A STUDY OF THE RAIN WATER HARVESTING OF THE OUTER ISLANDS REGIONS IN TONGA

REPORT:

FEBRUARY – MARCH, 2010

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And

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Kingdom of Tonga

PREFACE

As many of us involved in many years in promoting and strengthening the drinking water harvesting in Tonga began to share our experiences through working very closely with community, donor agencies and organizations, we discovered that serious questions were emerging about why the majority of the population of Tonga somehow need or prefer water from the tanks to drink more so than water from any other sources. One particular donor agency was very curious and requested a specific answer for this. The answer is pure and simple the people have confidence that rain water in the tank is "good" to drink.

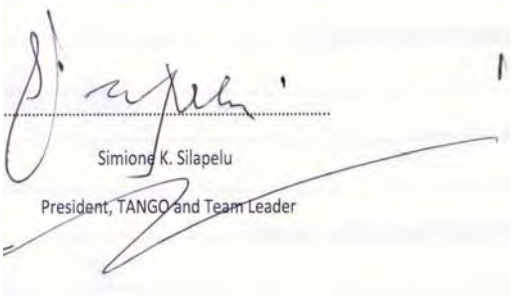
Water is life and life is water without a doubt. This commodity is for every living thing and human beings are included. This particular product can break or make a country financially, socially, and also politically. Therefore our individual experiences and notions are not enough for such an essential creation so we must begin to share and analyze the situation in depth to discover the trends and patterns of our work and knowledge of water and in particular the drinking water so that our future action may be relevant to the EU-EDF9 Water Harvesting key objective that is for the population of the outer islands regions to have sufficient drinking water in time of drought.

Health issues are particularly significant in so far as the water usages are concerned specifically for drinking. Apart from the body needs water but that water must be clean and sanitized. It was in this sense that with a view to promote wider public training, education and awareness on how to keep and sustain hygienic drinking water and also how best securing the storage water tanks to last and from unnecessary damage. In turn, that water is not only plentiful in time of drought but similarly provide good quality reliable drinking water in a safe and sound tank.

The study was a remarkably productive and enriching experience for all who were involved. It became a forum for critical reflections and analysis. It also built a knowledge and understanding amongst different communities, villages and the survey team. One particular leader of one of the village sounded out to one of the team members that never before have there any survey come to their individual houses, our survey was the first. Maybe so, but the response was cheering and surely revitalizing.

This report is seen as a vehicle for catalyzing common knowledge and understanding among government, donors, NGOs, and communities. It can also become a basis for dialogue with government and donors. We do hope that it serves that broader purpose of strengthening NGO activities and its collaboration with government and donors not only on this water harvesting project but other type community development projects as well.

This report has been prepared by Mr. Simione Silapelu (team leader), Mr. Sione Faka'osi (assistant, team member), Mr. Sione Faeamani (team member), Rev Mr. Niulolo Prescott (team member), and Ms 'Oketi Faletau (alternate team member). It is an attempt to present common trends and concerns to assist implementation planning of installation of tanks and training, education and awareness. Detailed evidence and data is separately available in the appendices.



ACKNOWLEDGEMENTS

This TANGO-Tonga Trust Survey Report has been produced with the assistance of many people. TANGO and Tonga Trust on behalf of the Survey Team would like to thank everyone who has given their time in meetings, individual interviews and in the provisions ofyour informative views.

We would like to thank Mr. Pita Vuki, Deputy Secretary of the Prime Minister's Office for his support and acted in timely fashion in bringing immediate attentions of all outer islands districts government representatives to assisting our survey. Thanks convey to the two Governors of Vava'u and Ha'apai and their staffs, in particular the Governor of Vava'u Hon. Luani for his personal involvement and chaired the meeting in Neiafu especially his personal interests on this project concerned and its impact on the people of Vava'u.

Thanks go to the Government Representatives and staffs of 'Eua and Niua Toputapu, especially Mr. Semisi Halaholo and Mr. Peauafi Haukinima, the Government Repsentatives respectively for their enthusiasms and personally actively involved in the community meetings and in the village levels. Thanks also go out to the District Officers, in particular the Town Officers for theirindividual cooperations and personal involvements with the team members in carrying out the survey. Some provided their personal vehicles to assist us during the survey. We feel indebted to them greatly. Our thanks go to the individual households who gave their times and hospitalities by in provision of their ideas in the hope of improving their lives and helping our survey.

Nonetheless, generally speaking the friendships that were conveyed to the team during the survey of different islands regions definitely made our tasks easier, to put it as figure of speech. Deep down, really it was great to have people with sense of cultural value and cooperations. This is held true when two of our survey team stranded for two more weeks in the island of Niua Toputapu in that one of the local churches' members provided foods for them on Sundays and other times when foods were available.

TANGO and Tonga Trust, on behalf of the National Water Safety and Quality Management Committee would like to express their appreciations for the magnanimous supports of the EU Government through EU-EDF9 Project funding provided to the Tonga Water Board and the Ministry of Health that enhanced and enabled them to carry out their public duties in a productive and sustainable manner.

Similarly, TANGO and Tonga Trust also wish to express their thanks and gratitude to the EU-EDF9 Project through Component: Rain Water Harvesting for thefunding assistance extended to them that makes it possible not only to complete the survey (re 150 Pilot/ 600-700 and ove rain water tanks) but initiated and starting it to the outer islands regions. Last but not least, our thanks go to the SOPAC, in particular Mr, George Beck for his directions and advise especially patients with us on preparations and conducting and the final reporting of the survey.

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DEFINITIONS

In this study Rain Water harvesting is defined as total coordinated efforts of collecting rain water for the purpose of drinking.

Agriculture and Food Related Groups: These organizations provide services and dedicated to issues related to agriculture, farming, fishing, and the manufacture, production, sale and export of food and food related products

Business community: The group of business people in the villages and in the main township

Church community: The group of different churches in the villages and every where else

Development groups: These organizations work on the national level to provide assistance and funding to groups and individuals for the improvement of Tonga

Education and school groups: These include ex-students groups and those organizations providing support for teachers, students, administrators and school physical facilities

Ferro cement tanks: Storage drinking water tanks of various sizes and shapes made up locally of cement powder with other reinforcements

Health related organizations: Groups in this category focus on people wellbeing and public health issues

Humanitarian organization: Is an organization provide services to individuals and families without regard to economic or social status

Humanity: The people whom exist with privilege upbringing and /or under privilege ones

Men's groups: These groups centre on men's activities

Non-governmental Organizations (NGOs): It is defined as a non-profitable, non-governmental organization that is independent from the government and working for the welfare of the members and their community.

Service organizations: These organizations provide for improvement of Tonga without the interest of a specific community or group in mind. Unlike development groups these organizations do not provide funding for others

Umbrella organization: It is an organization that is responsible for coordinating other groups and organizations

Village community: The group of people of the village

Village water committees: Are groups that focus on the water supply system in their own village(s)

Women's community group: These organizations support activities for females in their own community

SUMMARY OF THE MAIN FINDINGS FROM THE STUDY

The report findings are as follows:

Background and History

Fiqures are based only on the households interviewed during the months of January to March 2010

The water related handling

The main source of drinking water in Vava'u

Seventy percent (70%) of main source of drinking water is cement tank

Eleven percent (11%) of main source of drinking water is piped water

Zero percent (0%) of main source of drinking water is bottled water

Zero percent (0%) of main source of drinking water is others

The main source of drinking water in Ha'apai

Twenty-nine percent (29%) of main source of drinking water is cement tank

Three percent (3%) of main source of drinking water is piped water

Zero percent (0%) of main source of drinking water is bottled water

Zero percent (0%) of main source of drinking water is others

The main source of drinking water in 'Eua

Seventeen percent (17%) of main source of drinking water is cement tank

Five percent (5%) of main source of drinking water is piped water

Two percent (2%) of main source of drinking water is bottled water

Zero percent (0%) of main source of drinking water is others

The main source of drinking water in Niua Toputapu

Eighty percent (80%) of main source of drinking water is cement tank

Twenty percent (20%) of main source of drinking water is piped water

Zero percent (0%) of main source of drinking water is bottled water

Zero percent (0%) of main source of drinking water is others

The main source of drinking water in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available. This was an airline decisions because the island district air strip runway was not safe for landing. The grasses were too long moreover, there were no petrol in the island district to top up the lawn mower(s) to keep the grasses low to a height safe for the aircraft landing and departure.

The main source of water supply in Vava'u

Ninety-one percent (91%) of water supply is piped water

Zero percent (0%) of water supply is own cement tank

Zero percent (0%) of water supply is own well

Nine percent (9%) of water supply is others

The main source of water supply in Ha'apai

Eighty-two percent (82%) of water supply is piped water

Two percent (2%) of water supply is own cement tank

One percent (1%) of water supply is own well

Fifteen percent (15%) of water supply is others

The main source of water supply in 'Eua

Ninety-three percen (93%) of water supply is piped water

Six percent (6%) of water supply is own cement tank

One percent (1%) of water supply is own well

Zero percent (0%) of water supply is others

The main source of water supply in Niuatoputapu& Tafahi

Ninety-six percent (96%) of water supply is piped water

Two percent (2%) of water supply is own cement tank

Zero percent (0%) of water supply is own well

Four percent (4%) of water supply is others

The main source of water supply in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The main source of places where they get rainwater for drinking purpose during drought/dry months in Vava'u

One percent (1%) of Church Building &Hall where they get rainwater for drinking purpose during drought/dry months

Zero percent (0%) of Community Halls where they get rainwater for drinking purpose during drought/dry months.

Ninety-five percent (95%) of Neighbours where they get rainwater for drinking purpose during drought/dry months

Four percent (4%) of others where they get rainwater for drinking purpose during drought/dry months

The main source of places where they get rainwater for drinking purpose during drought/dry months in Ha'apai

One percent (1%) of Church Building &Hall where they get rainwater for drinking purpose during drought/dry months

Two percent (2%) of Community Halls where they get rainwater for drinking purpose during drought/dry months

Seventy-five percent (75%) of Neighbours where they get rainwater for drinking purpose during drought/dry months

Twenty-two percent (22%) of others where they get rainwater for drinking purpose during drought/dry months

The main source of places where they get rainwater for drinking purpose during drought/dry months in 'Eua

Eight percent (8%) of Church Building &Hall where they get rainwater for drinking purpose during drought/dry months

Five percent (5%) of Community Halls where they get rainwater for drinking purpose during drought/dry months

Seventy-eighty percent (78%) of Neighbours where they get rainwater for drinking purpose during drought/dry months

Nine percent (9%) of others where they get rainwater for drinking purpose during drought/dry months

The main source of places where they get rainwater for drinking purpose during drought/dry months in Niua Toputapu & Tafahi

Zero percent (0%) of Church Building &Hall where they get rainwater for drinking purpose during drought/dry months

One percent (1%) of Community Halls where they get rainwater for drinking purpose during drought/dry months

Eighty-eight percent (88%) of Neighbours where they get rainwater for drinking purpose during drought/dry months

Eleven percent (11%) of others where they get rainwater for drinking purpose during drought/dry months

The main source of places where they get rainwater for drinking purpose during drought/dry months in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The main type of material used for the dwelling roofing in Vava'u

One hundred percent (100%) metal material used for the dwelling roofing

Zero percent (0%) wood material used for the dwelling roofing

Zero percent (0%) thatch material used for the dwelling roofing

Zero percent (0%) concrete material used for the dwelling roofing

Zero percent (0%) other materials used for the dwelling roofing

The main type of material used for the dwelling roofing in Ha'apai

Ninety-seven percent (97%) metal material used for the dwelling roofing

Zero percent (0%) wood material used for the dwelling roofing

Two percent (2%) thatch material used for the dwelling roofing

Zero percent (0%) concrete material used for the dwelling roofing

One percent (1%) other materials used for the dwelling roofing

The main type of material used for the dwelling roofing in 'Eua

Ninety-seven percent (97%) metal material used for the dwelling roofing

Three percent (3%) wood material used for the dwelling roofing

Zero percent (0%) thatch material used for the dwelling roofing

Zero percent (0%) concrete material used for the dwelling roofing

Zero percent (0%) other materials used for the dwelling roofing

The main type of material used for the dwelling roofing in Niua Toputapu & Tafahi

Ninety-seven percent (96%) metal material used for the dwelling roofing

Three percent (3%) wood material used for the dwelling roofing

Zero percent (0%) thatch material used for the dwelling roofing

Zero percent (0%) concrete material used for the dwelling roofing

Zero percent (0%) other materials used for the dwelling roofing

The main type of material used for the dwelling roofing in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The main condition or quality/state of roofing in Vava'u

Twelve percent (12%) of poor (very rust) state of roofing

Seven percent (7%) of average (littlte rust) state of roofing

Sixty-two percent (62%) of good (no rust) state of roofing

Ninety percent (19%) of very good (new roof) state roofing

The main condition or quality/state of roofing in Ha'apai

Three percent (3%) of poor (very rust) state of roofing

Twenty-one percent (21%) of average (littlte rust) state of roofing

Thirty six percent (36%) of good (no rust) state of roofing

Fourty percent (40%) of very good (new roof) state roofing

The main condition or quality/state of roofing in 'Eua

Two percent (2%) of poor (very rust) state of roofing

Fourteen percent (14%) of average (littlte rust) state of roofing

Fifty percent (50%) of good (no rust) state of roofing

Sixty percent (66%) of very good (new roof) state roofing

The main condition or quality/state of roofing in Niua Toputapu & Tafahi

Four percent (4%) of poor (very rust) state of roofing

Fourteen percent (23%) of average (littlte rust) state of roofing

Fifty-eight percent (58%) of good (no rust) state of roofing

Fifteen percent (15%) of very good (new roof) state roofing

The main condition or quality/state of roofing in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The preferred type of tank for rainwater storage purpose in Vava'u

Sixty-four percent (64%) of the plastic tank for rainwater storage purpose

Four percent (4%) of the Fibreglass tank for rainwater storage purpose

Thirty percent (32%) of the ferro cement tank for rainwater storage purpose

Zero percent (0%) of other tanks for rainwater storage purpose

The preferred type of tank for rainwater storage purpose in Ha'apai

Eighty-six percent (86%) of the plastic tank for rainwater storage purpose

One percent (1%) of the Fibreglass tank for rainwater storage purpose

Ten percent (10%) of the ferro cement tank for rainwater storage purpose

Three percent (3%) of other tanks for rainwater storage purpose

The preferred type of tank for rainwater storage purpose in 'Eua

Six percent (6%) of the plastic tank for rainwater storage purpose

Two percent (2%) of the Fibreglass tank for rainwater storage purpose

Eighty-seven percent (87%) of the ferro cement tank for rainwater storage purpose

Five percent (5%) of other tanks for rainwater storage purpose

The preferred type of tank for rainwater storage purpose in Niua Toputapu & Tafahi

Fifty-four percent (54%) of the plastic tank for rainwater storage purpose

Zero percent (0%) of the Fibreglass tank for rainwater storage purpose

Fourty-six percent (46%) of the ferro cement tank for rainwater storage purpose

Zero percent (0%) of other tanks for rainwater storage purpose

The preferred type of tank for rainwater storage purpose in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The main type of toilet facility used at the household in Vava'u

Thirty-two percent (32%) of flush toilet used at the household

One percent (1%) of Manual Flush toilet used at the household

Sixty-four percent (64%) of Pit toilet used at the household

Three percent (3%) of No toilet used at the household

The main type of toilet facility used at the household in Ha'apai

Thirty-nine percent (39%) of flush toilet used at the household

Six percent (6%) of Manual Flush toilet used at the household

Fifty-five percent (55%) of Pit toilet used at the household

Zero percent (0%) of No toilet used at the household

The main type of toilet facility used at the household in 'Eua

Sixty-five percent (65%) of flush toilet used at the household

Six percent (6%) of Manual Flush toilet used at the household

Twenty-five percent (25%) of Pit toilet used at the household

Four percent (4%) of No toilet used at the household

The main type of toilet facility used at the household in Niua Toputapu& Tafahi

Nineteen percent (19%) of flush toilet used at the household

Zero percent (0%) of Manual Flush toilet used at the household

Seventy-three percent (73%) of Pit toilet used at the household

Eight percent (8%) of No toilet used at the household

The main type of toilet facility used at the household in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The main source of household income in Vava'u

Twelve percent (12%) of regular household income

Fifty-six percent (56%) of farming household income

Six percent (6%) of weaving/ carving household income

Two percent (2%) of fishing household income

One percent (1%) of remittances household income

The main source of household income in Ha'apai

Fifteen percent (15%) of regular household income

Three-seven percent (37%) of farming household income

Ten percent (10%) of weaving/ carving household income

Twenty-four percent (24%) of fishing household income

Fourteen percent (14%) of remittances household income

The main source of household income in 'Eua

Twelve percent (12%) of regular household income

Fifty-five percent (55%) of farming household income

Five percent (5%) of weaving/ carving household income

Ten percent (10%) of fishing household income

Eighteen percent (18%) of remittances household income

The main source of household income in Niua Toputapu & Tafahi

Nineteen percent (19%) of regular household income

Thirty percent (30%) of farming household income

Fourty-two percent (42%) of weaving/ carving household income

Nine percent (9%) of fishing household income

Zero percent (0%) of remittances household income

The main source of household income in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The cement water tank in Vava'u

Two percent (2%) of major damage (cannot be repaired) to cement water tank

Zero percent (0%) of minor damage (can be repaired)

The cement water tank in Ha'apai

Thirteen percent (13%) of major damage (cannot be repaired) to cement water tank

Zero percent (0%) of minor damage (can be repaired) to cement water tank

The cement water tank in 'Eua

Twenty-one percent (21%) of major damage (cannot be repaired) to cement water tank

One percent (1%) of minor damage (can be repaired) to cement water tank

The cement water tank in Niua Toputapu & tafahi

Twelve percent (12%) of major damage (cannot be repaired) to cement water tank

Zero percent (0%) of minor damage (can be repaired) to cement water tank

The cement water tank in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

The involvement on maintenance, training education and awareness in Vava'u

Two percent (2%) of maintenance, training, education and awareness

Ninety-eight percent (98%) on no training, education and awareness

The involvement on maintenance, training education and awareness in Ha'apai

Zero percent (0%) of maintenance, training, education and awareness

One hundred percent (100%) on no training, education and awareness

The involvement on maintenance, training education and awareness in 'Eua

Zero percent (0%) of maintenance, training, education and awareness

One hundred percent (100%) on no training, education and awareness

The involvement on maintenance, training education and awareness in Niua Toputapu

Zero percent (0%) of maintenance, training, education and awareness

One hundred percent (100%) on no training, education and awareness

The involvement on maintenance, training education and awareness in Niua Fo'ou

Note:

There are no data from Niua Fo'ou because the flights there were not available etc.

1. INTRODUCTIONS

Introduction and Method of Research

Introduction:

Tonga has been identified that its people are using rainwater as their main water source for drinking. However in the time of drought the people in the outer islands are often confronted with shortage of supply for their consumption /drinking. Hence this survey attempts to investigate the conditions of the outer islands rain water harvesting / storages with the intention to increase their rain water collections capacity and also to improve the water quality.

Moving forward with the aim of this study to collect information necessary to accomplish its aim in the most effective and efficient way, EU through SOPAC has commissioned and funded this whole enterprise starting with the survey and to be followed with the implementation strategy .

Surveyed of Tonga Outer Islands Villages and Data Collection

Survey Questionnaire

The data collected for the survey was based on an interview method consisting of a formal questionnaire and conversations. There were three sets of scopes /questions designed to apply in the interview in order to achieve the realistic objectives of the EU-EDF9: Project Component for the people in outer islands regions including 'Eua, Ha'apai, Vava'u and 2Niuas and Tafahi to obtain sufficient drinking water in the event of drought.

1. One set for village households without rainwater storage,
2. One set for those households who had damaged water tanks and cannot be repaired
3. Similarly, another set for same households about training, education and awareness capacity concerning safe and quality of drinking water and tanks

Supplementary to above:

1. The questions about roofing conditions were also designed to ensure water harvesting is vital for safe and hygienic of water to drink

All questions were in one way or another are related to the main areas of the survey; household population, household type of building structure and type of roofing, household current drinking water source, type of rainwater storage, rain water other uses, other source of water supply, village, community and church buildings, halls and sizes of buildings with rain water storages, water storage and village present/existing underground water system, people perspectives on type of preferred drinking water storages, people awareness of good and clean drinking water and safety of tanks.

How the survey was conducted

Survey Planning and Implementation Scheduled. As proposed in the earlier submission that the survey is scheduled for February and March, and it started as planned. However, certain circumstances beyond our control delayed us another 2 weeks from our normal time after Ha'apai and Vava'u. Given our trips to many small islands depends on flight itinerary and especially on good weather. Cyclone Renee was not very friendly to Tonga during this period and has caused much delay in the schedule. There was another two weeks delay after the survey of Niua Toputapu and Tafahi, in that the survey team was stranded in Niua Toputapu for other weather conditions relatives to Cyclone 'Tomasi', airline mishap and preference.

The Prime Minister's Office was officially requested prior to the beginning of the survey to assist us and it was given in timely fashion and indeed helpful. We were very grateful. This was to help us in the survey of the outer islands regions household drinking water storages by having its district and town officers including the two island governors and three other government representatives to be informed of the forth coming survey objectives and needs. Given that these government representatives know their own regions /villages well.

First of all, we requested of town officers /district officers of every village and inaccessible islands to work with us as guidance. Besides, they were requested to provide us with list of every village households at arrival that would lead us to survey their houses in term of no drinking water tanks, have tanks but badly damaged plus the roofing conditions and rate them as follows rusty roofing, little rust, and no rust roofing. Again, the response from each representative was very cooperative, favorable and attended to. The Reponses from Town and available District officers were equally pleasing and we sincerely most thankful.

Also we, the consultants conducted panel type discussions program over the TV and Radio about the Project Program prior to our visitation to that group of islands. This is also for the community awareness and information as well and likewise, requesting their cooperation during our survey. As a result, the request was given in collaborative manner, again much appreciated. There were TV and Radio Programs after our survey of each islands district to again update them and other outer islands regions communities on the comparative situations of their drinking water and other related issues that may interests them.

Surveyors /Consultants

Survey Consultant Team as approved was:

Mr. Simione Silapelu, Leader (administrator and coordinating needs)

Mr. Sione Faka'osi (assistant, training and awareness needs)

Mr. Sione Faeamani (actual survey questionnaire needs)

Rev. Mr. Niulolo Prescott (constructional and technical needs)

Ms 'Oketi Faletau (alternate, training and awareness needs)

Each of the consultants has his/her specific areas regarding the survey still, mutual supports remain.

The Outer Islands Regions where surveyed conducted:

SECTION A:

'Eua Island (visited 2nd – 5th Feb 2010)

'Eua Island is about 20 kilometers east of Tongatapu the main island, where Nuku'alofa the capital. It was about 7-minute flight eastward from Fua'amotu International Airport. Travel by boat would take about 2 hours.

Communication by phone both land line and mobile are not a problem. The island of 'Eua has a land area of 160km square with a total population of about 5,206 and a total household of about 905. The island has about 15 villages. About 92 percent of all dwellings are roofed with metal and the rest are wood, concrete and thatched.

About 70% of the people of 'Eua depends on agricultural farming a mixed of subsistence and cash crop activities for survival. They contribute to about 45% of the national income. A mixed of subsistence and cash crops.

We flew to the Island and had a meeting with the Government Representative, Mr. Semisi Halaholo and all the District and village officers for briefing purposes at 2pm. We as consultants assigned into different villages to work with their respective town officers interviewing their individual households.

Total number of households, churches, schools, town officers interviewed in the 15 villages was 287. Here are the totals interviewed and consulted in each village:

The Villages and No. of households consulted/interviewed

'Eua Island:

Table 1.1 The Villages and No. of households consulted/interviewed

No	Villages	No of household		No	Villages	No of household
1	Houma	25		9	Tufuvai	17
2	'Ohonua	93		10	Petani	18
3	Ta'anga	17		11	'Esia	6
4	Pangai	25		12	Tongamama'o	7
5	Sapa'ata	9		13	Fata'ulua	9
	Futu	11		14	Mu'a	17
7	Kolomaile	22		15	Mata'aho	7
8	Angaha	17			**Total**	**283**

We have covered the 15 villages for the island of 'Eua before returning to Tonga on the Friday, 5th Feb 2010.

Survey situations

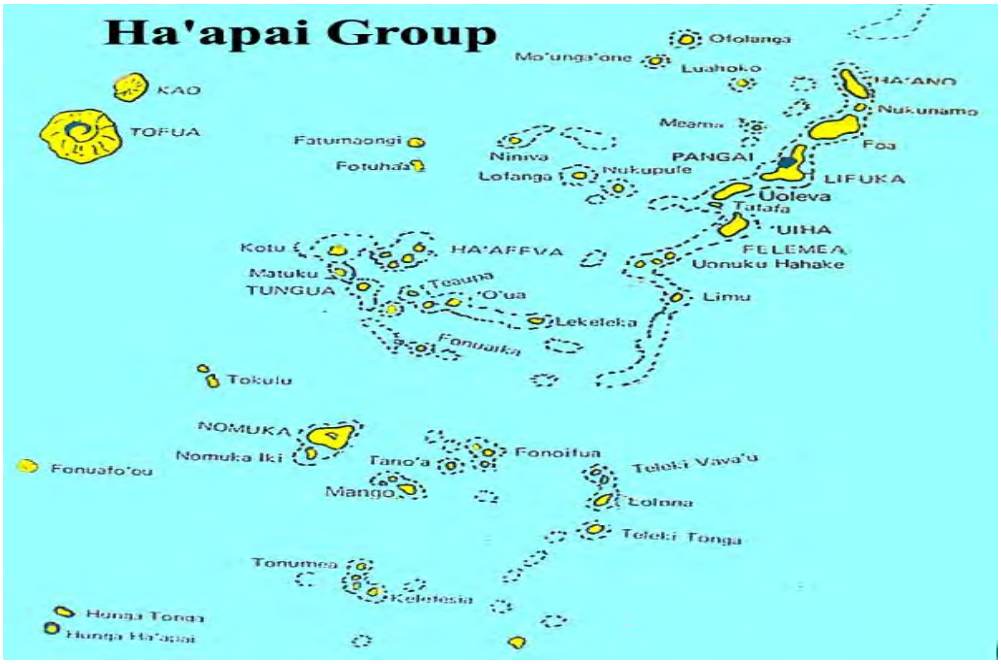
Conducting of survey: We found the actual conducting of survey interesting, but awkward. Because the original format used to develop questionnares papers were too long creating large amount of papers to carry therefore, slowing down our interactions with the interviewees. This slowed us down considerably and it looked as though it might affect our survey timeline. So, we used vehicles to assist us to speed up our progress, but also overcome the adverse weather - hot sun and rain.

So, 'Eua was used to test our first set of questionnaires that was sent over for approval. This was also test how the survey is to be conducted. However, as we finished surveying part of 'Eua in the first day of three days survey, we found the first set of questionnaires a bit too long, too many papers used and the format can be rearranged to cut down the questions so we made revisions. Still it was not enought.

We modified once more of the revised questionnaire for the same reasons again and proof helpful and easy to interact between us and the households. Critically nevertheless the objectives remain intact and that is, to point toward the real drinking water needs in the event of drought. Likewise, the part regarding training and awareness was understandale and the responses to questions were also apperent as well.

SECTION B:

Ha'apai Group of islands (visited 15th to 20th Feb 2010)



Ha'apai is an archipelago of 51 islands of which only 17 are inhabited. But the scattered geographical nature and distribution of the islands makes Ha'apai Group different and unique in comparison with other island groups.

The region as a whole presents an uneven pattern of development. There are needs to improve the infrastructure especially wharves for the island boats as well as for the international ships. Fishing is the principal and important component of subsistence and export earnings for the Ha'apai households. Some of the wharves in the outer islands are dangerous at day time and much worst for night travelers. In fact, this wharves condition no-doubt contributes to the lack of a regular source of income and in turn adding to the financial hardship faced by these islanders.

The flight from Tongatapu to Lifuka, the main island would take about half an hour and about a day by ferryboat. To travel by small boat from their main island where Pangai the main township situates to some of these smaller fragmented islands would take even three hours to some of them weather permitted.

This group of islands has a total population of 7,570 (2006 census) live in 1,377 households.

We had a TV and radio program broadcasting simultaneously targeted the Ha'apai islanders in regard to the trip to Ha'apai and its purpose before we flew over. But this also, a general public awareness about the EU-EDF9 Project, pertaining to EU Risk Reduction Project (B-Envelope)

Component; with regard to the increasing Rain Water Harvesting, in order to reduce water scarcity & improving quality drinking water in time of drought. The total number of households, and institutions such as churches, schools businesses, government offices and town officers interviewed and observed was 371 throught out the whole island regions.

Badly constructed and outdated ferro cement tank.

Ha'apai Island

Table1.2 The Villages and No. of households consulted/interviewed

No	Villages	No of household		No	Villages	No of household		No	Villages	No of household
1	Mo'unga'one	9		12	Lotofoa	12		23	Holopeka	5
2	Lofanga	8		13	Ha'ateiho-Si'i	10		24	Felemea	14
3	Mango	5		14	Ha'ano	23		25	Sapa'ata - Hihifo	12
4	Fotuha'a	2		15	Muitoa	5		26	Houma Tofua	2
5	Nomuka	7		16	'O'ua	6		27	Faleloa	19
6	Matuku	6		17	Ha'afeva	10		**28**	Fangale'ounga	12
7	Kotu	7		18	Foa (Ha'afakahenga)	1		**29**	Fotua	8
8	Pangai- Pili	40		19	Pangai (Navea)	1		**30**	Fakakai	26
9	Hihifo- Niukini	7		20	Ha'ato'u	4		31	Pukotala	10
10	Hihifo- Hihifo	15		21	Hihifo (Kapala)	15		32	Fonoi	4
11	'Uiha	52		22	Koulo	8		33	Pangai (Fanga'aoniu)	11
									Total	**371**

Survey situations

Because of our modifications of the questionnaire our survey proved a lot easier in that Ha'api Islands are made up of a group of small Islands scattered in a vast area of Ocean. This mean boating to the Island concerned was no easy task. The sea can be rough at times and that's what exactly happened during our survey in Ha'apai. Cyclone Renee came within reach of Tonga, during our survey of Ha'apai. One must be fully verse with sea situations out there when you prepare to travel to many small distant islands in predetermined time come what may. Risk is the word that must be in mind before leaving to the isolated islands. Ocean may be rough but to enter the shore and onto the dry land particularly to three Islands are no easy tasks either.

Foods and drinks (rations) must be one of prorities after the boat safety checks (technical), petrol and safety equipments are on board etc, and destinations informed. We were told and heard time and time again if anything goes wrong with the boat engine and failed, Fiji and/or Solomon Is are the two countries that Tongan boats may end up at. The worst adverse consequence may be true as well.

Before, we started planning our trip to Ha'apai Islands we were told from Ha'apai that there are only two reliable and fast boats that may assist our trip to the islands in Ha'apai. Unfortunately, both boats were out of action. There was other different boat available and fast too, but misunderstanding at the end of the trips regards the charges but it was settled amicably.

Without large ample size tanks in the islands they are surely in great hardship, let alone the risk of developing communicable diseases such as typhoid, and diahorrea, only because of lack of water from the tanks and alteranive sources of water. All of the remote islands except one or two have this very dilemma.

In 1990's the government supplied emergency water measure to the remote islands of Ha'api during the long drought in Tonga, and Ha'apai group of islands was in the midst of it all and hardest hit. The remote islands were literally run out of water – water for drinking and everything else. The water was delivered on a marine vessel donated to the Tongan government. That ship is no longer in Tonga.

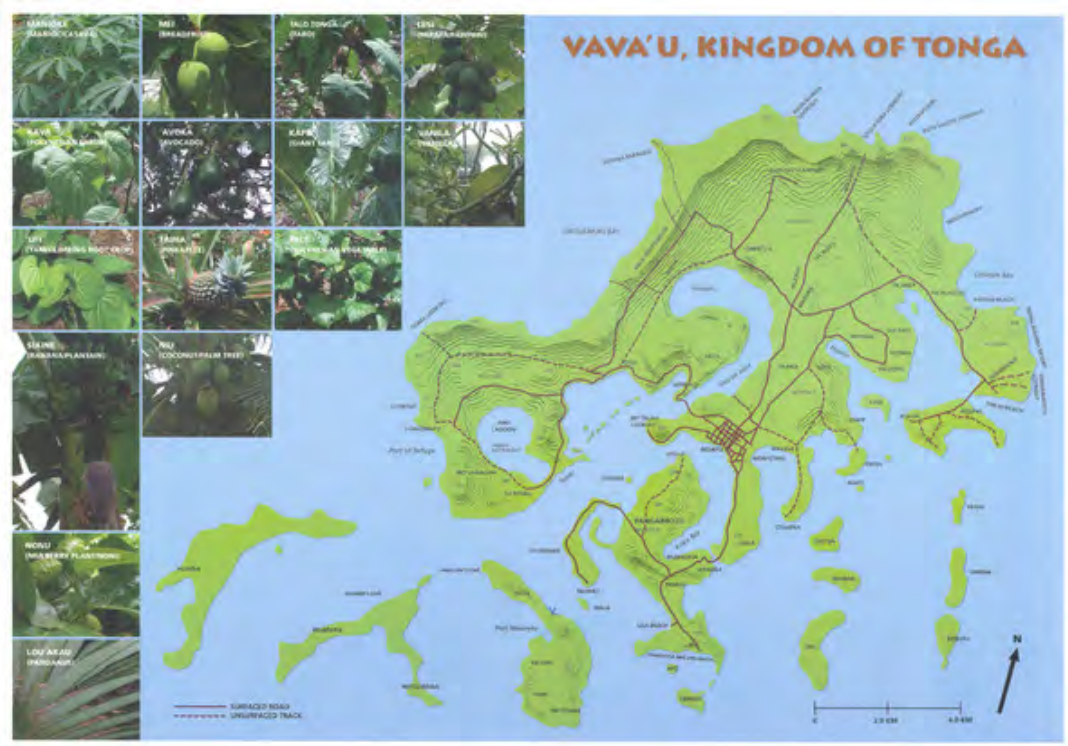
Other principal problems that still engulf the scattered islands are surely transportation (marine), telecommunication means to most scattered islands and electricity of course to some smaller islands, except solar with limited used.

There are four main island centres in Ha'apai were the reciepients of the Australian Government on local power grid system including diesel power generation, underground reticulation and households wiring installations. They are the islands of Nomuka, Ha'afeva, 'Uiha and Ha'ano.

However, this is one of the lessons learnt from this islands district to organize a project to implement in Ha'apai one has to go there in person and deal direct with the necessary arrangements in lieu of arrangement by phone and /or by someone there, proxy. This will certainly help reducing time, costs and avoiding misunderstanding.

SECTION C:

Vava'u Islands (visited 1st – 6th Mar 2010)



It is an island group locates in the north of the Kingdom and has not only the second largest population of about 15,505 but the second largest island too. The total number of households is 2885 living in 6 districts. We interviewed 473 in accordance to households with adequate roofing.

This island district is vulnerable to natural hazards for example cyclones. Of course, cyclones don't start there but there are two cyclones paths that come through Vava'u one comes down from the north, Samoa and the other from Fiji. Waka striked Vava'u in 2001 was the most devastated cyclone in recent time. Renee too last month, in February did come through the island district but with slight damaged.

Vava'u is about an hour flight from Tongatapu and about a day and night by ferryboat.

Vava'u Islands

Table 1.3 Villages and households were being consulted and interviewed

No	Villages	No of household		No	Villages	No of household		No	Villages	No of household
1	'Olo'ua	5		11	Okoa	17		21	Kapa	9
2	Ofu	9		12	Ha'akio	8		22	Nuapapu	7
3	Falevai	7		13	Longomapu	32		23	Taunga	9
4	Hunga	6		14	Koloa	5		24	'Utulei	13
5	Lape	3		15	Ha'alaufuli	44		25	Talihau	17
6	'Utungake	5		16	Pangaimotu	31		26	Tu'anekivale	15
7	'Utui	24		17	Toula	23		27	Neiafu	60
8	Holeva	7		18	Ovaka	8		28	Falaleu	8
9	Makave	30		19	Matamaka	5		29	Fungamisi	17
10	Ta'anea	44		20	'Otea	5			**Total**	**473**

Survey situations

Like the two previous islands Vava'u has its own topography issues such as scattered islands, heights, distances and boat entrance problems as well. The availability of boats has no difficulties except ofcourse the costs, comforts and in particular the safety factor. The boats that were hired and used did not have all the necessary safety equipments for the safety of the passengers, the skipper and the boat.

Again, the main factor that driven us to carry out our tasks irrespective of the weather and marine conditions, various terrain situations and the boats status as far as the survey goes was the time limits. Land vehicles were also used and practical supports from town and district officers tremendously helpful and appreciated.

Governor's Office staffs assistance and survey directions gave us momentous leads, enthusiastic and catalyst to the whole survey. As a result our endeavor was rewarded with satisfactorily outcomes and in timely fashion taking into account of only three of the team was available. The boats were reasonable in comforts and sizes, but most imperative remained however, the safety equipments that all the boats must have on board. The boats were hired it was hardly any such equipments on board.

In final technical analysis, like 'Eua and Ha'apai, the ferro cement tanks have similar effects in Vava'u as well of collapsing tanks roofs, falling walls, cracking substructure etc and that is caused by followings; the constructions, the locations and the dreadful weather, the aged of the tanks. Briefly it means; one, in case of the constructions the tanks were built according to the designs and two, the materials and three, how the tanks are constructed and four, who constructed the tanks, but most importantly five, how the constructions of tanks were supervised.

And as for the locations of the tanks closed to the harsh environment such as sea, wind and rain then cyclones and earthquakes one could not helped but the tanks locations are very much the functions of the design, materials, build and the supervisions of tanks. Similarly, the last long (aged) of the tanks is much depended on how we the owners of the tanks look after them.

But if we look at the very old squared communal (cement) tanks as attached (Pg 26) built in early 1990's one wonders why these tanks are still in very good conditions except roofing that have been replaced over the years. One thing we noticed with these old water storages (cement) tank were their thickness, it's about 30 cm and dug deep into the ground. This type tank stood up to the test of time in that of hurricanes and earthquakes, likewise manmade destructions.

There are the six districts in Vava'u namely: Neiafu, Pangai, Hahake, Leimatu'a, Hihifo, and Motu

SECTION D:

NIUA TOPUTAPU & TAFAHI (Visited 10th – 30th March 2010)

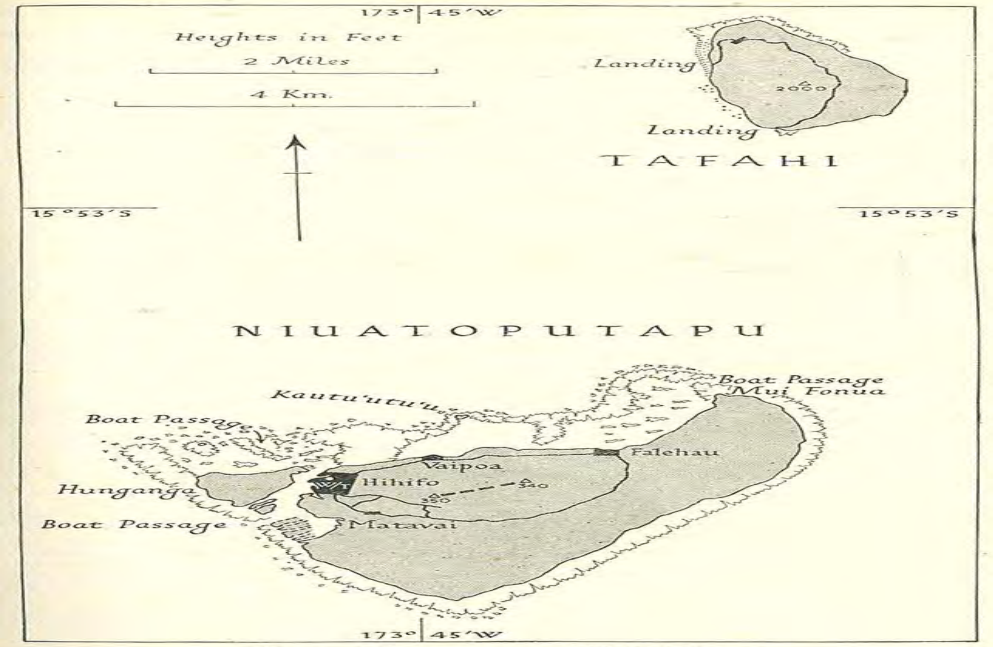


Fig. 30. Niuatoputapu and 'Tafahi, 'Tonga
The existence of the W/T station at Hihifo is doubtful. Based on: (1) Admiralty chart no. 979; (2) A. H. Wood, *History and Geography of Tonga*, p. 75 (Nuku'alofa, 1932).

Niuatoputapu is an island in the island nation of Tonga, Pacific Ocean. Its name means *sacred island*. Older names for the island are Traitors island or Keppel island.

Niuatoputapu is located in the north of the country, 300 km away from Vavaʻu near the border with Sāmoa. Its closest neighbours are the small island of Tafahi, only 9 kilometers to the north-northeast, and the island of Niuafo'ou. The three islands together form the administrative division of the Niuas. There is an airport in Niuatoputapu, Mataʻaho airport, which is designated to accept domestic flights Only. The population of Niuatoputapu was 934 in 2006. The inhabitants formerly spoke the Niuatoputapu language, but it has now been extinct for centuries. Now the inhabitants speak Tongan. Nevertheless Sāmoan, ʻUvean and Futunan elements can be noticed.

Geography

The central top of Niuatoputapu, just beside Vaipoa, is a hill of only 157 meters in height. It is the eroded remnant of a large volcano, which erupted about 3 million years ago. The island is surrounded by a large reef, uplifted and largely covered with volcanic ash, which has yielded it a fertile soil.

Niuatoputapu consists primarily of three villages: Hihifo (meaning "west" in Tongan), Vaipoa, and Falehau. Hihifo is the largest village, and, as its name suggests, lies in the west of the island. It contains the majority of the governmental facilities of the island, including the post office, telecommunications, police station and a high school (there are primary schools in all 3 villages). Vaipoa lies in the middle of the island. To the east is Falehau, which contains Niuatoputapu's port.

However, all the government offices are now destroyed during tsunami of September 30, 2009. The TCC telecommunication post is still function after some major upgrading right after after tsunami including new tower which facilitate the mobile phone system. And this is the only means of communication because the landline systems were totally destroyed.

In Niua Toputapu, there is no electricity power grid system like four small islands in Ha'apai. So, whoever, has a mobile phones must find a portable generator somewhere to charge your mobile phone.

In Niua Toputapu at present has an Emergency Control District operation since tsunami diasater. All the local government operations are located at the government running high school, Niua Toputapu High School. The combined primary schools of Hihifo and Vaipoa are in the same High School buildings compound.

Niua Toputapu residents were told by the government through emergency decree that the emergency provisions for household relocation (move to higher ground to new housing) will build complete housing including bedrooms, kitchen, toilet etc. But, there are no water tanks for the houses.

When we had the meeting with community and chaired by the Government Representative, he gave the meeting participants whom consisted of District Officer and town officers an ultimatum that the EU-EDF9 Project component of Rain Water Harvesting will apply only to people who included in the list moving up to the new locations. Any families remained behind the existing locations would be excluded.

This put our project in dilemma, because the project needs every household to participate provided they have no tanks or damaged tanks and the roofings are in good conditions.

Now the Government Emergency Relocation Project has now officially requested the EU-EDF9 Project i.e. the rain water harvesting to provide their project of new housing development with the new tanks of 82. Our survey however approved of 32 households whom houses inhabitable and presently occupied in their existing locations. These households may not want to relocate. In fact the 82 new tanks requested from the government through Tsunami Emergency Recovery and Management Project – Niua toputapu is not included 32 approved tanks from our survey.

TANGO and Tonga Trust agreed and the National WaterSafety and Quality Steering Committee also endorsed the government request. We felt this is a humanitarian provision from the EU-EDF9 Project: Rain Water Harvesting to Niua Toputapu community after the horrific aftermaths of tsunami of September 30, 2009 of which 10 lives had gone with much destructions to properties of individuals, families, churches and government. All things considered, the scars that stuck in the minds and the hearts of citizens that experienced one way or another of the deadly natural calamity.

Niua Toputapu & Tafahi (visited 10th – 30th March 2010)

Table 1.4 List of villages and households water tanks with damaged or without tanks

No	Villages	Village Visited tanks	No. of h/holds visited	No. of h/holds Visited badly	Institutions visited list	No. of h/holds

		Squared	w/out tanks	damaged tanks	Hall	Church	School	interviewed
1	Hahifo	Nil	43	21	4	7	1	16
2	Vaipoa	2	20	16	1	2	Nil	15
3	Falehau	1	37	4	3	2	1	6
4	Tafahi	2	nil	20	2	2	1	2
	Total	5	100	61	10	13	3	39

Note:

1. The households without tanks that having rust / corrosion roofing are not in the program
2. The households with badly (unrepairable) tanks that having rust/ corrosion roofing are not included in the program for health reasons
3. The households tanks found to be reapairable (minor damaged) are not considered in the program. Its worth to point out even these tanks in minor damaged category the tanks were in the same age as the already badly damaged ones.
4. Tafahi needs only guttering systems plus facia boards. It has enough water tanks but insufficient guttering system and more than half of 25 or so houses and institution buildings are rusty and corroded
5. In Niua Toputapu, over 80 % of water tanks were Ferro cement water tanks, and the rests are fiberglass and recently plastic tanks
6. New Zealand AID introduced few 500ltr plastic as an emergency measure for the island after tsunami – it's good but too small as the weather is still too dry over there for over 6 months or more. Water from the tanks are quickly dry out, because most households use water from the tanks for other uses as well and not for drinking alone.

The Survey Observations

The tanks came with different sizes and shapes round and squared as well and including 1000ltr, 5000ltr, 10,000ltr and 13636.36ltr and other smaller sizes. Some built by contractors from outside Niua Toputapu and some particularly squared ferro cement tanks built locally.

One could not help but to mention tsunami in relation with Niua Toputapu. It has an unforgettable but terrible memory blemish in the minds and the hearts of everyone whom experienced it by struggle, run off, stare at or just are made aware of it.

Tsunami did not spare any weight, size or type of anything in its path regardless. It literally obliterated or pushed or rolled the tanks away of distances up to hundreds of meters or more from its original locations. Some tanks are still on the road sides.

There is no heavy machinery to move them. Most of the tanks damaged /destroyed on sites didn't matter what types, sizes, and weight, they were all damaged one way or another, ven some were leveled with ground.

All together, one could look out nearly a half a mile away of the enormity of the destruction expressly in the village of Hihifo. It is an astonishing landscape to observe. Nine individuals got killed during the tsunami and one later on in this most destructive, apprehensive but deadly disaster in Niua Toputapu and Tonga in recent memory.

We talked to some people who actually wrestled with the tsunami about their future hope in Niua Toputapu and in particular their prospect of future homes. The answers are mixed for instance some would like to remain with status quo, some would like to move away fom Niua Toputapu to Tongatapu and/ or overseas to be with their children and some would like to remain in Niua Toputapu but move away from their destructed homes, to new homes to higher ground proposed and to be constructed by the government.

In fact, the Project Manager of the Tsunami Emergency Recovery and Management Project had indicated his desire to closely associate /integrated our EU-EDF9 Project Component of Drinking water harvesting with his project in Niua Toputapu. The answer to him, the phase one of the project is for 150 tanks for pilot on all the outer islands regions which is to be finished by December 31, 2010. However, he was advised to write a letter if he is so wish to integrate his project of homes construction and our drinking water harvesting project.

There is without a doubt, lots of interests and much hopes arising out of the EU-EDF9 Project Component; water harvesting. Not only, the Project Manager of the Tsunami Emergency Recovery and Management Project has interests, but the Government Represetative too and the people of troubled Niua Toputapu and Tafahi have much more than just interests. They need the tanks more so and now.

Tafahi feels the hardships as well because their dependency on the main island of Niua Toputapu to provide them with normal sustenance, sanitation supplies etc. However, regarding water storages Tafahi Island does not need any more water tanks, they now have two or more per household and many have no gutters, down pipes etc.

So, all they need are guttering, down pipes and gutter timber board. Bad roofing for example rusty and corrosive are another main troubling parts for the island residents. For alternative water sources, they don't have any except tanks water. So, like the main island, Niua Toputapu Tafahi too purposely asked that EU-EDF9 Water harvesting project component to prioritize their water needs.

Eighty-two (82) new houses will be built by the government in Niua Toputapu, and similarly 82 new drinking water tanks are needed and to incorporate with the buildings.

At the moment drinking water emergeny measures of small size 500ltr plastic tanks were donated by New Zealand to Niua Toputapu and lucky homes and institutions were lucky enough to receive them and includes only emergency hospital occupied church building, the only primary and secondary school (same school ground), churches, government temporary offices and households in different locations central to the community living areas. In this illustration, there are also good numbers and sizes of plastic buckets to aid this household with water catchments. They use these buckets for manual clothes washing containers with sticks as hands agitator as well.

There were few months of drought before and after our team of two surveyed of the island district. The majority of the three village communities plus Tafahi Island began to search for drinking water from the next door neighbours and/ or the bush coconuts, etc.

The ground water of each of three villages is operating but only one village of Vaipoa is function normally. The other two ground water supplies are intermittently operating.

One good thing though regarding water for other things apart from drinking, there is natural water stream in the village of Hihifo that very well known for them. They use this for bathing and other uses including gardening and animals.

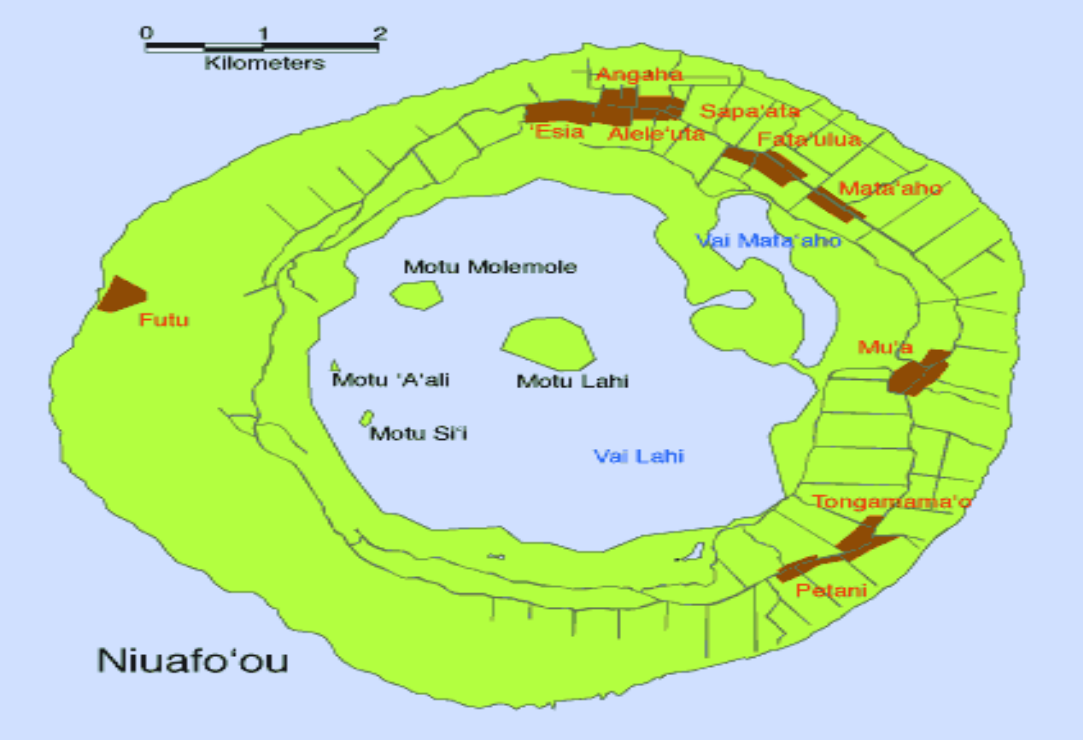
Still they need transportation to deliver water to each home. But for other villages, when they desparate for water such as bathing sea is the way forward.

The petrol and other necessities were run out such as bottled water, sugar, flour, rice, tin foods and other sanitation supplies just before our team left the island district. There may be less modern toilets used in this island district still they need proper supplies for proper applications in case of hygiene in order to avoid spread of communicable diseases such as typhoids and diaorrhea.

By the way, the ground water is not supplied to every home right now for different reasons for instance high ground levels, weak water pressure, tsunami's aftermaths and so on. So, sanitations remain a problem. But, drinking water let alone good clean water is by far the biggest need of this island district.

SECTION E:

Niuafo'ou (Not yet visited)



Note:

There are no data from Niua Fo'ou because the flights there were not available. This was an airline decisions because the island district air strip runway was not safe for landing. The grasses were too long moreover, there were no petrol in the island district to top up the lawn mower(s) to keep the grasses low to a height safe for the aircraft landing and departure.

Villages

Kolofo'ou Mu'a Fata'ulua Mata'aho Esia Petani Tongamama'o Sapa'ata

2. SURVEY SUMMARY

Fiqures are based only on the households interviewed

Table 1.5 Proportion of private households by division and the main source of drinking water in percentage.

	Tank (water)	**Piped water**	**Bottled water**	**Others**
Tongatapu	N/A	N/A	N/A	N/A
Vava'u	70%	11%	-	%
Ha'apai	29%	3%	-	%
Eua	17%	5%	2%	%
Niuatoputapu	80%	20%	-	%
Tafahi				
Niuafo'ou	N/A	N/A	N/A	N/A

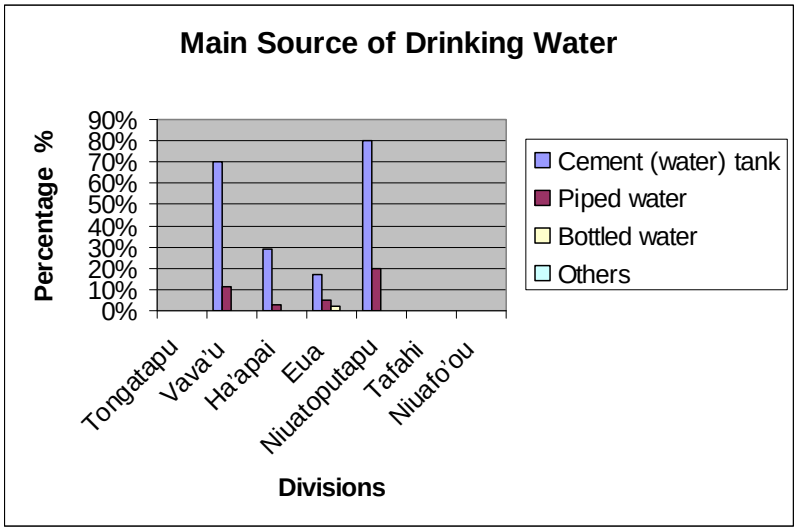


Table 1.6 Proportion of private households by division and the main source of water supply apart from drinking water in percentage.

	Piped water	**Own cement tank**	**Own well**	**Others**
Tongatapu	N/A	N/A	N/A	N/A
Vava'u	91%	-	-	9%
Ha'apai	82%	2%	1%	15%
'Eua	93%	6%	1%	-
Niuatoputapu& Tafahi	96%	-	-	4%
Niuafo'ou	N/A			

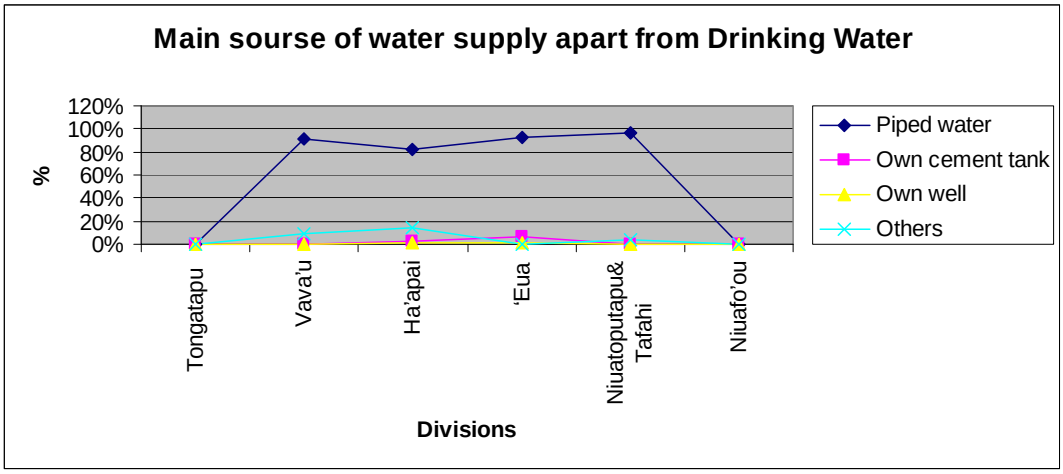


Table 1.7 Proportion of private household by division and the places where they get rainwater for drinking purpose during drought/dry months in percentage.

	Church Building &Hall	**Community Halls**	**Neighbors**	**Others**
Tongatapu	N/A	N/A	N/A	N/A
Ha'apai	1%	2%	75%	22%
Vava'u	1%	-	95%	4%
'Eua	8%	5%	78%	9%
Niuatoputapu& Tafahi	-	1%	88%	11%
Niuafo'ou	N/A	N/A	N/A	N/A

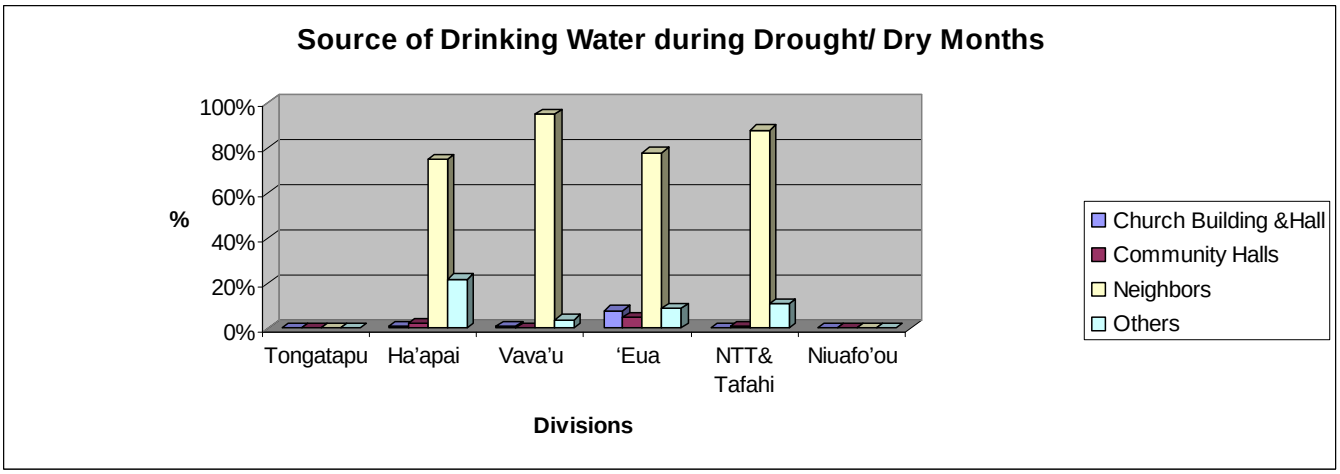


Table 1.8 Proportions of private households by division and the main type of material used for the dwelling roofing.

	Metal	**Wood**	**Thatch**	**Concrete**	**Others**
Tongatapu	N/A	N/A	N/A	N/A	N/A
Vava'u	100%	-	-	-	-
Ha'apai	97%	-	2%	-	1%
'Eua	97%	3%	-	-	-
Niuatoputapu& Tafahi	96%	-	-	-	-
Niuafo'ou	N/A	N/A	N/A	N/A	N/A

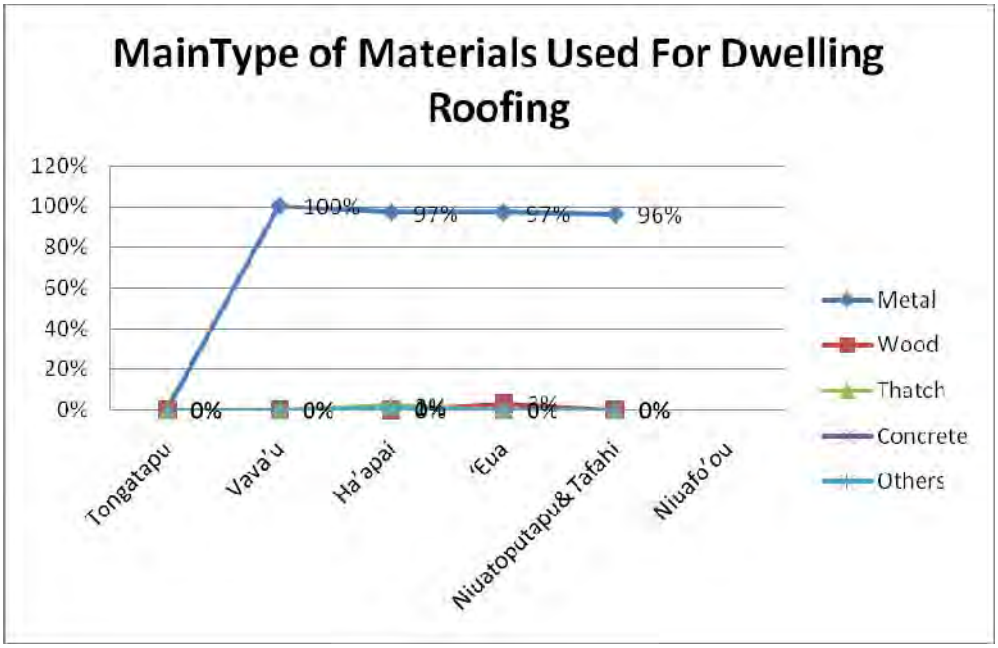


Table 1.9 Proportions of private households by division and the main condition or quality/state of roofing.

	Poor *(very rusty)*	**Average** *(little rust)*	**Good** *(no rust)*	**Very good** *(new roof)*
Tongatapu	N/A	N/A	N/A	N/A
Vava'u	12%	7%	62%	19%
Ha'apai	3%	21%	36%	40%
'Eua	2%	14%	50%	66%
Niuatoputapu&Tafahi	4%	23%	58%	15%
Niuafo'ou	N/A	N/A	N/A	N/A

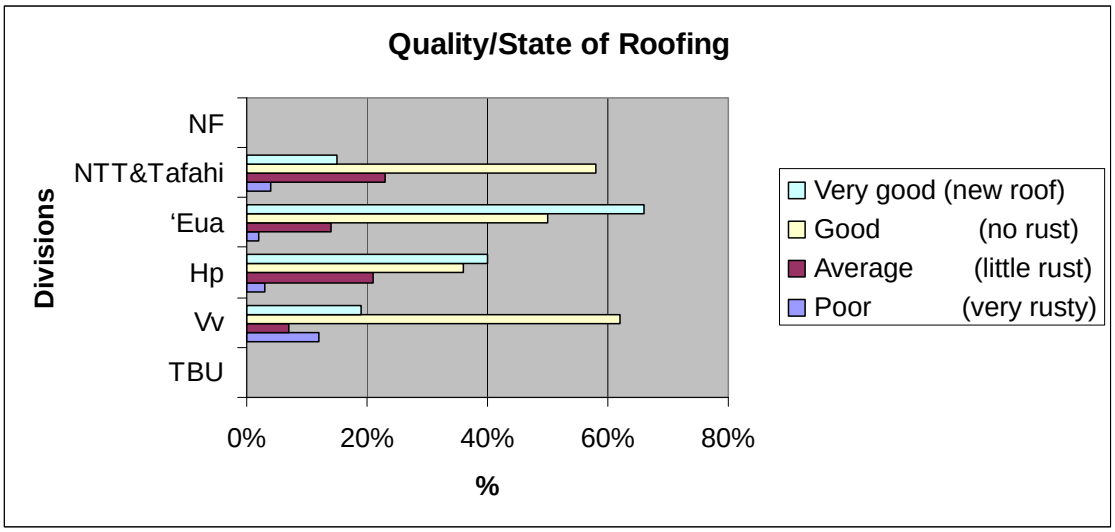


Table 1.10 Proportions of private households by division and preferred type of tank for rainwater storage purpose.

	Plastic tank	**Fiberglass tank**	**Ferro cement tank**	**Others**
Tongatapu	N/A	N/A	N/A	N/A
Vava'u	64%	4%	32%	-
Ha'apai	86%	1%	10%	3%
'Eua	6%	2%	87%	5%
Niuatoputapu&Tafahi	54%	-	46%	-
Niuafo'ou	N/A	N/A	N/A	N/A

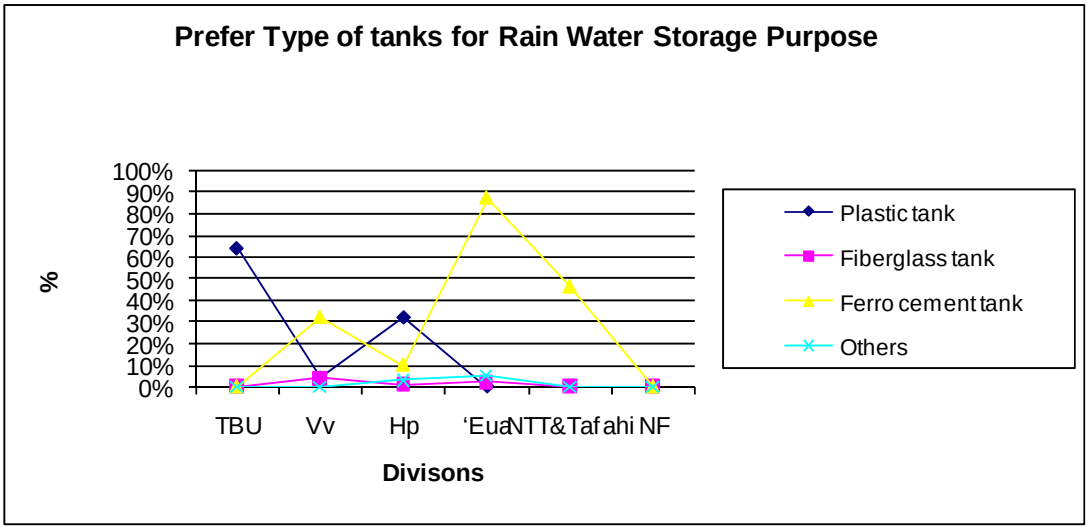


Table 1.11 Proportions of private households by division and main type of toilet facility used at the household in percentage.

	Flush toilet	**Manual Flush**	**Pit**	**None**
Tongatapu	N/A	N/A	N/A	N/A
Vava'u	32%	1%	64%	3%
Ha'apai	39%	6%	55%	-
'Eua	65%	6%	25%	4%
Niuatoputapu& Tafahi	19%	-	73%	8%
Niuafo'ou	N/A	N/A	N/A	N/A

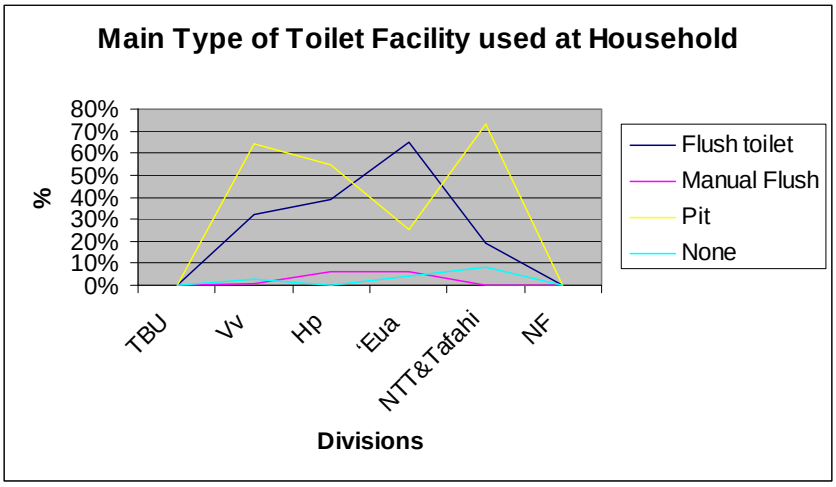


Table 1.12 Proportion of private households by division and main source of household income in percentage.

	Regular Employment	**Farming**	**Weaving/ carving**	**Fishing**	**Remittances**
Tongatapu	N/A	N/A	N/A	N/A	N/A
Vava'u	12%	56%	6%	2%	1%
Ha'apai	15%	37%	10%	24%	14%
'Eua	12%	55%	5%	10%	18%
Niuatoputapu& Tafahi	19%	30%	42%	9%	-
Niuafo'ou	N/A	N/A	N/A	N/A	N/A

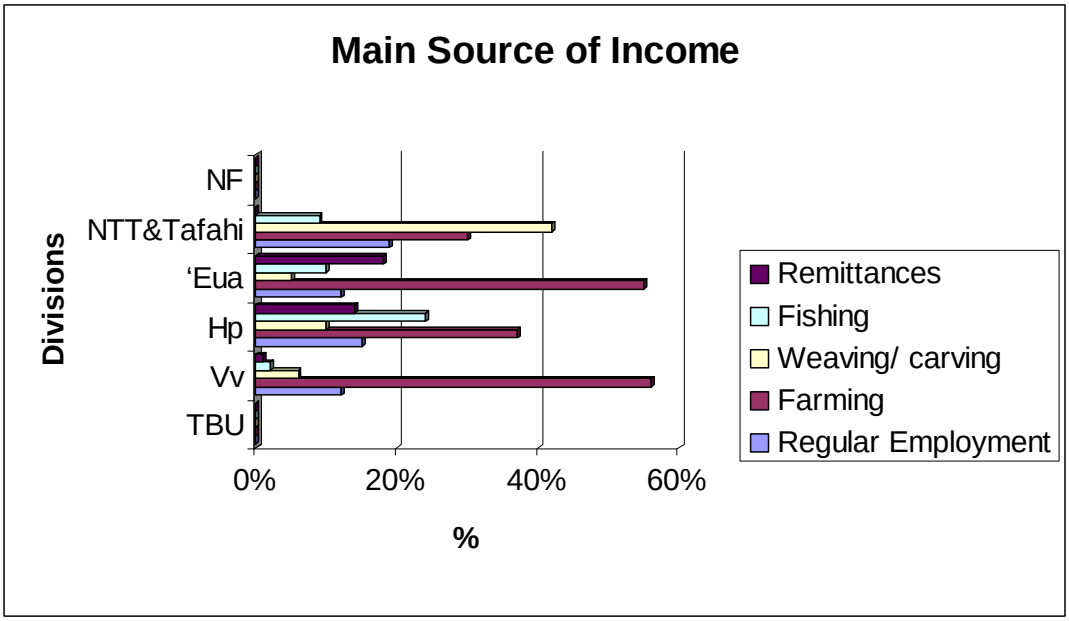


Table 1.13 Proportion of private households by division and the circumstances of cement water tank.

	Major Damage *(cannot be repaired)*	**Minor Damage** *(can be repaired)*
Vava'u	2%	-
'Eua	21%	1%
Ha'apai	13%	-
Niuatoputapu& Tafahi	12%	-
Niuafo'ou	-	-

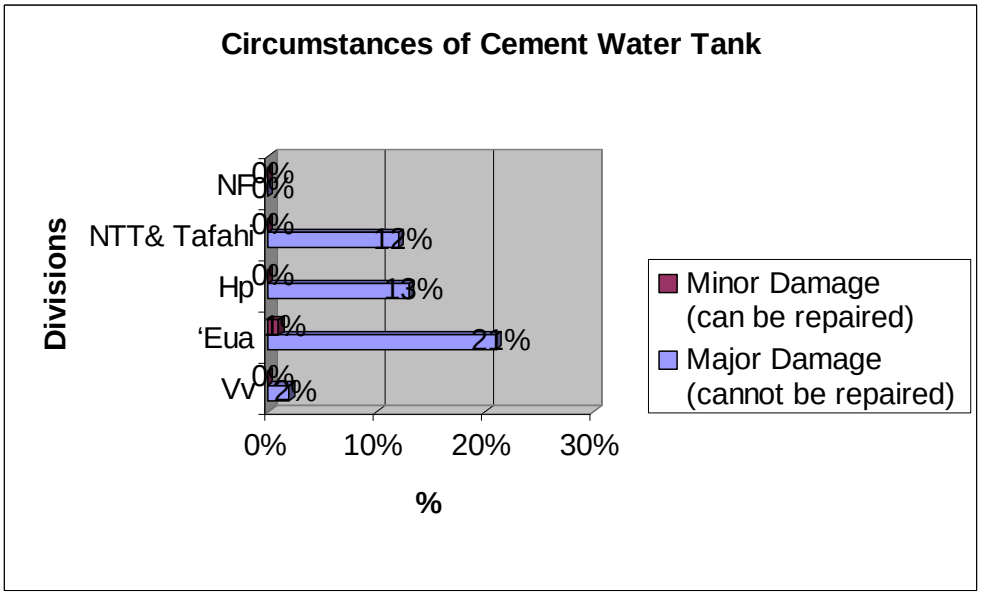
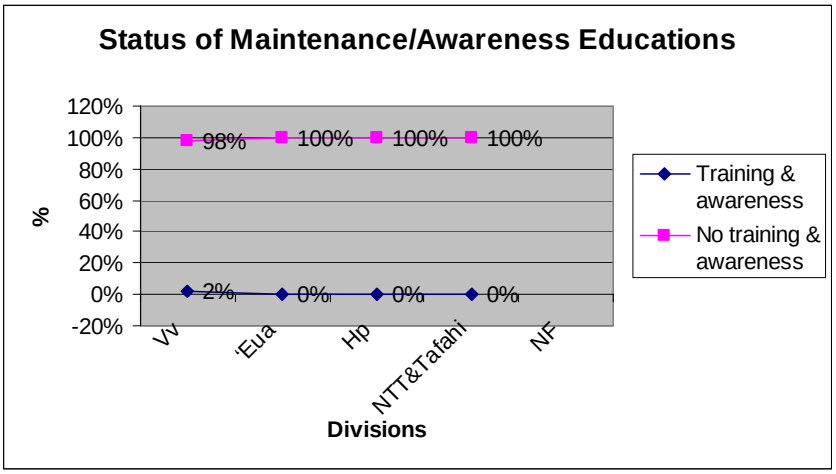


Table 1.14 Proportion of private households by division and maintenance education and awareness.

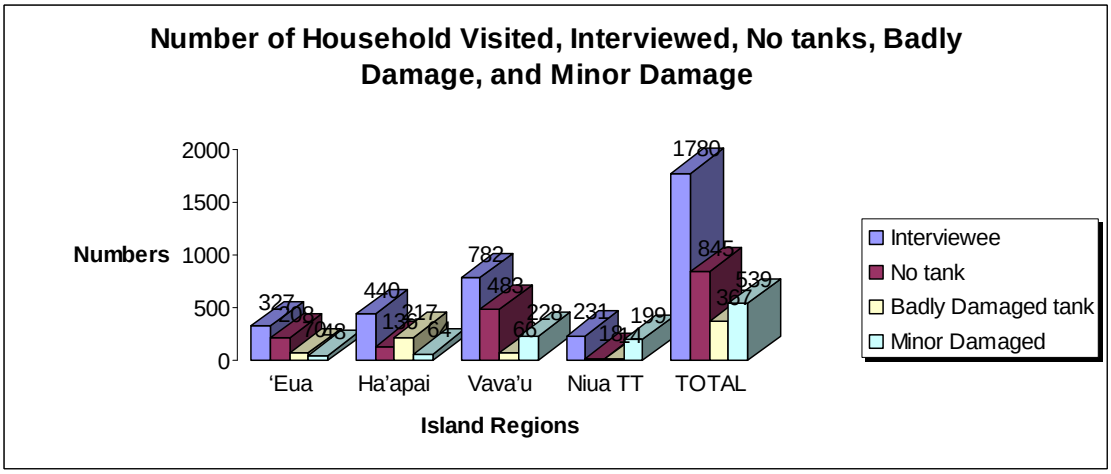
	Training & awareness	No training & awareness
Vava'u	2%	98%
'Eua	-	100%
Ha'apai	-	100%
Niuatoputapu& Tafahi	-	100%
Niuafo'ou		



List of numbers of households visited/ Interviewed with no tanks, badly damaged tanks and minor damaged tanks

Table 1.15 Total Number of Households visited, Interviewed, total number without tanks, Badly damaged tanks and Minor Damaged Tanks.

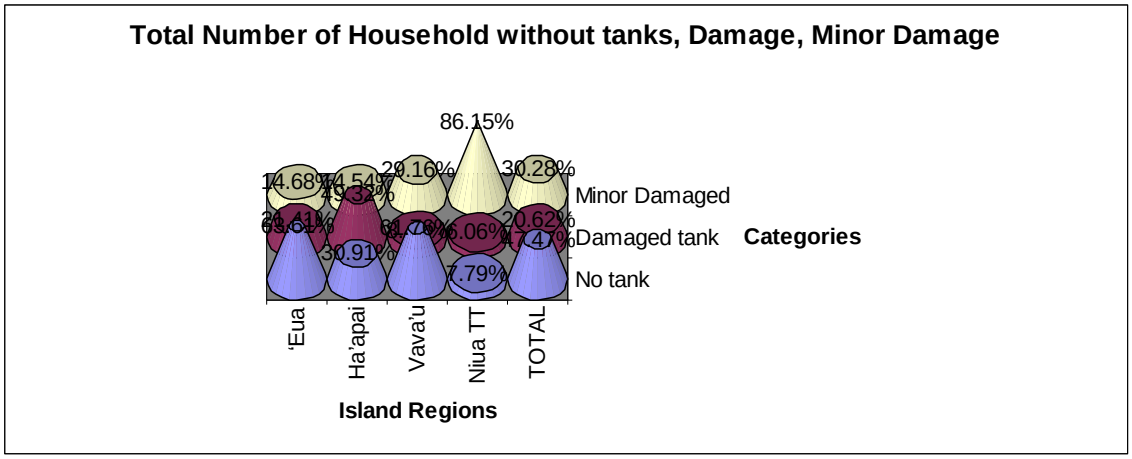
No	Islands region	Interviewee	No tank	Badly Damaged tank	Minor Damaged
1	'Eua	327	208	70	48
2	Ha'apai	440	136	217	64
3	Vava'u	782	483	66	228
4	Niua TT	231	18	14	199
	TOTAL	1780	845	367	539
	Total # of new Tanks req'd		(845+367) = 1212		



No of Households without tanks, badly and minor damaged tanks in propotion to the number visited and interviewed in percentage.

Table 1.16 Total Number of No tanks, badly and minor damaged tanks in all outer Islands in percentage.

No	Islands region	No tank	Damaged tank	Minor Damaged
1	'Eua	63.61%	21.41%	14.68%
2	Ha'apai	30.91%	49.32%	14.54%
3	Vava'u	61.76%	8.44%	29.16%
4	Niua TT	7.79%	6.06%	86.15%
	TOTAL	47.47%	20.62%	30.28%
	Total # of new Tanks req'd	(47.86%+21.85%) = 69.72% (47.47%+20.62%)= 68.09%		



Allocations of Tanks:

All the allocations of tanks sizes to each and every islands regions and villages are much depended on the costs factor nevertheless 150 tanks will be installed as per project objective.

The island regions, number, types and sizes of tanks for the installation of 150 Pilot part of EU-EDF9 Project, component: drinking water harvesting:

Table 1.17 Allocations of Water Tanks.

Original No. of tanks	**Island Regions**	**Village/ remote island**	**Review / Final No. of tanks**	**Types of tanks**	**Sizes of tanks**
'Eua 20 tanks -4	'Eua		16 tanks	Ferro cement	litres13,636.36

NTT				tanks	
Ha'apai 62 tanks – 38NTT	Ha'apai		24 tanks	Plastic tanks; Rotomould	5,000 litres
Vava'u 48 tanks – 28NTT	Vava'u		20 tanks	Ferro cement Tanks	13,636 Litres
Niua Tt 8 tanks + 74	Niua Tt		82 tanks	Plastic tanks; rotomould	5000 Litres
Tafahi 4 tanks - 4NTT	Tafahi		Nil tank	Gutters assembly etc	More than 4 gutters + downpipes etc
Niua F 8 tanks	Niua F		8 tanks - requested	Plastic tanks; rotomould	10,000 litres
Total No. 150 tanks			Total No. 150 tanks		

Draft Action plan

Table 1.18 Draft Action Plan for Pilot Community Sustainable Rainwater Harvesting (May – December)

Tasks	**May 2010**	**June 2010**	**July 2010**	**August 2010**	**September 2010**	**October 2010**	**November 2010**	**December 2010**
A. 150 tanks installed in pilot communities	Finalized survey report & submit to SOPAC	Tender for companies/ Contract signed to install water tanks	Deliver/ Installation of water tanks	Deliver/ Installation of water tanks	Deliver/ Installation of water tanks	Deliver/ Installation of water tanks	Deliver/ Installation of water tanks	
			Site inspections & quality management	Site inspections & quality management	Site inspections & quality management	Site inspections & quality management	Site inspections & quality management	Site inspections & quality management
B. Increase community awareness on SRH			Participants on water tanks training on SRH	Participants on water tanks training on SRH			Water quality monitoring H25 training	Water quality monitoring H25 training
			Media awareness campaign	Media awareness campaign	Media awareness campaign	Media awareness campaign	Media awareness campaign	Media awareness campaign

3.Analysis: Common (Typical) Challenges and Options

These two islands regions described in this section reflected the typical situations of water tanks and other related rain water harvesting of the rests of the islands regions

Section A: 'Eua Island

1.0 Numbers of house holds with out water catchments

Generally, the survey noticed that the numbers of household that are still having no water catchments at all are still very high and unexpected. The statistics of the survey would provide more information to these numbers which will indicates the number of people that are still dependant on other people's water catchments. The survey did not discriminate the races, religion or village but observed general population in relation to the volume of good water reserve drinking purposes.

2.0 Condition of houses and roofs

The survey targeted the households pre-identified by the Town Officers to which they think that the roof top is in good condition to collect clean and good water for drinking.

Many houses included in the list given to us for survey were disqualified because of the condition of the roof is too rusty, unstable roof structure or whole house structure is unstable to withstand any natural disaster.

It was also noticed in the survey that there are great numbers of existed water catchments that are in deteriorated roof tops or unstable structures. The survey did not design to identify how many of the household with water tanks are Good or in bad condition, but it has recognized that there is a great percentage of housing conditions that are not in good condition to collect good water for drinking. These figures vary from village to village as we observed and much of the reasons are related to;

- how far they are from the sea,
- The economic situation of the household

The survey also noticed that there are many households with deteriorated roof tops wish to have their name recorded in the need for water catchments despite the condition of their roof.

The survey also noted that roof top of institutions like Church's Hall, Chapels, village clubs, schools are the most suitable roof condition and structurally stabled to withstand natural disasters. It was also noted that people are easily access to these public facilities than to a water tank located in a private household.

A typical roof condition a one of the settlement in Pangai used only plastic polythene to cover the roof over a Tongan structure of house.

3.0 Condition of Existing water catchments

The survey also took notice of the condition of existing water catchments. There are five main types of water catchments in 'Eua,

1. Ferro Cement type
2. Fiber Glass water catchments type
3. Plastic type water catchments.
4. Concrete Blocks water catchments.
5. Concrete In-situ water cement.

Each of the five types has their own problems which related to;

- bad workmanship,
- project failure
- houses deteriorated
- water quality and dirty
- leakage
- plants and weeds growing inside
- natural disasters
- man made

- aging

We found a typical Concrete Blocks water tank with a broken hole on the side. Most of these types of cement are facing leakage problem which reflect the choice of blocks and workmanship were not in good supervision.

The statistics will clearly shows the percentage of the types of water catchments distributed among the five types, but it was obvious that Ferro cement and Concrete Blocks water catchments are the more common types used in 'Eua.. The size of water tanks also varies from 1000lts to 10,000ltrs and in round or square formation.

Almost, every water tank, disregarding it types is facing the same problem with maintaining clean water or difficult to wash the internal surface of the water catchments. There is one company that has added a waste plug in the bottom so that the water tanks can be washed during the raining period by releasing the plug.

Some of the problems are related to severe salty condition of the environment especially in the coastal areas. This problem is more sever in the ferro cement catchments and Concrete Block water catchments when the reinforcements are affected by the salt causing sever rusting and deteriorating for the concrete sprawl and collapsed of the water catchments roof and cracks on walls

An old concrete water catchment never worked since it was built.

A Common problem with plastic tanks was the tap pop out of the base especially when the tank is full in water.

4.0 People's choice of type of water catchments

The survey also noted that the people did not have any choices when each donor decides what type of water catchments are to use in their respective programmes. The choices of people to which types should they preferred reflected a lot of missed conception to what is more appropriated. The respond mostly reflect that the people do not care what types of water catchments as long as they have an adequate water catchment's to collect good drinking water for their families. The size of water collection tanks also reflected the relationship between the number of people in the house hold and the type of work they are involved.

Most people prefer the Ferro cement type but this is because they are only used to drinking water from Ferro cement tank. Only few people choose plastic tanks as a respond to the TV advertisement of Rotomould (Rota Tank).

5.0 Main water supply and other sources of water for drinking and other activities

There is a major water problem in 'Eua when the main town water supply is still failing to provide good drinking water, adequate volume for the village and community in general. During the short drought in the last few months 'Eua main water supply was so low that it reached the lowest according to the information we collected. Government Representative Mr. Semisi Halaholo said that the water Board in 'Eua was going to shut few areas in 'Eua in an effort to control the water volume of usage in relation to the water level in the spring water well.

Some people were boiling the town water for drinking while others weren't prepared to use town water for drinking purpose. There is no other water supply company in 'Eua apart from few small trade shops have few bottled water. The majority of the people do not access to any water for drinking apart from raining water. There is not much agriculture spraying in 'Eua and therefore environmentally safe for raining water to be collected for drinking.

Section B -Ha'apai

Numbers of house holds with out water catchments.

Generally the numbers households in the Island of Ha'apai that are still have no water catchments or building's related problems are still very high. The survey also did not record all the houses with bad roofing that are or without water tanks. The survey only concentrates on good roof and stabled houses that are not having any water catchments but it has noted that some islands roofing is about 80% or more rusting and are not in good condition to have any water collecting facility in it for drinking purposes.

1.0 Condition of houses and roofs

Most of the houses in the islands of Ha'apai are in very bad roof condition or structurally unstable to pre qualify them for the programme. The survey took noted that there is a very high percentage of deteriorated roofing's in the islands and especially to coastal villages like , Fonoi, Mango, Nomuka, Matuku, Ha'afeva, Tungua, Kotu, and Mo'unga'one. The rest of the high land islands like 'O'ua, Fotuha'a, Lofanga have a different problem as accessing to these island are very difficult.

Maintenance problem in these islands are more common as materials transported to these island are the major problems.

It is very common to find a few water tanks standing in the open area where the houses were already broken down or was damages by a cyclone. Some of these owners are migrating to overseas and left the building deteriorated resulted in total destruction and demolition.

The survey also noted that most of the institution buildings like Churches, schools and village hall are the best facility for collecting water for drinking purposes. Most of these facilities are very well looked after and maintained at all time. We also noted that most of these facilities do not have adequate water catchments in relation to the roof surface.

Roof of the Free Wesleyan Church in Lofanga is the best facility to collect water for drinking.

Family of 15 members lives in this household but none of the buildings roof and structure are qualify to be considered in this programme. They are currently thatching water from the Church building which is about 400m away.

Residents in Mango with current roof condition which is typical to most of the Island.

2.0 Condition of Existing water catchments

The survey took notice of the condition of the existing water catchments in the island of Ha'apai that more than 80% of the water catchments are ferro Cement types. Most of these ferro cement types are failed in the island and especially the coastal Island and villages. This is due to severe salty condition and in few case showed bad workmanship and wrong materials used. It is clear that,

implementations of the any project of these types and nature requires more supervision and control in the method used and the choice of types of water catchments to be use in these islands.

This is typical ferro cement with the roof of the water tank being collapsed due to severe salty condition and poor workmanship.

Bad workmanship often causes structural collapse or roof broken down. This is an old broken water tank being converted to bath room. Other cases found to have been used for kitchen.

This is one of the town water catchments that was build during the King Tupou II in early ninety's. They are still in good working condition. There is not water taps but a bucket is used to thatch water.

An example of the fibered tank being broken from a earth quake movement. This problem is very common in Kotu and Ha'afeva Islands

One of the problems with the fiber tanks are that moulds are growing in the base of the water tank. Sometime it grows to as long as a foot and turns the water quality into undrinkable quality. This is a typical fiber tank in Kotu.

3.0 People's choice of type of water catchments

Many of the people's experiences in the sever conditions and deteriorating of water catchments in Ha'apai force them to reject certain types of water catchments like fiber glass water catchments in Kotu, and Ha'afeva happens to not withstand the sever earthquake situation as they split from top to bottom. Some island rejected the ferro cement due to its failure in the structure. Some people choose the plastic water catchments due to easy installment.

4.0 Main water supply and other sources of water for drinking and other activities

Most of these islands do not have any other water sources apart from rain water collectors with the exception of Lofanga and Ha'afeva. All other the islands of Ha'apai are totally rely on raining water. It was clearly noted that all the islands ran out of water in the last few months of drought with very

little water to be used. The town Officer has to control the volume of water used by each family so that they preserve the volume of left over water existed on their islands.

This is an example of the water well in Mango as a substitute for water in times of water shortages. This water well do not have the quality for drinking as they are very dirty and also being diluted with salty at all times which is undrinkable.

There is a special problem that the survey took notice in Lofanga, where the Island of Lofanga has just established a village water supply under the aid of the JICA. According to the town officer's information that, the people of Lofanga were slack to look after their rain water tanks or upgrade their roofing because they though that their problem with water has been resolved, however when the long drought came, all the rain water tanks in the Island were emptied and at the same time the town water supply well also dried out.

This is enough for a severe alarming with regards to the water reserve in the Island of Lofanga. I suspect that Ha'afeva mould face the same problem. This problem stresses the importance of training for proper use of water and to sustain adequate volume of drinking water storage in the Island especially Ha'afeva and Lofanga. There are better roofing condition exited in the Institutions and do not have to spend extra money on building a new roof for such purposes.

5.0 Islands Accessibility and wharfs

There is no doubt that each island has it own difficulties in term of accessibility and proper wharf for loading and unloading purposes.

Fotuha'a, 'O'ua and Mo'unga'one are the most difficult islands to have access into it. All the islands of Ha'apai do not have a proper wharf where loading and unloading can be done easily. These islands are stretched in vast areas of sea water from the north to south. They are divided into three groups, 1: 'Otu Mu'omu'a lies to the south and Lifuka and Kauvai in the North and in the middle

where Lulunga island are situated. Boat transportation is considered to have a high degree level of attention and cost incurred to make the any project a success.

This is one the only access way to Fotuha'a where the boat can be drag in to the sand. It has very little opening and small sand beach that the size of the boat is also limited. In times of unloading we used a 8 foot aluminum boat to unload us into it and then rowed by another person into the beach. The domain also stretched into high land where difficulties also in carrying load from the beach up into the land inside. Which is about 800m climbing in a deep slope?

'O'ua and Mo'unga'one also have different degree of difficulty as there are related to high and low tide and special skills requires for the captain to safely maneuver the boat into the beach without hitting the reef.

Other islands have a lower degree of difficulties in accessibility island formation but still require great attention to these factors in time of implementation of the project.

This is a typical beach in the coastal Islands Mango in Ha'apai where most of the houses roofs are exposed to severe salty condition. Similar Conditions are found in Fonoi, Kotu, Mo'unga'one, Ha'afeva, Tungua, and Matuku where most of the houses are exposed

4. Awareness and Training Program

1. Survey Result – Attitude and Practices

It was clear from the survey results that 98 – 100% respondents have not participated in any training program on sustainable rainwater harvesting. At the same time, respondents expressed their wishes to engage on any training program that will contribute to raising their awareness about water quality, H2S testing, maintenance of water catchment system, and sustainable use of rainwater.

The survey timeframe helped to raise the profile of sustainable use of water. It was conducted when people in the outer islands were experiencing water shortage from months of drought in Tonga. Some households already have emptied water tanks and had to fetch water from a distance. The situation raised the profile of their vulnerability in time of drought, the challenges posed by water scarcity and the need for ongoing maintenance and sustainable use of water resources at the household, village and national level.

a. Maintenance of water catchment system – roofing, guttering, water tanks and water ouitlets.

Observations and discussions with people during the survey showed that **majority of water catchment are poorly maintained**. This is a major challenge to the sustainability of the rainwater harvesting system and is outlined in the technical analysis above. According to information from informal discussions with people during the survey, failure to maintain water catchment system is due to a combination of some of the following factors:

- Lack of understanding that rainwater catchment system needs to be regularly maintained and restored.
- Delaying tactics – some people may know what to do but due to delaying tactics, the problem continued to the stage beyond repair.
- Fear – some people fear of cleaning or emptying their water tanks in case there won't be any rain after clean up and they will have to fetch water from a far distannce.
- Poor attitude – most people are pre-occupied with the common attitude that "out of sight out of mind". As long as water is stored away safely in the tank, soft to drink and does not have any default taste, than it is good enough to drink.
- Economic hardship and low priority – maintenance and restoration of water catchment system is often low in people's priority due to economic hardship. Ultimately, most people could not afford to replace items like rusty roofing, guttering, etc.

b. Quality of Drinking Water

The survey confirmed the general perception that rainwater is always clean for drinking. Most believed they know the quality of water they drink. In asking how do they know or tell that drinking water from their ater tanks is good quality for drinking. Respondents said that clean water either have one or a combination of the following characteristics: spotless or no visible dirt, odorless, soft and others.

However, contamination of drinking water is a common problem to many water tanks and is understood by many respondents to be caused by the following sources: rusty roof, debris on roof/guttering birds waste and others. Sometime other insects such as mosquitos, cockroaches and dead mouses are found inside the water tanks. These not only contaminates the water but posed health threats to people who are unaware of the problem but still drink the water.

The survey also sought people's understanding on health hazard cause by contaminated water. Respondents believed that contaminated water caused diahorrea, typhoid, dengue fever and others. This is why is most important for people to understand the need for good quality clean water for drinking. Experience shows that most people will not clean up their water tanks unless dirt is visible or funny smell and strange taste. It is hard for many people to accept that germs existed in water is invisible to our eyes and because they do not have any justification for that, water tanks are usually left for a long time before it is emptied and cleaned.

Thst is why the simple H2S test has made some remarkable difference in some of the villages that has participated in the training program. What they see in the test tube after a few days has given them an alarming concern of the quality of their drinking water. It was a real eye opener which immediately follow-up with actions to clean water tanks.

It is indeed clear that regular flush out of water tanks will help people to get good and clean water quality for drinking**. An empowerd village committee or womens committee can take this task of organizing and carrying regular water tanks clean-up.**

C. Sustainable Use and Management of Drinking Water

It was clear from the survey that most people still take rainwater for granted. This is shown in their lack of strategy for water use in time of emergency, like natural disaster and drought. Helping community to develop a strategy will be useful, especially in using rainwater for drinking only while other sources, such as piped or well can be used for other domestic purposes like bathing and cooking. It is a common attitude towards natural resources that God has prepared in abundance for human to enjoy and will always be available. Water resources is no exception and many people still believed that rainwater from heaven will always replenish water resources and meet people's demand for water.

The recent drought has convinced many respondents that it is important to train and remind people to use their water resources wisely at all times. Nature is very unpredictable but it is our responsibility to prepare all the the time for any natural disaster. **Preparation will reduce the risks and level of impacts.** Thus it was clear from the survey that there is a

general lack of understanding and appreciation of the relevancy of water scarcity to climate change.

2. Current Training Program on Rainwater Harvesting: Lessons Learned

Tonga Trust has been kindly supported by Canada Fund to conduct community awareness and training of women (Amatakiloa's members) on sustainable rainwater harvesting in the outer islands since 2008. The training program has been based on the Training Guide developed by SOPAC and TCDT in 2004 under a UNEP funded pilot project.

The training was launched in Ha'apai in June 2008 and since then it has been conducted once a year in Vava'u, Ha'apai and 'Eua. Target participants in the training were included relevant national and local stakeholders in sustainable rainwater harvesting. It is estimated that it is close to 500 participants from Vava'u, Ha'apai and 'Eua engaged on the training program. In 2010, there has been a shifted in emphasis to H2S training because of the need for community to understand the quality of water in the water tanks.

Thus community leaders, such as, district and town officers participated in the training program. Initial H2Supplies were provided from WHO Suva based office helped to kick start the training in 2009. In 2010, Tonga's Ministry of Health not only made available their staff to co-facilitte the training program, they have also been very supportive in supplying H2S for all the training and water testing in the outer islands.

Participants at the H2S training workshop in Pangai, Ha'apai in April 2010

Ms. 'Oketi Faletau, Project Manager recording the results

Sorting results from H2S test tubes

3. Sustainability: Lessons Learned

a. Community Participation

The report recognised that the success of this pilot project will depend on the active participation of community right from the outset. Community participation in the survey has been tremendous and was beyond the expectations of the survey team. It reflects that the demand for water tanks is high. However, at the end of the survey, most of the surveyed households do not meet the basic requirement of good roofing.

It is very critical for the success of this pilot project to identify why previous water tanks project fails in the past. Community may be participated actively but it is not enough to warrant sustainability. It seems clear that community participation is an ongoing process with ongoing guidance and interactive learning and intervention from relevant institutions by way of conducting participatory training and evaluation.

The survey team was weary of transmitting correct information in order to ensure it will not raise the expectation of the community. Hoiwever, experienced shows that sometimes people can choose to hear what they want and not listening to those that does not cater for their needs.

It is very important to maintain the community enthusiasm to participate in this project, especially during the next phase of installing the water tanks at the pilot community. It is therefore important to develop a training program that will allow participants to have a better understanding of the different components of the Sustainable Rainwater Harvesting system, how to maintain them, how to maintain good quality water for drinking nd how to use water wisely at all times and to build their resilience against any upcoming drought or natural calamity.

Empowering community governance will ensure that local mechanisms are in place to help drive collective actions towards maintenance of water quality and sustainable use of drinking water.

b. Institutional capacity development

It is also very important for relevant institutions to build their capacity to be able to sustain provisions of ongoing training and advice to the community in maintaining the rainwater harvesting system. Some of the institutions involved in this training program are:

- Ministry of Health – provision of H2S supplies and staff to talk about the health risks of drinking contaminated water
- Tonga Water Board – provisions of technical advice on village water
- TANGO – provisions of water tanks
- Tonga Trust – provisions of training materials and staff to conduct training

4. Recommendations (Trainning and Awareness)

1. It is recommended that a two-pronged approach will be used when the training program is carried out in the next phase. The first approach will focus on the target **participants at the community level**, especially those households or institutions that involves in water tanks installation. The second approach is to target **the wider community at the national level**. Different training tools will be used for each approach to ensure the transmisson of the right information in a simple way and for participants to understand the information they are given.

2. It is recommended that the training program should include a **problem analysis and option analysis** as part of raising the participants awareness of the root causes of the problem and how they can implement solutions that will sustained and meet their demands for clean drinking water in time of natural disaster. Such training program will use a participatory approach, which focus on engaging participants to share and learn from each other. Participatory approach will not only empower locals to become proactive but it will also promote preventative measures, local and cost effective solutions to the problem of not

maintaining rainwater catchment system, poor quality of driniking water and unsustainable use of rainwater.

3.It is receommended that the training program should continue to be carried out at the island group level, that is, 'Eua, Vava'u and Ha'apai. **The first training will be conducted during the water tanks installation. The second training should included H2S testing when the water tanks if full of water. The third and final training will be an evaluation to compare the results of the water quality with previous data.** The second and final training can involve other tank owners in the H2S testing.

4. It is recommended that **tank design should consider seriously the use of water flush to empty the tanks regularly. This will help to improve water quality and operation of the flush system will be factored into the training program.**

SUMMARY AND CONCLUSION (WHOLE PROJECT)

This study has aimed to increase rain water harvesting to outer islands in order to reduce water scarcity in the event of drought and improving quality drinking water. In order to trial the 150 water tanks in all the outer islands regions, hence the survey targeted households without rainwater storages, those with major damaged tanks (unrepairable) and to a less extend the minor broken tanks (repairable).

The total households consulted and interviewed for the purpose for all the islands regions concerned were 1,780 altogether. These households were directed to us in the cooperation and understanding fashions among the key stakeholders such a sthe Prime Minister's Office, the 2 Governors, the 3 government Representatives. So, in the final it was the Town Officers especially and to a lesser the District Officers (supporting roles) who instrumental in giving us (the consultants) the names of the targeted households accordingly.

In the Survey Summary, it shows the areas that may affect and /or directly related to the implementations of both phases of the Project (EU-EDF9 Components: namely immediate implementing of 150 Pilot and later on of 600-700 and over drinking water tanks).

In reference to the survey key outcomes, we'll look at the Tables and see each islands regions responded and to what degree.

In table No. 1.5 Pg 42 The main source of drinking water. In this case the results clearly show that all the islands districts prefer tanks as source of their drinking water more so that any other sources such as pipe, bottle etc and including coconuts. This also reflects the people's likeness of taste, sense of ownerships, and economics.

In Table No. 1.6 Pg 42 The main source of water supply apart from drinking water. The piped water source is the clear choice in that the piped water supply is more improved in quanitity and quality. Therefore it is easy accessisble. This clearly shows how people able to differentiated and their preference of waters of all kind like water for drinking and water for washing, cooking, animals, and so forth and it's significant for health issues.

In table No. 1.7 Pg The places where to get drinking water during dry /drought months. The communities are all getting their drinking water from the neighbours. This is understandable because the neighbours are immediateand closer the kids are normally the water carriers and know each other /may be relatives and so on.

In table No. 1.8 Pg 44 The type materials used for dwells roofing. This is without adoubt that modern type European style houses have used in over 95% of all the islands districts. This is reflected the improvements of the knowledge and modern development of housing in Tonga. They also have the sense of living comfortably and to last.

In table No.1.9 Pg 44 The main condition or quality/ state of roofing. The roofing conditions of houses in all islands regions show the different results and they may caused by the followings: locations – near /exposed to the sea water, the age of the roofs, and may be lack of preventive maintenance but all in all it is the economics of the islands regions but more specifically households. In case of Ha'apai (mostly exposed to sea water) its roofing condition 2% poor (rusty/corroded), average (little rust/ acceptable) 14%, good (no rust) 50% and very good is 40%. In contrasts with 'Eua, 2% poor, 14% average, 50% good and 66% is very good. 'Eua is in better economics than Ha'apai and not in direct exposures to sea water as Ha'apai is.

In table No. 1.10 Pg 45 The preferred type of tank for rainwater (drinking) storage purpose. The plastic type tank is more in favour in all except one of 'Eua which is 87% preferred ferro cement type tank. Most of the folks in 'Eua likes the cement tanks because of its taste (as natural), clean /spotless, odourless, easy to clean and durable tank. The rests of the islands districts like the plastic tank because it looks fresh, strong (advertising gimmick), easy to install and quick, easy to trafer (moveable). Interestingly, not a single soul mentioned or related to how much of both cost. We didn't either.

In table 1.11 Pg 46 The type of toilet facility used at the household. Again, the results come in different forms, for instance 'Eua has more flush toilets (65%) than any other islands regions with 25% pit toilets. The other islands regions are on the average of 34%-35% having flush toilets with more pit toilets of 64% and 55% in Vava'u and Ha'apai respectively, and Niua TT/ Tafahi 19% and 73% flush and pit toilets respectively.

This is reflected better sources of other water supply that is piped water other than drinking water. 'Eua (with one supply of piped water to every village except one) has regular piped water supply better than other villages in outer islands regions. There water does not always clean (muddy) but nevertheless supply regularly and handy for other usages like toilets etc.

Other villages in other islands regions have problems individually for different reasons like in particular lack of water management. In the remote islands like in Ha'apai, Vava'u and Niua TT /Tafahi it's the specific issue of cannot have alternative source of water apart from tank water.

In table 1.12 Pg 46 The main source of households income. This is may be an irrelevant issue to the project but it reflects the one, numbers that have no tanks, numbers that have badly damaged tanks, minor repairable tanks but left unrepair for long period of time, numbers of tanks that have no guttering systems for months, even years, bad roofing conditions and so on. On all the islands regions they are more or less have the same employment status i.e. low regular employments of over 11% average, and farming of over 35% average, over 12.6% average for weaving but individually Niua TT with 42%, 24% fishing in Ha'apai obviously, with 18% income of 'Eua from overseas and only Niua TT with nil remittances from overseas.

Again, this table shows income level and where it comes from and how it comes is critical for the households' developments and hygienic living. This table does reflect poor economies/ incomes.

In table 1.13 Pg 47 The condtions of cement water (repairable water storage) tanks. This is showed how many / numbers of already constructed water tanks in each islands region, and which islands regions got more existed tanks than others. For instance Vava'u (8.44%) has less damaged cement tanks than Ha'apai (49.32%) and 'Eua (21.41%). But, Ha'apai got more tanks than 'Eua (21.41%). Those 3 islands regions were directly assisted by New Zealsnd, Australia and Japan.

'Eua was not directly assisted by any donor organization before, unlike Ha'apai and 2Niuas and Tafahi. Vava'u too was not directly assisted except the EU was assisted them but not community assistance like drinking water harvesting through cement tanks.

Most (98%-99%) of the existing ferro cement tanks in all the villages and remote islands were built through donations by donor organizations. The donor organizations mainly governments and included New Zealnd (NZAID), Australia (AusAID), Japan (JICA) and to a less extend Canada (Canada Fund) and the Catholic Church (Caritas).

On the other hand, the (1%-2%) of the privately cement tanks were either built by the owners or by the local builders. Some are small sizes vary from 1000ltr to 3000ltr cement tanks, even some are working 95% of them are in minor damaged category. They are leaking, look very old and dirty in and out

In table 1.14 Pg 48 The maintenance, education and awareness. This table tells us that training, public education and awareness was not the subject that everyone interested of doing/ let alone funding it. This is not only crucial to the public health at large, but to the maintenance and security of the tanks and the safe and quality of the water for drinking. It had been for too long that general community in Tonga had insisted that the rain water is the cleanest water to drink. It may be so. May be beforte it falls on the water harvesting system, and from there on, it's not that clean as everyone claims to be.

Thanks for the EU-EDF9 Project for shows us the way towards good clean (hygienic) drinking water after the project.

In table 1.15 Pg 48 Summary-Totals number of households visited/interviewed, number without tanks, badly damaged (unrepairable) tanks and minor (repairable) tanks.

This table refers to the complitations of the data put together in one table as the results of the entire survey of all outer islands regions. On the total however the new tanks required for the larger (600-700 and over new tanks) is the combination (845 altogether) of number of no water tanks (845) and damaged water tanks (367).

In table 1.16 Pg 49 Same summaries in the table 1.15 above in percentage

In table 1.17 Pg 49 Allocations of Water Tanks. This is referred to the allocations of water tanks to each island districts; their types and sizes, and of number of tanks. The outer islands districts villages and remote islands will be named in close collaborations with each government representatives.

However, TANGO and Tonga Trust agreed to install the 150 Pilot water tanks at the villages and/or remote islands institutions such as the schools halls/ classrooms, churches halls /chapels, and community halls etc because these are common/ communal building accessed to them by everyone. This was endorsed by the committee and the government representatives as well.

The actual selections of the villages/ remote islands will be done after the approval of the report. Importantly, TANGO and SOPAC will work together to decide thetypes and sizes of tanks to each island districts and the villages/ remote islands.

In table 1.18 The Proposed Action Plan. The Action Plan was designed to reflect the strategic planning to achieve the 150 Pilot Project objectives and maintain the completion date of 31st December 2010.

Additional informations:

By the way, the privately built tanks are having various sizes and shapes, aged and colour. The tanks wouldn't last long and should be condemned but one major problem with that, is most if not all of the owners of those tanks feel attached (sentimental values) to their own built tanks. The reasons for this sentimental attachments are mainly twofolds one, who built the tanks (normally the father or one in the family) and who financed the tanks (again the family local/ overseas).

As for the Fibreglass tanks, over 90% do not favour it because they say there are micro organisms growing inside the tanks. This may be caused by the sun rays that consistently got inside the tanks through the thin skin walls /top of the tanks. So, this type of water tank is not included in the project.

The facilitating and coordinating agencies that involved installations of water tanks in outer islands regions were included mostly government (80%) through Central Planning Department (Ministry of Finance & Planning) throughout the outer islands regions. The FSP/Tonga Trust, and to a less extend Catholic Church etc. and TANGO recently only in Vava'u and in one village only.

On the other hand, the (1%-2%) of the privately cement tanks were either built by the owners or by the local builders. Some are small sizes vary from 1000ltr to 3000ltr cement tanks, most (95%) of them are in minor damaged category. They are leaking, look very old and dirty inside and outside. This type tanks are leaking at different height levels of the tanks for example any part of the tanks the leaks come out at that's indicates where the level of water left in the tanks, and the water level could be 50%, 65%, 80% full etc.

In recent years, one donor worked directly with the recipients, hired local builders (Niua Toputapu /Tongatapu) supervised and administered the entire programmes unfortunately the end results ofboth large projects ended up in huge failure. They had to do the projects again.

Usually, the building of the cement water tanks were carried out by the local cement water tank builders in associated contract arrangements with the implementation agencies

abovementioned. The 1%-2% of the privately owned cement tanks were built by the owner themselves and/or local builders. But most of the builders are not qualified builders except extensive experiences over the years of building ferro cement tanks.And that was how they developed their skills in cement tanks building industry.

The lessons learned from all of this:

- First, it is imperative to talk with appropriate stakeholders in sofar as the project(s) that benefit them. They know more of their situations better than the people who intending to do good deeds for them. Actually it would in turn benefittted both the benefactor(s) and beneficiaries in term of time and costs, and especially the acceptable outcome(s).
- The benefactor(s) and /or its representative(s) had an opportunity to see first hand of the locations and the situations that may impact one way or another of the proposed project(s).
- It will by all account assist the project planning and its executions.
- It's advisable for the donor organizations to always work with reliable and established organization(s) locally. They know more of the situations better. Therefore, helping reducing costs and saving time. However, consistent supervisions are required at all time.
- There are principal areas to consider particularly to positively impact (immediate and long terms) the whole of the project
    - one, to establish sytem of drinking water (culture) resistance such as incessant used of drinkable water by few, men only (kava drinking) – Necessary Training and awareness,
    - two, a system of alternative water source(s) for example well water (local), "Lepa" rain water collection for washing, gardening, animals drinking etc other than water for drinking and/or water de- salination (brackish water) processing; Necessary Training and awareness,
    - three, a drinking water drought preparedness including control; before drought or immediately knowing of drought, during the drought and after drought or a month or so after drought

So, now it is vitally important for everyone involved in the project concerned to work in collaboration to achieve the completion date, the end of the year, 31st December 2010, but first and foremost the 150 Pilot Project objectives to fulfil and the outcome that is to be successfully and satisfactorily completed.

We undoubtedly confident and believe it will.

Summations of the study: (Refer to Table 1.16, Pg 49)

Comparative compilations of households visited and interview, collections of numbers of no tanks, identified of badly and minor damaged tanks in all outer islands regions.

'Eua:

1. Households visited and interviewed were 327 with 208 households without tanks, 70 households with badly damaged tanks and 48 households of minor damaged tanks.

Ha'apai:

1. Households visited and interviewed were 440 with 136 households without tanks, 217 households with badly damaged tanks and 64 households of minor damaged tanks.

Vava'u:

1. Households visited and interviewed were 782 with 483 households without tanks, 66 households with badly damaged tanks and 228 households of minor damaged tanks.

Niuatoputapu:

1. Households visited and interviewed were 231 with 18 households without tanks, 14 households with badly damaged tanks and 199 households of minor damaged tanks.

Note 1:

The total number of households visited and interviewed in all outer islands regions were 1780, with 845 totals without tanks and 367 badly damaged tanks with 539 totals of minor damaged tanks.

Note 2:

The total number of new tanks required is 1212. It's the sum of numbers of no tanks and badly damaged tanks (845 + 367).

RECOMMENDATIONS (WHOLE PROJECT)

The Pilot Project of 150 drinking Water tanks and the study preceding its implementation proving vitally important in order to explore the followings:

A. The general availability and accessibility of good quality drinking water to a good number people if not all the people in areas to test the viability of the project component in terms of concerned island(s) situations e.g. life threatening of communicable diseases for example typhoids, diaorrehea etc spreading in the outer island districts. Other factors of hardships/ difficulties such as non existence alternatives water sources and the deliveries of alternative water supply

B. Access to necessary construction materials, manufactured goods, for example different/ variety types of goods – already made tanks and sizes, the immediate availability and quality of the drinking water tanks

C. To learn the following concerns relatives to implementation phase for instance small remote islands location, their situations with terrains, and ports entry etc in order to find out how best to deliver, unload/ deliver of construction materials, already made tanks to the individual places. The costs for all these necessary equipments of the component

D. Access to different tanks builders and manufacturers locally, and /or overseas if needed

E. Observe how logistics could handle in different island regions, regarding transports – land and marines, and includes personnel accommodations/ foods etc.

F. To find out the local costs in relations to abovementioned necessities and integral parts of the first part of the project component

G. How to plan the project ahead including budgeting, tendering/ contracting; executing the plans and includes monitoring/ management.

H. How in general, regionally and locally administer, monitoring and reporting the component during the implementations phase.

I. How to finally reporting the outcome, inspect and closing the project component i.e. by donor, EU and Project Regional Agency and Co-ordinator, SOPAC.

The main directions of our survey were based on followings:

In all of the Outer Islands Regions the survey found the contrasts and similarities in accordance to more specific areas such as:

1. Households that have no drinking water tanks at all
2. Households that already have drinking water tanks of any sizes and types but damaged badly and could not be reapired
3. The households above must have houses with roofs that are sufficient to harvest water for drinking and not rusty (out of form) and /or corrosion (decay)
4. Otherwise the No.1 & 2 households above would not be qualified to include in the processes of selection of beneficiaries for the first project part of 150 pilot

600-700 tanks and over:

There is also another important part of the survey that is the larger extension of same project component of 600-700 and over. So, in order to qualify for the next larger project the abovementioned qualifying processes will be included.

Other areas of great significance would impact one way or another of both parts of the project component to a large extent highlighted in our survey and included geographical locations, terrains, infrastructure, current facilities, local capability and local economy etc

Criterions for selections of recipients:

The criterions of selection of island districts, villages/ remote islands and individuals and /or institutions specifically for the 150 Pilot includes: taking great considerations of:

a. No. of pilot tanks available to all Outer islands Regions – Only 150 tanks available with planned budget

b. Geographical locations / water constraint of islands districts – Lands elevation islands like 'O'ua, Fotuha'a, Mo'unga'one as accessing to these island are very difficult, coupled with it the inaccessibility to other water sources except Lofanga that has new ground water system funded by the Japanese Government (JICA) unfortunately, their new water venture makes no difference because their alternative ground water supply is coming with the high tide (dependent) and away with the low tide.

c. Convenience of villages/ isolated islands population to the obtainable tanks – accessible and unobjectionable places for every one

d. Humanitarian Considerations in case of Niua Toputapu and Tafahi

e. And, finally the costs – Naturally, the costs are the determining factor to achieving the goal of the project component that is 150 Pilot drinking water tanks to distribute among all outer islands regions.

f. The appropriate types and sizes of tanks that enable the 150 tanks pilot project component objective is to install in all outer islands regions of 'Eua, Ha'apai, Vava'u, Niua Toputapu /Tafahi and Niua Fo'ou

Installations of 150 Pilot tanks

To install 150 tanks to all outer islands districts of 'Eua, Ha'apai, Vava'u, Niua Toputapu /Tafahi and Niua Fo'ou, and the distributions of the tanks, its types and sizes are as follows (as showed in the Table 1.17 Pg 49):

1 Installtions of tanks to outer islands districts:

1.1 'Eua with 16 tanks, 13, 636.36 litres ferro cement tanks

1.2 Ha'apai with 24 tanks of 5,000 litres plastic type tanks

1.3 Vava'u with 20 tanks of 13,636.36 litres ferro cement tanks

1.4 Niua Toputapu with 82 tanks of 5,000 litres plastic tanks

1.5 Niua Fo'ou with 8 only tanks 10,000 litres plastic tanks

2. The tanks are to be installed at the institutions compounds for example Church Chapels and Halls, schools classrooms buildings, villages halls etc

3. To use local building contractor(s) to build the cement tanks in 'Eua and Vava'u. Plastic (Rotamould) to distribute to Ha'apai, Niua Toputapu and Niua Fo'ou, however, platforms are required for all the tanks and again needed local builders to do these as well. The above installations plus guttering systems etc

   These assisting the local economies, less costs, and save times of project implementations

Humanitarian assistance (Niua TT)

4. The emergency and humanitarian contributions of 82 tanks to Niua Toputapu incorporated with the government emergency measures for tsunami disaster

5. To consider the 32 survey qualified tanks on the existing locations to be included in this 150 pilot project with addional fund to be provided. Moreover, government must agree to 32 tanks on their existing locations because of the 82 new tanks from the EU-EDF9 project they requested for.

6. Otherwise, 32 survey qualified required tanks to include in the larger project of 600-700 and over

Minor Damaged tanks

7. These tanks in minor damaged category were in the same period as the already badly damaged ones. Therefore, it is recommended to consider these tanks for replacement but with smaller size tanks in the vicinity of 9091ltr ferro cement tanks and/or 3000 ltrs plastic.

Tongatapu Regions

8. To include Tongatapu in the project as future project phase 3. There are lots of people in this region have interests in the project. Many people rang and requested to include them on this project for drinking water tanks.

9. And/ or a survey to be conducted in Tongatapu first to finding out more on rain water harvesting situations in this region before considering the possibilities of involving them in the project.

Proposed Draft Actions Plan: Refer to Table 1.17, Pg 49

10. The Tender for companies and Contract signed to install water tanks in June, 2010
11. The delivery and the installations of tanks in July, 2010 in the outer islands regions of 'Eua, Ha'apai, Vava'u, and 2Niuas and Tafahi

12. The training, education and awareness is to be conducted in 3 phases that is;

    12.1 First, to be carried out at time of deliveringand installations of tanks to outer islands locations, commenced in July until December , 2010

    12.2 Water quality tests in November and December, 2010

    12.3 And the third and last one the analysis and evaluation of installed water tanks and the water in December, 2011.

Registration Fees

13. TANGO is to collect registrations fees of TOP$100.00 for every tank for administering of project monitoring and networking in order to maintain sustainability of the project component.

    13.1 To monitor and evaluate the tanks 6 months after installations.

    13.2 To give sense of ownership to beneficiaries.

    13.3 This project needs Support and Follow-up system

Niua Fo'ou survey

14. Survey of Niua Fo'ou Island District.

    14.1 The survey of Niuafo'ou is required to complete inorder to get fully knowledge of the drinking water situations in that island.

    14.2 The Government representative in Niuafo'ou requested of such a visit.

    14.3 The Island water constraints as we being told are totally different from any other outer island region in Tonga.

Insurance

15. The companies involving in the implementations of the 150 Pilot Project are to be insured liability and guarantee of workmanship (lost and damaged goods etc) on their own. That is included of the delivery of manufactured tanks to construction materials etc , and they may also have their own life insurance as well

APPENDIX A

Appendix – A. Community meetings in outer islands regions

'EUA:

The Meeting Attendance in 'Eua:

No	Name of participants	Who they are
1	Mr. Semisi Halaholo	Government Representative /Chairman
2	Tevita Ma'u	Town Officer
3	Tauleva Tafea	Town Officer
4	Makatangi Filiai	Town Officer
5	Siua Fa'u	Town Officer
6	'Apai Luau	Town Officer
7	Manuele Lama	Town Officer
8	Mosese Laukau	Town Officer
9	Mosese Lea'aepulu	Town Officer
10	Penisimani Hapihau	Town Officer
11	Paea Poto	Town Officer
12	Siosifa Kava	Town Officer
13	Ma'afu Kamoto	Town Officer
14	Mikaele Petelo	Town Officer
15	Tevita Lehaa	Town Officer
16	Siupeli Vaiangina	Town Officer
17	Toafa Faka'utoki	District Officer
18	Samisoni Taufa	District Officer
19	Rev. Kava Matafahi	Priest
20	Mr Sione Faka'osi	Project Consultant
21	Rev Mr Niulolo Prescott	Project Consultant
22	Mr Sione Faeamani	Project Consultant
23	Mr Simione Silapelu	Project Consultant
	Total	**23**

The Meeting Attendance in Ha'apai:

No	Names	Who they are
1	Mr. Viliami Latu	Chairman / Assistant Deputy Secretary for Governor
2	Miss 'Ela Lolohea	Assistant Secretary, Governor's Office
3	Ms Veivosa Taka	Communiy
4	Mr. Eke Vi	Community
5	Rev 'Aisake Kolo'ofa'i	Priest
6	Rev Sione F. 'Ulufonua	Priest/ Teacher- Principal
7	Mr. Sitanilei Fakahua	Community
8	Mr Moimoi Fakahua	Town Officer/ Broadcaster
9	Mr Siaosi Makineti	Town Officer
10	Mr Seluini Hakaumotu	Community
11	Mr Simote Mahe	Community
12	Mr Taufaloa Tonga'onevai	Community
13	Sister Maria (Catholic)	Teacher
14	Mr Sione Sa	Community
15	Mr Tevita Vakalahi	Community
16	Mr Tevita Ta	Community
17	Ms 'Ofa Tukutau	Community
18	Ms Sia Maamakalafi	Community
19	S. Kioa	Teacher
20	Mr Tokaukamea Puleiku	Community
21	Mrs Langilangi Vi	Business Woman/ Community NGO
22	Ms Milika Ika	Community
23	Neau Sika Talakai	Community
24	Ms 'Oketi Faletau	Project Consultant
25	Mr Sione Faeamani	Project Consultant
26	Mr Simione Silapelu	Project Consultant
	Total	**26**

The Meeting Attendance in Vava'u:

No	Names	Who they are
1	Lord Luani	Govenor/ Chairman
2	Mr Paula Tatafu	Chief Magistrate, Vava'u District
3	Mr 'Etuate S Lavulavu	No 1Member of Parliament, Vava'u
4	Mr Finau Tupou	District Officer, Neiafu district
5	Mr Taniela V Loseli	District Officer, Hihifo district
6	Mr Peauafi Tatafu	District Officer, Pangaimotu district
7	Mr Na'aniumotu 'Anitoni	District Officer, Hahake district
8	Mr Sitiveni M Pua	District Officer, Motu district
9	Mr Hala 'Otukolo	Town Officer, Neiafu
10	Mr Sione Kuli Tuita	Town Officer, Falaleu
11	Mr Savelio H Siasau	Town Officer, Fungamisi
12	Mr Lata 'Alatini	Town Officer, Okoa
13	Mr Malemanu Mahe	Town Officer, Nga'unoho
14	Mr Tevita 'Iteni Pongia	Town Officer, 'Utungake
15	Mr Tevita Manu 'Ofetoa	Town Officer, Pangaimotu
16	Mr Tevita Filipe	Town Officer (Alternate), 'Utulei
17	Mr Hainite Ata	Town Officer, Longomapu
18	Mr Lingikoni Kaafi	Town Officer, Tefisi
19	Mr Heamasi Finau	Town Officer, Tu'anuku
20	Mr Moana Nimo	Town Officer, Vaimalo
21	Mr Taniela Fisi'ihoi	Town Officer (Alternate), Taoa
22	Mr Tu'akifalelei Havea	Town Officer, Mataika
23	Mr Maloni Uasila'a	Town Officer, Feletoa
24	Mr Paane Tonga	Town Officer, Leimatu'a
25	Mr Nai Nusipepa	Town Officer, 'Utui
26	Mr 'Eukaliti Halaifonua	Town Officer, Houma

The Meeting Attendance in Vava'u (Cont'd):

27	Mr Havea Lolohea	Town Officer, Ha'akio
28	Mr 'Atapani Tupou	Town Officer (Alternate), Mangia
29	Mr Metui Loni	Town Officer, Ta'anea
30	Mr fakava 'Otuafi	Town Officer, Ha'alaufuli
31	Mr Vehikite Kioa	Town Officer, Tu'anekivale
32	Mr Uele Moala	Town Officer, Holeva
33	Mr Minaati Fifita	Town Officer, Koloa
34	Mr 'Alavini Vea	Town Officer, Toula
35	Mr Sione Vailea	Town Officer, Olo'ua
36	Mr Napa'a Halatanu	Town Officer, Hunga
37	Mr 'Ofa Blake	Town Officer, Falevai
38	Mr Semisi Ngu	Town Officer, Kapa
39	Mr Sateki Kivalu	Town Officer, Nuapapu
40	Mr Manuevaha Fosita	Town Officer, Taunga
41	Mr Kilisimasi Ma'ukoloa	Town Officer, 'Otea
42	Mr Uikelotu Taufa	Town Officer, Lape
43	Mr Latu Kelekiheni Manu	Town Officer, Matamaka
44	Mr Solomone Fuavao	Town Officer, Holonga
45	Mr Valupei Vaisima	Town Officer, Ovaka
46	Ms Tae Guttebeil	Manager, Guttenbeil Store
47	Ms Mele Kamoto	Manager, Tonga Power
48	Ms Masina Tu'itupou	Deputy Secretary, Governor
49	Ms 'Oketi Faletau	Project Consultant
50	Mr Sione Faeamani	Project Consultant
51	Mr Simione Silapelu	Project Consultant
	Total	**51**

The Meeting Attendance in Niua Toputapu:

No	Names	Who they are
1	Sione Peuafi Haukinima	Government Representative/ Chairman
2	Rev Mr Lopiseni Vao	Minister, Free Wesleyan church of Tonga
3	Father Lolesio Lakai	Priest, Roman Catholic Church
4	Pastor Mr Brian Pulini	Preacher, Seventh day Adventist Church
5	Mr Tupou Manitisa	Minister, Tokaikolo ‘ia Kalaisi
6	Mr Mosese Kalamafoni	Minister, Church of Tonga
7	Mr ‘Aisea Ta’ofi	District Officer, NTT
8	Mr Solo Mahe	Town Officer, Hihifo
9	Mr Heneli Similai	Town Officer, Vaipoa
10	Mr Viliami Maea	Town Officer, Falehau
11	Mr Soane Selui	Head Teacher, NTT High School
12	Ms Monika ‘Uvea	Assistant, Deputy Health Officer
13	Mr Sione Faeamani	Project Consultant
14	Mr Simione Silapelu	Project Consultant
15	Ms Lose Ohi	Assistant Secretary

The Meeting Attendance in Tafahi:

No	Names	Who they are
1	Ms Pelenaise Faka’osi	Community
2	Ms Katalina Faka’osi	Community
3	Ms Mele ‘Afa	Community
4	Mr Fa’one Faka’osi	Community
5	Ms Le’ota Pulupaki	Community
6	Ms Makalita Faka’osi	Community
7	Ms Susana Faka’osi	Community
8	Ms Falakika Faka’osi	Community
9	Mr Tui’one ‘Osika.	Town Officer.

10	Ms Liliola Lehapoto	Community
11	Ms Koula Manu	Community
12	Ms Visesio Faka'osi	Community
13	Mr Sione Vea	Businessman
14	Mr Brian Pulini	Pastor
13	Mr Sione Faeamani	Project Consultant
14	Mr Simione Silapelu	Project Consultant
	Total	**14**

APPENDIX B

Appendix B: Table summary of the results of questionnaires

Fiqures are based only on Table 1.5 – Table 1.14

The most appropriate responses from all outer islands region regarding ten (10) key outcomes of the study:

No	Summary of Ten main final survey outcomes	'Eua	Ha'apai	Vava'u	NTT Tafahi	Niua F
1	The main source of drinking water Re: cement water tank Re: Piped water	17% 5%	29% 3%	70% 11%	17% 20%	N/A
2	The main source of water supply apart from drinking water Re: Piped water	93%	82%	91%	96%	N/A
3	The places where they get rainwater for drinking during drought/dry months Re: neighbors	78%	75%	95%	88%	N/A
4	The main type of material used for the dwelling roofing. Re: metal	97%	97%	100%	96%	N/A

5	The main condition or quality/state of roofing. Re: Average Re: Good Re: Very Good	14% 50% 66%	21% 36% 40%	7% 62% 19%	23% 58% 15%	
6	The preferred type of tank for rainwater storage purpose. Re: plastic tanks Re: ferro cement tanks	6% 87%	86% 10%	64% 32%	54% 46%	
7	The main type of toilet facility used at the household in percentage. Re: flush Re: pit	65% 25%	39% 55%	32% 64%	19% 73%	
8	The main source of household income Re: Regular employment Re: Farming Re: Weaving/ carving Re: Fishing Re: Remittances	12% 55% 5% 10% 18%	15% 37% 10% 24% 14%	12% 67% 6% 2% 1%	19% 42% 42% 9% -	
9	The conditions of cement water tank Re: major damage (cannot be repaired) Re: minor	21% 1%	13% -	2% -	12% -	
10	Training and awareness Re: training Re: Non training	0% 100%	0% 100%	2% 98%	0% 100%	

APPENDIX C

Appendix – C List of households in all outer islands regions with good roofing but no water tanks storages

'EUA:

No	Village	Household	Institution
1.	'Ohonua		
		1. Tavake Halaevete	1. Police Quarter
		2.Kesomi Siakumi	2. Methodist church
		3. 'Ana Vaea	3. Mataenga Kindy
		4. Seini Kata	Sub -total =3
		5. Pesalili Taka	4. Kalapu Kava Tonga
		6. Kilifi 'Aisake	5. Free church of Tonga
		7. Hauta'e 'iloa	6. 'Eua High School
		8. Penina takai	7. Falelotu Siasi Konisitutone
		9. Mautui Vai	Sub - total = 4
		10. Mataiasi LeiolaPeni Moa	8. siasi Tonga tau'ataina II
		11. 'Etueni finau	Sub - total = 1
		12. Sione 'Otutoa	
		13. Willie Kaumatule	
		14. Ma'asi Tonga	
		15. Ta'anga Kata	
		16. Taniela Latu	
		17. 'Akimeta Matafaa	
		18. Tui'one Vaiangina	
		19. Matangi Tonga	
		20. 'Isikeli Lauteau	
		21. Palei Vai'ohina	
		22. Moimoi Langilangi	
		23. Toafa	
		24. Sione matangi	
		Total = 24	
		25. 'Api faifekau Siasi Tonga Hou'eki	
		26. Paula Siosio	
		27. Manase Tu'itupou	
		28. Sefita Mafi	
		29. 'Atunaisa Havea	
		30. Sione Taulaki	
		31. Paula vailea	
		32. Kilioni Tu'ivai	
		33. Kafovalu Vailea	
		34. finau Sisipeli	
		35. Lau'aitu Filikitonga	
		36. 'Ana taufalele	
		37. 'Ana Siupeli	
		38. Ta 'akimoeaka	
		39. Langilangi Napa'a	
		40. 'Epalahame Pau'u	
		41. Tai'ese Vaea	
		42. Lea 'aesila Napa'a	
		43. Vaivevea Kamaloni	
		Sub-Total = 19	
		44. Tukuange takai	
		45. Toni vave	
		46. Taulanga Takau	
		47. 'Aisake toamotu	
		48. Sione 'Ikale	
		49. Lepani Kaufusi	
		50. Tau'ili'ili Vea	
		51. Tau'aika Tu'itupou	
		52. Manoa Luseane	
		53. Sione Ongoongo	

		54. Toni fakateli	
		55. Siupeli vaiangina	
		53. Tevita Napa'a	
		54. Sione foliaki	
		55. Filimioekava Fili	
		56. Tevita Tu'ivai	
		57. Matelie havea	
		58. Mo'unga Fili	
		59. Liuanga fa'onevai	
		60. Kauni Lotu Tameilau	
		61. Kafoa Peauta	
		Total = 61	Total = 8
	OVERALL	= 69	
2	Pangai		
		1. Taipaletl 'atu'ake	1. Hall Siasi Tonga Tau'ataina
		2. 'Alovili Fungalei	2. Chapel siasi Tonga Hou'eiki
		3.Faifekau Tonga Hou'eiki	3. Kava Club – Mikaele Me'alele
		4. 'Oteti Tu'ifua	
		5. Timote Lelenga	
		6. Sinali H	
		7. Hau Kaufana	
		8. Sitiveni Tu'itupou	
		9. Toka'one Kolo	
		10. Kalisitina Pauli	
		11. Uele	
		12Tevita Meilau	
		13. Fe'ofa'aki 'Aholahi	
		Total = 13	Total = 3
	OVERALL	= 16	
3	Sapa'ata		
		1. Peni Fe'ao	1. Village youth
		2. Vailahi kaho	2. falelotu Siasi Tau'ataina 'o Tonga
		3. Solomone Vi 'Akau	3. Church Chapel
		4. Vaoahi Lama	
		5. Manuele Lama	
		Total = 5	Total = 3
	OVERALL	= 8	
4	Futu		
		1. Pnisimani H. hau	1. Siasi Paitaiso
		2. Timote Kolomalu	
		3. siaosi Highgate	
		4. Kuli lavelua	
		5. Kasa 'Ahokava	
		6. Felise tatafu	
		7. 'Inoke tatafu	
		8. Sione Petelo	
		Total = 8	Total = 1
	OVERALL	= 9	
5	Mata'aho		
		1. Sione Palelei	1. 'Otuha'apai 2 Kava Kalapu
		2. Lisiate Potaufa	2. FWC Church
		3. Manu sau	
		4. 'Alimoni Kafoa	
		5. Peni 'Epui	
		6. Seteone Luau	
		7. Lomekina 'Elone	
		Total = 7	Total =2
	OVERALL	= 9	
6	Angaha		
		1. Lutu Vehikite	1. Api Polisi, Fire
		2. 'Esilio Sina	2. Church
		3. Teti lakalaka	3. Kava Club Mosimosi
		Total = 3	Total = 3
	OVERALL	= 6	
7	Tufuvai		
		1. Telefoni finau	1. Hall, Church of Tonga
		2. Moana Tu'I'onetoa	
		3. 'Alatini Feleti	
		4. Fangupo Falepapalangi	
		5. Kosema Pani	

		6. Tipeli Finau	
		7. samisoni Topani	
		8. Fetuli Peau	
		9. Sitenili Peau	
		10. Kaliti Langi	
		11. Siosifa Kava	
		Total = 11	Total = 1
	OVERALL	= 12	
8	Petani		
		1. Vili Kautai	1. Hufangahau College
		2. Mafoa 'Unga	
		3. Hulita Tu'ilautala	
		4. Nasio Latu	
		5. Sione N. Soakai	
		6. Faifekau Siasi Tonga Hou'eiki	
		7. 'Alifaleti Havili	
		Total = 7	Total = 1
	OVERALL	= 8	
9	'Esia	1. Taniela Sailosi	1. 'Esia Community Hall
		2. Petelo Vaohea	
		3. latu Mosese	
		4. Sosefo Sailosi	
		5. Nimiloti Havea	
		6. Lahi kavaliku	
		Total = 6	Total = 1
	OVERALL	= 7	
10	Tonga Mama'o		
		1. Tevita Mala'efo'ou	1. Free Church of Tonga
		2. Fononga Havea	2. Hall, Tongamama'o
		3. Kalafi Palelei	3. Sainai Prison Camp
		4. Maka Filiai	
		5. TaliteLetisi	
		6. Sainai Prison residence	
		7. Sainai Prison residence	
		Total = 7	Total = 3
	OVERALL	= 10	
11	Fata'ulua	1. Viliami Kaihau	
		2. Kilisi Laukau	
		3. 'Akimeta	
		4. Tavite Vaitohi	
		5. 'Api Siasi Tonga Hou'eiki	
		6. Melena Ongoloka	
		7. Samisoni taufa	
		Total =7	
	OVERALL	= 7	
12	Mu'a		
			1. Kava Club
			2. SUTT Church
			Total = 2
	OVERALL	= 2	
13	Kolomaile		
	/Ha'atu'a	1. Mosese ma'u	1. GPS Primary Shool
		2. Suliasi Tukia	
		3. Semisi makalou	
		4. Tupou Ata	
		5. Sione soafa	
		6. Mohulamu Halaholo	
		7. 'Aisake Tukia	
		8. Movete	
		9. Manu Fifita	
		10. Tausei Latu	
		11. Siuaki Katoa	
		12. Sila moala	
		13. Peni Mosese	
		14. Lasitani matealona	
		15. 'Alisi Va'enuku	
		16. Mele Vaioleti	
		17, Manu Ma'u	
		18. Lavinia TaialeLisiate Tupou	

		Total = 18	Total = 1
	OVERALL	= 19	
14	Ta'anga		
		1. Lingi hafoka	1. Ta'anga Village Hall
		2. Ahi Kaumatule	2. Teacher's GPS residence
		3. Lioa Launoa	
		4. 'Ofa Kamoto	
		5. Filianga Kapani	
		6. Ma'afu Latu'ila	
		7. Mataki Tomasi	
		8. Sione Latu'ila	
		9. Tevita Lemani	
		10. 'Api nofo'anga faifekau	
		11. Vailatu	
		Total = 11	Total = 2
	OVERALL	= 13	
15	Houma		
		1. Siosifa Palenapa	1. Vai ko Kahana Kindegarden
		2. Sione Kula	
		3. Taufa Tulikihakau	
		4. 'Alamoni Taiala	
		5. Naisa Vilai	
		6. Faha Muli	
		7. Fono Folau	
		8. Taniela Tupou	
		9. Ata Moala	
		10. 'Eveline Ma'ake	
		11. Tuiano Pau'uvale	
		12. Simione Fiu	
		Total = 12	Total = 1
	OVERALL	= 176	Overall = 32
'EUA	**TOTAL**	**176 + 32 = 208**	

HA'APAI:

No	Village	Household	Institution
1	Pangai Navea		
		1. Tevita Fisi'ilose	1. 'Etuate fakahua Store
		2. 'Api nofo'anga SUTT	2. Hall Falehufanga
		3. Maile Vi	3. Hall Moihu
		4. Tevita Vi	4. Hall Siasi Tokaikolo
		5. Penisimani Paletu'a	5. Hall vahefonua FWC
		6. Siua Latu	6. Siasi Baha'i
		7. Langilangi Vi	7. 'Ofamo'oni School
		8. Tu'a Vi	
		9. Uinifuti Vi	
		10. Palolo Vi	
		11. Siesia Malamala	
		12. Vili paletu'a	
		13. Malakai lolohea	
		14. 'Ilaisa Va'inga	
		15. Vasita 'Ahome'e	
		Total = 15	Total = 7
	Overall	= 22	
2	Hihifo, Mailefihi		
		1.Sani Fisilau	1. Penitekosi Church hall
		2. vaka 'Alakoka	
		Total = 2	Total = 1
	Overall	= 3	
3	'Uiha		
		1. Hangale	1. Nursing Home
		2. Saia Niumeitolu	2. siasi 'o tonga Chapel
		3. Molisi	3. 'Alekisio 'Osai
		4. Hotili Vaitaiki residence	4. FWCT Chapel
		5..'Alekisio 'Osai	5. Catholic Chapel
		6. Simifi Tutu'ila	
		Total = 6	Total = 5
	Overall	= 11	

4	Felemea		
			1. Siasi Tonga Hou'eiki
			2. Siasi tonga hou'eiki chapel
			Total = 2
	Overall	= 2	
5	Faleloa		
		1. 'Ofa Mahe.	1. Viliami Faka'osifolau (Church of Tonga residence)
		2, Langi F. Tavake	2. Tong Hou'eiki Hall
		3. Lui Makaafi	3. Siai Konisitutone
		4. Tae Lafo'ou	4. FWC Church Building
		5. Fatani Langi	
		6. Makaui Makaafi	
		7. Viliami Niulala	
		8. Mafi makaafi	
		9. Sotiaka Akoteu	
		10. Sione Vailahi	
		11. Kalisi Akoteu	
		Total = 11	Total = 4
	Overall	=15	
6	Lotofoa		
		1. Aso 'ahohako Lahi	1. Youth Hall
		2. Oso 'ahohako	2. Siasi Tonga Tau'ataina Hall
		3. Misieli ma'u	3. Siasi Tonga Hou;eiki
		4. Manu falekava	
		5. Paea Pasi	
		6. Fine Fonua	
		Total = 6	Total = 3
	Oveall	= 9	

No	**Village**	**Household**	**Institution**
7	Fangale'ounga		
		1. Mosese Kilisimasi	1. Pentecostal Church
		2. Supiesa Taufa	2. Catholic Church
		3. Paini Tupou	3. Methodist hall Building
			4. Tonga Houeiki Church Building
		Total = 3	Total = 4
	Overall	= 7	
8	Ha'ateiho Si'i		
		1. Potaufa Talakai	1. Church of Tonga Hall
		2. Tu'ipulotu Vea	2. Kalapu Hall
		3. Sikopio Fangufangu	3.Siasi Tonga Hou'eiki – Church hall
		4. Fononga Teutau	
		5. Vilipuhi'I Fangufangu	
		6. 'Ikale Kalikefu	
		Total = 6	Total = 3
	Overall	= 9	
9	Foa Ha'afakahenga,		
		1. Vili Leni	1. Community Hall
		2. Kilisitina Teutau	
		3. Nisi Tanitaka	
		4. Mosese maile	
		5. To'ofohe Tu'ivailala	
		6. Liniteti Maile	
		Total = 6	Total = 1
	Overall	=7	
10	Fotua		
		1. Masiu Kafoa	1. Fotua Kindy School
		2. Latu Latavao	2. Fotua Primary School
		3. Sumutea Launoa	
		4. Sione Fehoko	
		Total = 4	Total = 2
	Overall	=6	
11	Ha'ano		
		1. Kliamasi Takeifanga	1' Tonga Hou'eiki hall
		2.Taani Langi	2. Tonga Tau'ataina hall
		3. Siosaia Taufa	
		4. Taani fifita	
		5. Viliami Tolo Fifita	
		6. Tevita fatai 'Ova	

		Total = 5	Total = 2
	Overall	= 7	
12	Fakakakai		
		1. ‘Ialaiasi Fehoko	
		2. Lote Ta’ai	
		Total = 2	
	Overall	= 2	
13	Pukotala		
		1. ‘Etuini Lou	
		Total = 1	
	Overall	= 1	
14	Muitoa		
		Nil	N il
15	Koulo		
		1. Sisiate Kofe	
		2. Faiva tulimafua	
		Total =2	
	Overall	= 2	
16	Holopeka		
			1. Tonga Hou’eiki residence
			2. Tonga hou’eiki Hall
			3. Tonga tau’ataina
			4. FWC Hall
			5. FWC Chapel
			6. FWC residence
			Total = 6
	Overall	= 6	

No	**Village**	**Household**	**Institution**
17	Hihifo (Kapala)		
		1. Vunga Tupou	1. Kavamo’unga’one
		2. SDA residence	
		3. Pokileti ‘Ofa	
		4. Haloti Fotu	
		Total = 4	Total = 1
	Overall	= 5	
18	Houmatofua		
		1. Matou Tuafine	
		2. Ron Taukolo	
		Total = 2	
	Overall	= 2	
19	Hihifo Niukini		
		1. salesi fohe	1. ‘Uiha / Felemea residence
		2. Tanekinanga Sio	2. siasi Tonga Hou’eiki
		3. Vaha Fe’ao	
		4. saane Lesoni	
		5. Lui sekope	
		Total = 5	Total = 2
	Overall	= 7	
20	Hihifo Sapa’ata		
		1. Tufolau Pepa	1. Siasi Uesiliana Chapel
		2. siupeli Pepa	2. Hall Uesiliana
		3. Sifa Tu’itavake	
		4. Ma’ili sisitoutai	
		5. Molitoni Veatupu	
		Total = 5	Total = 2
	Ovrall	= 7	
21	Hihifo Kolofo’ou		
		1. viliami Pulu	
		2. Halangatutu Kolo	
		3. Sione Nu’uhiva	
		4. Maikolo Talanoa	
		Total = 4	
	Overall	= 4	
		Total = 89	Total = 47
	HA’APAI TOTAL	**89 + 47 = 136**	

Vava'u:

No	Village	Household	Institution
1	Ofu	1.Fakatou Fifita	1. FWC Chapel
		2. Heitonga Topui	2. Siasi Tonga Tau'ataina
		3. Sitiveni Vailea	
		4. Latu Fifita	
		5. Funaki talasinga	
		6. Sione Setuata	
		Total = 6	Total = 2
	Overall	= 8	
2	Kapa	1. Sione 'Asitomani	
		Total = 1	
	Overall	= 1	
3	'Otea	1. Kilisimasi Ma'ukoloa	
		Total = 1	
	Overall	= 1	
4	Falevai	1. Niveti Naupoto	1. FWC Chapel, Falelotu Tonga
		2. 'Amalani Sulunga	2. Falelotu Tonga Tau'ataina
		Total = 2	Total = 2
	Overall	= 4	
5	Nuapapu	1. Taisia Kata	1. FWC Residence
			2. Tonga Hou'eiki
		Total = 1	Total = 2
	Overall	= 3	
6	Hunga	1. Paea Mahe	1. FWC
		2. Vaha Maamaloa	
		Total = 2	Total = 1
	Overall	= 3	
7	Ovaka	1. Maleini Taufa	1. FWC Church
		2. Tanginoa Tu'iono	2. GPS Ovaka teacher residence
		3. Tali Mahe	
		4. Puamau Lolohea	
		Total = 4	Total = 2
	Overall	= 6	
8	Toula	1. Funaki Tangitau	1. FWC Chapel
		2. Seleti Hopoate	2. Tokaikolo residence.
		3. Sioeli Ngu	3. Siasi Tonga Tau'ataina residence
		4. Tafi 'Aholotu	
		5. Tonga Vaha'i	
		6. Kilipati Lander	
		7. Vaka Kaita'eifo	
		Total = 7	Total = 3
	Overall	= 10	
9	'Utulei	1. Siaosi Hausia	1. Village Hall
		2. Viliami Latu	2. Cathlic Church
			3. FWC Hall 'Utulei
			4. FWC Residence
			5. GPS 'Utulei
		Total = 2	Total = 5
	Overall	= 7	

No	Village	Household	Institution
10	'Utungake	1. Sekona Latavao	
		Total = 1	
	Overall	= 1	
11	Pangaimotu	1. Hamoni Foliaki	1. catholic Chapel
		2. Tinitale Piukala	2. FWC Chapel
		3. 'Ulauaki Levely	3. FWC Residence
		4. Mele Vasi Tu'I'onetoa	
		5. Manase Vaha'i	
		6. Filatelifia afu	
		7. Fili Tu'I'onetoa	
		8. Sione Taufa Loketi	
		Total = 8	Total = 3
	Overall	= 11	
12	Talihau	1. Pauni Fangupo	1. FWC Church Chapel
		2. 'Eliki Malumalu	
		3. Paula tatafu	

		Total = 3	Total = 1
	Overall	= 4	
13	Makave	1. Leimoni Taulepa	
		2. Mofini Filimoe'atu	
		3.Semisi Vainikolo Penisinita	
		4. Laulaupea'alu	
		5. Siale Mikaele	
		6. Malina Angitone	
		7. Masina Tu'itupou	
		8. Fe'iloaki Kauvaka	
		9. Manupuna Ika	
		10. Matisoni Halafihi	
		11. Tiki Sa'ia	
		12. Nanise Finau	
		13. sateki Lea	
		14. Loisi salesi	
		15. Taiapa'a Tu'itavuki	
		Total = 15	
	Overall	= 15	

No	Village	Household	Institution
14	'Utui	1. mateaki Veleika	1. To'anag'ofa kalapu Home
		2. Sione Moimoi	2. 'Utui Village Hall
		3. Mele vakalahi	
		4. Viliami Fotu	
		5. Manuika Moala	
		6. 'Ofa Vunga	
		7. Lotolua Fisi'ihoi	
		8. Fetu'u vakalahi	
		9. Sione Lonitenisi	
		10. Latu veleika	
		Total = 10	Total = 2
	Overall	= 12	
15	Tu'anekivale	1. Heneli Teumohenga	
		2. Lupou Manu	
		3. Lui Palefau	
		4. paea Si,ilai	
		5. sioape Taufa	
		Total = 5	
	Overall	= 5	
16	Ha'alaufuli	1. Filosi Nuku	1. Community Kindy school
		2. 'At Vailea	2. Free Church of Tonga hall
		3. Kinikini lolohea	3. FWC Hall
		4. salesi hafoka	
		5. sefita Fa	
		6. Sione P, Ma'ake	
		7. mele Palemani	
		8. Pahulu Tomu	
		9. Keisi vaipapalangi	
		10. Sione Moimoi	
		11. Sivihiva Vaka	
		12. Taufa Sipa	
		13. Lepa Mafi	
		14. Vivili Topui	
		15. Siloni 'ala	
		16. Hia Fetu'u	
		17. Taniela 'Otuafi	
		18 Vaiamfa Vaifai	
		19. Lisiate saluni	
		Total = 19	Total = 3
	Overall	= 22	

No	Village	Household	Institution
17	Holeva	1. Mahe Similai	
		2. Sione Vaiokina	
		3. Kava Moala	
		4. ‘OFa Toki	
		Total = 4	
	Overall	= 4	
18	Houma	1. Sione Tupe	
		2. ‘Ulaiisai Mo’unga	
		3. Siosi Fine	
		4. ‘Isileli lolohea	
		5. Viliami ‘Afa	
		6. Solomone Pasoni	
		7. Tevita Halaifonua	
		Total = 7	
	Overall	= 7	
19	Mangia	1. Sefo Palu	1. FWC
		2. mataiasi veleika	
		3. Mele ‘Otuhouma	
		4. Kaisa vakalahi	
		Total = 4	Total = 1
	Overall	= 5	
20	Feletoa		
		1. Saane Mailangi	1. FWCT Chapel
		2. Kakani Vaha	
		3. Pale latu	
		4. ‘Ilaise Latu	
		5. Fiunoa Latu	
		6. ‘Aloisio Mailangi	
		7. ‘Anitelu Latu	
		8. kalesita Fangupo	
		9. Maikolo Tupou	
		10. Sinisa Hu’akau	
		11. Teu Uasila’a	
		12. Taiseni Naipuka	
		13. Salesi Sauaki	
		14. Sione ‘Utuvai	
		15. ‘Alomalie Vulangi	
		16. Sisilia Leao	
		17. Katinia vale	
		Total = 17	Total = 1
	Overall	= 18	
21	Holonga		
		1. Sione Ahi Kiteau	1. GPS Holonga
		2. Melino leleifi	
		3. Kiveni Moala	
		4. Sioasaia Manusete	
		5. Mafoa Lilo	
		6. Sikoti Manumu’a	
		7. Viliami ‘Atoa	
		8. Mausa Lilo	
		Total = 8	Total = 1
	Overall	= 9	
22	Ta’anea	1. Sione kalonihea	
		2. Paea ‘Anitoni	
		3. sefo Lometeau	
		4. Tino Tatau	
		5. Sione Fifita ‘Anitoni	
		6. Pioasi metui	
		7, Tono ‘Ala faleafa	
		8. ‘Apona Vatikani FaleAfa	
		9. Kolu valahulu	
		10. Tevita Piutau	
		11. ‘uluaki kalonihea	
		12. Simione Vaka Faleafa	
		13. Leimoni	

		Mafimalanga	
		14. Peki Taufalele	
		15. Peni ‘Anitoni	
		16. Peni sasa	
		17. Peta Ta’ufo’ou	
		18. ‘Apolo Kupu Faleafa	
		19. Tiki kalekale Faleafa	
		20. Filimone ‘Anitoni	
		21. Petuliki ‘Ana	
		Total = 21	
	Overall	= 21	

No	Village	Household	Institution
23	Ha’akio	1. Tu’iono Kinikini	
		2. Hala Kinikini	
		3. ‘Afitu Tupou	
		4. ‘Unaloto naipoto	
		5. ‘Api Lolo	
		Total = 5	
	Overall	= 5	
24	Neiafu		
		1.Siale Latu	1. Siasi ‘o Tonga
		2. Saia havea	
		3. Toni havea	
		4. Seionala Filimoehala	
		5. Masi Tu’ifua	
		6. ‘Alipate Tau	
		7. Hehea havili	
		8. Malini Moa	
		9. Lupeni Tupou	
		10. Moala Fupau	
		11. Lotoiti Moala	
		12. ‘Ilaiuti Fanua	
		13. Masuni Tupou	
		14. Kepu Kupu	
		15. Lei faleola	
		16, Haniteli Pala	
		17. Soakai Havea	
		18. Malakai Tau	
		19. Tae politoni	
		20. Koloa Fine	
		21. ‘Alifeleti Tike	
		22. Lutui fanau	
		23.Lopeti Tupou	
		24. Pele vaha’i	
		25. Niu’ui Faletau	
		26. Nikio Finau	
		27. Simione vaha’i	
		28. Loupua Tapa’atoutai	
		29. Hehea Havili	
		30. ‘Esitoni Havea	
		31. ‘Amanaki kapukava	
		32. salesi Ika	
		33. ‘Olioni Latu	
		34. tevita Paea	
		35. tafokitau Peaua	
		36. Tevita paea	
		37. FCT residence	
		38.Loise Tu’iniua	
		Total = 38	Total = 1
	Overall	= 39	
25	Fungamisi		
		1.Savelio Siasau	
		2.Salele ‘Ulupano	
		3. Tamiano Siasau	
		4. Nikolo Siasau	
		5. Viliami Moa	
		6. Talatala Vaitaki	
		7. Lesieli lavakei’aho	
		8. Valupei ‘Ulupano	
		9. Koloa Paea	

		10. siaosi Tangitau	
		11. Maletino Tonga	
		12. kelepi mailangi	
		13. siaosi Mailangi	
		14. Sosafate Peauafi	
		15.Mele Pone	
		16. ‘Aho Lelei Lvakei’aho	
		Total = 16	
	Overall	= 16	
26	Falaleu		
		1. Fifita Kivalu	
		2. Henele tevita	
		3. ‘Atonio takau	
		4. Holo Po’oi	
		5. talanoa Masuni	
		6. Po’oi	
		7. ‘ulu Pou	
		8. Tupou Havea	
		9. Masima Moala	
		10. sitiveni Hausia	
		11. siaosi Tukuafu	
		12. Vesisio faiva	
		13, ‘Alipate Mailangi	
		14. ‘Ulupou Va’asini	
		15, lotimana Hefa	
		Total = 15	
	Overall	= 15	
		Total = 3	
27	Okoa	1. Motulalo Kolo’ofa’i	1. Siasi Tonga Hou’eiki
		2. Mele Tu’itupou	2. Nile Hall
		3. Melehifo ‘Ofa	3. FWC
		4. Hingano Nusipepa	
		Total = 4	Total = 3
	Overall	= 7	
28	Ha’alefo – Prison		
		1. Tokolahi Kasinga	
		2. Fononga Va’inga	
		3. Sikalu Spencer	
		Total = 3	
	Overall	= 3	
39	Mataika		
		1. ‘Aho Fe’loaki	1. FCT Chapel
		2. Sailosi latu	2. FWCT Chapel
		3. Tuiaki Fe’iloaki	3. Tonga Hou’eiki Chapel
		4. ‘Unaloto Tangai	
		5. Punou latu	
		6. Lepolo ‘Amato	
		7. Sioape Lisala	
		8. Heneli Havea	
		9. Siua Manakofua	
		10. Netane Feke’api	
		11. Mosese Lavemai	
		12. Taufa Salesi	
		13. tafini Tongia	
		14. Fangatua ‘Alofaki	
		15. Manu Matanga Langi	
		16. Siua manakofua	
		17.‘Aho fe’iloaki	
		Total = 17	Total = 3
	Overall	= 20	
30	Leimatu’a		
		1. Pua Tonga	1. Siasi Kosipeli
		2. Falakiseni Finau	2. Amasaia Afu Group
		3. Simi Kuila	3.FCT Hall
		4. Ongo Kauni	4. Catholic Church Hall
		5. Sifa Vaka	5. Siasi Penitekosi
		6.Sione Kava Mo’unga’one	6. GPS Leimatu’a
		7. Manu Lisala	
		8. Fetokai Hausia	
		9. Metui Fotu	
		10. Fiuongo Lau’i	

		11. Moala Teisina	
		12. Taliai Tonga	
		13. Pesa Lau'i	
		14. Vili Veikoso	
		15. Peni Finau	
		16. Lea Lile	
		17. Vai Lau'i	
		18. Faka'osi Fili	
		19. Tupou Fili	
		20. Fifita Fili	
		21. Taani Lavaka	
		22.Sitaleki Fifita	
		23. Tukia To'a	
		24. 'Ofeina Hala	
		25. Ika fangalahi	
		26. Saia 'Onevai	
		27. Paea Finau	
		28. Lupe Hehea	
		29. 'Esitio 'Asi	
		30. Mamalea 'Ali	
		31. Sione Afu	
		32. 'Inoke Afu	
		33. 'Ulukai Talakai	
		34. Simi Kuonga	
		35. Sione Sipoti	
		36. Semisi Katoa	
		37. Tongia Laiseni	
		38. Nehumi To'a	
		39. Paongo Mafi	
		39. La'ulu Afu	
		40. Tevta Lau'i	
		41. Sione Palu Lau'i	
		42. Simi Katoa	
		43. Siale mouhea Kaveinga	
		44. 'Epoki Tonga	
		45. Maa'imoa Petelo	
		46. Falame Vaiaku	
		47. Sione Fonokalafi	
		48. Setefano Makoni	
		49. Sela Tone	
		50. 'Isi Langa'oi	
		51. Ongolea Kavamo'unga'one	
		52. 'Unaloto Tu'alau	
		53. 'Akanesi Katoa	
		54. Semisi Hafoka	
		55. Naeata Moala	
		56. Havili Hufo'ou	
		57. Nio 'Isalei	
		58. Mosese Finau	
		59. 'Inoke Liutolo	
		60. talanoa Fe'iloaki	
		61. 'Ofa Makoni	
		62. Vilimoa vaiaku	
		63. Falaniseni Vaiaku	
		64. Katieli Lau'i	
		65. Pukotala Vea	
		66. Latu Lisala	
		67. Pilimi Fili	
		68. Senituli Napa'a	
		70. Semisi Fonua	
		71. Malakai Tuhe	
		72. Lupe Situlu	
		73. Tapukalua Fonua	
		74. Poasi Talakai	
		75. Mosese Vaiaku	
		76. Sisi Lisala	
		77. Viliami Lavulavu	
		78. Lusa Masila	
		79. "Amelia tau'ataina	
		80. Kata Ma'u	
		81. 'Aliki Langa'oi	

		82. Ngalu Tameifuna	
		83. Saitoni Vaiaku	
		84. Siunipa talakai	
		85. 'Etimani Navai	
		86. Loni Kapeli	
		87. Siole To'a	
		88. 'Alamoni Tu'ipulotu	
		89. Loketi To'a	
		90. Falemaka Taufa	
		91. Tevita Kamilo	
		92. Meili Kokohu	
		93. 'Etimoni Vete	
		94. Sione To'a	
		95. Sunia Fonua	
		Total = 95	Total = 6
	Overall	= 101	
31	Taoa		
		1. Siaosi Latu	1. FWCT Hall
		2. Manoa Latu	2. FWCT Chapel
		3. Vina 'Asikia	
		4. Sekope Latu	
		5. Mapa Fisi'ihoi	
		6. Lava Sinipata	
		7. Sione Koli	
		8. Po'uli Funaki	
		Total = 8	Total = 2
	Overall	= 10	
32	Longomapu		
		1. Sateki Lokotui	1. Tonga Hou'eiki Chapel
		2. Samiuela Fuapau	2. Sateki Veikune Hall
		3. 'Iloa vea	3. FWCT Hall
		4.Tafuna Latu	4. GPS Longomapu
		5. Valeli Vea	
		6. Simote Malani	
		7. Simione Ata	
		8. Lopiseni Telua	
		9. Sione Loseli	
		10. Saia Lavulavu	
		11. Koli Hafoka Taufa	
		12. Kaufusi Poutele	
		13. Sefita Tokolahi	
		14.Vailanu Kiteau	
		15. Paea Tongatu'a	
		16. Sivinia Miko	
		17. Meleane Fononga	
		18. Pamela Kiteau	
		19. Lavinia Puafisi	
		20. Paea Tupou	
		21.Kaveinga Tu'ata'ane	
		Total = 21	Total = 4
	Overall	= 25	
33	Tu'anuku		
		1. matila Finau	1. GPS Tu'anuku
		2. Soane Siua	2. Tonga Hou'eiki Chapel
		3. Rev Moetau	3. Village Hall
		4. Lakai Fie'ilo	4. FWCT Chapel
		5. Siua Talau	5. Tavake Fai'ana Hall
		6. 'Apolosi Vaea	
		Total = 6	Total = 5
	Overall	= 11	
34	Tefisi		
		1. Fono Lavemaau	1. Tutoatasi Hall
		2.Lavinia Puafisi	2. Village hall

		3. Paea Tupou	3. Free Church of Tonga
		4. Lopeti Tulikihakau	4. FWCT Hall
		5. Taani Pohahau	5. Siasi ‘o Tonga
		6. Senoni kaafi	6. GPS Tefisi
		7. Sione Moaeteau	7. Siasi Konisitutone
		8. Temisi Lavaka	
		9. Nepeoti Fonua	
		12. Malakai Fusitu’a	
		13. Sione Manutalulu	
		14.Fangatapu Leha’uli	
		15. Ngalu Vanisi	
		16. Tu’itufu Fainu	
		17. Fono Fainu	
		18. Lingikoni Saafi	
		19. Lopini Kautai	
		20. ‘Api Tupou	
		21. Toa Fusimahina	
		22. Lei Tupa	
		23. Ika Tupa	
		24. Piuela Tuia	
		25. ‘Anitelu Tupou	
		26. Taufa Nau	
		Total =26	Total = 7
	Overall	= 33	
35	Vaimalo		
		1. Vaioleti Malu’ifonua	1. FWCT Hall
		2. ‘Ofa Tupuivaha	2. Siasi Tonga tau’ataina
		3. Maki’I Nimo	
		4. Mateaki Kapukava	
		5. Lotani ‘Ale	
		6. Hene Ma’u	
		7. Sinamoni Maama	
		Total = 7	Total = 2
	Overall	= 9	
36	Taunga		
		1. Lea Piukala	1. Village hall
		2. ‘Amelia Faleta	
		3. Valeti Fifita	
		4. Tu’iono Afei	
		5. manu Fosita	
		Total = 5	Total = 1
	Overall	= 6	
37	Matamaka		1. FWC Church
			Total = 1
	Overall	= 1	
38	Lape		1. GPS lape (Residence)
			2. GPS Lape
			Total = 2
	Overall	= 2	
39	Koloa		1. Koloa Community Hall
			2. Koloa Methodist building
			3. Siasi Tonga Tau’ataina
			Total = 3
	Overall	= 3	
		TOTAL = 414	TOTAL = 69
	VAVA’U TOTAL	**414 + 69 = 483**	

NIUA TOPUTAPU:

No	Village	Household	Institution
1	Hihifo		
		1. Maka Holi	1. Tonga Hou'eiki hall
		2. Sioeli Lefai	2. Tonga Hou'eiki Chapel
		3. Fotu Pelesikoti	3. FCT Chapel
			4. Tokaikolo Church
			5. FWCT Chapel
			6. Seventh Day Adventist
		Total = 3	Total = 6
2	Vaipoa		
		1. Mateaki Patolo	1. FWCT hall
		2. Mahe Manu	
		3. Father Lolesio Residence	
		Total = 3	Total = 1
3	Falehau		
		1. Kolo Po'uli	
		2. Mikaele Langi	
		3. Latu Pongipongi	
		4. Manu Toki	
		5. Sunia Tevesi	
		Total = 5	
	TOTAL	= 11	TOTAL = 7
4	Tafahi	nil	nil
	OVERALL	11 + 7 = 18	
	NIUA TOPUTAPU TOTAL	**= 18**	

LIST OF TOTAL NUMBER OF H/H WITHOUT TANKS OF ALL OUTER ISLANDS REGIONS

'No	ISLANDS REGION	HOUSEHOLD	INSTITUTION	TOTAL DAMAGED TANKS
1	'EUA	176	32	208
2	HA'APAI	89	47	136
3	VAVA'U	414	69	483
4	NIUA TOPUTAPU	11	7	18
5	TAFAHI	NIL		
6	NIUA FO'OU	N/A		
	TOTAL	**690**	**155**	
	OVERALL	690 + 155 **= 845**		**845**

APPENDIX D

Appendix – D List of households with good roofing in all outer islands regions but having major damaged water storage - cannot be repaired

'No	Village	Household	Institution
	'EUA:		
1	Tonga mama'o		
		Nil	Nil
2	Kolomaile		
		Nil	Nil
3	'Ohonua		
		1. Lavinia Vaka'uta	1. 'Ohonua Village Hall
		2. Koli fe'ao	Sub-Total = 1
		Sub-Total = 2	2. Baha'I Faith
		3.Sakalaia Veituna	3. Siasi tonga tau'ataina
		4.Pateta Ulakai	4. MOW
		5. 'Oto'ota Fonua	5. GPS "ohonua
		6. Semisi Napa'a	Sub-Total= 4
		7. Posesi Vailea	
		8. Seini Kite	
		9. Sima Tupe	
		10. Talai Fili	
		11. Semisi Fili	
		12. 'Asaeli Napa'a	
		13. Lilika Vaka'uta	
		14. Siua Launoa	
		15. Luatangi Fotu	
		16. Taulanga Takau	
		Sub-Total = 14	
		17. Semisi halaholo	
		Sub-Total = 1	
		Total = 17	Total = 5
	OVERALL	= 22	
4	Mata'aho		
		1. Siu fanagtua	1. Kava Kalapu 'Otuha'apai #1
		2. Veili Luau	
		2. sau Puli	
		3. Tu'a sau	
		4. Sione Hafoka	
		5. He laukau	
		6. Tuifio finau	
		7. Satelaite Mafoaeata	
		8. Sitati Tonutonu	
		9. Palu Latu	
		10. Filimone 'Epui	
		11. Peni Taufa	
		Total = 11	Total = 1
	OVERALL	= 12	
5	Angaha		
		1. 'Api nofo'anga Faifekau	1. Vailahi Hall
		2. Hulu Peni	2. Village Hall
		3. Paula Falemaka	
		4. Simione Huitau	
		5. Va'inga Tonga	
		6. Sione Palu	
		7. Paula 'Otu	
		8. 'Ema Latu	

		9. Silivia Pani	
		Total = 9	Total = 2
	OVERALL	= 11	
6	Petani		
		1. Lose Molia	1. Petani Village hall
		2.Soane Siale	2. Siasi Tonga Hou'eiki hall
		. Mesui Faka'iloatuli	3.Falelotu Siasi Uesiliana
		3. 'Api faifekau FWCT	
		4. sione Ikahihifo	
		5. Paea finau	
		6. Manoa Tupou	
		7. Sione Kautai	
		8. Ula Tolo	
		9. Paea Siakumi	
		Total = 9	Total = 3
	OVERALL	= 12	
7	Fata'ulua		
		Nil	
8	Houma		
		Nil	
9	Tufuvai		
		1. Si'ikaeha Tameifuna	1. Village hall
		2. Maka Feleti	2. GPS Tufuvai
		3. Sione Toupili	
		4. Melino letisi	
		Total = 4	Total = 2
	OVERALL	= 6	
10	Mu'a		
		1. 'Otufanga Fa'u	
		2. Fenuki Moala	
		3. Kolo Kepu	
		4. Ma'ulu'ave	
		5. Simipeli Tua'i	
		Total = 5	
	OVERALL	= 5	
11	Pangai		
		1. Suli Vea	
		Total = 1	
	OVERALL	= 1	
12	Tongamama'o		1. Siasi Tonga Houeiki
			Total = 1
	OVERALL	= 1	
13	Ta'anga		
		Nil	
		Total = 56	Total = 14
'EUA	**TOTAL**	**56 + 14 = 70**	
	HA'APAI:		
1	Ha'ano		
		1. Katea taufa	1. Tapu Mana'ia Hall
		2. Lautala Taufa	
		3. Tonga Afu	
		4. Pauala Tu'itavuki	
		5. sitani Lei	
		6. Fine havea	
		7. Uate Sisi	
		8. Sifa Lepolo	
		9. 'isileli Fuapau	
		10. K.Manu Takeifanga	
		Total = 10	Total = 1
	OVERALL	= 11	
2	Fakakai		
		1. Solomone Ta'ufo'ou	1. Clinic
		2. Mahe 'Otukolo	
		3. Ma'ukihe Hafoka	
		4. Semisi Fehoko	

		5. Sitiveni Manu	
		6. Lisita Niu	
		Total = 7	Total = 1
	OVERALL	= 8	
3	Muitoa		
		1. Loseli Tu'i	
		Total = 1	
	OVERALL	= 1	
4	'Uiha		
		1. Tautala Tu'ikolongahau	1. FWCT Hall
		2. Viliami Tu'ikolongahau	2. Kalapu Mailo
		3. Seini Helani	3. FCT Hall
		4. Kali Pekipaki	
		5. Tevita Helani	
		6. Tu'alau Lautaimi	
		7. siaosi Pohahau	
		8. Tevita Punai	
		9. Sepa Potaufa	
		10. 'Anitelu Halatoa	
		11. Kisi Potaufa	
		12. poaki Folua 'Ahokava	
		13. Puli Kofutu'a	
		14. Tahilau Tu'itupou	
		15. Sulu Potaufa	
		16. Matatau mumui	
		17. Melino Kinikini	
		18. 'Elisi Veatupu	
		19. Latuniu Tupuevaha	
		20. 'Apiesa Hingano	
		21. Kelepi Potaufa	
		22. Hopoate tavalea	
		23. Moala 'ofa	
		24. Fine Molisi	
		25. 'Atamani Lolohea	
		26. Kauvaka Angakehe	
		27. Suvenia 'Alofa	
		28. Paula Siniva	
		29. Seiano Niumeitolu	
		30. Fotuika Vailea	
		31. Kelepi Tau'aika	
		32. Folau Hemaloto	
		33. Hon Malapo	
		34. Siosi Kaafi	
		35. Fisi'ihoi Halatokoua	
		36. Malakai 'Anau	
		37. Tu'ifua Vaikona	
		Total = 37	Total =3
	Overall	= 40	
5	Felemea		
		1. Taani Tonga	
		2. Pango 'Ofanoa	
		3. Sini Holani	
		4. Sione Tupou	
		5. 'Eliesa Lauaki	
		Total = 5	
	OVERALL	= 5	
6	Fotuha'a		
		1. Sifa Fualalo	1. Wesleyan Chapel
		Total = 1	Total = 1
	OVERALL	= 2	
7	Mango		
		1. Peni Topui	
		2. Paenga Pahulu	
		3. 'Ilaisa Ngiringini	1. GPS Mango
		4. Kaleti faka'osi	2. SUTT Chapel
		5. Piokalafi faka'osi	
		Total = 5	Total =2
	Overall	= 7	
8	Fonoi		
		1. Ma'ake Malupo	1. SUTT Hall
		2. Siatani Moimoi	2. SUTT residence

		3. ‘Aliki Moavaka	3. SUTT Chapel
		4. ‘Esitolo Faha’ivalu	4. GPS Fonoi
		5. Palei nafe	
		6. catholic residence	
		Total = 6	Total = 4
	OVERALL	= 10	
9	‘O’ua	1. Polonga tau’alupe	
		2. ‘Asipeli Niupalau	
		3. ‘Ikinesi Fietonu	
		Total = 3	
	OVERALL	= 3	
10	Matuku		
		1. Sione Taufa	1. Hall Siasi Tonga hu’eiki
		2. Kiloka Pepa	2. SUTT hall
			3. SUTT Chapel
			4. siasi Tonga hou’eiki residence
			5. GPS Matuku
		Total = 2	Total = 5
	OVERALL	= 7	
11	Lofanga		
		1. Sekope Paongo	1. SUTT residence
		2. Va’inga Tokotaha	2. GPS Lofanga
		3. Melevea Paongo	3. GPS Head Teacher Residence
		4. Uasi Tu’ivai	
		5. Tevita Siu’ulua	
		Total = 5	Total = 3
	Overall	= 8	
12	Nomuka		
		1. Pamela Tokai	
		2. Vainikolo Pahulu	1. ‘Otumu’omu’a hall
		3. Tevita Fotuika	2. Siasi tonga Tau’ataina Hall
		4. malakai Fukofuka	3. Siasi Tonga hou’eiki hall
		5. Sione Hia	4. SUTT Hall
		6. Lotu Nehoa	5. AOG Hall
		7. Samuela Moala	
		Total = 7	Total = 5
	OVERALL	= 12	
13	Ha’afeva		
		1. ‘Isileli Palu	1. Tonga hou’eiki Chapel
		2. Kamilo Tonga	2. Tonga Tau’ataina Residence
		3. Tevita Vea	3. Tonga Hou’eiki residence
		4. peti talakai	4. SUTT hall
		5. Simote vea	5, Catholic Chapel
		6. ‘Aleki lavaka	6. SUTT Chapel
		7. semisi taufu’i	7. Nursing Home
		8. ‘Ema Pahulu	8. Siasi Tonga Hou’eiki chapel
		9. Peni veikoso	9. Siasi Tonga houeeiki residence
		10. mauniteni taulani	10. GPS
		11. Lisiate Havealeta	
		12. Viliami fifita	
		13. Tu’uhetoka	
		14. Mavae Latavao	
		Total = 14	Total = 10
	OVERALL	= 24	
14	Kotu		
		1. Lousa ‘Ilangana	1. SUTT Chapel
		2. sekona Ta’ufo’ou	2. Tonga hou’eiki chapel
		3. Sione ta’ufo’ou	3. Nasaline vaimahanga Hall
		4. Heamasi katoa	4. Hall Konisitutone
		5. Toemoeata folau	5. GPS Kotu
		6. Fa He	
		Total = 6	Total = 5
	OVERALL	= 11	
15	Pangai Navea		
		1. Viliami Latu	1. Siasi tonga Hou’eiki
		2. Tupou	
		3. Sanilaite Tautuiaki	
		4. Ha’unga tau	

		Total = 4	Total = 1
	OVERALL	= 5	
16	Tongaleleka		
			1. Holo Lofanga
	OVERALL	= 1	Total = 1
17	Pangai		
		1. Palu Ngauamo	
		Total =1	
	Overall	= 1	
18	Pangai fanganonu		
		1. 'Inoke tongotea	1. Hall Siasi Uesiliana
		2. Seti Filo	2. Hall 'Apiako Tailulu
		3. Maka Loni	3. Hall Siasi tonga Hou'eiki
		4. Sione Le'ota	4. Falelotu siasi tonga hou'eiki
		5. Puluno falevai	5. Hall 'Avila
		6. 'Api nofo'anga siasi Tonga tau'ataina	6. Assmbly of God
			7. Hall Kau vaivai
			8. Ha'apai Youth red cross
			9. Kalapu Fofo'anga
			10. 'Api Nofo'anga Kau Taupo'ou
		Total = 6	Total = 10
	Overall	=16	
19	Hihifo – kapala		
		1. Sione Pulini	
		2. fifita Niua	
		3. Siol'a Liuaki	
		4. Hatasu Veatupu	
		Total = 4	
	Overall	= 4	
20	Hihifo Sapa'ata		
		1. 'Alakeita Tu'ivailala	
		2. Saane Tu'uta	
		3. saia Pua	
		4. Monitiveti Liuaki	
		Total = 4	
	Overall	= 4	
21	Hihifo Mailefihi		
		1. salesi Mafi	
		2. Sefili Finau	
		3. manu 'Utumoengalu	
		Total = 3	
	Overall	= 3	
22	Hihifo Kolofo'ou		
		Nil.	
23	Faleloa	1. Sione Vailahi	
		2.Viliami Faka'osifolau Church of Tonga	
		3. Kalisi Akoteu	
		Total = 3	
	Overall	= 3	
24	Ha'ato'u		
		1. 'Akata Falemaka	
		Total = 1	
	Overall	= 1	
25	Koulo		
		1. viliami Molitika	
		2. Livai Kaivei	
		3. 'Elenoa Filimone	
		Total = 3	
	Overall	= 3	
26	Holopeka		
		1. Likiliki Kiole	
		2. Tevita Tapu	
		3. Sione Vi	
		Total = 3	
	Overall	= 3	
27	Lotofoa		
		1. Tu'ilavani	1. siasi tonga hou'eiki

		2. Tevita Lavaka	2. Siasi tonga Tau'ataina
		3. 'Alo 'Ahohako	
		4. Misieli Moa	
		5. Ma'u fakava	
		6. Pau Pasi	
		7. Pohiva Pasi	
		8. Viliami Tuluta	
		Total = 8	Total = 2
	Overall	= 10	
28	Faleloa		1. GPS faleloa
			2. FWC
			3. Faleloa Communiy Hall
			4. Simavai Fakakolo
			Total = 4
	Overall	**= 4**	
29	Mo'unga'one		
		1. Lolohea Vaka	1. Tonga hou'eiki Hall
			2. Tonga hou'eiki Chapel
			3. Tonga hopueiki residence
			4. SUTT residence
			5. Siasi Tonga tau'ataina
			6. siasi Katolika
			7. GPS Mo'ung'one
		Total = 1	Total = 7
	Overall	= 8	
30	'O'ua		
			1. GPS 'O'ua
			2. SUTT cHapel
			3. SUTT Hall
			4. Tonga Tau'ataina Hall
			5. Tonga Hou'eiki Hall
			6. Tonga houeiki residence
			Total = 6
	Overall	**= 6**	
31	Fotuha'a		
		1. Fe'ao To'a	1. GPS
		Total = 1	Total = 1
	Overall	= 2	
		Total = 151	Total = 66
	OVERALL	**151 + 66 = 217**	
HA'APAI	**TOTAL**	**= 217**	
	VAVA'U:		
1	Neiafu		
		1. Sione Kilisimasi	1. FCT Hall
		2. Tupou Visa	
		3. Vaea 'Otukolo	
		4. Taniela ika	
		Total = 4	Total = 1
	Overall	= 4	
2	Falaleu		
		1. NIL	1. Nil
3	Ha'alaufuli	1. Penisipa	1. 'Apiako Lautohi
		Total = 1	Total = 1
	Overall	= 1	
4	Kapa		
		1. FWC residence	
		Total = 1	
	Overall	= 1	
5	Matamaka		1. Village hall
			Total = 1
	Overall	= 1	
6	'Utungake		1. Sima fakakolo
			Total = 1
	Overall	= 1	
7	Mangia		1. Community Hall
			Total = 1

	Overall	= 1	
8	Longomapu		
		1. Hainite Ata	1. FWC
		2. Tisani Molimoli	
		3. Angahiki Loseli	
		4. ‘Osipeni Pasikala	
		5. Sosina Tongatu’a	
		6. Lesieli Telua	
		7. Kaliti Kata	
		Total = 7	Total = 1
	Overall	= 8	
9	Tu’anuku	1. ‘Amanki Funaki	
		2. Fane Maileti Tonga	
		3. Suli Ma	
		4. Mahe To’a	
		5. samuela Tau’aika	
		Total = 5	
	Overall	= 5	
10	Holonga		
		1. Mafi Fonohea	1. FCT Chapel
		2. Feilala Piu	2. Village hall
			3. FWCT Chapel/ Hall
		Total = 2	Total = 3
	Overall	= 5	
11	Mataika		
		1. Rev Sione havea residence	
		2. Paula Lavemai	
		3. ‘Epenisa Fatai	
		Total = 3	Total = nil
	Overall	= 3	
12	Feletoa		
		1. ‘Anaise Hasiata	1. GPS Feletoa
		Total = 1	Total = 1
	Overall	= 2	
13	Ofu		
		1. Funaki talasinga	
		Total = 1	
	Overall	= 1	
14	Leimatu’a		
		1. Paane Tonga	1. Polisi /Pilisone
		2. Sisi Afu	2. Village hall
		3. Hiva Fakauho	
		4. ‘Anitelu Vaiaku	
		5. Palauni Fotu	
		6. Tangi Finau	
		7. Tokotoko Maumu’a	
		8. Fe’iloaki Kavamo’unga’one	
		9. Vilivesi ‘Onevai	
		10. ‘Ofa Tuhuoti	
		11. Fisi’itoka Faka’i	
		12. Sione Langa’oi	
		Total = 12	Total = 2
	Overall	= 14	
15	Taoa		
		Nil	Nil
16	Tefisi		
		1. ‘Asena Fusitu’a	
		2. Siua Fifita	
		3. Peni Peliti	
		4. Lose Kivalu	
		5. ‘Ainise Lavemaau	
		6. Laulile Tangulu	
		7. Sione Mahina	
		8. Keivini Lavemaau	
		9. Filimoto Tupa	
		10. Sione Fifita	
		11. Latu Vi	
		12. ‘Ana Taufalele	
		13, Tongolei sa	

		14. Namaliu	
		15. Tevita kelepi	
		16. Kolope Leha'uli	
		17. Hopoate Latu	
		Total = 17	
		Total = 54	Total = 12
VAVA'U	**TOTAL**	**54 + 12 = 66**	
	NIUA TOPUTAPU:		
1	Hihifo		
		1. Leo 'Onesi	1. Fwct Hall
		2. 'Ofa Halapua	
		3. Paula Fe'ao	
		4. Viliami vea	
		Total = 4	Total = 1
	Overall	= 5	
2	Vaipoa		
		1. Samuela Makatohi	1. FWCt hall
		2. Koli Fukofuka	2. Catholic hall
		3. Lea'aepeni Finau	
		4. Tipeti Finau	
		5. Soane tangi mausia	
		6. Fatai Finau	
		7. Latu Moimoi	
		Total = 7	Total = 2
		Total = 11	Total = 3
	NIUA TT TOTAL	**11 + 3 = 14**	
	OVERALL	**= 14**	

LIST OF TOTAL NUMBER OF HOUSEHOLDS OF ALL OUTER ISLANDS REGIONS WITH TANKS BUT HAVING MAJOR DAMAGED – CANNNOT BE REPAIRED

'No	ISLANDS REGION	HOUSEHOLD	INSTITUTION	TOTAL DAMAGED TANKS
1	'EUA	56	14	70
2	HA'APAI	151	66	217
3	VAVA'U	54	12	66
4	NIUA TOPUTAPU	11	3	14
5	TAFAHI	NIL		
6	NIUA FO'OU	N/A		
	TOTAL	**272**	**95**	
	OVERALL	272 + 95 **= 367**		**367**

APPENDIX E

Appendix – E Backgound of TANGO

3.1 Information on TANGO

3.1.1 What is TANGO?

TANGO is an Association of Non-Governmental Organizations (NGOs) who irrespective of color or creed is unified by community of interests. TANGO was established as the national umbrella body for all NGO's in Tonga. TANGO has affirmed that we shall:

a. Strive for peace and social justice
b. Promote the interests and welfare of all humanity
c. Work to achieve sustainable development
d. Foster environmental awareness
e. Build a sense of community in Tonga

Tonga Association of Non Governmental Organizations (TANGO) was established in 1990 during the workshop running by the Tonga Red Cross and funded by the AusAID on the subject - Disaster Preparedness. The established aim of TANGO was to become a National Umbrella Body NGO for every NGOs in Tonga for other reasons and includes one easy access to by other NGOs, locally, nationally and globally and donor agencies, and government too. In other words TANGO is a focal point for all NGOs.

The first President of TANGO was Late Bishop Finau of the Roman Catholic Church, and the second President was Pastor Fonua 'Ofa, President of the Seventh Day Adventist Church. The third and present President is Mr. Simione K. Silapelu, the Businessman. TANGO has member organizations of over 250 in Tongtapu alone. Some are active and some are not active until new projects arrive, then they come alive once again.

3.1.2 The objectives

The Association is a charitable organization registered under the law of Tonga; Incorporated Act (Section 7) in May 9, 2000. It states purposes includes:

b. To help communities create a better standards of living for themselves
c. To assist different population groups achieve a higher level of self sufficiency and development by providing training and opportunities for growth amongst the Tongan people
d. Provide technical assistance and services to NGOs where needed
e. Ensures the views of NGOs are represented in the formulations of national development plans
f. Liaise with local and international organizations

g. Obtain and dissemination information's of interest to NGOs
h. Facilitate cooperation and collaboration among NGOs
i. Represent the view of the Tongan NGOs to the public
j. Monitor and coordinate the activities of NGOs

3.1.3 TANGO mottos and goal

TANGO organization golden philosophy is represented by the following **mottos**: "**The purpose of our work is to take delivery of the necessity of life, to improve living standard**" and "**to remain harmonize with the environment**". And the **main goal:** "**Opens up opportunity to all groups so that the practical justice is achieved**".

3.2 TANGO Urban and Rural Projects Experiences

TANGO currently works directly with Canada Fund on different urban and rural village community grassroots projects since 1997, and over 80-90 per cent of its project are water related, either of concrete water tanks sized 3000 gallons tanks or village ground water supplies. There was only one project of concrete water tanks built in Vava'u island district. The majority of the projects were in Tongatapu island district. Similarly, one ground water supply project in Vaipoa village in Niua Toputapu Island and the rests in urban and rural village communities in Tongatapu island district.

3.2.1 TANGO in partnerships with other Donors

Besides, working with Canada Fund on water projects TANGO has worked with other donors such as:

a. NZAID on land filled on improving of environment; Popua village community, Tongatapu

b. AUSAID on education (kindergarten) and land filled; 'Eua and Nukunuku, Tongatapu respectively

c. British High Commission on land filled and community fencing; Pili, Ma'ufanga and Ha'atafu village community, Tongatapu

d. Japan through JICA and JOCV on Environment Project; Expert from Japan on planting mangroves and training of locals for two (2) years in Kanokupolu village community, Tongatapu and in close coordination and collaboration with Department of Environment.

e. Environment Dept of Ministry of Lands, Survey and Natural Resources, and Energy also worked with TANGO as partnership on Community Environment Project by implementing planting of trees and mangroves of Climate Change Project (adaptation) at the village of Kanokupolu, Tongatapu.

f. Environment Project: The building of seawall land protection assisted, supervised and managed both building of seawall and funds by TANGO with full support of the

Ministry of Land, Survey and Natural Resources, especially Department of Environment whose involvement in funding, lending hands on planting trees, and training. The Ministry of Works and Disaster Relief used their heavy machineries and their advice. This project initiated and self funded by the Kanokupolu village community themselves through local and overseas fund raisings.

3.2.2 TANGO Training Experiences

TANGO managed and conducted trainings by its officers who were trained overseas specifically and included Train Trainers. Those trainings were funded by PMO, NZAID/PMO and by AusAID through an Australian Development NGO, namely Overseas Service Bureau – OSB. Similarly, trainings were carried out in partnership and with the assistance of government senior officers of related posts and expertise on applicable fields.

The relevant and practicable subject matters for training chosen were deliberated based on real issues experienced by the grassroots communities groups such as Leadership Roles, Simple Bookkeeping, Disaster Preparedness and Disaster Management, and included Train Trainers on above related subjects. These training were performed mainly with grassroots village community groups in Vava'u, Ha'apai Island districts and in Tongatapu district also.

TANGO has established critical links with government sector through its participationon several high level national planning/ development committees. These have included currently the National Census Steering Committee, the National Water Safety and Quality Management Committee, National Codex and Alimantarius Committee, the Port Users Advisory Committee to name a few. Previous to these, TANGO was members of National population Committee, National Disaster Advisory Committee, Beautification, Enviromental Projects of Department of Environment and Energy Projects of Ministry of Land and Survey, and Rural Development Committee of Central Planning Department.

In addition to its work within Tonga, TANGO has represented the NGO community at several regional and international meetings and conferences. This included meeting of the Speakers and Clerks of the Regional Commonwealth House of Legislative Assembly held in Nuku'alofa Tonga – Tonga Parliament; the third Commonwealth NGO Forum in Auckland New Zealand – Commonwealth Foundation; the Policy Analysis Training Program for Pacific Islands Development Program at East-West Centre in Hawaii, USA – Ctr for Cultral & Technical Interchange Between East & West;

Tthe Commonwealth NGO Forum in parallel with Head of Governments Meeting held in Abuja Nigeria - Commonwealth Foundation; Emergency Operations Centre Training Nuku'alofa Tonga – SOPAC; Strategic National Planning Course Sydney Australia - AusAID Centre for Pacific Development and Training Sydney Australia; Human Right Meeting in Port Villa, Vanuatu, Commonwealth Secretariat; Seminar on Promoting Good Governance for PDMC Leaders Lautoka Fiji – ADB; and participation NGO Invitation Program on the occasion of the United Nations Convention on Climat Change, COP3 held in Kyoto Japan – representing the Alliance of Small Island States (AOSIS) – KIKO Forum.

3.2.3 TANGO conducted Study of NGOs and developed Directory

TANGO in 1998 conducted and compiled a report on the "Study of the Non-Government Organizations (NGOs) Sector in Tonga" funded by Canada Fund. This information was collected to assist TANGO in developing a three-year strategic plan, and create a database on NGO's in Tonga and assist with the publication of a Development Resources Directory for NGOs.

And in 1999 TANGO compiled Directory again Canada Fund funded by using information collected during the 1998 study of the NGOs sector in Tonga. This directory is being provided as a service to the communities, the donor agencies and the government departments in Tonga. However, both study and directory needed review.

TANGO was awarded with Silver Medal in double Commemoration of His Majesty King Tupou IV 75th Birthday Day and 25th year of his rule in the Kigdom. TANGO was awarded for it outstanding services to the Tongan community.

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APPENDIX F

Appendix-F Tonga Community Development Trust – Brief Profile

Establishment:

Tonga Trust started from the work of the Catholic Village Womens Development Program (VWD) in 1978. The organisation was formally registered at the Tonga's Magistrates Court in November 17, 1983 under the name Foundation for the Peoples of the South Pacific/Tonga (FSP Tonga). Two years later, the name of the organisation was changed to Tonga Community Development Trust in November 17, 1985. Its mandate continued to focus on alleviation of poverty in Tongan families and communities and fostering self reliance and sustainable community development. Since its inception, TCDT has been governed by a Board of Directors.

TCDT Governance:

The organization is run by a Board of Directors under which served the Executive Director and staff. The founding members of the Board of Trustees were:

1. Bishop Patelisio Finau (First Chairman)	1978 – deceased
2. Dr. Sione 'Amanaki Havea	1978 – deceased
3. Mrs. Papiloa Bloomfield Foliaki	1978 - present
4. Mrs. Elizabeth Sylverstein founder of FSP USA Inc.	1978 – deceased
Replacement Board members:	
5. Bishop Dr. Soane Lilo Foliaki	1994 – 08 (retired)
6. Hon. 'Akau'ola	1996 – Deceased
7. Dr. Caroline Fusimalohi	2003 – 06 (retired)
8. President Siaosi Moleni	2006 - present
9. Dr. Viliami Fakava	2006 – 08 (migrate)
10. Mrs. Fatai Pale	2006 – deceased
11. Bishop Soane Patita Paini Mafi (current Chair)	2008 - present

On November 17, 1985, FSP Tonga officially changed its name to the Tonga Community Development Trust (Tonga Trust).

Executive Directors:

1. David Wyler:	1983 - 85
2. Alekisio Huni:	1985 - 87
3. Jonathan Lindborg:	1987 - 88
4. Denis Wolff:	1988 – 03
5. Lopeti Senituli:	2004 – 06
6. Papiloa Foliaki (Acting)	2006 – 07
7. Sione Faka'osi	2007 - present

In April 1999, Tonga Trust established a field office in Neiafu, Vava'u. It now has an office in Ha'apai and 'Eua and is planning on establishing an office in Niuafo'ou. In 1994, Tonga Trust had its first audit conducted in Tonga and since then, annual audit has been conducted every year.

Tonga Community Development Trust has acquired a body of knowledge and high level of experiences in various aspects of coordinating and managing of projects (project development, planning, implementation, monitoring, evaluation and reporting). The list below shows the diverse areas of project TCDT has involved from the past to present.

Past Projects:

1. Toloa Forestry Awareness and Conservation Project – funded by Canada Fund
2. Pesticides Awareness and Sustainable Agriculture (PASA) – funded by European Union
3. Pacific Disaster Preparedness Strengthening Project – funded by AusAID
4. Australian Youth Ambassador for Development (AYAD) – funded by AusAID
5. Village Women's Development Program – funded by Australia Foundation for Asia and the Pacific
6. Solid Waste Management Awareness Community Theatre Project – funded by AusAID
7. Water Safety Plan Awareness Project – funded by SOPAC/WHO
8. Rainwater Harvesting Piloting Project – funded by Sweden Agency for International Development
9. Organic Home Garden and Kitchen Compost Project – British High Commission Office - Fiji.

10. Important Bird Areas – funded by Birdlife International through Environment Consultants Fiji
11. Community Mediation Training – funded by EU/GoT
12. Improved Wastewater and Sanitation Management in the Pacific – funded by UNEP/SOPAC

Current Projects:

1. Mitigating Climate Change Impacts in Lifuka and Foa Pilot Project – funded by GEF/SGP
2. Disaster Preparedness: Coping Communities – funded by NZAID
3. Coping Strategy: Building Communities Resilience - funded by Force of Nature
4. Development of Model Specie Recovery Program for Tonga – funded by CEPF
5. Water, Sanitation and Hygiene Project – funded by Water Supply and Sanitation Collaborative Council (Geneva) & SOPAC
6. People and Policy Project – funded by NZAID
7. Youth and Mental Health Project – funded by NZAID
8. Ama Takiloa ae Fefine Tonga Project (women development program) – funded by Christian World Service – NZ
9. Sustainable Rainwater Harvesting Awareness – funded by Canada Fund
10. Increase Availability of Drinking Water in the Outer Islands during Dry Season – funded by EU/SOPAC
11. Voter Education – funded by Canada Fund

IUCN Membership:

Tonga Community Development Trust became a member of IUCN in October 2008. IUCN (International Union for Conservation of Nature) is the biggest global network on conservation. It is envisaged that diverse interests and experience of IUCN members will benefits Tonga Trust. Likewise, Tonga Trust will contribute to achieving IUCN's aim of conserving endangered species, like the *Malau* (Tongan Megapode).

FSPI Affiliated Member:

Tonga Community Development Trust is an affiliated member of the Foundation for the People of the South Pacific International. FSPI is the regional secretariat for a network of 10 independent community-based organizations working in the Pacific to foster self-reliance and sustainable community development. FSPI is the largest, most experience secular civil society organization network in the Pacific, with network members in Timor-Leste, Fiji, Kiribati, Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu, and Vanuatu, and metropolitan partners in Australia and the United States of America.

Mission Statement:

Tonga Trust is one of Tonga's oldest NGOs. Tonga Trust works in partnership with families and communities, development partners and government to empower communities, especially the most disadvantaged members, to be self sufficient and become responsible agents of their own development.

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APPENDIX G

Appendix-G SRH Projects in Tonga - past and current

Date	Island Group	Village	Type of Project	Implementing Agency	# of h/h tanks	Other Notes	Cost in $TOP	Comment
Eua								
2007/08	Eua	Houma 'Eua Water supply upgrade	(tanks, pumps & engine)	NZ AID			63814	
The Niuas								
Vava'u								
2007	Vava'u	Ha'akio	Water Supply	JAPAN			69030	
2005	Vava'u	Holeva	Water Supply	JAPAN			88510	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2007	Vava'u	Leimatu'a	Water Supply	JAPAN			98345	village water system
								P139
2006	Vava'u	Longomapu Village	Water Supply	JAPAN			150000	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2008	Vava'u	Mangia	Water Supply	JAPAN			58983	

2007/08	Vava'u	Tu'anekivale – Matatahi 'Ene'io	Rotamould	AusAID TCDS	22			
unknown	Vava'u	Nieafu	Cement Tank	CWL (Canada Fund)	7	3000 g tanks		
2008	Vava'u	Okoa	Water Supply	JAPAN			148500	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2008	Vava'u	Ofu	Water Supply	JAPAN			142000	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2007/08	Vava'u	Paingaimotu	Rotamould	AusAID TCDS	19			
2004	Vava'u	Taoa	Water Supply	JAPAN			121910	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2007/08	Vava'u	Tefisi	Water tanks & fence	NZ AID			15000	
2008	Vava'u	Tefisi	Water Supply	JAPAN			150000	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water meters and pipes).
2008	Vava'u	Tu'anuku	Water Supply	JAPAN			143000	construction costs of one (1) water supply system (2 pumps, 5000 gallon tank, water

								meters and pipes).
2007/08	Vava'u	Tu'anuku (Kulupu Hakauve'eve'e	Rotamould	AusAID TCDS	25			
2008	Vava'u	Utui	Water Supply	JAPAN			73560	
2005	Vava'u	'Utungake	Cement Tank	Tonga Community Development Trust	25			
2004/05	Vava'u	'Utungake	Cement Tank	NZ AID			20000	
The focus of EU's aid to Vava'u under the 9th European Development Fund was on Health and Education. These interventions did not include the provision of water tanks to homes or investments in village water systems.								
Ha'apai								
2005	Ha'apai	Fakakakai & Pukotala Village	The Project for Water Supply	JAPAN			149767	construction costs of one (1) water supply system (pump, 5000 gallon tank, water meters and pipes).
2004	Ha'apai	Faleloa	The Project for Water Supply	JAPAN			65450	construction costs of one (1) water supply system (pump, 5000 gallon tank, water meters and pipes).
2004	Ha'apai	Falemea	Water Supply	JAPAN			18730	construction costs of one (1) water supply system (pump, 5000 gallon tank, water meters and pipes).
2007/08	Ha'apai	Ha'ato'u	Rotamould	AusAID TCDS	11			

2004/05	Ha'apai	Hihifo (Fieinua)	Cement Tanks	AusAID TCDS	20		30159	
2004/05	Ha'apai	Hihifo (Melino & Ofa)	Cement Tanks	AusAID TCDS	5		10049	
2004/05	Ha'apai	Koulo (Mala'evakapuna)	Cement Tanks	AusAID TCDS	5		8042	
2004/05	Ha'apai	Mo'unga'one (Komiti Fakakolo Mo'unga'one)	Cover Renovation	AusAID TCDS			8563	
2005	Ha'apai	Muitoa/Ha'ano Village	Water Supply	JAPAN			142868	construction costs of one (1) water supply system (pump, 5000 gallon tank, water meters and pipes).
2004/05	Ha'apai	Nomuka	Cement Tanks	AusAID TCDS	20		26138	
2008	Ha'apai	Nomuka	Water Supply	JAPAN			85075	
2004/05	Ha'apai	Pangai (Fangalahi)	Cement Tanks	AusAID TCDS	5		6032	
2007/08	Ha'apai	Pangai (komiti fakakolo Navea)	Rotamould	AusAID TCDS	10			
2007/08	Ha'apai	Pangai (Niu'ui Staff quarters)	Rotamould	AusAID TCDS	3			
2007/08	Ha'apai	Petani School - Ha'apai		NZ AID			14400	
2007/08	Ha'apai	Tongoleleka	Rotamould	AusAID TCDS	7			
2007/08	Ha'apai	Uiha Komiti fakakolo	Rotamould	AusAID TCDS	30			

2007/08	Ha'apai	Uiha Clinic	Rotamould	AusAID TCDS	2			
Tongatapu								
2004/05	TBU	Alakifonua (Ta'eiloa)	Cement Tanks	AusAID TCDS	11		15534	
2006	TBU	'Aloua Ma'a Tonga	Cement Tanks	Canada Fund	23		25123	
2007/08	TBU	Fahefa	Village Tank stand and tank	AusAID TCDS				Install 30ft tank Stand with 5,000 gallon fibre tank plus 66 water meters to residences
2007/08	TBU	Fua'amotu	Water tank & stand	NZ AID	1		20000	
2006/07	TBU	Fua'amotu (Halakafa WD group)	Cement Tanks	AusAID TCDS	27			
unknown	TBU	Funga Tufutele	Cement Tanks	Canada Fund Funga Tufutele	30		16050	
2004/05	TBU	H/Lulunga(Havelu Lulunga WDG)	Cement Tanks	AusAID TCDS	15		21060	
2008	TBU	Ha'afeva	The Project for Water Supply	JAPAN			82547	village water system
2004/05	TBU	Ha'akame	Village Water Tank stand	AusAID TCDS	1		13230	
2007/08	TBU	Ha'ateiho	water tank and stand	NZ AID	1		15924	

2004/05	TBU	Halaleva (Lepoaki)	Cement Tanks	AusAID TCDS	10		13252	
2007/08	TBU	Hala'ovave	Plastic Tanks	AusAID TCDS	14			
unknown	TBU	Heilala Women in Development	Cement Tanks	Canada Fund	35		35280	
2006/07	TBU	Hihifo Komiti Vai	Upgrade water supply system	AusAID TCDS				
2006	TBU	Hofoa	Water Supply	JAPAN			149866	village water system
2006/07	TBU	Hofoa (Ki he lelei taha group)	Rotamould	AusAID TCDS	26			
2005	TBU	Hoi	Water Supply	JAPAN			115799	village water system
2004/05	TBU	Houma	Water Supply stand	AusAID TCDS	1		43000	
2007	TBU	Houma	Village Water Tank and Stand	Canda Fund Houma Water Tank	1		26269	
2005	TBU	Houma	The Project for Water Supply	JAPAN			135181	village water system
2006/07	TBU	Houma(kelikao)	Cement Tanks	AusAID TCDS	21			
2007/08	TBU	Hu'a tolitoli (Prison)	Rotamould	AusAID TCDS	9			
2006/07	TBU	Kahoua	Village Water Tank & Stand	AusAID TCDS	1			

unknown	TBU	Kolofo'ou Women's group	Cement Tanks	Canada Fund	30		30240	
unknown	TBU	Kolofo'ou Lototaha 'o e Hala Fatafehi	Cement Tanks	AusAID TCDS	20			
2004/05	TBU	Kolonga	Cement Tanks	AusAID TCDS	40		39658	
2007	TBU	Kolonga	Water Supply	JAPAN			72692	village water system
2006	TBU	Lakepa	Water Supply	JAPAN			148980	
unknown	TBU	Lapaha	Cement Tanks	(Canada Funds)	40		31652	
2007/08	TBU	Lapaha	Cement Tanks	NZ AID	215		804000	
2006/07	TBU	Lavengatonga (Kulupu fietokoni)	Cement Tanks	AusAID TCDS	20			
2008	TBU	Lofanga	Water Supply	JAPAN			84879	village water system
2005	TBU	Lomaiviti	Water Supply	JAPAN			91431	construction costs of one water supply system (pump, 5000 gallon tank, tank stand, water meters and pipes)
2007	TBU	Makaunga	Water Supply	JAPAN			98345	village water system
2005	TBU	Manuka	Water Supply	JAPAN			111142	construction costs of one water supply system (pump, 5000 gallon tank, tank stand, water meters and pipes)

2005/06	TBU	Matahau village water upgrade	water supply	NZ AID			20000	
2004/05	TBU	Matangiake (Fefine Matangiake)	Cement Tanks	AusAID TCDS	30		49561	
2004/05	TBU	Ma'ufanga (Kulupu Fietokoni)	Cement Tanks	AusAID TCDS	27		39755	
2008	TBU	Nakolo	Water Supply	JAPAN			81729	
2007	TBU	Nuku'alofa	Cement Tanks	Canada Fund Aloua Ma'a Tonga	35	3000 g	53550	
2005	TBU	Nukuhetulu	Water Supply	JAPAN			120841	construction costs of one water supply system (pump, 5000 gallon tank, tank stand, water meters and pipes)
2007	TBU	Nukuleka	Water Supply	JAPAN			72692	village water system
2006/07	TBU	Nukunuku	Cement Tanks	NZ AID			10200	
2007/08	TBU	Nukunuku Hahake Water Committee	Village Tank stand and tank	AusAID TCDS				Install 30 ft Tank Stand with 5,000 gallon fibre tank plus installation of 70 water meters to residents
2007/08	TBU	Nukunuku Taungasisi	Rotamould	AusAID TCDS	44			
2006/07	TBU	Patangata (Comm Care Tonga)	Cement Tanks	AusAID TCDS				

2004/05	TBU	Pea water upgrade		NZ AID			10000	
2007/08	TBU	Polokia Pea fefine Katolika	Rotamould	AusAID TCDS	18			
2006/07	TBU	Pelehake Kapakau Tatangi	Cement Tanks	AusAID TCDS	24			
2004/05	TBU	Pili (Fie'aonga)	Cement Tanks	AusAID TCDS	8		11567	
2005	TBU	Puke	Water Supply	JAPAN			91431	village water system
2004/05	TBU	Teekiu (Fangux2 silivia o Teekiu	Cement Tanks	AusAID TCDS	25		41301	
2006/07	TBU	Tofoa Women in Development	Cement Tanks	AusAID TCDS	21			
2007	TBU	Tokomololo	Water Supply	JAPAN			82625	village water system
2006/07	TBU	Tokomololo (Matahiva)	Cement Tanks	AusAID TCDS	11			
2007	TBU	Tupou College	Water Supply	JAPAN			118103	village water system
2007/08	TBU	Utulau	Water pump and fence	NZ AID			20000	
2005	TBU	Utulau	Water Supply	JAPAN			125799	construction costs of one water supply system (pump, 5000 gallon tank, tank stand, water meters and pipes)
2006	TBU	Vaini-Melino moe 'Ofa	Cement Tanks	Canada Fund	12		28800	

2006/07	TBU	Vaini	water pump	NZ AID	1		11000	
2005	TBU	Vaotu'u	Water Supply	JAPAN			98008	construction costs of one water supply system (pump, 5000 gallon tank, tank stand, water meters and pipes)
unknown	TBU	Houma	Cement Tanks	Canda Fund	30		23775	

APPENDIX H

Appendix- H Questionnare

Part 1 Questions for Households

Village Name:_____ **Surveyor Name:**_____

Household HeadName:_____ **Survey Date:**_____

Household population: _____ **Gender:**_____**(M/F)**_____

Contact Ph.:_____ **Occupant:**

1. Building characteristics/Household dwelling

1.1 What is the main type of materials used for the external building walls

i. Poured concrete ii. Metal
iii. Timber iv. Thatched v. Other (Specify)

1.2 What type of materials used for the roofing?

i. Poured concrete ii. Metal
iii. Timber iv. Thatched v. Other (Specify)

1.3 The quality/condition of the roofing for rainwater harvesting

i. Poor (very rust) ii. Average (little rust)
iii. Good (no rust) iv. Very good (new roof)

2 Drink Water Sources

2.1 Where do you get your drinking water from?

i. Piped water supply ii. Water tank (Specify) (rain water)
iii. Own well – covered/protected iv. Bottled water
v. Boiled water vi. Other (Specify)

2.2 What other sources of water you have?

i. Piped water supply ii. Own tank (specify)-cement, plastic, fibre
iii. Own well iv. Other (Specify)

2.3 What is the main toilet facility available – uses?

i. Flush toilet ii. Manual flush
iii. Pit
iv. Other (Specify)

2.4 Which water tank/collector do you prefer to drink water from?

i. Cement tank ii. Fibreglass tank
iii. Polyethylene (plastic) iv. Other (Specify)

2.5 Give reasons?

i. Clean ii. Soft iii. Cool
iv. Odorless v. durable vi. Other (specify)

2.6 What other usage of drinking water in the household?

i. Animals ii. Gardening iii. Other (Specify)

3 Tenure

2

3.1 What is the tenure of this household
i. Own the property ii Renting iii. Rent free
iv. other specify
4 Income
4.1 What is the current source of income for the household
i. No income ii. Wages / salary iii. Own business
iv. Sell own product (fish, crops, handicrafts etc)
v. Land lease vi. House Rent vii. Remittances
viii. Other sources (specify)
5 Vulnerability
5.1 Does this household have any vulnerability
i. Yes ii. No
5.2 If yes what type of vulnerability
i. Children ii. Aged iii. Injury
iv. Ill health v. Disabilities e.g. Blind, deaf, walking, mental etc.

Part 2 Questions for Institutions

Name of Institution:_____ Contact Person/Ph. No_____

Surveyor Name:_____ Survey Date:_____

1 Institution Name
1.1 School / church (Chapel, Hall, Residence) / kava club / Village Hall
1.2 Members:

2 Building Characteristics
2.1 What is the main type of materials used for the external building walls
i. Poured concrete ii. Concrete blocks iii. Metal
iv. Timber v. Thatched vi. Other (Specify
2.2 What type of materials is used for the roofing of the building
i. Poured concrete ii. Metal
iii. Thatched iv. Other (Specify)
2.3 The quality/condition of the roofing for rainwater harvesting
i. Poor (very rust) ii. Average (little rust)
iii. Good (no rust) iv. Very good (new roof)

3 Drink Water Sources If you do not have drink water tank
3.1 Where do you get your drinking water from?
i. Neighbors ii. Other homes iii. Town water supply
iv. Bottled water v Other (Specify)
3.2 How many water tanks in that place?
3.3 How many damaged tanks in the same place?
3.4 What is the size(s) of the above existing tank (litres)
i. 500 ii. 1000 iii. 2000 iv. 3000 v. 4000 vi. 50000

3

3.5 What other sources of water you have?

i. Piped water supply ii. Own tank (specify)
iii. Own well iv. Other (Specify)

3.6 What is the main toilet facility available – uses?

i. Flush toilet ii. Manual flush
iii. Pit iv Other (specify)

3.7 Which water tank/collector do you prefer to drink water from?

i. cement tank ii Fibreglass tank
iiPolyethylene (plastic) iv Other (Specify)

4 Split Island situations

4.1 What are the natural difficulties facing the split islands

i. Boat Entrance ii. High terrain iii Natural seasonal disaster
iv. Rough seas / wharf / port v. Other (specify)

4.2 What are other difficulties facing the people of the split islands

i. Land transport (None, Limited) ii. Maine transport iii distances
iv. Transportation costs iv. Other (specify)

4.3 What type of communication exists in the island

i. telephone ii. Mobile iii. Others

5. Damaged water tanks

5.1 What is the condition of your drinking water tank?

i. Minor damaged (Can be fixed) ii. Major damaged (cannot be fixed) iii. Others specify_____

5.2 What causes the damage

i Construction Problem ii Disaster iii Willfully damaged iv Carelessness v Other(Specify)

5.3 Was your drinking tank funded by any donor?

i. Yes ii. No iii. Other>>specify_____

5.4 Which donor did fund your drinking water tank?

i. EU ii. No iii. AusAID
iv. NZAID v. Canada Fund vi. Japan vii. Other >>specify_____

5.5 What company did supply & build your drinking water tank? .....

Part 6. Training & Public Education/Awareness

6.1 Had there any training & education/awareness conducting about the maintenance of drinking water tanks?

i. Yes ii. No iii. others>>specify_____

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6.2 If yes, did you use this training & education to maintain your drinking water tank?

i. Yes ii. No iii. others >>specify_____

Quality of drinking water (causes and impact)

6.3 Do you know the quality water for drinking
i Yes ii No

6.4 How do you know or how you can tell?
i Spotless (no visible dirty) ii odorless iii soft iv Others (Specify)

6.5 What are the sources of contamination of water tanks
i rusty roof ii debris on roof/guttering iii birds waste iv Others (Specify)

6.6 What are health hazard caused by dirty/contaminated drinking water and poor sanitation?
i diahorrea ii typhoid iii dengue fever iv Others (Specify)

Sustainable Management of drinking water

6.7 Does your water tank emptied much quicker than you expected?
i Yes ii No

6.8 If yes why is that?
i leaking (mama) ii unsustainable use iii too many people iv drought
v many outside borrowers

6.9 How can you ensure that your drinking water will be available during time of drought
i no leak ii use wisely iii number of tanks iv larger size tanks Others (specify)

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