

Cook Islands country report on Animal Genetic

1. INTRODUCTION

The Cook Islands consists of 15 islands scattered over 2 million square kilometers of the South Pacific Ocean, between 156* - 167* West and 8* - 23* South. The islands are split geographically into the Northern islands and the Southern islands. It has two distinctive types of islands:

- (a) Northern Group – all coral Atolls
- (b) Southern Group – mainly of volcanic origin, with two Atolls

The capital island of Rarotonga is the biggest in area, population and also the Government administration center.

Island	Population (1 st Dec 2001)	Area (Acres)	Area (sq kms)	Rainfall (mm)	Mean Temperature	
					Min. (*C)	Max. (*C)
Rarotonga	12,206	16,569	67.1	2,040	20.8	27.0
Mangaia	745	12,791	51.8	2,044		
Atiu	622	6,643	26.9	1,992		
Mitiaro	230	5,507	22.3	1,842		
Mauke	468	4,544	18.4	1,575	22.1	27.8
Aitutaki	1,937	4,519	18.3	1,894	22.9	28.3
Manuae	0	1,531	6.2			
Takutea	0	321	1.3			
Southern Islands	16,208	52,425	212.3			
Penrhyn	357	2,420	9.8	1,866	25.6	29.7
Manihiki	516	1,333	5.4	2,337		
Rakahanga	161	1,012	4.1	2,360	24.2	31.2
Palmerston	48	519	2.1	1,988	23.4	28.8
Pukapuka	664	321	1.3	2,816	24.5	31.2
Nassau	69	321	1.3			
Suvarrow	4	101	0.4			
Northern Islands	1,819	6,027	24.4			
Cook Islands	18,027	58,452	236.7			

Source: Agriculture Census 2000, Population Census 2001

The provisional population of the Cook Islands on 1st December 2001, gives a head count of 18,027 people. This was a decrease of 5.6 % since the 1996 Population Census. All of the islands except Rarotonga experienced a population decline when compared to the 1996 Census. The Southern Group islands decreased by 26.2 %, with Atiu Island

decreasing to almost 35 % followed by Mangaia with 32%. The Northern group islands also faced a population decline of 25.9% with Penrhyn Island experiencing the biggest decline of 41.1%.

The two island groups making up the country portray a marked difference in their agriculture activities. The Northern Islands remains relatively isolated from the Southern Islands. Copra has always been the main agriculture product for the northern group islands but the copra price has been very unattractive, involvement of the people in the agriculture sector has diminished. Most people has turned to pearl farming activities, which is becoming a profitable venture, particularly on the islands of Manihiki and Penrhyn.

The Southern group, on the other hand, continues to indulge in a much more diversified agriculture industry. This group has the benefit of cooler climate and more fertile soil enabling a wider variety of agriculture production. Regular air and sea transportation enhances export opportunities particularly to New Zealand. Agriculture is still the main activity in the Southern Islands with the exception of Rarotonga where trade, tourism and the service-related sectors are the major sources of income.

At current market prices, GDP stands at NZ\$171 million for the calendar year 2000. This is equivalent to NZ\$9,587 per capita. In constant 1990 prices, GDP stands at NZ\$136 million in 2000, up from NZ\$ 123 million in 1999. This represents a real annual increase of 10.2%. Contribution to GDP by sector shows agriculture continuing to fall, now settling at \$15 million. This is contributed mainly to a continuous decline in the Cook Islands population. Tourism makes up 67% of GDP followed by Public Administration with \$23 million (13% of GDP)

Agriculture and Fisheries sector experienced strong growth in the year 2000 making up 23% of GDP. This was basically due to the increase in pearl export from \$5 million in 1999 to over \$18million in 2000. Construction also showed high growth followed by Wholesale and Retail Trade.

Agriculture, which covers crops and livestock and the farming system, is based on smallholdings due to our land tenure system and also to the agriculture land available. During the Agriculture Census 2000, there were a total of 3,646 households in the Cook Islands, 1,697 households (47%) were considered as agriculture active households. The remaining 53% were classified as minor agriculture households (29%) and non-agriculture (24%).

Of the agriculturally active households, a little over three quarters (76%) were dependent on agriculture subsistence only, while 15% were classified as subsistence with some cash cropping with the sale of agricultural produce by these households being of secondary importance. The remaining 9% were classified as commercial producers as the sale or export of their produce was the primary intention of their agriculture activity.

The current crops grown are vegetables such as cabbages, lettuces, tomatoes, broccoli, cucumbers, carrots, spring onions, cauliflower and pele. Fruits cover bananas, oranges,

lemons, papaya (pawpaw), breadfruits, coconuts, carambola, pineapples, watermelons, rock melons and passion fruits. Root crops covers taro(*Colocasia esculenta*), cassava, yams, tarua, ginger and tumeric.

Animal production is based on pigs, goats, chickens and cattle. According to the Agriculture Census 2000, the most popular type of livestock raised was pigs with 92% of all households recorded as keeping pigs. Around 31% of households were reported as raising goats, 30% chickens, and 4% cattle. In terms of numbers of animals, the number of chickens in the Cook Islands at the time of the census is estimated at some 24,300 followed by pigs (15,900), goats (3,600), cattle (300) and horses (70).

Employment in the agriculture sector is a major issue in the Cook Islands due to the population decline from migrating overseas and the attitude or the lack of interest shown by the young generation in the field of agriculture. The current situation has also affected other industries in the country and already there have been moves to bring in labour from other Pacific island countries like Fiji and Tonga.

Livestock industry in the Cook Islands is mainly for subsistence and catering for the local market in order to substitute meat import from overseas. In the year 2000, the Cook Islands imported 113.92 tonnes of beef, 164 tonnes of mutton and 1,545.02 tonnes of frozen chickens. We are self sufficient in pork meat and eggs, but still struggling to compete with overseas competitions as these animal products rely mainly on imported feed.

Pigs play an important roll in our customary way of life and this is the main reason that 92% of all households in the Cook Islands keep pigs. Goat meat is a delegacy among the locals and also a substitute for pork meat on religious grounds for Seven Day Adventist followers.

It has always been a Government policy to enhance livestock production as an import substitute. The population as a whole has been keeping animals like pigs, chickens and goats for the last 100 or so years mainly for subsistence use. Today the trend is for import substitute, likewise an industry is in the making and changes has to be made in order to train the farmers on various aspects of animal husbandry. The Government through the Ministry of Agriculture usually motivates the livestock sector, like any other agriculture sector in the Cook Islands. The most organized livestock sector is the pig farmers on Rarotonga, who have formed their own Pig Farmers Association and have taken over the central abattoir (funded by FAO) from the Government. All livestock farms are privately owned and there is no international corporations or co-operatives.

The farm size and their distribution are usually decided by:

- ❑ Agriculture land available-on Rarotonga a lot of the agriculture lands has already been occupied by dwelling houses and if this trend continues, it will have a big impact on the farm size in the near future.
- ❑ Land tenure system - all land are family owned, and access to agriculture land is always available if you are a landowner or by asking the

landowners for their permission to use the land for agriculture purpose only. Agriculture land can also be achieved through occupation right if you are a landowner or leased from the landowners if you are a non-landowner.

- The location and the size of the market-The concentration of the population is on the main island of Rarotonga and its farmers have a better access to that market as compared to the other islands.
- The introduction of the Cook Islands Environment Act has its impact on the farm size and its distribution especially on Rarotonga. In some cases it is impossible to extend or to find a new area for farming because of the restrictions under this law.

The recent trend in livestock production in the Cook Islands is to promote small ruminants but at the same time maintain our pig and egg production industry. We import 164 tonnes of mutton a year and there is a likelihood that we might introduce some tropical sheep from Fiji and at the same time promote and upgrade our existing goat herds to supplement mutton import. We are also looking at rabbit meat production for the local market.

The move in this direction is not only to supplement mutton import but also to diversify from imported feed especially required by mono-gastric animals. We have lands on the other southern group islands that can be utilized for small ruminants with grass and legumes available locally. The aim is to save foreign exchange and not to be dependent on feed import. The rabbit industry will be ideal for farmers who have very limited land and maybe a cottage industry for tanning of skins from rabbits and goats that will bring extra income for the farmers

The Cook Islands has achieved food security in a sense that we have a malnutrition problem causing obesity. On Rarotonga once in a while there is this advertisement played on the local TV saying EATING TOO MUCH FOOD IS A SIN.

The risk of food shortage is limited unless we have a really bad cyclone or a long drought. The northern group of islands face more risk of food shortage at times because of their nature as a coral atoll and also because they are more isolated than the southern group of islands.

It has already been identified that the decline in agriculture production has been contributed to population decline, so it does have an effect and the government have since been trying to attract the local people to come back to the Cook Islands. During the government reform in 1996, there was a mass migration of people from the other island to NZ and Australia. This flow is still occurring at a lesser pace with people from the other islands shifting to the main island Rarotonga, then gradually ending up in NZ or Australia. The decline in population on the other islands will not really affect food security except that there will be more lands lying idle and might be a good omen in disguise for the few who are willing to invest in agriculture production. There is no poverty in the Cook Islands because our custom allows us to share during hard times.

There have been some changes in the demand for animal products since the introduction of the tourist industry in the mid 1970s. Most of the changes have been based on the quality and hygiene of the animal product. Even though there has been a mass campaign to cut down on meat to prevent high blood pressure and diabetes, the demand for meat has actually increased. Over the years there has been a lot of work done mainly in the area of pig production to cater for the tourist industry. Training of pig farmers on pig husbandry, better breeds was introduced into the country, livestock extension and animal health services were provided by the Ministry of Agriculture. A central abattoir funded by FAO was constructed to cater for a more hygienic slaughtering and inspection facility. Privately owned licensed butcher shops and supermarket outlets were made available for this industry.

I personally see a role for Animal Genetic Resources in meeting future demands for food and agriculture in the Cook Islands. It will provide us with an inventory of what animal breeds do exist in this country and if there are any breeds left to conserve, then government should enforce it through legislation.

2. The State of Production Systems

The livestock production system in the Cook Islands is based on:

- (a) Subsistence
- (b) Semi-commercial
- (c) Commercial

Over the years, there has been a lot of work carried out to improve the state of production through the introduction of new genetic resources and proper management of these resources.

The most important animal product and trend that have occurred are in the area of pig production, poultry, goats and cattle. The livestock production system among the different island is based on the geographical make-up of each island, the agriculture land available and the animal feed most available for the livestock resources on each island.

2.1 *Primary Animal Production Systems.*

Most farmers keep more than one species of animal. Locally adapted animals are important because of their hardiness to rough management, adaptation to the climate and also to the unbalanced feed like coconut as the main diet. Recently introduced breeds are also important because of their feed conversion ratio based on imported feed and the market requirements. All farms are individually owned and farm sizes are based on subsistence, semi-commercial and commercial purposes. On some islands animal production heavily rely on external inputs such as purchased feed, vet drugs and breeding stock, but on some islands it is relatively self-sustaining because they are only needed for subsistence requirements. The differences in the level of inputs whether imported or

local do have an impact on production, as this will decide the viability of production at all levels.

The risk factors are cyclone, drought, labour, high investment costs, environment impact, high imported feed costs, availability of water and high freight costs.

Individual animal production systems are highlighted below.

2.1.1 Pig production

Subsistence level – there are 5 systems used to produce pigs for subsistence:

- (a) Tethering – animals are tied on one of the front legs to a tree and moved around regularly.
- (b) Small wooden crates – small enclosures made of timber from imported crates with slatted floors. This can either be moved around or remain permanent.
- (c) Enclosure made of stonewalls – this practice is common in the outer islands where dead coral stones are in abundance and commonly used.
- (d) Enclosure with imported pig wire fencing material – a free-range system where proper fencing materials are used.
- (e) Concrete floor pigpens – this system is used where there is an abundance of water.

Semi commercial – there are 2 systems used at this level:

- (a) Wooden crates as under subsistence level.
- (b) Concrete floor pigpens.

Commercial – at the commercial level, there is only one system used, i.e. concrete floor pigpens.

2.1.2 Poultry production

Subsistence level – there are only 2 systems used:

- (a) Free range – birds roam freely without any fencing.
- (b) Partly housed and partly free range – this system is used for subsistence egg production.

Semi commercial – there are 2 systems used:

- (a) Enclosed housing with fenced area for grazing – grazing area can be extended.
- (b) Fully enclosed housing system – either litter or battery system.

Commercial – there are no commercial broiler industry except egg production. All commercial operation is based on the enclosed battery system.

2.1.3 Goat production

Subsistence- there is 2 systems practiced:

- (a) Free range – this system is practiced in the outer islands where the herd roams freely
- (b) Tethering – animals are tethered on the neck and tied to stakes or trees and moved around regularly.

Commercial – there is no commercial set up in the meantime

2.1.4 Cattle Farming

There is no commercial or semi-commercial cattle farm in the Cook Islands except on a subsistence level. Tethering is the main system carried out where animals are moved around regularly.

2.2 Most Important Animal Product in the Country

Meat, eggs, milk, hides and manure can be classed as the most important animal products in this country. The top three (meat, eggs and milk) have a relative importance on the economic and social impact of this country due to their daily need, while hide and manure have a lesser need on a daily basis. The importance of these products covers all islands and the animal species used for meat are pigs, cattle, goats, chickens and ducks. Chicken is the main supplier for eggs but on some of the northern group islands sea birds is the main source of this product. Milk is imported because cattle and goats are used for meat. Chicken, pigs and goats are the manure suppliers.

There is a big difference between the products from locally adapted and the recently introduced breeds. Locally adapted pigs have amore fat to lean meat ratio and a smaller carcass while introduced breeds have heavier carcass with leaner meat quality. Local cattle also have smaller meat per carcass ratio as compared to the bigger and better meat quality from the introduced breeds and the same goes for the local goats. For chicken and duck, the carcass is also smaller including their eggs as compared to the introduced breeds. All of our animal products are for local or domestic market and this is the trend for the next 10years.

2.3 *Major Trends or Significant Changes that Occurred in the Use and Management of Animals in the Cook Islands.*

There have been some changes in the relative contribution of the different production systems to food security during the last 10 years. The major change has been in the field of pig and egg production. Government has exempted import levies on livestock feed for pig and chicken for a specified period. This is an incentive to encourage more farmers to invest in pork and egg production.

There have been changes in the types and diversity of products produced. One example is the much leaner meat quality required by the local market outlets. Health issues on consuming fatty meat as a contributing factor to heart diseases has brought about some of these changes. Some of the changes can either be classed as related to the locally adapted or recently introduced breed. There have been no major recent changes in the animal production infrastructure.

The impact of pig production on the environment has brought in some new restricting laws under the Environment Act. Other limiting factors are high initial investment costs; high imported feed costs, labour shortage and land tenure problems. There are some doubts about joining the WTO, whether our small livestock industry will be under threat from overseas competitors. These constraints are important if we want our livestock industry to survive for the next 10 years.

3. **THE STATE OF GENETIC DIVERSITY**

Genetic diversity among and within animal species in the Cook Islands have been ongoing for the last 30 years and the state of knowledge have been passed down throughout the years by the Ministry of Agriculture as the focal point of information. Information is gathered via our Quarantine Service through records of animal imports.

The state of genetic diversity is divided into 3 groups:

- i. Locally adapted breeds
- ii. Recently introduced breeds
- iii. Continually imported breeds

3.1 *The State of Knowledge on AnGR*

The Agriculture Census is the only survey that has been carried out during the past years that includes animal population but excluding animal breeds within each animal species. Overseas information is gathered on new breed performances and these informations are used locally as guidelines on the economic performance of such animals when imported into the country.

There are a lot of factors involved in carrying out these tasks. Funding, manpower and training are some of the major factors required for capacity building in order to carry out these tasks.

We have no national livestock information system capable of monitoring the status of breeds of each animal species. Our only system for monitoring the status and trends in breeds of each species is based on our livestock extension service farm visits.

There have been no comparative characterization studies (base-line breed surveys, genetic and molecular genetic characterization) being carried out to evaluate the 3 groups involved. But through experience most farmers have noticed differences amongst the 3 groups and they have adapted to the breeds more suited to their needs.

3.2 *Assessments of Genetic Diversity.*

The animal species of importance are as stated under section 2 of this report, i.e. pigs, chicken, goat and cattle. Breeds of each species being raised in the Cook Islands are:

- Pigs – Local pigs, Berkshire, Tamworth, Large White, Landrace, and Duroc.
- Chicken – Local chickens, Black Australorp, Rhode Island Re, White Leghorn, Brown Shaver, White Shaver and Cobb.
- -Local breeds, saanen, Fiji goat.
- Cattle – Short horn, Angus, Fresian, Murray Grey and Hereford

There is no programme in place to assist farmers to conserve specific breeds and not breed is being actively developed, or at present in the country but is not currently raised to contribute to food security. There have been some significant changes in the number of breeds in each species; some of the primary factors causing these trends are:

- The present local market requirements
- The availability of imported balanced feed
- Farmers are more educated
- The availability of breeding stock from overseas.

The impact of exotic genetic resources on indigenous breeds has in some ways been successful and in some ways not successful as the outcome has brought more problems and costs to the farmer. The distribution of the breeds within the country is clearly defined. The exotic breeds are mainly found on Rarotonga where imported feed, water and market outlets are readily available. Local breeds are mainly distributed among the other small islands where transportation by boat is a problem.

The only wild relatives of domestic species are the wild chickens and on some islands, wild ducks. They have very little status and they do not contribute to any breeding programme for domestic species. For wild chickens, they do contribute to food production but on a small scale.

4. THE STATE OF UTILIZATION OF AnGR

The current utilization of AnGR is mainly for food security and catering for the local market as an import substitute. Future utilization will be based on the same strategy.

4.1 The State of Use of AnGR

There are policies and legal instruments in place to protect the current use of AnGR for breeds already available within the country and those that are being introduced from other countries. Government supports the use of AnGR as an economic development strategy, thus ensuring that instruments are available to promote technologies like animal health/disease surveys, breeding technologies like AI, prevention of cruelty to animals and promoting local products rather than imported. Other policies promote training of farmers seeking overseas funding for livestock development projects for the community and livestock extension programmes.

The majority of the AnGR in the Cook Islands is used for cultural, religious, recreation or social functions. There are more animals slaughtered for these functions and compared to those put through the market. There is a vast difference in the breeds mentioned above that contributes to food and agriculture. In the outer islands, locally adapted animals are the major contributor while on Rarotonga, locally adapted and a combination of recently introduced and continually introduced is used.

Cross breeding is the main breeding structure commonly used with the main purpose of upgrading and preventing in-breeding among the local animals. New blood is imported from overseas and on-farm results have been evaluated for traits based on growth rate, meat quality, feed conversion ratio and the overall economic viability over imported feed.

Simple technologies are applied except in the case of pigs and cattle where AI has been carried out in the past. Currently this technology is on hold because of funding and due to reducing animal diseases and the low cost involved in transportation as compared to import of live animals.

The Ministry of Agriculture's livestock division has no research facility but for the last 30 years the division has been playing an important role in livestock extension and part of that role involves making recommendations to farmers for the best species to acquire and the recommended breeders overseas in order to be in line with the Animal Import Regulations under the Animal Quarantine Act.

There are signs of changes over the years, maybe not significant on some islands but on Rarotonga these changes can be seen as a sign of improvement to the food and agriculture sector. Most of these changes are due to market driven, government and donor policies, opportunities for new products and access to exotic AnGR from overseas.

Future trends in technologies and methodologies cannot be stopped and have to be adapted one way or the other because farmers are always looking for better ways to

improve on their production activities. The future potential in advancement in this area on AnGR will be hard to say but technologies and methodologies proven overseas as a danger to AnGR or to humans should be prohibited through legislation.

Even though the country's requirement for AnGr is for the local market, international policy can also affect the use of AnGR through dependency on imported inputs for some species.

4.2 The State of Development

Most animal farmers carry out their own breeding programmes. In 1998 the Ministry of Agriculture in conjunction with the Seventh day Adventist Church carried out an FAO funded Telefood goat breeding project with the aim of breeding and distributing the offsprings to farmers for breeding purposes. A new breed was introduced from Fiji and the offsprings were sold to farmers both on Rarotonga and the outer islands. This programme was handed over to the church in 2000 and their breeding programme is still progressing. There has been no other breeding programme being carried out because of funding restrictions.

The Environment Act protects the conservation of natural resources, namely foreshores, lagoon and streams. Over the years there have been some neglect in the areas mentioned above and this legislation has become one of the most powerful instruments created to stop pollution and pollution-causing agents like agriculture fertilizers, chemicals and livestock effluents.

On Rarotonga where most of the livestock population is concentrated this legislation has an effect on the further development of some farms (pigs) where whole farms have to be relocated or cannot further expand. Apart from this legislation, there is no policy or legislation that affects the development of AnGR in the Cook Islands. Future trend in development is the likelihood of introducing other species and breeds that are not currently being used in this country such as rabbits, geese, turkeys, and tropical sheep.

4.3 Obstacles, Opportunities and Needs for Use and Development of AnGR.

The most important opportunity for improved use and increased genetic development of AnGR is for food security and import substitution. Currently there is no strategy or action plans put in place for improved use, increased genetic development of AnGR or for locally adapted breeds. For locally adapted breeds, maybe the opportunity lies in the use of underutilized feed resources but apart from that there is very little to go on.

This is the first time AnGR has been properly looked at, and there is a lot of work to be carried out in properly identifying the priorities, opportunities and constraints to the improved use or genetic development of AnGR.

5. THE STATE OF THE CONSERVATION OF AnGR

The state of the conservation of AnGR is based on *in situ* conservation where the breed is developed to suit the environment. *Ex situ* conservation is not practiced where small closely managed populations is maintained outside of their adaptive environment.

5.1 *Conservation*

Under the Conservation Act, there is a role for AnGR where any animal species can be prevented from extinction, especially indigenous species but this law has been introduced only recently. Most of our AnGR has long been extinct and this exercise has enlightened us on the understanding of the different roles required for future conservation in terms of sustainable use and development of AnGR.

The Environment Service is responsible for all conservation programmes, which are mostly Government funded. Currently, there is no conservation strategy or action plan for AnGR due to the lack of awareness, financial support, lack of technology and technical capacity, lack of trained human resources or perceived as a private sector responsibility.

The two main contributing factors affecting the security of each breed within species in this country are the uncontrolled breeding programmes being carried out by farmers and the uncontrolled slaughtering of AnGR for cultural, religious or social functions.

Apart from AnGR, there has been an increased shift in the level of support for conservation programmes over the past 10 years from both internal and external sources.

6. THE STATE OF POLICY DEVELOPMENT AND INSTITUTIONAL ARRANGEMENTS FOR AnGR

Policy development and institutional arrangement activities are organized and sponsored either under the local budget or overseas aid funding. Formal national programmes are usually government funded. Government agencies are the motivating mechanisms for involving all interested parties in policy development for AnGR

There are incentives involved in the use and development of AnGR and these incentives are neutral in terms of providing equal support for locally adapted or exotic genetic resources. Investment and initiatives to import and use of exotic AnGR has been made in the past and the results have been positive.

Currently there are no mechanisms in place to improve recognition and understanding of the various roles of men, women, and children in the utilization and conservation of AnGR. There are no links with other national and international biodiversity objectives, especially with the Convention on Biological Diversity.

Sanitary aspects of AnGR are covered under the Environment Act and quarantine legislation is covered under the Animal Act supported by an Animal Import Regulation and Animal Disease Prevention Regulation. This legislation have some effect on the movement of indigenous and exotic resources including food product standards because only the recommended countries under this legislation are allowed to export AnGR and meat products into the Cook Islands

There is an Animal Cruelty Act that covers ethical concerns regarding the use and welfare of animals but there is hardly any impact on the use, development and conservation of AnGR because it is hardly being enforced. There is no legislation or policies relating to Genetically Engineered Organisms (GMOs) and intellectual property rights.

The Cook Islands have no bilateral or multilateral arrangements with other governments, research institutions or others related to research of AnGR. The primary institutions and organizations that are involved in AnGR are the Ministries of Agriculture, Education, Environment and Health. Priorities for overcoming the gaps in research capacity, education, and for enhancing training, policy development and other institutional capacity are funding and trained personnel. There are inadequate educational programmes in characterization utilization and conservation of AnGR and most students study overseas for much of their training on AnGR.

Currently there is no strategy for enhancing the information and communication systems capacity to support and promote the better management of AnGR, including indigenous knowledge, monitoring and reporting on the state of these resources, trends and threats. The Cook Islands would welcome outside assistance towards filling in these gaps.