

The Tongan Beef Industry

Country report for ACIAR Project LS/2018/102

Research opportunities for smallholder beef cattle systems in Pacific island
countries

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Acronyms

AU\$ - Australian Dollar

DFAT - Department of Foreign Affairs and Trade, Government of Australia

FAO - Food and Agriculture Organisation of the United Nations

IFAD - International Fund for Agricultural Development, United Nations

IUCN - International Union for Conservation of Nature

MAFFF - The Ministry of Agriculture, Food, Forests and Fisheries, Government of Tonga

NZAID - New Zealand Agency for International Development

PACCSAP - Pacific-Australia Climate Change Science Adaptation Planning, Government of Australia

PARDI2 - Pacific Agribusiness Research in Development Initiative Phase 2, ACIAR

PHAMA - Pacific Horticultural and Agricultural Market Access, DFAT, Government of Australia

SPC - The Pacific Community (formerly The Secretariat of the Pacific Community)

SPREP - South Pacific Regional Environment Programme

TOP – Tonga Pa’anga (TOP1 = AU\$0.58 on 01-Jul-2018)

TRIP - Tonga Rural Innovation Project

UNDP - United Nations Development Program

US\$ - United States Dollar

1 Introduction

1.1 Background to report

The beef cattle sector plays a significant role in livelihoods in many Pacific island countries (PICs). Contributions of the industry vary by locality but includes contributions to localised consumption and ceremonies, rural incomes, downstream industry and trade. Benign tropical systems in the region are well suited to cattle production, and under-utilised resources are available to boost productivity in some countries. There is robust demand for beef in a diverse range of markets.

Cattle production is however stagnant in nearly all countries and small-holder segments of the industries are under-performing. All national governments are interested in building or revitalising beef industries to various degrees. The sector is under-invested and under-researched, and policy is not necessarily informed by detailed, household-level or up-to-date research.

Against this background, ACIAR commissioned a Small Research Activity to investigate research opportunities for small-holder beef cattle systems across some of the Pacific island countries, namely Fiji, Vanuatu, Samoa, Tonga and the Solomon Islands.

This report provides a brief descriptive analysis of the Tongan beef industry. The research was conducted in 2018 using the following methods:

- A review of existing published or unpublished literature on the Tongan beef industry;
- Statistics collected from international databases, from government sources and from industry; and
- A scoping trip, including interviews and field visits with government agencies, extension and education providers and the commercial sector (small holder and large holder cattle producers, abattoirs, butchers, input suppliers). See Section 6.

This country report on Tonga will be combined with country reports from Fiji, Vanuatu, Samoa and the Solomon Islands to identify priority areas of research for development of the beef cattle sector that fall within the remit of ACIAR.

2 Underlying structures

2.1 Economic

Tonga had a GDP of US\$417 million in 2017 (constant US\$1010). GDP growth averaged 2% over the 10 years 2008-17. Growth declined in 2006-07 and in 2012-13, followed by rebounds in each following period (World Bank, 2018). Growth is largely driven by public expenditures due to a small private sector (Tonga Statistics Department, 2017). Remittances and handicraft are important.

In terms of contribution to GDP, agriculture is the second biggest sector in Tonga after the services sector. Value-added from agriculture, forestry, and fisheries increased over the period to account for a high 17% of GDP (World Bank, 2018).

Tonga has a small, open economy, with a significant trading sector relative to GDP. Tonga imports a wide range of machinery, minerals, and food, including animal products. About 90% of exports are agricultural such as kava, squash, roots crops, coconuts, and fish. Squash exports declined by 12% in 2013/14 due to a collapse in the market and exporters, exposing the narrow export base (MAFFF, 2015).

The overall trade deficit for Tonga was \$US170 million in 2017. In 2013, imported basic food products were valued at TOP55.5 million, and exports of similar items at TOP18.9 million, creating a “food trade deficit” of about TOP36.6 million. As overviewed below, policy-makers are aiming to replace some of these imported food items (Government of Tonga, 2016).

Tonga has had low inflation, except for very large increases in kava prices in 2016.

2.2 Demographics and incomes

2.2.1 Population

The *Tonga Household Income and Expenditure Survey 2015/2016* reported a resident household population of 99,557 in 2015, with 18,007 households (Tonga Statistics Department, 2017). About 75% of Tonga’s population is rural. The rural population is declining slowly due to out-migration and urbanisation, especially on Tongatapu, which is leading to an aging farmer population and farm labour shortages (Government of Tonga, 2016). The Ministry of Agriculture, Food, Forests and Fisheries (MAFFF) are concerned that the younger generation are not interested in farming, and seek livelihoods overseas (migration, seasonal work, and sport). Crime was also a concern in some areas, including the illegal slaughtering of animals on-farm and taking of meat.

The *Tonga National Agricultural Census 2015* reported 13,944 agriculturally active households and organisations. Of the 13,944 active agricultural households, 92% (12,859) raised livestock (Tonga Statistics Department (2017). About 20% (3,310 households) of the total households in Tonga kept cattle at the time of the 2015 Census (MAFFF, 2015).

2.2.2 Incomes

GDP per capita in 2017 was US\$3,862 (2010 constant) (World Bank, 2018). Household surveys (Government of Tonga, 2016) report average per capita annual incomes were TOP5,890 (US\$2,681) in 2015, with significantly lower incomes in outlying areas (such as Ongo Niua) and higher in urban areas (for example, Tongatapu). About 25% of households in Tonga are estimated to currently live below the Basic Needs Poverty Line (Indexmundi, 2018), as a function of location (in outer islands), subsistence agriculture, and fluctuating alternative sources of income (remittances, handicrafts, and youth unemployment).

Income is derived mainly from wages with remittances making up about 20% of household incomes. Incomes from agriculture and handicrafts make up about 10% each, with livestock (mainly pigs) only a minor item (Government of Tonga, 2016).

2.2.3 Subsistence levels and consumption

Tonga has one of the highest rates of food subsistence production in the Pacific, where agriculture is primarily a means of providing food security and meeting cultural and religious obligations. Over 95% of agriculturally active households are engaged in subsistence and semi-subsistence agriculture activities, with only 5% engaged in commercial agriculture activities (MAFF, 2015)².

² Definitions used in the Census are: subsistence agriculture is where most of the produce is consumed by household; semi-subsistence is where some produce is consumed by the household and some sold to market; and commercial agriculture is where most of the produce is sold on the market. Livestock categories were measured by the number of cattle kept: subsistence 1 animal; semi-subsistence 2-24 animals; commercial > 24 animals.

On the production side, 40% of households sell some of their agricultural produce, 7% sell a portion of their fisheries harvest, 33% sell livestock that the household raises and 33% sell handicrafts and home processed foods (Tonga Statistics Department, 2017).

On the consumption side, tubers are the main food item consumed by Tongan households, 69% of which is own-produced. However, there are range of food products that are mainly purchased. The second largest food item for Tongan households is chicken, 99% of which is purchased. Sheep meat and beef are also in the top eight food items consumed of which 100% and 94% are purchased respectively (Government of Tonga, 2016).

2.3 Land use

2.3.1 Land tenure

There are four main categories of land in Tonga: own land; short-term lease; long-term lease, and “others” (MAFFF, 2015). There are about 12,120 land parcels in Tonga of which around 45% are owned by households. Land is inherited by the eldest son and every male over the age of 16 years old is entitled to eight acres of bush allotment but finite land and population growth has reduced this to four acres, especially on Tongatapu. About 46% of parcels are accessed by households that do not have bush allotments through “other” arrangements, including access to the land of extended family members overseas, or use of land from a chief in return for some production from the land.

2.3.2 Activities

A New Zealand Soil Bureau survey of the soils of Tongatapu (Gibbs, 1976) identified soils that were formed from either volcanic ash (Vaini or Lapaha soils) or coral sands (Nuku’alofa) or were slow draining soils of marshes and swamps (Sopu). Vaini and Lapaha are the main soils on Tongatapu and these are typically neutral, fertile clay-based soils. Nuku’alofa and Sopu soils are found in only small areas. Average annual rainfall on Tongatapu is 1,730 mm with a distinct wet season between December and April each year (Figure 1), although even during the dry season average monthly rainfall exceeds 50 mm and is often above 100 mm. Land use on Tonga is dominated by coconuts and crops (or is fallow). Livestock fit into the cropping system. However roaming livestock (mainly pigs) cause major crop losses, and even though this is a “community problem” there are few examples of communities being able to resolve this issue (Government of Tonga, 2016). Livestock can therefore be a substitute rather than complementary activity for cropping.

Monthly mean rainfall - Nuku'alofa

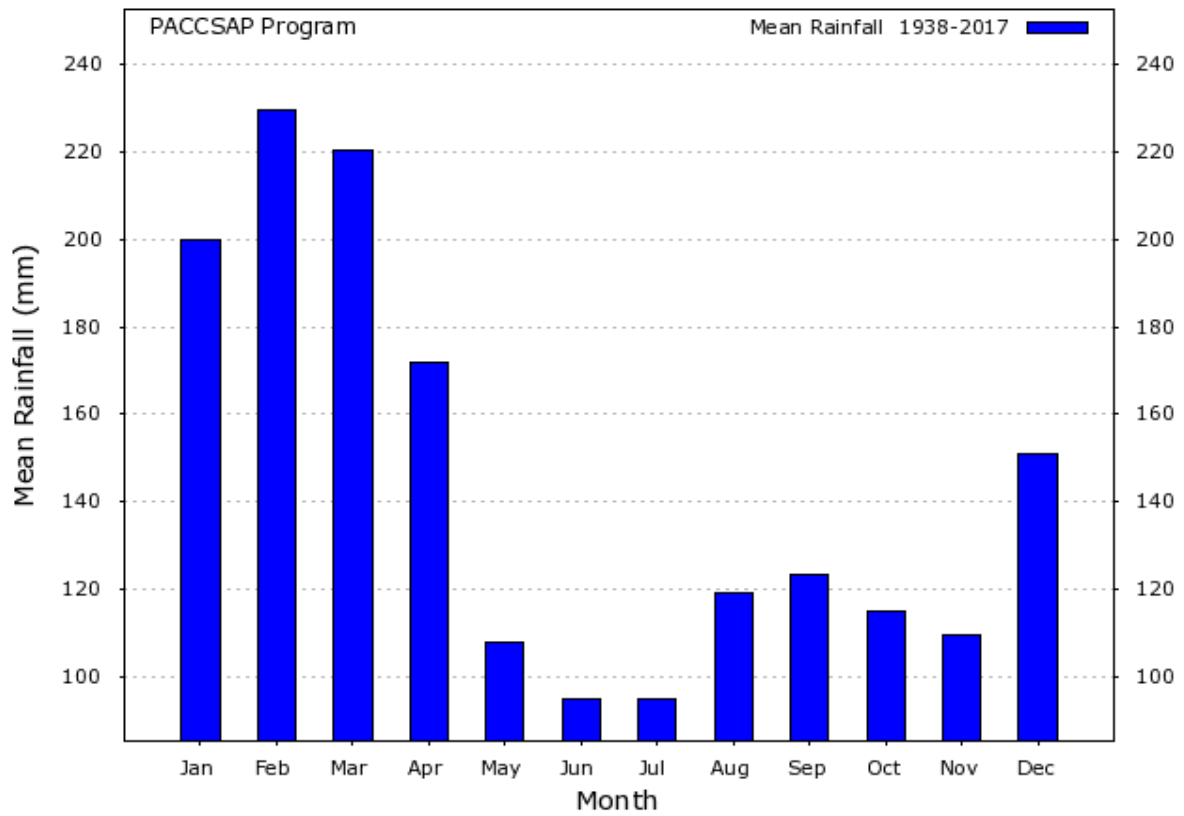


Figure 1: Long-term average monthly rainfall data for Nuku'alofa on Tongatapu, Tonga

Source: PACCSAP (2018)

Of the 13,944 agriculturally active households, 8,708 households owned bush blocks, covering 66,202 acres, used for a range of activities such as crops and livestock (Figure 2). The average area of a bush allotment per household for Tonga (and Tongatapu) was eight acres, which can be planted to crops or used for livestock (MAFFF, 2015).

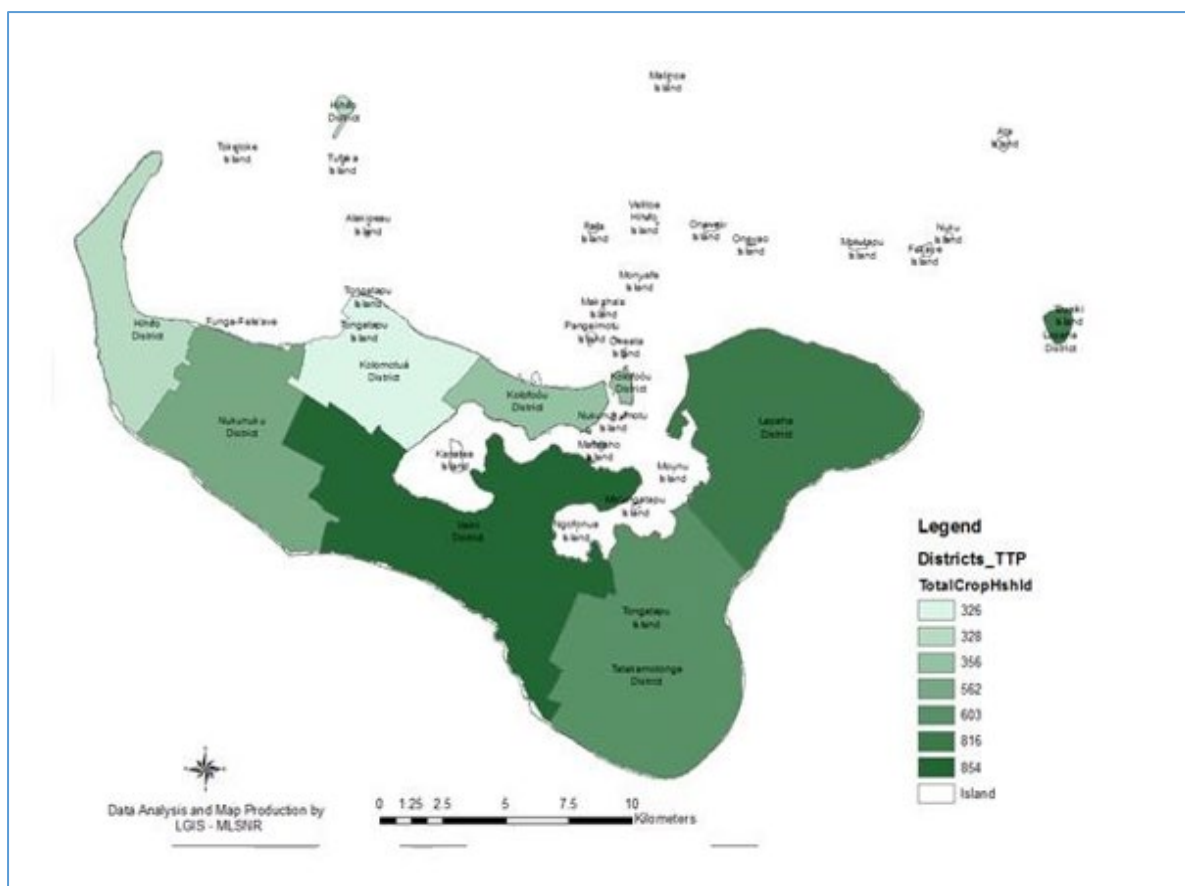


Figure 2: Distribution of agriculturally active households on Tongatapu (darker shades indicate greater numbers)

Source: MAFFF (2015)

Half of the land in Tonga is used for agriculture (Table 1). Of this, 41% is used for annual and perennial crops. The five most common annual crops cultivated in 2015 were cassava, yam, yautia, sweet potato, and swamp taro. Compared to 2001, the area planted to cassava and sweet potatoes increased, and others decreased. The five biggest perennial crops were kava, paper mulberry, vanilla, pineapple and pandanus. Kava and vanilla production have declined between 2001 and 2015, but taro is now said to be increasing again (MAFFF, 2015). Land is increasingly cultivated by contractors (private or government) using tractors.

Table 1: Cultivated land use in Tonga 2015

Island divisions	Total cultivated Land area acres	Land use (acres)				Town allotment Kitchen garden
		Annual crop	Perennial crop	Pasture	Fallow land (<5yrs)	
TONGA	57,611	23,999	3,207	4,858	25,445	102
Tongatapu	39,253	18,148	1,163	3,885	16,006	51
Vava'u	8,989	2,424	1,343	571	4,636	15
Ha'apai	4,129	1,643	158	43	2,277	8
'Eua	4,084	1,160	443	351	2,114	15
Niuas	1,156	624	100	8	412	12

Source: MAFFF (2015)

Only 8% of land in Tonga is used for pasture and livestock. Tongatapu has the largest total cultivated land area (39,253 acres or 68% of all agricultural land in Tonga). However, with a relatively large population, small land sizes and higher density of cropping, there is limited land available for extensive livestock production. Cattle (and small ruminants) must be excluded from cropping land for much of the year. Furthermore, crops are commonly planted under coconuts (at least in Tongatapu), further reducing opportunities to graze. The predominance of cropping in land use suggests that significant increases in ruminant livestock production may need fuller utilisation of crop by-products, rather than grazing.

About half of the land in Tonga is fallow. This large percentage is because land owners have migrated overseas or to other islands or due to lack of resources such as finance and labour. There is no requirement under law to use allocated land.

The Division of Livestock has supported a trial of electric fencing for some households as means of utilising pastures and for the exclusion of stock from cropping land. In these cases, cattle are moved back to secure paddocks near the household at night to reduce the risk of theft.

2.4 Livestock

Livestock numbers reported in the National Agricultural Census 2015 are shown in Table 2. It is important to note that the Livestock Division regard the census data as seriously over-stated (due to the enumeration process). The Division periodically conducts its own surveys and estimate about half the number of cattle. That is, numbers present can be discounted by up to 50%.

Table 2: Total number of livestock by type of species by islands division 2015

	Beef cattle	Dairy cattle	Pigs	Horses	Sheep	Goats	Chickens	Ducks
TONGA	16,755	2,007	110,310	1,942	1,240	1,744	92,071	2,705
Tongatapu	8,847	1,052	60,047	396	653	419	55,756	2,565
Vava'u	5,130	582	25,019	690	283	613	17,629	39
Ha'apai	1,318	229	11,749	424	9	269	9,805	21
'Eua	1,411	144	8,434	261	266	329	5,170	77
Ongo Niua	49		5,061	171	29	114	3,711	3

Source: MAFFF (2015)

Since the previous *Agricultural Census* in 2001, total reported numbers of cattle and sheep increased, while numbers of pigs, horses, goats, chickens, and ducks declined.

As mentioned above, 92% (12,859) of households raised livestock in 2015 (Tonga Statistics Department (2017) and 95% were regarded as subsistence or semi-subsistent producers (MAFFF, 2015). Small livestock (mostly pigs and chickens) are kept for home consumption, and most livestock disposals are for ceremonies. In this environment, productivity is low (Government of Tonga, 2016).

3 Policy, development, and research initiatives

3.1.1 Agricultural and livestock policy

The *Tonga Agriculture Sector Plan (2016-2020)* has four areas of focus:

- Climate-resilient agricultural production systems;
- The enabling environment;
- Subsistence-level staple food, cash crop and livestock production; and
- Increasingly active and export-orientated agriculture, with a strong focus on vegetables.

Under-pinning the “*Food for Tonga First*” Plan, is the aim to replace imports and become more food self-sufficient in the long term, not just because of impacts on the balance of trade and foreign currency, but also because of food vulnerability and price inflation. This especially applies to staples such as local root crops versus imported rice. Vegetables are considered to provide the best opportunity for commercialisation and exports. While domestic meat is generally acknowledged as uncompetitive with imported meat, policy-makers are also interested in opportunities to reduce imports of chicken, mutton and beef. It is envisioned that the production and sale of surplus products will enable more farmers to move from subsistence to semi-commercial systems.

Interviewees outlined some of the policy and project initiatives toward livestock:

- Tonga hasn’t undertaken a disease surveillance / survey since the 1990s. Policy-makers are concerned about the prevalence of diseases including tuberculosis. Tonga has had various volunteer veterinarians, but no permanent position;
- There is concern about food safety and the hygiene of meat. Tongatapu used to have a static abattoir that did anti- and post-mortem inspection. It ran for 10 years but closed in the 1990s due to high expenses and transport issues. Tonga is considering the viability of domestic slaughter and processing facilities and associated marketing infrastructure for the sale of meat and live animals. This would include training in hygienic livestock product processing, HACCP, and meat inspection. Tonga is interested in introducing a mobile slaughter unit like Samoa, which would be easier to introduce on the flat land and network of tracks in Tonga, although the resourcing and feasibility would have to be established;
- Nutrition gaps are acknowledged as a major gap in research and development programs. There was an Australian pasture improvement project that finished in the early 1990s. The Ministry of Agriculture, Food, Fisheries and Forestry (MAFFF) had a research station then, but the pasture research has concluded and the station since closed.
- The *Tonga Agricultural Sector Plan* aimed to support a series of studies and training courses on the livestock sector (Government of Tonga, 2016); and
- The Livestock Division acknowledges the value of record keeping. Attempts have been made to undertake this for poultry / layers (including feed, vaccination and disease incidents, and production). Interviewees stressed that this is a long-term, interactive process.

The government and various development agencies have undertaken a series of livestock development initiatives aimed at selected areas to increase productivity to improve food security, replace imports, and to generate livestock for sale (MAFFF, 2015).

The *Tonga Agricultural Sector Plan* mentions prospects for the development of the sheep industry due to high demand for sheep meat and advantages in slaughtering small animals. The *Tonga Agricultural Sector Plan* envisions a model similar to Samoa, through breed improvement (Fiji Fantastic, Wiltshire, and Dorpers) and improved nutrition and management.

In the beef industry, policy-makers have signalled broad aims and undertaken a few limited measures. For example, the Livestock Division estimates that about 8-12 cattle are killed in Tongatapu per week through commercial channels. They aim to increase production so that 20-30 head can be killed per week.

3.2 Agencies and development projects

The Livestock Division of MAFFF has the following sections and programs (see MAFFF, 2018):

- Livestock Feed Technology Program;

- Pig Research and Development Program;
- Smallholder Sheep Program;
- Livestock Research Service Program (a station at Vaini); and
- Veterinary Laboratory (for upgrading).

Another body relevant to livestock development in Tonga is the Tonga Livestock Farmers Council Inc. The Council was established in 2014 by the MAFFF and is located in the Livestock Division office. While the Council supports government policy such as import substitution, it is a non-profit organisation designed to provide development opportunities to members (of which there are 15, 10 have cattle). One issue that members have identified is the high cost of farming inputs. Although these are imported duty free, the Council is seeking to reduce costs.

- For example, the Council has since 2015 imported (from New Zealand) 22 containers of feed for pigs (weaners, breeders etc.) and chickens (layers, broilers). The imports were funded through a low interest loan from the Tonga Development Bank; and
- The Council was also involved in a pasture improvement program (with Ha'amo Seeds and Pioneer Seeds, through the Livestock Division and Australian and New Zealand Aid). The Council distributed seeds and provided training (although have lamented that farmers didn't follow protocols). Another corn project was seen as more successful.

Tonga has a number of other industry organisations including GroFed, GROCOM, the Manufacturers Association of Tonga, the Youth Council (processing of coconut oil), the Tongan National Arts and Handicrafts Association, and various Farmers' Councils. Some are well-established and have, or are, receiving donor support (mainly from NZMFAT and DFAT), while others, such as the Livestock Council, are more reliant on their members and on direct government funding.

The Hango Agricultural College (on 'Eua Tonga Island) is important to the Tongan agricultural sector and education. It offers diplomas and certificates in agriculture, as does the Tonga Institute of Higher Education. The college accepts and trains students from other PICs.

FAO started a project in 2017 called the Cattle and Sheep Integrated Production and Management Project for Tonga (TCP/TON/3602) (see MIC, 2017). This involves training, animal medicines, and genetic improvement, but not pasture improvement. The project may be extended in the future.

The China/MAFFF Agro-tech Cooperation Project has (since 2010) aimed to develop intensive livestock production and horticulture. It appears that these systems are to be adapted to farm and Tongan conditions, tested for feasibility and possibly extended to downstream sectors (Government of Tonga, 2016). Activities include:

- The import of day-old chicks (incubated by the Livestock Division for a week then distributed to farmers);
- A similar model for ducks;
- Small (five head) integrated piggeries. There have been eight demonstrations so far with wire fences to reduce crop damage and concrete floors to integrate with biogas converters and for hygiene;
- Vegetable and mushrooms; and
- Sweet potatoes (for noodles).

In addition to bilateral donors, multilateral agencies active in Tonga's agricultural sector include IFAD (especially the TRIP program), the World Bank, the Asian Development Bank, UNDP, FAO (Integrated Land and Agro-ecosystem Management Systems in Tonga), PACCSAP, and the International Union for

Conservation of Nature (IUCN). Regional agencies include the South Pacific Regional Environment Programme (SPREP) and The Pacific Community (SPC). DFAT's PHAMA program operates in Tonga, mostly for root crops and horticultural exports. Tonga is also a target country for the ACIAR funded PARDI2 (Pacific Agribusiness Research in Development Initiative Phase 2) project.

4 Industry structures

4.1 Industry map

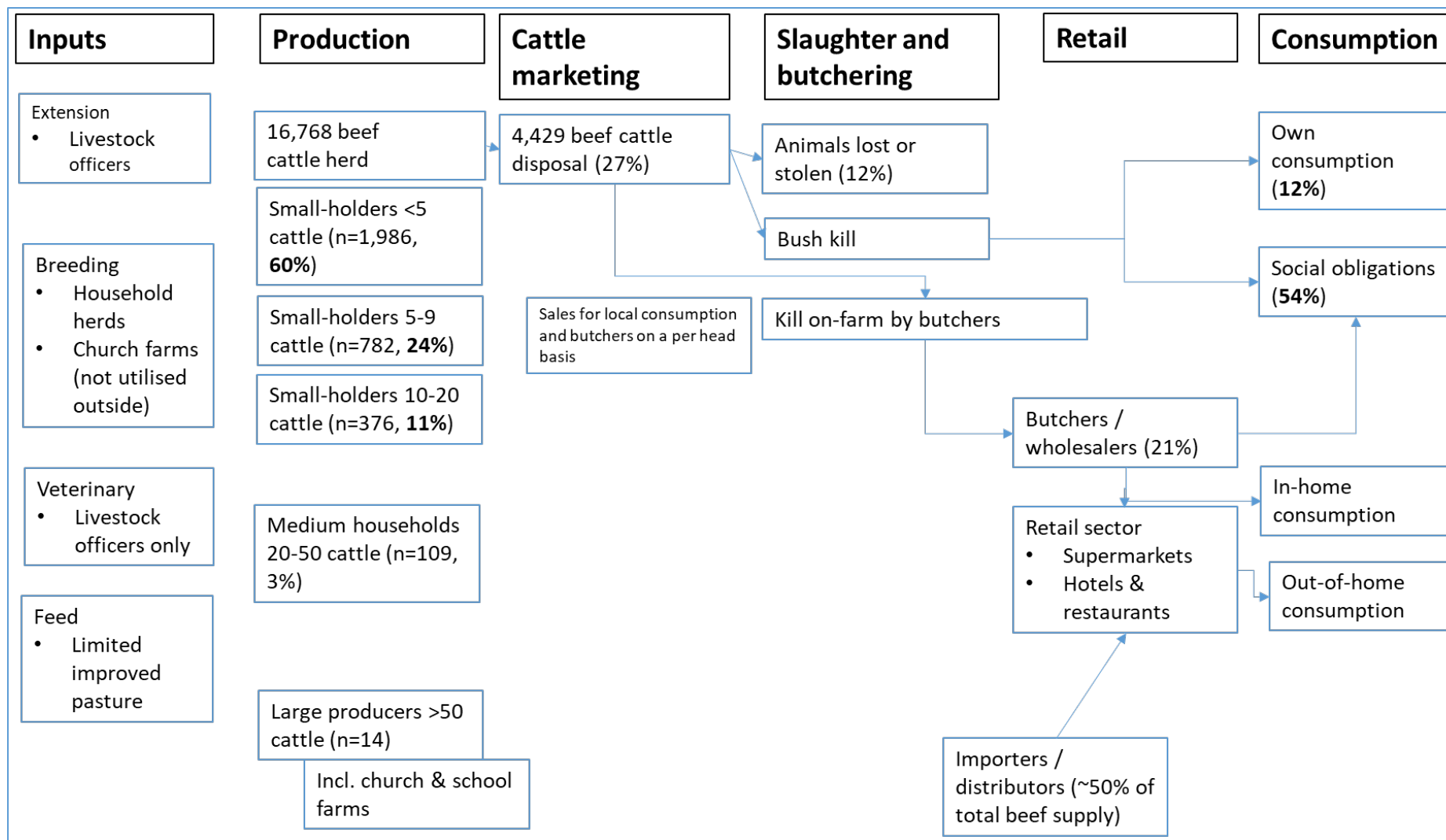


Figure 3: Structures and actors of the Tongan beef industry

4.2 Inputs

4.2.1 Breeding

The majority of beef cattle in Tonga are referred to as 'local' breeds which are likely derived from *Bos taurus* cattle imported by early European settlers. These locally adapted cattle were subsequently crossed with imported Santa Gertrudis, Brahmans, Friesians, Herefords, Limousin, Gelbvieh, Senepol and Simmental / Brahman Cross.

The government research farm (Vaini) previously conducted breed improvement programs, but this is no longer continued. Niuate Beef Cattle Farm operate their own artificial insemination and natural breeding programs, while Tupou College and Hango Agriculture College undertake dairy cattle breed improvement.

4.2.2 Feed and pastures

Various studies make reference to Tonga (MacFarlane, 1998; and Reynolds, 1995) although there doesn't appear to have been substantial on the ground research through these FAO projects. The MAFFF Research Station (which has since been wound up) trialled guinea grass, elephant grass, signal, centrosema and glycine. A few limited pasture improvement programs include: the pasture seed distribution program (Ha'amo seeds); pasture on institutional farms (see below); and various plots such as mombassa planted by Livestock Division on a private farm. The existence of private and government contractors for cultivation and seedings would appear to enable pasture improvement.

There may be opportunities to feed cattle crop residues including sugar cane, oil palm, sugar palm, and coconut palm (Government of Tonga, 2016).

4.2.3 Fencing

Fencing in Tonga was similar to that in other Pacific countries – barbed wire with timber, living or star picket posts. However, the Livestock Division has supported some households to trial electric fencing as a means of utilising pastures and exclusion from cropping land. A recipient farmer was visited. The fence consisted of steel reinforced bar as posts with plastic plugs, 2 wires, a solar charger, battery, and unit. The fence is moved very 3-7 days (for rotation) and the cattle and unit kept at the house at night to stop theft.

4.3 Production

4.3.1 Cattle numbers

In April 2015 Tonga's cattle numbers were reported to be 18,803 head, of which 16,768 (89%) were beef cattle and 2,035 (11%) were dairy cattle. In 2001, cattle numbers were reported to be 10,354 head. If these numbers are accurate, then the Tongan herd has grown at a very rapid rate of 4% per year between 2001 and 2015³.

Cattle are spread over all the island groups. Tongatapu has the largest cattle herd, followed by Vava'u, Ha'apai, 'Eua, with virtually no cattle in the Niuaus. In Nuku'alofa, butchers report that there are many small-holder farmers in the east (Fuamotu) (see Table 3).

³ Average annual compound growth rate

Table 3: Cattle numbers in island groups, 2001 and 2015

Island Divisions	2001	2015	Annual average growth rate
TONGA	10,354	18,762	4%
Tongatapu	5,736	9,899	4%
Vava'u	2,744	5,712	5%
Ha'apai	609	1,547	7%
'Eua	1,204	1,555	2%
Ongo Niua	61	49	-2%

Source: MAFFF, 2015

4.3.2 Cattle herd and indicators

The 2015 Agricultural Census asked producers to report on cattle numbers of different types (Table 4). Although errors may occur, they provide a snapshot of the herd.

Table 4: Beef cattle herd profile, 2015

Island divisions	Total beef cattle	Calves	Steers	Heifers	Bulls	Cows
TONGA	16,768	1,820	1,737	2,450	3,172	7,589
Tongatapu	8,854	1,109	888	1,259	1,742	3,856
Vava'u	5,130	470	587	815	836	2,422
Ha'apai	1,318	66	137	176	272	667
'Eua	1,417	169	122	192	316	618
Niuas	49	6	3	8	6	26

Source: MAFFF (2015)

If correct, the statistics provide some general indicators:

- 45% of the herd are cows, which is relatively high, indicating a low culling rate or use for sale/ceremony;
- 35% of males are castrated;
- The bull to cow ratio is 42% (or 1 bull to every 2.3 cows);
- The calving rate is about 24%; and
- Based on cattle disposals in Section 4.4 (4,429), the turnoff rate for beef cattle is 27%.

These statistics suggest that productivity is low and although not supported by measurement, interviewees offered a number of various reasons for this. It was considered that low calving rates were not due to lack of bulls which are common in own herds or neighbours (although tethering may restrict mating). Nutrition is seen as the major constraint. Cattle are predominantly tethered and should be moved often (for example, every day in wet season and twice per day in dry season). However, cattle were frequently moved less often, possibly every four days, leading to skinny cattle and over-grazing followed by weed establishment.

4.3.3 Farm sizes

The 2015 Agricultural Census reported that about 3,310 households raised cattle. More than 60% (1,986) of the households kept five cattle or less, 782 households kept 5-9 cattle, 376 households kept 10-19 cattle and 109 households kept 20-49 cattle. Only 14 households kept more than 50 cattle (MAFFF, 2015). That is, approximately 95% of farms have less than 20 cattle, approximately 3% have 20-50 cattle, and less than 1% have more than 50 cattle.

4.3.4 Institutional farms

While the majority of cattle households are evidently small, some larger farms (40 head) were visited, although the cattle management, condition, and feed were not obviously different. That is, there is not necessarily a strong relationship between scale and improved production systems. However, there are some large church and school farms that keep cattle.

Tevita Farm, part of Liahona High School (Mormon Church), once had 400 cattle on two farms, but now have 107 cattle (54 cows) on one farm of 135 acres. They have a core breeding herd of Santa Gertrudis / Brahman / Holsteins, some derived from a shipment of breeders from Vanuatu in 1999. The cattle are raised mainly for consumption in the church / school but surpluses are also sold (up to 20 heifers and 20 bull calves per year). While these are good breeding animals, there is little appreciation in quality characteristics, and these are probably sold and slaughtered.

The farm is used for training. This includes students from Liahona High School (where agriculture is a subject) and from the Tonga Institute of Higher Education in Tongatupo. The Livestock Division and FAO have used the farm for training animal health, animal husbandry, and management for groups of 20-30 farmers.

The Topou church / college / farm has:

- 200 dairy cattle, 55 milking cows. Males are castrated and sold;
- 600 sheep, Fijian tropically adapted sheep (Fiji Fantastic); and
- 50 beef cattle, including Brahmana and Santa Gertrudis.

The farm now retains females to build up the herd but sells bulls (again to buyers for slaughter rather than breeding), with prices said to be increasing. Topou is also used for some livestock training and demonstration activities.

4.4 Cattle marketing

4.4.1 Sales channels for slaughtered cattle

The Agricultural Census (MAFFF, 2015) reported that during the year ended April 2015, a total of 4,564 cattle were disposed of: 4,429 beef cattle and 135 dairy cattle. This represented 27% of the beef cattle in Tonga, or 24% of the total (beef and dairy) herd, but turnoff rates varied from 32% in Ha'apai to low rates in 'Eua and Niua (Table 5). The sales channels were:

- The main purpose for disposing of cattle was for social obligations (weddings, funerals, birthdays or church conferences). About 2,481 cattle (54% of total disposals) were for social obligation purposes;
- 974 cattle (21%) were for sale;
- 554 cattle (12%) were for home consumption; and
- 555 cattle (12%) were lost or stolen.

Table 5: Total number of cattle kept and disposed of 2015

Island divisions	Total cattle			Beef cattle		Dairy cattle	
	Kept	Disposed	% Disposed	Kept	Disposed	Kept	Disposed
TONGA	18,803	4,564	24%	16,768	4,429	2,035	135
Tongatapu	9,915	2,380	24%	8,854	2,283	1,061	97
Vava'u	5,712	1,370	24%	5,130	1,345	582	25
Ha'apai	1,547	490	32%	1,318	479	229	11
'Eua	1,568	320	20%	1,417	318	151	2
Niuas	61	4	7%	49	4	12	0

Source: MAFFF (2015)

4.4.2 Prices

One butcher reported prices of TOP1,000 for a small animal, and TOP2,000, for an average animal, and up to TOP4,000 for a large animal. The mid-sized animal would weigh about 200 kg carcass weight and equate to TOP10/kg carcass weight, or TOP5/kg liveweight.

4.5 Slaughter and retail

All cattle in Tonga are killed on farm as “bush kill”. As mentioned in Section 4.4, most cattle are killed on-farm for ceremony and another 12% for own consumption.

Sales to butchers account for another 20% of sales. In this case, butchers slaughter on-farm, and transport beef back to storage facilities in Nuku'alofa. In comparison to MAFFF farmer survey results that report that 974 cattle were sold per year (Table 5), the Livestock Division estimate that 8-12 cattle are killed per week by butchers in Tongatapu (520 head/year). The Livestock Division hopes that herd numbers will increase so that 20-30 cattle can be killed per week (1,300/year).

There are four butchers in Nuku'alofa. The largest kills an average of 5-7 cattle per week, or 3-4 if they are big animals. The smallest butcher kills about 160 cattle per year or 3-4 per week. Based on these estimates, these four butchers might slaughter up to 920 head per year.

The butchers in Nuku'alofa have a lot of contacts and also advertise for cattle (on the radio) in Tongatapu, only when supply is short, and also on the other islands. If the butchers can't buy enough cattle, they kill their own. One butcher has his own farm and the other buys cattle when he can and tethers them with friends and family.

Farmers contact the butchers when they have cattle to sell, the butchers will then appraise the animal by eye, make an offer, followed by negotiation. Cattle are slaughtered on-farm and at least one butcher has a (5x12 foot) trailer to hang and butcher (up to six) carcasses. There is no inspection and the trailer is not enclosed with all meat packed in plastic bags.

Beef is mostly kept at the house or retail areas although one large butcher has five cold storage units (4x6 foot). This butcher distributes meat in an enclosed truck to restaurants and other buyers. Buyers also come to the outlet, including Chinese restaurants and companies looking for fresh beef (not frozen imported beef). The small butcher only has two deep freezers and can only kill 1-2 cattle per slaughter, which is freezer capacity and retails directly.

Butchers indicated that they often offer to buy cattle from farmers, but that farmers want to keep cattle in case they are needed for ceremonies. The largest butcher undertakes service slaughtering for ceremonies which includes slaughter, cleaning, and butchering for TOP350 per beast which only takes

about one hour. The smaller butcher will sell cuts to ceremonies but not carcasses due to the profit derived from butchering.

Retail prices in the large butcher were:

- Sirloin - TOP25/kg;
- Ribs, rump - TOP10/kg;
- Offal and bones; and
- Gives away bags of fat.

Retail prices for the small butcher were:

- Sirloin - TOP22/kg;
- Scotch fillet - TOP20/kg;
- “Normal steak” - TOP16/kg;
- Ribs - TOP14/kg;
- Whole head - TOP20/kg;
- Mixed meat - TOP5/kg; and
- Fat - TOP5 per 2 kg.

Butchers and government officials interviewed said that they are happy with the current decentralised, uninspected slaughter system, but agreed that other systems could be considered (such as mobile or static slaughter units). One butcher is considering building his own permanent slaughter area in Nutova (21 miles outside of Nuku'alofa).

All interviewees said that the major constraint in the slaughter sector is accessing supply.

4.6 Consumption

Because of the low cost, the main meat consumed in Tonga is chicken. Beef is eaten only every week or two and ceremonies are a channel for distribution. Some interviewees said that it is positive that beef and other resources are contributed to ceremonies because it means more people attend these important cultural events. Domestic demand for beef has increased not only for daily consumption but also for cultural events such funerals, birthdays, and church or community functions.

4.7 Imports

The gap between consumption and domestic supply is reflected in imports. Import data is not available for recent years, but imports appeared to have been relatively stable between 2008 and 2011 (550-650 tonnes/year) and then stepped up between 2012 and 2014 (850-930 tonnes/year) (Table 6). Based on estimates of 4,429 cattle disposed of (MAFFF, 2015) and an average carcass weight of 200 kg (885.5 tonnes), imports are roughly the same volume as domestic production (50% of total supply).

Table 6: Imports of frozen and chilled/fresh beef 2008-14

	Weight (tonnes)	Total value (US\$ million)	Unit cost US\$/kg	% weight fresh or chilled (vs frozen)
2008	653	1.7	2.5	32%
2009	454	1.4	3.2	14%
2010	595	1.9	3.2	1%
2011	555	2.1	3.7	2%
2012	857	3.2	3.8	15%
2013	822	2.9	3.6	26%
2014	924	3.1	3.4	5%

Source: UNComtrade (2018)

The value per kilogram has remained similar over the period (TOP3.4 in 2014), the large majority of which is in frozen form. This appears significantly lower than butcher retail prices (except for “mixed meat”), although it is difficult to compare across different cuts and forms (fresh and frozen).

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6 Agencies visited for study

June 23-28, 2018

- MAFFF, Tonga
- Tevita – Liahona farm / college / church
- Tonga Livestock Farmers Council Inc.
- Topou church / college / farm
- Leo Butchery
- David Butchery
- Dan – chicken – beef farmer
- Livestock Division