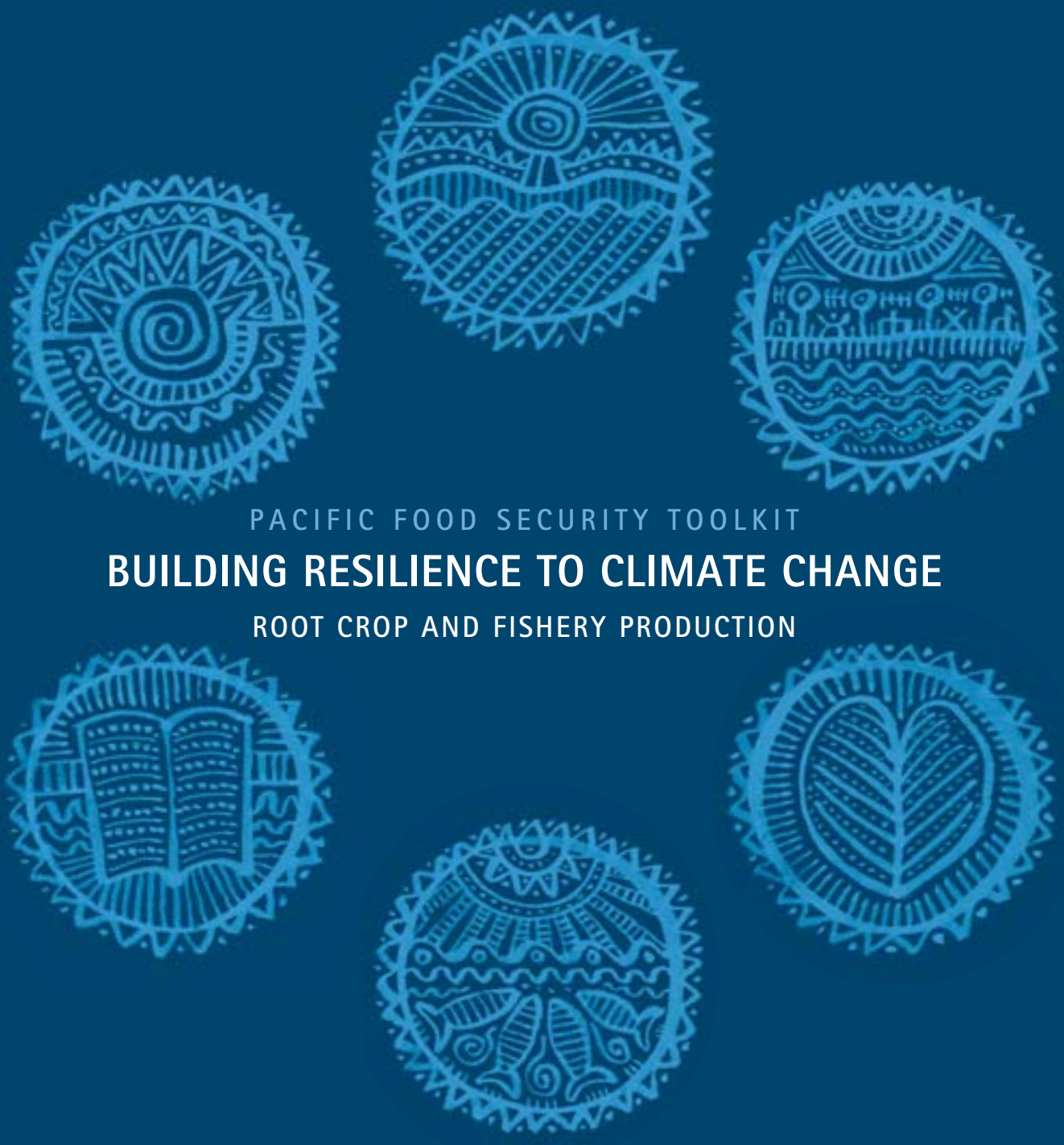


PACIFIC FOOD SECURITY TOOLKIT

BUILDING RESILIENCE TO CLIMATE CHANGE

ROOT CROP AND FISHERY PRODUCTION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

SPREP

FAO
FIAT PANIS

PACIFIC FOOD SECURITY TOOLKIT

BUILDING RESILIENCE TO CLIMATE CHANGE

ROOT CROP AND FISHERY PRODUCTION

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME 2010

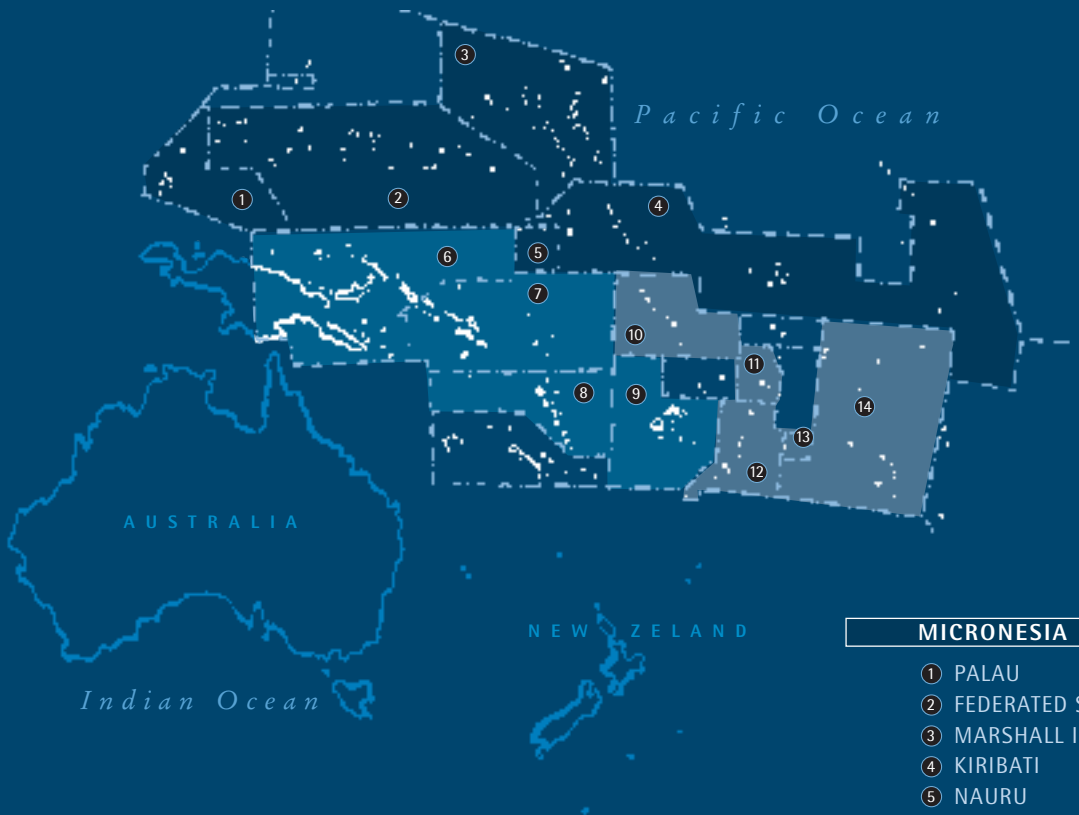
ACKNOWLEDGMENTS

This toolkit was prepared by Willy John Morrell, in collaboration with the Pacific Expert Group on Food Security and Climate Change which was established by the Secretariat for the Pacific Regional Environment Programme (SPREP) and the United Nations Food and Agricultural Organization (FAO) in October 2008. Additional partners for this initiative include the Secretariat for the Pacific Community (SPC), the University of the South Pacific (USP) and Conservation International (CI). The Swedish International Development Cooperation Agency (SIDA) generously provided funding for this initiative.

This booklet draws heavily from a variety of online resources, books and reports. The majority of these resources are included as reference tools in Section 6. Any failure to acknowledge reference sources is unintentional. The fisheries module draws strongly on the recent work led by the Strategic Engagement Policy and Planning Facility at the Secretariat of the Pacific Community and several co-authors. Conservation International's preparation of Module 3 on the role of ecosystems in food security is also much appreciated.

Special thanks go to Johann Bell (Secretariat of the Pacific Community), Terry Hills (Conservation International), Mat Purea and Nadia El-Hage Scialabba (FAO), as well as Nancy Hart, Pietro Bartoleschi and Arianna Guida for their technical, photographic, editorial and design contributions.

MAP OF PACIFIC ISLAND COUNTRIES(*)



MICRONESIA

1. PALAU
2. FEDERATED STATES OF MICRONESIA
3. MARSHALL ISLANDS
4. KIRIBATI
5. NAURU

MELANESIA

6. PAPUA NEW GUINEA
7. SOLOMON ISLANDS
8. VANUATU
9. FIJI

POLYNESIA

10. TUVALU
11. SAMOA
12. TONGA
13. NIUE
14. COOK ISLANDS

(*) FAO MEMBER COUNTRIES

INTRODUCTION

What is the purpose of this toolkit?

This *Food Security Toolkit*, designed specifically for Pacific Island Countries and Territories (PICTs), aims to improve Pacific Islanders' ability to produce and access safe and nutritious foods that meet their dietary and cultural needs. Targeting food security in the Pacific region is a critical action in the face of climate change, which will continue to place added pressure on existing food and water resources. The ultimate aim of the toolkit is to help ensure that Pacific Island communities continue to produce and have access to a wide range of nutritious food for the dinner plate and market place.

How to use this toolkit?

The toolkit is divided into a series of modules, so as to accommodate future changes or additions. It includes an introductory module that looks at climate change in the Pacific, a module on key Pacific food production systems and two applied modules on Pacific root crops and Pacific fisheries.

The toolkit also contains 55 "adaptation steps" that are designed to provide ideas and, in some cases, practical measures that can be used and, with time, adapted to help maintain and strengthen food security in the face of climate change. Importantly, the toolkit provides its readers a list of existing tools and resources that present more detailed information on climate change adaptation measures, food security and related issues.

Who is the target audience?

Tackling food security and climate change in the Pacific region requires the development or implementation of integrated strategies, policies and practices that reach all levels of Pacific society. It also requires a strong collaborative and cross-sectoral approach from regional organizations, national governments, and urban and village leaders, as well as individual farmers and fishers. The toolkit is, accordingly, broadly focused and provides both adaptive steps for PICT government agencies and practical steps designed to improve sustainable management and production practices at the community level. The toolkit has been written for a broad audience that may include: government officials; national agriculture, forestry and fisheries development officers; non-governmental organizations (NGOs); community groups; and other stakeholders within the agriculture and fisheries sectors.

CONTENTS

ACKNOWLEDGMENTS iii

INTRODUCTION 1
What is the purpose of this toolkit? 1
How to use this toolkit? 1
Who is the target audience? 1

MODULE 1 – CLIMATE CHANGE 4
1.0 What is climate change? 5
1.1 What is the greenhouse effect? 7
1.2 What will be the impacts of climate change in the pacific? 7
1.3 How will climate change impact food security in the pacific? 8
1.4 How do we stop climate change? 9
1.4.1 Checklist of simple mitigation steps 10
1.5 What is the rest of the world doing? 12
1.6 What is climate change adaptation? 13
1.6.1 Examples of climate change adaptation measures by sector 14
1.7 How is the region combating climate change? 15
1.8 The impacts of climate change on pacific food systems 16
1.8.1 Changing water regimes 21
1.8.2 Storms and cyclones 22
1.8.3 Drought and fire 23
1.8.4 Crop inundation and soil salinization 24
1.8.5 Invasive species, pests and diseases 25
1.8.6 Ecosystem services 26

MODULE 2 – AN OVERVIEW OF THE KEY PACIFIC FOOD SYSTEMS 28
2.0 Key pacific farming systems 29
2.1 Traditional cropping systems 30
2.2 Agroforestry systems 31
2.2.1 Non-permanent agroforestry systems 32
2.2.2 Permanent agroforestry systems 34
2.2.3 Modern agroforestry in the pacific 34
2.2.4 Agroforestry tree species 36
2.2.5 Agroforestry crops 36
2.3 Livestock systems 37
2.4 Combating the impacts of climate change 38
2.4.1 Combating poor planning 38
2.4.2 Combating information gaps 40
2.4.3 Combating sea-level rise 41
2.4.4 Combating droughts 42
2.5.5 Combating storms and cyclones 43

MODULE 3 – THE ROLE OF ECOSYSTEMS IN RESILIENT FOOD SYSTEMS IN THE PACIFIC 46
3.0 Ecosystems and food security 47
3.1 Terrestrial systems 48
3.1.1 Vegetation complexity and landslides 48
3.1.2 Shelter belts 49
3.2 Coastal and marine systems 50
3.2.1 The role of mangroves 51
3.2.2 The role of coral reefs 52
3.2.3 The role of seagrasses 54
3.3 Combating loss of biodiversity and farming systems decline 55
3.3.1 Combating pests and diseases 57

MODULE 4 – PACIFIC ROOT CROPS 60
4.0 Root crops in the pacific 61
4.0.1 Root crop nutrition 62
4.0.2 Pacific trade 63
4.0.3 Storage and preservation 63
4.0.4 Growing conditions 64
4.1 Adaptation steps for root crops 65

MODULE 5 – PACIFIC FISHERIES 80
5.0 Fisheries in the pacific 81
5.0.1 Traditional coastal fisheries 82
5.0.2 Commercial fisheries 84
5.0.3 Freshwater fisheries 85
5.0.4 Aquaculture in the pacific 86
5.0.5 Nutrition 87
5.1 The impacts of climate change on fisheries 87
5.1.1 Ocean warming and sea-level rise 88
5.1.2 Ocean acidification 90
5.1.3 Changing rainfall and storm patterns 90
5.1.4 Ecosystem degradation 91
5.2 Adapting to the impacts of climate change 92
5.2.1 Addressing planning and climate change mainstreaming 93
5.2.2 Combating information gaps 95
5.2.3 Adaptations for tuna fisheries 97
5.2.4 Adaptation for coastal fisheries 99
5.2.5 Adaptation for aquaculture and freshwater fisheries 102

MODULE 6 - TOOLS - WHERE TO GO TO FIND OUT MORE? 106
Climate change and food security tools 107
Climate change tools 108
Climate change adaptation tools 110
Pacific food systems & root crop tools 113
Invasive species tools 120
Fisheries & marine ecosystems tools 121
Aquaculture 124
coral reefs 125
mangroves 128