

Climate Change Impacts - Pacific Islands -

The IPCC 4th assessment report identifies small island states as being the most vulnerable countries of the world to the adverse impacts of climate change. The Pacific is in fact without a doubt one of the world's most vulnerable regions when it comes to risk of disaster due to climate change, particularly several of the low-lying coral islands. Climate change is already affecting Pacific Islands with dramatic revenue loss across sectors such as agriculture, water resources, forestry, tourism and other industry-related sectors.

Some of the projected impacts of climate change on main sectors that specifically apply to the Pacific Islands are listed below.

Agriculture

Ocean warming, frequent tropical cyclones, flash foods and droughts are likely to have dramatic impact on food production system in Pacific Islands. Local food production is vital to the Pacific Islands where the majority of rural people still live and depend on subsistence agriculture.

While subsistence agriculture provides local food security, cash crops (such as sugar cane, banana and forest products) are exported in order to earn foreign exchange. Projected impacts of climate change are expected to be responsible for both affected local livelihood and drop in competitiveness of cash crops. In particular, key future impacts are related to extended periods of drought and, on the other hand, loss of soil fertility and degradation as a result of increased precipitation, both of which will negatively impact on agriculture and food security.

Scientific studies state that in the absence of adaptation, a high island such as Fiji, could experience damage of USD 23 million to 52 million per year by 2050. The overall change in agricultural welfare is expected of a range between -8 and +4 billion USD per year facing with 2-4 C° temperature increase

Furthermore, fisheries contribute significantly to GDP and rural poor livelihood on many of the Pacific Islands; consequently the socio-economic implications of the impact of climate change on fisheries are likely to be important and would exacerbate other anthropogenic stresses such as over-fishing. For example, more intense tropical cyclones and rise in sea surface t° will negatively impact inshore fisheries and food supply, especially in rural areas.

Not all effects of climate change on agriculture are expected to be negative. For example, increased temperatures in high-latitude islands are likely to make conditions more suitable for agriculture and provide opportunities to enhance resilience of local food systems.

Coastal Systems

Climate change is expected to cause serious degradation of the coastal environment and natural resources on which poor rural people depend. Higher rates of erosion and coastal land loss are expected in many Pacific Islands as a consequence of the projected increase in sea level. For example, for Majuro atoll in the Marshall Islands and Kiribati, it is estimated that for a 1m rise in sea level as much as 80% and 12,5%, respectively, of total land would be vulnerable. Pacific Islands are shown to be mainly vulnerable to coastal flooding and decreased extent of coastal vegetated wetlands. There is also a detectable influence on marine and terrestrial pathogens, such as coral diseases and oyster pathogens.

Low-lying island states and atolls are likely to experience increased sea flooding, inundation and salinization as a direct consequence of sea level rise. In particular, estimated impacts of sea-level rise on Pacific Islands' coastal communities are quantified in 77,018 km of shoreline affected with direct costs of 1,419 million of USD per year at sub-regional level associated to a 30-50 cm of sea-level rise.

Ecosystems

Livelihood on Pacific Islands is seriously dependent on ecosystem services. Even though projected temperature increase is not likely to have widespread adverse consequences, some ecosystems, such as coral reefs, are very sensitive to temperature changes. For example, mangrove area in the Pacific Islands is expected to decline by 1% and 13% associated with an increase of 2 C° and 4 C° temperature increase respectively.

In mid and high-latitude islands, higher temperature and the retreat and loss of snow cover could improve conditions for the spread of invasive species and forest cover. In addition, elevated seawater temperatures can damage corals by bleaching and also impair their reproductive functions, and lead to increased mortality.

In the event of increasing extreme events such cyclones forest biodiversity could be severely affected, but with limited impacts on commercial forestry. Facing with 2 % temperature increase, tropical cyclone intensities in the north-west Pacific are expected to increase by 12-15% and average rainfall to decrease by 12-28%.

Climate change, coupled with other anthropogenic stresses already present, will further compromise the long-term viability of these tropical ecosystems.

Water

Water resources in Pacific Island are extremely vulnerable to changes and variations in climate because of their limited size, availability and geology and topography, especially in rainfall. Facing with a 2-4 C° temperature increase, projected economic losses amount to 1 billion USD in damages to water resources. Water stresses caused by climate change will have terrific impacts on poor rural people reliant on water resources for their livelihoods.

Major impacts are related to changes in temperature and rainfall, and sea level rise that are responsible for accelerated coastal erosion, saline intrusion into freshwater lenses and increased flooding from the sea which cause large effects on human settlements.

Precipitation is likely to increase slightly during December, January and February in the southern Pacific and during June, July and August in the northern Pacific. Even so, the scarcity of fresh water is often a limiting factor for social and economic development in the Pacific Islands. Infrastructure deterioration resulting in major leakages is common, and water pollution from soil erosion, herbicide and pesticide runoff, livestock waste, and liquid and solid waste disposal results in high costs.

This reliance on rainfall significantly increases the vulnerability of Pacific Islands to future change in distribution of rainfall. For example, climate models show that a 10% reduction in average rainfall by 2050 is likely to correspond to a 20% reduction in the size of freshwater lens on Tarawa Atoll, Kiribati. Furthermore, decline in the size of the islands, resulting from land loss accompanying sea-level rise, is expected to reduce the depth of the freshwater lens on atolls by as much as 29%.

Less rainfall coupled with accelerated sea-level rise would compound this threat. Lower rainfall typically leads to a reduction in the amount of water that can be physically harvested, to a reduction in river flow, and to a slower rate of recharge of the freshwater lens, which can result in prolonged drought impacts.