

Food and Agriculture Organization of the United Nations



International Plant Protection Convention

Department for Environment Food & Rural Affairs

# **II Plenary Session**

# Climate Change and the Impacts on Plant Health

Pacific Plant Protection Organisation (PPPO)

London, 21 – 23 September 2022 International Plant Health Conference



### Climate Change and the Impacts on Plant Health PACIFIC PLANT PROTECTION ORGANISTION REGION (PPPO)

- Southwest Pacific comprises of 22
   Pacific Island countries and territories
   scattered over 40 million sq kms ocean.
- Populations range from 1400 Tokelau to 25 million plus Australia.
- Areas range from 10 sq km (Tokelau) to
   7.7 million sq km Australia.
- Over 50 languages + 200 dialects.
- Grouped 3 sub regions Melanesia, Micronesia, Polynesia regions





# **Climate Change in the PPPO region**



- El nino Prolonged droughts
- Heavy Rainfall Floods



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### **Impacts**



- Stressed plants
- Major Pest outbreaks due to reduced population/absence of natural enemies
- Huge decline in agricultural production
- Huge decline in fresh produce exports



### Effects of rainfall change on crop production

In FIJI the 1 in a 50 year flood in 2009 affected
70% of pawpaw orchards
dalo and cassava plantations in the low-lying area of Naitasiri and Rewa
80% of vegetables and pulses that immediately required re-planting

Source - SPC 2016



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# Example of a disrupted ecology in Fiji

- "2016 Fiji Ant-Mealybug Bioinvasion" (Thaman 2018)
- Not likely a new invasion (too widespread over a sudden time period)
- Likely driven by extreme weather event, Cyclone Winston
- Cyclone caused biological control insects to decline → "Enemy release" enabled sapsucking insect outbreak → More resources led to outbreak of white-footed ants



White-footed ants. Image © Mario David Bazan, CCL



# <u>Cont'd</u>

- Outbreak of more than 20 sap-sucking insect species
- Affected 292 plant species including crops, ornamentals and native plants
- Likely to see more examples like this due to climate change with more extreme adverse weather events





# Taro leaf blight in Papua New Guinea (PNG)

- Taro leaf blight caused by *Phytophthora colocasiae* was introduced in PNG during the 2<sup>nd</sup> World War on Bougainville in the 1940s.
- It spread to the mainland PNG in early 1979 It then spread to other parts of the coastal areas of the country.
- The disease has not been recorded in the central highlands region with cool, temperate-like weather conditions.
- The first record of TLB in the highlands was on wild taro at Kuk Agricultural Research Station in Western Highlands Province in 1986.
- The spread of TLB and the increased in commercial taro cultivation in the highlands region since the mid-1990s is attributed to change of climate in the highlands of PNG.



A taro leaf plant severely infected by TLB fungus and severe shot-hole symptoms.



### **Banana Associated Wilt Phytoplasma in PNG**

- Banana Wilt Associated Phytoplasma (BWAP) is a phytoplasma disease. It was first observed on Buka Island of Bougainville in 2006.
- In 2009 field samples were collected from banana pseudo stem tissues in Madang Province.
- The disease mainly affects a particular the local cooking banana variety of the ABB genome.
- Initially, the disease was confined to hot and humid weather conditions in the coastal provinces of PNG.
- The disease in recent years seem to have spread into areas bordering the coastal and highland provinces most likely due to the impact of climate change.



Disease causes yellowing and browning of leaves and eventually the whole plant dies. Affected plants do not bear normal size fruits.



# How is climate change affecting Nauru?

- Sea-level rising With only one island to occupy the 11,000 occupants we have seen the many residential areas on the fringe of the island been affect. Houses are torn apart due to the water intrusion
- Sea-level rising also affects the water security of people, especially those living at the low-lying areas, saltwater intrusion have caused problems with drinking water
- Ocean acidification also affects the food security of the people of Nauru, most people rely heavily on the ocean for food. With the warming of the ocean causing less fish, coral bleaching limiting the Nauruan people access to food



## **Saltwater intrusion**

- Although the Pacific Islands have done little to contribute to global warming, they are facing some of the most dire consequences of rising seas.
- Intrusion of seawater threatens biodiversity along with crop yields







Top photo – Pandanus trees affected by sea water in Kiribati Bottom photo's – Taro farm affected by sea water in Chuuk, FSM

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### **Prolong wet seasons**

- Prolong wet seasons contributes to the spread of black pods in Cacao.
- Black pod is caused by a fungus (Phytophthora) that spreads rapidly on the pods under conditions of excessive rain and humidity, insufficient sunshine, and temperatures below 21 °C.
- **Phytophthora spp.** are responsible for pod loss of 20 to 30% of the total cacao crop annually, in Fiji.





# **Global warming**

- Increased temperatures have impact on a crop's optimal growth period. While some crops may show increased yields, most food crops will experience negative effects on the amount and quality of yields.
- In Tuvalu, a breadfruit variety is fruiting almost year around compared to the usual seasonal fruiting, thus ensuring the continuous supply of food that is high in complex carbohydrates, low in fat, and cholesterol and gluten free.





# Some impacts of Climate change on crops in the Pacific

### On atolls

■ More frequent extreme weather events → tidal waves, seawater inundation and rising water table → direct crop loss, soil salination, reduced agricultural land, loss of freshwater reserves

### On high islands

■ More frequent extreme weather events → direct crop damage, landslides lead to soil erosion, reduced agricultural land, leaching and tree cover loss increasing susceptibility to weeds

### All islands

- Increased habitat for pest insects, ecological changes causing pest outbreaks
- More frequent droughts
- Sea level rise



# **Climate Change**

Along with the Pacific region, Australia is on the front line of climate change impacts.

Through the NPPO (Australian Government Department of Agriculture, Fisheries and Forestry - DAFF), Australia is working to use science and innovation to support climate change preparedness and recovery.

### The department has a number of initiatives such as;

- The National Environmental Science Program (NESP) National Environmental Science Program | Department of Agriculture, Fisheries and Forestry
- Agriculture Biodiversity Stewardship program Agriculture Stewardship Package Department of Agriculture
- National Landcare and regional Land Partnerships programs National Landcare Program -Department of Agriculture



### **Connected, Informed & Prepared – Leaving no one behind**

Climate Change and the Impacts on Plant Health



### **SAFE FOOD AID – FACT SHEETS**

#### Climate Change and the Impacts on Plant Health



#### SENDING SAFE AID WITHOUT HARMFUL PESTS AND DISEASES

FACTSHEET 01

#### For agencies and development partners sending live plants: nursery stock, propagative or other planting material

Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases



FACTSHEET For agencies and development partners sending fresh produce and other food items

Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases



SENDING SAFE AID WITHOUT HARMFUL PESTS AND DISEASES

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    FACTSHEET
    For agencies and development partners sending new
and used building materials
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Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases





#### FACTSHEET For agencies and development partners sending seeds 02 for planting

Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases



#### SENDING SAFE AID WITHOUT HARMFUL PESTS AND DISEASES

### 64 For agencies and development partners sending meat and animal products

Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases



#### SENDING SAFE AID WITHOUT HARMFUL PESTS AND DISEASES

FACTSHEET 06

For agencies and development partners sending new and used vehicles, machinery and equipment (VME)

Please help us to safeguard our vulnerable environment and communities by ensuring that any humanitarian aid that is sent does not inadvertently introduce harmful pests and diseases





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# THANK YOU



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