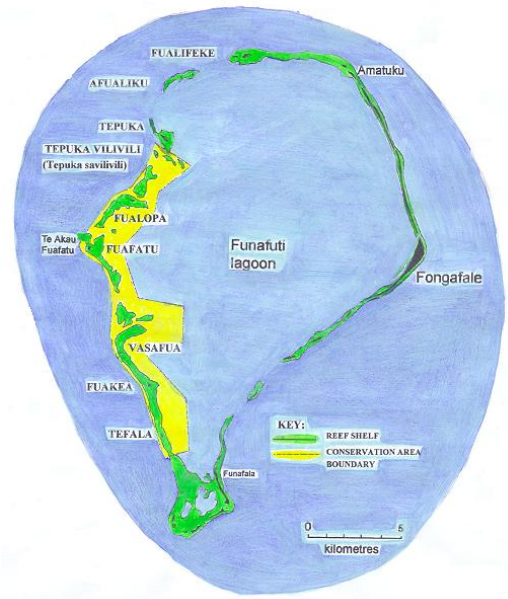
REPORT OF THE COMMUNITY NATURAL RESOURCE USE SURVEY AND ENVIRONMENTAL AWARENESS SURVEY

Funafuti Atoll, Tuvalu, December 1999



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1. Introduction

1.1 Background

Being the Capitol of Tuvalu, the seat of National Government and the centre of employment opportunities, Funafuti atoll is now home to more than 40% of the country's people, having a population of around 4,000 on less than 3 square kilometres of land (Mclean & Hosking,1992). As most people rely heavily on marine and island resources, the large population is putting increasing pressure on the atoll's natural resources through harvesting as well as from environmental hazards such as rubbish dumping and pollution.

To address some of these problems, in May 1994, the Funafuti community agreed to implement a Funafuti Marine Park proposed by the Government of Tuvalu under the NEMS (National Environmental Management Strategy) process, and requested that the activity proceed with close consultation between land owners, the Funafuti Town Council and the Community (SPREP,1997).

During May - October 1995 the Environment Unit of the Ministry of Natural Resources and Environment, together with consultants from SPREP (South Pacific Regional Environment Programme), put together the Project Preparation Document (PPD) for the *Funafuti Marine Conservation Area* (see map), to be funded as a three year project under SPREPs South Pacific Biodiversity Conservation Programme (SPBCP) (Environment Unit,1995).

The Funafuti Conservation Area Project was then set up in 1996 with the aim of :

Conserving the marine and island biodiversity of Funafuti atoll through the sustainable use of natural resources for the benefit of the community and its descendants.

The four programmes developed to implement the project include:

- Project management and legal framework
- Natural resource management
- Community education and awareness
- Ecologically sustainable income generation

Monitoring the success or otherwise of these programmes is an important part of project management. Therefore the PPD requires, among other things, a Community Awareness questionnaire survey to be developed and carried out to assess the progress of the environmental education programme (Environment Unit,1995: Section 4.3.2. Output 6).

As part of the community consultation process in 1995, the PPD team undertook a community resource use survey amongst fishermen and landowners of the proposed area to get some ideas about:

- the level of harvesting and use of marine and terrestrial resources in the proposed Conservation Area and the perceived change in the abundance of these resources over the recent past;
- the attitudes towards the declaration of a Conservation Area and the conservation of threatened species;
- the methods of resource harvest in the proposed conservation area and the perception of whether these methods are damaging or not; and

- how best species conservation can be achieved, especially of threatened species (Environment Unit,1995).

As that survey was carried out with a sample of 21 men only, it is considered useful for the survey to be repeated more thoroughly together with the community awareness survey to be conducted at this time.

1.2 Purpose and scope of the survey

1.2.1 Part one – Use and importance of natural resources

Conservation of the biodiversity of Funafuti atoll requires both the protection of ecosystems and the protection of species, both food species and rare or threatened species (which are in danger of becoming locally or even globally extinct if they are not conserved). Species such as turtles (fonu) which are listed as endangered and clams (fasua) and coconut crabs (Uu) who's survival is dependent on communities and governments putting conservation and management plans in place (IUCN,1994), are important both as threatened species and also as traditional food resources.

To properly manage Funafuti's natural resources for the benefit of the community and its descendents, it is necessary to have information on both the resources themselves, which is done through ecological surveys (see Kaly 1997, Kaly et al,1999, Watling,1998 and Ludescher et al.1999) and also on the community's use of those resources.

Therefore, the broad questions to be answered by this survey section are:

- To what extent are Funafuti's living natural resources harvested by the community and what are the perceived changes in the abundance of these resources over the recent past?
- What areas are important habitats for these species?
- What methods are used to harvest these resources and what are the perception of whether these methods are damaging or not?

1.2.2 Part two – Public awareness of the Funafuti Conservation Area

The Community education and awareness programme aims to increase community understanding about the need for conservation and management of our natural resources and the benefits of having a Conservation Area where the plants and animals are left to grow and reproduce without human disturbance or harvesting. Methods used to pass information to the community have included workshops and seminars about the results of our ecological surveys, regular radio programmes and Newspaper articles about the Conservation Area and other environmental issues, posters and information sheets.

To monitor the success of this programme the following broad questions need to be answered:

- What proportion of the public are aware of the Funafuti Conservation Area (FCA)?
- What type of FCA awareness programmes are reaching the largest proportion of the community?
- What is the general understanding of the purpose of the Funafuti Conservation Area?
- What is the level of support for the Funafuti Conservation Area?
- What is the general awareness of environmental problems and their possible solutions?

- How is understanding and support of the FCA linked to exposure to public awareness campaigns?

2. Methodology

2.1 The questionnaire

Part 1 of the questionnaire was developed using and expanding on the questions from the Community Survey used in the Project Preparation Document (Environment Unit,1995:Appendix 1). Questions were added to collect more specific information on the quantities of turtles, coconut crabs and birds harvested (See Appendix A).

Part 2 of the questionnaire was developed by writing specific questions aimed at answering the broad questions listed in Section 1.2.2 above. Closed questions were used where specific *yes* or *no* or quantity answers were sufficient. Open ended questions were used to collect information on conservative or destructive fishing methods, ecological information about the resources and understanding of the FCA purpose and regulations (See Appendix A).

The Questionnaire was translated into Tuvaluan and pilot tested on a group of 12 community members. Questions that were not easily understood were changed and improved before the survey began in July.

2.2 The sample

The population of interest for this survey is the inhabitants of Funafuti atoll. As these include people from the eight Tuvalu island communities who may have varying affiliations and access to Funafuti's natural resources and also use different methods for harvesting these resources, it was considered important to stratify the sample according to the size of the different Island communities. To obtain a manageable but proportionate sample of 97 participants (around one quarter of all households), the last Tuvalu Census (Population and housing Census 1991) was used to stratify the sample (see Table 1). Two men were surveyed to every one woman surveyed as it is mostly the men who go fishing and hunting for turtles, coconut crabs and birds etc and therefore need to know the boundaries and regulations of the Conservation Area.

Table 1: Funafuti atoll population (1991) and the Community survey sample stratified by island community and gender

Island community	Population ('91)	% of Funafuti Population	Number surveyed	Male/Female 2:1
Funafuti	966	26.7	27	18/9
Nanumea	588	16.2	16	10/6
Niutao	515	14.2	14	9/5
Vaitupu	440	12.2	12	8/4
Nukufetau	368	10.2	10	6/4
Nanumaga	315	8.7	9	6/3
Nui	204	5.6	6	4/2
Nukulaelae	135	3.7	4	3/1
Other	84	3	0	-

2.3 The survey team and data collection

The Funafuti Conservation Area Project's two Conservation Officers distributed questionnaires to men and women from the correct number of households from each community resident on Funafuti. Questions were asked in an interview style setting with older people and others who did not find it easy to read the questions, whilst other participants filled the questionnaires themselves.

2.4 Potential biases

The sample was not completely random as a number of private and commercial fishermen were specifically targeted within each community. There is also the possibility that people who do not know much or anything about the Funafuti Conservation Area, are under-represented in the sample, as some refused to answer the questionnaire.

2.5 Data analysis

Answers to all closed questions and some open-ended questions were coded and entered onto a *STATISTICA* computer spreadsheet (see Appendix B). Summary tables and frequency histogram graphs were produced to show percentage of respondents giving each answer.

Answers to other open-ended questions were summarised in table form and tallies were added to again determine the percentage of respondents giving each answer.

3. Results

3.1 Survey participant response rate

Due to other work commitments of the survey team, questionnaires were distributed and answered over the months of July-September and then also in December. At the closing date of December 14th 1999, 84 out of 97 questionnaires had been answered and returned, giving an overall response rate of 87 percent.

The response rate from each Island community was as follows:

100% from Nui, Nukufetau, Nanumaga and Vaitupu
88% response from Nanumea (14 of 16)
81% response from Funafuti (22 of 27)
71% response from Niutao (10 of 14)
25% response from Nukulaelae (1 of 4)

The overall female and male response rate is unknown as 19 participants did not answer that (non compulsory) section of the survey. Of the 64 respondents who did answer; the female to male response rate was 19 females to 46 manes.

3.2 Part one - Use and importance of natural resources

3.2.1 Harvesting of living natural resources -

What resources are harvested? Where are they most commonly found? What methods are used to harvest them?

3.2.1.1 Importance of the Funafuti Conservation Area

As can be seen from table 2, the Funafuti Conservation Area is seen to be important for many of the living natural resources (plants and animals) used by the survey participants. Eighteen people said that the area is an important habitat for clams, 11 people said it is an important habitat for coconut crabs, 8 said it is important for all fish species. Food plants such as lauulu, and coconut were also mentioned as were wood crops such as Pisonia and Hernandia trees and handicraft resources such as pandanas, land snails and cowrie shells.

Table 2: Species for which the Funafuti Conservation Area is considered important

English	Tuvaluan	number of people	English	Tuvaluan	Number of people
Clams	Fasua	18	Pandanas	Fala	4
Coconut crab	Uu	11	Birds	Manu	3
All fish	Ika katoa	8	tubeworms	Tio	3
Fern	Lauulu	6	Coconuts	Niu	2
Turtle	Fonu	6	Trochus	Molikau	2
Land snails	Misa/pule	6	Spidershell	Kalea	2
Reef fish		5	crabs	Kamakama	2
Crayfish	Ula	5	Hermit crabs	Uga	1
Algae	Limu	5	Bech-de-mer	Funafuna	1
Pisonia trees	Pukavai	5	Hernandia trees	Puka	1
Crabs	Kaipea	4	Tuna	Atu/Kasi	1

3.2.1.2 Fish

Of the eighty four people surveyed, 66 people said that they go fishing at least sometimes during the year, at an average of around two days per week and two and a half weeks per month. From graph 1 you can see that a third of participants said that they fish all year around, while 10% of participants fish between 6-11 months of the year, one quarter of participants fish 1-5 months of the year, another quarter only fish occasionally and 13% never go fishing.

Results seen in graph 2 show that while lagoon, reef and ocean fish are all important components of Funafuti's fishery, the greatest amount of fish appears to be caught from the ocean, followed by the lagoon and then the reef.

Up to 70% of people keep or share more than half of all their catches (graph 3). Less than 10% of people sell more than half of their lagoon or reef fish, and only a quarter of the people sell more than 50% of their ocean fish (graph 4).

Graph 5 shows that the most commonly sold fish are ocean fish such as tuna, which are sold by around half of all the people who go fishing. 24% of these people said they also sell deep sea fish and another 23% said they sell all kinds of fish.

Table 3 shows the most commonly caught species of fish and other marine resources and also shows the methods most commonly used to catch these species. Some other, less common methods used include fish traps made from stones and also fish traps made from nets.

Table 3 : Types of marine resources harvested using various methods (the numbers are the number of families using the different methods for harvesting each species)

English name	**Tuvaluan name**	**Gill net**	**Throw net**	**Spear /gun**	**Line Fishing /trolling**	**Deep bottom fishing**	**Hand collection**	**Other**
Crustaceans								
crayfish	Ula			2			58	
crab	Kaipea						63	
Coconut crab	Uu						55	
Molluscs								
clam	Fasua			1			67	
Trochus				1			5	
Oysters	Pa						11	
octopus	Feke			4	3		43	
Land snails&cowries	Misa&Pule						36	
Other molluscs							21	
Bech-de-mer	Funafuna						47	
Reef and lagoon fish								
Mullet	Kanase	22	10	5				4
Top sail drummer	Nanue	23	18	8	3			6
Milk fish	Paneava	62	11	7	4			4
Rabbit fish	Maiava	30	14	6	3	2		5
Black trevally	Tafauli				5	17		3
Surgeon fish	Pone	71	14	17				3
Parrot fish	Laea	12	10	15	1			6
Unicorn fish	Ume/pokapoka	9	5	19	3			6
Soldier fish	Malau	5	4	9	14	6		14
Paddle tail snapper	Taea/taiva	4	2	6	19	5		8
Eel	Pusi	2	1	11	4	1		6
Open ocean fish								
Tuna	Kasi&atu	2			20	2		
Rainbow runner	Kamai	1			22	3		
barracuda	Ono	1		1	18	4		
Dolphin fish	Masimasi	1			17	2		
Deap sea fish								
Red bass	Fagamea	4		2	9	13		5

3.2.1.3 Turtles

Graph 6 shows, that of the 84 people surveyed, almost one third of the people said they harvest turtles while about two thirds said that they do not. Only12 % said they harvest turtle eggs while 85% said they don't.

Those 24 participants who did harvest turtles caught up to 50 turtles within the past year, with an average of 2 turtles per person and a maximum of seven turtles per person. Those 12 people who did harvest turtle eggs, collected up to 17 batches of eggs within the past year, with an average of 1.4 nests per person and a maximum of 4 nests per person (see table 4 and graphs 7&8).

Table 4: Number of turtles and turtle egg batches harvested by community survey participants in the past year

Number of people	turtles caught by individuals	Number of people	eggs batches taken by individuals
3	0	3	0
9	1	3	1
5	2	5	2
2	3	0	3
2	4	1	4
2	5		
0	6		
1	7		
Total	**50**	**Total**	**17**

Harvest method

Diving from a motorised boat is the most common method of turtle harvesting used by around one third of those people catching turtles. Over a quarter of the hunters also take nesting turtles from the beach, about 5% use the stick and net and another quarter of the hunters said that they use all of the above methods (see graph 9).

Nesting sites

Graph 10 shows the islets of Funafuti atoll that are considered to be nesting sites for the green turtle (fonu). The four most commonly mentioned nesting sites are the Conservation Area islets of Fuafatu, Tefala, Fuakea and Fualopa. However Islets outside the Conservation Area, such as Tepuka and Funafala are also mentioned.

3.2.1.4 Coconut crabs

Half of the survey participants said that their family harvest coconut crabs while the other half said that they do not (see graph 11).

Harvest method
Graph 12 shows that the most commonly used method for hunting coconut crabs is **Fakanamu**. Grated coconut is heated with stones that have been in a fire. This highly aromatic roasted nut is then spread along an easily followed trail of lauulu leaves (birds nest fern) as bait for the crabs. Using a stick to poke holes in the ground or down potential burrows is also used to find and catch crabs as is searching with a light.

Harvesting Area
Graph 13 shows the Funafuti islets that are considered important harvesting grounds for coconut crabs (Uu) (that is where crabs are most abundant). Again, The Conservation Area islets of Fualopa and Tefala are amongst the four most popular harvesting grounds. Other important areas are Tepuka, Mateika, Papaelise and Avalau.

3.2.1.5 Birds

Only one third of survey participants said that their families harvest seabirds whilst two thirds said they do not (see graph 14). Birds commonly harvested include black and brown noddies, frigate birds and boobies.

Harvesting methods
Graph 15 shows that most people who harvest birds use the traditional stick and net method. A few people said that they collect birds by hand and only one survey participant said that they use a shotgun.

Harvesting Area
Tefala and Fuafatu islets inside the Conservation Area are the most popular bird harvesting sites. Other important islets include Funafala and Fogafale and a few people also harvest them from Tepuka, Avalau and Papaelise (see graph 16).

3.2.2 Some information on timing of resource harvesting

Table 5 shows some seasons, moon and tide phases considered to be important for the successful harvesting of some marine and island animals.

Table 5: Seasons, moon and tide phases important for harvesting of living natural resources in Funafuti

Species		**Season/moon and tide phases**
English	**Tuvaluan**	
Black trevalley	Tafauli	Febuary to April
Red snapper	Malau	Full moon
Paddle tail snapper	Taea	Good weather
Snapper	Taiva	Sun set/ high tide
cod	Fapuku	March to June
Drummer fish	Nanue	Full moon, pre-dawn and neap high tide also
Reef fish	Ika ot te papa	Low tide
Tuna	Atu	January to October
Crayfish	Ula	When jelly fish are swimming on top of water and new moon
Rock crabs	Kaipea	Rainy weather
crabs	Kamakama	New moon and low tide
turtles	Fonu	11-12 days after first batch of eggs is laid and high tide
birds	Manu	New moon

3.2.3 Observed changes in abundance of natural resources and perceived reasons for these changes

Between 18 and 26 percent of the respondents say they have observed an increase in the abundance of coconut crabs, coral, clams, turtles and birds. 35% observed an increase in the abundance of crayfish and 37% observed an increase in the abundance of some fish species (see table 6 and graphs 17-23). Graph 24 shows that around 40% of the people believe that the reason for the increase in these resources is that the public has become more aware of the need for, and methods for sustainably harvesting their resources. A further quarter of the respondents believe the increase to be due to the beneficial effects of the Funafuti Conservation Area. Other possible reasons stated are the decrease in the number of people who now go fishing and hunting and also the recovery of populations after the effects of the last severe cyclone.

Over half of all survey respondents say they have observed a decrease in the abundance of fish, clams, turtles and coconut crabs over the past 10-15 years. Around 40% have also observed a decrease in the number of crayfish and birds and in the health of the corals (see table 6 and graphs 17-23). Graph 25 shows that 35% of respondents believe this decrease in resources to be due to the increase in the human population of Funafuti and the accompanying pressure on the environment. Other important reasons given were the use of new fishing methods and equipment such as spear guns and outboard motors, the resultant over fishing and habitat damage, the mis-use of traditional fishing knowledge and the increase in pollution of the lagoon. The use of spears which break the surrounding coral, and the increase in the number of people walking on and crushing the coral reefs while they are fishing, are also given as important causes of the coral damage over the recent past (graph 26).

Table 6: Percentage of survey respondents observing an increase or a decrease in the living natural resources of Funafuti over the past 10-15 years

Resource	Increase ↑	Decrease ↓	No change	Don't know
Fish	37	56	1	6
Crayfish	35	41	5	14
Clams	22	51	4	24
Coral	20	40	40	0
Turtles	26	57	0	17
Coconut Crabs	18	51	7	24
Birds	26	49	6	19

3.2.4. Knowledge of ecologically friendly and unfriendly fishing practices

Graph 27 shows that half of the survey respondents said traditional fishing methods using a canoe without an anchor or using fishing lines without sinkers are ecologically sustainable because they do not damage the habitat and they also make it more difficult to over-fish the resource. Another quarter of the respondents do not know of any ecologically friendly fishing practices. A few respondents knew of net size restrictions and fish minimum size limits to avoid catching small fish before they have had a chance to reproduce.

Graph 28 shows that one third of survey respondents said that the use of small mesh fishing nets is destructive and unsustainable and another third of the respondents said that spear fishing is very damaging to the coral reef habitat and also increases the rate of over-fishing. Fifteen percent of respondents could not think of any unsustainable fishing practices.

3.3 Part 2 - Public Awareness of the Funafuti Conservation Area Project

3.31 Varying success of Funafuti Conservation Area Project extension methods and materials

Ninety percent of the survey respondents new of the Funafuti Conservation Area Project, while the other 10% had not heard about it.. Eighty five percent of the people who knew about it had heard about the FCA project through programmes and press releases on Radio Tuvalu. The second and third most successful communication method s were said to be from talking to other people and from articles in the monthly newspaper. This was followed by posters and brochures, the work-place, workshops and school (see graph 29).

3.3.1 Knowledge of the aim, rules and boundaries of the FCA

Aim

To display a full knowledge of the purpose of the Funafuti Conservation Area a respondent was expected to include the following three points in their answer:

- Conservation of biological diversity (plants, animals and ecosystems)
- To increase fisheries resources
- For the benefit of future generations

Graph 30 shows that while only 20% of respondents listed all three components of the FCA purpose, a further 70% new part of it, while 10% still had no idea.

Rules

There are at least ten rules (now laws) concerning what is allowed and is not allowed to be done inside the FCA. Graph 31 shows that half of the respondents know at least one rule (most answered *no fishing*), while around a quarter of the respondents listed two or three rules. Less than 10% listed many of the rules and around 15% of people did not know any of the rules at all.

Boundaries

When asked to draw the FCA boundaries on the map, only a quarter of the respondents new the boundaries correctly. Around 45% almost drew the boundaries right (some included Tepuka islet in the north and some missed out Tefala islet in the south), while the other 30% of respondents where incorrect or gave no answer (see graph 32).

3.3.4 Perceived benefits and disadvantages of the FCA

Only 2% of respondents said that there are no benefits from the FCA and a further 4% said that they did not know of any benefits. One third of the respondents said that protection of the FCA would cause an increase in natural resources, another quarter recognised that protection of the FCA would cause an increase in fish numbers. About 12% of respondents said the community would benefit through income generated from the FCA and 15% said that they would benefit from both an increase in natural resources and from income based on eco-tourism (see graph 33).

More than one quarter of respondents said that there are no disadvantages caused by having a Conservation Area. Another quarter said that the islet landowners are disadvantaged by the rules of the FCA and a further quarter of respondents said that the fishing restrictions are a disadvantage to the fishermen (see graph 34).

3.3.4 Support for the FCA

Ninety six percent of the survey respondents support the Funafuti Conservation Area. The reasons for supporting the FCA are given in graph 35. These are similar to the benefits mentioned above and also include *the conservation of biodiversity* and *because it will benefit the children/future generations*. The 4% of respondents who do not support the FCA gave the reasons of loss to landowners, loss to fishermen and that no income has been gained from the project (see graph 36).

3.3.5 General awareness of environmental problems facing Funafuti

Workshops given and information distributed under the FCA environmental education and awareness programme have included material about the environmental problems facing Funafuti and possible solutions to these problems as these are important issues that effect the conservation of the atoll's plants animals and ecosystems (biodiversity). The following sections look at the degree of awareness of these issues.

3.3.5.1 Perceived environmental problems around the village

The main environmental problems observed around the village were identified as overcrowding and rubbish. Other problems recognised included sewage pollution and lack of proper toilet facilities, too much cutting of trees, and lack of environmental awareness. 18% of the respondents said that they did not know of any environmental problems around their homes (see graph 37).

3.3..5.2 Government and family solutions to these problems

Possible Government and Management level solutions to these problems included environmental laws and education, and also funding for proper waste management infrastructure and building of a proper dump, import restrictions on waste intensive products, and decentralisation to decrease the population pressure. Over 20% of the respondents did not know how the government could address these problems (see graph 38). Half of the respondents said that education of the family and children by the elders, the parents and schools is an important family solution to the identified environmental problems. Other family solutions identified included, not throwing away rubbish in the street and not dumping rubbish all over the place, reduction in the use of imported products, increased use of family planning and protection of the environment. Twenty percent of respondents did not know what the family could do to help solve these environmental problems (see graph 39).

4. Discussion and recommendations

4.1 Part one - Use and importance of natural resources

In summary it can be seen that the Funafuti Conservation Area is recognised as being an important habitat for many marine and island resources that are commonly harvested by the people of Funafuti. Specifically, almost all of its islets are recognised nesting grounds for the green turtle, coconut crabs were frequently said to be harvested from Tefala and Fualopa and birds were said to be most commonly harvested from Tefala and Fuafatu. This information reconfirms results from (Watling,1998 & Ludescher et al,1999) that these are important breeding and roosting habitats for seabirds. However, hopefully the frequency of harvesting refers to times before these islets were protected and is not revealing a lack of knowledge of the prohibition on the harvesting of all species from these islets.

The results also show that fisheries resources are very important to the people of Funafuti, with most of the survey respondents fishing sometimes and one third of them fishing all year round. More than two thirds of the respondents keep most of their catch for their families and friends and the rest is sold. It was found that most people spend their greatest fishing effort on ocean fish such as tunas, followed by lagoon and then reef fishing. This brings up the question of whether it is easier to catch ocean fish because the lagoon and reef fish populations have perhaps been reduced?

Many different species of fish and also crustaceans (crabs and crayfish) and molluscs (octopus and shellfish) are harvested, with gill nets, throw nets and spears commonly used to catch lagoon and reef fish, while lines are used for trolling and deep bottom fishing. Crustaceans, molluscs and other invertebrates are most commonly taken by hand.

Species of special conservation interest include the turtles, coconut crabs and seabirds.

One third of the respondents said they harvest turtles and together caught a total of 50 over the past year. These were mostly taken by diving from a boat. However over a quarter of the hunters also said they take nesting turtles off the beach, probably without being aware that this activity is illegal under the *Tuvalu wildlife Protection Ordinance*. Only 12% of respondents said they take turtle eggs, with a total of 17 nests having been harvested over the past year.

Coconut crabs are taken by half of the survey participants, mostly by laying baited trails through the bush. While seabirds are harvested by one third of the survey participants, mostly using the traditional stick and net method with only one shotgun mentioned.

Around half of the survey respondents say they have observed a decrease in the resources they harvest and the coral reef habitats that these species depend on. They recognise the reasons for this decrease to be the increasing human population pressure and modern fishing techniques which are leading to over-harvesting , habitat damage and pollution.

Around two thirds of the participants recognise that small mesh fishing nets and spears are causes of both habitat damage and over-fishing, and half of the respondents said that the use of traditional canoes without anchors and lines without sinkers reduce both the habitat damage and the fishing pressure.

Around one quarter of the respondents said that they have observed an increase in the abundance of coral, coconut crabs, clams, turtles and birds over the recent years and around one third say they have observed an increase in crayfish and some fish species. One third of these respondents believe the observed increase in resources to be due to an increase in the community's awareness and environmental protection measures. A further quarter of these respondents believe it to be due to the effects of the Funafuti Conservation Area and also due to a decrease in the numbers of people going fishing and hunting. It is hoped that these latter respondents are not referring to less competition for resources harvested from the Protected FCA.

4.2 Part 2 - Public Awareness of the Funafuti Conservation Area Project

Ninety percent of survey respondents know about the Funafuti Conservation Area, with 85% of people having heard about it on radio Tuvalu. The monthly newspaper articles and conversations with other community members were the next most successful methods of communicating information about the FCA. The relatively low number of respondents having seen posters and brochures or having attended a workshop, suggests that more time needs to be spent on distributing these methods of community education and awareness raising.

Questions about the public's knowledge of the purpose, rules and boundaries of the FCA showed that while only 20% of respondents knew the whole purpose of the FCA Project, a further 70% knew part of it and only 10% had no idea. However only one third of respondents knew more than one rule about the regulation of activities inside the FCA. The most commonly stated rule was "no fishing" (by three quarters of respondents). 15% of the people did not know any of the rules. Around half the respondents almost knew the correct boundaries of the FCA while one third did not know the location at all and only one quarter drew the boundaries correctly.

Most people understand some of the benefits to be expected from the FCA, mentioning either an increase in all natural resources, an increase in fisheries resources, and/or an increase in income generated for the community. It is encouraging to see that only 12% of respondents consider the sole benefit to be income generation. This must not be seen as the priority in development of a Conservation Area but should be a component only.

There were an equal number of respondents who said;- there are no disadvantages caused by the FCA; there are disadvantages to landowners; and there are disadvantages to fishermen. However there were only 4% of all respondents who did not support the idea of having a Conservation Area. Reasons given for this lack of support were the above mentioned disadvantages and the fact that those respondents had expected the community to have earned some income from the project by now.

Questions about public awareness of environmental problems around the village revealed that most people recognise problems of overcrowding and rubbish pollution. Sewage pollution, tree cutting and general lack of environmental awareness were also mentioned. The Government and managers were seen to be able to help solve these problems mainly by making environmental laws and increasing environmental education and also by funding proper waste management infrastructure. Possible family solutions to these problems were education of all family members by parents and teachers, about not throwing and dumping rubbish, family planning and general environmental protection. 18% of the respondents did not know of any environmental problems.

4.3 Recommendations

Information gathered by this survey shows some strengths and weaknesses of the FCA environmental education and awareness programme and gives some background information on the importance the community places on the resources that are being harvested in Funafuti and protected inside the FCA. Below are some recommendations on how this information could be used to improve the programme and thereby also hopefully the protection of the FCA.

1. Continue the FCA Radio programme with an emphasis on the rules (now laws) of the FCA and also explanations on the need for protection of threatened species such as turtles, clams and coconut crabs and management of fish populations
2. Continue the monthly newspaper article with a constant update on FCA Project activities
3. Increase time and effort on the development and distribution of FCA posters and maps and widely distribute the FCA Information Sheets
4. Hold a 3-5 day workshop that covers all aspects of the FCA Project, from the law, to survey results, protection of threatened species and the setting up of FCA fees and charges to visitors and transport providers
5. Continue to hold workshops with women's groups about management of environmental problems around the home
6. Inform/remind the public through radio and newspaper, that it is illegal to catch turtles when they are on the beach - anywhere in Tuvalu
7. Lobby the Funafuti Town Council (Kaupule) and/or the Fisheries Department to develop and enforce by-laws and regulations on the protection of turtles and clams and restrictions on fishing net mesh sizes, use of spears and minimum size limit for fish caught. (This survey shows that many people agree these resources are declining and these fishing methods are damaging their resource).

5. Acknowledgements

We would like to thank all the people who gave their time to participate in this survey and thereby assist us in the management of the Funafuti Conservation Area. We would also like to thank the survey team for their hard work, the CACC and Kaupule o Funafuti for their support and SPREP for the funding of the Project.

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7. Appendices

Appendix A - The Questionnaire

PART ONE – USE AND IMPORTANCE OF NATURAL RESOURCES

1. How often does your household harvest marine resources such as fish?

Days in a week: ……

Weeks in a month: ……

Months in a year: …… (name the months) ……..

2. What marine resources are harvested and how?

3.

Species	**Method of harvest**						
	Gill net	Throw net	Spear fishing	Spear gun	Hand line	Deep bottom fishing	other
Crustacea							
Crayfish							
Slipper lobster							
Crab							
Coconut crab							
Others (name them)							
Molluscs							
Giant clams							
Trochus							
Pearl oyster							
Octopus							
Misa and pule							
Other (name them)							
Sea cucumber							
Reef and lagoon fish							
Mullet							
Drummer fish							
Milk fish							
Emperors							
Rabbit fishes							
Pony fish							
Trevalley							
Surgeon fish							
Parrot fish							
Unicorn fish							
Soldier fish							
Rock cod							
Snapper							
Eel							
Other (name them)							

Offshore fish							
Tuna							
Rainbow runner							
barracuda							
Dolphin fish							
other							
Deep water fish							
Snapper							
other							

3. Are there specific seasons when any of the above marine resources are caught?

Species	**Season (months caught)**

4. Are there any particular species for which the Conservation Area is very important?

Species

5. What percentage of the household catch comes from each of the following areas?

Lagoon	Reef	Outside the reef	Total
			100%

6. What percentage of the catch is used for the following purposes?

	Home consumption	sharing	Sale	Total
Lagoon				100%
Reef				100%
Outside reef				100%

7. List which species you sell (which kind of fish, turtle, clam, sea cucumber etc)

8. Do you know of any turtle nesting sites in or near the Conservation Area? (including ones that no longer exist) – show these on the map.

9. a) Do you or any member of your household harvest turtle eggs? **Yes** **No**

b) If yes, how many nests have you harvested in the past 12 months? …….

10. a) Do you or any member of your household catch turtles? **Yes** **No**

b) If yes, How many turtles have been caught by your household in the last 12 months? ……

c) What method is used to catch these turtles? …….

11. a) Do you or any member of your household harvest coconut crabs?**Yes****No**

If Yes,
b) where from? …….
c) How do you catch them? ……..

12. a) Do you or any member of your household harvest birds? **Yes** **No**

If yes,
b) what species do you catch? ……
c) where do you catch them?……
d) what method do you use?……

13. Have you observed any change in the stock/amount of the following resources over the past 10-15 years, and why do you think the change has occurred (eg overfishing, pollution, natural causes or do not know).

	More plentiful	**Less plentiful**	**No change**	**All gone**	**Why has the change occurred**
Fish (list the species)					
Clams					
Crayfish					
Hawksbill turtle					
Green turtle					
Other marine species					

Coconut crabs					
Birds (list the species)					

14 a) Have you observed any change in the coral reef over the past 10-15 years?

Yes No

b) If yes, please describe the change (eg much dead coral, much regrowth after the cyclone, more algae etc). …….

……

c) Why do you think the change has occurred? ……

15. Can you recall any specific disaster that has affected the Conservation Area in the recent past (10-15 years)?……

16. Can you describe any fisheries conservation practices (traditional or modern) that you think are good for managing and conserving the living natural resources of Funafuti?

……
……
……

17. Are there any fishing and harvesting practices (traditional or modern) that you think should be discouraged in order to help manage the living natural resources of Funafuti?

……
……
……

PART TWO - PUBLIC AWARENESS OF THE CONSERVATION AREA

1. Have you seen or received any information about the Conservation Area?

Yes No

2. If yes, Where have you received this information?
Mark one or more of the things below

From the Radio ……
From the newspaper ……
From a workshop …… Which one(s) ……
At school ……
From posters ……
From talking to people……
Through work …… Where do you work ……..
Other …… explain……...

3. Where is the Funafuti Conservation Area? Draw on the map.
4. What do you believe to be the purpose of the Funafuti Conservation Area?
……
……

5. What are some of the rules inside the Conservation Area?
……
……
……

6. Do you support the idea of having a Conservation Area? **Yes** **No**

Why? …….

7. What do you consider to be the benefits of having a Conservation Area?
……
……

8. Are there some disadvantages of having a Conservation Area? ……...
……
……

9. What do you consider to be the main environmental problems facing your village?
……..……..
……

10. What are some possible action that you think the Government and managers could take to solve these problems? ……
……
……
……

11. What are some actions that your family could take at home to help solve these environmental problems?……..
……..
……..
……..

Any other comments

Appendix B - Answer Code to the Questionnaire

Question 1 – HOW OFTEN DO YOU GO FISHING?

1 days/week 0=none 1=1 to 7=7 8=don't know 9=only sometimes
2 weeks/month 0=none 1=1 to 4=4 5=don't know 6=only sometimes
3 months/year 0=none 1=1 to 12=12 13=don't know 14=only sometimes

Question 5 – PERCENTAGE OF FISH CAUGHT IN LAGOON, REEF AND OCEAN

4 fish caught in lagoon 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
5 fish caught on reef 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
6 fish caught in ocean 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%

Question 6 – USE OF FISH CAUGHT IN LAGOON, REEF AND OCEAN

7 percent of lagoon fish kept 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
8 percent of lagoon fish shared 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
9 percent of lagoon fish sold 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
10 percent of reef fish kept 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
11 percent of reef fish shared 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
12 percent of reef fish sold 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
13 percent of ocean fish kept 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
14 percent of ocean fish shared 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%
15 percent of ocean fish sold 0=none 1=less than 25% 2=26-50% 3=51-75% 4=more than 75%

Question 7 - TYPES OF FISH SOLD

16 Types of fish sold 0=none 1=pelagic and bottom fish 2=pelagic(ocean)fish 3=bottom fish 4=reef and pelagic fish 5=reef and bottom fish 6=reef fish 7=all species 8=?

Question 9 – 12 HARVEST OF TURTLE EGGS, TURTLE, COCONUT CRAB, BIRDS

17 do you take turtle eggs 1=yes 2=no 3=used to before
18 do you take turtles 1=yes 2=no 3=used to before
19 method of turtle catch 1=beach 2=stick&net 3=dive 4=all 5=other
20 do you take coconut crab 1=yes 2=no 3=used to before
21 do you take birds 1=yes 2=no 3=used to before

Question 13 – CHANGE IN SPECIES NUMBERS OVER 10-15 YEARS

22 any change in fish numbers? 1=increase 2=decrease 3=no change 4=all gone 5=don't know
23 any change in clam numbers? 1=increase 2=decrease 3=no change 4=all gone 5=don't know
24 any change in crayfish numbers? 1=increase 2=decrease 3=no change 4=all gone 5=don't know
25 any change in turtle numbers? 1=increase 2=decrease 3=no change 4=all gone 5=don't know
26 any change in coconut crab num? 1=increase 2=decrease 3=no change 4=all gone 5=don't know
27 any change in bird numbers? 1=increase 2=decrease 3=no change 4=all gone 5=don't know

Question 14 – CHANGE IN CORALS

28 any change in the corals? 1=no change 2=damage 3=growth 4=don't know

Question 15 – RECENT IMPACTS TO THE CONSERVATION AREA

29 any recent impacts to the conservation area? 0=none 1=cyclone 2=drought (4) 3=more people 4=big waves 5=? 6=don't know 7=soil erosion (3)

Question 16 – KNOWN CONSERVATION/FISHING PRACTICES

30 any known methods for fisheries conservation? 0=none 1=closure 2=family tapu 3=net restrictions 4=? 5=linefish without sinkers 6=sizerestrict 7=don'tknow 8=vakapaopao (4) 9=fish traps (6)

Question 17 – DISTRUCTIVE FISHING PRACTICES

31 any known destructive fishing practices that should be changed? 0=none 1=small nets 2= ? 3=don't know 4= spear (3)

PART TWO

32 have you heard of the CA?	1=yes 2=no
33 from the radio ?	1=yes 2=no
34 from the newspaper?	1=yes 2=no
35 from a workshop?	1=yes 2=no
36 from school?	1=yes 2=no
37 from work	1=yes 2=no
38 from posters and pamflets?	1=yes 2=no
39from talking to people?	1=yes 2=no
40 knowledge of the CA boundary	1=correct 2=almost correct 3=incorrect
41 knowledge of the CA purpose	1=know 2=partly know 3=don't know
42 knowledge of the CA rules	0=none 1=one 2=a few 3=many
43 Support for CA	1=yes 2=no
44 perceived benefits from CA	0=none 1=more fish 2=don't know 3=Income Generation 4=increased natural resources 5=education &income generation 6=? 7=increased natural resources and income generation 8=for future generations
45 disadvantages of the CA	0=none 1=to landowners 2=to fishermen 3=don't know 4=limited access 5=?
46 perceived environmental around your village	0=none 1=rubbish 2=overcrowding 3=don't know 4=sewage problems &crowding 5=? 6=sewage/poo 7=cutting of trees (4).
47 what could the Governemnt and managers do about it	0=nothing 1=education 2=funding 3=don't know 4=import restrictions 5=? 6=CA law 7=law and education
48 what can your family do about it	0=nothing 1=educate 2=don't throw rubbish 3=don't know 4=family planning 5=stop dumping rubbish 6=recycle 7 buy less from overseas

PART THREE

49 age	1=20-30 years 2=31-40 years 3=41-50 years 4=51-60 years 5=more than 60 years
50 sex	1=female 2=male
51occupation	1=fisherman 2=Government employment 3=business person 4=family work 5=other
52 number of people in household	1=less than 5 people 2=5-10 3=11-15 people 4=15-20 people
53 do you own land in CA	1=yes 2=no

Appendix C - SUMMARY STATISTICS FOR SURVEY ANSWERS

How many days in the week did you go fishing?

	Count	Cumul. Count	Percent of Valid
none	11	11	13
one	13	24	16
two	16	40	19
three	11	51	13
four	6	57	7.
five	2	59	2.
six	5	64	6.
seven	1	65	1.
sometimes	14	81	17.
don't know	2	67	2.
Missing	3	84	3.

How many weeks in the month do you go fishing?

	Count	Cumul. Count	Percent of Valid
none	11	11	14.
one	8	19	10.
two	17	36	21.
three	7	43	8.
four	18	61	23.
sometimes	16	78	20.
Don't know	1	62	1.
Missing	6	84	7.

How many months in the year do you go fishing?

	Count	Cumul. Count	Percent of Valid
none	9	9	12.
one	2	11	3
two	2	13	3
three	5	18	67
four	4	22	5.
five	3	25	4.
six	4	29	5.
eight	2	31	3
ten	1	32	1.
eleven	2	34	3
twelve	22	56	29.
sometimes	18	75	24.
don' t know	1	57	1.
Missing	9	84	12.

Percentage of fish caught in the lagoon

	Count	Cumul. Count	Percent of Valid
none	14	14	17.
<25%	20	34	24.
25-50%	29	63	35.
51-75%	15	78	18.
>75%	4	82	5
Missing	2	84	2.

Percent of fish caught on the reef

	Count	Cumul. Count	Percent of Valid
none	23	23	28.
<25%	28	51	34.
25-50%	25	76	30.
51-75%	3	79	3.
>75%	3	82	3.
Missing	2	84	2.

Percent of fish caught in the Ocean

	Count	Cumul. Count	Percent of Valid
none	15	15	18.
<25%	18	33	21.
25-50%	23	56	28.
51-75%	10	66	12.
>75%	16	82	19.
Missing	2	84	2.

Percentage of lagoon fish kept

	Count	Cumul. Count	Percent of Valid
none	14	14	17.
<25%	7	21	8.
25-50%	10	31	12.
51-75%	17	48	21.
>75%	33	81	41.
Missing	3	84	3.

Percentage of lagoon fish shared

	Count	Cumul. Count	Percent of Valid
none	25	25	31
<25%	32	57	39.
25-50%	19	76	23.
51-75%	4	80	5
>75%	1	81	1.
Missing	3	84	3.

Percentage of lagoon fish sold

	Count	Cumul. Count	Percent of Valid
none	62	62	76.
<25%	10	72	12.
25-50%	4	76	5
51-75%	2	78	2.
>75%	3	81	4
Missing	3	84	3

Percentage of reef fish kept

	Count	Cumul. Count	Percent of Valid
none	24	24	30.
<25%	7	31	9
25-50%	8	39	10.
51-75%	9	48	11.
>75%	32	80	40.
Missing	4	84	5.

Percentage of reef fish shared

	Count	Cumul. Count	Percent of Valid
none	32	32	40.
<25%	33	65	41.
25-50%	11	76	14
51-75%	3	79	4
>75%	1	80	1.4
Missing	4	84	5.4

Percentage of reef fish sold

	Count	Cumul. Count	Percent of Valid
none	65	65	81.4
<25%	7	72	9
25-50%	2	74	2.
51-75%	4	78	5.
>75%	2	80	2.
Missing	4	84	5.

Percentage of ocean fish kept

	Count	Cumul. Count	Percent of Valid
none	19	19	23.
<25%	19	38	23.
25-50%	4	42	5
51-75%	13	55	16.
>75%	26	81	32.
Missing	3	84	3.

Percentage of ocean fish shared

	Count	Cumul. Count	Percent of Valid
none	36	36	44.
<25%	31	67	38.
25-50%	12	79	15
>75%	2	81	2.
Missing	3	84	3.

Percentage of ocean fish sold

	Count	Cumul. Count	Percent of Valid
none	53	53	65.
<25%	4	57	5
25-50%	3	60	4
51-75%	6	66	7.
>75%	15	81	18.
Missing	3	84	3.

Kinds of fish sold

	Count	Cumul. Count	Percent of Valid
none	50	50	60.
ocean&deepsea	8	58	10 (24)
Ocean	9	67	11(27)
bottom	1	68	1.(4)
reef&ocean	4	72	5(11)
reef&deepsea	1	73	1.(4)
reef	2	75	2.(6)
all	8	83	10(24)
Missing	1	84	1.

( ) %of all fish sold

Do you harvest turtle eggs, turtle, crab, birds?

Turtle eggs

	Count	Cumul. Count	Percent of Valid
yes	12	12	14
no	71	83	84.
used to before	1	84	1.
Missing	0	84	0.

Turtles

	Count	Cumul. Count	Percent of Valid
yes	24	24	29.4
no	56	80	68.4
used to before	2	82	2.4
Missing	2	84	2.4

Coconut crab

	Count	Cumul. Count	Percent of Valid
yes	42	42	51
no	41	83	49.
Missing	1	84	1.

Birds

	Count	Cumul. Count	Percent of Valid
yes	24	24	29
no	58	82	70
used to before	1	83	1.
Missing	1	84	1.

Methods of catching turtle

	Count	Cumul. Count	Percent of Valid
I don' t catch	57	57	69.
On beach	7	64	8.
Stick&net	3	67	4.
Dive from boat	9	76	11.
All methods	6	82	7.
other	1	83	1.
Missing	1	84	1.

Change in species abundance

Fish

	Count	Cumul. Count	Percent of Valid
increase	30	30	37.
decrease	45	75	56.
No change	1	81	1.
Don't know	5	80	6.
Missing	3	84	4.

Crayfish

	Count	Cumul. Count	Percent of Valid
increase	27	27	35.
decrease	32	59	41.
no change	4	63	5.
Don' t know	15	78	19.
Missing	6	84	8.

Clams

	Count	Cumul. Count	Percent of Valid
increase	16	16	21.
Decrease	39	55	51.
no change	3	58	4.
Don't know	18	76	24.
Missing	8	84	11.

Birds

	Count	Cumul. Count	Percent of Valid
increase	20	20	26.
decrease	38	58	49.
no change	5	63	6.
Don't know	15	78	19.
Missing	6	84	8.

Coconut crab

	Count	Cumul. Count	Percent of Valid
increase	14	14	18.
decrease	39	53	51.
no change	5	58	7.
Don't know	18	76	24.
Missing	8	84	11.

Turtle

	Count	Cumul. Count	Percent of Valid
increase	20	20	26.
decrease	43	63	57.
Don't know	13	76	17.
Missing	8	84	11.

Change in corals

	Count	Cumul. Count	Percent of Valid
no change	32	32	40.
damage	33	65	41.
growth	16	81	20.
Missing	3	84	4.

Natural or manmade disasters that have effected the CA

	Count	Cumul. Count	Percent of Valid
none	19	19	26.
cyclone	39	58	54.
drought	1	59	1.
More people	3	62	4.
Big waves	4	66	6.
Soil errosion	1	72	1.
Don't know	5	71	7.
Missing	12	84	17.

Conservation methods

	Count	Cumul. Count	Percent of Valid
none	11	11	14.
closures	1	12	1.
netrestrictions	10	22	13.
&canoe/noachor	39	61	51
sizerestriction	4	65	5.
dontknow	7	72	9.
Net/traps	5	77	5.
Missing	7	84	9.

Destructive fishing methods

	Count	Cumul. Count	Percent of Valid
none	11	11	14.
smallnet	14	25	18.
spear	16	41	21.
spear&smallnet	25	66	32.
deep/line	4	70	5.
Fish drive	3	73	4.
anchor	4	77	5.
Missing	7	84	9.

Have you heard of the FCA..?

	Percent
yes	90.
no	10.
Missing	0

From radio?

yes	86.
no	14.

From Newspaper

	Percent
yes	63.
no	37.

From workshop?

yes	15.
no	85.

From posters?

yes	43.
no	57.

From talking to people?

yes	68.
no	32.

From the workplace?

yes	27.
no	73.

From School?

yes	7.
no	93.

Aim of the FCA

	Count	Cumul. Count	Percent of Valid
know	17	17	21.
Part know	60	77	72.
Don't know	6	83	7.
Missing	1	84	1.

Knowledge of rules of the FCA

	Count	Cumul. Count	Percent of Valid
none	12	12	15
one	39	51	49.
a few	22	73	28.
many	7	80	9.
Missing	4	84	5

Knowledge of CA boundaries

	Count	Cumul. Count	Percent of Valid
know	21	21	28.
Almost know	35	56	46.
Don't know	20	76	26.
Missing	8	84	11.

Support of the FCA

	Count	Cumul. Count	Percent of Valid
yes	79	79	96.
no	3	82	4.
Missing	2	84	2.

Benefits of the FCA

	Count	Cumul. Count	Percent of Valid
none	2	2	2.
More fish	23	25	28.
IGA	9	37	11.
↑Natural Resoces	28	65	34.
Education &↑IG	1	66	1.
↑NR &IG	13	79	16.
For future gener	3	82	4.
Don't know	3	28	4.
Missing	2	84	2.

Disadvantages of FCA

	Count	Cumul. Count	Percent of Valid
none	31	31	38.
To landowners	22	53	27.
To fishers	20	73	25.
Limited access	2	81	2.
Don't know	6	79	7.
Missing	3	84	4.

Environmental problems in the village

	Count	Cumul. Count	Percent of Valid
none	7	7	9.
rubbish	24	31	30
crowding	26	57	33.
sewage	10	73	13
tree cutting	4	77	5
introducedanimals	1	78	1.
Lack of awarness	2	80	3.
Don't know	6	63	8.
Missing	4	84	5

Government solutions

	Count	Cumul. Count	Percent of Valid
nothing	6	6	8.
educate	18	24	23.
funding	10	34	13.
Import restriction	2	50	3.
CA law	2	52	3.
Law&educate	18	70	23.
Decentralisation	3	73	4.
Proper dumpsite	6	79	8.
Don't know	14	48	18.
Missing	5	84	6.

Family solutions

	Count	Cumul. Count	Percent of Valid
Nothing	6	6	8.
Educate the fam	39	45	49.
Dontthrow rubsh	8	53	10
Family planning	2	66	3.
dontdumprubsh	4	70	5
buyless imports	2	72	3.
Protectnvironmen	7	79	9.
Less pets	1	80	1.
Don't know	11	64	14.
Missing	4	84	5

Ownership of lands in the CA

	Count	Cumul. Count	Percent of Valid
yes	18	18	29.
no	41	59	66.
Don't know	3	62	5.
Missing	22	84	35.

Family size

	Count	Cumul. Count	Percent of Valid
<5people	9	9	15
5-10	41	50	68.
11-15	9	59	15
16-20	1	60	2.
Missing	24	84	40

Occupation

	Count	Cumul. Count	Percent of Valid
fisher	10	10	17.
Gov'ment/Kaupule	24	34	40
business	8	42	13.
family	5	47	8.
seaman	2	58	3.
Church	2	60	3.
other	9	56	15
Missing	24	84	40

Gender

	Count	Cumul. Count	Percent of Valid
female	19	19	29.
male	46	65	71.
Missing	19	84	29.

Age

	Count	Cumul. Count	Percent of Valid
<20yrs	3	3	5.
21-30yrs	14	17	24.
31-40yrs	22	39	37.
41-50yrs	9	48	15.
51-60yrs	8	56	14.
>60yrs	3	59	5.
Missing			