Workshop Report

on

Training Workshop on Food Security, Climate and Extreme Events

6 – 8 May 2014

Nukualofa, Tonga

Tonga Ministry of Agriculture, Food, Forestry, and Fisheries
SPC Land Resources Division

SPC/USAID Vegetation and Land Cover Mapping and Improving Food Security for Building Resilience to a Changing Climate in Pacific Island Communities

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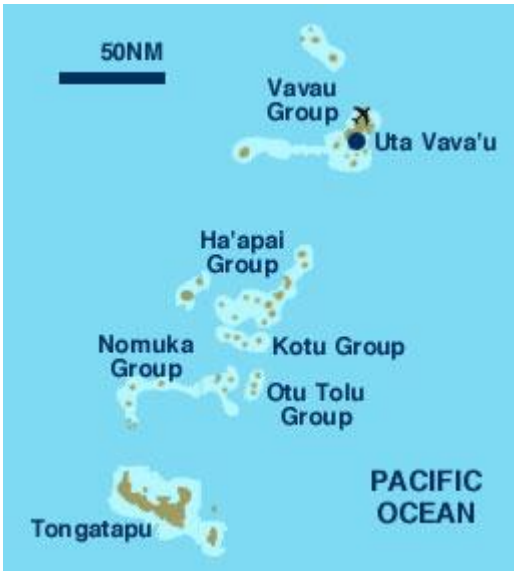
Introduction

This workshop was executed as part of the USAID/SPC project titled *Vegetation and Land Cover Mapping and Improving Food Security for Building Resilience to a Changing Climate in Pacific Island Communities*, and for which provided the funding of the workshop.

The origins of this training workshop evolved from a prior visit by Dr Siosiua Halavatau (Deputy Director, SPC LRD) with Ministry of Agriculture, Food, Forestry, and Fisheries (MAFFF) counterparts in exploring the potential for the interest of introducing climate change and variability concepts for the future consideration of deploying climate information systems for agriculture services advice to end users such as farmers and fishermen. The concept found interest from MAFFF and this workshop was prepared for and executed in partnership with SPC/USAID and MAFFF from the 6th to the 8th of May, 2014.

Climate change and food security as a combined area of work is still relatively new in Tonga, where partnerships focused on introducing weather and climate related information in combination with food security and agriculture advice have yet to be formalised. This workshop provided a first step towards this, and provided some impetus for a more coordinated and systematic approach toward food security monitoring in terms of beginning formal planning for a tool to coordinate food security monitoring at the national level better, and for which will ultimately enhance the resilience of the sector to climate change, variability and extreme weather.

Background context



Geography

The Kingdom of Tonga is located in the Central South Pacific and it lies between 15° and 23° 30' South and 173° and 177° West. It is an archipelago of 172 coral and volcanic islands with an area of 747sqkm. Thirty six of these islands are inhabited with an area of 649 sqkm.

Tonga has a tropical climate throughout the year reflecting its position within the southeast trade wind zone of the South Pacific. There is a marked seasonality in the Tongan rainfall. There

is a dry season from May to October and a wet season from November to April. About 65% of the rain falls during the wet season and about 35% during the dry season. Tongatapu rainfall is a little more spread out with a 60:40 ratio.

There is a marked diurnal, seasonal and spatial variation in the Tongan temperature. Mean annual temperatures vary according to latitude from 27 C at Niuafo'ou and Keppel to 24 C at Tongatapu. Diurnal and seasonal variations can reach as high as 6 C throughout the island group. Seasonal variation in temperature is more marked in the southern cooler islands.

Tonga's climate pattern is very much affected by the El Nino phenomenon. El Nino is the term used to describe the movement of warm sea temperatures from the Western Pacific to the Eastern Pacific. This event usually happens once in every 3 to 7 years.

Tropical cyclones affect Tonga 1.3 times per year. This figure increases to 1.7 during El Nino years. Historical records of cyclone occurrences in the South West Pacific have shown a decreasing trend particularly in the last decade (1999-2008), however there is not enough evidence to confidently predict that this trend is permanent and not an inter-decadal cycle.

The trend of sea level rise for Tonga indicates a general increase with a magnitude of 6.4mm/yr (Tonga's Country Report for the South Pacific Sea level and Monitoring Project, 2007) since records started from 1993 up to 2007.

According to the 2006 census, Tonga's total population counted 101,991 and distributed amongst 17,529 households. Out of the total population, 51,772 were males and 50219 were females representing a sex ratio of 103 males per 100 females. Tongatapu was the most populous for its population was 72,045 which accounted for 71% of the Tonga's total population, for Vava'u 15,505 (15%), 7,570 (7%) for Ha'apai, 5,206 (5%) for 'Eua and 1,665 (2%) for the Niuas. Within each island division it is further subdivided into districts.

Population has grown with an average annual growth rate of 3.6% from 1956-1966, 1.6% from 1966-1976, 0.49% from 1976-1986, 0.3% from 1986-1996 and 0.4% from 1996 – 2006. Tonga's economy is very much dependent on mostly from Remittance (50-60%), Agricultural export (10-15%) squash as the leading export, and the rest from fisheries, tourism and foreign Aids. Tonga has been classified as one of the fifty one Small Island Developing States which is vulnerable to exogenous shocks.

The Agricultural sector is a key sector to the economy of Tonga for it comprises nearly a quarter of Tonga's GDP. This sector supports majority of the population for subsistence and for cash incomes. It employs a third of the employees and also accounts for at least fifty percent of the export earnings.

The remaining indigenous forest has been variously estimated at between 4% and 11% (Hoponoa 2004) over the whole island group with much of this confined to inaccessible steep or remote areas, uninhabited islands, coastal strips, swamps and mangroves.

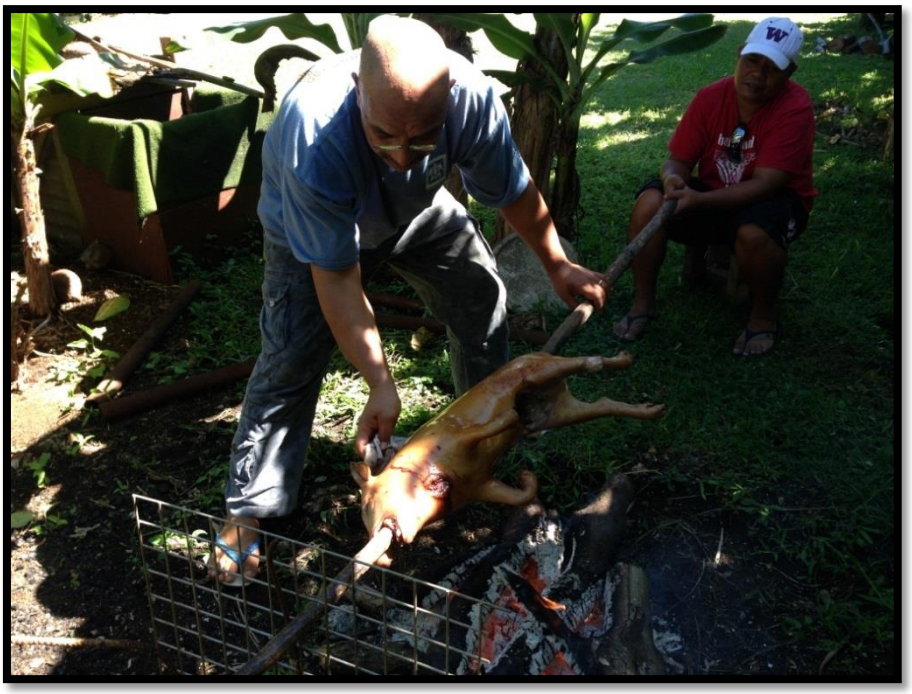
Fisheries sector is still identified by the Government of Tonga as one of the sectors with good economic potential which significantly contributes to the sustainable development of Tonga's

economy. The contribution from Fishery sector to Tonga's GDP is about 25 percent of combined agriculture, forestry and fisheries (Statistics Department, 2009).

Local food production

Farming in Tonga is characterized as subsistence farmers for home consumption, subsistence activities for sale and commercial farmers. The 2002 Agriculture Census (AC) indicated that 64.2% of total households were actively involved in agriculture (Table 2). The analysis shows that within the agriculturally active population, 59% of the total households are engaged in subsistence activities for home consumption only, 38.6% are engaged in subsistence cash income and 24% for commercial farming (Tonga Agriculture Census, 2002). Higher proportion of agriculturally active households resided in the islands of Vava'u, Ha'apai, 'Eua and Niuas than the non-agricultural and minor agricultural households.

These areas were occupied with cassava, yam and taro covering over 30% of farmed areas. Although the census indicated an increase in acreage of farmland in 2001 compared to in 1985, total production and productivity has fallen in recent years despite increases in the internal demand for food. The total area of farmlands in 2001 was 40,087 acres. The declining production and productivity is reflected in the agricultural (including fisheries and forestry) export volumes. Figure 5 shows that total exports declined from 2007 – 2010. Similar trend was observed for agricultural export commodities which made up of 70% of export values. These figures show not only declining production and productivity but also the Tonga's vulnerability to global market shocks. The period of declines in export corresponds to the market and food price shocks in 2008 and later in 2011.



Livestock production plays a significant role in the diets and livelihoods for the people of Tonga. Four in every five households in the Kingdom of Tonga kept different kinds of livestock in 2001 (Table 4). Pig appeared to be the most popular livestock kept by high proportion of number of households followed by chicken reflecting the high importance of pork to the diet of Tonga's population. At the island level, Ha'apai reported the highest average of 14 pigs per household keeping pigs, followed by 'Eua (13), Niuas (12), Vava'u (11) and Tongatapu (8).

The households keeping cattle in the Kingdom of Tonga accounted for about 15% of the total households. The actual count of cattle kept by these households totaled to 10,354 cattle giving an average of 4 cattle per household. As such, maintaining or increasing the levels of livestock production would require improving livestock management practices and developing feed supplement to reduce cost of production.

The Agriculture census also revealed that a total of 7,704 persons were engaged in the fishing activities at least on a weekly basis. On the average, two persons per households were engaged in fishing. About 22% (1,139) of the total fishing households sell their catches, reflecting the importance of fisheries to the livelihood and food security for Tongans.

Although limited data, stakeholders identified several factors contributing to the decline in agricultural production and productivity in Tonga. These include, unsustainable agricultural practices impacting soil productivity; pests and diseases; increasing urbanization to name a few.

Proceedings of Training Workshop

Organisation

The workshop was hosted by MAFFF at the Fisheries Division offices in Sopu. Logistical arrangements were organised by MAFFF via the SPC/USAID national coordinator, Mr Fatufehi Moala, including the organisation of local speakers. The final agenda of the workshop can be found as Attachment 1 to this report.

Participation

Participation was organised primarily by MAFFF with consultation with the SPC LRD team, and were limited to invitations to those external of Government with interest in the primary sector, Ministries of Government, and officers of MAFFF across the various Divisions. In total, there were 22 workshop participants (the participants list is found in Attachment 2), along with the three SPC LRD resource persons (Dr Siosiua Halavatau, Gibson Susumu, Dean Solofa).

The running of the workshop was facilitated and coordinated by the LRD team, with presentations contributed from MAFFF presenters (previously coordinated by Mr Moala). In the main, the workshop consisted of PowerPoint presentations, discussions oriented from themes of the presentations, and group work exercises. An evaluation survey of the workshop was also completed at the end.

The workshop was opened with welcome remarks by the CEO of MAFFFMs. Losaline Ma'asi , with the opening speech provided by the Honourable Minister Sione Sangster Saulala declaring the workshop open. The speech of the Minister is found in Attachment 3. Dr Halavatau provided an

introduction and background the workshop and then handed off to Mr Susumu and Mr Solofa to provide more details about the objectives of the workshop and how they perceived the flow of the four days of the workshop to run as per the agenda.

Presentations

The following were the set objectives of the workshop, and were discussed at length by the main facilitators, Mr Susumu and Mr Solofa;

1. Facilitate knowledge and information sharing on Food Security (FS) and Climate Change (CC) amongst stakeholders in Tonga; **(undertaken in Days 1 & 2)**
2. Examine ways of enhancing coordination and information sharing on FS and CC identify possible points of mainstreaming and collaboration among programs; **(undertaken in Day 3)**
3. Discuss and identify CC threats and FS issues/challenges, and knowledge gaps in Tonga, and; **(undertaken partially in Day 3 and more fully in Day 4)**
4. Facilitate framework development on FS and CC for intervention need to be met or scaled up in order to successfully build resilience to food and nutrition security in Tonga. **(undertaken in Day 4)**

Monday 5th May presentations

Climate of the Pacific: Mr Solofa provided summary presentation overview on the climate features of the Pacific that introduced the concepts of climate variability and long term change, current trends and projections for the Pacific region.

The Tonga Meteorological Service: The Tonga Meteorological Services (TMS) representative provided overview on the TMS, its functions and operations, observing networks for weather and climate, and its products and services to the public and targeted end users.

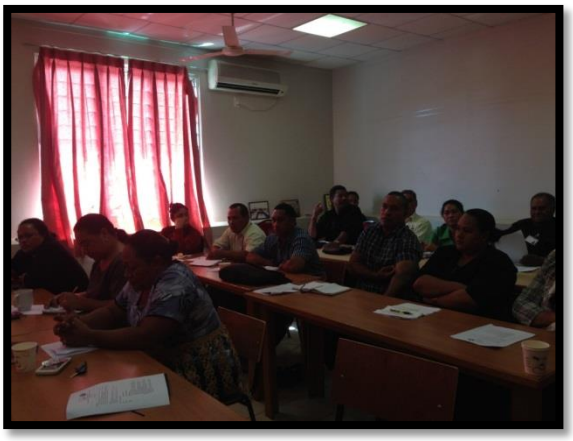
Climate of Tonga: The TMS representative continued on and provided detailed climatology of Tonga, features of weather and observed climates in different islands.

Scientific Aspects of ENSO-Related Interannual Variability in the Pacific and Tonga: Mr Solofa and a TMS representative provided an expanded discussion on ENSO related Interannual Variability, and its effects on the Pacific at large and Tonga's weather and climate.

Consequences of Climate Variability and Change for Tonga: Discussion of the impacts of climate variability and change for Tonga and the information needs of communities, resource managers, businesses and government agencies.

Seasonal Climate Prediction, Tools and Techniques and current TMS products and services: Mr Solofa provided an introduction to the scientific foundations for predicting seasonal-to-interannual variability in climate and the basic features of global and regional forecasting models. The session also included a demonstration of the seasonal prediction tool, SCOPIC, by a representative of the TMS. Some time was also allocated to the discussion on traditional methods of forecasting, and seasonal calendars as developed in other parts of the region.

Day One Summary: The content of the training for Day 1 was focused primarily on climatological aspects of the Pacific region, with later focus on the features these have in play for the climate of Tonga. Feedback was in the form generally of clarification and of verification of field observations on weather patterns, climate impacts. Personal observations and reference to traditional knowledge in relation of weather and climate to planting seasons began to emerge from the participants.



Tuesday 6th May presentations

Introduction to Food Security: This was done by Dr Halavatau and Mr Susumu, and introduced the basic concepts and determinants of Food Security in terms of the current definitions as provided by the WB and in particular closer study of the elements of the four 'pillars' defined. The presentation also discussed in some details the threats to food security in the Pacific in general, with focus on examples of those elements in the Tonga case study (referring Dr Halavatau's extensive experience and thorough knowledge of food production system in Tonga. Mr Susumu discussed the Food Secure Framework work that had been undertaken in the last 5 years and its current status, and then closed the session by illustrating the data on food security analysis that he had done for Tonga based on the limited data that he had been able to access to date.

SPC Food Security and Climate Change Vulnerability Assessment: Dr Halavatau provided an overview of SPC/USAID CC and FS Community Vulnerability Assessment (CVA) Framework and detailed the methodology in the examples of the data and information collected from country PRAs undertaken, and how the information was utilized in the assessment. A CVAs for Selected Countries (SI, VAN, FJ, SAM, TONG, KIR & RMI)

Land Use and Soil Health (Dr Viliami Manu, Chief Soil Scientist): Dr Manu provided an informative presentation on the current Land Use in Tonga, and the state of soil health in the Kingdom. Dr Manu used updated information with GIS layers showing this information, particularly for land use), and pointed areas where in combination with soil health data, were not producing as healthily as they did in the past. The main message was the need to use these data sets for planning to assist farmers to recommend the types of crops best suited to the soils and available lands.

Food Production Systems in Tonga (Mana'ia Halafihi (Chief Agronomist): Mr Halafihi of the Planning and Policy Unit of MAFFF provided an overview presentation on the food production systems in Tonga, covering major root crops and supplies to markets over a 3 year period and making note of their annual variation. It was noted that the various root crops and their seasonal variations allow for some food security planning in terms of assuring the availability component of local food security.

Pest and Disease Update/Distribution in Tonga: Dr Viliami Kami, Head of Quarantine of MAFFF provided a presentation on pests and diseases, covering aspects of climate and weather influences and the associated risks. There is a need for modelling to inform the climate change risks, in particular where future changes may increase the range of pests with increased potential risks to food security.

Animal Health and Production in Tonga: Mr. To'ifalefehi Moala, Consultant) presented the background and history on the development of animal health and production in Tonga, and included mention on pests and diseases that affect livestock production. Mr Moala also covered a comparison of the imports of certain meats and together with local production provided a picture of food security with protein diet in that regard. Again, there is an information need that would be useful from several standpoints, with regard to climate variability, weather extremes, and climate change, and that advance information that could help to lower the stresses on animals would be helpful. Local knowledge is being applied but there is a need for more scientific information particularly where climate and weather is concerned.

Research and extension Program in Tonga: A brief oral presentation was provided by one of the MAFF representatives (name unrecorded) in the research and extension programme of MAFFF. While there is an appreciation and understanding of the climate and weather implications on agriculture, there is currently no joint work with the Tonga Meteorological Service to explore further the implications, benefits, and opportunities to the deployment of TMS products and services to improve the information services of extension and research that is being delivered to farmers. Research continues to struggle in terms of resources (financial and technical) to cover the areas of research that these scientists are required (and others they desire) to do.

Food imports and import substitution programs in Tonga, NCD and other diet related diseases and prevention programs in Tonga: Dr Halavatau provided overview and led the ensuing discussion with the participants with these two topics. It is clear from the discussions that while programmes exist at the national level (with partnerships across other technical agencies such as SPC and WHO), there seemed to be wholesale agreement that there remains much more to be done. In a recent global survey, Tonga ranks amongst the top 10 countries in the world for obesity (along with several other PICs), and this is an indication that food security aspects are not in balance in some pillars, while also falling behind in terms of health programming and monitoring for NCDs. Opportunities to contribute from the agriculture sector involved discussions along the lines of the promotion and encouragement of programmes supporting a greater return to traditional foods and healthier diets in lieu of more imported foods which are higher in fats, sugar, and carbohydrates.

Climate change projects in Tonga: Ms 'Ofa Kaisamy (from the Ministry of Environment, Lands, Climate Change, and Natural Resources) provided an overview of the current works of the Ministry's Climate Change Division with highlight on the projected climate change scenarios for Tonga, and their current efforts under the UNFCCC Second National Communications reporting that they hope to launch towards the end of 2014. The Ministry being the focal point for climate change activities and programmes in the country, is pleased that sector focus is now ongoing as evidenced by this climate change and food security workshop, and encouraged the exchange of information to ensure that the Ministry is informed of the progress in this particular sector.

The day concluded with a review of the day's discussions with some overview on the previous day's information and perspective of the climate variability, change, and weather extremes background. Dr Halavatau stressed the need for the agriculture sector to be more holistic in keeping track of the food security challenges faced by Tonga, and the need to work closer with those national experts and coordinators such as the Tonga Met Service, and the Ministry of Environment. There was also great feedback noted during the discussions about the need for more resources that need to be made available to MAFFF, particularly in the research and extension areas as these are the ground contact points for the Ministry in terms of working with farmers who are the most vulnerable and yet are the cornerstone of food security in Tonga. The workshop concluded with a preview of the

next two days of discussions where the information collected and shared in the first two days will provide the impetus and focus of the working groups for Wednesday and Thursday work.

Wednesday 7th May and 8th May

The third day of the workshop called for group works for the most part where each group was given specific tasks and topics in a tabular form to complete on butcher paper for later presentation during the day. The TORs are given below.

Two groups were formed to complete a table with the below headers. Considering the variety of the representation of the participants, it was anticipated that taking time for lengthy discussions to facilitate the completion of the tables would allow for the group works to proceed for the entire day. Mr Susumu and Mr Solofa providing roving guidance and added advice where requested from the two groups. The first half of the day the groups were asked to complete the first of the two columns for input, the 3rd and 4th for the afternoon, and the final two in the morning of the following day.

While much had been covered in the presentations as to the threats to the agriculture sector on climate change and variability, the intent of the exercise is to serve as a recall exercise and to also capture information/knowledge/ideas/issues that may not have been previously discussed or captured by the presenters.

The column headers:

1	2	3	4	5	6	7
Sectors	**Causes**	**Problems/Issues**	**National Priority Actions/Solutions**	**Responsibility (Lead/Support Agencies)**	**Regional Support Needs**	**What climate information services can be provided by other agents?**

The fully completed tables of the two groups are found in Attachment 4.

Interaction and feedback

By the end of the workshop, and in particular as a discussion of the outputs of the group exercise activities of the two groups, and the resulting discussions from the participants, there was an unsurprising agreement that climate change and variability of course play a huge factor in food security in Tonga, and that advance information for use by the sector and sector partners (private businesses etc.) would greatly help in terms of planning and preparation. Discussions and thoughts were captured as to why this is happening today, and how some solutions or measures could be put in place to help. All are agreed that it is possible to enact some of the suggested solutions included (example, MAF and TMS to collaborate to improve extension services given to community farmers and also to help improve farmer training materials/courses).

Across the tables of the two groups, the findings were very similar and tended towards the discovery of issues at the institutional level of the issues with Agriculture. While this is an eventual outcome and a positive one in terms of the involvement of the participants in their discussions to identify root cause, it brought the workshop organisers to the decision to discuss with MAFFF counterparts on the need to revisit the Food Security Framework for Tonga.

The results of the group works have been distilled by the workshop organisers and participants into the following tables in the next section of the report.

Summary outcomes and follow up

The results of the group work (sourced from the work tables they completed) have been distilled further into two tables by the participants and the facilitators as found in Annex 1 and Annex 2. The information has been sorted into a 'moving forward' set of action oriented tables that, following the discussions on Wednesday afternoon and Thursday morning, will be sources for the immediate future development of a Food Security Framework document for MAFFF. The first table (Annex 1) has evolved into a Monitoring and Evaluation (M&E) table that has identified Goals, Strategies, Indicators, Baselines, Targets, Means of Verification, and Assumptions and Risks. A second table (Annex 2) was also created called an Action Plan Matrix, which would be a direct input source for an eventual Food Security Framework, and this framework identifies, Actions, Indicators, National agency Leads/Partners, CROP agency leads/partners, and a budget column that will be completed at a later stage.

Climate Change, Variability, and extreme weather pose significant risks

Earlier this year, Tonga's islands were ravaged by Tropical Cyclone Ian, a Category 5 system with over 200km per hour winds. The storm skirted east of the Vava'u group, before the eye passed directly over the northeast islands of Ha'apai, impacting around 5,000 people. The cyclone brought destructive winds and heavy rain, and caused flash flooding in low-lying coastal areas, prompting the Prime Minister to declare a state of emergency for Vava'u and Ha'apai the same day. One person died and thousands were left homeless in the worst affected islands of Uiha, Lifuka, Foa, Ha'ano, Lofanga and Mo'unga'one. In aerial photos taken by the New Zealand Air Force, debris could be seen scattered throughout villages, with roofs ripped from houses, power lines down, and trees uprooted. Food security in Tonga came under pressure, in the background of NCDs being a priority concern.

The above serves as a reminder of the types of extreme features of weather and climate that can deteriorate food security in a short period of time. Slow onset events like drought, linked to El Nino phases of ENSO are also common features of Tonga's climate that food security has to contend with also. With the changing climate as a backdrop to this island nation, the monitoring of food security concerns for Tonga will continue to be high on a priority list for MAFFF.

Through the group work of the participants, the concern about the frequency and intensity of future extreme events such as tropical cyclones and drought is rated highly. These, they feel, are what triggers issues with food security that have knock on effects. An example was given in terms of the recent tropical cyclone, that while above ground crops such as bananas became short in supply, the access to substitute ground crop such as taro and yams were also hampered by the damage to the infrastructure that provided for access to plantations per damaged roads and destroyed market places. While fortunately these were addressed in the short term, it was discussed that better planning could have avoided unnecessary delays. It was also recognized, though little discussed, that traditional subsistence agriculture continued to provide good food supply in times of extreme weather events.

The Tonga Meteorological Service (TMS) representatives were quite helpful in their contribution to the workshop. With their expert knowledge in the interpretation of the climate change projections

as done by the ICCAI PCCSP project, possible applications can be developed together with MAFFF under a partnership seeking to strengthen and complement the research and extension type services of each agency.

A Food Security oriented framework would assist MAFFF with better planning

The group discussions raised several discussion points about the need for a holistic approach to the issues dealing with a common and shared approach to help monitor the progress of programmes and activities for Tonga, aimed at improving food security and creating new sustainable and collaborative partnerships in support of its various elements. Ultimately, this raised the issue for the MAFFF and LRD teams to discuss the relevancy of drafting a new national food security strategy that would not only address the core elements of food security definitions, but also include strong elements for accounting for and preparing for climate variability, change, and extreme weather impacts on agriculture.

During the exercise, all stakeholders identified the need to strengthen synergies between programs and Ministries to avoid unnecessary and costly overlaps. Lack of coordination between stakeholders is resulting in fragmented and ineffective impacts of programs and interventions. As such, the Government of Tonga has identified food security as an excellent convergence for all sectors to work together to produce meaningful results of programs with overall aim to improve food security and thrive economic development. An incoming national food security framework thus would be formulated to delineate clear roles and synergies amongst stakeholders to eliminate the unnecessary and costly overlaps amongst programs.

At the conclusion of the workshop, it was agreed that the LRD facilitators and MAFFF counterparts would continue to work together to draft a Tonga Framework for Action on Food Security.

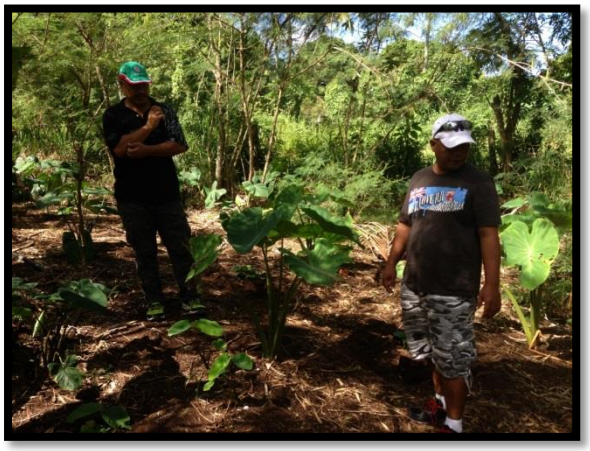
Conclusion

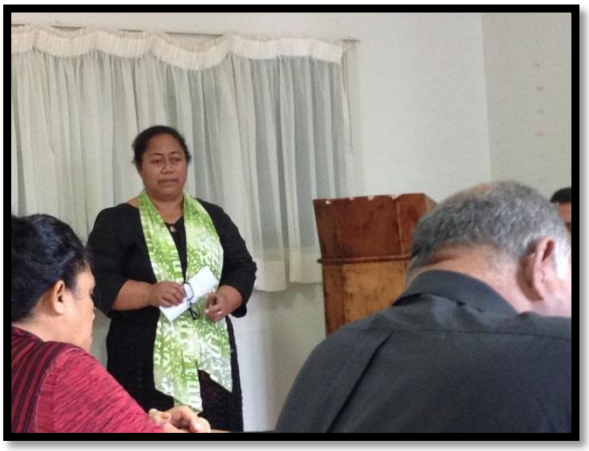
The training workshop on Food Security and Climate Change was implemented successfully, as part of the SPC/USAID project activities for Tonga. The training provided participants with new information on details of the climate variability, change and extreme weather projections, changes, and trends of Tonga. While there is common appreciation of the regular climate of the country, most of the information shared was on a level of detail that had not been understood before, or have had previous training organised on that level before. There was undoubtedly a lot of information shared on climate science, climate variability, long term change, and the influences on weather extremes like tropical cyclones, storm surges, flash flood rain, and other features. While much of this was new to the participants with non-meteorology background, they appreciated the application of agriculture advisories that could potentially be garnered from such information. Understanding the final and potential costs of disasters related to climate and weather influence provide a good economic motivation for the mainstreaming of climate information into existing agriculture planning efforts. The feedback from the participants about the usefulness of the training workshop and the new knowledge gained served to build a foundational appreciation for the services of agencies like the Tonga Meteorological Service, whose tailored products and services could provide a new set of research and extension improvements to advisory services and products already being given to farmers. Bringing together representatives from MAFFF, the Tonga Meteorological Service, the private sector, and other government agencies helps provide a potential new partnership bridge for the sharing of climate information to the primary sector.

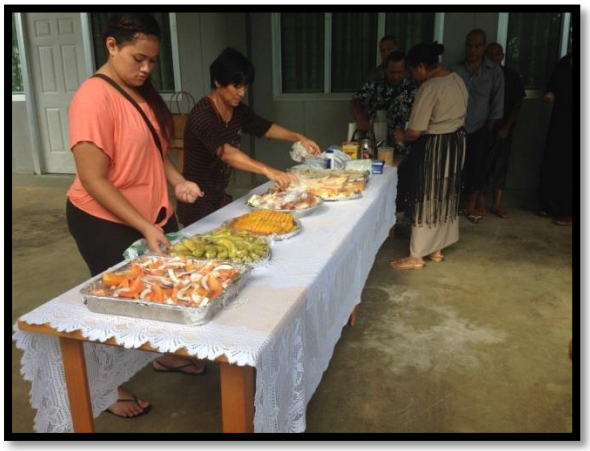
The food security component of the training, much more familiar to the participants, nevertheless extracted new information and opinions on how the Tonga communities of practice could better plan and programme activities together in support of monitoring and motivating solid food security practices. The session served to underscore the fact that a lot of agriculture knowledge exists for monitoring and implementing food security monitoring, but currently lacks a system for practice and implementation. To this gap, and spurred on by the institutional discussions around the themes of supporting a food security monitoring and partnership effort, the next recommended step out of this workshop is for SPC and MAFFF counterparts to work on producing a draft national food security strategy that brings in all the contributing elements of food security in Tonga, reflecting also of course the climate change risks.

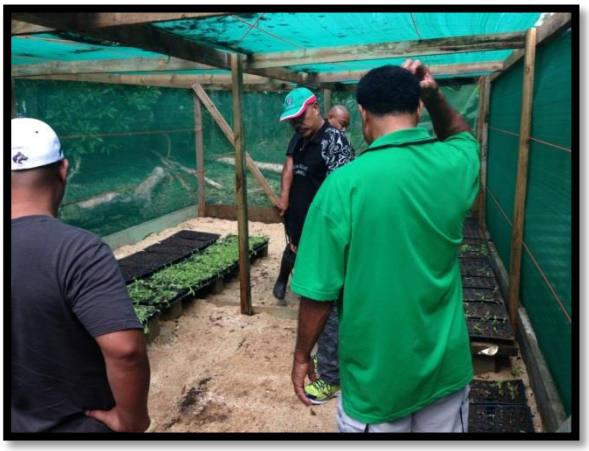
A national framework for action on food security is currently being prepared by SPC and MAFFF counterparts, and a first draft will be completed by 4th quarter of 2014. MAFFF and SPC counterparts will plan activities around the validation of the draft framework, and for a round of consultation in Tonga for this as follow up.

The SPC/USAID team acknowledges the generous support of the Tonga Ministry of Agriculture, Food, Forests and Fisheries for their kind support and supporting resources in the execution of this training workshop. In particular the USAID National Coordinator, Mr Fehi Moala kindly coordinated and prepared the organisation of the logistics and participants.









Attachments

1. Final Agenda of Tonga FS&CC Training Workshop


Adobe Acrobat Document

2. Participants list


Adobe Acrobat Document

3. Minister's Speech to Open the Workshop


Adobe Acrobat Document

4. Completed group tables (Group 1 Dean, Group 2 Gibson)


Adobe Acrobat Document


Adobe Acrobat Document

Annexes

Annex 1. Monitoring and Evaluation Matrix

Goals	Strategies	Indicators	Baseline	Target	MOV	Assumptions/ Risks
1. Improve availability of sufficient food of appropriate quality	• Improve soil health productivity • Enhance availability of off season crops • Strengthen pest and disease management • Increase livestock production • Strengthen Research and Extension Delivery Services	• Number of farms adopting sustainable farming practices • increased availability of crops • % Number of livestock number increased • Crop yield increased • Acreage degraded areas replanted	• Increasing reliance on imported food • Limited capacity of farmers • Limited access to planting materials	• Improve soil health and productivity • Increase supply of crops (during off-season) • Increased number planting materials distributed and planted • Increased area of farmlands	• HIES • Ministry Reports • Trade Stat	• High production problems • Strong community support
2. Enhance all households' access to adequate resources to acquire appropriate and nutritious food.	• Support Trade and Marketing of Local Food and Fisheries Products • Increase competitiveness of agriculture products • Strengthen synergies between tourism and agriculture • Increase export capacity • Strengthen capacity of food safety authorities	• # value added products marketed in domestic markets • Number of food processing training conducted • Number of restaurants serving local food • Number trainings and number of trainees on food safety • One food safety lab established • Income from agriculture sales increased • Contribution of agriculture to GDP increased	• Limited value addition • % agriculture contribution to GDP	• Number of restaurants serving local food increased • Number of dishes promoted on local food • Food safety authorities trained • Food quality and food safety products enhanced	• HIES • Trade Stat • Population Census	• Availability of food processing and food safety technical capacity • Availability of local produce supply • Strong government support with availability of funding
3. Improve food	• Promote Household Health and Nutrition	• Number of people receive awareness	• Limited awareness and knowledge on	• At least 1000 people receive awareness	• MOH reports	• Health problems

utilization	Strengthen awareness and education on nutrition and healthy food choices • Promote farm diversification	• Number of awareness conducted • % reduced diabetes rates • % reduced in hypertension rates • % reduced in obesity rates • Reduced prevalence of anemia and Vitamin • % reduced in micronutrient deficiencies • Contribution of local food to diet	value of local food • NCD rates increasing • High Prevalence rates of anemia among women and children	• % reduced diabetes rates • % reduced in hypertension rates • % reduced in obesity rates • Reduced prevalence of anemia and Vitamin • Reduced reliance on imported food	• STEP surveys, National DHS	remain high • Reliance on local food remain high
4. Ensure resiliency of food supply systems	• Improve resilience of food supply systems • Improve and diversify income generating opportunities with local food	• Enhanced capacity to adapt to CC • Income diversity increased	• Limited capacity to adapt to CC • Limited income opportunities	• CC capacity building provided • Income generating opportunities increased	• Ministry monthly reports • HIES	• Adaptation capacity remain low • Availability of local and export markets

Annex 2. Action Plan Matrix

Goal 1. Improve availability of safe and nutritious food				
Strategy 1: Improve soil health and productivity				
Actions	**Indicators**	**Lead/Partners**	**CROP**	**Budget**
a. Training on suitable farming techniques to improve farming practices to minimize soil erosion (e.g. reduce soil cultivation during wet season)	• Number of farming techniques adopted by farmers • Reduced soil cultivation • Number of trainings provided	Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, TMS,	SPC FAO UNDP IFAD	
b. Soil diagnostic training provided to	• Number of training provided • Number of extension officers trained (TOT)	Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, TMS,	SPC	
c. Promote use of cover crops (mucuna)	• Number of farms using cover crops			
d. Minimise use of machinery	• No. of land preparation per farm per year			
e. Promote organic farming	• Number of farm certified organic			
f. Promote contour/terracing farming	• Farms on sloping areas adopt contour / terracing			
g. Document/promote traditional farming techniques	• Traditional documentation and promoted			
h. Improve fallow/shifting cultivation where possible	• Awareness on improving fallow periods			
i. Awareness provided to minimise deforestation and promote rehabilitation of	• Number of awareness • Deforestation minimised			

degraded lands using agroforestry species				
j. Bad weather	• Will be addressed under CC			
Strategy 2: Increase availability of off-season crops				
a. Conduct trials and training on suitable off-season vegetables	• On farm trials established on suitable vegetable production	Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, TMS,	SPC	
b. Target production during off-season	• Training on production problems conducted			
c. Introduction of suitable varieties for off season	• New varieties introduced • Increase availability of seeds and seedling			
Strategy 3: Improve pest and disease surveillance				
a. Pest and disease management training provided to farmers	• Strengthen research on integrated pest/disease management	Quarantine and Extension, MAFF, MOH, MOE, MOF, MLCI – Min of Labour, Commerce and Industry, Private Sectors – Businesses, Farmers	SPC FAO	
b. Strengthen pest and pests and disease surveillance through partner with extensions and farmer community	• MOU between Quarantine and other MAFF Divisions to assist with surveillance	Quarantine and Extension, MAFF, MOH, MOE, MOF, MLCI – Min of Labour, Commerce and Industry, Private Sectors – Businesses, Farmers		

C. Diversify pest and disease management approaches to minimise pesticide resistance (ongoing trials)	• Need mapping of disease occurrence, emergence, incursions – overlay with climate data			
d. Strengthen awareness to reduce smuggling	• Strengthen enforcement identified			
e. Conduct import risk analysis with major trading partners	• High Risk Countries for Animal/Plant identified;			
f. Strengthen bilateral quarantine agreements???	• Partnership between Quarantine and Trade – Strengthen Quarantine Enforcement of Quarantine Regulations			
g. Equip quarantine services (e.g. X-ray Machine)	• Quarantine fully equiped			
Strategy 4. Improve livestock production				
a. Conduct livestock feasibility on suitable husbandry practices	• Number of assessments conducted • Number of new livestock farms	Livestock, MAFFF Research Division, MAFF, Town Officers, District Officers, Farmers, TMS,		
b. Introduction and promotion of improved small livestock species (introducing new lines)	• Number of livestock increased (Chicken, Ducks, Goats, Sheep, Pigs)			
c. Establish breeding program	• One breeding centre established			
d. Provide training on livestock husbandry practices	• Number of trainings conducted • Number of participants adopting new husbandry practices			
e. Advocate prioritisation of scholarship for Veterinary studies	• Scholarship provided for Vet studies			

f. Strengthen TOT for PARAVET Program	• Number of PARAVET Officers trained			
g. Conduct trials to identify feed supplements	• Feed supplements identified			
h. Training on feed preparation	• Number of trainings provided			
i. Conservation of national local breeds	• Local breed genebank established			
Strategy 5: Strengthen research and extension service delivery on local food production systems				
a. Conduct TOT on Participatory rural training	• MAFFF Extension Officers trained on PRA	Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, Local/District Governments		
b. Farmer field trainings conducted	• Number of farmers trained			
c. Establish on farm trials and farmer field schools???	• **On farm trials and farmer field schools established in each district**			
Goal 2. Improve access to safe and nutritious food				
Strategy 1: Support Trade and Marketing of Local Food (and fisheries) Products				
a. Identify at least 5 potential value added products	• 5 value added products identified	Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, Local/District Governments		
b. Promote simple food processing and value addition technologies	• Value adding technologies promoted • Number of enterprises adopting technologies			

c. Conduct training on value addition	• At least 6 communities and enterprises received training			
Strategy 2: Strengthen synergies between the agriculture and tourism sectors				
a. Conduct training on local cuisines to restaurants and hotels	• Number of trainings conducted • Number of restaurants serving new local recipes	MOH, MAFF	SPC IACT?	
b. Provide incentives to restaurants and hotels prioritizing local food	• At least 3 enterprises awarded			
Strategy 3: Identify potential export crops (and fisheries) products and enhance export opportunities				
a. Promote production of potential export/ or cash crop and fisheries products	• At least 3 new export commodities identified	PS, Research Division, MAFF, Extension, MAFFF, Town Officers, District Officers, Farmers, Local/District Governments	SPC IACT	
b. Train farmers on quality standards	• Number of trainings conducted			
c. Identify export markets for local foods	• At least 2 export markets identified			
d. Strengthened domestic and international transport linkages	• Export transportation secured			
Goal 3: Improve food utilisation				
Strategy 1: Promote Household Health and Nutrition				
a. Improve knowledge on healthy food choices	• % of people making smart choices on healthy food	MOH, MAFFF		
b. Strengthen awareness and education on nutrition and	• Food and nutrition security awareness and education programs developed			

healthy food choices				
Strategy 2: Development of national diet guideline and healthy lifestyles				
a. Document local food recipes and traditional knowledge on food preparation and preservation techniques	• Document and develop local recipe guidelines	MOH, MAFFF		
b. Promote nutrition and physical activity (with focus on farming as important physical activities) to schools and government employees	• Strengthen nutrition and physical activities in schools • Number of employees participating in physical activities • Number of school gardens established			
c. Develop school dietary guidelines for households and food vendors and advocate guidelines	• Number of vendors and households and individuals adopting dietary guidelines			
d. Analyse nutritive value of local foods and document	• At least 6 high nutritive Vitamin and Iron rich varieties identified and promoted			
Strategy 4: Strengthen capacity of food safety authorities				
a. Trainings provided to food authorities	• Number of trainings provided • Number of Food Safety Officers trained and certified	MOH, MAFFF		
b. Equip food analysis laboratories	• At least one capable food analysis laboratory developed			
c. Capacity of food analysis provided	• At least 3 Officers competent in food analysis			
Goal 4: Enhance resilience of food supply systems				
Strategy 1: Increase adaptation to changing climate, and preparedness to, and management of natural disasters				
a. Undertake Climate Change Vulnerability Assessment and Disaster Risk Assessment	• Completed assessments for at least 6 communities • Number of government and NGO partnerships on assessments			

	• Assessments finalized and published			
b. Training on CCA and DRR	• Number of trainings conducted • Number of trainees • Community disaster committees established and community climate change adaptation and disaster management plans using assessments from (a) completed and trialed			
c. Establishment of emergency disaster management systems	• Emergency disaster management systems established in 6 communities			
d. Promote resilient production systems	• At least 5 resilient crop varieties identified and promoted, with economic assessments completed for each selected crop			
d. Assess resilient high nutritive local varieties and other introduced varieties	• At least 4 resilient varieties identified and documented			
e. Establishment of genebanks and promote conservation, distribution and utilisation of high nutritive genetic materials	• At least 6 genebanks established • 4 resilient varieties conserved in genebanks • Number of genetic materials distributed and utilised			
Strategy 2: Improve and diversify income generating opportunities through				
a. Strengthen market linkages with farmers	• Market opportunities identified and promoted in communities			
b. Identify potential income generating communities and identify markets	• At least 5 markets identified for local food products			
Strategy 3: Crop Modeling				
a. Partnership between MAFFF and TMS established	•	MAFFF and TMS		

b. Collect data for Crop modeling	•			
c. Provide training on Plant Gro Crop modelling	•			