

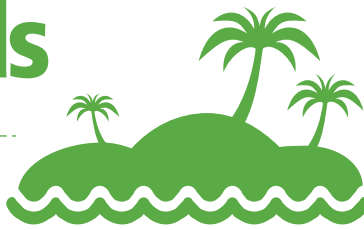


# Food

Key findings for the Pacific from the United Nations Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report (AR6) on Impacts, Adaptation and Vulnerability



## GRADUAL CLIMATE CHANGES are impacting food production in small islands



### Coastal agroforestry



systems are losing biodiversity

CHANGES



### Access to locally grown food

will be disrupted including staples like taro and sweet potato



floods and droughts



warming temperatures



severe cyclones



### Children and pregnant women

have experienced greater health impacts from inadequate nutrition



### More dependence on imported food



## Climate change could undermine food production



saltwater intrusion



loss of fish stocks



damage to gardens

### More threats to exported products



## Livelihood diversification



Aquaculture

## PRODUCT AND MARKET DIVERSIFICATION

can increase food and income security and nutrition



Tourism



crop diversity



garden relocation



food storage and preservation



### Indigenous Knowledge and Local Knowledge

can reduce vulnerability of food resources

ADAPTATION

# Food

Key findings for the Pacific from the United Nations Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report (AR6) on Impacts, Adaptation and Vulnerability



**The projected impacts of climate change on agriculture and fisheries will undermine food production systems, but in some cases enhance productivity.** Impacts of climate change on food production include warming temperatures, severe cyclones, sea level rise, floods and droughts, saltwater intrusion into freshwater and soils, as well as loss of fish stocks from ocean warming and acidification. These can all increase instances of food insecurity and malnutrition in Pacific Island nations.<sup>1</sup>

## WHAT IS HAPPENING

**Seafood plays an important role in achieving food security in many islands.** Important fish species that support food security and incomes of island communities are currently impacted by climate change. Fish protein is estimated to make up 50-90% of animal protein consumption in rural areas, and 40-80% in urban areas. Island nations may need to retain more of their tuna catch rather than relying solely on coastal fisheries to achieve food security in the future.<sup>2</sup> Food security is also being impacted by changing distribution of fish stocks, particularly open-water tuna. This is significant for nations such as Tokelau and Kiribati who rely heavily on fisheries for both local food security and their national economy.<sup>3</sup>

**Climate change has disrupted access to marine and terrestrial protein sources, impacting the diet and nutrition of subsistence dependent communities.**<sup>\*\*</sup> Children and pregnant women have experienced disproportionately greater health impacts from inadequate nutrition.<sup>\*\*\*4</sup>

**Food production in small islands is being impacted through slow-onset stressors such as rising average temperatures, shifting rainfall patterns (including associated extreme events) and sea level rise associated with climate change.**<sup>5</sup>

For example, changes in the El Niño-Southern Oscillation have been associated with drought which increased sweet potato losses in the Highlands in Papua New Guinea<sup>6</sup> and tropical cyclone Pam in 2015 caused damages to the agricultural sector valued at nearly two-thirds of Vanuatu's GDP.<sup>7</sup>

**Food and livelihood securities of Pacific Island Nations are increasingly challenged as climate change and human influences accelerate biodiversity loss in agroecosystems.**

Coastal agroforestry systems are rapidly losing native biodiversity, which is vital for food security in the Pacific islands. For example, insects which are necessary for pollination are being impacted by changes in the climate.<sup>8</sup>

## WHAT COULD HAPPEN FURTHER

**Climate driven changes in the frequency and/or magnitude of extreme events, and environmental degradation, will disrupt access to locally grown or harvested food.** This could increase dependence on imported food and increase rates of malnutrition and non-communicable diseases. Projections suggest that local food accessibility could be significantly reduced by 2050 in the low- and middle-income countries of the Western Pacific (including, Fiji, Papua New Guinea, Solomon Islands, and other Pacific islands), impacting the health and welfare of island inhabitants.

\* = medium confidence

\*\* = high confidence

\*\*\* = very high confidence

1 FAQ 15.3; Chapter 15 Executive Summary

2 15.3.4.4

3 FAQ 15.3

4 SPM.B.1.3

5 15.3.4.4

6 Table 5.10

7 15.3.4.4

8 FAQ 15.3

**Foods that are staples including taro and sweet potato are expected to suffer from moderate to high impact by 2090.** Livestock is an important protein source on some islands and is particularly vulnerable to changes in temperature as animals will increasingly face heat stress.<sup>9</sup> 9 of 16 Pacific Island entities (Cook Islands, Federated States of Micronesia, Guam, Kiribati, Marshall Islands, Niue, 17 Papua New Guinea, Solomon Islands, and Tuvalu) could experience  $\geq 50\%$  declines in maximum catch potential by 2100 relative to 1980–2000 under both a low and high emission scenario.<sup>\*10</sup>

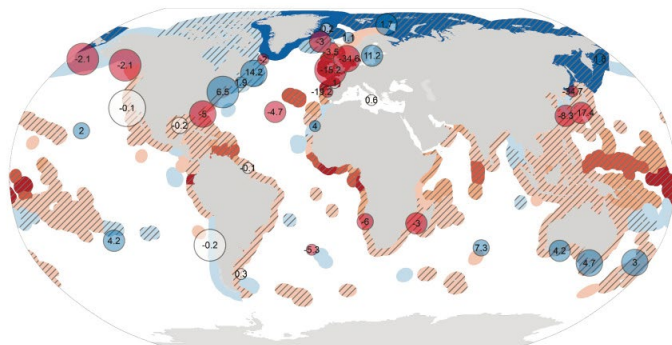
**Continuous reduction of soil fertility as well as increasing incidence of pests, diseases and invasive species contribute to the growing vulnerability of agriculture on small islands.<sup>11</sup>**

**Many export crops could be impacted by increasing temperatures and changes in rainfall.** For example, coffee is expected to be significantly impacted largely due to increased temperatures in the highlands of Papua New Guinea. Sugar yield in Fiji could decline by 2–14% under projected scenarios.<sup>12</sup>

**Higher temperatures could increase the presence of food or water borne diseases and the challenge of managing food safety.** Changes in weather patterns can also disrupt food transportation and distribution systems on islands where Indigenous communities are often located in remote areas.<sup>13</sup>

Historical and projected maximum sustainable yield (MSY) and maximum fish catch potential by region. Projected changes in maximum catch potential by 2050 (average between 2041–2060) relative to 2000 (1991–2010) under (a) RCP2.6 and (b) RCP8.5 scenarios

a. Low Emissions Scenario (RCP2.6)

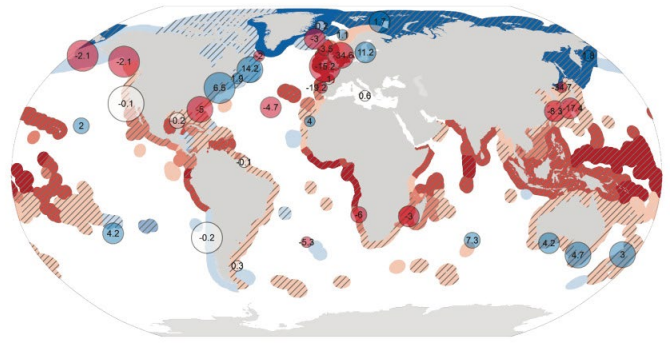


**Projected changes in maximum catch potential by 2050**

**Projection**  
Maximum catch potential  
Model agreement (N=2)  
 Agree  
 Disagree

Changes in maximum catch potential (%)  
  
 +25  
 +15  
 +10  
 0  
 -10  
 -15  
 -25

b. High Emissions Scenario (RCP8.5)



## RESPONSE OPTIONS

**Product and market diversification is a livelihood strategy which can increase food security and nutrition as well as income security.** Instances of this have already been documented in places such as Vanuatu and Fiji. For example, communities are adapting by planting a diversity of different crops within household and communal gardens, locating gardens in different areas within their customary lands to ensure that not all crops are destroyed due to an extreme event, and the storage, and preservation of certain food staples (so-called famine foods).<sup>14</sup>

**Evidence is emerging for the success of traditional adaptive strategies influenced by Indigenous Knowledge and Local Knowledge (IKLK).** These can reduce vulnerability of land-based food resources to slow onset climate change and disaster events on land-based food resource. Women are working on various local-level climate change adaptation and environmental projects. Women report testing and using adaptive strategies informed by IKLK, that have been modified to suit a changing environment. This includes harvesting rainwater during droughts, planting native plants along coastlines to prevent erosion and flooding, developing plant nurseries, experimenting with growing salt-tolerant (taro) crops, and relocating crop cultivation inland. The report also acknowledges the role of reversing loss of Indigenous knowledge about food production in many island societies and incorporating it into future strategies.<sup>15</sup>

9 FAQ 15.3, 15.3.4.4  
10 15.3.4.4

11 FAQ 15.3  
12 15.3.4.4

13 FAQ 15.3  
14 15.5.6

15 15.3.4.4

## Adapting food livelihoods to species shifts

### Adaptation options

Alternative livelihoods    Alternative species    Mobility    Technology and knowledge    Economic incentives    Ecosystem-based management    Monitoring shifts    Transboundary management



### Limits to adaptation

Training and education    Property rights    Access to technology    Access to finance    Power Dynamics    Scientific data    Governance

### Adaptation outcomes

	Alternative livelihoods	Alternative species	Mobility	Technology and knowledge	Economic incentives	Ecosystem-based management	Monitoring shifts	Transboundary management
<b>Marine</b>	Aquaculture/ tourism	New markets for incoming species	Ecosystem-based and multi-species management	Gear/vessel modification	Shared quotas, establish fishing rights, use of IK and LK	Adaptive fisheries management	RMFOs-EEZ fisheries TB agreements	
<b>Freshwater</b>	Aquaculture/ tourism	Reduction of post-harvest losses	New markets for emerging fisheries	Sufficient capacity and enforcement	Access rights, tenure licenses	Adaptive/ ecosystem-based fisheries management	Fisheries considered in freshwater usage (e.g. hydroelectric)	Fisheries agreements and TB management
<b>Terrestrial</b>	Agro-ecological livestock and farming	New markets for incoming species	Sufficient capacity and enforcement	Utilisation of IK and LK	Access rights, tenure and licenses	TB protected areas and management		

### Maladaptation

Resource detachment, loss of cultural identity, knowledge and social pride

Regional/community conflicts, increased inequities due to access

Perverse subsidies, increased inequities

Illegal and unreported harvest, species trafficking and poaching

Overexploitation, industry relocation, human relocation necessitated by food/livelihood insecurity

Data poor assessments, uninformed decision-making

Power dynamics, top-down policy making and agreement, failure to adapt policies

International conflicts, unbalanced negotiations, sovereignty and climate justice issues leading to overharvest

Adapting food livelihoods to species shifts. Common adaptation options, limitations and potential for adaptation in aquatic and terrestrial species with climate-induced movement of food species and reliant peoples.<sup>16</sup>

16 Chapter 5, Cross-Chapter Box Moving Plate.2