

Challenges and Opportunities of Groundwater Governance in the Kingdom of Tonga

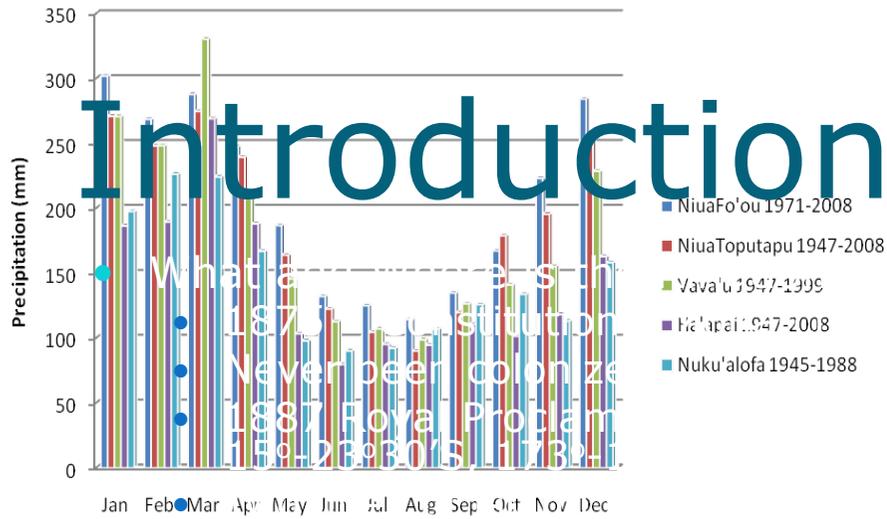
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"Groundwater Governance: A Global Framework for Action"
Regional Consultation for Asia and the Pacific Region,
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Institute of Hydrology and Environmental Geology (IHEG)
Shijiazhuang, CHINA



Introduction



• Islands Groups: (1) Tongatapu ('Eua), (2) Ha'apai, (3) Vava'u, (4) Niua

• Rainfall Distribution

- Even throughout the year with noticeable lows during May and November and worst when associated with El Nino events.
- Rainfall is 1700mm annually in the southern island - 2500mm in the northern remote islands.
- Temperature ranges from 22.6°C in the south to 29.9°C to the north
- Average of 1.3 cyclones per year since 1969
- Source of Water: Groundwater and Rainwater

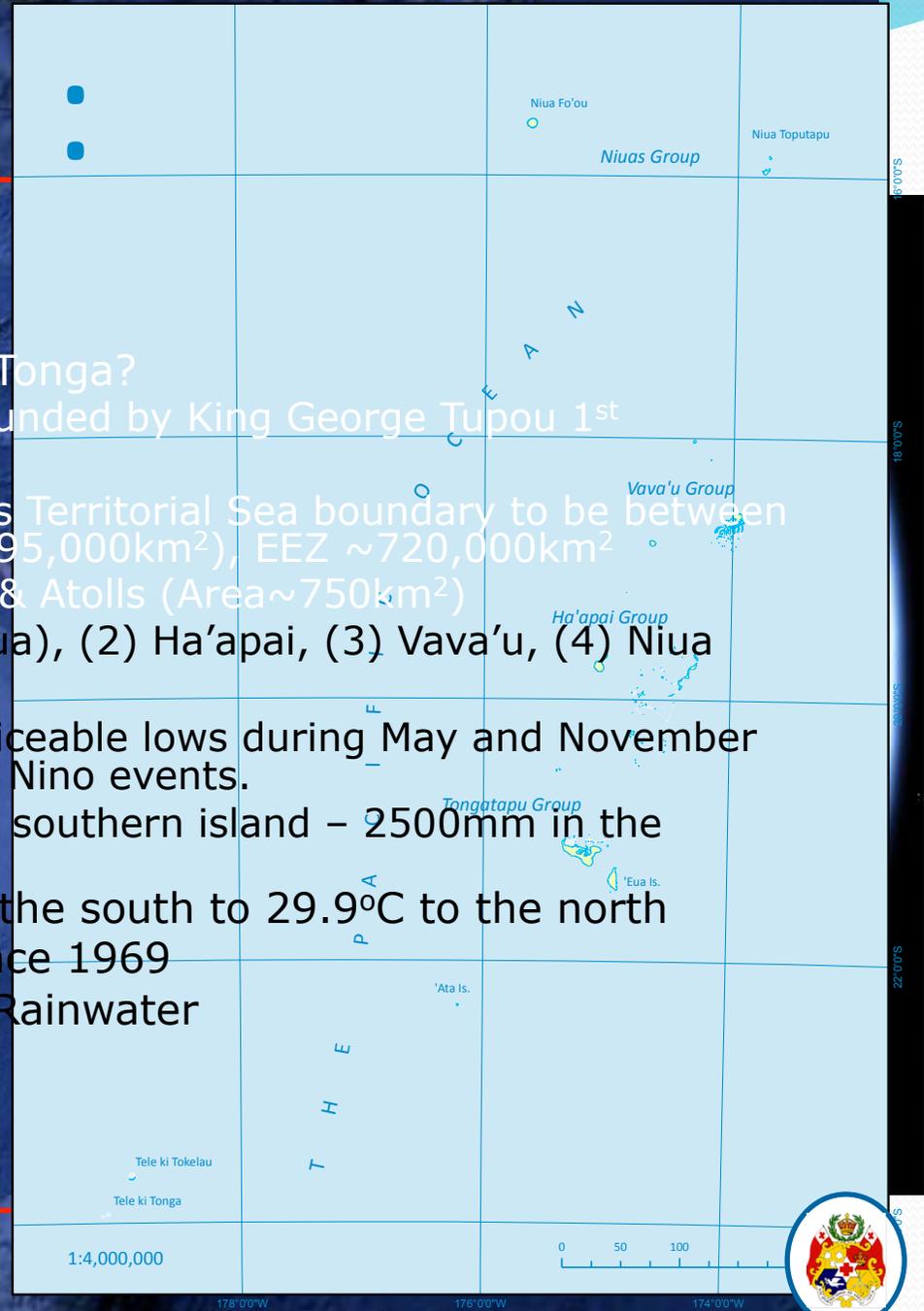
Tonga?

• Bounded by King George Tupou 1st

• 's Territorial Sea boundary to be between

• 395,000km², EEZ ~720,000km²

• & Atolls (Area ~750km²)



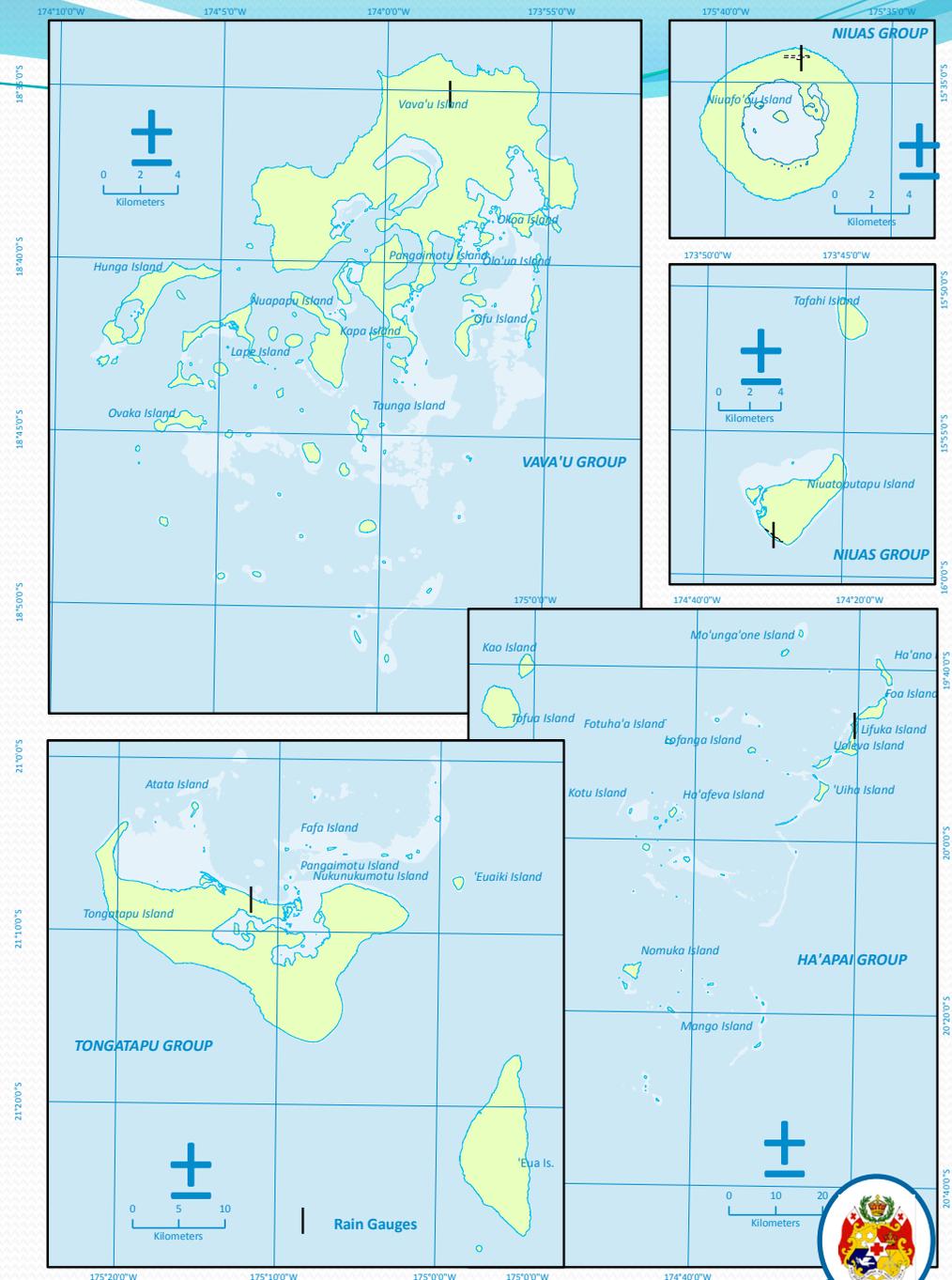
Introduction

CENSUS STATISTICS

- **Popn=103,036** (0.2% increase in 5yrs); 0.8A% increase in Tongatapu, -5.2% Niua, -2.6% Ha'apai, -0.8% 'Eua, -0.7% Vava'u;
- **Tongatapu=73%** (75,158); Vava'u=14% (14,936); Ha'apai=6% (6,650); 'Eua=5% (5,011); Niua=1% (1,281)
- **Households=18,053** (3.4% increase from 2006, and 7.8% from 1996 to 2006);
- **Household size=5.7** persons per household in 2011; **5.8** in 2006; **6.0** in 1996
- **70% of the Households** have flush toilets systems (2006); **80%** in Tongatapu; **54%** Vava'u; **38%** Ha'apai; **60%** 'Eua; **34%** Niua.
- **Population Density=159persons/km²; 289p/km²** in Tongatapu (increase from 2006, 277p/km²).
- **83% Access reticulation systems (groundwater): 98%** in urban areas and **63%** in rural areas
- About **two thirds** of the population resides in urban areas.
- **40% rainwater as primary source:** 47% in Ha'apai and Niua. 81% prefer rainwater for drinking.

ECONOMY

- Heavy reliance on **remittances \$186.2M**, (40% of GDP in 2009);
- **Exports \$7.2M:** fish (T\$4.3m), squash (T\$2.6m) and vanilla (T\$0.3m)
- **Imports \$188.4M:** food, animals, beverage & tobacco (T\$83.6m); fuels, minerals & chemicals (T\$74.4m); and machinery & transport equipment (T\$30.4m) from Fiji and New Zealand (EID, 2009)
- **Unemployment is up 36%** of the total workforce (Census 2006)



Groundwater Governance – Management & Responsibilities

- **National Water Resource Committee (NRWC) 2009 Cabinet endorsed.**
 - **Responsibilities**
 - coordinate inter agency responsibilities relating to the water resource;
 - establish a multi-agency National Water Resources Technical Committee: review and make recommendations to the Committee on applications for water resource development and extraction.
 - promote the dissemination of information about the water resource to government agencies and the general community;
 - recommend declaration of water source protection zone in accordance with section 8(1)(f) of the Water Resource Management Bill;
 - approve a management plan to be applied to any designated water source protection zone in accordance with section 8(1)(f) of the Water Resource Management Bill;
 - arrange for the preparation, confirmation and implementation of the Tonga Water Management Plan; and
 - identify, review and, where appropriate, endorse projects to be undertaken with the aim of protecting, conserving and improving the water resource.
 - **Members of the Committee:**
 - Composed of Government organisations Chaired by the Ministry of Lands, Environment, Climate Change & Natural Resources (MLECCNR); State Owned Enterprise (Utilities); Non-Government Organisations.
- **Hydrology Section, Natural Resources Division, MLECCNR**
 - Responsible for monitoring the groundwater resources
- **Rural Water Supply & Sanitation Section of the Ministry of Health (MOH)**
 - Responsible for the operations of rural water supplies; Monitor the biological quality of the water;
 - Also responsible for inspection of the quality of sanitation systems of all developments.
- **Tonga Water Board (TWB)**
 - Responsible for the distribution of groundwater to residents of the urban areas with in 4 of the bigger islands.
- **Village Water Committee**
 - Responsible for the distribution and operation of the Village Water Supply

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Groundwater Governance – Legal Framework

- **Water Supply Regulations 1963**
 - Enabled the establishment of Village Committees consisting of 10 village members to operate and maintain village groundwater supply systems.
- **Public Health Act 1992**
 - States the responsibilities of the MOH to monitor the water quality from groundwater supply but does not indicate standards for specific uses.
- **Tonga Water Board Act 2000**
 - States the mandate of the TWB to supply water for all purposes(, but does not specify rural or urban).
- **Environmental Impact Assessment 2003**
 - Provides a framework for development framework to prevent the making or arbitrary decisions in regards to land use.
- **Waste Management Act 2005**
 - The Act regulates the collection and disposal of solid wastes and management of all waste in the Kingdom. It also promotes recycling.
- **Environment Management Act 2010**
 - Details the power of the Ministry of Environment to monitor and protect the environment including the water resources.
- **Water Resource Management Bill 2012**
 - Comprehensive provisions in relation to ownership, management and regulation of water resources in the Kingdom to ensure sustainable management of the groundwater resources.

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Groundwater Governance – Issues

- **Lack of National Legislation**
 - There is no legislation that deals solely with the water.
 - The Water Resource Bill 2012 is heavy on the management
 - There will be a significant need for capacity to implement the Act and enforce it.
- **Lack of Enforcement of Existing Legislations**
 - This is due to lack of capacity resources: human and financial resources, technical skills; and
 - political pressures e.g. An EIA is required for a development but political pressure results in construction taking place before the EIA is provided or not at all.
- **Lack of Water Quality Standards**
 - Public Health Act 1992 states MOH's responsibility to test water quality and issue water portable certificates. hey need does not state what quality is safe, good or non-usable.
- **Lack of Institutional Coordination**
- **Lack of Reporting and Information on Groundwater**
 - No information on Extraction Quantity and Rate
 - Lack of information on ground water available for what uses
- **Lack of Monitoring of Private and Outer Islands Wells**
- **Lack of Data Storage Standards and Data Archiving**
- **Lack of Strategic Plans for Water and Sanitations**
- **Lack of Will**

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Groundwater Governance – Emerging Threats

- **NATURAL THREATS**
 - SEA LEVEL RISE
 - INCREASE TROPICAL CYCLONES ASSOCIATED WITH STORM SURGES
 - INCREASE RAINFALL INTENSITY
 - PROLONGED DROUGHT (DRY) PERIODS
- **ANTHROPOGENIC THREATS**
 - INCREASED POPULATION WILL RESULT INCREASED DEVELOPMENTS
 - INCREASED SANITATION (SEPTIC SYSTEMS)
 - LIMITED LAND AREA, LIMITED FRESHWATER LENS
 - INCREASED POPULATION AND SEPTIC DENSITY
 - INCREASE POLLUTANTS
 - LACK OF GROUNDWATER INFORMATION PROVIDES INEFFECTIVE MANAGEMENT LEADS TO UNHEALTHY SOCIETY AND POOR ECONOMIC GROWTH



Groundwater Governance – Opportunities & Way Forward

- Better Coordination between immediate stakeholders
- Establishment of a Tonga Water Resource Management Plan (District & Village Plans)
- Improve Capacity of the Hydrology Section of the MLECCNR to Manage and Monitor the Groundwater Resources
- Establishment of facilities and tools that will enable estimation of available resources and monitoring of use, in Urban and Village Level
- Training and Capacity Building of Village Water Committees in Effective Water Governance
- Education and Awareness at all level of the Society



Groundwater Governance – Key Messages

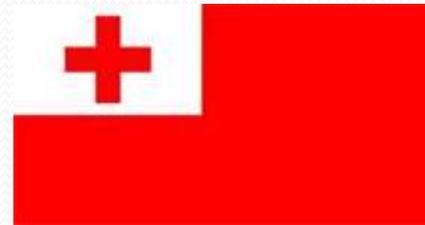
- Climate Change is a reality and is experienced today by the coastal communities in Tonga
- The extent of the impact of sea level rise and other natural threats is not yet clearly understood
- Population will continue to grow so will the associated pollution unless supported by external aid
- The amount of available water is unknown and we can't manage what we cannot measure.
- There needs to be significant Training and Capacity Building of all level of the Society to Manage the limited water resources
- Effective Communication, Education and Awareness is paramount to sustainable groundwater systems

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Malo 'Aupito

- Sincere Thanks!



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