

4. Surveillance of maritime zones

Maritime surveillance is a key issue in the Pacific region that requires regional cooperation, as the geography of the region makes it difficult for nations to independently conduct such activities. Maritime surveillance involves different security and safety challenges, including risks relating to transportation, navigation and pollution, and threats posed relating to illegal fisheries, illegal traffics (human, drugs, etc.), and unauthorised immigration. While cooperative maritime surveillance is already common in the region, it is likely to increase because of climate change.

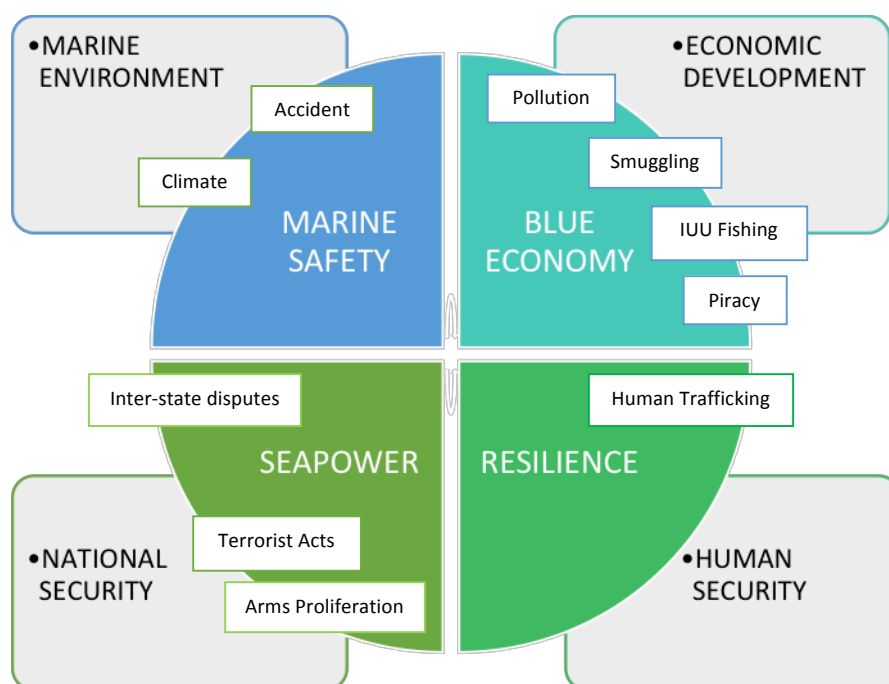


Figure 17 - Maritime Security Matrix. Source: Bueger, 2015

The challenges identified in the chart above are not all directly related to climate change. Some of them, such as fishing, will be especially affected by the impacts of climate change (rise of water temperatures or ocean acidification), for instance on fish stocks. However, most of the time, climate change will act as a threat multiplier/risk amplifier rather than as a key determinant, making its impacts on these challenges mostly indirect:

- Resource scarcity and distribution will influence the behavior of fishing stakeholders and vessels, and could create tensions related to illegal border crossing and inter-state disputes;
- Degradation of living standards and livelihoods in the region could encourage piracy, trafficking and smuggling;
- Sea pollution will also be affected by climate change since the concentration of vessels in a specific fishing zone (following resource displacement), will increase shipwreck risks due to sea swell potential amplification, and the proliferation of toxic seaweeds (bio pollution).

I. Regional challenges

1. Fisheries surveillance

Climate change is identified as a major threat to food security in the Pacific States, especially because “many have a very high reliance on seafood as a source of protein, and modelling identifies that they are projected to have reduced seafood production as a result of climate change” (MRAG Asia Pacific, 2010).

Cooperative surveillance of fisheries in the South Pacific is essential, as the impacts of overfishing or IUU (illegal, unreported and unregulated) fishing on the food security and economic opportunity of Pacific Island countries is likely to be highly significant. Indeed, **the control of fishing areas is a major issue in the Pacific**. Due to globalisation, population growth and changing dietary habits that usually accompany the emergence of a middle class (a phenomenon occurring in Asia), coastal and offshore fishing activities are increasing, with larger and more sophisticated fleets.

According to a study published in 2016 by the Forum Fisheries Agency, which assists and advises 17 Pacific states in the implementation of sustainable fishing practices **“the best estimate total volume of product either harvested or transhipped involving IUU activity in Pacific tuna fisheries is 306,440t**, with 90% confidence that the actual figure lies within a range of 276,546t to 338,475t. Based on the expected species composition and markets, the ex-vessel value of the best estimate figure is \$616.11m. The 90% confidence range is between \$517.91m and \$740.17m” (MRAG, 2016).

Such a high rate of illegal activities could be linked to insufficient means of surveillance on the concerned areas: in their current configuration and deployment, they are more deterrent than coercive. As an illustration, Palau has two patrol boats, one Australian-gifted Patrol Boat and one Japanese-gifted Patrol Boat. Maritime aircraft monitoring requires support from the US Coast Guard or Pacific Maritime Surveillance Patrol aircraft to monitor an EEZ of 629,000 km², which includes a Marine Sanctuary covering 80% of Palau's EEZ. Surveillance and monitoring of the vast Pacific maritime domain (more than 30 million km²) require specific organization, naval and air capacities, extensive technical support (including satellite) and skilled staff members managing a Vessel Monitoring System (identification tool which can be useful to monitoring behaviors and highlighting suspicious vessels).

Monitoring and regulation of catches is essential to control fishing and ensure the renewal of fish stocks. Many regional organizations, NGO or firms are involved in this process:

- Based in Honiara (Solomon Islands), the **Pacific Islands Forum Fisheries Agency (FFA)** has 17 members²². FFA was “established to help countries sustainably manage their fishery resources that fall within their 200-mile EEZs. FFA is an advisory body providing expertise, technical assistance and other support to its members who make sovereign decisions about their tuna resources and participate in regional decision making on tuna management through agencies such as the Western and Central Pacific Fisheries Commission (WCPFC)”²³. It is the key organisation responsible for monitoring,

²² Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.

²³ <https://www.ffa.int/about>

control and surveillance of fisheries activities in the region. As part of this role, the FFA operates the **Regional Fisheries Surveillance Centre**, which is responsible for identifying and tracking vessels operating in the South Pacific. Australia Defence provides support to the Agency through an embedded Royal Australian Navy Surveillance and the **Pacific Maritime Security Program**, discussed further below.

- The **South Pacific Regional Fisheries Management Organization (SPRFMO)** was established in 2012 by the member states of the Convention on the Conservation and Management of High Sea Fishery Resources in the South Pacific Ocean to enhance the cooperation of States in the field of conservation and management of living resources in such areas of the high seas²⁴.
- All countries armed forces in the region are taking part in maritime surveillance through military support to FFA fisheries operations (Island Chief, Tui Moana, Kuru Kuru, Rai Balang²⁵) or the organization of specific operations (Nasse, Tautai, to stop illegal foreign fishing of inshore fishing resources). All those activities are coordinated within the **Pacific QUAD agreement framework**²⁶.
- Many firms or private stakeholders are now conducting fisheries monitoring through different kind of services:
 - o MRAG Asia Pacific, “an independent fisheries and aquatic resource consulting company dedicated to the sustainable use of natural resources through sound, integrated management practices and policies”.²⁷
 - o OceanMind, a consulting company which helps every actor of the fishing sector (governments, seafood firms, seaports, marine protection areas, etc.)²⁸
- NGOs like Global Fishing Watch, which is “promoting ocean sustainability through greater transparency, using cutting-edge technology to visualize, track and share data about global fishing activity in near real-time and for free”.²⁹
- Company organizations such as the Pelagic Freezer-trawler Association, which “represents the interests of 9 European pelagic freezer-trawler companies, which fish for human consumption”.³⁰
- The UN Food and Agriculture Organization (UNFAO) plays an important role through the Committee on Fisheries (COFI) and works with a wide range of partners (governments, regional fisheries bodies, cooperatives, fishing communities).³¹

All these actors are involved in the monitoring and regulation of fisheries in the Pacific but do not pursue the same interests. The resources allocated to fishing and fishing monitoring are quite different. The question is: how climate change will affect this imbalance?

²⁴ <https://www.sprfmo.int/about/>

²⁵ <https://www.ffa.int/node/2060>

²⁶ <https://www.colsbleus.fr/articles/7547>

²⁷ <https://mrag.co.uk/>

²⁸ <https://www.oceanmind.global/>

²⁹ <https://globalfishingwatch.org/>

³⁰ <https://www.pelagicfish.eu/organisation>

³¹ <http://www.fao.org/fisheries>

First, climate change will influence the displacement of tuna species³² to the east of the Pacific. "According to research conducted by IRD, the rise in surface water temperature, which is greater in the west part of the ocean basin, would lead to the migration of tuna to Polynesia in the east. The catch areas would thus move away from the Melanesian coasts, Solomon Islands or Papua New Guinea" (IRD, 2013).

Impacts of climate change such as the evolution of ocean currents, the changing chemical composition of the ocean and reduced oxygen levels will also likely impact the migration of tuna resources. Biodiversity in the region will also be impacted by the changes to food webs as a result of climate change, and by the decline in micronekton productivity which constitutes tuna's staple food (Bell et al., 2012). Micronekton scarcity in some areas will also accentuate the migration of highly mobile species such as tuna.

While this migration could be favorable to French Polynesia as more fish will migrate into French Polynesian waters, it will also potentially contribute to a rise in incursions by foreign vessels into its EEZ. Anticipated shifts in migratory patterns could also create incentives to overfish in the near term in areas where tuna populations are expected to decline. It is thus important to better understand the functioning of ocean ecosystems and how climate change will impact on them, considering the important geopolitical impacts of any changes in fish location, in particular of tuna resources. The **Pacific Community's MICROPAC (Micronekton in the Pacific) project (2020-2023)** aims at improving the accuracy of predictions of the impact of climate change on pelagic ecosystems and tuna resources, through a study of the biodiversity of the micronekton (which is tuna food) at the Pacific scale and its spatial distribution³³. Such project will contribute to the sustainable management of tuna resources in the region, and to better understand and anticipate future movements of fishing fleets.

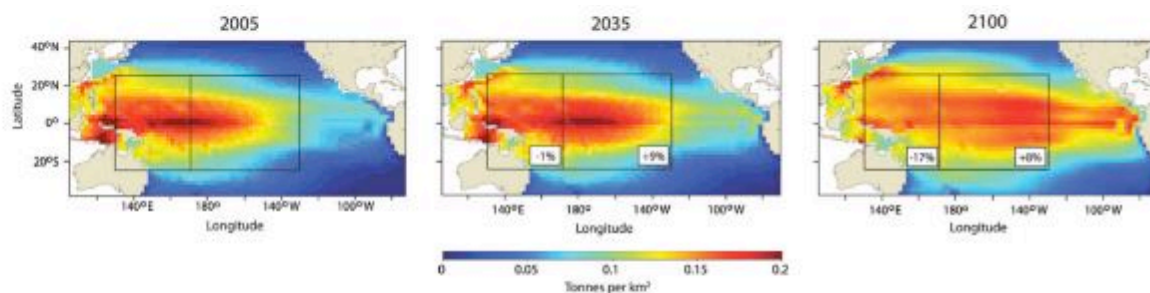


Figure 18 – Projected distribution of skipjack tuna biomass across the tropical Pacific Ocean in 2035 and 2100 under the IPCC A2 high emissions scenario³⁴. Source: Lehodey et al., 2013

Second, and in a more indirect way, climate change (by affecting the livelihoods of farmers for instance), could encourage people to work in the fishing industry if their main activity no longer allows them to live with dignity. We may also see the opposite impact, with people engaged in the fishing industry attempting to move to alternative, land-based livelihoods when fisheries become unproductive. While ecosystem degradation sometimes drives

³² Form the skipjack specie.

³³ in collaboration with SPC (International), IRD (France), CLS (France), CSIRO/IMOS (Australia) and NIWA (New Zealand). See recommandations.

³⁴ Numbers are percentage changes for the outlined areas east and west of 170°E.

farmers or pastoralists to engage in criminal activities in the Sahel, the situation is different in the Pacific where states are less populated and governments more engaged. . Nevertheless, droughts and/or the destruction of fields due to bad weather could contribute to led Vietnamese farmers to migrate (Chapman & Van, 2018) and engage in fishing, feeding – along with other factors such as state incentives –Vietnamese illegal foreign fishing of inshore fishing resources (Gemenne, 2017). In the future, these are changes to be feared if hydro-climatic disasters or conflicts of use increase without the authorities being able to provide appropriate and sustainable responses.

In August 2018, an operation to combat IUU fishing called **Operation Island Chief** took place, involving 10 member-nations of the Forum Fisheries Agency, including Australia and New Zealand, along with France and the United States. Using boats and aircraft the operation covered more than 16.5 million square kilometers of ocean and found no boundary infringements or breaches³⁵. However, the means deployed in the region are still only dissuasive at the moment and will not suffice to respond the increased pressure. Indeed, with the projected fish displacements and stocks reduction ensuing from climate change, the increased demand and resource scarcity would result in rise of the number of ships cruising on the Pacific waters, and thus an increase of potential infringements.

Finally, another element affecting climate change resilience in the South Pacific region is the incoherence of the objectives of public policies, between subsidizing and monitoring³⁶.

Indeed, harmful subsidies to deep-sea fishing constitute a major problem because they may encourage illegal fishing, either by boosting the fishing capacities of large shipowners, who may be tempted to harvest additional resources, or because their fishing capacity disadvantages the smallest operators, who may also be tempted to harvest more resources to address their disadvantage. The question is “what is the best way to monitor fishing activities in the Pacific? Stopping or reducing the subsidies or finance fishing surveillance?” There is a balance to be struck. If climate change becomes a serious threat to fishing in the future, acting now on regulation is important to avoid spillover effects. Moreover, there is an additional question on the use of fishing license attribution incomes as an efficient development model. If it is not well managed, it could have a negative economic impact.

2. Trafficking, piracy and terrorism

The stressors resulting from climate change may also exacerbate existing issues in the Pacific region, including trafficking, piracy and terrorism. The UN Office on Drugs and Crime (UNODC) identifies four major issues in the region (UNODC, 2016): “Drug and precursor trafficking; Trafficking in persons & smuggling of migrants; Environmental crimes (fishery crime and other wildlife trafficking & illegal logging and timber trafficking); and Small arms trafficking [...] driven by several factors as (a) the geographical location of the PICTs situated between major sources and destinations of illicit commodities; (b) the extensive and porous jurisdictional boundaries; and (c) the differences in governance and heterogeneity in general law enforcement capacity across numerous PICTs and the region in general”.

³⁵ <https://www.radionz.co.nz/international/pacific-news/363874/pacific-fisheries-surveillance-finds-no-breaches>

³⁶ We must underline the fact that rich nations spend more in subsidizing fisheries than the estimates losses of revenue from illegal fishing, implying that the global cost of fisheries subsidies is greater than the cost of IUU fishing. <http://www.franciscoblaha.info/blog/2016/2/26/the-promises-of-technology-in-fisheries-and-mcs>

The UNODC report (2016) recognizes that **“threats to the regional marine environment and resources, such as fisheries crimes, pollution and climate change, represent significant risks to the livelihoods of local populations”** (p.19). It adds that “rising local demand, the impacts of climate change and growing export markets have placed considerable strain on natural resources that are unique to, or common across, the PICTs” (p.47).

We know that climate change will impact coastal fishing through coral bleaching. This phenomenon, which will cause gradual disappearance of coral reefs due to the rise of average temperature, increased heat wave frequency and ocean acidification (oxygen depletion), could have several consequences (Frölicher et al., 2018). “The recovery rate of living coral reefs is expected to increase from 40% today across the Pacific to 10% to 20% by 2050, reducing the amount of coral fish by 20%, which is a crucial food local populations” (Bell et al 2013). The findings of the latest IPCC Special Report on the impacts of global warming of 1.5°C is very alarming in regard to the consequences of the +1.5°C and +2°C temperature increase trajectories to 2100: the first would lead to the disappearance of 70-90% of coral reefs, the second would lead this proportion to exceed 99%. It will be important to think through the potential impacts this will have on people's livelihoods and social cohesion (Masson-Delmotte et al. 2018).

In circumstances where there is a lack of economic opportunities and efficient governance, there is a risk of some people turning to criminal activities such as piracy, smuggling or trafficking. Indeed, it has been repeatedly demonstrated that deteriorating living conditions can contribute to the growth of criminal activities in absence of other income opportunities. Depending on the region, this may include drug trafficking, smuggling or even terrorism (Nett & Rüttinger, 2016).

Moreover, **recent studies are beginning to analyze the human trafficking opportunities created by post-climate disaster contexts.** People can become more vulnerable to human smugglers. Facing the loss of their relatives and/or their means of livelihoods, displaced people can see migration as the only opportunity to survive (Coelho, 2017).

3. Pollution

Maritime pollution mainly refers to the impacts of shipping at sea rather than the sea pollution induced by land-based activities, which is another major problem, as illustrated by the quantities of plastic present in the waters of seas and oceans (Schmidt et al., 2017³⁷). At sea, ships can pollute in various ways: deliberate outgassings, strandings and wrecks (because of a navigational error, a storm or other) and cargo spillings (case of oil spills). They also have a significant impact through the release of CO₂, sulfur oxide and ballast water (that may introduce invasive species).

Climate change will only be impacting marine pollution indirectly in the future. For example, a shift of tuna beds from the Pacific to the south and to the French EEZ (see section on fishing)

³⁷ This recent study also shows that 90% of plastic waste from the oceans is carried by large rivers such as the Nile or Yangtze.

may increase vessel traffic and thus increase the risk of degassing, collision and stranding, causing multiple pollution. Increases in sea swell and storms could lead more frequent shipwrecks (major source of pollution); however, the impact of climate change on swell remains unsure³⁸.

Pollution can also be natural, as shown by the global warming related proliferation of *Sargassum* algae which becomes a major problem in many parts of the world (Himbert, 2018). According to a report from ANSES, these plants pollute the beaches, give off a very unpleasant smell causing many ills for people living nearby, and slow down tourism activity. These algae also tend to accumulate heavy metals such as cadmium or arsenic. Finally, they obstruct ports and damage equipment. Proliferation is partly explained by the warming of the waters in connection with climate change, favoring the growth and development of these plants. For the time being, the Pacific is not affected by this phenomenon, but similar proliferation of other algae can have heavy impacts on fauna and flora by reducing the algae / coral ratio in New Caledonia (Jamme et al., 2015) or by threatening the pearling industry in Polynesia due to the asphyxiation of the lagoons sudden proliferation can cause (Le Moullac et al., 2016).

Finally, it should be noted that the presence of plastic particles in marine and oceanic waters also has implications on climate change, as demonstrated by a team of researchers at the University of Hawaii (Royer et al., 2018). Indeed, these particles of polyethylene release, under the action of solar radiation, greenhouse gases such as methane and ethylene, which contributes to warming the surface of the planet.

In terms of pollution at sea, maritime surveillance cannot be the only solution, for obvious reasons of means because states cannot ensure the coverage and overflight of their vast exclusive economic zone. It must be based on respect for international conventions and the accountability of flag states, some of which remain unreviewable (Chevallier, 2014).

4. Potential long-term risks relating to established maritime zones

Climate change has the potential to cause some actors to interfere with state sovereignty and the international law of the sea in the Pacific region in unprecedented ways. State sovereignty involves the right to control and exploit certain sea areas associated with the state's landmass; however changing geography as a result of rising sea levels, storm surges, landslides and extreme weather events may be used by some to promote ambiguity about the limits of a state's EEZ and sovereign claims.

Under the United Nations Convention on the Law of the Sea (UNCLOS), marine areas are split into five main zones, each with a different legal status. Notably, many of these zones are associated with the physical landmass of a nation state and are calculated by reference to the 'baseline', or low water line, of the country in question. For example, the territorial sea of a country extends on 12 nautical miles from the baseline, and its EEZ is up to 200 nautical miles away from the baseline.

³⁸ Some studies report an increase in wave height in the North Atlantic but are unable to link them with certainty to anthropogenic climate change (Komar et al., 2009).

These current legal definitions mean that if a large amount of coastline is lost because of climate change, the situation of a state's territorial sea and exclusive economic zone may change in proportion with the amount of land lost. This change could have implications for fishing practices and shipping routes and would impose further costs on nations already experiencing the negative consequences of climate change.

The laws of the sea are relatively well-defined and agreed upon (for example, there are 168 state parties to UNCLOS) however, **the ambiguity created by changing conditions resulting from climate change may be exploited by actors which seek to challenge the rules on which is built the global order.** The regional environment may also become more contested as climate change puts a strain on a variety of social and economic infrastructures; this may lead to an increased willingness on the part of a range of players to challenge previously accepted rules and norms.

II. Local issues

Although all these problems are regional and require cooperation, specific issues can be identified for each country, which will be exacerbated by climate change impacts.

1. France

For France, maritime surveillance is a highly strategic issue as it is present on all the oceans of the globe and has jurisdiction over the world's second biggest maritime domain (11 million km², more than half in the Pacific region). What are the challenges of current maritime surveillance for France in the region and to what extent will they be impacted by climate change?

The migration of tuna to the eastern Pacific and French Polynesia or the degradation of living conditions related to the impacts of climate change in some Asia-Pacific countries are likely to increase the pressure on fishery resources in the huge French EEZ, impacting the defence missions. The French maritime domain could undergo more and more frequent illegal intrusions and looting. The question of the means to be deployed to ensure its surveillance and preservation will therefore be particularly acute, in a context where the current system provides a dissuasive but fragile function in the event of increased threats. Beyond the problems of maritime surveillance, the question arises of the economic sector that supports many states in the region. Access and fishing rights account for 10-60% of total government revenue in six countries (out of 26 in the Pacific Community) when more than 16,000 jobs depend on it. Artisanal fishing is also the first or second source of income for half of the households (and 50-90% of the animal protein intake of coastal households) (General Secretariat of the Pacific Community, 2014).

2. Australia and New Zealand

Two major regional powers, geographically close, Australia and New Zealand (NZ) share a number of common interests and issues. Their strategic partnership is close, despite diverging approaches on some issues. As they hold common market and several trade arrangements

(Closer Economic Relations, Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), etc.), Australia and NZ cooperate through defence relationships relating to diplomatic, intelligence, law enforcement, custom and military alliances, and notably cooperation relating to HADR and maritime surveillance.

As they share common defence interests, Australia and NZ hold a number of cooperation agreements such as the 1944 Canberra Pact, and the 1991 Australia – New Zealand Joint Statement on Closer Defence Relations. The latter, which is reviewed every two years and was renewed in March 2018, provides a policy framework for practical cooperative activities such as strategic assessment & planning, combined and joint operations and exercises, personnel training and communication (Australian Government Department of Defence, 2018).

Indeed, for both these countries with extensive areas of maritime responsibility, maritime domains constitute a major defence and economic matter. Both Australia and New Zealand have extensive EEZs. While Australia's extends for more than 10.2 million square kilometers of EEZs (mainland and offshore territories) (Australian Government Department of Home Affairs, 2018), NZ's sovereign rights extend 4.08 million square kilometers. Both countries are responsible for search and rescue within extremely vast maritime areas. **Monitoring and protecting these maritime areas represents a major challenge for both nations** and require considerable financial and time investment in surveillance and law enforcement, carried out by specialized fleets of air and sea patrols. In their respective Defence White Papers, both countries identify regional security as of critical interest for national security and resilience. (Australian Government Department of Defence, 2016; New Zealand Government, 2018).

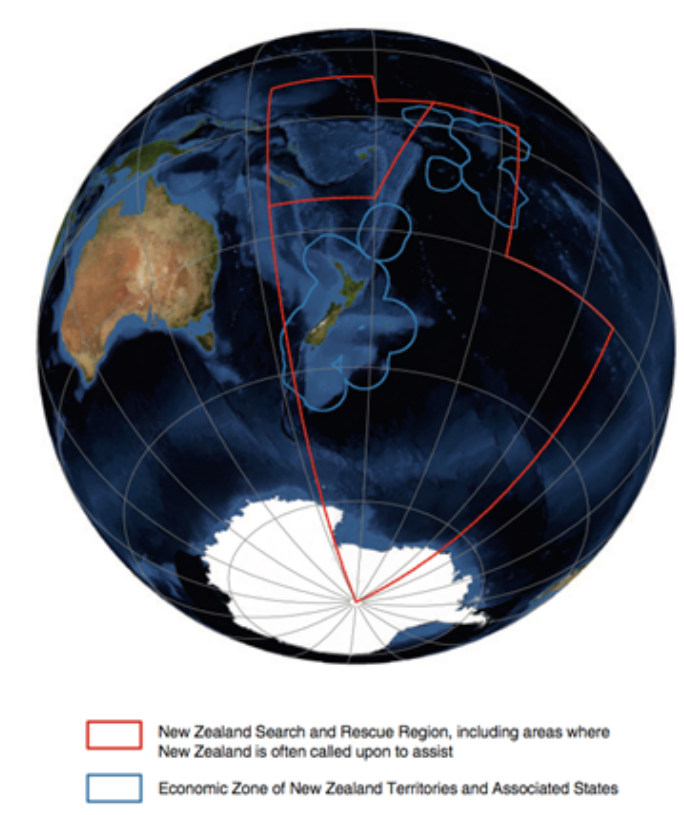


Figure 19 – New Zealand Search and Rescue Region. NZ Ministry of Defence, 2018.

In this scope, both NZ and Australian defence forces pay close attention to their operational capabilities and have recently engaged in developing their maritime surveillance capacities and legislations:

- In June and July 2018, Australia purchased six Northrop Grumman MQ-4C Triton maritime UASs and a eighth P-8A in April 2019, while NZ commissioned four Boeing P-8A Poseidon maritime patrol aircraft to replace its aging P-3K2 Orion fleet. Both are scheduled to enter service in 2023 and are aimed at developing reconnaissance and surveillance tasks.
- The Australian Border Force are currently working on the Future Maritime Surveillance Capability Project, which aims at developing the next generation Australian maritime surveillance capability (Australian Government, Department of Home Affairs, 2018)
- NZ is currently going through a policy review process focused on ensuring that the country has a 'fit for the future' maritime security strategy that is able to continue to secure New Zealand's marine economic and cultural environmental interests for future generations.

A number of maritime security agreements also exist between regional nations to tackle illegal fishing, transnational crime, smuggling, etc. in the Pacific, for example:

- **Australia's Pacific Maritime Security Program (PMSP)**, which allows for maritime security cooperation between Australia and 12 other Pacific Island Nations. Described by former Australian Prime Minister Malcolm Turnbull as "the centerpiece of Australia's defense engagement in the South Pacific", the PMSP made 19 Australian patrol vessels available for partner nations starting 2018 (Colton, 2018). It also involves the provision of two King Air aircraft to provide integrated aerial surveillance up to 1400 hours annually, coordinated by the FFA.
- Backed by political agreements and bilateral security partnerships & treaties between the receivers and Australia, the PMSP constitutes a significant security investment in the region. The program is a \$2 billion commitment to the region over the next 30 years, and consists of three components: Pacific Patrol Boat replacement, integrated regional aerial surveillance, and efforts to strengthen regional coordination.
- **The Pacific Quadrilateral Defence Coordination Group (Pacific QUAD or QDCG)** gathers French, American, Australian and New Zealand forces in common surveillance and sovereignty maritime actions in the region. A key focus of the QUAD is the provision of aerial and space patrols to support the four major regional maritime security operations run by the Pacific Islands Forum Fisheries Agency (Rai Balang, Island Chief, Tui Moana, Kuru Kuru). Australia supports the participation of Pacific Islands Countries in these exercises and operations.
- **A Joint Statement of Enhanced Partnership was drawn** up by France and Australia in 2012. It allows for close cooperation between the two countries over intelligence, defence, military support and environmental matters, among which maritime security holds an important share.

- The **Niue Treaty Subsidiary Agreement** (NTSA) provides flexible mechanisms for member parties to share fisheries data and intelligence and conduct joint surveillance and enforcement activities. The NTSA entered into force in mid-July 2014 and now has 12 Parties (Australia, Cook Islands, FSM, Nauru, Niue, Palau, Republic of the Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu). Another two countries have signed but not yet ratified the NTSA (New Zealand, PNG); three countries have not yet signed (Fiji, Kiribati, Tokelau). The NTSA covers at-sea patrols and aerial surveillance. It also provides for the provision of training, investigation, port inspections and technical, analytical and legal assistance, amongst other things. Australia provides legal and operational support for PICs to ratify and implement the NTSA (A\$4.4. million, 2017-21).

As climate change impacts increasingly puts livelihoods at threat and alters the geographical distribution of fish stocks, occurrences of illegal activities may multiply (illegal fishing, smuggling, trafficking, piracy, transnational crime, etc.) in Australia's and NZ's EEZs. Geostrategic competition for resources is also likely to increase due to resources distribution alterations in the wake of climate change.

Nevertheless, climate change threats are also considered potential opportunities for strengthening regional security partnerships, cooperation and coordination, thereby building enhanced trust between Pacific nations (McPherson, 2017).

3. Chile

Considering the perimeter of **Chile's** littoral (83,850 km of coast), insular and oceanic territories, and with approximately 3,400,000 square kilometers of maritime space, the country mostly relies on the natural resources it holds for its development and the well-being of its populations. For Chile as for many other nations, the Pacific ocean has thus a particular importance as a vital space for the development of states and the main source of protein, and is critical for international trade.

Chile is one of the main fishing powers in the world, representing approximately 2% of GDP and employing more than 60,000 people, with around US\$ 6500 million in exports (Division de Relaciones Internacionales, 2018). Such a dependency on maritime resources makes Chile highly vulnerable to climate change, which will, no doubt, majorly affect the country's productive processes. In addition, Chile faces serious threats in its national waters such as illegal fishing, marine pollution (especially by plastics), ocean acidification, etc., that affect its biodiversity and marine ecosystems.

Given the importance of the Pacific, Chile has, together with eleven other countries (including Australia, France, Fiji and New Zealand), led and signed the Declaration "**Because the Ocean**" which recalls the importance of the ocean in the implementation of the Paris Agreement and urges countries to include ocean conservation efforts within the framework of their climate policies³⁹.

³⁹ <https://www.becausetheocean.org/>

In this context, Chile has also devised a *Strategic Plan for Biodiversity* and a *National Oceanic Policy*, and is currently creating protected areas that cover today 40 % of its EEZ. This task is being addressed from an integrative perspective that includes management plans, satellite monitoring and control technology by the Navy. Regarding climate change, the Ministry of Defense of Chile has focused on two axes of action: 1) the protection of maritime interests in the areas of responsibility, especially oriented to ocean resources, should be strengthened ; 2) the National Action Plan on Climate Change (2017-2022) also suggested the elaboration of the **Climate Change Policy for the National Defense sector**, a proposal that is under analysis by the Ministry of Defense (Division de Relaciones Internacionales, 2018).

4. Fiji

Fiji's EEZ borders five Pacific Island nations, with around 40% of the EEZ bordering international waters. While sharing common borders with neighbouring islands in the Pacific, Fiji is also charged with control of its airspace and maritime areas.

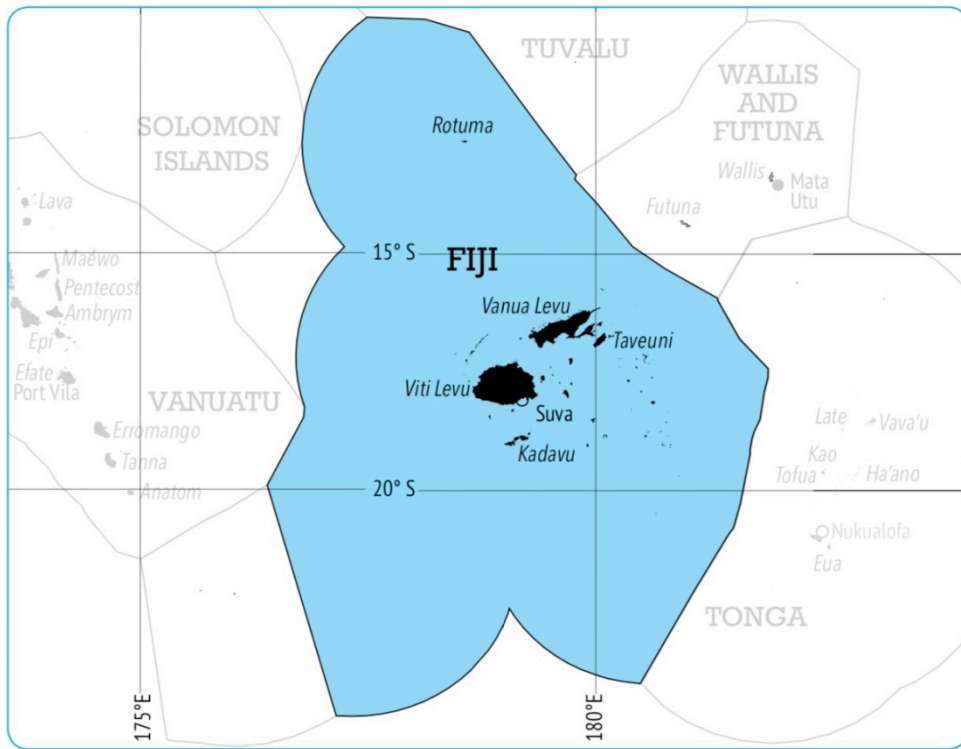


Figure 20 – Fiji's EEZ. Source: SPC. 2016. *Fisheries and the Economies of PICTS*. Noumea: SPC

Fiji works closely with its regional partners on maritime surveillance platforms and these include the Niue Treaty, the Te-Vaka-toa Arrangement, HAWEA, MLSA Agreement, US Bilateral Ship-rider Agreement with Fiji and the Boe Declaration.

Fiji is also one of the recipient countries under the Australian Pacific Maritime Security Program (PMSP) which provides support in terms of and replacement patrol boats and aerial surveillance capability.

5. Recommendations for regional cooperation

Pacific countries are reshaping their regional collaboration to plan and implement adaptation strategies in order to increase capacity to deal with adaptation in the context of both slow and rapid-onset disasters. The reshaping of the Pacific is an opportunity to develop new approaches within external partners to benefit from this new configuration.

In the Pacific, **climate change impacts will lead to growing challenges threatening Pacific Islands' security** through issues such as land and food security, state-sovereignty and culture preservation. There is no strong evidence linking directly climate change to conflict, but increasing human insecurity resulting from climate change acting as a "risk multiplier" may potentially provide the root causes of conflict. However, conflict and violence could be directly related to climate change through forced migration (PIF, UNU-EHS, UNU-GMC 2015:29).

The Pacific Islands Forum (PIF) Secretariat is the main regional entity supporting climate governance in the Pacific Region, and has been increasingly involved in the mitigation of the security consequences of climate impacts. The organization comprises 16 independent states and the French territories of French Polynesia and New Caledonia, and harmonizes regional positions on issues related to climate change, migration, land and conflict. Political decisions are taken at the annual Pacific Islands Forum leaders' meetings. The **Pacific Regional Environment Programme (SPREP)**⁴⁰ is the major intergovernmental, regional organization in charge of framing programmes managing and protecting the environment and natural resources over the region. The **Pacific Community (SPC)**⁴¹ delivers technical assistance and policy support to 22 Pacific Island countries in areas such as health, human development, agriculture, forestry and fisheries. Finally, the **University of South Pacific (USP)**⁴² is a major educational institution in the region as it provides education, consultancies and targeted research including in the area of sustainable development, migration, land tenure and the environment.

The **SPREP has an important role in climate governance** as it is the coordinating entity reflecting the region's engagement with the United Nations Framework Convention on Climate Change (UNFCCC).

Leaders recognized the security implications of climate change at the 1994 Forum meeting where they reaffirmed that "global warming and sea-level rise were among the most serious threats to the Pacific region and the survival of some island states". The Declaration affirmed an expanded concept of security, including traditional (including transnational crime and cybersecurity) and non-traditional security issues such as environment and resources and human security, and includes commitments to build capacity, improve information-sharing, develop early warning systems and promote regional security analysis, assessment and advice. An action plan is being developed by the PIF to practically address the security issues

⁴⁰ [Pacific Regional Environment Program \(SPREP\) \[external website\]](#)

⁴¹ [Pacific Community \(SPC\) \[external website\]](#)

⁴² [University of South Pacific \(USP\) \[external website\]](#)

affirmed in the Declaration, providing an opportunity to cooperate regionally with the PIF and support PIF members to implement the Declaration, including by addressing the security threats presented by climate change.

More recently, Leaders reaffirmed the urgency of recognizing and addressing the security implications of climate change in the 2013 Majuro Declaration for Climate Leadership and in 2015 agreed on the Pacific Islands Forum Leaders Declaration on Climate Change Action in the lead up to the Paris COP21 meeting. It was not until 2011-2015 that a work program in relation to climate change and security emerged, specifically in relation to better understanding the relationship between climate change, migration and conflict. A research policy brief, "Promoting Human Security and Minimizing Conflict Associated with Forced Migration in the Pacific Region", was completed in May 2015⁴³. In 2018, the **Boe Declaration** on regional security from the Pacific Islands Forum leaders reaffirmed that 'climate change remains the single greatest threat to the livelihoods, security and wellbeing of the peoples of the Pacific'.

I. Regional cooperation

1. Foster regional research initiatives

Greater **research cooperation** on the security implications of climate change in the South Pacific is needed. In their assessment of Defence readiness and capabilities to address climate change in the Pacific, the New Zealand Ministry of Defence and the New Zealand Defence Forces recommend that '*defence should explore opportunities to support scientific research on climate change and security (or conflict) in the South Pacific and on how climate change will change the way the Defence Force should operate in the Southern Ocean and Antarctica*'. We fully support this recommendation: this report provides a first element of such regional scientific cooperation.

A regional initiative such as the **Pacific Environmental Security Partnership proposed by US INDOPACOM** could significantly foster such research, and would have a strong potential to coordinate the work on the security dimensions of climate change in the Pacific. The work conducted at the level of the SPDMM should be envisioned as benefitting the region as a whole, and not only the SPDMM member countries.

The **Pacific Fusion Centre** which is being established by Australia in partnership with national and regional stakeholders in the Pacific, will assist leaders to respond to maritime and other security threats (including those impacted by climate change) by facilitating information exchange, fusing data and sharing analysis in line with agreed principles of regional information sharing.

- 1.1. Encourage the sharing of best practice in regards to **policy and scenario development** that accounts for the intensifying impacts of climate change. Including climate change implications for Defence in high-level policy and scenario

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<http://www.forumsec.org/resources/uploads/attachments/documents/Promoting%20Human%20Security%20and%20Minimizing%20Conflict%20Associated%20with%20Forced%20Migration%20in%20the%20Pacific%20Region.pdf>

development opens opportunities for different units or departments to do more and be better prepared for more operational requirements, including concurrent requirements, over time.

- 1.2. The COP25, organised in December 2019 in Chile, shall provide an excellent opportunity to showcase regional cooperation on climate change and security in the South Pacific, as well as the role of the military in addressing the security impacts of climate change. In that regard, the organisation of a side-event and/or a policy dialogue with the climate community would be most welcome.
- 1.3. Encourage and support **education and awareness-raising** about the security impacts of climate change. SPDMM can play a significant role in supporting **strategic regional research** on such issues.
- 1.4. Elaborate a joint document on best practices implemented by the South Pacific Ministries of Defense on environmental security. It could be submitted for approval on the occasion of the next SPDMM. It could potentially be a SPDMM contribution to relevant regional fora on environmental security, including the Pacific Environmental Security Partnership.
- 1.5. Each SPDMM member should designate a point of contact to facilitate and monitor the implementation of the recommendations presented in this section and approved by the ministers.

II. Vulnerability of key infrastructure

2. Refine measurement of the infrastructure at risk in the South Pacific Region

Data on key infrastructure remain patchy. While key infrastructure can easily be identified, more precise measurements would be needed to assess their actual vulnerability. Such measurements should be **standardized across the region** in order to facilitate the sharing of experiences and best practices. France is currently undertaking a review of the vulnerability of some of its infrastructure, with an innovative systemic methodology. This methodology could be shared with South Pacific partners in order to facilitate the standardization of vulnerability assessments.

Such assessment should include two phases: first, the key infrastructure should be **identified**; then its vulnerability should be assessed in a systemic fashion. This means the context of the infrastructure, and not just the infrastructure itself, should be assessed. In particular, the impact of a damaged infrastructure on other infrastructure or territories should be identified.

- 2.1. Topographic data are needed at the **centimetre scale**. Given that sea-level rise is a primary concern for key infrastructure, much of which is located along the coastline, it is essential that topographic elevation data are formulated at the centimetre scale, and no longer at the meter scale as it is the case for now. Vertical accuracy needs to be at the centimetre scale to have any meaningful value in discussions on

vulnerability to climate change. Though this is not technically a defence issue, the SPDMM should support the development of **standardised methodologies** in the region.

- 2.2. The SPC has initiated a **Coastal Inundation Regional Network** for five countries and territories of the South Pacific: Cook Islands, Samoa, Kiribati, New Caledonia and French Polynesia. This project, which follows up on the Climate Risks and Early Warning Systems (CREWS) initiative, seeks to reinforce the capacity of national meteorological services for impact-based forecasting of coastal inundation. Such a network could also be supported by the SPDMM, as it has the potential to facilitate the exchange of best practices and mutual experience. The second phase of this project, lead by the SPC, could be supported by the SPDMM at a cost of 1.5 million EUR.
- 2.3. Improved cooperation with **development agencies** would also be most welcome, as those agencies have often conducted work on critical infrastructure, including in countries without military capacity.

3. Improve and share best practices on the vulnerability assessment of critical infrastructure at the regional level

Our understanding of the vulnerability of key infrastructure remains limited because of the lack of comprehensive assessments. Too often vulnerability is reduced to exposure to risks, and resilient elements of the local context are being overlooked. Regular meetings to share best practices and methodologies could greatly improve the resilience of key infrastructure at the regional level.

Resilience should also be better integrated into climate policies. Damage to key infrastructure in remote islands and areas is likely to compromise the provision of essential services. Therefore legislative frameworks will need to account for the fact that the provision of essential services might be compromised. Particular attention in adaptation measures will therefore be required, in order to maintain the provision of essential services and compensate for the potentially higher costs of these services (those related to energy provision in particular) in remote areas.

- 3.1. A **systematic review** of the vulnerability of infrastructure needs to be undertaken at the local level. Current information only allows for an assessment of the level of exposure to climate impacts, but vulnerability to climate impacts cannot be reduced to exposure to climate impacts, as the latter is too deterministic and doesn't account for other factors, such as the combination of different climate risks, non-linear risks, or the local context. These different factors can mitigate or aggravate vulnerability. A systematic methodology for such review to be undertaken on the field could be discussed at the regional level.
- 3.2. **While this report makes a step in this direction, it is recommended that SPDMM initiates an in-depth dialogue between its partners about this.** A dedicated meeting to discuss the impact on infrastructure, vulnerability assessment and the sharing of

methodological best practices could be most useful in this regard. It could eventually become a regular dialogue.

III. Humanitarian challenges

4. Enhance natural disasters detection and monitoring, as well as data analysis, through innovative early warning systems

Initiatives aiming at improving weather conditions monitoring, to better anticipate cyclones, should be encouraged and used to help armed forces and populations to prepare themselves to climate-induced disasters. It will require to engage different stakeholders (scientists, militaries, civil authorities, communities) in research projects, and to provide adequate funding to implement them.

- 4.1. The French Ministry for the Armed Forces, in partnership with the French National Museum of Natural History and the French Ministry for the Ecological and Inclusive Transition, launched in 2017 the "**Bar-tailed Godwit Program**". This research project aims at observing the behaviour of transpacific migratory birds to complement satellite data in the monitoring of climate-related natural disasters. Migratory birds can often judge weather conditions and anticipate cyclones and tsunamis. The second stage of the program, titled "**Kivi Kuaka**" and extended to other partners (French Development Agency, USGS, Massey University), consists of equipping a few hundred birds (Bar-Tailed Godwit and Alaskan Curlew) with new generation GPS probes, which transmit data via the International Space Station (ISS), as part of the ICARUS initiative. They will also collect meteorological data that could improve climate modeling and weather forecasts. Analysing such birds' behaviour can thus provide useful information to increase disaster preparedness. It is recommended to the SPDMM to support this program and its potential developments.

5. Sustain armed forces preparedness and command chain effectiveness

Past experiences of humanitarian interventions in the South Pacific region have demonstrated that due to the specific geographic circumstances, some remote islands and areas are very hard to access following a disaster, leaving affected populations without immediate support. Humanitarian actors can also face constraints and limitations in providing quick relief, due to excessively cumbersome authorisation and decision-making procedures from civilian and military authorities.

- 5.1. **Encourage governments to include civilian elements, such as National Disaster Management Offices (NDMO), in training and preparation for HADR operations.** Similarly, it is also recommended to include military personnel into civilian preparations and training, as this would facilitate the chain of command in HADR operations.
- 5.2. Territories can be inaccessible in case of natural disasters because of weather events or lack of adapted means. **The possibility to stock humanitarian aid and equipment (tent, water, generator, fuel, non-perishable items) should be systematized in a preventive way, in the most distant and remote areas.** This could be done collectively

and according to needs and means of every partner in the region. For SPDMM nations, that could be declined, when feasible and specifically during cyclone seasons, at least for foreign or national military equipment in designated countries to minimize the logistic constraints. Likewise, any SPDMM nation could ask for support of another member nation to relocate HADR-related military equipment within their own country to better anticipate logistics requirements, such as the lift of emergency HA stores, and to minimize heavy lifts of equipment (HA and military) in the aftermath of a disaster. Any NDMO could express logistics needs outside of emergency periods through the usual CIV-MIL request process addressed to other SPDMM nations Embassies. Defence attachés could then reply when feasible using military assets when deployed in requesting country.

6. Deepen cooperation among military and non-military actors, at different scales

Several military and civil-military cooperation mechanisms to assist Pacific islands countries in disaster relief operations already exist and involve a broad range of local, regional and international actors. Priority should be to assist the host country to lead the response, including benevolent foreign interventions within the limits stated by the supported government. Building the capacity of Pacific Island states to respond to natural disasters is paramount. Furthermore, HADR responses may provide an opportunity to enhance regional cooperation as a whole.

- 6.1. **Cooperation in HADR serves complementary purposes and should consequently be enhanced** through more intensive preparatory information exchanges, practical activities and exercises common to the different defense forces involved in the region. It is meant to **build increased confidence** among regional militaries, mutual understanding and regional culture that would encourage expertise sharing between military forces.
- 6.2. **Improving coordination and communication across government agencies, armed forces and non-governmental organizations** remain an enduring challenge that should also be addressed, through regional workshops involving relevant stakeholders for instance.
- 6.3. **Develop better collaboration between Defence and Homeland Security forces** to tackle disaster response issues and overcome the difficulties related to diverging operational cultures. This can be done through increased integration and participation in the conduct of exercises or training.

7. Provide adequate training

Assisting Pacific islands nations to lead the HADR response on their territories should be accomplished through skill transfer and capacity building, in addition to logistical, medical or equipment support from international partners. The focus should be on strengthening Pacific community, local and governments' capacity to lead and manage humanitarian responses. Additional trainings to Pacific islands' defence and police forces as well as NGOs should thus

be further integrated into regional cooperation mechanisms. Specific trainings for aid providers (local and international) should also be provided to better respond to local priorities and take into account cultural sensitivities.

- 7.1. The **Australia-Pacific Security College** will deliver training and professional development opportunities to security officials from Pacific countries. The College is designed to be flexible by delivering bilateral and regional courses across the Pacific utilizing existing facilities and by responding to countries' needs. The College aims to support the Boe Declaration implementation by delivering capacity building across the broad concept of security issues it sets out (including related to climate, environmental and human security). The College will also establish an active alumni network of Pacific security decision makers to strengthen networks across Pacific countries and agencies to facilitate closer collaboration on cross-border issues.
- 7.2. While humanitarian responses are nationally-led and civilian-led, **CIV-MIL coordination is key** to the support of military forces during HADR operations. Training ahead of any cyclone season should be aimed at accelerating the setup of the CIV-MIL cell, under the lead of NDMO (or UNOCHA) with all contributing nations. NDMOs could organize yearly, ahead of the cyclone season ideally, a briefing to all Defence attachés and defence representatives to facilitate the integration of military contributions when a disaster happens.
- 7.3. Improve the knowledge and understanding of **UNOCHA frameworks and practices** for military entities.

IV. Maritime surveillance

8. Improve maritime surveillance capacities

Considering these growing challenges, it is essential to have a strong regional capacity to conduct maritime surveillance and protect sovereign waters. As the effects of climate change become more and more manifest and pressing, **there is a growing need for the region to be well equipped and trained (equipment and cooperation) to execute a range of timely and effective deterrence, prevention and response operations.**

- 8.1. This implies **more information sharing between navies and coast guards**, cooperation and training, and the establishment of collaborative strategies.
- 8.2. **Increase naval and air monitoring capabilities.** Climatic, demographic and socio-economic trends will impact surveillance missions while maritime activities in the region will increase. It will question the air and naval means to ensure the monitoring of EEZ, fisheries, and current signals suggest that additional capabilities are needed. They could also be supplemented by air and space surveillance capabilities.

- 8.3. **Support innovative projects to anticipate and monitor fishing stocks displacement** like the Pacific Community's MICROPAC project⁴⁴. The project seeks to better understand the functioning of ocean ecosystems by studying the displacement of micronecton organisms that can impact displacement of fishing resources. SPDMM could support SPC in launching such a strategic project for Oceania (0.6 M€ on a 4 year period).

9. Promote an integrated approach at national and global scales

Maritime surveillance is a complex mission that requires the mobilization of a wide range of actors to be fully effective. This implies, in the first instance, a joint effort on the part of the State services, as any intrusion into the fishing zone does not only involve fisheries authorities. Secondly, it means that we must also act on the root causes of the phenomena that the State is supposed to monitor, in order to ensure the overall coherence of public policies. In other words, the State must be careful not to feed - through certain measures or decisions in multilateral forums - on the one hand the problems it is supposed to combat on the other.

- 9.1. **Develop an inter-ministerial response by accompanying the means of surveillance with diplomatic reactivity in the event of a detected break-in.** In terms of IUU fishing, we must underline that a diplomatic part is also necessary. If unauthorized foreign vessels are detected in an EEZ, public authorities of the country must be confronted with pieces of evidence which need surveillance and investigation means (satellite, ships and aircrafts). Diplomatic relations are thus crucial to support the struggle against IUU fishing and must work closely with other state agencies or ministries.

⁴⁴ in collaboration with SPC (International), IRD (France), CLS (France), CSIRO/IMOS (Australia) and NIWA (New Zealand).

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