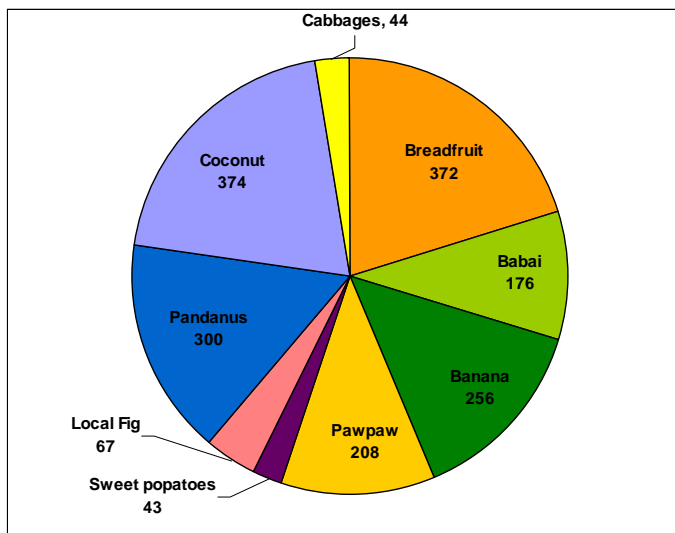


5.2 ECONOMIC ACTIVITIES

5.2.1 Agriculture

There is an Agricultural Assistant and a Nurseryman on the island whose responsibilities are to carry out the Agricultural headquarters outer island plans in agricultural and livestock development. Agricultural activities are greatly hindered by drought at times restricting activities to teaching home gardens, provision of pigs and chickens, animal health schemes, provision of seeds, seedlings (coconuts) and breadfruit cuttings, and coconut replanting schemes. The latter scheme (coconut replanting) however is not fully supported by the islanders as it is deemed a waste of time and effort due to most of the replanting schemes not bearing as much fruit as one would love them to bear. Besides, people have their own traditional cultivation methods that are most of the time linked to phases of the moon and considered more successful than the agricultural methods of spacing amongst others that only result in a lot of wasted space according to the islanders.

Fig 19: Access to food trees and vegetables 2005



Statistics displayed in the chart (left), shows that of the 437 households on Marakei, 374 (86%) have access to coconut trees, 372 (85%) to breadfruit, 300 (69%) pandanus, 256 (59%) bananas,, 208 (48%) pawpaw, 176 (40%) bwabwai, 67 (15%) local fig, 44 (10%) cabbages and 43 (10%) sweet potato trees/crops. 'Access' is defined as those food trees that are located near households thus easily accessed by household members. The numbers of coconut and pandanus trees therefore, are limited in the census to those that are near households or in the villages excluding those in the bush.

Pawpaw throughout Kiribati has generally been popular in nutritional value and also in providing a variety of color to the normal food especially when feeding guests or visitors. 'Te bero' (local fig) is another of the tree crops in Kiribati that is hard to cultivate and propagate as it can only be grown from cuttings and generally, is rare on all islands in the country. 'Bwabwai' is kept solely for ceremonial occasions with cultivation methods closely guarded secrets that are inherited from the parents. Pandanus on the other hand are abundant in variety and amongst these, there are certain pandanus varieties that have assigned uses for pandanus paste ('tangauri' and 'tua'e'), pandanus powder ('kabubu'), weaving and cigarette paper.

There are no strict inspection codes as yet for transport of foodstuff, plant materials and animals on



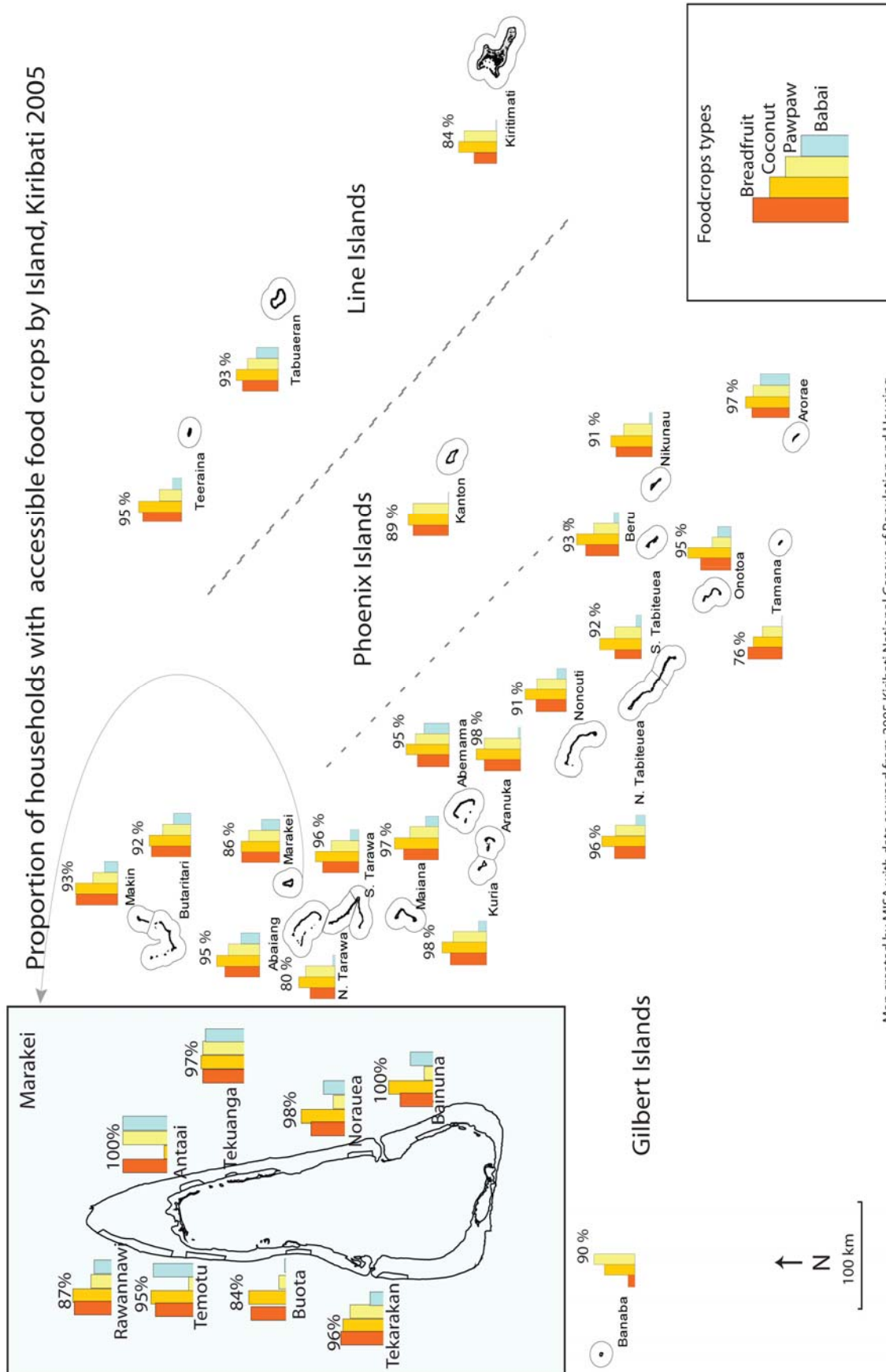
the ships and planes that visit the island and thus agriculture is vulnerable to introduced pests. The threat from 'bwabwai' beetle has been solved through strict regulations of 'bwabwai' being taken from South Tarawa to the outer islands. It falls upon the Agricultural Assistant and his nurseryman to inspect all visiting aircrafts and sea vessels to check that 'bwabwai', bananas and exotic plant life are not brought to the island without proper quarantine clearances and certificates.

Marakei has been one of the luckier islands in the Gilbert group along with Nikunau in the south and later Abemama in the central to have been selected as project islands for the DSAP (Development of Sustainable Agriculture in the Pacific) project funded by the South Pacific Commission (SPC) and the European Union (EU). In Kiribati the DSAP activities focus on enhancing traditional farming systems through appropriate technologies, strengthening farmer networks, on-farm demonstration plots, establishing crop and tree nurseries, and the distribution of plant materials. National workshops were organized in PRA techniques and effective communication for extension staff, partners, and stakeholders. Other trainings to build national capacities and skills towards achieving sustainable agriculture on the islands have also been identified and carried out.



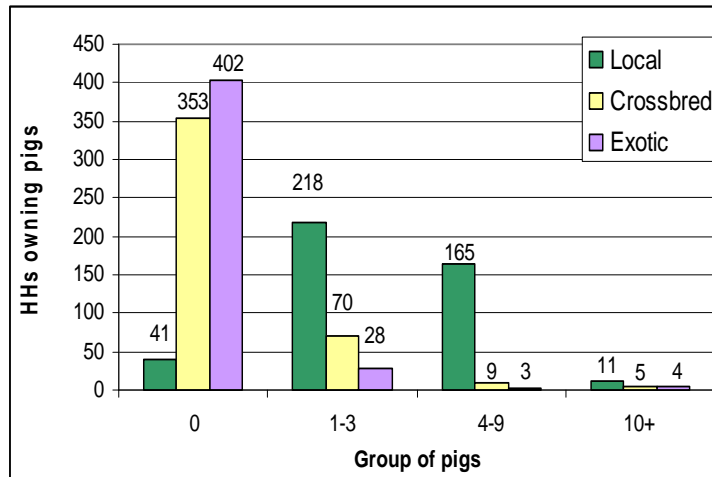
Farmer energy, enthusiasm and innovation may be plentiful but bio-diversity on Marakei is very limited. To address this and the shortage of planting materials, DSAP has established genebank sites on Marakei (and the atoll of Nikunau) and has organised the exchange between farming communities of staples such as pandanus and the giant swamp taro (*Cytosperma*), known locally as 'bwabwai'. Farmers are also being encouraged to compare varietal performance and

around Marakei there were six on-farm trials and demonstrations of sweet potato varieties and nine on-farm varietal demonstrations of taro and banana to identify the varieties that, with enhanced techniques such as composting, grow best under atoll conditions (<http://www.spc.int/dsap>). The establishment of a crop/tree genebank in the village of Tekuanga has allowed people on the island of Marakei a site they can access for crop/tree materials and different cultivars of pandanus and breadfruit have been introduced to the island to complement the existing ones, which generally, throughout Kiribati are limited.



5.2.2 Livestock

Livestock on the island is limited to pigs and chickens of both local and exotic breeds. The local pigs and chickens were documented as having been introduced in the early days before Kiribati became a British protectorate and later exotic breeds were introduced as part of the Division of Agriculture's plans to develop agriculture and livestock on the outer islands of Kiribati. Local pigs vary in color and sizes and are very short, rarely reaching a height of 1 meter whereas the introduced local breeds if managed properly, grow higher than a meter and are actually nicknamed as 'horses' by the locals who never cease to marvel at the height and size that these exotic breeds can grow to. Crossbred with a local breed, the progeny are normally faster (than local breeds) growing, taller pigs with higher food conversion rates and good breeding qualities e.g. more piglets per litter. The pigs are generally either



penned or tethered while the chickens are free ranged. Five (5) exotic breeds have been imported into the country by the Division of Agricultural that has been distributed throughout Kiribati for crossbreeding purposes. These breeds include the Duroc, Landrace, Berkshire, Large White and Tamworth.

Fig 20 (left): Households owning pigs

Exotic breeds of pigs and chicken have been introduced for cross-breeding with the local breeds. The idea of owning a great big pig such as the introduced breeds resulted in initial high demand for the exotic breeds of pigs. This however lost popularity when the exotic breeds were found to be unable to perform well on a local diet that consisted mostly of coconuts and household leftovers. Through lessons learned, locals are now happy to own exotic breeds only so they can cross them with their own local pigs to get better progeny. As portrayed in the above chart, the majority of the households do not own crossed and exotic breeds as these breeds are initially dependent on the Division of Agriculture supplying them plus the cost of a pig borders on \$50.00 which is generally unaffordable on the outer islands.

The total number of pigs on the island in 2005 was 1,753. From this, 1,460 (83%) are local pigs, 199 (11%) are crossbreds and 94 (6%) are exotic breeds. While most of the households do not own cross (81%) or exotic (92%) pigs, while a small 9% did not even own a local pig as portrayed in the above chart.

Generally, pigs are more popular as domestic animals because they are the major source of meat during family, church and island feasts. It is extremely rare in the whole country for one to kill a pig solely to eat pork as they are kept specifically for important feast and functions when whole baked pigs grace these feasting tables and is the most sought after food at such times.

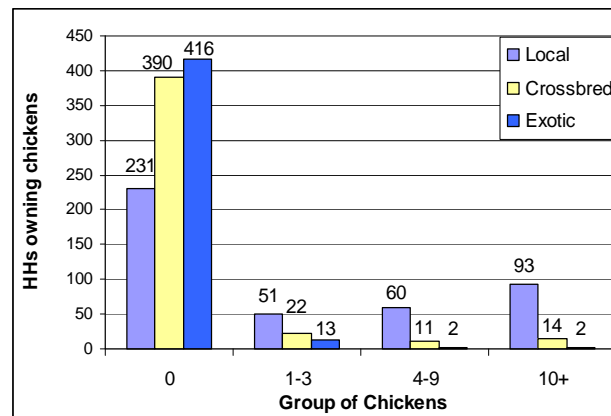


Feeding a pig, children's responsibility when pigs are young and there are not many pigs

Evidently, a total of 293 cross and exotic breeds exists on the island which, given time, would presumably increase the number of more cross bred pigs on the island that are expected to perform better than the local breeds in terms of growth rates on a local diet amongst others.

Chickens on the other hand totaled 1,990 from which there were 1,690 (85%) local, 253 (13%) crossbred and 47 (2%) exotic chickens. As portrayed in the chart (below), the majority of the 437 households also do not own cross (89%) or exotic (95%) breeds of chicken and a considerable 53% of the households also do not own local chickens.

Fig 21: Households owning chickens

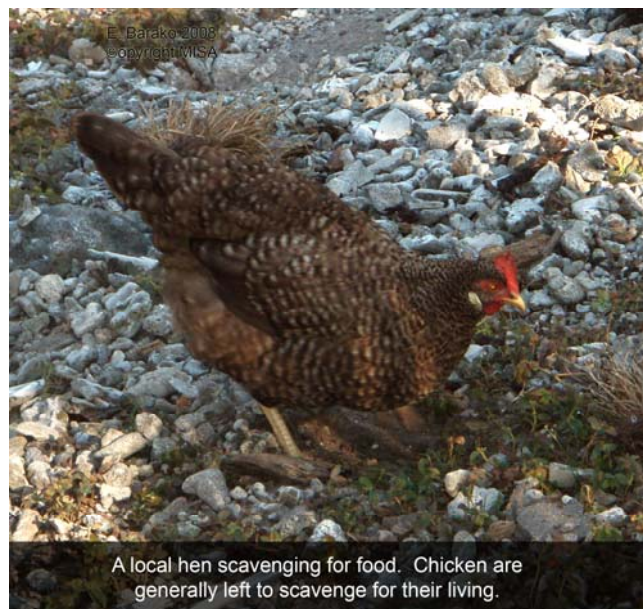


Chickens are free-ranged and are also kept domestically for households own meat protein supplements and, like pigs, for special occasions. As free range chickens, they inter-mingle with chickens from other households resulting in crossbred chickens. Where the hens are kept for laying eggs to produce more chickens, the roosters are kept to breed with the hens as well as for their feathers that are popularly used for fish lures. As is quite prevalent in the islands, the free-range management of chickens on the outer islands has impelled marking of chickens to declare ownership of the chickens. These markings include chopping off certain claws of the chickens or tying certain colored pieces of cloth to the feathers or legs. Eggs are rarely eaten unless important guests/functions are present or when it is required as part of a medicinal ingredient. However, on some islands, since the chickens are free ranged, there is no way to know which chickens belong to whom and chickens are more liable to live off the bush and thus called bush chickens, open to anyone to chase and kill when needed.

Unlike pigs, free ranged chickens are not liable to fines or confiscation by Island Councils whereas free-ranged pigs on the other hand are considered an offense against the law, liable with fines or confiscation of the pigs. The confiscated pigs can be released to owners at a fee of \$10.00 and where they are not claimed, they are auctioned off to the public. Pigs are kept in pig pens or tethered under shades of trees as is common throughout the islands of Kiribati.

Even though, both pigs and chickens are kept for own consumption, sale opportunities to supplement their meager incomes are never passed by especially when one has a lot of pigs or chickens and does not have an upcoming family or village function. Pig prices on the outer islands are generally negotiable but most of the time the Agricultural price of AU\$4.50/kg live-weight is used. Most would rather buy them live due to pig blood at slaughter being a local delicacy.

There are no known diseases specific to Marakei livestock and factually, the pigs and chickens alike are free from infectious and dangerous diseases such as the well



known avian influenza in chickens or trichinella in pigs etc. They are however vulnerable to worms and skin parasites. Exotic breeds of chicken are prone to 'botulism' once released to the outer islands making it hard for exotic chicken breeds to live long on the islands. The local breeds are however immune to botulism. Crossbreeding eventually does happen resulting in more disease resistant crossbreds (a characteristic of local breeds) with higher laying characteristics, tender meat and faster growing rates, characteristics of exotic breeds.

Other than providing cultivation and gardening services to the public, Agricultural Officers also castrate pigs and carry out routine injection of pigs on the island for worms and mange, the common pig ailments in Kiribati. Sterilization of cats and dogs are carried out from the Animal Health Division within the Agricultural Department who visit individual islands should the need to sterilize the domestic animals arise, as reported by the Agricultural Assistant.

5.2.3 Fisheries

Fishing is at large, a routine activity for the men which they carry out when the seas are calm, and whenever home fish reserves have run out while others fish whenever they can as a hobby and to pass the time away. Fish jerky is still a common product throughout the island and is provided as gifts to guests, sold to others and exported to relatives in other parts of Kiribati mostly to those in South Tarawa. There are many different kinds of fishes that serve as food for the Ikiribati and special methods are utilized for certain species or groups of species. These methods are standard amongst the fishermen but individual variation does exist (*Preston E. Cloud Jr. 1952*) which are most of the time kept within families.

As islands, households have been harvesting the sea in one way or another, initially to satisfy their own subsistent needs and to send salted fish (fish jerky) to relatives in other parts of Kiribati mostly South Tarawa and lately for domestic sale to others unable to fish, most of the time Council staff living at the Council quarters in Rawannawi.

The Ministry of Fisheries and Marine Resource Development supports fisheries development on the outer islands through:

- the provision of technical staff for training, advisory and resource monitoring/evaluation purposes;
- research and trialing of new fishery-related projects;
- the sourcing of funds for implementation of national projects (such as cold storage (ice plants), etc.)
- the provision of affordable fishing gear.

Presently, there is not a technical fisheries assistant on the island who assists with fishery government projects on the island as delegated from the Fisheries Division in Tanaea. The Fisheries Division in Tanaea is also carrying out many breeding projects on some potential marine resource developments such as breeding of pearl oysters, white teat-fish and the 'bwaraitoa'.

Pearl oysters are part of the Fisheries trial projects presently in Butaritari, Abemama and Onotoa where they are providing young pearl oysters to these islands for trial purposes to see how they would fare.



The white teat-fish are also bred in the tanks and then dispersed in the waters on the outer islands of Kiribati where they are most likely to breed. Buttons (shirts etc) are made out of the 'bwaraitoa' which according to Fisheries is not that abundant in the country and thus they are also breeding this shellfish for dispersal in the country waters.

5.2.4 Handicrafts

A few years ago, Government established the Kiribati Handicraft and Local Produce Company (KHLP) to encourage people to make handicrafts and local products for commercial purposes. The company buys materials from the outer islands and then re-sells them to the urban population, as well as foreigners. However, despite the existence of KHLP, the level of production is still very small. Among other reasons, KHLP faces staffing and funding difficulties that results in its inability to adequately absorb production from the outer islands.



An uninhabited council house used as a canoe shelter instead

Marakei is not well known for handicrafts as it is more well known for its 'bwabwai' cultivars – the tastiest in the country. Even so, Marakei also produces the following general handicrafts:-

- Mats of different sizes
- Baskets of assorted sizes and makes (popularly for bibles and hymn books)
- String
- 'Rauara' (Cigarette paper made from peeled pandanus leaves)
- Fishing hats
- Fans of different sizes and makes

5.3 INFRASTRUCTURE



Nei Keina bridge joins Baretoa and Tekarakan

Government schools and medical facilities are all the responsibility of the Government including staff living quarters. Where working facilities are maintained by Government employees through the Ministry of Works & Energy, government employee living quarters are maintained by the Councils with funds provided by the Government especially teacher and medical facilities. The Marakei Island Council, like the rest of the councils in the outer islands provide living quarters to the council seconded staff from the Government but these quarters are their own responsibility to maintain and upgrade as needed. House rents are charged those occupying the houses even in cases when the seconded Government

employee is a native islander with her/his own village and home.

The most predominant infrastructures on the outer islands are the churches, causeways and mwaneabas. Marakei is one of its kind in the Gilbert group having an inner lagoon with only two passages opening out into the ocean. Apart from the churches, missionary resident homes, schools, village and church mwaneabas as the most outstanding infrastructures on the island, there are also two bridges at these two passages. 'Nei Keina' bridge joins Baretoa (Raweai) and Tekarakan while 'Nei Taangaangau' bridge joins the villages of Bwainuna and Norauea.

5.3.1 Land Transport

The most common form of land transport is the pushbike followed by motorbikes and trucks. Motorcycles ranks second in popularity, as they are generally more expensive than pushbikes. The Marakei Island Council has two JSS trucks and the Council does charge a small fare for pupils and inter-village travelers in order to raise funds to meet the truck's operational cost and maintenance which unfortunately is not presently available. A project within MISA



Late afternoon on the road in Marakei

known as the Health Services Communication Improvement Fund (HSCIF) is responsible for maintaining funds supplying spare parts for these JSS trucks and including the medical motorcycles. The Ministry of Medical Health and Medical Services (MHMS) has to pay permanent hire for the use of the motorcycles

by their outer island medical assistants and nurses while the councils have to pay \$200.00/JSS truck per month to this fund. The HSCIF supplies the Island Councils and medical facilities with spare parts for the either the trucks and motorbikes and purchases new motorbikes for the nurses every 4 years. The old medical motorbikes are given to Island Council to use and most of the time, these are tendered out to the general public on the island only if the Council does not have any use for them.

Even though pushbikes are the main means of transportation for the islanders, motorbikes are however also popular as they make traveling a lot easier plus they can also be hired out to visiting officials at a cost of \$20.00 per day. Pushbikes can also be rented out but most of the time, visiting officials do not have the time to go cycling around the island to carry out their work with most preferring motorbikes or trucks as their transportation during their visit. There were 299 pushbikes present and working on the island in 2005 owned by 279 (64%) of the 437 households.

Trucks most of the times are hired when there are island functions requiring most of the communities to attend at which time trucks can be hired and Marakei's case, a truck is convenient for the traditional round trip to visit the shrines around the island especially when one is a newcomer to the island. In other cases, a truck is hired to transport coconuts, wood, gravel or sand from the bush or other parts of the island, far from the villages.



The main student transport on the islands - the JSS truck

Island Council trucks provide the main transport for Primary and JSS students to and from their schools and general use by the Council. The availability of trucks has made easier access to schools by the children around the island.

5.3.2 Sea Transport and Shipping



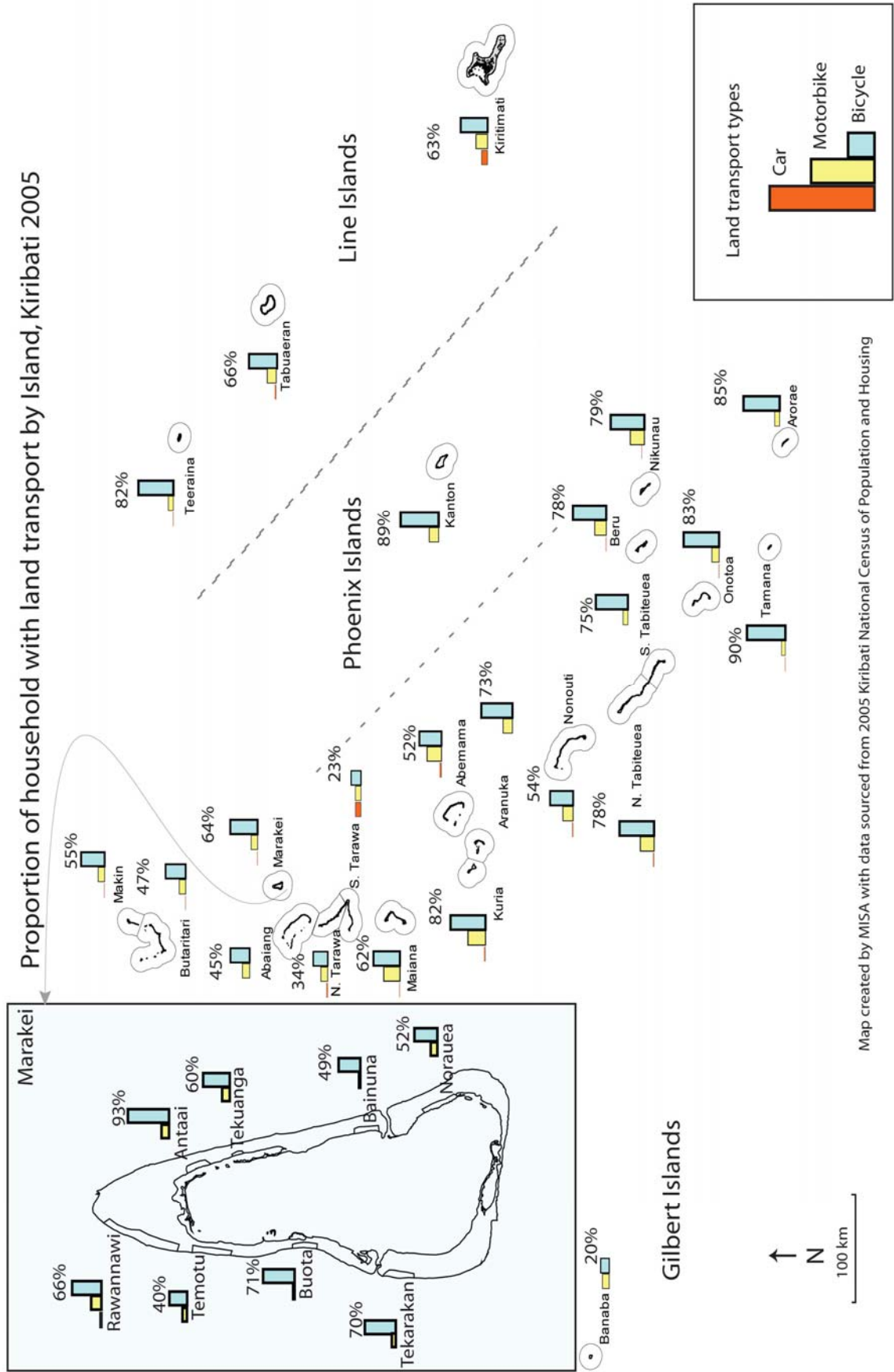
Boat channel and seaport at Rawannawi, Marakei

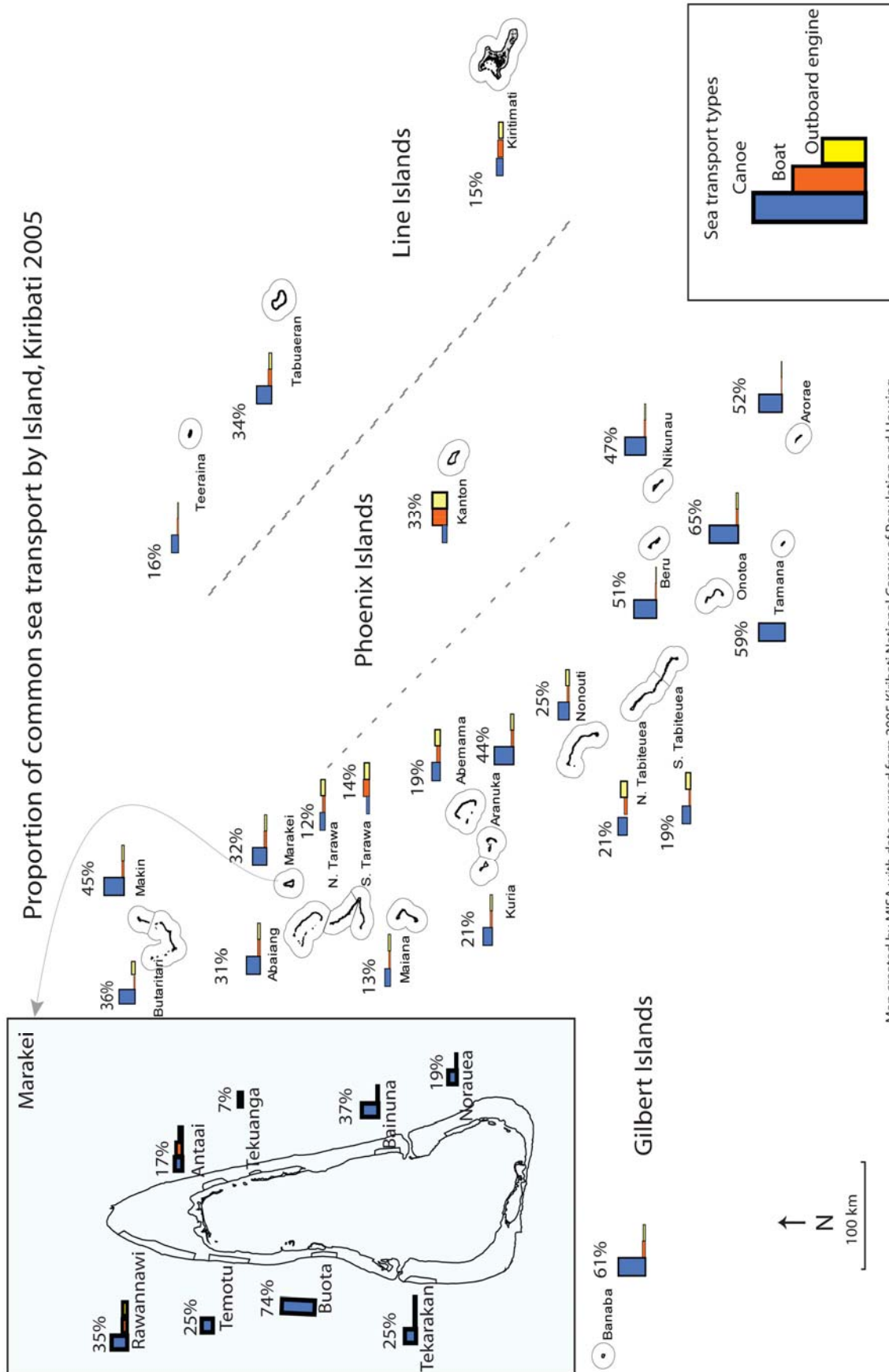
Kiribati is a country of fragmented islands dispersed over a vast ocean area that extends almost 3,000 kilometers across the central Pacific, bordering the Marshall Islands in the east and French Polynesia in the west. This fragmentation and vastness of ocean give rise to major communication and transport problems that have been, and will continue to be the greatest development challenge for government. Shipping is a critical service that needs to be provided and maintained between Tarawa and the outer islands, in order to facilitate the transportation of food and material supplies to and from the islands. Government has been the major

shipping operator since colonial times, and continues to dominate this service, although private businesses have secured an increasing share of the market. Still, central government attempts, through its shipping line – Kiribati Shipping Services Limited (KSSL) – to serve all islands in the country near and far.

Statistics also showed that in 2005 there were 139 canoes on the island owned by 137 (31%) of the 437 households and only two (2) boats/skiffs. Both these sea vessels are used for accessing fish resources in both the surrounding ocean and inner lagoon of Marakei.

The Kiribati Shipping Services Company Ltd. (KSSCL) is a Government company that provides the basic shipping services to all the outer islands of Kiribati. However, there is also an increasing number of privately owned boats that are also providing shipping services to the outer islands including 'Bwaan te Tangira' owned by the Onotoans, 'Te Ataana' privately owned by a Phillipino resident, and others. Most major service work on the ships excluding the privately owned sea vessels are carried out in nearby Fiji as the KSSCL is not equipped as yet to carry out these service jobs on their sea vessels. The privately owned vessels on the other hand are also serviced in Fiji or locally as some are made from local imported materials such as big housed catamarans.





5.3.3 Air Service

There is only one air service to the outer islands of Kiribati provided by the 'Air Kiribati', a Government owned company. Flight schedules to the islands differ as well as airfares. This air service does not include the islands in the Line & Phoenix group.



Due to their remoteness, the Southern islands excluding Tabiteuea North have only one flight a week while there are more flights to Tabiteuea North, the central and northern islands in a week. The Southern flight schedules comprise flying to two islands at a time. The Marakei flight is carried out in conjunction with the Abaiang flight thus passengers are shared amongst the two islands every Sunday of the each week. The second flight to Marakei is every Wednesday at

which time, the flight is solely for the people and cargoes of Marakei.

Even though the company has been operating on a loss for years, it has also been trying out a lot of methods to improve its services. On account of the cut in airfares having not worked, the airfares have now soared since August 2008.

Located close to South Tarawa, it takes approximately 20 minutes to get to Marakei on the small passenger planes and the plane does not need to refuel on the island or any other for the return trip. Compared to the southern islands, the planes have to re-fuel in Tabiteuea North for any southern island trip. The flight schedule is as provided from Air Kiribati in the following table:

Table 15: Flight schedules

Day	A/C	ROUTE	ETD	ROUTE	ETA
Wednesday	Casa	Tarawa	1245	Marakei	1305
		Marakei	1325	Tarawa	1345
Friday	Y-12	Tarawa	1350	Marakei	1410
		Marakei	1430	Abaiang	1440
		Abaiang	1500	Tarawa	1510
Sunday	Y-12	Tarawa	1325	Marakei	1345
		Marakei	1405	Abaiang	1415
		Abaiang	1435	Tarawa	1445

Source: Air Kiribati Bairiki 2009

Table 14: Air tariff

AIR KIRIBATI TARIFF	
Effective 1st July 2009	
Makin	\$90.00
Butaritari	\$72.00
Marakei	\$36.00
Abaiang	\$30.00
Maiana	\$30.00
Kuria	\$55.00
Aranuka	\$55.00
Abemama	\$55.00
Nonouti	\$100.00
TabNorth	\$120.00
TabSouth	\$135.00
Onotoa	\$150.00
Beru	\$160.00
Nikunau	\$170.00
Tamana	\$210.00
Arorae	\$230.00

Peak flights are generally during the school holidays, Easter, Independence celebrations, Christmas, and New Year holidays. Marakei are every Wednesday and Sunday of the week with an AU\$70.00 airfare per trip. There is a 15kg baggage and a 5kg hand carriage allowances while excess baggage

during flights costs double the normal freight cost of \$2.50. Air cargo baggage is generally cheaper (\$0.75/lb perishable goods and \$1.55/lb un-perishable goods than flight baggage for un-perishable goods. The different airfares are further elaborated in the following table:

5.3.4 Issues facing Transportation

Land and sea transportation on the island is not an issue as the Marakei Island Council has their own trucks and people have their own pushbikes and motorbikes. The council and individuals also have their own canoes and boats which are used for fishing and there is hardly any problem with transportation on the island and to and from the island considering that Marakei is located 20 minutes away from South Tarawa by plane. The issues lean more toward transportation to and from the island for the islanders, visitors as well as for food and material cargoes and the high cost of pushbikes and motorbikes. Bicycle



Some of the most handy things on an outer island - a motorbike, a wheelbarrow, a canoe and pushbikes

(pushbikes) prices are also controlled by the Government.

Transport hire costs on the outer islands like Marakei have been geared towards the local community being able to afford the hire of a truck for transporting of coconuts and other materials from the bush or other parts of the island as well as the Island Council making a small profit in return. Not surprisingly, service charges to the local community are generally lower than

charges to visiting Government officials or organization use as further displayed in the following table:

Table 16: Truck hire costs

	Service	Government charge AUD	Company/Organization charge AUD	Local Charge AUD
1	JSS truck	\$20.00/day	\$10.00/day	\$5.00/day
2	Kilometer charge	\$1.00/km	\$0.50/km	\$0.30/km

Generally, most islands have a hire, kilometer and overtime charge that varies from island to island. Marakei also has a rate of \$20.00/day for hire of one of their trucks plus \$1.00 per kilometer ran contrasting to Arorae in the South who charges a flat rate of \$50.00/hire regardless of the kilometer ran and overtime that the driver uses during these times of truck hire. Motorbikes on the other hand can be rented and driven by those renting the vehicle while trucks can only be hired but not rented out. Renting of trucks or cars is a rare business activity on the outer islands while it is easy to rent a motorbike or pushbike but then there are not that many cars or trucks on the outer islands.

5.3.5 Communication

Until a few years ago, the main mode of communication between the islands was with HAM radio

communication systems operated by TSKL. Each island has one such system based at the Island Council headquarter on the island. Members of the public normally use this for inter-island communication, as does the Island Council and central government in Tarawa. However, despite the fact that the system has been dependable and effective, there were a few problems relating to its use, among which are:

the system is not safe for sharing of private information, since the frequency used can be accessed by anyone with such a radio, and the radio equipment is operated by a TSKL agent.

the use of the radio is dictated by a schedule, hence only available for 1-2 hours daily, and only from Mondays to Fridays.

the radio operator lacks the skill to undertake major repair works if the radio breaks down.

Communication with the island could be cut for at least one week during which the radio is sent to Tarawa for repairs or awaits a technician from South Tarawa.

since there is only one radio, people from distant villages must take long journeys in order to use it.

In order to address these problems TSKL decided to slowly introduce a new technology, a satellite-based telephone system which connects directly to the telephone system in Tarawa. The new system also supports the use of facsimile and internet, and therefore was considered a major accomplishment as far as progress is concerned. This system on the outer islands is powered by 450 solar panels that harness this solar to 1000 amp. batteries (Turabu pers. comm.)



This system has already been extended to Marakei and even though, it also costs more to use compared to the radio; connection is vulnerable to rough weather conditions; and people still need to travel to Council headquarters to make a call, it is popular and a welcome progress. It provides more privacy when talking to relatives on other islands especially South Tarawa but can be a problem to those in the far villages who will still have to travel to the Marakei Island Council to access these telephone lines. It is also important to note that the government through TSKL is making an effort to improve the communication systems for the outer islands and as such has plans to establish tele-centers on the rest of the outer islands including those in the southern.

Like the rest of the islands in Kiribati, Marakei is also equipped with several CB radios at the different sectors on the island:

- Police quarters
- Island Council office operated by the radio operator employed by the Council
- Health Centers
- Air Kiribati

The Police and Medical radios are used solely by the individual officers for their own inter-department calls for supplies and emergencies while the Air Kiribati and health centre radios are used for communicating passenger and flight details and health matters. These CB radios by their nature are not used by the public unless it is an emergency of some kind when the Island Council radio and telephone cannot be accessed or is broken.

