

TRAVEL REPORT FORM

출장보고서

결 재	사원	원장		
	04/19 강보라	04/20 정홍상		
협 조				

I. Reporter 보고자

Department 소속	Position 직위(직급)	Name 성명	Travel Date 날짜	Note 비고
원장실	원장	정홍상	2017.3.6.~11.	통가 누쿠알로파

II. Major Activities 주요업무 수행내용

1. Main Contents and Activities 주요내용 및 활동

- 1) APCC Tonga AgroMet and Water Projects Joint Final Workshop 참석 및
신규 프로젝트 MOU 체결
- 일시 : 2017년 3월 8일
- 장소 : Tanoa International Dateline Hotel, Nuku'Alofa, Tonga
- 2) 수자원 및 농업 부문 세부협의를 위한 통가 정부 관계자와의 미팅
- 통가 농림식품수산부 장관 미팅(2017년 3월 8일, MAFFF Head Office)
- 통가 토지천연자원부 장관 미팅(2017년 3월 9일, MLSNR Office)
- 통가 부총리 미팅(2017년 3월 9일, MEIDECC Office)

2. Relevance to APEC Climate Center's Activities 결론 및 소감

- 1) APCC통가 프로젝트 최종 워크숍을 통해 프로젝트 결과를 공유함으로써 향후 2년 연구사업에 대한 MOU 체결 문건 검토를 실시할 수 있었으며, 통가 국토부 및 농림부 장관 동의 하에 부총리 사인을 통한 Agri-Water 사업의 MOU체결을 진행함.
- 2) APCC-통가정부부처 간 상호양해각서 하에서 수자원과 농업 분야의 원활한 사업 추진 방안 및 향후 계획을 논의할 수 있게되었음.
- 3) 통가 정부 관계자(장관, 부총리)와의 미팅에서는 AgroMet and Water 프로젝트 결과를 공유하며 통가 물부족 대응에 더욱 도움이 되도록 협의하고 성공적인 상호 협력관계를 잘 유지하도록 합의함.

III. References 참고사항

(with attachment of any information or report in case of attendance of conferences, workshops and meetings) 학술대회, 워크숍, 회의 등 참석 시 관련 정보 및 문서 첨부

1. Presented and Collected Materials 주요 수집자료

2. Suggestions and Remarks 건의사항

APCC Tonga AgroMet and Water Projects Joint Final Workshop

Final workshop for the projects:

- [AgroMet Project] Improving Agricultural Productivity through Ensuring Data Availability and Enhancing Agro-meteorological Services
- [Water Project] Development of Smart Groundwater Management System in the Kingdom of Tonga: Utilizing Climate Information in Response to Shortage of Water

Featuring the initiation and signing of the MOU for the project:

- [Agri-Water Project] Development of smart water management system using climate information in response to shortage of water in the Kingdom of Tonga

1 SUMMARY

Name	APCC Tonga Joint Final Workshop		
Projects	- Improving Agricultural Productivity through Ensuring Data Availability and Enhancing Agro-meteorological Services - Development of Smart Groundwater Management System in The Kingdom of Tonga: Utilizing Climate Information in Response to Shortage of Water - Development of smart water management system using climate information in response to shortage of water in the Kingdom of Tonga	Date	Wednesday, 8 March 2017
Location	Nuku'alofa, Tonga	Venue	Tanoa Dateline Hotel
Participants	40 Government officials and project beneficiaries	Food or Drink	Lunch
Lead Organizer	APEC Climate Center	APCC Staff	- Dr. Kwanghyung Kim - Dr. Sunkwon Yoon - Dr. Yeonghee Shin - Ms. Inja Jeon - Ms. Christianne Aikins

Partners	- Tonga Meteorological Service - Ministry of Agriculture and Food, Forest and Fisheries - Ministry of Lands, Survey & Natural Resources		
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2 BACKGROUND AND PURPOSE

2.1 PROJECT BACKGROUND

2.1.1 AgroMet Project

Project Period: August 2014 – December 2016

Key APCC Personnel: Dr. Kwanghyung Kim (Principle Investigator)
Ms. Christianne Miko Aikins (Project Manager)

Workshop Goal: Final event to complete project

The project *Improving agricultural productivity through ensuring data availability and enhancing agro-meteorological services* is a partnership between the APEC Climate Center and the Tongan government with the Ministry of Agriculture and Food, Forests, and Fisheries (MAFFF) and the Tongan Meteorological Service (TMS) as implementing partners. Through scientific research, development of tailored products, and strong engagement with stakeholders, the project helped to increase the capacity of Tongan growers in managing climate risks.

The project ran from August 2014 to December 2016. The project was led by Dr. Kwanghyung Kim (Principle Investigator (PI)) with Ms. Mara Baviera (Project Manager, 2014-2015) and Ms. Christianne Miko Aikins (Project Manager, 2015-2017)

The project was based on four components:

1. Assessment of users' needs and capacities
2. Development of an agricultural database: Tonga Agricultural Information System (TAIS)
3. Research through modeling and field trials
4. Development of an Agro-climate service: Tonga Climate Service for Agriculture (ToCSA)

This workshop acts as the final project activity, closing the project and disseminating the key outputs.

2.1.2 Water Project

Project Period: January – December 2016

Key APCC Personnel: Dr. Sunkwon Yoon (Principle Investigator)
Dr. Jaepil Cho

Ms. Eunjeong Lee
Ms. Inja Jeon (Project Manager)

Workshop Goal: Final event to complete project

The project *Development of Smart Groundwater Management System in The Kingdom of Tonga: Utilizing Climate Information in Response to Shortage of Water* has been done in cooperation with the natural resources division of Tongan Ministry of Lands and Natural Resources as implementing body. Through scientific research, application of tailored technology and modeling, and active cooperation with stakeholders, the project contributed to increased accessibility to groundwater information and the capacity of Tongan government officials in utilizing the obtained information for strategic planning of water management. The project was implemented from January to December in 2016 and led by Dr. Sunkwon Yoon (PI) in cooperation with Dr. Jaepil Cho and Ms. Eunjeong Lee as participating researchers and Ms. Inja Jeon (Project Manager, PM).

The project was based on four components:

1. Needs and capacity assessment of counterpart
2. Development of groundwater monitoring system
3. Development of groundwater modeling
4. Climate change impact assessment

Disseminating the key outputs, closing the current project and discussion on the consecutive project will be done during this workshop.

2.1.3 Development of smart water management system using climate information in response to shortage of water in the Kingdom of Tonga (Agri-Water Project)

Project Period: January 2017 – December 2018

Key APCC Personnel: Dr. Sunkwon Yoon (PI, Groundwater Management Component)
Dr. Yeonghee Shin (PI, Agriculture Component)
Dr. Kwanghyung Kim (Agriculture Component)
Ms. Inja Jeon (Project Manager)

Workshop Goal: First event to launch project and sign MOUs

[Groundwater management]

This project aims to provide support for better understanding and implementation of water management policies in the Kingdom of Tonga. The focus will be to provide guidance to Tongan government for a strategic plan for securing water resources in response to seasonal variability and changing climate. The various project activities will be implemented within the framework of APEC Climate Center (APCC) and Tonga's Ministry of Lands, Survey & Natural Resources (MLSNR) partnership for two years (2017-2018).

The project will cover two major substantive areas: (i) improving the access of water resource data and its management system for government officials; and (ii) improving

resilience towards water resources in the context of seasonal variability and climate change. More specifically, the project will aim to:

- **Component 1:** installation of the real-time groundwater monitoring system and development of advanced groundwater flow model
 - To improve the accessibility of the government officials to water resource by installing the real-time groundwater monitoring system in selected sites
- **Component 2:** development of climate-smart groundwater information system and decision-making system for sustainable water resources management
 - To support the stakeholders and decision-makers in Tonga's water resources sector to sustainably secure water resources by providing optimal alternatives to the current water management system.

This work will contribute towards capacity building of the water resource managers in Tonga as well as to allow government officials to establish a strategic plan for water management for the public with more science based system, which will strengthen their ability in responding to climate variability for their water management. This project will be led by Dr. Sunkwon Yoon as PI and Ms. Inja Jeon as Project Manager in close collaboration with the MLSNR of Tonga.

[Agriculture]

This project aims to increase the capacity of Tongan crop growers and government officials in managing climate risks such as drought in crop fields. The focus will be to support the beneficiaries in Tonga's agriculture sector to sustainably secure crop production by providing optimal soil moisture management to the current agriculture system. The various project activities will be implemented within the framework of APCC and Tonga's MAFFF (Ministry of Agriculture & Food, Forests and Fisheries) partnership for two years (2017-2018).

The project will cover two major substantive areas: (i) improving the access of beneficiaries to water resource data; and (ii) improving resilience towards water resources for agricultural use in the context of climate change. More specifically, the project will aim to:

- **Component 1:** Installation of soil moisture sensors and soil water potential sensors and monitoring soil moisture condition
 - To improve the accessibility of the stakeholders to soil water resource by installing a sensor in selected sites as well as to validate the monitoring data
- **Component 2:** Modeling for soil moisture contents
 - To help efficient use of agricultural water with the modeling results along with the moisture content and crop water consumption
 - To estimate soil moisture content for unmeasured area and provide useful information on the soil to beneficiaries

This work will contribute towards the establishment of the strategic plan for effective water management in response to abnormal weather such as drought. In addition, the commercial farmers are expected to be able to stabilize their crop production as well as to prevent the economic loss thanks to the preemptive response to drought. This project will be led by Dr. Yonghee Shin as project investigator and Ms. Inja Jeon as project manager in close collaboration with the MAFFF of Tonga.

2.2 WORKSHOP OBJECTIVES

- Increased awareness about APCC and the successful outcomes of these projects among key stakeholders
- Official handover performed of the Tonga Climate Service for Agriculture (ToCSA*) to TMS and MAFFF to ensure the sustainability of the service and encourage increased inter-ministerial collaboration
 - ✧ ToCSA: The online AgroMet portal developed by APCC in partnership with TMS and MAFFF under the AgroMet project to bring together agricultural and meteorological data to better equip farmers with climate and weather-based tools for adaptive agricultural planning
- Introduction of the upcoming project *“Development of smart-water management system using climate information in response to shortage of water in the Kingdom of Tonga”*
- MOU signing ceremony for 2017 project among Ministry of Lands, Survey, and Natural Resources (MLSNR), Ministry of Agriculture & Food, Forests and Fisheries(MAFFF), Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication (MEIDEC) and APCC
- Enhance relations between APCC and key government partners

3 AGENDA

Time	Item	
10:00 – 10:05	Word of Prayer	Mr. Manaia Halafihi (MAFFF) [TBC]
10:05 – 10:15	Welcome Address from the Ministry of Agriculture and Food, Forests and Fisheries	Dr. Viliami Toalei Manu (CEO, MAFFF)
10:15 – 10:25	Welcome Address from the Ministry of Lands, Survey & Natural Resources	Mr. Fetu'u Ve'a (Acting Deputy Secretary, MNSLR)
10:25 – 10:30	Address from APCC	Dr. Hong-Sang Jung (President, APCC)
10:30 – 10:40	Signing of MOU for Agri-Water Project	APCC-MAFFF-MNSLR-MEIDECC
10:40 – 10:55	AgroMet Project: Highlights of the August 2014 - December 2016 AgroMet Project	Dr. Kwanghyung Kim (Research Fellow, APCC)
10:55 – 11:05	AgroMet Project: Presentation from the Ministry of Agriculture and Food, Forests and Fisheries	Mr. Manaia Halafihi (MAFFF)
11:05 – 11:15	AgroMet Project: Presentation from the Tonga Meteorological Service	Mr. 'Ofa Fa'anunu (Director, TMS)
11:15 – 11:20	AgroMet Project: ToCSA System Handover Ceremony	Dr. Hong-Sang Jung (President, APCC) Mr. 'Ofa Fa'anunu (Director, TMS) Dr. Viliami Toalei Manu (CEO, MAFFF)
11:20 – 11:25	AgroMet Project: Address from Project Beneficiaries	Ms. Ella Gabriel (Research and Development Officer, Nishi Trading) and Mr. Saia PekiPaki (Farmer)
11:25 – 11:45	Water Project: Highlights of the 2016 Water Project	Dr. Sunkwon Yoon (Research Fellow, APCC)
11:45 – 11:50	Water Project: Presentation from the Ministry of Lands, Survey & Natural Resources	Mr. Taaniela Kula (Deputy Secretary, MNSLR)
11:50 – 12:00	Agri-Water Project: Presentation on upcoming APCC Project <i>development of smart water management system using climate information in response to shortage of water in the Kingdom of Tonga</i> from	Dr. Yonghee Shin (Research Fellow, APCC)

12:00 – 12:05	Updates on the April 2016 – March 2017 Project <i>Improved austral winter seasonal forecast and tropical cyclone sub-seasonal to seasonal outlooks in Kingdom of Tonga through APCC MME seasonal prediction</i>	Ms. Miko Aikins (Project Manager, APCC)
12:00 – 12:05	Vote of Thanks	Mr. Manaia Halafihi (MAFFF) [TBC]
12:05 – 12:15	Closing Prayer	Mr. Manaia Halafihi (MAFFF) [TBC]
12:15 – 13:45	<i>Lunch</i>	

4 PARTICIPANT LIST

In total, 50 participants are expected to attend, including members of APCC. Staff-level governmental partners, non-governmental project partners, and other project beneficiaries have not been listed by name in the workshop plan, but will be listed fully in the workshop report.

MINISTRY OF AGRICULTURE AND FOOD, FORESTS, AND FISHERIES (MAFFF)

- Dr. Viliami Toalei Manu (Chief Executive Officer, MAFFF) [TBC]
- Mr. Manaia Halafihi (Head of Corporate Service Division, MAFFF)
- 2 or 3 staff will be added [TBC]

MINISTRY OF METEOROLOGY, ENERGY, INFORMATION, DISASTER MANAGEMENT, ENVIRONMENT, CLIMATE CHANGE AND COMMUNICATIONS (MEIDECC) AND THE TONGAN METEOROLOGICAL SERVICE (TMS)

- Hon. Siaosi 'Ofakivahafolau Sovaleni (Deputy Prime Minister and Minister for Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications) [TBC]
- Mr. 'Ofa Lehua Kisaione Fa'anunu (Director, TMS)
- 1 or 2 staff will be added [TBC]

MINISTRY OF LANDS, SURVEY AND NATURAL RESOURCES (MLSNR)

- Lord Ma'afu (Minister for Lands, Survey and Natural Resources)
- Mr. Fetu'u Vea (Acting Chief Executive Officer, MLSNR)
- Mr. Taaniela Kula (Deputy Secretary, MLSNR)
- Mr. Rennie Vaiomounga (Senior Geologist, MLSNR)
- 1 or 2 staff will be added [TBC]

APEC CLIMATE CENTER (APCC)

Name	Role at APCC	Project
Dr. Hong-Sang Jung	President	All
Dr. Kwanghyung Kim	Team Leader, Strategic Planning Team, Climate Application Department	AgroMet Project, Agri-Water Project
Dr. Sunkwon Yoon	Research Fellow, Climate Application Department	Water Project, Agri-Water Project
Dr. Yonghee Shin	Research Fellow, Climate Application Department	Agri-Water Project
Ms. Inja Jeon	Project Manager	Water Project, Agri-Water Project
Ms. Christianne Miko Aikins	Project Manager	AgroMet Project

5 SIDE-MEETINGS

Date	Participants	Details
08/03/2017 PM	- Dr. Hong-Sang Jung - Dr. Sunkwon Yoon - Dr. Kwanghyung Kim - Ms. Inja Jeon - Lord Ma'afu (Hon. Minister of MLSNR) - Taaniela Kula (Deputy Secretary of MLSNR)	Meeting to discuss: - Current status of water management and the urgent issue to be tackled - Feedback on the current project - Seek out the possibility of further joint project development for groundwater management and funding opportunities
09/03/2017 [TBC]	- Dr. Hong-Sang Jung - Dr. Kwanghyung Kim - Hon. Siaosi 'Ofakivahafolau Sovaleni (Deputy Prime Minister and Minister, MEIDECC) - Mr. 'Ofa Lehua Kisaione Fa'anunu (Director, TMS),	Meeting to discuss: - Past achievements in Tonga to promote APCC visibility and recognition - Collaboration on current projects - Opportunities for future collaboration in supporting TMS and MEIDECC
10/03/2016 AM	- Dr. Hong-Sang Jung - Dr. Kwanghyung Kim - Mr. Manaia Halafihi (Head of Corporate Service Division, MAFFF)	- Field visit to the Vaini Research Station to see Automatic Weather Station and Field Trial location
10/03/2016 PM	- Dr. Hong-Sang Jung - Dr. Kwanghyung Kim - Ms. Ella Gabriel (Research and Development Officer, Nishi Trading)	- Field visit to project beneficiary farms, including Nishi Trading