions in households growing specific crops over a relatively short period may be attributed to some households increasing their land area and thereby operating larger holdings for economies of scale. However, as information on household agricultural land or cropping area was not collected in the 2017 Census it is not possible to verify this observation.

TABLE 42
Number of households by type of main crop grown and island: 2012 and 2017 (continued)

Crop	Number of households growing crop								
	Funafuti			Nukulaelae			Niulakita		
	2012	2017	% diff	2012	2017	% diff	2012	2017	% diff
Total	845	849	0.5	67	57	-14.9	7	10	42.9
Banana/pata/fuamaulalo	482	263	-45.4	54	28	-48.1	7	5	-28.6
Coconut/niu	561	159	-71.7	42	38	-9.5	7	6	-14.3
Breadfruit/mei	283	110	-61.1	28	30	7.1	4	5	25.0
Pandanus/fala	305	66	-78.4	16	13	-18.8	7	2	-71.4
Swamp taro/pulaka	82	11	-86.6	53	31	-41.5	0	0	-
Taro/talo	82	20	-75.6	39	10	-74.4	0	0	-
Pumpkin/squash/panikeni	188	54	-71.3	47	15	-68.1	3	2	-33.3
Tree spinach/bele/pele	113	62	-45.1	11	2	-81.8	2	1	-50.0
Sweet potato/kumala/pateta	30	16	-46.7	50	22	-56.0	3	0	-100.0
Felo	28	7	-75.0	3	0	-100.0	0	0	-
Cassava/tapioka	38	12	-68.4	13	4	-69.2	2	1	-50.0

SOURCE: 2012 and 2017 Censuses

TABLE 43
Number and percentage change of households growing crops by crop type, Tuvalu: 2012, 2015/16 and 2017

Crop	Number of households			% change 2012 to 2015/16	% change 2012 to 2017
	Growing 2012	Harvesting 2015/16	Growing 2017		
Cabbage	227	91	201	-60	-11
Cucumber	197	60	163	-69	-17
Pumpkin	514	220	231	-57	-55
Pepper	327	44	68	-87	-79
Eggplant	42	8	9	-80	-79
Tomato	102	51	106	-50	4
Pulaka	670	591	394	-12	-41
Taro	653	373	300	-43	-54
Tapioca	154	73	59	-53	-62
Sweet potato	234	139	132	-41	-44
Coconut – green	1 358	653	694	-52	-49
Banana	1171	719	776	-39	-34
Pawpaw	318	585	624	84	96
Breadfruit	940	678	540	-28	-43
Pandanus	872	440	395	-50	-55
Felo	150	144	82	-4	-45

SOURCE: 2012 and 2017 Censuses, 2015/16 HIES

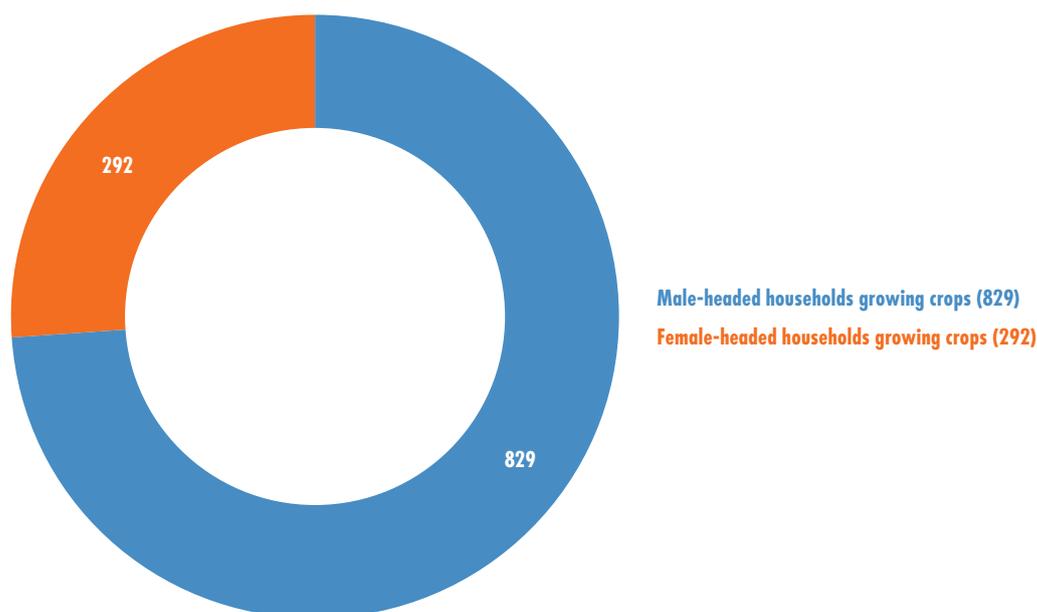
There may also be some residual effects of Cyclone Pam, which impacted Tuvalu during February and March 2015, on household crop planting and harvesting. Flooding from king tides and waves, estimated to be 3–5 metres, associated with the cyclone swept across the low-lying islands, with the central islands of Nui, Nukufetau and Vaitupu the worst affected. Significant damage occurred to agriculture and infrastructure, with water supplies

on Nui contaminated by seawater and rendered undrinkable. The northern islands of Nanumea, Nanumanga and Niutao were also affected with houses flooded on Nanumanga.

The resultant seawater inundation impacting on soil salinity may be another factor influencing households not to plant crops in the 2016-17 growing season, which was the 12 month period covered by the 2017 Mini-Census.

FIGURE 40

Number of households growing crops by gender of household head, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 44

Number of households growing crops by gender of household head and island: 2017

Island	Gender of household head					
	Total		Male		Female	
	Total households	Growing crops	Total households	Growing crops	Total households	Growing crops
TUVALU	1 626	1 121	1 168	829	458	292
Nanumea	105	97	80	75	25	22
Nanumaga	93	88	75	70	18	18
Niutao	116	112	82	78	34	34
Nui	97	97	83	83	14	14
Vaitupu	187	151	138	115	49	36
Nukufetau	112	107	88	85	24	22
Funafuti	849	409	564	270	285	139
Nukulaelae	57	52	53	49	4	3
Niulakita	10	8	5	4	5	4

SOURCE: 2017 Census

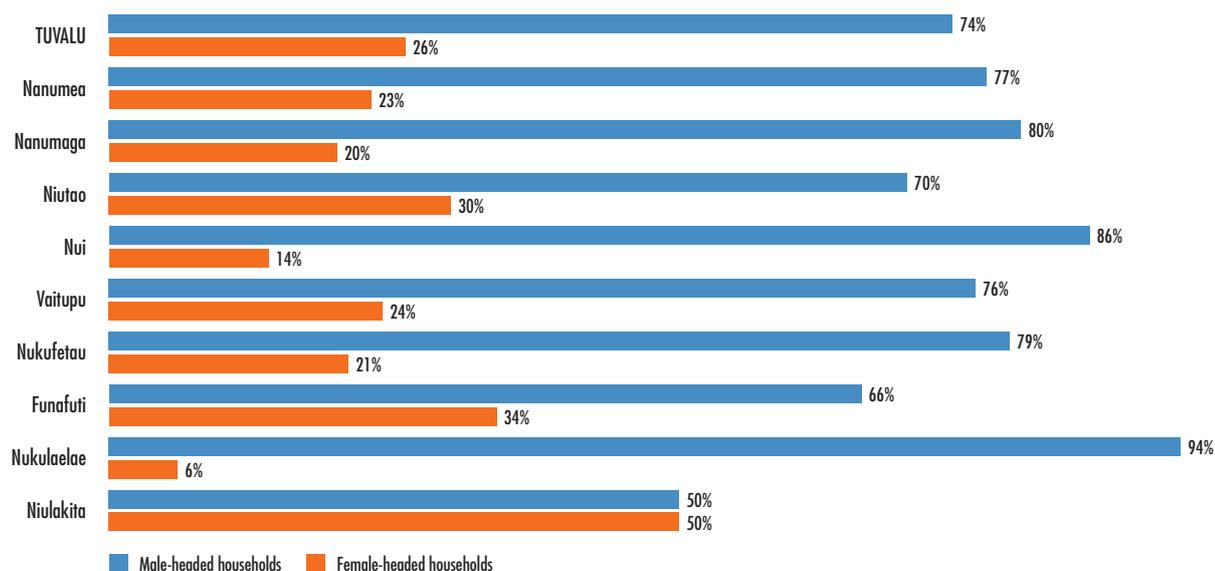
Household cropping estimates were also compared with results from the 2015/16 Household Income and Expenditure Survey (HIES) which confirmed the downward trends in households growing most of the main crops since 2012.

The following table compares household crop data collected in the 2012 Census, 2015/16 HIES and the 2017 Census. It should be noted that the questioning was slightly different in the 2015/16 HIES where details of crops harvested were collected, whereas in the 2012 and 2017 Censuses the questionnaires

asked details of crops grown or harvested in the previous 12 months. As a result, there may be some comparative undercount in the HIES data, where a household was growing a particular crop but had not yet harvested it when surveyed.

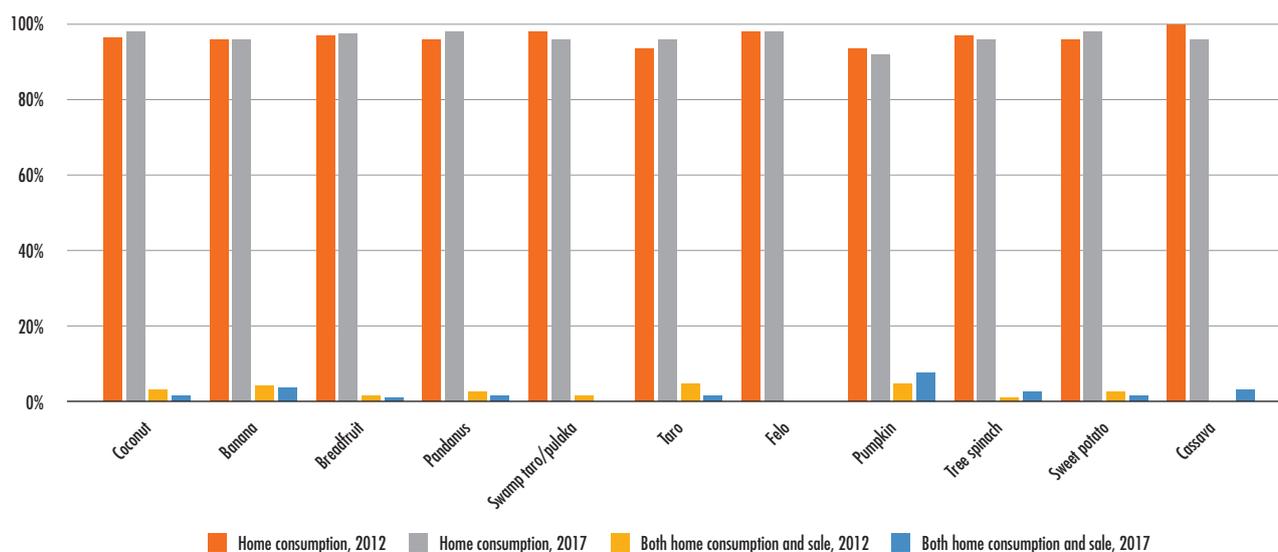
During the five year period between 2012 and 2017, the only increases recorded were in the number of households growing pawpaw (96 percent increase) and tomatoes (4 percent) (Table 43). There was a decrease in all other crop types reported by households.

FIGURE 41
Percentage distribution of households growing crops by gender of household head and island: 2017



SOURCE: 2017 Censuses

FIGURE 42
Purpose for growing crop by main crop type, Tuvalu: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

Continuation of this downward trend will have severe ramifications for the nation's food security and may place a greater reliance on the importation of fruit and vegetables and the associated transportation issues and food refrigerated storage requirements to minimise food wastage.

5.2 Cropping household gender characteristics

Of the households engaged in crop growing, 829 (or 74 percent) were headed by males, with

292 households (26 percent) headed by women (Figure 40), identical to the proportion of households raising livestock.

The islands reporting the highest proportion of male-headed households engaged in livestock raising were Nukulaelae (94 percent) and Nui (86 percent) while Niulakita (50 percent), Funafuti (34 percent) and Niutao (30 percent) reported the highest proportions of female-headed households growing crops (Table 44 and Figure 41).

TABLE 45
Number of households growing crops by purpose, Tuvalu: 2017

Crop	Purpose of growing crop				
	Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other
Total	1 118	7	64	16	38
Beans (string, long, green, star)/piini	10	0	0	1	0
Tree spinach/bele/pele	129	0	3	2	0
Bell pepper/capsicum/pepa	62	0	3	3	0
Cabbage/kapisi Saina	186	0	8	6	1
Chili pepper/tili	56	0	0	3	0
Corn/koni	2	0	1	0	0
Cucumber/kukama	149	1	5	7	1
Egg plant/paigani	8	0	1	0	0
Lettuce/letisi	15	0	4	0	0
Spring/green onion/aniani	2	0	2	0	0
Tomato	93	0	7	6	0
Melons (water, rock)/meleni	25	0	5	0	0
Pumpkin/squash/panikeni	212	2	12	4	1
Banana/pata/fuamaulalo	743	2	23	8	0
Breadfruit/mei	530	0	5	5	0
Coconut/niu	682	0	8	3	1
Pandanus/fala	387	0	5	3	0
Pawpaw/olesi	604	1	12	6	1
Sweet potato/kumala/pateta	129	0	2	1	0
Swamp taro/pulaka	380	0	2	0	12
Taro/talo	288	2	5	1	4
Cassava/tapioka	57	0	2	0	0
Felo	81	0	0	0	1
Gie	26	0	0	0	0
Laukatafa	30	0	0	0	0
Tiale	165	1	2	0	22
Toddy	411	1	23	1	1
Other	33	0	0	0	0

SOURCE: 2017 Census

5.3 Production Purpose

Of the 1 121 households who reported growing crops in 2017, the vast majority of crops were grown for home consumption, i.e. subsistence. A further 64 households (or 6 percent) grew crops mainly for home consumption but also sold some of their produce, specifically bananas, toddy and pawpaw. Less than 2 percent of cropping households grew their crop mainly for sale but had some home consumption. These crops were mainly bananas, cucumbers and pawpaw (Table 45).

There is very little evidence of increasing commercialization of crop growing throughout Tuvalu. In the previous 2012 Census, households reported on three main purposes of growing their crops: 'subsistence', 'commercial' and 'both subsistence and commercial (i.e. semi commercial farming – where households sell the excess production from their home garden)'. However, due to the extremely small number of responses in the 'commercial' category, these were omitted from the 2012 Census findings. It was therefore felt that the category 'both' or semi-commercial was adequate to cover the very minimal results for purely commercial activity.

TABLE 46
Number of households growing crops by harvest frequency, Tuvalu: 2017

Crop	Number of households growing crop	Frequency of harvest							
		At least every week	Every fortnight	Every month	Every 2 months	Every 3 months	Every 4 months	About twice a year	Once a year
Total	1 121	864	329	513	336	347	347	420	244
Beans (string, long, green, star)/piini	11	3	3	3	1	1	0	0	0
Tree spinach/bele/pele	134	78	28	21	5	0	0	0	2
Bell pepper/capsicum/pepa	68	33	16	14	1	2	1	0	1
Cabbage/kapisi Saina	201	77	41	46	17	14	4	1	1
Chili pepper/tili	59	38	8	9	3	1	0	0	0
Corn/koni	3	0	0	1	1	0	1	0	0
Cucumber/kukama	163	55	27	35	27	11	4	1	3
Egg plant/paigani	9	1	1	4	3	0	0	0	0
Lettuce/letisi	19	10	4	3	2	0	0	0	0
Spring/green onion/aniani	4	2	1	1	0	0	0	0	0
Tomato	106	46	19	19	14	6	2	0	0
Melons (water, rock)/meleni	30	3	5	2	10	4	3	2	1
Pumpkin/squash/panikeni	231	19	13	84	48	30	21	8	8
Banana/pata/fuamaulalo	776	22	21	122	135	160	134	127	55
Breadfruit/mei	540	131	73	150	44	45	34	45	18
Coconut/niu	694	575	52	22	7	9	7	4	18
Pandanus/fala	395	9	4	9	34	67	70	161	41
Pawpaw/olesi	624	185	138	171	61	32	26	4	7
Sweet potato/kumala/pateta	132	9	5	17	13	23	34	14	17
Swamp taro/pulaka	394	16	9	18	16	27	60	168	80
Taro/talo	300	1	3	13	12	20	55	127	69
Cassava/tapioka	59	2	2	3	3	4	12	17	16
Felo	82	6	2	4	6	3	7	38	16
Gie	26	0	0	1	1	0	3	9	12
Laukatafa	30	3	2	8	11	3	2	0	1
Tiale	190	120	13	31	10	2	5	3	6
Toddy	437	408	25	1	1	0	0	2	0
Other	33	16	2	6	2	1	1	1	4

SOURCE: 2017 Census

To enable some comparisons between the 2012 and 2017 Censuses, data for 2017 has also been combined into the two categories: 'home consumption' (or subsistence) and 'both' (home consumption plus sales). Figure 42 below indicates that there has been minimal change in the commercialization of crop production in the five years between the 2012 and 2017 Censuses, with the vast majority of households still growing the main crop types for their home consumption. In fact, for several crop types, the proportion of households growing them for home consumption has increased slightly, which would indicate a lesser focus or interest in growing crops commercially.

5.4 Frequency of harvest

Toddy and coconuts were the most frequently harvested crop with most households collecting toddy or coconuts on at least a weekly basis. Other frequently harvested crops included vegetables such as tree spinach, bell and chili peppers, cabbage, lettuce and tomatoes (Table 46).

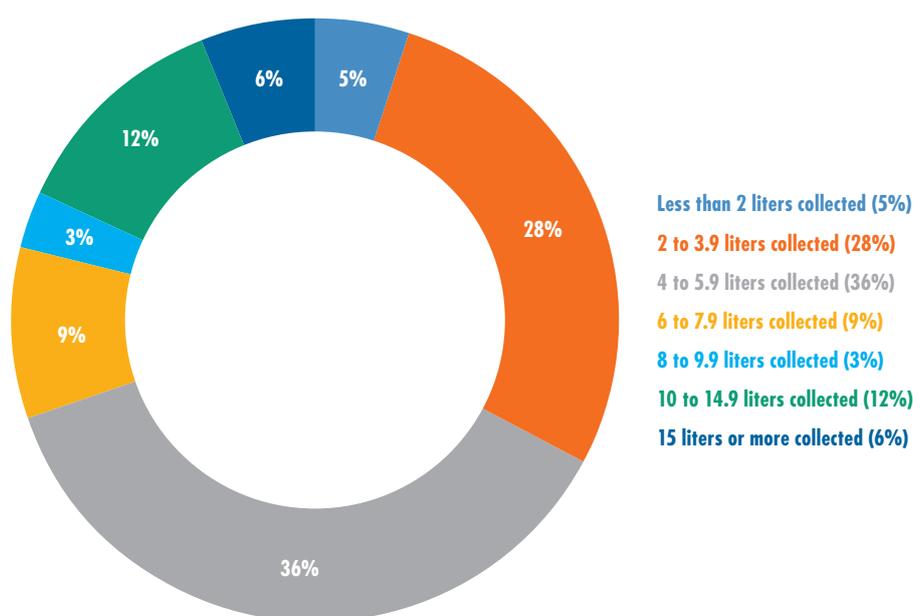
Fruits such as breadfruit and pawpaw were also harvested at least on a monthly basis, while the picking of bananas ranged from every month to about twice a year. Root crops such as pandanus, swamp taro, taro and felo were mainly harvested twice a year but annual harvesting was also reported.

TABLE 47
Number of households cutting toddy, average liters collected by island: 2017

Island	Total households	Number of households cutting toddy	Percentage of households cutting toddy	Average liters of toddy collected in a typical day	Number of liters collected in a typical day						
					Less than 2 liters collected	2 to 3.9 liters	4 to 5.9 liters	6 to 7.9 liters	8 to 9.9 liters	10 to 14.9 liters	15 liters or more
TUVALU	150	150	150	150	5	1	81	5	15	15	15
Nanumea	10	10	10	10	1	0	3	0	0	0	0
Nanumaga	40	40	40	40	2	0	11	0	15	15	15
Niutao	79	79	79	79	0	1	60	3	0	0	0
Nui	2	2	2	2	0	0	0	0	0	0	0
Vaitupu	5	5	5	5	2	0	0	1	0	0	0
Nukufetau	1	1	1	1	0	0	0	0	0	0	0
Funafuti	10	10	10	10	0	0	6	1	0	0	0
Nukulaelae	3	3	3	3	0	0	1	0	0	0	0
Niulakita	0	0	0	0	0	0	0	0	0	0	0

SOURCE: 2017 Census

FIGURE 43
Number of households cutting toddy, average liters collected, Tuvalu: 2017



SOURCE: 2017 Census

5.5 Toddy collection

Over a quarter of all households reported collecting toddy, with most collecting this at least every week. Toddy collecting was more prevalent on the outer islands, where more than 70 percent of households on Niulakita (80 percent), Nukulaelae (70 percent), Nui (70 percent) and Nukufetau (70 percent) reported undertaking this activity. The lower national average was the result of only 3.7 percent of Funafuti households collecting toddy (Table 47).

The most common quantity collected was between four (4) and 5.9 liters per typical day with the average volume collected being 5.7 liters (Table 46). Almost 20 percent of toddy-collecting households reported collecting ten (10) or more liters on a typical day (Figure 43).

CHAPTER 6

FISHING

The 2017 Census household questionnaire also collected information on households' buying and selling of fish. While the questions are more structured around economic activity rather than specific fish and seafood catching and capture activity, it could possibly be assumed that most households selling fish/seafood did undertake fishing activity.

However, it cannot be assumed that households buying fish did not also catch fish at some stage in the previous twelve months, as the fish may have been bought to supplement insufficient catches for the households' needs.

6.1 Households engaged in buying and selling fish

Of the 1 626 households in the country in 2017, 976 households (60 percent) reported that they had bought or sold fish in the thirty (30) days prior to Census night. The majority (87 percent) of these households reported buying pelagic fish, with 246 households (25 percent) buying reef fish (Table 48).

More than half of all households (852) reported buying pelagic fish, including 80 percent of Vaitupu households, 74 percent of Nanumea households and 73 percent of Nui households. The purchase of reef fish was most popular on Nukufetau (58 percent of households) and Funafuti (20 percent) while the buying of deep sea fish was most prominent on Nukufetau (33 percent) and Nukulaelae (21 percent). There were minimal purchases of either reef or deep sea fish on the other islands.

Nationally, only 85 households reported selling pelagic fish and 44 households sold reef fish in the thirty (30) days prior to Census night. Between them, Nukufetau, Funafuti and Nukulaelae accounted for over 72 percent of households selling fish nationally.

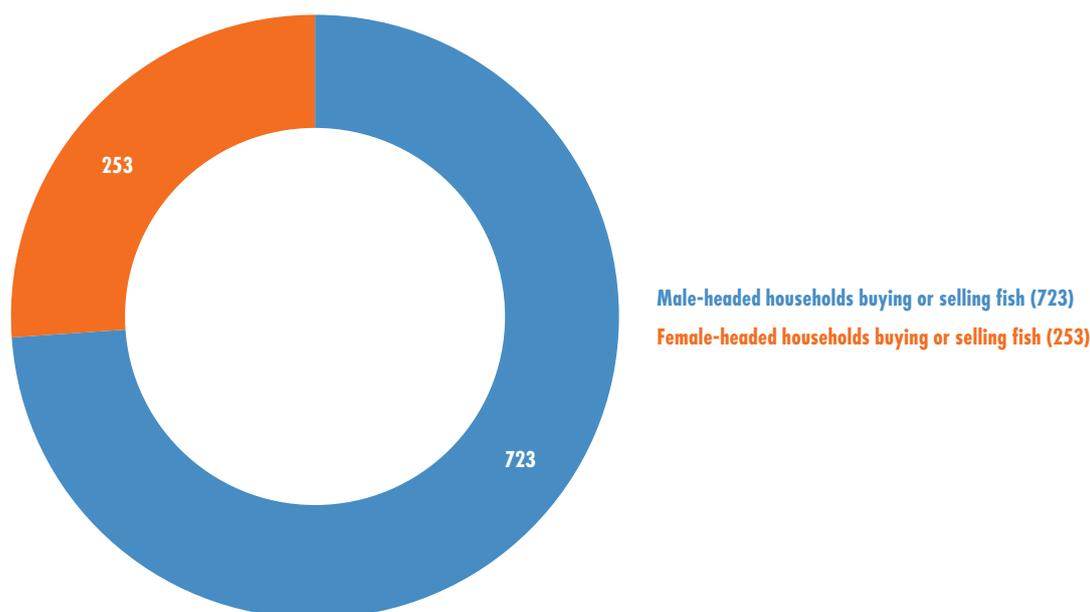
TABLE 48
Number of households buying or selling fish by type and island: 2017

Island	Total households	Number of households buying or selling fish	Buying fish			Selling fish		
			Reef fish	Pelagic fish	Deep sea fish	Reef fish	Pelagic fish	Deep Sea fish
TUVALU	1 626	976	246	852	83	44	85	20
Nanumea	105	85	1	78	2	2	6	0
Nanumaga	93	71	0	66	0	1	7	0
Niutao	116	64	0	59	1	0	9	1
Nui	97	73	2	71	1	1	3	1
Vaitupu	187	156	0	149	0	0	8	2
Nukufetau	112	93	65	71	37	21	18	6
Funafuti	849	397	170	330	30	15	19	1
Nukulaelae	57	37	8	28	12	4	15	9
Niulakita	10	0	0	0	0	0	0	0

SOURCE: 2017 Census

FIGURE 44

Number of households buying or selling fish by gender of household head, Tuvalu: 2017



SOURCE: 2017 Census

TABLE 49

Number of households buying or selling fish by gender of household head and island: 2017

Island	Gender of household head					
	Total		Male		Female	
	Total households	Buying or selling fish	Total households	Buying or selling fish	Total households	Buying or selling fish
TUVALU	1 626	976	1 168	723	458	253
Nanumea	105	85	80	65	25	20
Nanumaga	93	71	75	58	18	13
Niutao	116	64	82	45	34	19
Nui	97	73	83	60	14	13
Vaitupu	187	156	138	116	49	40
Nukufetau	112	93	88	74	24	19
Funafuti	849	397	564	270	285	127
Nukulaelae	57	37	53	35	4	2
Niulakita	10	0	5	0	5	0

SOURCE: 2017 Censuses

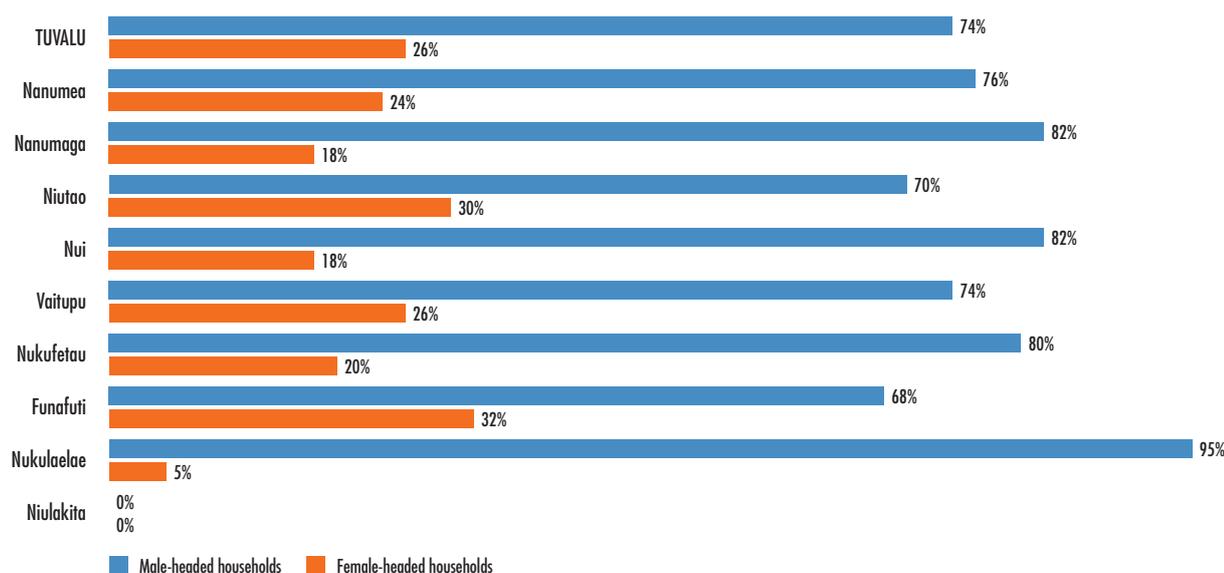
6.2 Fishing household gender characteristics

Of the 976 households buying or selling fish in the 30 days prior to the Census night, 723 (or 74 percent) were headed by males and 253 (26 percent) by females (Figure 44 and Table 49). This ratio was identical to both the livestock and cropping household gender ratio.

At the island level, Nukulaelae reported the highest proportion of male-headed households buying or selling fish at 95 percent, followed by Nui and Nanumaga both 82 percent (Figure 45). Funafuti had the highest reported number of female-headed households buying or selling fish at 32 percent followed by Niutao with 30 percent.

FIGURE 45

Percentage distribution of households buying or selling fish by gender of household head and island: 2017



SOURCE: 2017 Censuses

TABLE 50

Number of households buying or selling fish by frequency of trading and fish type, Tuvalu: 2017

	Number of households buying or selling fish	Frequency of buying or selling fish in the past 30 days				
		1 to 4	5 to 9	10 to 14	15 to 19	20 plus
Buying reef fish	246	224	17	2	1	2
Buying pelagic fish	852	743	90	13	1	5
Buying deep sea fish	83	74	7	1	0	1
Selling reef fish	44	31	9	1	2	1
Selling pelagic fish	85	44	21	6	2	12
Selling deep sea fish	20	13	6	0	1	0

SOURCE: 2017 Census

6.3 Frequency of buying or selling fish

More than 87 percent of households buying the various fish types did so between one (1) and four (4) times during the 30 days prior to Census night, with a further 11 percent of households buying pelagic fish between five (5) and nine (9) times in that period (Table 50).

It was similar for households selling reef or deep sea fish, with most selling on one (1) to four (4) occasions during the 30 day period. It was a little different for households selling pelagic fish as 12 households reported selling fish on more than 20 occasions in the 30 days, suggesting these were most likely commercial fishing households.



CHAPTER 7

HANDICRAFTS

The 2017 Tuvalu Mini-Census collected information on handicraft production by households. The questions were structured around the types of handicrafts produced, the number of items produced and the main purpose for producing the handicrafts, i.e. for home consumption or use, for sale of some combination of both home consumption and sale.

7.1 Households engaged in handicraft production

In 2017, just over one-third (35 percent) of Tuvaluan households reported that they were engaged in handicraft production, including 56 percent of outer island households and 16 percent of Funafuti households (Table 51 and Figure 46). Handicraft production was particularly evident on Nukulaelae, Nui and Nukufetau islands, where 82 percent, 79 percent and 77 percent of households respectively reported handicraft production.

A large number of households reported producing several different types of handicraft. Table 52 below details the number of households on each island by the types of handicraft produced. Almost two-thirds of handicraft-producing households produced brooms, 55 percent made mats and 37 percent made laukie (fine pandanus leaves used in the making of mats and other handicrafts).

Comparison of the number and percentage of households engaged in handicrafts as reported in the 2012 and 2017 Censuses displays some very interesting results. The proportion of total households engaged in handicraft production reduced from 60 percent to 35 percent between 2012 and 2017 with significant decreases reported across all islands, except Nukulaelae, and for all types of handicrafts.

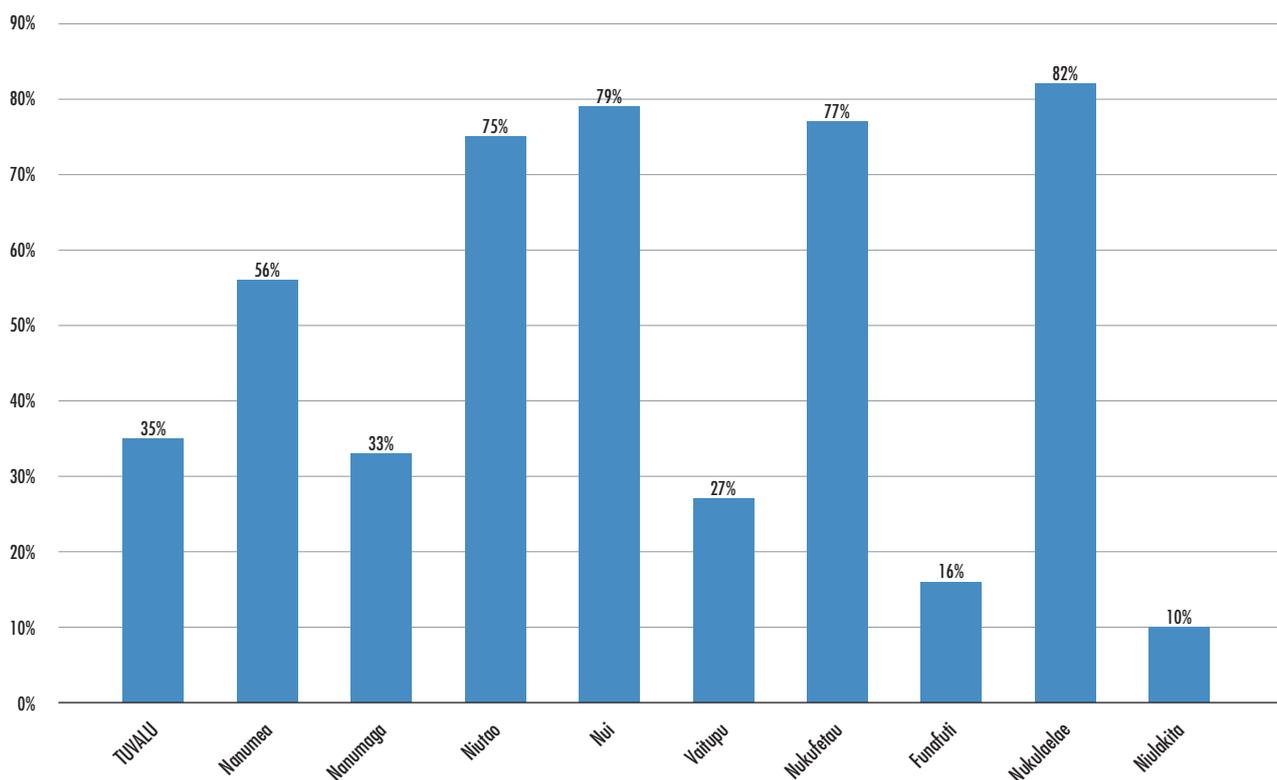
The decreases were evident on both Funafuti and the outer islands, with the proportion of Funafuti households producing handicrafts decreasing from 47 percent in 2012 to 16 percent in 2017, a two-thirds reduction. Large reductions were also reported in Vaitupu and Nanumaga where the proportion of households producing handicrafts almost halved, from 52 percent in 2012 to 27 percent in 2017 in Vaitupu and from 60 percent to 33 percent in Nanumaga (Table 53 and Figure 47).

TABLE 51
Number of households engaged in handicrafts by island: 2017

Island	Number of households	Number of households engaged in handicrafts	Percentage of households engaged in handicrafts
TUVALU	1 626	571	35
Nanumea	105	59	56
Nanumaga	93	31	33
Niutao	116	87	75
Nui	97	77	79
Vaitupu	187	51	27
Nukufetau	112	86	77
Funafuti	849	132	16
Nukulaelae	57	47	82
Niulakita	10	1	10

SOURCE: 2017 Census

FIGURE 46
Percentage of households engaged in handicrafts by island: 2017



SOURCE: 2017 Census

TABLE 52
Number of households by handicraft item produced and island: 2017

Island	Type of handicraft								
	Necklace	Mat	String	Model Canoe	Broom	Fan	Basket	Laukie	Other
TUVALU	65	312	4	25	374	110	87	212	47
Nanumea	0	33	0	12	30	9	13	35	3
Nanumaga	3	29	0	1	6	8	2	10	1
Niutao	1	53	1	1	82	17	50	29	2
Nui	0	45	3	6	72	34	2	19	9
Vaitupu	2	22	0	0	39	3	2	37	1
Nukufetau	12	53	0	0	78	17	2	51	5
Funafuti	46	41	0	3	25	21		6	23
Nukulaelae	1	35	0	2	42	1	16	25	3
Niulakita	0	1	0	0	0	0	0	0	0

SOURCE: 2012 and 2017 Censuses

The number of households producing the various handicraft items were mostly halved or even greater between 2012 and 2017. For example, the number of households producing the more common items of brooms or mats fell by 49 percent and 51 percent respectively, while the share of households producing necklaces dropped from twelve (12) percent in 2012 to four (4) percent in 2017. The actual number of string-producing households fell from 138 in 2012 to

only 4 in 2017, with only households in Niutao and Nui reporting this activity.

Increases in the proportion of households producing baskets was reported on Niutao, Nanumea and Nukulaelae, while small increases were also reported in the proportion of households producing brooms on Nukulaelae and Nukufetau.

TABLE 53A

Number of households engaged in handicrafts by type of handicraft and island: 2012 and 2017

Island	Total households		Number of households engaged in handicrafts		Number of households and type of handicraft							
					Necklace		Mat		String		Model Canoe	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
TUVALU	1 761	1 626	1 062	571	206	65	695	312	138	4	138	4
Nanumea	115	105	95	59	5	0	76	33	13	0	13	0
Nanumaga	116	93	70	31	2	3	67	29	9	0	9	0
Niutao	123	116	104	87	3	1	92	53	6	1	6	1
Nui	138	97	115	77	3	0	70	45	19	3	19	3
Vaitupu	226	187	118	51	13	2	84	22	20	0	20	0
Nukufetau	124	112	103	86	29	12	82	53	6	0	6	0
Funafuti	845	849	398	132	148	46	177	41	52	0	52	0
Nukulaelae	67	57	53	47	2	1	43	35	13	0	13	0
Niulakita	7	10	6	1	1	0	4	1	0	0	0	0

Island	Number of households and type of handicraft									
	Broom		Fan		Basket		Laukie		Other	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
TUVALU	801	374	380	110	154	87	531	212	209	47
Nanumea	64	30	23	9	9	13	73	35	24	3
Nanumaga	38	6	26	8	5	2	54	10	15	1
Niutao	98	82	50	17	16	50	72	29	15	2
Nui	107	72	69	34	3	2	44	19	23	9
Vaitupu	93	39	34	3	21	2	70	37	8	1
Nukufetau	76	78	42	17	18	2	81	51	3	5
Funafuti	274	25	126	21	78	0	98	6	117	23
Nukulaelae	46	42	7	1	2	16	34	25	4	3
Niulakita	5	0	3	0	2	0	5	0	0	0

SOURCE: 2012 and 2017 Censuses

The most commonly produced handicraft items were laukie, necklaces, brooms and mats. In total, over 60,000 individual handicraft items were estimated to have been produced by Tuvaluan households in the twelve (12) months prior to Census night in November 2017.

There was significantly more handicraft production occurring on the outer islands, where most of the brooms, mats, and laukies were produced. Nukufetau and Nanumea households produced the largest number of handicraft items, with almost 13 000 and 12 000 individual items respectively, mainly laukies (Table 54).

Each of the laukie-producing households produced on average more than 200 laukies, while the average number of brooms produced by the

374 broom-producing households was almost eight (8). Over three-quarters (77 percent) of the necklaces were produced by Funafuti households, producing on average 52 necklaces per household, while the average number of mats produced per household was seven (7), again predominantly on the outer islands.

7.2 Handicraft household gender characteristics

Of the 571 households engaged in handicrafts production, 417 (or 73 percent) were headed by males and 154 (27 percent) by females (Figure 48 and Table 55). This ratio was very similar to both the livestock and cropping household gender ratio.

TABLE 53B

Percentage of households engaged in handicrafts by type of handicraft and island: 2012 and 2017

Island	Percentage of households engaged in handicrafts		Percentage of households and type of handicraft							
			Necklace		Mat		String		Model Canoe	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
TUVALU	60	35	12.0	4.0	39	19	8	0.2	8	0
Nanumea	83	56	4.0	0.0	66	31	11	0.0	11	0
Nanumaga	60	33	1.7	3.2	58	31	8	0.0	8	0
Niutao	85	75	2.0	1.0	75	46	5	1.0	5	1
Nui	83	79	2.0	0.0	51	46	14	3.0	14	3
Vaitupu	52	27	6.0	1.0	37	12	9	0.0	9	0
Nukufetau	83	77	23.0	11.0	66	47	5	0.0	5	0
Funafuti	47	16	18.0	5.0	21	5	6	0.0	6	0
Nukulaelae	79	82	3.0	2.0	64	61	19	0.0	19	0
Niulakita	86	10	14.0	0.0	57	10	0	0.0	0	0

Island	Percentage of households and type of handicraft									
	Broom		Fan		Basket		Laukie		Other	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
TUVALU	45	23	22	7	9	5	30	13	12	3
Nanumea	56	29	20	9	8	12	63	33	21	3
Nanumaga	33	6	22	9	4	2	47	11	13	1
Niutao	80	71	41	15	13	43	59	25	12	2
Nui	78	74	50	35	2	2	32	20	17	9
Vaitupu	41	21	15	2	9	1	31	20	4	1
Nukufetau	61	70	34	15	15	2	65	46	2	4
Funafuti	32	3	15	2	9	0	12	1	14	3
Nukulaelae	69	74	10	2	3	28	51	44	6	5
Niulakita	71	0	43	0	29	0	71	0	0	0

SOURCE: 2012 and 2017 Censuses

TABLE 54

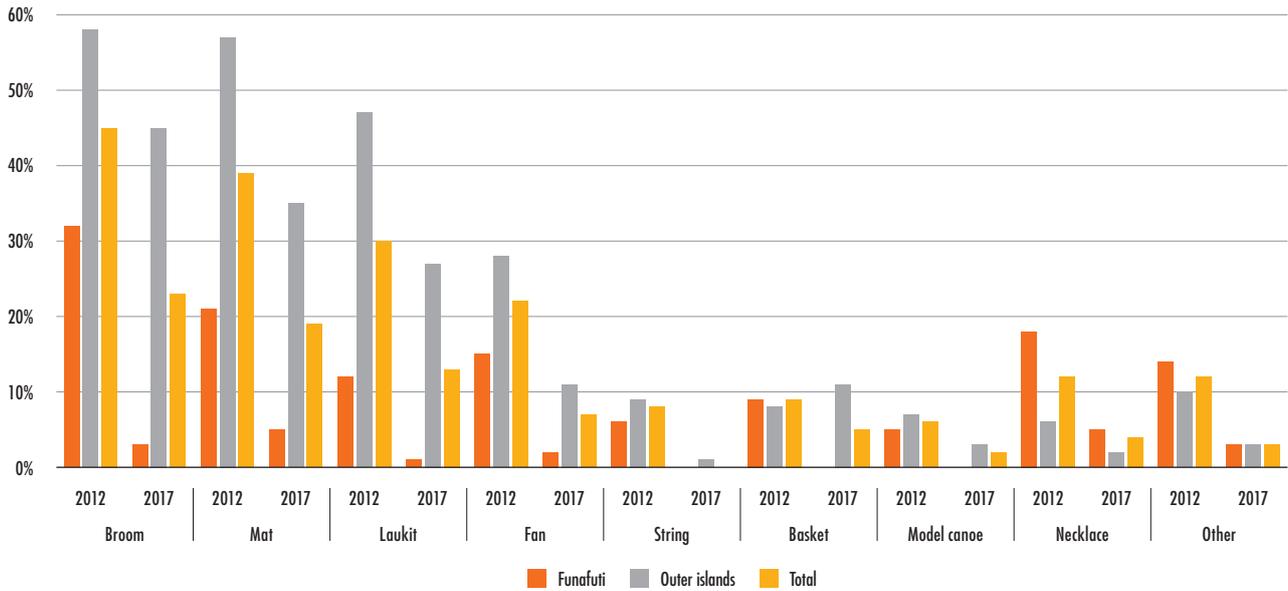
Number of handicraft items produced by type and island: 2017

Island	Total items produced	Type of handicraft								
		Necklace	Mat	String	Model Canoe	Broom	Fan	Basket	Laukie	Other
TUVALU	60 014	3 137	2 289	100	149	2 939	2 017	1 926	45 742	1 715
Nanumea	11 866	0	222	0	30	107	70	107	11 315	15
Nanumaga	2 818	85	254	0	10	31	223	2	2 211	2
Niutao	8 529	25	488	8	5	1 155	249	1 683	4 908	8
Nui	3 565	0	261	92	9	629	695	22	1 739	118
Vaitupu	9 911	60	186	0	0	282	67	5	9 271	40
Nukufetau	12 932	543	388	0	0	386	78	7	11 045	485
Funafuti	5 087	2 412	301	0	85	152	625	0	483	1 029
Nukulaelae	5 305	12	188	0	10	197	10	100	4 770	18
Niulakita	1	0	1	0	0	0	0	0	0	0

SOURCE: 2017 Censuses

FIGURE 47

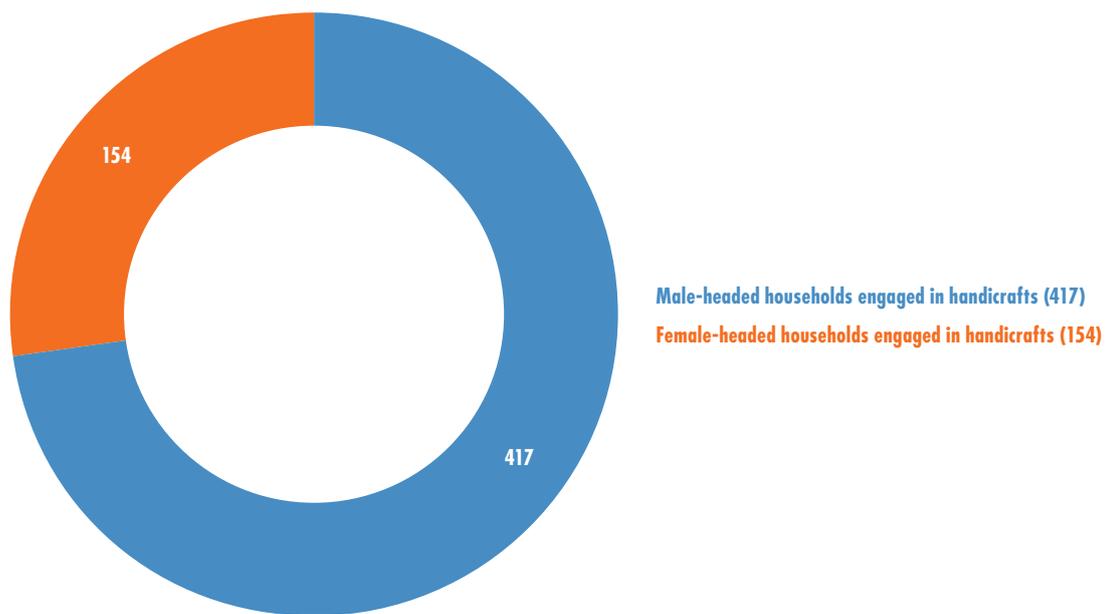
Percentage of households engaged in handicrafts by type of handicraft and strata: 2012 and 2017



SOURCE: 2012 and 2017 Censuses

FIGURE 48

Number of households engaged in handicrafts by gender of household head, Tuvalu: 2017



SOURCE: 2017 Census

At the island level, Nukulaelae reported the highest proportion of male-headed households engaged in handicraft production at 91 percent, followed by Nui (87 percent) and Nukufetau (84 percent) (Figure 49). The sole household engaged in handicrafts on

Niulakita was headed by a female, while the next highest reported number of female-headed households engaged in handicrafts was Funafuti with 50 percent.

TABLE 55

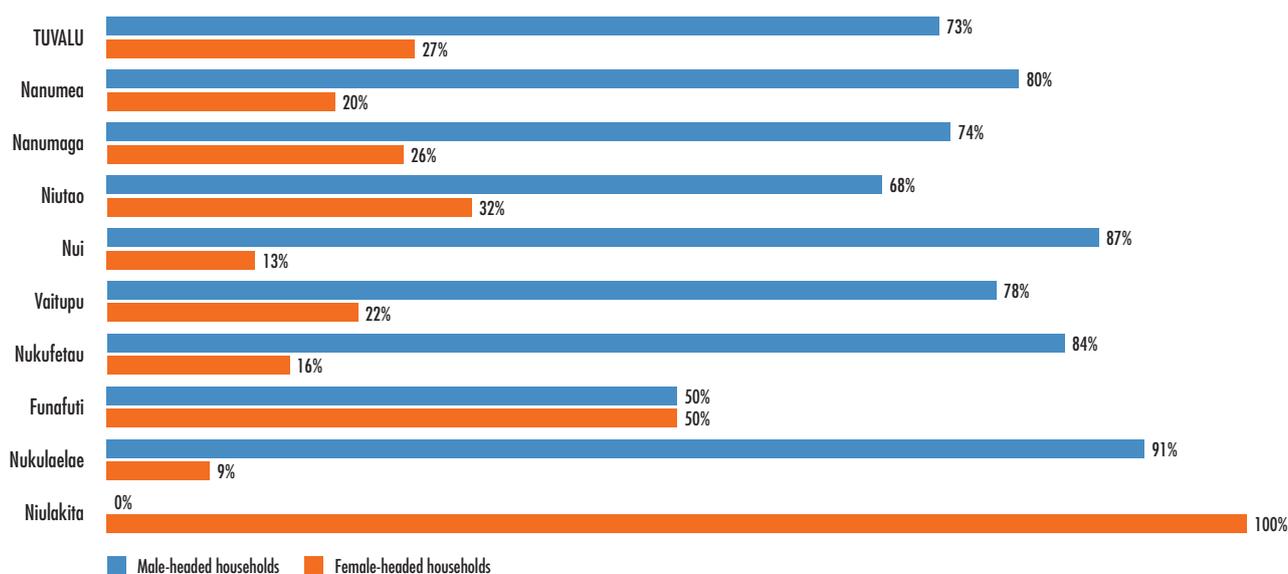
Number of households engaged in handicrafts by gender of household head and island: 2017

Island	Gender of household head					
	Total		Male		Female	
	Total households	Engaged in handicrafts	Total households	Engaged in handicrafts	Total households	Engaged in handicrafts
TUVALU	1 626	571	1 168	417	458	154
Nanumea	105	59	80	47	25	12
Nanumaga	93	31	75	23	18	8
Niutao	116	87	82	59	34	28
Nui	97	77	83	67	14	10
Vaitupu	187	51	138	40	49	11
Nukufetau	112	86	88	72	24	14
Funafuti	849	132	564	66	285	66
Nukulaelae	57	47	53	43	4	4
Niulakita	10	1	5	0	5	1

SOURCE: 2017 Censuses

FIGURE 49

Percentage distribution of households engaged in handicrafts by gender of household head and island: 2017



SOURCE: 2017 Censuses

7.3 Production purpose

Two-thirds (66 percent) of households engaged in handicraft production in 2017 did so for home consumption (or use) with 14 percent of these households also selling some of their handicraft items (Table 56 and Figure 50). A further 22 percent

of households produced handicrafts for sale, with the largest number of these households (63 percent) located on Funafuti. A smaller number of households (7 percent) produced handicraft mainly for sale but also had some home consumption and 5 percent produced handicrafts for other reasons, including customary purposes.

TABLE 56

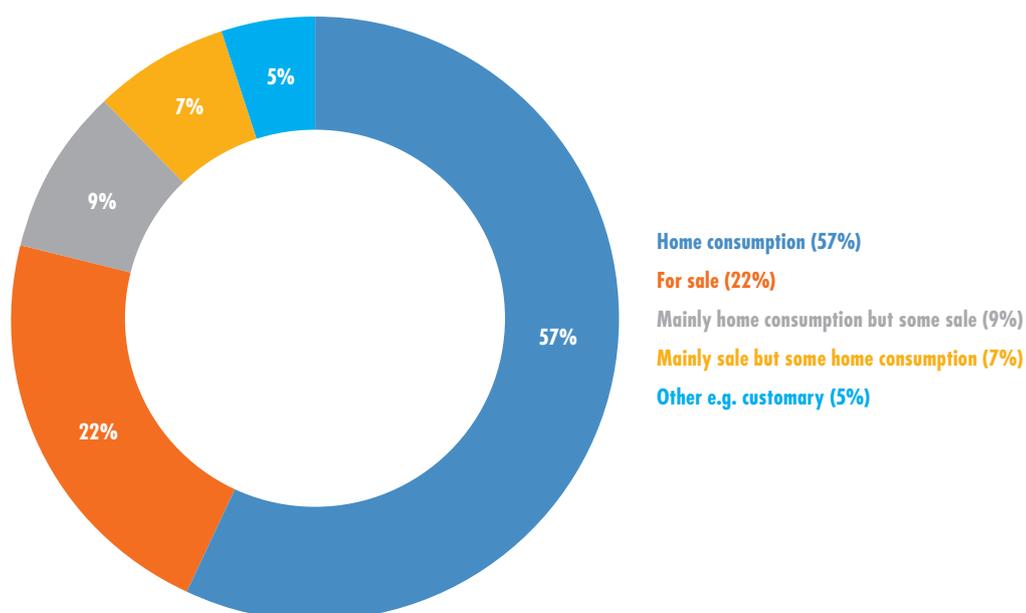
Number of households engaged in handicrafts by purpose and island: 2017

Island	Number of households	Number of households engaged in handicrafts	Purpose of making handicrafts				
			Home consumption	For sale	Mainly home consumption but some for sale	Mainly for sale but some home consumption	Other e.g. customary
TUVALU	1 626	571	327	127	53	38	26
Nanumea	105	59	43	6	1	2	7
Nanumaga	93	31	7	10	4	9	1
Niutao	116	87	63	5	19	0	0
Nui	97	77	42	7	10	7	11
Vaitupu	187	51	38	5	3	4	1
Nukufetau	112	86	57	14	8	6	1
Funafuti	849	132	42	80	3	6	1
Nukulaelae	57	47	34	0	5	4	4
Niulakita	10	1	1	0	0	0	0

SOURCE: 2017 Census

FIGURE 50

Percentage of households engaged in handicrafts by purpose, Tuvalu: 2017



SOURCE: 2017 Census



CHAPTER 8

FOOD SECURITY: AVAILABILITY OF MEAT/FRUIT/VEGETABLES

The 2017 Census did not collect any details of crop production volumes or land area utilized for crops, therefore it is not possible to determine the level of crop production across Tuvalu in the twelve months leading up to Census night in November 2017 or what changes there were since the previous Census was conducted in 2012.

The 2015/16 Household Income and Expenditure Survey (HIES) did ask householders aged 16 years and over questions regarding their meat, fruit and vegetable consumption, including whether they had:

- A good meal with meat/fish on Sundays and other special occasions;
- Fresh fruits and vegetables at least once a day.

Households with children aged 1 – 15 years were further questioned as to whether the children had:

- One meal with meat, chicken, fish or vegetarian equivalent daily;
- Fresh fruits and vegetables at least once a day

The responses indicated that, nationally, 8 percent of households did not have a good meal with meat or fish on Sundays and other special occasions, with higher levels (11.6 percent) in the rural outer island households (Table 57). The main reason given was that the household could not afford the meal but some households reported that they did not want that meal. Only 4 percent of households in Funafuti did not have this weekly meal.

Over one (1) in five (5) households nationally indicated that they did not have fresh fruits and vegetables at least once a day, with one (1) in three (3) outer island households reporting this. Again financial considerations was the main reason on the outer islands, an issue for 30 percent of rural households, while the “do not want” response was the more common response in the urban area of Funafuti.

Nationally, 12 percent of households with children aged one (1) to fifteen (15) years reported that they did not have one meal with meat, chicken, fish or vegetarian equivalent daily. Again, most of these households were located on the outer islands with 16 percent of rural households unable to afford to eat a meat, fish or equivalent meal daily.

Sixteen (16) percent of households with children aged one (1) to fifteen (15) years reported that they did not have fresh fruits and vegetables at least once a day, including an estimated 27 percent of rural (outer island) households. The vast majority (96 percent) of households in this situation nationally reported that they could not afford to eat fresh fruits and vegetables on a daily basis.

TABLE 57
Number of households identifying food-related deprivation by strata, 2016

Deprivation type	TUVALU		Urban		Rural	
	Number of Households	Percentage	Number of Households	Percentage	Number of Households	Percentage
Total number of households	1 872		870		1 002	
Number of Households with children aged 1-15	1 437		670		767	
A good meal with meat/fish on Sundays and other special occasions						
Do not have it	151	10.5	35	5.2	116	15.1
Cannot afford	114	7.9	25	3.8	89	11.6
Do not want	37	2.6	9	1.4	27	3.6
Fresh fruits and vegetables at least once a day						
Do not have it	400	27.8	67	10.0	333	43.4
Cannot afford	329	22.9	30	4.5	299	39.0
Do not want	70	4.9	37	5.5	34	4.4
One meal with meat, chicken, fish or vegetarian equivalent daily*						
Do not have it	172	12.0	7	1.0	165	21.5
Cannot afford	124	8.6	5	0.7	119	15.5
Do not want	48	3.4	2	0.3	46	6.0
Fresh fruits and vegetables at least once a day*						
Do not have it	224	15.6	16	2.4	208	27.1
Cannot afford	214	14.9	9	1.4	205	26.7
Do not want	10	0.7	7	1.0	3	0.4

NOTE: * Households with children aged 1–15 years only

SOURCE: 2017 Census

CHAPTER 9

CLIMATIC EVENTS AND NATURAL DISASTERS

The 2017 Tuvalu Mini-Census also sought information on climatic events such as king tides, storm surges and other natural disaster events including cyclones and drought which may have impacted on the household dwelling in the last five (5) years. Households were also asked whether they had lost any owned land due to erosion in the last five (5) years.

Across Tuvalu, 40 percent of households reported being impacted by a natural event in the previous five years, with over a quarter of households impacted by natural disasters including cyclones and drought (Table 58). Storm surges were reported by 18 percent of households, while a similar number lost land due to erosion and 16 percent of households were impacted by king tides.

The islands most affected by these events were Nui (87 percent of households), Nukulaelae (86 percent) and Nukufetau (61 percent).

Loss of land due to soil erosion was a major event impacting on 70 percent of Nui households, with

almost half of Nui households also impacted by king tides (Table 59 and Figure 51). Almost three-quarters of Nukulaelae households reported being impacted by other natural disasters, while more than 30 percent of households on the islands of Nukufetau, Nui, Nanumaga and Vaitupu were also affected, most likely by Cyclone Pam in early 2015.

The loss of soil due to erosion also impacted on more than 40 percent of households on Nanumea and Nukufetau.

Interestingly, none of the Niulakita households reported experiencing any of these climatic or natural disaster events in the last five (5) years.

TABLE 58
Number of households impacted by natural event in last five years by type and island: 2017

Island	Total households	Total households impacted	Percentage of households impacted	Type of natural event			
				King tide	Storm surge	Other natural disasters (e.g., cyclones, droughts)	Loss of land due to erosion
TUVALU	1 626	658	40	259	288	425	300
Nanumea	105	56	53	14	8	24	43
Nanumaga	93	47	51	22	25	33	13
Niutao	116	46	40	18	18	20	35
Nui	97	84	87	48	30	37	68
Vaitupu	187	74	40	29	43	58	34
Nukufetau	112	68	61	15	8	46	46
Funafuti	849	234	28	81	122	166	41
Nukulaelae	57	49	86	32	34	41	20
Niulakita	10	0	0	0	0	0	0

SOURCE: 2017 Census

TABLE 59

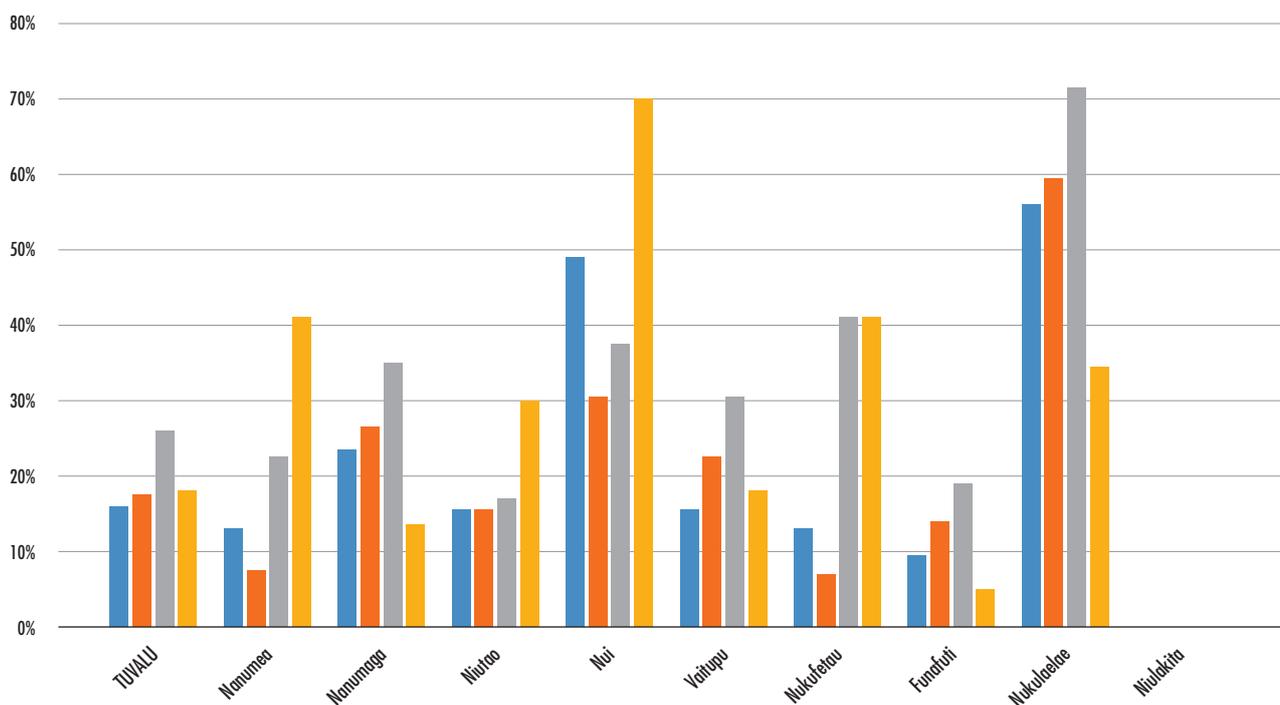
Percentage of households impacted by natural event in last five years by type and island: 2017

Island	Percentage of households impacted	Type of natural event			
		King tide	Storm surge	Other natural disasters (e.g., cyclones, droughts)	Loss of land due to erosion
TUVALU	40	16	18	26	18
Nanumea	53	13	8	23	41
Nanumaga	51	24	27	35	14
Niutao	40	16	16	17	30
Nui	87	49	31	38	70
Vaitupu	40	16	23	31	18
Nukufetau	61	13	7	41	41
Funafuti	28	10	14	20	5
Nukulaelae	86	56	60	72	35
Niulakita	0	0	0	0	0

SOURCE: 2017 Census

FIGURE 51

Percentage of households impacted by natural event in last five years by type and island: 2017



SOURCE: 2017 Census

CONCLUSIONS AND RECOMMENDATIONS

This final chapter provides some key findings from the agricultural content of the 2017 Tuvalu Population and Housing Mini-Census and several recommendations, particularly around future agricultural survey activities.

Agriculture has traditionally been the preoccupation of Tuvaluan people and involves the cultivation of trees and crops and raising a limited number of pigs and chickens. Crop production is primarily for subsistence, crops comprising coconut, babai (swamp taro), taro, breadfruit, pandanus, banana, pumpkin, sweet potatoes and pawpaw. Home gardening is practiced but is constrained by damage caused by roaming animals (pigs and chickens), the lack of inputs and water availability.

The nation's small size, isolation from markets, and a harsh physical environment are significant constraints to the country's development. Land resources are few and of poor quality and with the highest point of land is less than five meters above sea level the low-lying atolls face occasional cyclones and the prospect of marine inundation in the event of rising sea levels. Higher sea levels already threaten the country's underground water table and the future habitation by the people of Tuvalu.

The Government of Tuvalu's *Te Kakeega III* (National Strategy for Sustainable Development, 2016 to 2020) identified that agriculture in Tuvalu faces a long list of challenges that constrain prospects for agricultural development much beyond present levels. Long-standing supply-side constraints on food production include:

- Harsh climate;
- Very poor soils;
- Narrow product base with few options to widen the base;
- Land tenure systems that limit land availability;

- Labour intensive production restricted to small plots;
- Poor inter-island transport links;
- Dependence on imported agricultural inputs; and
- Lack of infrastructure to support non-subsidised agricultural development beyond subsistence.

It is acknowledged that the development of agriculture in Tuvalu must confront many fundamental issues and challenges. Nevertheless, there is considerable scope for increasing production for local consumption and reversing recent production declines. Key challenges will be to revitalize and expand agriculture extension services, encourage people to once again turn to local rather than imported foods for better nutritional health, and improved transport and marketing of local produce.

With this in mind, the 'Tuvalu Agriculture Strategic Marketing Plan, 2016 – 2025' has identified six key objectives for the agriculture sector, including:

- Increase local food consumption and decrease reliance on imported food;
- Generate foreign exchange earnings by exporting prime local products;
- Revive traditional integrated organic farming practices and consequently increase land productivity;
- Preserve and breed more climate-resilient traditional food crops and tree varieties by cultivating them with innovative crops and trees that are bred to be more resilient to climatic changes;
- Increase knowledge and awareness of the benefits of local food; and
- Increase the sale of local produce and quality traditional handicrafts in Tuvalu.

Key findings/conclusions

The subsistence nature of Tuvalu's agricultural sector was evidenced by the number of households in the 2017 Census who reported undertaking some form of agricultural activity. Of the 1 626 households nationally, 1 464 (90 percent) reported some type of agricultural activity, including livestock raising (reported by 84 percent of all households), crop growing (69 percent), buying or selling fish (60 percent) and handicraft production (35 percent).

These numbers were considerably higher on most of the Outer Islands, where over 95 percent of households reported engaging in agricultural activities of some kind. While the Census identified that raising livestock and crop production were the main agricultural activities in Tuvalu, it also found that many households were engaged in mixed farming activities, i.e. in at least two or more of the sub-sectors of livestock raising, crop production, fishing or handicraft production. This is particularly evidenced by the high proportion of households on the Outer Islands reporting various forms of agricultural activity.

Understandably, there was less crop production (48 percent of households) or livestock raising (76 percent of households) reported on Tuvalu's capital and most populated island, Funafuti, where the total land area is only 299 hectares and the population density approximately 2 800 people per square kilometre.

The vast majority of households engaged in agriculture were subsistence producers, that is, the produce grown by the household was primarily for the household's own consumption. Less than one (1) percent of the households engaged in livestock raising reported that their production was mainly for sale, while only two (2) percent of cropping households grew crops for sale. The challenge for households is to increase their production levels to a more commercial scale of operation to overcome problems such as poverty, famine, hunger and poor nutrition. However, there are obstacles to be overcome to further develop commercial farming, such as the availability of suitable arable land.

Whilst Funafuti dominates the job opportunities in the public sector, most agriculture, fishing and handicraft production takes place on the outer islands. There is a growing observance that traditional skills are being lost, as many of the younger generation migrate to Funafuti in search of employment or are reluctant to engage in the

traditional subsistence lifestyle. Slowing the migration of population to Funafuti, and improving the quality of life and income earning opportunities for those on the outer islands remains a high priority.

Possibly the most concerning aspect of the 2017 Census was that less Tuvaluan households reported undertaking agricultural activities compared with the data collected in the previous Census conducted in 2012. The number of households raising livestock or poultry, growing crops and producing handicrafts all decreased significantly between 2012 and 2017.

Livestock raising

In the livestock sub-sector, the proportion of households raising pigs reduced from 81 percent of all households in 2012 to 76 percent in 2017, households raising chickens decreased from 54 percent (2012) to 42 percent (2017) and households raising ducks fell from 15 percent of all households in 2012 to 9 percent (2017).

While total pig numbers remained fairly steady at around 11 000 on Census night 2017 compared with 2012, there were significant reductions recorded in poultry numbers. Chicken numbers decreased from 19 209 in 2012 to 15 443 in 2017, a decrease of 20 percent in the nation's flock, while duck numbers decreased by over one-third from 1 842 (in 2012) to 1 209 (2017).

Similar trends were observed with domestic animals, where dog numbers nearly halved between 2012 and 2017 and cat numbers decreased by 21 percent during the same period.

Cropping

The reductions in the cropping sub-sector were even more dramatic, with the actual number of households growing the traditional main crops such as coconut, bananas, taro, breadfruit, pandanus, talo and felo decreasing between 33 percent and 62 percent for each crop type. The reduced crop production on the more heavily populated Funafuti is a major concern, and which, unless addressed will further increase the reliance on crop production from the outer islands or the importation from other countries, and with it the additional financial burden of transportation and refrigerated storage.

Most cropping households cultivated multiple crop types, with an average of 5.1 different crops grown per household in the 12 months leading up to the 2017 Census night.

In 2015/16, it was estimated that over one-third of Tuvaluan households' expenditure on food and non-alcoholic beverages was on imported goods including chicken (fresh and frozen), rice, sugar and biscuits. While it is clear that the lack of suitable land area and soil quality throughout Tuvalu has meant that grains, including rice, will continue to be imported, unless the production of local fruit and vegetable crops can be increased the heavy reliance on imported food items will remain. Improving fruit and vegetable productivity and yields remain critical to Tuvalu's desire for greater food security and enhanced self-sufficiency towards its goal of import substitution.

Unlike the 2012 Census, the 2017 Mini-Census did not collect any information on the area of land used by households for agricultural production or the size of home gardens, crop cycles, quantities of vegetables harvested from home gardens, fertilizer type and frequency of application or agriculture tools owned.

It is therefore not possible to determine definitively whether the decrease in the number of households growing crops has actually resulted in a decrease in fruit and vegetable production across each of the islands. It could be the case that some households are acquiring or leasing their neighbor's or nearby land for the purpose of cropping, resulting in less households actually engaged in cropping activities but larger average agricultural holdings for those households still cropping. Such larger holdings can potentially realize efficiencies and 'economies of scale' including labour requirements, infrastructure such as tractors or other equipment, storage facilities, larger scale marketing and supply options.

As the 2017 Mini-Census did not collect actual measures of land size or production levels for each household, it is not possible to examine the extent of the larger scale agricultural operations or the efficiencies that scale may present, or their contribution to overall production levels compared with subsistence households.

To be able to accurately monitor and model these trends in household agricultural activities into the future, it is critical that consistent data, such as land size, land use, cropping frequency and fruit tree numbers and stage of production are collected whenever a Census or survey is conducted.

These decreases in the number of agricultural households have occurred during a period in which

the Tuvalu Government, through the Department of Agriculture, has made efforts to enhance extension services through employing additional staff, supplying farm tools and also sending agricultural staff abroad for training.

Fishing

In economic terms, fishing licensing revenue remains Tuvalu's biggest source of revenue, earning the small nation A\$20 – 25 million per year.

Tuvalu is highly dependent on coastal fishery resources to meet domestic needs and safeguard food security. Evidence suggests that coastal marine life is being impacted by pollution, over-fishing and coastal degradation, particularly around Funafuti. Septic tank leakage and uncontrolled liquid sanitation waste has created harmful and excessive nutrient loads in the Funafuti lagoon, and is likely the cause of Sargassum seaweed overgrowth and chronic problems with ciguatera that began some time before 2010.*

Fish are important for both food security and nutrition. Attempts to develop domestic fisheries in Tuvalu beyond the subsistence level have met with only limited success so far.

The fishing questions in the 2017 Mini-Census focused largely on the economic aspects of households buying and selling fish, including the categories of fish bought and sold and the frequency of buying and selling fish in the previous thirty (30) days. While some assumptions can be drawn that households selling fish may have actually caught the seafood, this could not be verified.

Unlike the 2012 Census, the 2017 questionnaire did not include any fishing activity questions, such as the specific varieties of the fish caught or seafood collected, the average weight of fish caught each week, where the fishing or seafood activity was undertaken, the type of fishing methods used or whether the household owned a boat, outboard motor or canoe. Also not collected in 2017 was information on whether the fish or seafood caught or collected was mainly for home consumption, for sale or some combination of both.

Information on the buying and selling of fish are more appropriately collected in the five-yearly Household Income and Expenditure Survey (HIES) than a Population and Housing Census or in this case a Mini-Census.

* Government of Tuvalu's *Te Kakeega III* – National Strategy for Sustainable Development, 2016 to 2020.

In summary, the fish-related questions on the 2017 Mini-Census were of little value in assessing actual household fishing activity and therefore provide no opportunities for comparisons with fishing activity data collected in past Censuses.

Handicrafts

Handicraft production also showed a significant downward trend, from 60 percent of households engaged in handicrafts in 2012 to only 35 percent of households in 2017, with significant decreases reported across most islands and for all types of handicrafts.

The decreases were particularly evident on Funafuti where the proportion of households producing handicrafts decreased from 47 percent in 2012 to 16 percent in 2017, a two-thirds reduction. At a national level, the number of households producing the various handicraft items were mostly halved or even greater between 2012 and 2017.

The 2017 Mini-Census collected information on the number of individual handicraft items produced by each household. This information was not previously collected in either the 2002 or 2012 Population and Housing Censuses, but is a valuable data item addition for future comparisons.

General

One of the main challenges facing Tuvalu is to encourage educated people at productive age to become engaged in the agricultural sector. If agriculture and fisheries are not viewed as an attractive job option for young people in Tuvalu, then the availability of labor resources to support an increasing agriculture sector might prove a challenge in the future. This could soon become problematic if the current trend of younger persons migrating from the outer islands to the capital, Funafuti continues along with the aging demographic of farming household heads.

Furthermore, with over one quarter of agricultural households currently headed by females, it will also be important to actively encourage and engage females into the agricultural workforce if program objectives are to be realized. These female-headed households are critically important in enhancing household food security and nutrition and to the overall health and wellbeing of the household.

The 2017 Mini-Population and Housing Census provided a unique opportunity for identifying all

agricultural households, including in urban areas, for developing an up-to-date, reliable frame as a starting point for future agricultural censuses and surveys. As stated previously, unfortunately the Mini-Census did not include relevant questions to develop a reliable frame of households undertaking fishing or aquaculture activities, either subsistence or commercial.

Building a frame of household-operated agricultural holdings (or land parcels) is a larger and more complex task. It effectively means establishing the extent and scale of households' agricultural activity, including how many separate land holdings are operated by each household and their geographical location. Minimum size limits, on variables such as numbers of livestock, numbers of trees (tree crops), area of land (temporary crops), value of annual sales, and the purpose of production (breeding livestock) are used in many countries to determine whether a household's agricultural activity qualifies as a holding or not. The small size and number of households in Tuvalu lends itself to incorporating agricultural and fisheries content in the 10-yearly Population and Housing Census, where basic information can be collected on smaller holdings and more detailed information collected on households above a minimum size limit through a supplementary questionnaire. With such an approach, enumerator effort and resources can then be focused on the more productive holdings.

The 2017 Tuvalu Mini-Census was certainly a positive step in determining agricultural household numbers, however the lack of detailed information regarding actual land area farmed, the number and type of holdings, crop production or yields per crop type, bearing and non-bearing orchard and plantation tree numbers etc., does present some difficulties in assessing and defining the smallest holdings from the productive holdings.

Recommendations

It is also important that authorities consider consolidating and building capacity and capability within the Departments of Agriculture and Fisheries to enable the ongoing collection, production and dissemination of up-to-date and accurate agricultural statistics in a timely and coherent manner. Such information is critical for informed decision making and for the development of policy planning to promote economic growth not only in rural areas but nationally, to reduce poverty, improve nutrition and provide food security.

For future Censuses, it is recommended that line ministries and institutions responsible for the Tuvalu Census development consider adopting the Core and Supplementary Agriculture and Fishing Module approach developed by the Pacific Community (SPC) for the 2022 and future Population and Housing Censuses. This approach has been successfully implemented in other Pacific Island countries and covers the key agriculture and fisheries data requirements.

This methodology of including a stronger agricultural and fisheries content in the Population and Housing Census has been successfully adopted by several other Pacific Island countries.

It is recommended that initiatives be introduced to encourage and enable farmers and graduates to work together to conduct research and trial new

approaches to improve livestock husbandry and health, increase crop production and productivity, including environmentally-friendly land and livestock management, soil fertilization and pest control, as well as to enhance fisheries activities.

It is important that future Censuses include post-enumeration surveys which incorporate quality assurance checks of not only household and individual demographic data collected, but also of any agriculture or supplementary information collected from each household. Without such post-enumeration studies, it is not possible to qualify the accuracy of the agricultural and fisheries data collected. Such studies may also identify any weaknesses in enumerator or supervisor training which can then be rectified for future censuses or surveys.

ANNEX

Median 2017 TUVALU MINI-CENSUS OF POPULATION AND HOUSING: HOUSEHOLD QUESTIONNAIRE FORM 3 (Agriculture and fishing content)

<p>H16. In the last 12 months, did any member of this household grow or harvest any of the following?</p>	<p>MULTI-SELECT: YES/NO crops</p> <p>01 <input type="checkbox"/> / <input type="checkbox"/> Beans (string, long, green, star)/piini 02 <input type="checkbox"/> / <input type="checkbox"/> Tree spinach/bele/pele 03 <input type="checkbox"/> / <input type="checkbox"/> Bell pepper/capsicum/pepa 04 <input type="checkbox"/> / <input type="checkbox"/> Cabbage/kapisi saina 05 <input type="checkbox"/> / <input type="checkbox"/> Chili peper/tili 06 <input type="checkbox"/> / <input type="checkbox"/> Com/koni 07 <input type="checkbox"/> / <input type="checkbox"/> Cucumber/kukama 08 <input type="checkbox"/> / <input type="checkbox"/> Egg plant/paigani 09 <input type="checkbox"/> / <input type="checkbox"/> Lettuce/letisi 10 <input type="checkbox"/> / <input type="checkbox"/> Spring/green onion/aniani 11 <input type="checkbox"/> / <input type="checkbox"/> Tomato 12 <input type="checkbox"/> / <input type="checkbox"/> Melons (water, rock)/meleni 13 <input type="checkbox"/> / <input type="checkbox"/> Pumpkin/squash/panikeni 14 <input type="checkbox"/> / <input type="checkbox"/> Banana/pata/fuamaulalo 15 <input type="checkbox"/> / <input type="checkbox"/> Breadfruit/mei 16 <input type="checkbox"/> / <input type="checkbox"/> Coconut/niu</p> <p>And 12 other symbols [4]</p>
<p>I Read each option.</p>	
<p>HOUSEHOLD Roster: CROP PURPOSE generated by multi-select question crops roster_cr</p>	
<p>H16a. What was the other crop?</p> <p>E @rowcode == 28 E1 self. Length > 0 M1 Other description cannot be left blank.</p>	<p>TEXT otherCrop</p> <p>.....</p>
<p>H16b. What was the MAIN purpose of growing or haversting %rostertitle%?</p>	<p>SINGLE-SELECT cropPurpose</p> <p>01 <input type="radio"/> Home consumption 02 <input type="radio"/> For sale 03 <input type="radio"/> Mainly home consumption, but some for sale 04 <input type="radio"/> Mainly for sale, but some for home consumption 05 <input type="radio"/> Other (e.g. customary)</p>
<p>H16c. How frequently do you haverst this crop or plant?</p>	<p>SINGLE-SELECT cropFreq</p> <p>01 <input type="radio"/> At least every week 02 <input type="radio"/> Every fortnight 03 <input type="radio"/> Every month 04 <input type="radio"/> Every 2 months 05 <input type="radio"/> Every 3 months 06 <input type="radio"/> Every 4 months 07 <input type="radio"/> About twice a year 08 <input type="radio"/> Once a year</p>

<p>H16d. On average, how many LITERS of toddy is collected in a typical DAY?</p> <p>E @rowcode == 27</p> <p>E1 self.InRange(0.1, 50.0)</p> <p>M1 The number of liters entered is out of range. Valid values are 0.1L to 50.</p>	<p>NUMERIC DECIMAL toddy</p> <p>-----</p>
<p>H17. Does this household currently raise the following animals?</p> <p>I Read each option.</p>	<p>MULTI-SELECT: YES/NO animal</p> <p>01 <input type="checkbox"/> / <input type="checkbox"/> Pigs</p> <p>02 <input type="checkbox"/> / <input type="checkbox"/> Chickens</p> <p>03 <input type="checkbox"/> / <input type="checkbox"/> Ducks</p> <p>04 <input type="checkbox"/> / <input type="checkbox"/> Goats</p> <p>05 <input type="checkbox"/> / <input type="checkbox"/> Dogs</p> <p>06 <input type="checkbox"/> / <input type="checkbox"/> Cats</p>

HOUSEHOLD

Roster: LIVESTOCK AND PETS

generated by multi-select question [animal](#)

roster_an

<p>H17a. How many %rostartertitle% does this household currently own?</p> <p>E1 // valid number of pigs @rowcode == 1 ? (!self.InRange(1, 30) ? false : true) : true</p> <p>M1 The number of %rostartertitle% is out of range. Valid values are from 1 to 30. You can ignore this error is the number has been verified.</p> <p>E2 // valid number of chicken @rowcode == 2 ? (!self.InRange(1, 50) ? false : true) : true</p> <p>M2 The number of %rostartertitle% is out of range. Valid values are from 1 to 50. You can ignore this error is the number has been verified.</p> <p>E3 // valid number of ducks @rowcode == 3 ? (!self.InRange(1, 10) ? false : true) : true</p> <p>M3 The number of %rostartertitle% is out of range. Valid values are from 1 to 10. You can ignore this error is the number has been verified.</p> <p>E4 // valid number of goats, dogs and cats @rowcode == 4 ? (!self.InRange(1, 5) ? false : true) : true</p> <p>M4 The number of %rostartertitle% is out of range. Valid values are from 1 to 5. You can ignore this error is the number has been verified.</p>	<p>NUMERIC INTEGER animalNum</p> <p>-----</p>
<p>H17b. What was the MAIN purpose of raising %rostartertitle%?</p> <p>E @rowcode == 1 @rowcode == 2 @rowcode == 3 @rowcode == 4</p>	<p>SINGLE-SELECT animalPurpose</p> <p>01 <input type="radio"/> Home consumption</p> <p>02 <input type="radio"/> For sale</p> <p>03 <input type="radio"/> Mainly home consumption, but some for sale</p> <p>04 <input type="radio"/> Mainly for sale, but some for home consumption</p> <p>05 <input type="radio"/> Other (e.g. customary)</p>

<p>H17c. What type of housing does the household use for keeping its %rosteritle%?</p> <p>E @rowcode == 1 @rowcode == 2 @rowcode == 3 @rowcode == 4</p>	<p>SINGLE-SELECT animalPen</p> <p>01 <input type="radio"/> Modern 02 <input type="radio"/> Local 03 <input type="radio"/> Both 04 <input type="radio"/> No housing</p>
<p>H17d. How do you dispose of the %rosteritle% waste?</p> <p>E @rowcode == 1 @rowcode == 2 @rowcode == 3 @rowcode == 4</p>	<p>SINGLE-SELECT animalWaste</p> <p>01 <input type="radio"/> Pit 02 <input type="radio"/> Septic tank 03 <input type="radio"/> Open flush 04 <input type="radio"/> Composting 05 <input type="radio"/> Other</p>
<p>H18. In the past 30 days did anyone in this household buy or sell any of the following kinds of fish?</p> <p>I Read each option.</p>	<p>MULTI-SELECT: YES/NO fish</p> <p>01 <input type="checkbox"/> / <input type="checkbox"/> BUY – REEF fish such as groupers – pula 02 <input type="checkbox"/> / <input type="checkbox"/> SELL – REEF fish such as groupers – pula 03 <input type="checkbox"/> / <input type="checkbox"/> BUY – PELAGIC fish such as tuna – takua/atu 04 <input type="checkbox"/> / <input type="checkbox"/> SELL – PELAGIC fish such as tuna – takua/atu 05 <input type="checkbox"/> / <input type="checkbox"/> BUY – DEEP SEA fish such as ruby deepwater snappers – palu malau puku/loa 06 <input type="checkbox"/> / <input type="checkbox"/> SELL – DEEP SEA fish such as ruby deepwater snappers – palu malau puku/loa</p>
<p>H19. How many times in the past 30 days did your household BUY – REEF fish such as groupers – pula?</p> <p>E fish.Yes.Contains(1) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER buyReef</p> <p>-----</p>
<p>H20. How many times in the past 30 days did your household SELL – REEF fish such as groupers – pula?</p> <p>E fish.Yes.Contains(2) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER sellReef</p> <p>-----</p>
<p>H21. How many times in the past 30 days did your household BUY – PELAGIC fish such as tuna – takua/atu?</p> <p>E fish.Yes.Contains(3) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER buyPelagic</p> <p>-----</p>
<p>H22. How many times in the past 30 days did your household SELL – PELAGIC fish such as tuna – takua/atu?</p> <p>E fish.Yes.Contains(4) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER sellPelagic</p> <p>-----</p>

<p>H23. How many times in the past 30 days did your household BUY – DEEP SEA fish such as ruby deepwater snappers – palu malau puku/loa?</p> <p>E fish.Yes.Contains(5) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER</p> <p style="text-align: right;">buyDeep</p> <p>-----</p>
<p>H24. How many times in the past 30 days did your household SELL – DEEP SEA fish such as ruby deepwater snappers – palu malau puku/loa?</p> <p>E fish.Yes.Contains(6) E1 self. InRange(1, 30) M1 Number of times entered is out of range. Valid values are from 1 to 30.</p>	<p>NUMERIC INTEGER</p> <p style="text-align: right;">sellDeep</p> <p>-----</p>
<p>H25. In the last 12 months, did any member of this household make the following handicrafts?</p> <p>I Read each option.</p>	<p>MULTI-SELECT: YES/NO</p> <p style="text-align: right;">Handicrafts</p> <p>01 <input type="checkbox"/> / <input type="checkbox"/> Necklace 02 <input type="checkbox"/> / <input type="checkbox"/> Mat 03 <input type="checkbox"/> / <input type="checkbox"/> String 04 <input type="checkbox"/> / <input type="checkbox"/> Model canoe 05 <input type="checkbox"/> / <input type="checkbox"/> Broom 06 <input type="checkbox"/> / <input type="checkbox"/> Fan 07 <input type="checkbox"/> / <input type="checkbox"/> Basket 08 <input type="checkbox"/> / <input type="checkbox"/> Laukie 09 <input type="checkbox"/> / <input type="checkbox"/> Other</p>

HOUSEHOLD

Roster: HANDICRAFTS

generated by multi-select question [handicrafts](#)

roster_ha

<p>H25a. What was the other handicraft?</p> <p>E @rowcode == 9</p>	<p>TEXT</p> <p style="text-align: right;">craftOther</p> <p>.....</p>
<p>H25b. How many %rostertitle%(s) did you make in the past 12 months?</p> <p>E1 self. InRange(1, 50) M1 The number of %rostertitle%(s) that you entered is out of range. Valid numbers are from 1 to 50.</p>	<p>NUMERIC INTEGER</p> <p style="text-align: right;">craftNum</p> <p>-----</p>
<p>H25c. What was the main purpose for making %rostertitle%(s)?</p>	<p>SINGLE-SELECT</p> <p style="text-align: right;">craftPurpose</p> <p>01 <input type="radio"/> Home consumption 02 <input type="radio"/> For sale 03 <input type="radio"/> Mainly home consumption, but some for sale 04 <input type="radio"/> Mainly for sale, but some for home consumption 05 <input type="radio"/> Other (e.g. customary)</p>

H29a. Has this dwelling ever been affected by a king tide in the last 5 years?	SINGLE-SELECT 01 <input type="radio"/> Yes 02 <input type="radio"/> No	kingTide
H29b. Has this dwelling ever been affected by a storm surge in the last 5 years?	SINGLE-SELECT 01 <input type="radio"/> Yes 02 <input type="radio"/> No	stormSurge
H29c. Has this dwelling ever been affected by other disasters in the last 5 years? (e.g., cyclones, droughts)	SINGLE-SELECT 01 <input type="radio"/> Yes 02 <input type="radio"/> No	naturalDisaster
H30. Has any member of this household lost any owned land due to erosion in the last 5 years?	SINGLE-SELECT 01 <input type="radio"/> Yes 02 <input type="radio"/> No	erosion

REFERENCES

Food security in the Pacific and East Timor and its vulnerability to climate change, Secretariat of the Pacific Community in conjunction with CSIRO (2011)

Te Kakeega II – National Strategy for Sustainable Development 2005-2015, Government of Tuvalu (published November 2005)

Te Kakeega III – National Strategy for Sustainable Development 2016 – 2020, Government of Tuvalu (published March 2016)

Tuvalu Agriculture Strategic Marketing Plan, 2016 – 2025, Government of Tuvalu (published 2016)

Tuvalu Country Report No. 18/209, International Monetary Fund (July 2018)

Tuvalu Fishery and Aquaculture Country Profile, Food and Agriculture Organisation of the United Nations (February 2017)

Tuvalu Food Security Profile, Food and Agriculture Organisation of the United Nations (published 2020)

Tuvalu GDP 2018 – National Accounts, Tuvalu Central Statistics Division (<https://stats.gov.tv/category/economics/national-accounts/>)

Tuvalu 2015/2016 Household Income and Expenditure Survey (HIES) Full Report, Tuvalu Central Statistics Division and Pacific Community (November 2018)

Tuvalu Population and Housing Census 2012 – Household and Personal Questionnaire, Pacific Data Hub – Microdata Library (<https://microdata.pacificdata.org/index.php/catalog/50/related-materials>)

Tuvalu Population and Housing Census 2012 Volume 1 – Analytical Report, Central Statistics Division (CSD) of the Government of Tuvalu (2013)

Tuvalu National Population and Housing Census 2012 – Migration, Urbanisation and Youth Monograph, United Nations Population Fund Pacific Sub-Regional Office

Tuvalu Population and Housing Census, 2017 – Documentation and Data Description, Pacific Data Hub – Microdata Library (<https://microdata.pacificdata.org/index.php/catalog/269/study-description>)

Tuvalu Population and Housing Mini-Census 2017 – Preliminary Report, Central Statistics Division, Ministry of Finance, Economic Planning and Industries, Government of Tuvalu

Tuvalu – Situation Analysis and Agriculture Sector Overview, Food and Agriculture Organisation of the United Nations

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