

# Resilience of Pacific Agricultural Systems Against Crisis



**Sergie Bang<sup>1</sup>, Gae Gowae<sup>2</sup>  
Judith Francis<sup>3</sup>, Gerd Ruecker<sup>4</sup>**

<sup>1</sup> National Agricultural Research Institute of Papua New Guinea (NARI)

<sup>2</sup> University of Papua New Guinea, Papua New Guinea (UPNG)

<sup>3</sup> Technical Centre for Agricultural and Rural Cooperation, The Netherlands (CTA)

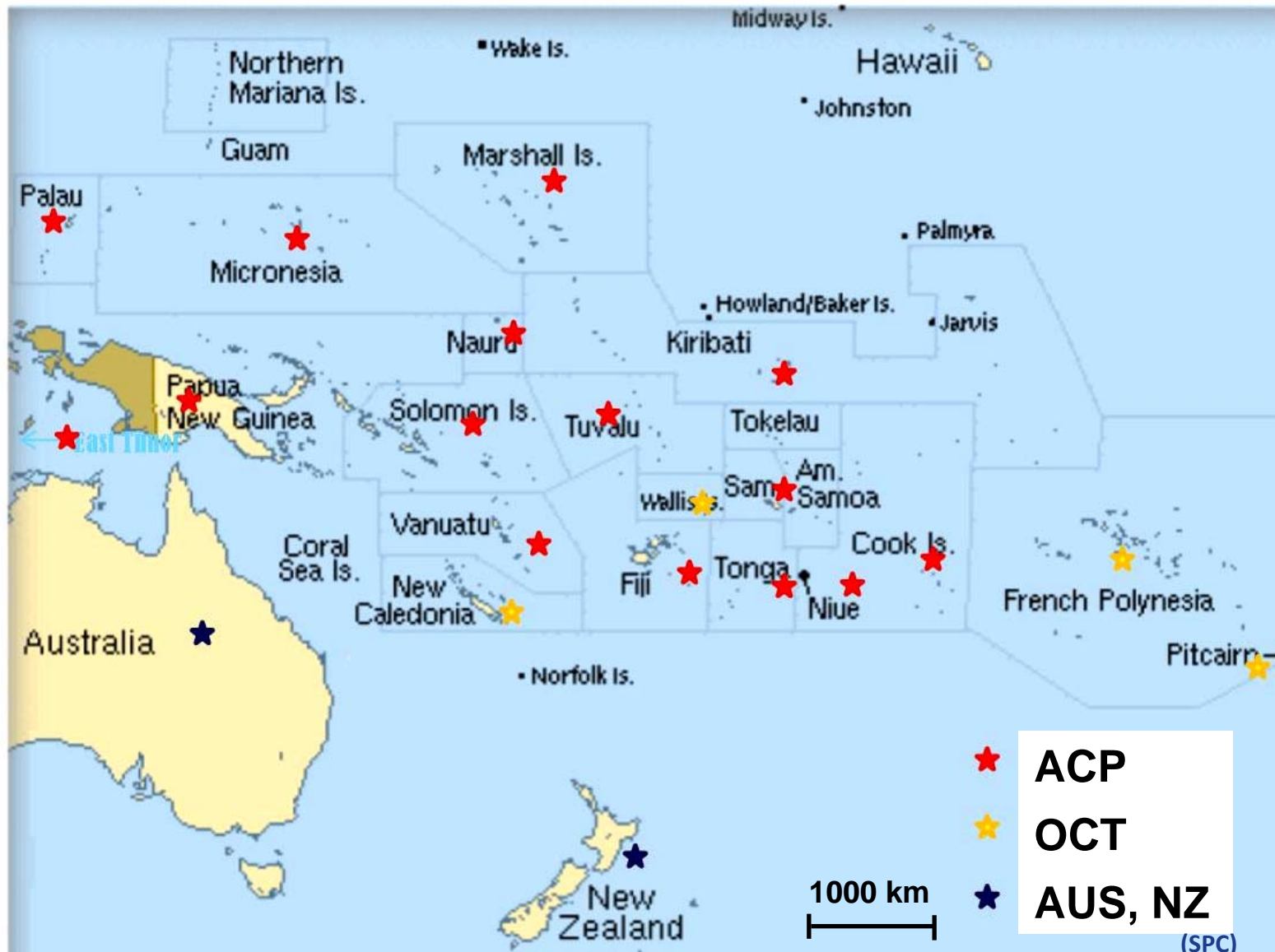
<sup>4</sup> German Aerospace Center, Germany (DLR)



(Farmer – Scientist Consultation (Keravat, PNG, NARI))

# Overview

## Distance, Diversity & Similarity in the South-Pacific



# Significance

## Agriculture in the Pacific

---

- Between 60-85% of its nearly 10 million people are rural based & live from agriculture, forestry and fisheries
- Up to 35% of gross domestic product (GDP) in resource rich countries such as Papua New Guinea is derived from agriculture & forestry

→ Vital products for ensuring **food security**

→ Key sources of **employment, income and trade**

→ Agro-forestry serves as **climate mitigation and carbon sink**

→ Farmers knowledge & genes serve as global essential **cultural heritage and biodiversity pool**



Daily market in Port Vila, Efate, Vanuatu (IRD, Le Meur)

**But**

The Pacific Islands are **one of the world's most vulnerable regions** with respect to the impacts of global and climate change (IPCC, 4th assessment report)



# Traditional Farming Communities

## Internal Stresses

---

### Land related

- **Limited expansion of arable land** (mountains, low soil quality)
- **Declining soil productivity** (shorter fallow periods & low replenishment)
- **Increased risk of saltwater inundation, excessive rainfalls & soil erosion**
- **Reduced soil fertility** due to impacts of global CC
- **Increased incidence of complex & new pest / disease problems**



**New garden creation in highlands**  
(High Altitude Highlands of PNG, NARI)

### Farmer related

- **Inadequate farmer's ability to manage increased occurrence of natural disasters**

### Economics related

- **Poor access to improved seed materials & breeding stocks**
- **Poor market access** (poor development/maintenance of infrastructure)

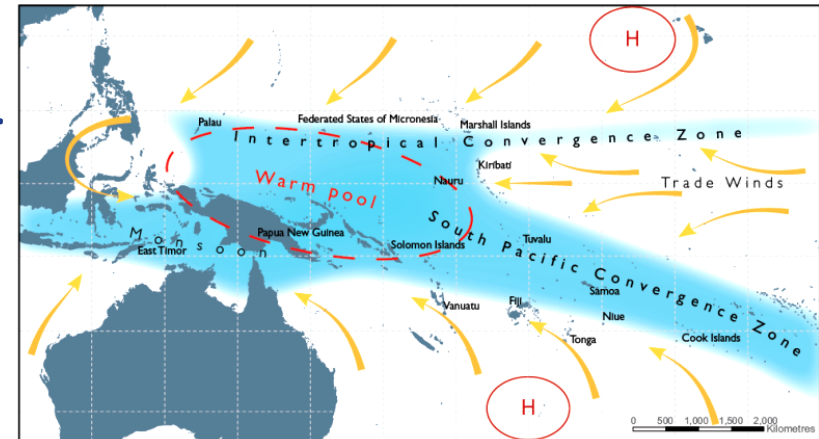


Harvesting sweet potato using a traditional tool (digging stick), (Tambul Plain, PNG, Bustin Anzu, Police Media, PNG, 2005)

# Traditional Farming Communities

## External Stresses

- Increasing deforestation
- **Competition** with tourism, biofuels, urban.
- **Market changes**
- **Changing weather patterns**
- Vulnerability to natural hazards



Position of climate features Nov-April

## Impact

- **Damage of crop production**
- Increase of **yield gap**
- Destruction and **loss of productive land**



Poor yield due to excessive wet conditions  
(La Nina of coast and adjacent farm land)

# Increasing Resilience By Technology Development and Adoption Strategy

---

1. Integrated use of indigenous genetic resources & improved seed systems & management of natural resources
2. Development & release of **36 key-technologies** for improved agriculture  
(e.g. drought coping strategies, early maturing sweet potato varieties for the highlands)
3. Adjusting technology developments to a **ecological-cultural diversity** under **changing externalities**:  
(e.g. via GIS-based Agricultural Development Domains, targeting different learning needs of smallholder farmers)
4. Integrating science, traditional knowledge & technical cooperation



Farmer vanilla training  
(Keravat, PNG, Gadi Ling, NARI, 2008)



Tissue culture analysis  
(Keravat, NARI, PNG)

# Sustainable & Transformative Changes by Science and Technology Investments

---

## PNG-Perspective

- Public investment in agricultural S&T: 0.5% of agric. GDP
  - **Returns to agricultural S&T investment: 35%**
    - ➔ Huge scope for increasing both public & private investment in agric. S&T
    - ➔ S&T investment in agric. could bring tremendous benefits to PNG
- (Dr John Kola, Chairman – NARI Council, 2009 on Agricultural Research for Development in PNG)

## Pacific-Perspective

- **Developing synergies and critical mass in S&T by**
  - ➔ Establishment of a Pacific universities network
  - ➔ Stronger S&T collaboration with AUS, NZ, Europe
  - ➔ Linking science, innovation & development



Lab assistant, Pouembout,  
New Caledonia, 2011 (IRD, Lemeur)



# Key-Issues

## Building Resilience of Pacific Agric. Systems by Improved

### 1. Human capacity development

- a) **Capacity in S&T** with focus on CC predictions, CC policy research and development, CC mitigation research, early warning systems
- b) **Capacity in disaster response** planning and management

### 2. Preparedness of smallholder farming communities to the effects of CC

- a) Research on **locally appropriate** CC adaptation measures & best-practices
- b) Effective **linking** CC adaptation interventions into mainstream public agricultural research and extension services
- c) **Working with communities** in implementation of interventions



(Collaboration between scientists and women farmers from PNG, Solomon Islands and Vanuatu in Honiara, Solomon Islands)



# Key-Issues

## Building Resilience of Pacific Agric. Systems by Improved

3. Integration of national information systems with regional/international systems
  - a) Investment in **regular monitoring** of land use, food production, climate, environment, human health
  - b) Development of mechanisms to **utilize information systems as decision-support systems** for policy makers, researchers, private sector and producers.
  
4. Enabling policy and institutional environment at national and regional level
  - a) **Cross-sectoral** (crops, livestock, forestry, fisheries) research/development plans mainstreaming CC adaptation and mitigation
  - b) Appropriate policies and strategies for mitigation of **effects of climate shocks**
  - c) **Regional – long-term research for development** frameworks (10 years) to complement national plans



Long-term collaboration between scientist and farmer through MoU

# Pacific-European Agricultural Research

## Strengthening Collaboration: **Next activities**

---

- EU FP7 **PACE-Net project** fosters research, innovation and policy collaboration between EU-Pacific

**Partners:** IRD, DLR, USP, UPNG, SPC, ANU, MBIE, Euro research support, APRE, MCST

**Next activities:** **EU-Pacific policy dialogue conference**

Fiji, 11 – 15 March 2013

**PACE-Net+ Project Proposal** (15 Dec. 2012)



- **CTA, USP, UPNG, UNESCO, PACE-Net Collaboration**

**Next activities:** **Expert meeting: Establishing a university network & regional science policy framework**

Fiji, 3 – 5 Nov. 2012



# Pacific-EU Agriculture Work Group

## Interest to expand group

---

### Contact person in the Pacific

Dr. Sergie Bang, National Agricultural Research Institute,  
Papua New Guinea (NARI)

Email: [sergie.bang@nari.org.pg](mailto:sergie.bang@nari.org.pg)

Web: <http://www.nari.org.pg/>



### Contact person in Europe and for PACE-Net

Dr. Gerd Ruecker, German Aerospace Center (DLR)

Email: [gerd.ruecker@dlr.de](mailto:gerd.ruecker@dlr.de)

Web: <http://www.internationales-buero.de>

