Implications of Climate Change on Defence and Security in the South Pacific by 2030

Executive Summary

May 2019

Introduction

The South Pacific region is and will continue to be one of areas most affected by the impacts of climate change. As agreed by leaders at the 2018 Pacific Islands Forum, in the ***Boe Declaration***, "climate change presents the single greatest threat to the livelihood, security and wellbeing of Pacific people" (Pacific Islands Forum Secretariat, 2018). Common challenges from various intensifying impacts of climate change, alongside **strong historical and cultural links between countries of the region have fostered regional** cooperation to build resilience to disasters and climate change for decades.

This report seeks to assess the security implications of climate change in the South Pacific and focuses on three key dimensions: the vulnerability of key infrastructure, humanitarian challenges and maritime surveillance. The report was commissioned by the 2017 South Pacific Defence Ministers' Meeting (SPDMM) and is the result of cooperation between the Ministries or Departments of Defence of Australia, Chile, Fiji, New Zealand, Papua New Guinea and Tonga, under the coordination of France. The report aided the development of proposed recommendations for the 2019 SPDMM's consideration to pave way for stronger regional cooperation on defence, climate change and security. The study was coordinated by the researchers of the French Institute for International and Strategic Affairs (IRIS), in charge of the Observatory on Defence and Climate[1]. The report has also benefited from valuable contributions of representatives of the different SPDMM members.

1. Climate impacts in the South Pacific by 2030

The South Pacific region faces significant challenges from climate change, especially rising sea levels, cyclones, droughts, and storm surges. By 2030, climate impacts are likely to be exacerbated by the demographic trends in the region, including high population growth – especially in the Melanesia sub-region – and many young people in most populations.

Sea-level rise

- Sea level will continue to **rise much faster across the Pacific** region than anywhere else, but there will be significant local variations. In the western Pacific and eastern Indian Oceans, **rates up to four times the global average**, at **about 12 mm per year**, have been reported between 1993 and 2009 (Nurse et al., 2014). As most of the infrastructure in small islands is located on the coast, this is of particular concern.

Temperature

- **The past decade has been the warmest ever recorded in the Pacific** (CSIRO et al., 2018). Between 1961 and 2017, the average temperature increase has been of 1.0°C on average in the Pacific.
- It is considered that the warming in Port Moresby (Papua New Guinea) is representative of the mean warming across the region, with a **temperature increase of 0,18°C per decade** (CSIRO et al. 2015).
- Over the past 50 years, **the number of exceptionally warm days and nights has more than tripled,** from 20 per year to up to 80 per year (CSIRO et al., 2015).

[1] http://www.iris-france.org/observatoires/observatoire-defense-et-climat/

- In the future, temperatures will continue to increase, as well as the number of hot days and nights. Predictions on temperature increase from the October 2018 Intergovernmental Panel on Climate Change's Special Report are stark: "If the current warming rate continues, the world would reach human-induced global warming of 1.5°C around 2040" (Allen et al., 2018, p.81).

Rainfall

- In the past decades, from 1981 onwards, the **south-west Pacific is become wetter, and the central Pacific is become drier** (CSIRO et al., 2015). It is not clear, however, whether this trend can be attributed to climate change, or is rather the effect of El Niño Southern Oscillation (ENSO).
- In the future, **average rainfall is expected to increase** across the Pacific region.
- **Extreme rainfall events that occur once every 20 years are likely to occur once every 7 to 10 years in a low-emissions scenario**, and once every 4 to 6 years in a high-emissions scenario (CSIRO et al., 2015).
- As a result, the **number of droughts is likely to decrease in most areas** of the Pacific, especially around the Equator. Yet, with climate change there is a heightened risk of droughts that do occur being more prolonged.

Tropical cyclones

- Tropical cyclones represent the most immediate climate risk to territories and populations of the Pacific (Shen & Gemenne, 2011).
- The Pacific typically experiences **an average of 10 cyclones per season** (CSIRO et al., 2015). In recent years, violent cyclones (Pam in 2015, Winston in 2016, Gita in 2018) have caused very significant damages to affected territories and populations.
- Climate models (CSIRO et al. 2015) suggest an overall **decrease of cyclonic activity in the South Pacific over time, but cyclones in the region will be of higher intensity** (Nurse et al., 2014; Campbell, 2018).

Overall security implications

- There is no doubt that climate change will remain a significant security challenge to the Pacific region in the coming decades. While some see climate change as a security concern in its own right, it can be viewed as a risk multiplier in the Pacific—climate change exacerbates and complicates state fragility, conflict dynamics, economic vulnerability and threatens many aspects of human security (McPherson, 2017).
- Climate change is affecting **cultural practices and traditional livelihoods**. Without attention and protection, communities in the South Pacific may lose the ability to practice their cultural traditions due to the impacts of climate change. Protecting a sense of community and identity will become more challenging.
- Coral bleaching, changes in fish populations and their mobility (especially tuna), depletion of groundwater resources, and seawater infiltration, will cause **harmful impacts on food and water security**. Dependence on imported foods is likely to increase in future for some Pacific islands, especially in urban areas (Bell et al., 2012).
- Growing human insecurity, combined with the search for better livelihoods, will increase **climate change related migration**, a phenomenon that is already occurring internally in the region, with people moving inland. However, there is a strong preference of many Pacific island people to adapt *in situ* to the impacts of climate

change. It is thus essential to give priority to investments directed towards supporting and enabling *in situ* adaptation. National, regional and international support will be needed to minimize the risks intrinsic to relocations, as some areas will become uninhabitable over time.

- In order to **avoid maladaptation practices**, it is essential to consider a diverse range of viewpoints when devising an adaptation strategy, especially when it involves migration movements, which can result in a positive outcome for some communities but have detrimental impacts upon others (Gemenne & Blocher, 2017).
- Regarding the health impacts of climate change in the Pacific, **increasing incidence of vector-borne diseases** (Dengue, Chikungunya) spark the most concern (McIver et al., 2016).
- Loss of fertile land and potable water due to salinization could contribute to **resource competition**, within or between islands that might escalate into security incidents without proper management, consultation and governance.

2. Vulnerability of key infrastructure

As the effects of climate change intensify, the risk to critical infrastructure increases over time. The needs of the population and the social, cultural and economic services most relevant to individual communities should be at the centre of plans to improve the climate resiliency of critical infrastructure across the South Pacific region. Armed forces must also have resilient infrastructure as they are expected to be amongst the first to support requests from their Governments in responding to a natural disaster in support of the population.

- **Critical infrastructure** can be broadly understood to include "systems, assets, facilities and networks that provide essential services and are necessary for the national security, economic security, prosperity, and health and safety of nations".[2] Critical infrastructure basically fulfils three key functions: **providing basic well-being of the population, delivering government services and enabling economic activity** (Baker and Week 2012).
- **Transport infrastructure is particularly essential** in the Pacific, due to the specific geographic characteristics of the region (geographically remote, distance between islands, interconnectivity) (Baker and Week 2012).
- **Infrastructure located in coastal areas is particularly vulnerable** – this includes roads, airports, ports, housing and other critical infrastructure along the coast, and essential services such as power supplies, telecommunications, the provision of potable water and health care facilities. These structures will be affected in a variety of ways, including through the symptoms of simple inundation events such as alkali-silica reaction or 'concrete cancer', erosion and corrosion, and through the more immediate and catastrophic damage caused by wave action (Kumar & Taylor, 2015).
- **Critical infrastructure located inland will also be tested and affected by flooding events and landslides** that will become more prevalent with variable rainfall patterns. Conversely, some nations will experience **drought and rainfall reductions** that will impact inland infrastructure such as dams and road networks, as the soil and foundations may dry, shrink and crack.
- **Fire events might also become more common in some countries such as Australia** and threaten homes and critical infrastructure.

[2] http://www.infrastructure.govt.nz/publications/critical5/crit5-narrative-v2.pdf

- **Building resilient infrastructure** to the above-mentioned impacts is essential, as well as ensuring our ability to **restore quickly destroyed infrastructure when a disaster strikes.**
- Due to the strong interdependence and interconnectivity of the Pacific countries, **vulnerability of infrastructure should be considered on a regional scale and not only within the territory where it is located**, as a damaged infrastructure (such as airports) in one part of the region can threaten the provision of vital and basic services in other parts of the Pacific region, especially the most remote areas.
- **Military infrastructure is usually treated independently from civilian infrastructure in vulnerability assessments**. Military bases typically suffer from the same vulnerabilities as civilian infrastructure. Sensitivity around military infrastructure can still be respected, while also sharing best practices to mitigate the impacts of climate change. There is a risk that climate impacts might prevent militaries from fulfilling certain aspects of essential missions, especially when impacts combine with each other.

The following table assesses the influence of major climate impacts on key infrastructure assets in the Pacific.

INFRASTRUCTURE	CLIMATE IMPACT									
	Coastal	• Storm Surge	• Sea level rise	• King tide	• Wave action	**Rainfall**	• Drought	• Prolonged Rain	• Flood	**Cyclonic Wind**
Energy										
Water										
• Supply										
• Waste Water										
• Drainage										
Solid Waste										
Transport										
• Roads										
• Ports										
• Airports										
ICT										
Buildings										
Settlements										
Health										
Education										
Tourism										
Key	Strong			Moderate				Weak/None		

Figure 1 – Overview of major climate impacts on infrastructure assets in the Pacific. Source: Baker and Week 2012.

The full report includes more detailed analysis of key infrastructures at risk in different parts of the South Pacific region.

3. Humanitarian challenges

On a regional level, several climate stressors will lead to **increased demand on regional militaries and other security-focused institutions to conduct Humanitarian Aid and Disaster Relief (HADR) operations or provide** other types of assistance. Humanitarian assistance draws on the expertise of defence forces—military personnel are trained to provide logistics assistance, help transport humanitarian supplies such as food, materials and staff, and build or rebuild infrastructure as required. **Regional cooperation on HADR has already grown substantially since year 2000** in response to the many natural disasters that regularly struck the Pacific region, taking the form of both multilateral (such as the FRANZ agreement) and bilateral agreements, military and civil-military cooperation.

- With the increasing intensity and severity of many diverse weather events, **HADR will become more complex in two notable ways**. The first is responding in areas where extreme weather events occur more regularly, as affected populations and key infrastructure assets are likely to come under unprecedented stress because of **shorter recovery periods**. The second is that with the widened tracks of cyclones, **some places in the Pacific will experience tropical cyclones for the first time, or where they were rare.**
- It **is also important to consider the cumulative effects of natural disasters**. If a cyclone of category 1 hits soon after a cyclone of category 5, it will be much more damaging than in a normal situation.
- **The increased frequency and intensity of extreme weather events,** along with business-as-usual activities (such as other deployments and exercises), is likely to stretch regional resources and lead to **more concurrent operational requirements**.
- With the intensifying impacts of climate change, **defence forces and other security or response entities will be required to act in more challenging circumstances**, with potential **effects on the mental and physical health of personnel.** It will require active preparation, monitoring and potential follow-up assistance or treatment.
- It is extremely important that **climate migration or relocation of affected communities is thoroughly planned in order to mitigate potential legal and security challenges** resulting from land disputes, inter-community misunderstandings, and resource scarcity (Gemenne & Blocher, 2017).
- With an increase in frequency of extreme weather events and increased requirements for military and humanitarian operations alike in the South Pacific, it will be important to remain mindful of **traditional resilience mechanisms** in the region (Hollis, 2018). Continuous improvement of people-to-people links will be of key importance.

The full report provides more detailed information about disaster preparedness and response from French, Australian and New Zealand defence forces in the region.

4. Surveillance of maritime zones

Maritime surveillance involves different security and safety challenges, including risks relating to transportation, navigation and pollution, and threats relating to illegal, unregulated and unreported (IUU) fishing, trafficking (human, drugs, etc.), and illegal migration. While cooperative maritime surveillance activities are already common in the region, threats are likely to become more complex due to the impacts of climate change. Most of the time,

climate change will act as a risk amplifier rather than as a key determinant of maritime surveillance challenges.

- **Resource scarcity will influence the behavior of fishing stakeholders and vessels** and could over time create tensions related to an increase in IUU fishing and other unsustainable or illegal activities (MRAG, 2016).
- Climate change is causing **displacement of tuna species**[3] from the west to the east of the Pacific. The catch areas are predicted to move away from the Melanesian coasts, Solomon Islands or Papua New Guinea (IRD, 2013). Micronekton (tuna food) scarcity in some areas will also accentuate the migration of highly migratory species such as tuna. It is thus important to better understand how climate change will impact changes in fish location. Fishing vessels are likely to follow migrating fish across the Pacific—enhanced maritime domain awareness will be key to allow Defence forces to help curb illegal fishing and to be prepared for possible search and rescue.
- Degradation of living standards and livelihoods in the region could encourage **piracy, trafficking and smuggling** (Gemenne, 2017). Criminal activity combined with movements of fish stocks highlights the increasing requirement for enhanced maritime domain awareness in the region.
- **Levels of ocean pollution will be affected by climate change** (Schmidt et al., 2017; Himbert, 2018). This is possible through vessels venturing into new areas following fish stocks and the proliferation of seaweed (bio pollution).
- **Climate change induced sea-level rise will change coastal geography in the Pacific, including in some situations the points on the foreshore used to measure the extent of coastal states' exclusive economic zones (EEZ).** These changes to coastal geography and related potential uncertainty around maritime boundaries may lead some actors to consider interfering with state sovereignty and contravening a coastal State's rights under the UN Convention on the Law of the Sea (UNCLOS).

The full report contains additional information on specific issues related to maritime surveillance for the SPDMM countries.

[3] The skipjack tuna in particular.