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# Climate Change and Food Security in the Pacific

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SABER SALEM, FEB 18 2020

It is irrefutable that the vast Pacific Ocean with its small island nations are in the frontline of the catastrophic climate change which is already threatening food security where the majority of the people depend on the sea for food and on subsistence agriculture. Traditionally, Pacific Island diet consisted of fish, seafood and root crops such as taro, cassava, yams and sweet potatoes and in many rural communities of the region, fish is the only source of animal protein. Now with rising sea-levels, salt water inundation of agricultural land, frequency of cyclones and other climate-change-related-disasters, this livelihood on which 70% of the region's population depends on is under threat and is one of the causes of chronic hunger and malnutrition in the region (WFP and SPC, 2018). Access to food and availability of food in the market are the two important components of measuring food security (Aliber and Mini, 2010 quoted in Masipa, 2017). Thus, from the Human Sciences Research Council (HSRC) perspective, food security means "food availability, food access and food use". According to HSRC, food availability means there is adequate amount of quality food in the market which people can easily access and utilise. Food access "refers to the ability of the nation and its households to acquire sufficient food on a sustainable basis" (Masipa, 2017).

In the Pacific region agriculture and tropical fruits are vitally important sectors, which determine food security. They make a huge contribution to the "livelihood of the populace, gross domestic product and food security" (Rosegrant, et al., 2015). In 2011 the United Nations Food and Agriculture Organization (FAO) calculated approximately 67% of the region's population depending on agriculture for its livelihood (FAO 2011). For instance, in the Fiji Islands agriculture accounts for 15% of its GDP, in Papua New Guinea it stands at 37% of its GDP while in Solomon Island it is 36% of the GDP (World Bank 2011). As for the coastal communities, marine resources such as fish and others are major sources of both food and commercial income, which they sell not only in the local markets but also internationally (FAO, 2008).

According to the Intergovernmental Panel on Climate Change (IPCC) assessment reports, climate change severely affects both agriculture and marine resources of the region, resulting in widespread unemployment, poverty and climate induced migration to developed countries. In addition to that, climate change causes "elevated air and sea surface temperatures, unpredictable rainfall patterns, rising sea levels, changes in regional climate systems, and increasing intensity and frequency of extreme weather events including tropical cyclones, depressions, and droughts" (Barnett 2007). Thus, it is projected that climate change will have 'large scale' impacts in the wider Pacific region by severely affecting agricultural productivity and food security negatively. This will inevitably precipitate widespread unemployment, poverty and mass migration to already overpopulated urban areas and industrialised countries. The urban drift is leading to "high income disparities" between the urban and rural population and is one of the causes of "chronic hunger and malnutrition" and with increased intake of imported and processed food is causing associated health risks. "Underweight and overweight are significant problems in the region – both are associated with the increasing dependence on foods with high sugar and fat contents" (WFP and SPC, 2018).

Given that sea level rise and sea flooding wash saltwater onto agricultural lands and make them uncultivable, the island nations have to import their required food, which is not affordable to a large portion of already impoverished section of the society (ADB, 2019). This makes them more malnourished and prone to contracting various illnesses and preventable deaths. Sea level rise also "exacerbates coastal inundation, soil salinization, seawater intrusion into freshwater ecosystem and erosion, thereby affecting the sustainability of coastal agriculture" (Rosegrant, et al., 2015). As a result, food will not be readily available in the local markets and Pacific islanders will not have direct

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access to food. This is the time when the local population will face severe shortage of food because it is either in short supply or too expensive. Given that the Pacific region is geographically remote, imported food will always remain costly for low income people.

Furthermore, there are scientific evidence that there has been a decadal annual increase in temperature, which has a domino effect on rising sea surface temperature, hence resulting in coral bleaching (UN, 2019). This will severely affect the coral reef system, which is a natural breeding and feeding ground for fish and other marine species. According to a report by the Australian government, the coral reef is in a 'very poor' condition. It states that coral reefs are exceptionally 'sensitive' to the warming of sea surface temperature. The "report estimates that by about 2030, the reef could look more drab, with fewer fish" (Kennedy, 2019). A reduction in fish stock will directly affect the food security of the Pacific islanders. Agriculture and sea are the two main sources of food to the Pacific people. Regrettably, climate change is impacting both of these vitally important sectors simultaneously, which raises the chances of food insecurity of the region greatly. "Global warming threatens more and worse cyclones, droughts, forest fires, floods and climatic shifts, with catastrophic consequences for food, water, livelihoods, housing and health" (Thakur, 2019).

Moreover, because of climate change, it is predicted that rainfall will become more intense and probably less frequent causing severe and devastating droughts (FAO, 2009). There are projections for the region, which shows "an increase in rainfall of about 0.3% by the 2050 and 0.7% by the 2080" (Nurse et al. 2001). Studies also indicate that there will be less rainfall per year. Both situations have negative impacts on agriculture where heavy rainfall will precipitate deluges and destruction of agricultural lands whereas less rainfall will cause droughts. Droughts are equally destructive to agricultural crops, tropical fruits and livestock. "Increased drought occurrence being of particular concern to food security as agriculture relies more heavily on rainfall than irrigation" (FAO, 2011).

In addition, persistent sea level rise is believed to threat not only food security, but the very existence of the entire Pacific region (Nunn, 2012; Wyeth, 2017). Globally, it is projected that the sea level will, on average, rise about 0.85 meter by the end of this century. In the Pacific Ocean sea levels have risen "at a rate of 10 mm/year or faster – a rate higher than the global average of 3 mm/year" (WFP and SPC, 2018).

It is predicted that the situation will deteriorate as the global gas emissions have seen a steady growth for the past couple of decades (UN, 2019). For instance, in 2018, "global fossil fuel CO2 emissions from electricity generation and industry grew by 2%" (Hersher, 2019). This is exceptionally alarming for the Pacific because these island nations are barely a few meters above sea level (Carter, 2015) with satellite observations confirming that "atolls in Kiribati and the Marshall Islands have been submerged due to rising sea levels" (WFP and SPC, 2018). This has resulted in these island nations believed to be the first to produce world's first climate refugees. The Kiribati government has purchased land in Fiji with an intention to relocate its sinking population to the neighbouring island country (Caramel, 2014). Fiji itself is threatened by sea level rise where the government has earmarked to relocate more than 80 coastal communities to higher grounds (Mckellar, et al. 2019).

Furthermore, scientists predict that as the sea level is rising uncontrollably, there will be up to 50% loss of mangroves particularly in the Micronesian region and up to 15% reduction of the mangrove area in the rest of the region (Ward, et al., 2016). This loss in mangrove area will have a harmful effect on fish stock, which is one of the biggest sources of food and income to the people. "As well as being a major source of food, fishing is a critical source of income. Indeed, the main food export for many Pacific countries is frozen fish" (WFP and SPC, 2018). Sea level rise mostly impacts coastal areas by inundating people's homes and sources of drinking water. Most communities have already run out of drinking water because sea flooding has washed saltwater into the sources of drinking water resulting in the drying up of the wells. According to a World Bank report, "King tides...[are] contaminating drinking water supplies for weeks and even months...[causing] extreme water shortage, affecting agriculture and peoples' general wellbeing" (WB, 2017). This water shortage will also affect agricultural productivity, which directly has a knock on effect on food security of the region.

It is predicted that climate change will usher in changes in the 'regional climate system', especially the El Nino Southern Oscillation. El Nino is believed to be the warm side of the oscillation, which could result in harsh droughts.

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This phenomenon is particularly harmful to the agriculture sector and hence affects food security of the wider Pacific region where a large number of its population will be subjected to starvation. For instance, in 1997 the region was hit by a severe drought or 'El Nino event', which caused food shortages. Papua New Guinea "required emergency food aid in its isolated highlands and low-lying islands where about 260,000 people faced life-threatening conditions due to depleted food supplies" (Rosegrant, et al., 2015). Fiji suffered a huge loss in its sugarcane industry. Overall, the drought resulted in a loss of \$65 million (FAO 2011), which is huge for the aid dependent developing island countries.

Additionally, scientists also predict that climate change will increase the frequency and intensity of destructive cyclones. In the Pacific region cyclone season starts in November and ends in May. During this period temperature keeps on soaring, which then leads to cyclones. Moreover, "maximum tropical cyclone wind intensities are likely to increase between 5% to 10% by 2050, with increase in peak precipitation rates of up to 25%, which, in turn, would cause higher storm surges" (Rosegrant, et al., 2015). It has been observed that the severity and intensity of tropical cyclones have increased (Webster et al. 2005). The region as a whole is prone to tropical cyclones during the rainy season. When tropical cyclones strike, it severely affects infrastructures, businesses and more importantly agriculture – hence threatening the food security of the cyclone-hit country. Tropical cyclones also wash saltwater onto agricultural lands making them uncultivable thereafter, which causes short-term food shortage and long-term food insecurity in the region (Webster et al. 2005; FAO, 2011).

In addition, cyclones cause sea flooding, which then inundates coastal areas and crops. Cyclones also cause landslides due to high volume of rainfall in a short span of time, which also destroys agricultural lands and crops resulting in low agricultural yields. "Reduced agricultural output could lead to lower earnings from agricultural exports and reductions in domestic food availability in some Pacific island countries" (FAO, 2011). Tropical cyclones also cause inflation in the local markets where most affected people do not have the financial capacity to purchase their daily required food and fish. Moreover, during the cyclone period, sea voyages become extremely dangerous hence prevents fishermen to fish as usual. Fish and other marine species are "both sources of protein and income" (FAO 2009) to Pacific islanders.

In conclusion, climate change not only causes food insecurity but also threatens the very existence of the Pacific region as a whole. There are multiple disasters that are precipitated by climate change such as sea level rise, drought, cyclones and flooding, which all directly impact the food security of the region and could send millions of its already impoverished population to destitution. Climate change does not affect the Pacific region alone. It has global disastrous impacts hence requiring a global action by governments to tackle the problem. The era of blame game is over. Every country has 'carbon footprint' in one way or the other. Thus, it is about time that governments come together and reduce their greenhouse gas emissions released into the atmosphere. According to a UN Report, every year greenhouse gas emissions is increasing when it should have diminished significantly in order to prevent earth from warming more than 1.5 to 2 °C. The "earth is already more than 1 degree warmer than it was before industrialization, and that is driving more frequent and severe storms, droughts, heat waves and other extreme weather" (Hersher, 2019). Any further increase in temperature will only cause more environmental problems such as food insecurity, diseases and submerging of coastal cities around the world. It therefore necessitates that global leaders must take action now before it is too late and global environmental crises go out of hand and nations suffer from multipronged financial, commercial and territorial losses. The world must understand that short-term socio-economic gains must not be prioritised over long term sustainable gains.

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