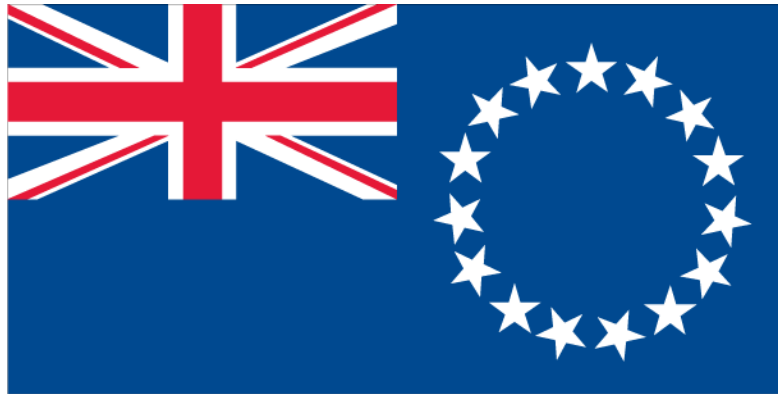


# Country Pasture/Forage Resource Profiles

## COOK ISLANDS



by

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## 1. INTRODUCTION

The Cook Islands which lie roughly east of the Island of Tonga, above the Tropic of Capricorn, are a group of fifteen small islands with a total land area of 237 km<sup>2</sup>, scattered over two million km<sup>2</sup> of ocean (Lambert, 1982). They are divided geographically into a northern group of low atolls: Penrhyn, Nanihiki, Rahanga, Pukapuka, Suvarrow and Nassau; and a southern group of volcanic islands: Mangaia, Rarotonga, Atiu, Mauke Mitiaro, Aitutaki, Manuae and Takutea (see Figure 1). The southern group occupies 87% of the land area (Mckean and Baisyet, 1994). Avarua on Rarotonga is the capital city. It is also the seat of government, centre of commerce and tourism. Most Cook Islanders are bilingual in Polynesian and English.

The population has been estimated at 25 000 (although the SPC projected figure is lower at 15 537 in year 2008 with a projected 2010 population of 15 660 with a 0.4% growth rate 2008–2010 – see SPC website [SPC, 2008] – and the July 2008 estimate in the World Factbook is only 12 271), not counting those now living in New Zealand.

Of this number, <12 000 live in Rarotonga on a total land area of 67 km<sup>2</sup>. Cook Island Maori are Polynesians. By tradition, Cook Island links with New Zealand go back to the early days when their ancestors travelled in war canoes and happened to land on the strange island now called New Zealand. The main areas of economic activities are tourism, agriculture, pearl farming and offshore financial services. Ruminant livestock production consists of a few cattle and less than 6 000 goats (Munro, E., personal communication). The country relies on imports of beef, veal, mutton and milk products from New Zealand and Australia (Table 1).



Figure 1. Map of the Cook Islands

Table 1. Statistics of livestock numbers, beef production and meat and milk imports, 1997–2007

Item	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cattle nos. (head)	120	120	200	180 (457*)	160	140	135	120	120	120	125
Horse nos. (head)	300	300	300	300 (106*)	300	300	300	300	300	300	305
Goat nos. (head)	2 500	2 500	2 500	2 500 (4 867*)	2 000	1 600	1 200	1 000	1 000	1 000	1 010
Sheep nos.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.
Beef prod. (Mt)	2	10	6	6	5	3	3	2	2	2	3
Mutton imports (Mt)	73	151	188	200	165	68	179	194	187	316	n.r.
Milk fresh imports (Mt)	73	52	79	170	77	56	265	281	317	276	n.r.
Cattle imports (heads)	-	-	1	1	1	-	-	-	-	-	n.r.
Beef and veal imports (Mt)	208	213	153	152	142	131	191	171	198**	172	n.r.

n.r. = no record; no data for 2008

\* Provisional figures from the 2000 census

\*\* Over the same period 1996 to 2005 chicken meat imports ranged from 320 mt (1996) to 914 mt (2005)

Source: FAOSTAT

## 2. CLIMATE AND AGRO-ECOLOGICAL ZONES

The climate is tropical with two distinct seasons, hot and humid. The average rainfall is between 2 000 and 3 000 mm per year. Lying at 20° S, the Cook Islands experience cyclones with high winds and intense rain. The mean annual temperature is 24 °C with little seasonal variation. The relative humidity is also fairly high throughout the year.

Forest types vary from montane rainforest on Rarotonga to lowland rainforests on limestone areas at Mauke, and beach forests on the atolls and reef islets. In addition there are some bush and grassland. The lowland rainforest has been disturbed in many areas, but upland forests are still more or less intact.

There are two distinct island groups; the northern group comprising islands with low-coral sandy soil and the southern group with eight islands, mainly of volcanic origin. Rarotonga, the biggest island and the capital of the Cook Islands, has a mountainous interior and peripheral low areas suitable for agriculture. Rarotonga is circular and volcanic in origin. Hills in the centre of the island rise to 652 m and are deeply dissected. Rarotonga is also the only island that has an abundant water supply. The other islands, particularly the atolls in the northern group, suffer from water loss, thus agriculture is limited.

Atiu is the third largest island with an area of 26.9 km<sup>2</sup>. It lies 215 km northeast of Rarotonga at about 20° S and 148° 40 W. The climate is tropical with a mean annual temperature of about 25 °C and a humidity of about 86%. Average annual rainfall is about 2 400 mm with the wettest months from January to May. The geology is typical of raised volcanic islands with a basaltic volcanic core, surrounded by a reef that has been raised above sea level by later volcanic activity.

## 3. SOILS AND TOPOGRAPHY

Soil fertility varies from island to island and islands of the southern group are much richer in flora than the northern group. The thin layer of soil on the atolls of the islands of the northern group provide an environment that can hardly support a wide range of flora, whereas the islands of the southern group with richer volcanic soils provide a good environment for plant growth. The northern islands are seven coral atolls, while the south is made up of eight volcanic islands.

Twelve different soil types have been identified based on the topography and parent materials available in Atiu (Campbell, 1982). On the island of Mangaia in the southern Cook Islands there are makatea types of soil (literal meaning in Polynesian is “white rock”). This is a coral limestone island that has been uplifted so that pure lime is at a considerable elevation above sea level. Thus this area consists of soils that are derived from limestone and are usually of very high pH; very poor soils are weathered from the old limestone reef. On the inner lowlands, clay-rich soils are formed on alluvium derived from the volcanic bedrock. The lowland soils are the most fertile and have been extensively used for agriculture and horticulture. Interior upland soils are dark red, clay-rich materials typically produced in tropical climates by weathering of basaltic volcano bedrock. These upland soils are generally less fertile due to nutrient deficiencies (Mataio and Syed, 1993; Mckean and Baisyet, 1994).

## 4. RUMINANT LIVESTOCK PRODUCTION SYSTEMS

As in every other Pacific Island country, subsistence farmers concentrate on rearing monogastric livestock (pigs and poultry). However, there are a few ruminants, cattle and goats. The livestock industry is divided into two sectors; formal and informal (Tokari, 2000). The formal or commercial farmers own a large number of animals and raise stock for sale to retailers, restaurants and hotels, etc. This sector is highly organized in goat production. Smallholders keep most of the cattle and goats and raise their animals in pens, backyards and often on free grazing or tethered; animals are raised for domestic consumption and festive occasions such as weddings, traditional celebrations, etc.

**Cattle production** has been in the Cook Islands since the colonial times in the 1940s and 1950s especially on the island of Rarotonga. European settlers owned the early cattle farms. Subsequently farms were established on the islands of Aitutaki and Mauke. The farm at Aitutaki was privately owned but closed down in the late 1950s, while the cattle farm on the island of Mauke under the Department of Agriculture was, in the 1980s, handed over to the island council to run (Van der Zwaag, 1980). The Cook Islands census of 1988 recorded 250 cattle and these were in herds of less than five. Of these the mature cows numbered 138. Hereford and a few other nondescript breeds are the cattle mostly found; there are no dairy cows, but beef animals are sometimes milked.

Of the few cattle, 200 were owned by the village council on the island of Mauke (FAO, 1991) and these were Hereford but were highly inbred and grazed under coconuts and on the adjoining airfield in Mauke. The cattle received no attention, and consequently due to the overgrazing of the available area the animals have left the pasture bare with undesirable species of broad-leaf weeds. The Government farm was closed in 1994 and the cattle sold. These cattle are either tethered or grazed on waste ground. A few cows are kept and milked especially mainly in Rarotonga and are kept in small herds of less five animals with the average number per household of only three (MA&S, 1988). The provisional data from the 2000 census indicate 457 cattle (including 156 cows), but data in FAOSTAT appear not to have taken note of the census information and the 2005 figure is 120 cattle.

### **Goats**

In the livestock census of 1988 approximately 5 500 goats were recorded with an average herd size of seven per household and there were 2 300 does. Goat meat is widely accepted and therefore the Ministry of Agriculture has placed emphasis on improving the available stock through crossbreeding with Anglo-Nubian crosses from Fiji, improved management and health (Parutua, 1985). FAO has assisted the Government to develop the goat industry (Munro, E., personal communication) and Tamarua (2001) provided details of several projects through which 16 does and 4 bucks of Anglo-Nubian cross were imported from Fiji, and training has been implemented. The interest in raising goats has increased due to changes in management recently adopted by smallholders; the major system used by subsistence farmers is tethering in both Rarotonga and in the outer islands. Free grazing where goats are allowed to roam is also practised but causes many problems to the owners and to crop owners. Goats under this system sometimes end up on the makatea (raised coral) where they become feral. This system is mainly used in the outer islands. Goat numbers appear to have declined since the mid-1990s but the provisional data from the 2000 census indicate numbers higher than in previous years at 4 867 including 1 272 does (Tamarua, 2001 suggests a figure for 2000 of 3 679 goats). FAOSTAT reports a steady decline and the 2005 figure is 1 000 goats.

## **5. CONSTRAINTS TO DEVELOPMENT OF PASTURE-BASED LIVESTOCK PRODUCTION SYSTEMS**

1. The geographical makeup of the Cook Islands is the major constraint to the development of pasture based livestock as the land available for agriculture is becoming more scarce due to various development programmes especially in Rarotonga and some of the outer islands.
2. Constant soil erosion is a constraint to the development of pasturelands.
3. Much good land that could be used for agricultural purposes is now being used as construction sites for new buildings for domestic and tourism purposes.
4. The land tenure system where many family members own the land is a constraint. Also the ownership of land by people residing overseas, who may not have immediate need for land, makes it difficult for locals to use such lands. This therefore make access to such land impracticable.
5. In some areas it is more economical to use agriculture land for horticulture because of quick returns.
6. Cost of land and production makes it impossible to acquire land on Rarotonga and in the outer islands. The cost involved in producing an agricultural product plus other factors in getting the

produce to the Rarotonga market would be very marginal and most of the time it is cheaper to buy imported products.

7. High dependence on meat imports into the country in the form of fresh and frozen beef and lamb, chicken and tinned fish and corned beef. These products are cheaper than locally produced goat meat.
8. The Government lacks trained staff and the institutional ability to support and advise farmers who might be interested in pasture development.

## 6. THE PASTURE RESOURCE

Considerable work is being carried out on identifying pasture resources in the Cook Islands because there has been very limited work previously. Most of the available grass and legume species were brought in during colonial times. Some of the grass and legume species available in the Cook Islands today that are listed below are assumed to be improved grass and legume species.

### 6.1 Improved pasture grass varieties

The common grasses found in the Cook Islands today are Para grass (*Brachiaria mutica*), Guinea grass (*Panicum maximum*), Johnson grass (*Sorghum halepense*), Carpet grass (*Axonopus compressus*), Couch grass (*Digitaria scalarum* (Schweinf), Green panic (*Panicum maximum* var. *trichoglume*), Rhode grass (*Chloris gayana*, Kunth), *Setaria sphacelata* Narok, and Buffel grass (*Cenchrus ciliaris*). The availability of these grasses varies from one island to the other.

### 6.2 Improved legume varieties

Few legume species are found in the Cook Islands. The most noticeable ones are Centro (*Centrosema pubescens*), Tropical Kudzu (*Pueraria phaseoloides*), Stylo (*Stylosanthes guianensis*), Siratro (*Macroptilium atropurpureum*), Leucaena (*Leucaena leucocephala*) and Pigeon pea (*Cajanus cajan*). The sensitive plant (*Mimosa pudica*) is a native legume found in the island of Mauke and areas around Rarotonga.

### 6.3 Weed control

Weed control in the Cook Islands is done by one of the following methods:

- slashing with a mower attached to a tractor,
- use of herbicides, and
- manual removal of weeds

### 6.4 Recent initiatives in forage improvement

There was a workshop sponsored by FAO on pasture development on the island of Mauke in 1989 and since then little has been done to improve the present available pasture and legumes in the Cook Islands. However, with the recent assistance given by FAO in the development of goats for meat and milk production, attention will definitely focus on the improvement of pasture especially in Mauke, the main island of Rarotonga and on Mangaia.

The Ministry of Agriculture has plans to include the outer Islands in the livestock extension programme during the 2000–2002 budget to address the problems of goat production. Possibly a goat development programme for the other islands (Aitutaki, Atiu, Mauke, Mangaia and Mitiaro) will be proposed in order to supply the main market on Rarotonga (Tamarua, 2001)

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