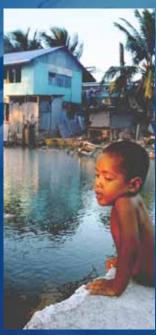
FRESHWATER Under THREAT PACIFIC ISLANDS

Vulnerability Assessment of Freshwater Resources to Environmental Change











United Nations Environment Programme

Secretariat of the Pacific Community
Applied Geoscience and Technology Division

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Regional Office for Asia and the Pacific United Nations Environment Programme UN Building Rajdamnern Avenue Bangkok, 10200, Thailand Tel: (+66) 2 288 1870 Fax: (+66) 2 288 3829

Fax: (+66) 2 288 3829 Email: uneproap@un.org Web: www.unep.org/roap

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David Duncan





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Foreword

Water is essential for life. It is also essential to most of the Millennium Development Goals (MDGs). Yet the world's freshwater resources remain vulnerable and a reliable assessment of its current vulnerability is needed. Major constraints to such an assessment have been the lack of an operational framework for vulnerability assessment and widespread lack of accurate and timely data at basin, and more significantly, sub-basin scale. However, progress in our understanding of what exactly is meant by vulnerability, as well as data gathering and processing techniques offer promising avenues to overcome these constraints.



The United Nations Environment Programme (UNEP) joined hands with a number of regional partners from Africa and Asia to address the issue of vulnerability of water resources on these continents. This assessment of freshwater resources vulnerability of the Pacific Islands produced in collaboration with the Secretariat of the Pacific Community is one of the outcomes of this partnership

The 14 Pacific Island Countries (PICs) are home to over 9 million people, the majority of whom live in rural areas. These countries have about 1,000 islands covering a land area of just over 500 thousand square kilometres, spread across 180 million square kilometres of ocean, more than one third of the earth surface. The term Small Islands Developing States (SIDS) recognizes the specific social, economic and environmental vulnerabilities of the 14 PICs. This Assessment concludes that their greatest vulnerability is the lack of freshwater resources in low-lying islands, exacerbated by limited human, financial and management resources, and increasing population densities. It includes a focused analysis of selected islands, which concludes that the Pacific island nations' economies, fragile ecosystems and livelihoods are particularly vulnerable to climate variability and change.

The water challenge is real and immense in PICs. This report reveals that about 10% of all deaths of children under five in the Pacific island countries are attributable to diarrhoeal diseases, and about 90% of these diseases are due to poor hygiene, lack of adequate sanitation treatment systems and high levels of poor quality drinking water

The study finds that there is no one solution for the Pacific and a unique mix of policy intervention and preferred management measures is available to reduce water vulnerability in each Island State. It is our hope that this pioneering assessment will lead to a long-term process of periodic review and update, providing an authoritative picture of water-related vulnerability, and contribute to the empirical basis for sustainable development in the Pacific.

Young-Woo Park

Jones - Won Park

Regional Director and Representative for Asia and the Pacific United Nations Environment Programme

Acronyms and Abbreviations

ADB Asian Development Bank CV Coefficient of Variation

DALY Disability Adjusted Life Years: a WHO measure of the loss of life and quality of life associated with diseases

DP **Development Pressures**

DPSIR Driver, pressure, status, impact response

EΗ Ecological Health

ENSO El Niño Southern Oscillation FS **Ecological Insecurities** FU European Union

FSM Federated States of Micronesia

GDP Gross Domestic Product

GEO Global Environment Outlook (UNEP)

Global Environment Facility **GEF**

IPCC Intergovernmental Panel on Climate Change **IWRM** Integrated Water Resources Management

MC Management Challenges MDG Millennium Development Goal ODA Official Development Assistance

Population

PICs Pacific Islands Countries

PIFS Pacific Islands Forum Secretariat

PNG Papua New Guinea

R per capita water resources (m3.annum-1.person-1)

RMI Republic of the Marshall Islands

RS Resource Stresses

SIDS Small Island Developing States

SOPAC Pacific Islands Applied Geoscience Commission; or SPC Applied Geoscience and Technology Division

SPC Secretariat of the Pacific Community

SPREP Secretariat of the Pacific Regional Environment Programme

STAR Science, Technology and Resources Network

UNCTAD United Nations Conference on Trade and Development

UNEP United Nations Environment Programme

UNESCAP United Nations Economic and Social Commission for Asia and the Pacific

UNICEF The United Nations Children's Fund

UN-OHRLLS UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries

and Small Island Developing States

USGS United States Geological Survey

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WHO World Health Organization

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Executive Summary

The fourteen developing Pacific Island Countries (PICs) of the Pacific Region are home to over 9 million people, speaking about 1 200 languages, with the majority of Pacific islanders (about 80%) living in rural areas. These Pacific Island countries have about 1 000 islands covering a land area of just over half a million square kilometres, spread across 180 million square kilometres of ocean. The ecosystems supported across these islands are unique and among the most endangered in the world.

The water resources of the PICs represent global extremes, with annual water availability in Papua New Guinea around 120 000 m³ per person versus Fongafale Islet in Tuvalu and Nauru having no confirmed freshwater resources, reliant on rainwater harvesting and desalination.

The PICs face similar challenges managing freshwater resources to other developing countries. Access to sanitation and safe drinking water, protecting sensitive ecosystems and generating productive use of variable water resources are among these issues. Often the challenges are associated with simply too little or too much water. Nevertheless, constrained by their remoteness, small size, fragility, natural vulnerability and limited human and financial resources, PICs face unique challenges managing water resources. These challenges require innovative approaches and tailoring of solutions not just to the region, but often to the complex combination of geographical and socioeconomic constraints of an individual island.

This study undertakes a vulnerability assessment of the freshwater resources of the PICs, based on input from technical experts and regional resource managers. The approach assumes that the vulnerability of freshwater resources is dependent upon the resources available to meet the productive, consumptive and environment uses; the pollution and development pressures; and the management capacity to respond to these pressures. This approach highlights the importance of drivers such as climate variability and change, population growth, urban migration and economic development to water resource vulnerability through their influence on the state of freshwater resources and the associated pressures.

Throughout the Pacific water resources are typically managed on an island-by-island basis as inter-island transfers across hundreds of kilometres of ocean are generally impractical and cost-prohibitive. Accordingly, this assessment has reviewed the water resource vulnerability of individual islands. A selection of islands was chosen for the study, representative of the two main island forms: (i) atolls and limestone islands dependent on rainwater and groundwater – Nauru, Majuro Atoll (in Republic of the Marshall Islands) and Fongafale Islet (Tuvalu); and (ii) volcanic islands with river systems – including Rarotonga (Cook Islands), Viti Levu (Fiji), New Guinea (Papua New Guinea) and Upolu (Samoa).

In compiling this water resource vulnerability index, it was necessary to make a range of assumptions to enable assessment of islands with significant variation in hydrology, geography, environment, socio-economic status

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