Understanding the growth and development of fisheries ecolabelling schemes in the Papua New Guinea

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Abstract

The growth and development of fisheries ecolabeling schemes in the Western and Central Pacific is a new trend of market based environmental governance. The Marine Stewardship Council (MSC) certification of the Parties to the Nauru Agreement (PNA) [1] free-school skipjack tuna fishery signifies the shift from the traditional state regulation to non-state market driven (NSMD) governance framework. Using this framework, the PNA has developed its Pacifical brand to promote the PNA and market its products.

This research is a case study in Papua New Guinea (PNG), the biggest player in the PNA. It aims to analyse the shift from state control to NSMD governance, the interaction of environmental governance in fisheries between public and private institutions, and the economic and development potential arising from the MSC. Generally, the research attempts to answer three broad questions - (i) What are the PNA policies and strategies in managing and controlling the tuna fishery?; (ii) Does the PNA MSC scheme improve PNA management and control over tuna resources?; and (iii) What are the economic and development potentials of the PNA Pacifical model?

Using a qualitative approach, my research has shown that the role of the state cannot be underestimated. States provide the enabling framework from which the NSMD governance scheme's (MSC) credibility and legitimacy are derived from. Specifically, empirical evidence shows that the MSC does have some influence in PNA's management and control of tuna resources. The MSC sustainability standards has complemented and improved the governance of purse seining by introducing new sustainability criterias in the fishery. On the other hand, the PNA's attempt to launch its own Pacifical brand is challenging. Supply of MSC certified tuna has been limited because of concerns raised by the Earth Island Institute Dolphin Safe program and a sense of apprehension by PNA members and the industry regarding the Pacifical model.

[1] The Parties to the Nauru Agreement include Federated State of Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu.

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Acronyms

DWFN	Distant Water Fishing Nations
EEZ	Exclusive Economic Zones
EII	Earth Island Institute
EMDV	Environmental Management and Development
EU	European Union
FOS	Friends of the Sea
GVC	Global Value Chain
IFIMS	Integrated Fisheries Information System
ISSF	International Seafood Sustainability Foundation
IUU	Illegal, unreported and unregulated fishing
PAE	Party Allowable Effort
PIC	Pacific Island Countries
PNA	Parties to the Nauru Agreement
PNG	Papua New Guinea
PNAO	Parties to the Nauru Agreement Office
MSC	Marine Stewardship Council
MSY	Maximum sustainable yield
Mt	Metric tonne
NFA	National Fisheries Authority
NGO	Non-governmental Organisation
NSMD	Non-State market driven
VDS	Vessel Day Scheme
UNCLOS	United Nations Law of the Sea Convention
WCPFC	Western and Central Pacific Fisheries Commission

WCPO	Western and Central Pacific Ocean
WWF	Worldwide Fund for Nature

1. Introduction/background

1.1 Fisheries governance framework in the Western and Central Pacific Ocean (WCPO)

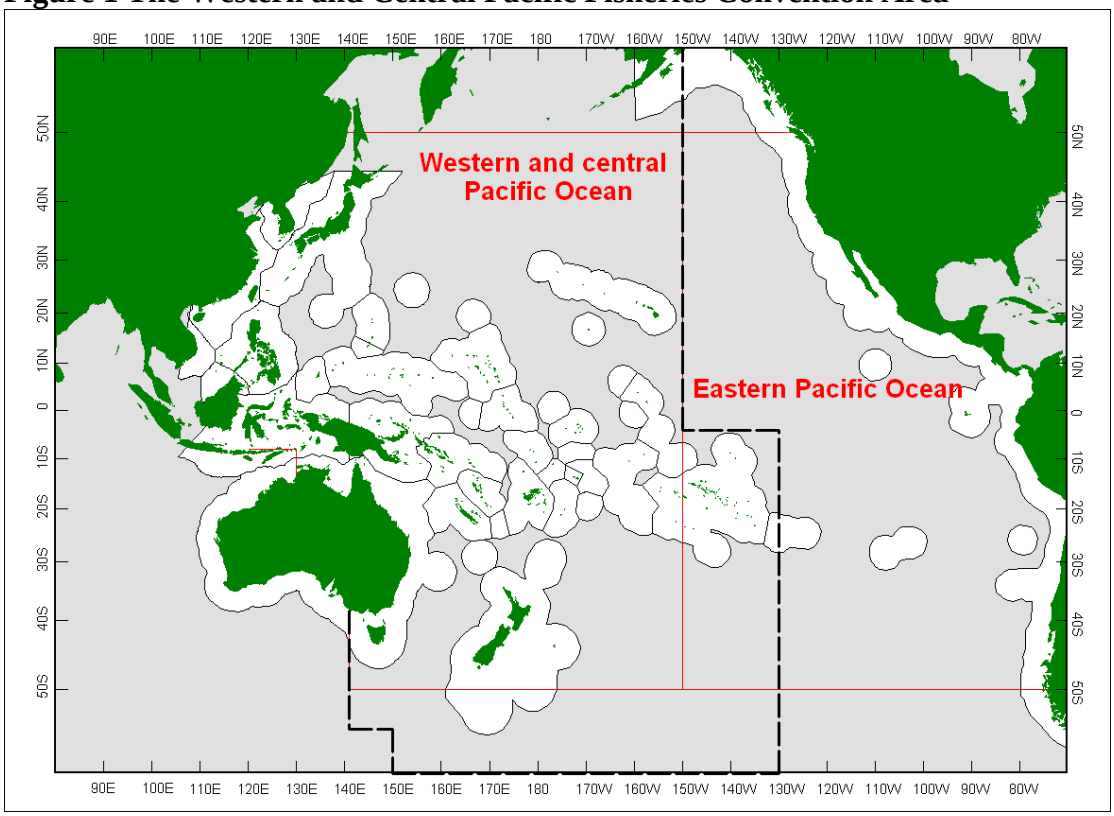
The WCPO fisheries governance framework is a three-pronged approach – the Western and Central Pacific Fisheries Commission (WCPFC) establishes the regional fisheries governance framework for all its members; the subregional framework and arrangements (Forum Fisheries Agency (FFA), Parties to the Nauru Agreement (PNA)) within WCPO and fisheries management at the national level. Given the highly migratory nature of fish stocks, there are sustainability concerns on the three main commercial tuna species (skipjack, yellowfin and bigeye) in all levels of governance. Illegal, unreported and unregulated (IUU) fishing is also a concern for the small island states in the Pacific managing their vast EEZ and has seen the EU taking a strong stance in the fight against IUU in the region.

1.1.2 Regional arrangement and institutions

The tuna industry in the Western and Central Pacific Ocean (WCPO) is one of the largest and the most productive fisheries in the world. The Western and Central Pacific Fisheries Commission (WCPFC), established in 2004 following the conclusion of the Convention for the Conservation and Management of Highly Migratory Fish Stocks in 2000, has the responsibility to manage and regulate fishing activities in the WCPO. The WCPFC is established in accordance with the United Nations Law of the Sea Convention (UNCLOS), and the United Nations Fish Stock Agreement (Tamate 2013; WCPFC 2015). The WCPFC Convention lead Pacific Island Countries (PICs) to develop a rights based management system to govern their fisheries resources, consistent with the conservation and management measures set by the WCPFC (Aqorau 2007). This was consistent with UNCLOS, which established the 200-mile exclusive economic zone (EEZ) for the 12 nautical mile territorial seas of Coastal States (Aqorau 2007; Tamate 2013). More importantly, the UNCLOS Convention placed the responsibility of managing the EEZs, including territorial and archipelagic waters, to PICs. Furthermore, PICs and distant water fishing nations (DWFN) are obligated under UNCLOS to cooperate to manage the high seas (Tamate, 2013).

The WCPFC is a consensus-based organisation that consists of 25 member countries[2], seven Participating Territories[3] and seven Cooperating non-members[4] (WCPC 2015). There are many actors with diverging interests, it often very difficult to reach consensus when proposing and developing new fisheries management policies and measures. The WCPFC has been predominately dominated by large DWFN such as the US, Japan, China, and the Republic of Korea. However of late, smaller Coastal States, acting collectively as sub-regional blocks, have been able to exert their influence at the WCPFC to develop new reforms, such as the vessel day scheme (VDS).

Figure 1 The Western and Central Pacific Fisheries Convention Area



Source: Harley et al. (2011)

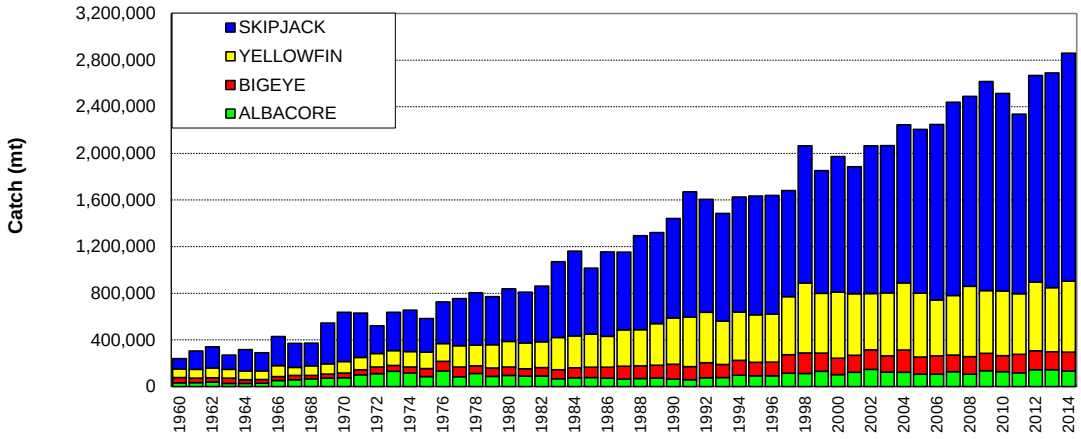
[2] Australia, China, Canada, European Union, Federated State of Micronesia, Fiji, France, Indonesia, Japan, Kiribati, Republic of Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, Unites States and Vanuatu

[3] American Samoa, Commonwealth of the Northern Mariana Islands, French Polynesia, Guam, New Caledonia, Tokelau, Wallis and Futuna.

[4] Ecuador, El Salvador, Mexico, Panama, Liberia, Thailand, Vietnam.

The WCPO contributes significantly to the global tuna catch supply. The 2014 provisional data from the WCPFC Scientific Committee (WCPFC SC11 2015) estimated total tuna catch at 2,860,648 metric tonnes (mt). This represented about 83% of the total Pacific Ocean catch and 60% of the total global tuna catch. The 2014 catch is the highest catch ever as shown in Figure 2. Contributions by fishery in 2014 also show that catch of skipjack is the highest ever at 1,957,693 mt (68% of the total WCPFC tuna catch); catch of yellowfin catch at 608,807 mt (21% of total tuna catch), which is also the highest recorded; the catch of bigeye is relatively stable at 161, 291 mt (6% of total tuna catch); and albacore catch at 132, 849 mt (5% of total catch) (WCPFC SC11 2015).

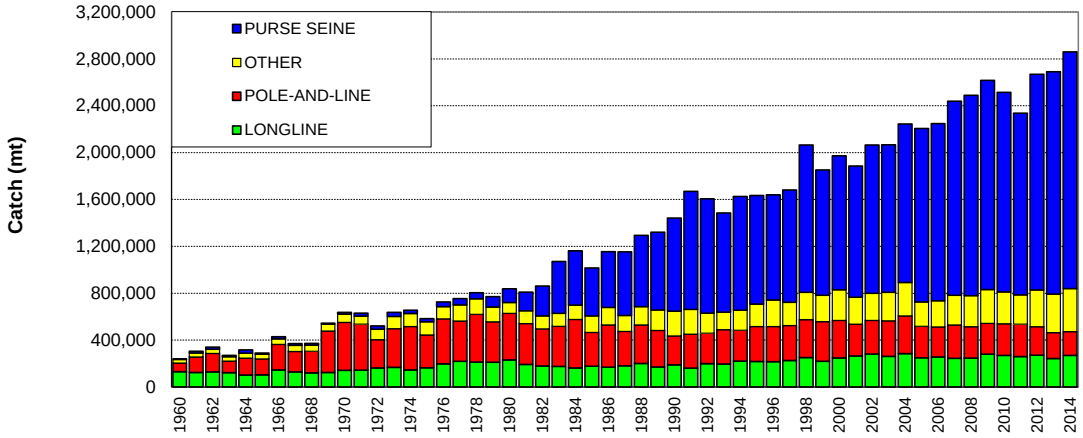
Figure 2 Catch (mt) of albacore, bigeye, skipjack and yellowfin in the WCPFC Statistical Area.



Source: WCPFC Scientific Committee 11th Regular Session (2015)

In terms of catch contributions by gear type in 2014, Figure 3 shows that purse-seine catch is the highest ever catch, more that 120,000 mt higher than 2013, at 2,020, 627 mt. This is followed by longline catch of 268, 795mt, the pole-and-line catch at 203, 736mt, which is the lowest catch since the 1960s. The albacore troll recorded the lowest catch of 2,221 mt in 2014.

Figure 3 Catch (mt) of albacore, bigeye, skipjack and yellowfin in the WCPFC Statistical Area, by longline, pole-and-line, purse seine and other gear types



Source: WCPFC Scientific Committee 11th Regular Session (2015)

In the last 20 years, growth in the purse seine fishing sector has increased skipjack tuna catches significantly compared to other fishing methods and species. In the most recent WCPO stock assessment conducted in 2011 for skipjack tuna, Harley et al (2011) estimate that the current skipjack fishing mortality rate is about 33 per cent the level of fishing mortality that is associated with the maximum sustainable yield (MSY). They conclude that overfishing is not occurring but that the WCPFC should develop limits of fishing for skipjack tuna. The conclusion is precautionary and also noting that the 2014 skipjack catch is an increase of over 114, 000 mt compared to the 2013 catch (1,842,485 mt). For yellowfin, the authors report that overfishing is not occurring. However, stock biomass and recruitment have gradually declined but the spawning biomass is estimated to be above MSY levels. The key concern for the WCPFC is the sustainability of bigeye tuna. Harley et al. (2011) posit that the current fishing levels for bigeye tuna is in excess of the MSY level and that overfishing is occurring. Unlike skipjack and yellowfin tuna, bigeye tuna takes longer to mature and overfishing affects their population reproduction cycle.

1.2. Parties to the Nauru Agreement (PNA)

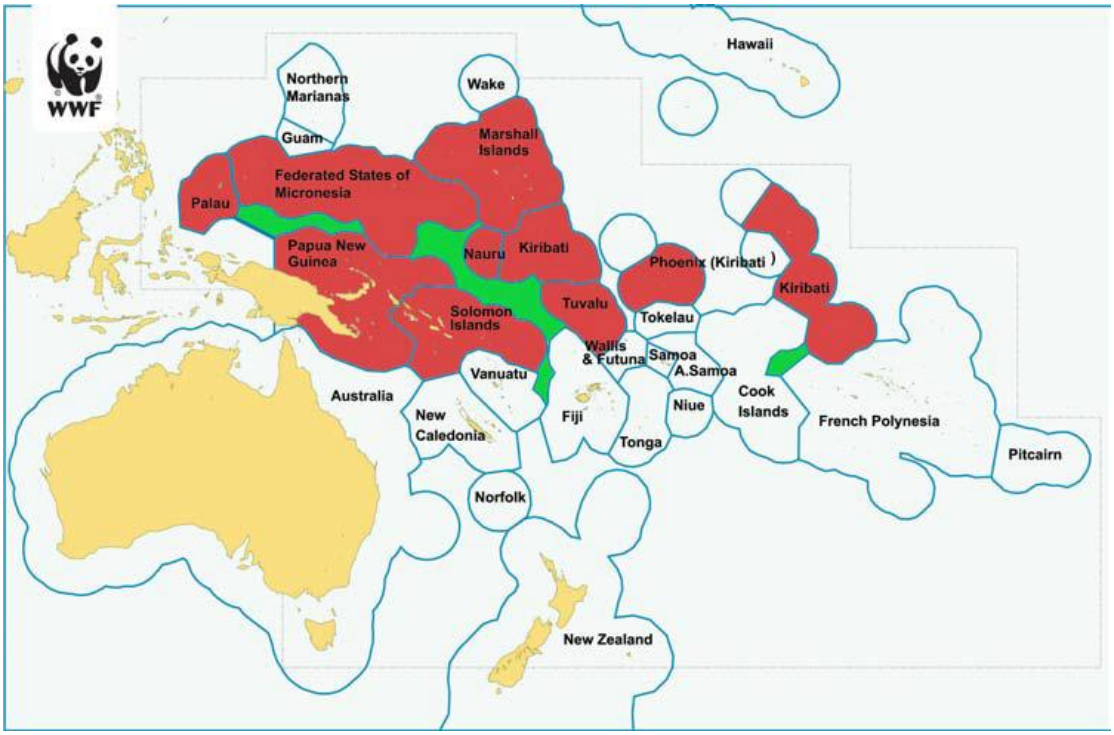
The Forum Fisheries Agency (FFA) administers the PICs fisheries cooperative framework. Within the FFA, there are a number of smaller groupings formed, based on

common interests, reflecting the diversity within FFA members. The PNA is a significant sub-regional grouping of eight small islands coastal states established in the late 1980s and early 1990s. During those times, DWFN (particularly Japan and Taiwan) were heavily fishing the waters of the PNA, paying low access fees in exchange for significant tuna catch volumes (Aqorau 2009). The PNA were played off each other during access negotiations by the DWFN. This led the PNA group to work together and exert greater control and management over the tuna resources from DWFN. In 1990, the Nauru Agreement was adopted that aimed to institute a collaborative framework and established a number of coordination and harmonisation of management measures [5] within the PNA EEZs (Tamate 2011). The FFA administered the Nauru Agreement until the PNA Office was established in 2009.

A significant development stemming from the Nauru Agreement was the adoption of the Palau Arrangement by the group in 1992. The Palau Arrangement aims to optimally utilise and conserve tuna stocks, maximise economic returns and support domestic development, and encourages collaboration amongst all parties. The Palau Arrangement established the Vessel Day Scheme (VDS) that replaces the vessel cap limits where fishing vessels are capped and introduces effort control through the allocation of days. The VDS establishes the overall effort limits – the total allowable effort (TAE), which is then allocated to PNA countries as party allowable effort (PAE), based on historical catch effort and fish biomass. The PAE is then sold domestically to fishing entities (Aqorau 2009). The days are tradable amongst PNA members, are monitored using the vessel monitoring system (VMS), and a minimum benchmark price (USD) per day is set periodically (Aqorau 2009; Havice 2013: Tamate 2011; Dunn et al. 2006).

[5] This includes the 1st, 2nd and 3rd Implementing Arrangements, the Palau Arrangement managing the purse seine fishery, and the Federated State of Micronesia Arrangement for regional access (see Tamate 2011).

Figure 4 Parties to the Nauru Agreement geographic map

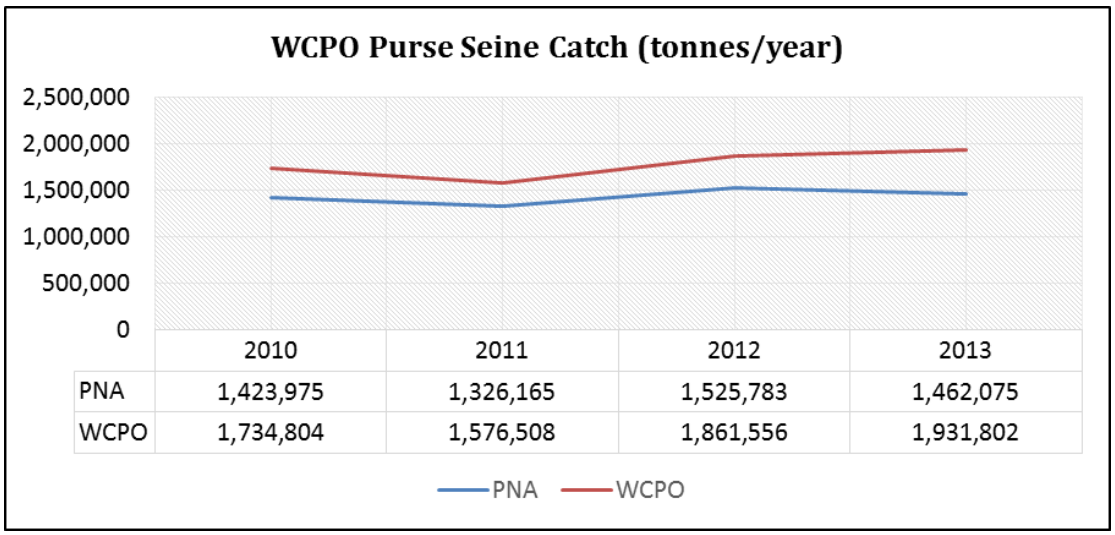


Source: WWF (2011)

The fishing days allocated to PNA countries are also used for MSC trips. In so doing, the PNA has control over the MSC fishing effort in PNA waters. Effectively, the PNA controls the purse seine fishery through the VDS and thus controls the supply of tuna in the Pacific.

In terms of catch effort, the PNA contributes about 60 % of the total WCPO catches and about 25% of the global tuna supply (FFA 2013). Specifically, Figure 5 shows the PNA's purse seine catch averages about 1.4 million mt since 2010 compared to the total WCPO purse seine catch. This also constitutes well over 80% of the total WCPO purse seine catch since 2013.

Figure 5 PNA's purse seine catch contribution to the WCPO purse seine catch



Source: PNAOc (2015)

Being a significant catch contributor in the WCPO, there are also concerns about the sustainability of skipjack, yellowfin and especially bigeye tuna. In response, the PNA has developed a suite of measures, such as the 100% observer coverage, 3 month FAD closure and catch retention to reduce bigeye mortality. There are also concerns raised by the EU regarding illegal, unreported and unregulated (IUU) fishing activities in PNA. The EU has since warned PNG, Solomon Islands and Tuvalu on the possibility of listing them as non-cooperating third countries. As of October 2015, PNG has been removed from the EU warning lists.

1.3. Papua New Guinea fisheries governance framework and significance

The PNG fisheries sector is governed under the aegis of the Fisheries Management Act 1998. The Act establishes the National Fisheries Authority that regulates all commercial fisheries activities in PNG. The Act also establishes a number of fishery management plans that regulate the respective fishery. These management plans establish the total allowable catch limits based on scientific advice, control of fishing

effort, area timed closures, species size and gear restrictions [Fisheries Management (Amendment) Act 2015].

PNG is a member of the WCPFC and is obligated to implement and adopt measures imposed by the WCPFC. PNG is also a significant player and member of the PNA block and implements the policies and measures adopted by the PNA domestically. These include the implementation of the 3rd Implementing Arrangements (3IA)[6], the VDS, the sub-regional observer program, among other measures.

In 2014, PNG introduced and implemented the auctioning of VDS to its purse seine fishery. The auctioning of VDS days by PNG was inline with scientific advice from the Secretariat of Pacific Community's (SPC) SEAPODYM modelling that assessed the sustainability of tuna resources in PNG's EEZ and archipelagic waters (Banks and Lewis 2013). The modelling showed that PNG's purse seine vessel days was 19,000 days, which was over and above the PNA's PAE allocation of 14, 980 days (see Figure 6).

Figure 6 Catch and effort (fishing days) estimates for foreign purse seine vessels fishing in PNG waters, 2010-2014

Year	*Fishing Days*	Catch (mt) / Species				
		SKJ	YFT	BET	OTH	Total
2010	*15,796*	417,035.90	135,979.36	7,365.61	149.52	**560,530.39**
2011	*14,648*	340,949.81	83,235.98	3,044.20	439.67	**427,669.66**
2012	*14,498*	286,641.98	66,979.76	3,392.88	829.04	**357,843.66**
2013	*14,980*	287,764.42	71,030.03	2,976.67	424.3	**362,195.42**
2014	*8,907*	134,352.38	51,033.07	2,291.83	434.26	**188,111.54**
Average	***13,766***	***293,348.90***	***81,651.64***	***3,814.24***	***455.36***	***365,270.13***

Source: Usu et al. (2015)

[6] Key 3IA measures include catch retention, 3 months FAD closure, closure of high seas pockets, 100% observer coverage and port-to-port monitoring.

It was recommended that PNG set its TAE at 19000 purse seine days in its EEZ and cap its archipelagic purse seine days 4000 days (Banks & Lewis 2013). Consequently, PNG developed an auctioning system – (i) EEZ auction for bilateral, PNG flagged and locally based foreign vessel and (ii) archipelagic waters days allocated to processing plants based on processing capacity. The auctioning of the vessel days is expected to reduce fishing effort in the archipelagic waters and the EEZ by limiting the number vessels, and that this will eventually reduce fishing effort.

In contrast to other PICs, PNG has one of the most robust and integrated fisheries management systems in place. Specifically, the PNG Integrated Fisheries Information Management System (IFIMS) is perhaps the most advanced system in PNA. The Vessel Monitoring System (VMS) is the fundamental platform of the IFIMS from which the modules of the VDS, licensing, the observer program, the catch documentation scheme and port sampling are based on. The IFIMS is also used as a verification and validation tool for all tuna related fishing activities in PNG waters.

In comparison with other PNA member countries, PNG is the largest and biggest player. It is the largest in terms of its landmass (462,840 square kilometres); it's population (approaching 8 million); it's natural resources endowments (oil, gas, gold, copper); an extensive 200 nautical mile EEZ and archipelagic waters which are rich fishing grounds; and its ideal geographic location to mainland Asia, Indonesia and Australia. These inherent characteristics have strategic importance for the PNG fisheries sector.

The close proximity to the rich fisheries grounds within its 200 EEZ has contributed significantly in terms of catch volume and on-shore processing capabilities. The availability of land and an abundant labour force were also critical factors for onshore processing. These inherent advantages are coupled with favorable investment climate, access to basic utilities and infrastructure, political stability and the overarching export driven strategy by the Government that emphasised downstream processing (MTDS 2011-2015) in the PNG.

In 2014, the total estimated catch of tuna was 297,178.82 mt, which was a significant drop from the 2012 estimate of 515,106.06 mt (PNG Annual Report to WCPFC SC11,

2015). The catch attribution[7] by purse seine fishing is significant – 296,072.71mt (99% of total catch). Catches from the longline fishery was estimated at just 1,106.12 mt (1% of total catch). In 2013, the FFA (2013) estimated that PNG contributes about 10% of the global tuna supply, 40% of total PNA tuna catches and about 23% of total tuna catches in the WCPO.

Onshore processing development in PNG is also increasing (Hamilton et al 2011). To date, there are six processing plants[8] established, with a combined processing capacity of 960 mt per day of canned, cooked loins, and raw tuna. These processing facilities provide close to 20,000 direct jobs, where women represent over 80% of the workforce (Hamilton et al 2011). The NFA is currently in negotiations with two additional, proposed onshore processing investors (PNG Annual Report to WCPFC SC11, 2015).

In the period 2007-2010, Hamilton et al (2011) estimate the total direct income generated was between K35-K48 (USD 10-14) million annually. Employee earnings were the most significant contributions (approximately K25 million per annum) and net local purchases (average of K13.5 million per annum). Hamilton et al. (2011) further estimates that the contributions to the balance of payments are between K170-215 million annually and contributes about K20-K30 million per annum or about 4% of GDP.

PNG's exports have generally increased since 2009. However, in 2010 there was a decline in exports because of an increase in the export of fresh and frozen whole round tuna overseas, and that a major exporter, RD Tuna Canners were suspended from exporting into the EU on sanitary and phytosanitary grounds. In terms of exports by product, frozen whole round tuna constitute more the 70% of exports, canned tuna about 20%, with the balance from other products (loins) (Usu et al. 2015).

[7] 188,111.54 mt by foreign vessels that fish under access arrangements; 63,789.32mt by PNG chartered vessels (locally based foreign); and 44,171.85 mt by the PNG flag vessels (Usu et al. 2015).

[8] The details of existing onshore processing plants and labour profiles are appended as Appendix 1.

Table 1 PNG exports, by products and quantity, from 2009-2014

Year	Volume (mt)	Value (USD)	Value (Kina)
2009	93,631.44	129,556,202.70	354,545,220.39
2010	68,189.87	120,254,249.88	326,065,872.42
2011	80,574.22	170,252,029.28	400,321,061.64
2012	104,619.86	271,686,624.64	565,426,132.05
2013	104,422.72	234,446,244.40	530,188,734.16
2014	99,773.49	220,068,111.67	538,973,957.57
Total	551,211.59	1,146,263,462.57	2,715,520,978.22

Source: National Fisheries Authority (2015)

1.4 Research objectives and questions

The growth of non-state market driven governance in natural resource management signifies the shift from traditional state control to market driven governance. The shift from states to market based governance respond to concerns by non-governmental organisations, community based organisations and retail end consumers about product quality and sustainability of natural resources units in production stages. The MSC certification of the PNA free school skipjack tuna is an example of this from state governance to governmentality through markets.

This shift by the PNA to the "Pacifical" model also attempts to vertically integrate fishing, processing, marketing, advertising and trading of PNA MSC products. Under Pacifical, an agreed premium of 20% from the final invoice at retail end is paid to the PNA (5%) and processors (15%). The PNA share is shared on a 50/50 basis between PNA States and its Netherlands-based joint venture partner, Sustunable b.v. The aim of Pacifical is to create an alternative revenue source for the PNA, through more direct involvement in tuna value chains, and to ensure the sustainability of skipjack tuna.

This research aims to understand the growth and development of the fisheries ecolabelling schemes in the Pacific. Specifically, the advances of the MSC in the PNA region and its spread into PNG are investigated. I assess the interaction between governments and non-state actors, the emergence of NSMD governance, and value chain development dimensions of the Pacifical model. To adequately analyse this, the following research questions have been formulated:

1. What are the PNA policies and strategies in managing and controlling the tuna fishery?
    i. Broadly, how effective are these policies and strategies in terms of resource sustainability and PNA control over tuna resources?
    ii. How does the PNA view "resource sustainability" and how does it seek to shape sovereign control over tuna resources?
    iii. Are these policies and strategies effectively implemented by PNA members and the purse seine industry, or is there a gap between PNA policy and practice?

2. Does the PNA MSC scheme improve PNA management and control over tuna resources?
    i. What are the objectives of the MSC scheme? Are the MSC requirements in contestation, complementary or overlapping existing PNA requirements? Are they also inline with respective PNA member countries objectives?
    ii. Does the MSC certification facilitate the extension of PNA authority and management control over tuna fisheries resources, and if so how?
    iii. How does the MSC ensure its credibility and legitimacy in the PNA MSC free-school skipjack fishery?
    iv. What is the relationship between the MSC standards and requirements and the EU IUU requirements and standards?

3. What are the economic and development potentials of the PNA Pacifical model?
    i. What is the value chain structure of the PNA Pacifical business model? Who are the stakeholders and how are they involved in the Pacifical?
    ii. What is the distribution mechanism of the PNA Pacifical business model?
    iii. What are the development opportunities for participating PNA countries and processors?

The remainder of this paper is organised as follows. Section 2 introduces the conceptual framework and a review of key literature, with a focus on NSMD governance, and the global value chain framework. In Section 3, the paper discusses the research methodology used in this research while in Section 4, the findings of the research is presented and discussed. Section 5 concludes this paper by reiterating the important role of the state and the governance of PNA Pacifical model.

2 Conceptual framework & literature review

2.1 Non-state market driven governance

2.1.1 Purpose and features of NSMD governance

The emergence and proliferation of non-state market driven (NSMD) governance is in response to the general shift in global environmental governance practices (Bernstein & Cashore 2007). For instance, Cashore et al. (2007) suggested that NSMD governance gained momentum in the forestry sector after the 1992 Rio Earth Summit failed to agree on the global forest convention. The NSMD governance framework responds to global commodity trends, consumer demand and welfare, environmental, social and ethical standards (Cashore 2002; Vandergeest 2007). Accordingly, Henson and Humphrey (2010), Cashore et al. (2007) and Bernstein and Cashore (2007) argue that NSMD governance is governance without the state, where private authority sets the rules; authority is granted by the market forces; is based on adaptation and learning overtime and among different actors; is transparent but costly and requires effective compliance and enforcement mechanisms.

NSMD governance relies on the market as the driving force that affects the supply chain (Cashore 2002; Eden & Bear 2010). Peres-Ramirez et al (2012) further state that market based mechanism promotes and rewards sustainable fishing through economic incentives (Peres-Ramirez et al. 2012)

2.1.2 Role of NGOS in NSMD governance

NSMD governance movement signifies the shift from governments to voluntary governance standards with a range of actors. Non-governmental organisations (NGOs)

have played instrumental roles in establishing market-based standards that act as checks and balance mechanisms for natural resource environmentalism (Eden & Bear 2010; Klooster 2005). In 1997, the Worldwide Fund for Nature (WWF) formed the MSC that is a non-governmental seafood certification scheme (Kirby et al. 2014).

NSMD governance has proliferated because governments have been widely viewed as lacking the capacity to effectively and efficiently manage, monitor and enforce environmental standards (see discussion in Vandergeest 2007). In fisheries, Gulbrandsen (2005) posits that "various non-state certification schemes have emerged in response to perceived public policy failures and have become particularly vibrant sources of rulemaking." Furthermore, Gulbrandsen (2006), Henson and Humphrey (2010) argue that the shift from governments to governance is a partnership between the public and private decision-making authority. Gulbrandsen (2006) further adds that NSMD governance is "characterized by collaborative partnerships, shared public and private rulemaking authority, and non-state policy making and enactment complementing traditional command-and-control regulation." Empirical evidence from this research also shows that decision-making authority has gradually shifted from the public domain to a collaborative partnership between the state and the private actors in fisheries management.

In addition, Vandergeest et al. (2015) reiterate the importance of state territorialisation by providing the enabling legal and regulatory framework and legitimacy over access to resources in the PNA. Nevertheless, the authors argue that territorialisation of the purse seine fishery is not driven by the MSC but has given 'credibility and publicity' to the PNA governance system. The authors also state that the MSC facilitated a redistribution of power and control to PNA states. However, I would argue that the redistribution of power and control to PNA states have been principally driven by the VDS. The VDS has shifted the power imbalance from larger DWFN to smaller coastal states and thus the leverage to generate higher economic returns from tuna resources and promote responsible fishing practices. Nevertheless, the MSC has increased the visibility and credibility of the PNA as postulated by Vandergeest et al. (2015). Indeed, the onus is now on the PNA States to cooperatively consolidate their efforts into economic gains, regional development and long term sustainability of the tuna resources.

2.1.3 MSC as a form of NSMD

The MSC scheme is widely regarded as the 'gold standard' in sustainable fisheries certification (Miller & Bush 2014). It is the first multi-criteria certification scheme, it is transparent and its principles are based on the FAO Code of Conduct for Responsible Fisheries (Gulbrandsen 2005). The MSC is based on three main principles (Gulbrandsen 2009; Ponte 2008; Ponte 2012; Kirby et al. 2014; Perez-Ramirez et al.2012);

i. the sustainability of fisheries stock;
ii. the fishery should ensure minimal impact on the structure, productivity, function and diversity of the ecosystem on which the fishery depends; and
iii. the fishery must have effective fisheries management systems in place.

However, the MSC has also been criticized. Ponte (2012) criticized the MSC for its failure to demonstrate that its certification scheme has positive impact on resources sustainability. Ponte (2008) also criticized the MSC for its lack of growth in developing countries. Vandergeest (2007), Peres-Ramirez et al (2012) and Gulbrandsen (2005) further reiterated that the MSC is a northern affair, largely restricted to developed countries and characterised by high cost of certification and lack of institutional capacity within developing countries, which are entry barriers.

2.2 Global Value Chain

The global value chain (GVC) concept has been used in global commodity trade to analyse the 'vertical' relationship between producers and buyers, and the movement of goods and services (Ponte & Gibbon 2005) from sourcing of raw materials, design, processing, marketing, and distribution to consumer. Ponte and Gibbon (2005) argue that the GVC analysis is a useful tool to understand international trade through a "combination of discreet, product specific value chains", where individual firms are linked in "internationally dispersed but integrated systems of input supply, trade, production and marketing".

Applying the concept of GVC in this research in analysing the PNA Pacifical model is useful. The two types of GVC approaches identified by Gereffi (1994), Klooster (2005),

Ponte and Gibbon (2005; 2008) and Gibbon et al. (2008) are useful benchmarks – producer-driven chains and buyer-driven chains. Gibbon et al (2008) suggest that the GVC is increasingly becoming buyer-driven chains characterised by less vertical integration, driven by manufacturers and situated in labour-intensive sectors. The producer-driven chain is found in capital-intensive sectors where the role of lead firms is important (see Gibbon et al. 2008).

Nevertheless, Gereffi et al (2005) identified five typology of value chain governance that are also useful for this research. These include (i) markets - the market linkages are not transitory and is not costly to seek new partners; (ii) modular value chains – involves suppliers producing to the customers specifications; (iii) relational value chains – complex relations between buyers and sellers where mutual dependences and assets specificity are essential. Management may involve family or ethical ties including reputation; (iv) captive value chains – small suppliers are dependent on large buyers, significant switching costs for suppliers and involves high degree of monitoring; and (v) hierarchy – "governance form is characterized by vertical integration".

The PNA Pacifical model attempts to vertically integrate the sourcing of raw skipjack, production, advertising, marketing and distribution Pacifical products. The model has some characteristics of both producer-driven and buyer-driven chains as identified by Gereffi (1994) but does not fully exhibit all the characteristics. It is a new form of GVC governance that relies on role of a 'middle man' to connect producers and buyers. It is also difficult to situate the Pacifical model within the five typology of value chain governance suggested by Gereffi et al. (2005). This is because the model is still developing and its full potentials and dynamics are not clear at this stage.

2.3 Credibility and authority of fisheries ecolabelling schemes in the Pacific

In the Pacific fisheries, there is growing evidence of growth and transition from traditional command and control governance by states to market based governance. The prominent market certification schemes include the US based Earth Island Institute

(EII) Dolphin Safe program, considered as the most successful consumer driven fisheries certification (Baird & Quastel 2011); the Friends of the Sea (FOS) and of late, the MSC.

In a comparative analysis of certification schemes in the Pacific, Kirby et al. (2014) based their analysis on the precautionary principal and the ecosystem approach based on international governance principles, standards and requirements. In terms of applying the precautionary principle, the authors concluded that Dolphin Safe does not evaluate status of the stocks; the Friends of the Sea (FOS) does not require target reference points while the MSC uses MSY as its reference points. Under the ecosystem approach, the authors concluded that the Dolphin Safe applies this principle in the likely fisheries impacts on dolphins and is more precautionary; the FOS is generally consistent (limit bycatch, species restriction; while the MSC successfully utilises the ecosystem approach by its unit of certification free school skipjack fishery in the PNA.

The MSC is also regarded as the 'gold standard' in sustainable fisheries certification (Miller and Bush 2014). It has high credibility status due to its governance structure and its scientific approach (principles, criteria and performance indicators) (Miller and Bush 2014). Conversely, Bush et al (2013) posit that the MSC scheme is transparent, accountable and relies on third party verification. These factors have contributed to the market dominance of the MSC.

However, Bush et al (2013) have also criticised the MSC for its lack of representation in developing countries. Perez-Ramirez et al (2012) further reiterated the MSC's bias toward the global north despite the fact that more that half of global fish supplies is sourced in the global south. This is exacerbated by MSC's high technical standards and cost of certification.

The MSC certification of the PNA free-school skipjack fishery in 2011 has potentially increased the presence of the MSC in the global south. The PNA is a significant player in the WCPO, consisting of Small Island developing states. Importantly, the PNA contributes about 25% of the global tuna supply (FFA 2013). On the other hand, PNA MSC certification also shows that the technical standards and cost of certification remain high.

3 Research Methodology

This research uses the non-state market driven (NSMD) governance and the global value chain (GVC) conceptual frameworks to analyse the growth and development of the MSC in the Pacific. The NSMD governance framework conceptualizes the role of the market, the role of the state and role of stakeholder and civil society. The relationship between markets, states and wider stakeholders determine the legitimacy and authority of NSMD governance (Cashore 2002). Conversely, the credibility and authority of NSMD governance also depends on how well placed it is in the global value chain. Global trade is conducted through systems of governance that links firm together in a variety of sourcing and contracting arrangements (Gereffi et al. 2001). The combination of these two conceptual frameworks allows me to analyse the regional development dimension in PNA countries.

3.1 Case selection and unit of analysis

PNG was chosen as the case study for this research. This was primarily because most of the PNA MSC related activities have been taking place in PNG. In addition, PNG played an important role during the initial stages of the MSC assessment in PNA by funding the MSC pre-assessment. To date, PNG continues to play a leading role in the PNA and further development of the PNA MSC scheme.

The unit of analysis is the purse seine fishery. Specifically, the free school caught skipjack tuna in the waters of the PNA countries.

3.2 Research design

In conducting this research, the qualitative research method was used to collect data. The research relied primarily on the use of semi-structured questionnaires. Key informants were identified through my contacts established when I was working for the PNG National Fisheries Authority (NFA). The interviews were conducted in a semi formal manner and to a lesser extent, the research also involved the quantitative method of enquiry where primary quantitative data on tuna exports were sourced from PNG, the Forum Fisheries Agency and the PNA Office.

This case study is systematic in its approach to explain, explore and or describe the construction or reconstruction of the development of the MSC in PNG (Flyvbjerg 2005). It provides an empirical lens about this developing and uses a grounded approach to research (Lund 2014). The findings and discussions were generated from empirical data collected on the field research.

3.3 Data collection and analysis

In collecting qualitative data, I have used semi formal interview techniques to engage and gauge the views of key informants. This method allowed for detailed conversation on some of the issues raised in the questions. Daily summary reports were generated to capture and highlight key themes and words during the interviews, which formed the basis of the weekly summary reports and the final field research summary. This exercise was necessary as I was able to identify key literature and the conceptual framework based on my findings. The research also utilised the snowballing technique to identify key informants during fieldwork.

This research was undertaken in my capacity as a research student in the Environmental Management and Development Strand, Crawford School of Public Policy, Australian National University. Nevertheless, I have relied extensively on my positionality in the public service through the PNG National Fisheries Authority to identify my key contacts, solicit information, follow-ups, the use of office facilities and funding assistance.

The research work was conducted under the ANU ethics protocol. Throughout this paper, I have maintained informant anonymity and confidentiality. This research has been made possible with funding assistance from the New Directions in Environmental Governance project, York University, Canada and the PNA Office, Majuro, Republic of Marshall Islands.

Table 2 Summary of key informant interviews

Type of Informant	Location of Interview		
	PNG	Fiji	Australia
Industry players			2*

National Fisheries Authority	7		
Other PNA members		2	
PNA Office		1	
Forum Fisheries Agency			2**
MSC			1
Pacifical			1
TOTAL			**16**

* via email ** via Skype

4 Results and discussions

4.1 Credibility of the MSC scheme

The MSC is viewed by the key informants as a credible scheme. It is perceived (especially by FFA, and PNAO) as science based, independently verified and rigorous in its approach to maintain and ensure sustainability of the target stock, ensures minimal impact on the ecosystem and ensures effective sustainability management systems are in place. All key informants have triangulated this during my fieldwork. The PNA fisheries officials interviewed (PNG, Solomon Islands, and FSM), key purse seine operators in PNG and officials from the Forum Fisheries Agency (FFA) and the PNA Office have all concurred that the MSC is a credible scheme. This overwhelming support and subscription to the MSC scheme in the PNA region is due to the MSC's rigorous scientific approach and principles, the independence of the scheme and its chain of custody (COC).

The PNA MSC scheme unit of certification is the free-school skipjack tuna fisheries and relies heavily on a Chain of Custody (COC). The COC is a traceability scheme that is used to identify and track fish from where it is caught to its final product state and sold through a system of monitoring and documentation. The effectiveness of the COC depends primarily on fisheries observers, who are MSC trained and certified. In addition, all crews must be MSC trained as well include land based facilities personnel. The objective of the MSC COC is;

> "…to provide an assurance for suppliers to demonstrate and claim that products originate from an MSC certified fishery and minimise the risk of public

confusion between fish and fish products that have not" (MSC 2015).

The MSC COC is a very important aspect of the PNA MSC scheme. This is because it is the only MSC fishery in the world where vessels land MSC and non-MSC tuna of the same species with the same gear, on the same boat, on the same day/trip, and typically transshipped before being sorted and MSC certification issued (PNA Working Paper 13, 2015). The implication of not complying with the COC implies the catch is not MSC caught and will not be processed and sold Pacifical products

This empirical evidence from my research suggests that implementation of the MSC scheme does complement and facilitate the extension of PNA authority and management control of tuna fisheries. The sustainability conditions of the MSC program can be used to benchmark PNA's sustainability guidelines and practices. This is summarised by a key informant's quote;

> "…I do believe that the conditions connected with sustainability within the MSC program, do help to provide a guideline to the PNA, so it can shape itself and implement and tighten its own tuna resource management and controls to the highest global standards…."

This demonstrates the impact of the MSC sustainability standards on PNAs sustainability guidelines and practices. It strengthens PNA's tuna resource management and control. Importantly, as argued by Vandergeest et al (2015), the MSC has given credibility and publicity of the PNA's management.

4.2The role of the State

The state has played a significant role in establishing and legitimising the MSC scheme in PNG. In establishing the MSC, the institutional, legal and regulatory framework provided the enabling environment for the MSC. The mandatory fisheries management measures and tools such as the observer program, the catch documentation scheme, and the monitoring, control and surveillance measures were all utilised by the MSC. Consequently, the legitimacy of the MSC scheme was ensured as the fisheries industry was accustomed to state control measures.

The principles of the MSC complemented the state measures that were in place. To implement its COC, the MSC relied on key state measures including the observer program, the VDS, the traceability scheme, and the vessel-monitoring scheme. These management measures and tools enabled the MSC to successfully launch its robust COC in PNG.

The complementary role of the state demonstrates the willingness to cooperate with non-state market driven governance. The PNG case is unique since the 'unintended hybrid' governance between the state and the MSC inherited complementary management measures for a common good – sustainability of tuna resources. This signifies the gradual shift from traditional rule making authority by the state to reconcile with market based governance that is responsive to sustainability concerns, ethical and social standards, global consumer demand, and commodity trade trends.

As postulated by Gulbrandsen (2006) and Henson and Humphrey (2010), this case study demonstrates the collaborative partnership and interaction between public and private rule making authority in managing tuna resources.

4.3 MSC relationship with EU Illegal, Unreported and Unregulated (IUU) Regulation

The MSC scheme does not a have direct relationship to the EU IUU Regulation[9]. However, they share the objective of ensuring the sustainability of tuna resources. The difference is the means to achieve the objective of sustainability. The PNA MSC scheme unit of certification is the free school skipjack tuna while the EU IUU

[9] The EU IUU Regulation can be accessed through the link http://ec.europa.eu/fisheries/cfp/illegal_fishing/index_en.htm

Regulation encompass the entire marine fishery. The former is focused on the sustainability of a subset of the purse seine skipjack fishery. It relies on the principles of stock sustainability, impact on the ecosystem and effective management. The chain of custody is the central instrument used to ensure traceability of the product and provide assurance to its buyers.

Conversely, the EU IUU Regulation attempts to quell illegal, unreported and unregulated fishing practices globally. The negative impacts of IUU fishing on the environment, economy and society have attracted global attention. Environmentally, IUU fishing contributes to overfishing, the depletion of fish stocks, the degradation of the marine environment and potentially threaten the entire marine ecosystem (Lutchman et al, 2011; Tsamenyi et al, 2010). Economically, the high demand for fisheries products globally provides the incentive for IUU fishing (Le Garlic & Cox 2006; Tsamenyi et al. 2008). Agnew et al (2009) estimated that the total economic losses were within USD10-23.5 billion annually, equivalent to 11-26 million tonnes of fish.

The EU IUU Regulation has four main elements. These include port state controls over third country fishing vessels; the catch certification scheme; the IUU vessel; and the list of non-cooperating third countries. A brief description of these elements is summarised in annex 3.

The EU has been proactive in the fight against IUU fishing globally and has set very high standards to protect its market from souring IUU fish. Since the passage of the EU IUU Regulation in 2008, the EU has warned a number of developing third countries in Asia (Thailand, Taiwan), Africa (Ghana) and the Pacific (PNG, Tuvalu, Solomon Islands) on the possibility of identifying them as non-cooperating third countries. These countries have been issued the 'yellow card' by the EU on the grounds of lack of compliance and enforcement in accordance with the EU IUU Regulation.

In June 2014, PNG was issued the 'yellow card' on the possibility of being identified and listed as a non-cooperating third country. The key issues[10] raised by the EU include

[10] The key issues identified by the EC for PNG are reproduced in Appendix 2.

the revision of the legal framework (Fisheries Management Act) inline with international and regional rules, the revision of the Tuna Management Plan, strengthen and improve the fishing license system and management, improve the monitoring, control and surveillance (MSC) framework, products, strengthen and improve cooperation with other flag States, improve reliability of catch certification schemes and the overall traceability of fishery (EC 2014).

Since the notification of the yellow card, PNG has made significant reforms and improvements in its systems and procedures to address the concerns of the EC. Some of the significant reforms include the revision and gazetting of the legal framework (Fisheries Management Act and Tuna Management Plan), an IUU- National Plan of Action has been developed, standard operating procedures developed in the MSC framework, the catch documentation scheme has been improved, licensing systems strengthened and improve, and establishing cooperation with other flag state countries fishing in PNG waters.

The EU is the most lucrative market for PNG exports. This is because PNG has a preferential market access (duty free, quota free) for its fish and fishery exports into the EU. However, exporters from PNG must also comply with the mandatory requirements of the EU IUU regulation and the sanitary and phytosanitary measures (SPS). With EU representing the main export destination for PNG products, it is imperative that PNG complies with these regulations or it could loose market access. Since the imposition of the yellow card, PNG has taken all the necessary steps to address the concerns raised by the EU.

As of 1st October 2015, PNG has been removed from the 'yellow-card' warning. According to the EC (2015), "PNG has taken ownership of their fisheries reforms and now have robust legal and policy frameworks in place to fight IUU fishing activities''.

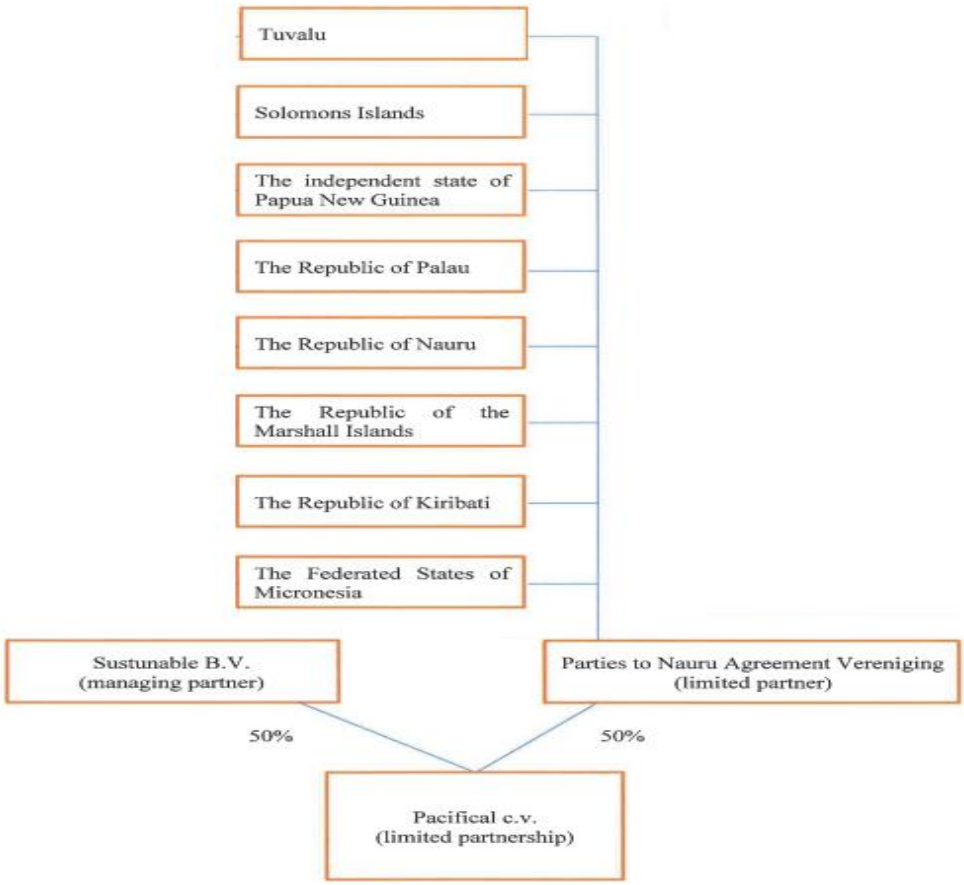
4.4 PNA Pacifical model

The PNA Pacifical is an initiative of the PNA Office in collaboration with Sustunable of the Netherlands – a respected leader in sustainable tuna marketing. This initiative was endorsed by PNA leaders during the Presidential Summit in 2010. The leaders saw

the Pacifical as an opportunity to further strengthen the sustainability of tuna stocks in PNA waters, create employment opportunities, generate additional revenue stream from tuna resources, enhance cooperation and networking with retailers and consumers in the global market (PNAO 2015; Pacifical 2015). The Pacifical model aims to shift from the traditional horizontal business strategies to vertically integrate fishing, processing, marketing and branding of PNA MSC caught and certified free school skipjack tuna. In addition, Pacifical branding is a commercial advertisement of the PNA to the rest of the world (PNAO 2015).

The Pacifical concept promotes and manages the PNA MSC caught and certified free school skipjack tuna in the market, concentrating on the link between private labels (home brands) with PNA processors. The Pacifical structure is vertically oriented, linking the producers directly with retailers. As a business model, the Pacifical is based on a 20% premium paid from the retail end, from which PNA processors receive 15% while the balance is shared on a 50/50 basis between PNA and Sustunable. It is argued by the PNAO (PNAO 2015) that the 50/50 share (of the 5%) between Sustunable and PNA is based on their respective roles - Sustunable is responsible for "global market development, promotion, media and marketing" while the PNAO manages and regulate the fishery, the COC and the MSC certification. The PNAO further reiterates that with Pacifical, access to global markets is cheaper and that PNA processors are the biggest winners (PNAO 2015).

Figure 7 The PNA Pacifical legal structure



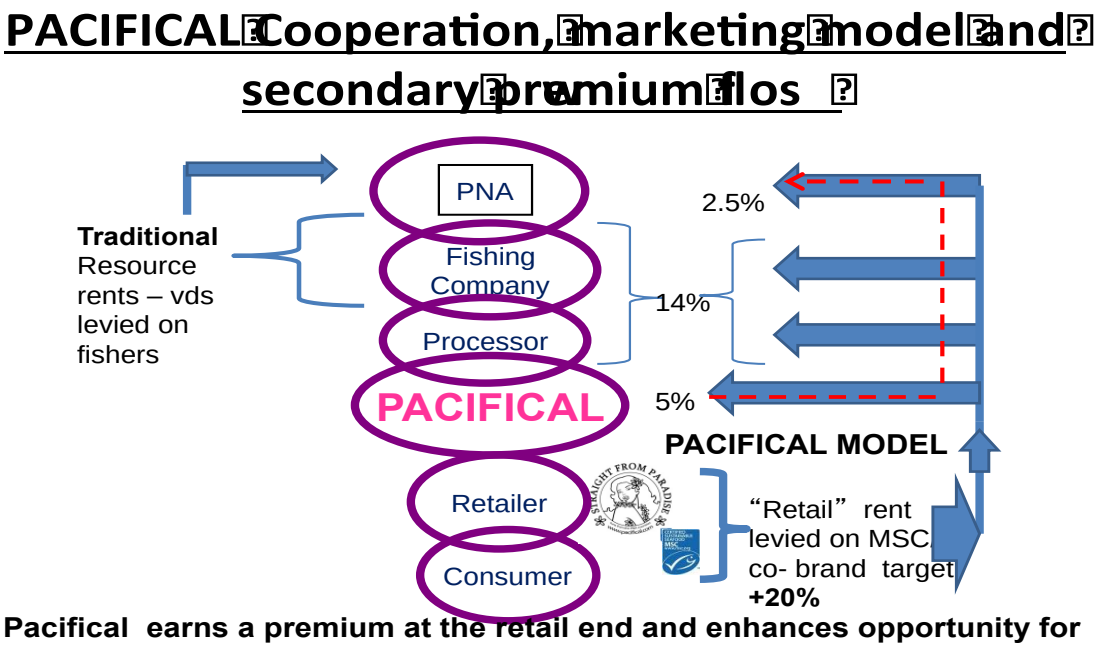
Source: Pacifical (2015).

The Pacifical is a legal entity registered under Dutch law as Pacifical C.V , trading as a joint venture limited partnership agreement between the PNA (the PNA Association) and Sustunable B.V. (Sustunable) effective 30 December 2010 (Pacifical 2015). The Pacifical c.v. is unique as it is a partnership agreement between the PNA group of states, who are based in the southern hemisphere, and Sustunable based in the Netherlands. This is an arrangement where the producers are in the south while its marketing operations in the north. The PNAO (2015) has reasoned that this arrangement could facilitate future EU funding, both private and public, for PNA developments and also provide capacity building opportunities for PNA officials.

In terms of trading, Pacifical receives and tenders orders from participating private labels to PNA processors. The highest bidder/processor establishes the contract to supply MSC certified tuna from participating vessels to the private label directly, including the agreed 20% premium on final invoice at retail end. Once the contract is

delivered, the processor pays 5% of the invoice value to Pacifical. PNAO receives 50% from the 5% paid to Pacifical (PNAO 2015). This is illustrated in Figure 6.

Figure 8 The Pacifical model



Source: PNAO (2015)

Based on the Pacifical model, the following scenario is developed to explain clearly the distribution of premium shares between the processors, PNAO and Sustunable. Currently, fish (tuna) is trading at USD1,250/mt at Bangkok price; fish is processed typically at a 40% recovery rate, plus the fixed costs of labour, power, canning, packaging and labels, freight and import duties. Trading out of PNG to the EU, import duty is exempted. If that is the case, then trading out of PNG would costs USD1, 000.

Table 3 Pacifical model distribution

Price Factors	PNG MSC (USD)	Premium Distribution	USD/mt
BKK landed	1,250.00	Pacifical 5% of Invoice	113.42
Fish Ave Price FOB	1,000.00	Industry premium	264.66
Total Fish Cost	1,000.00		
By-Product Credit	52.00	16 mt per container	
Net Fish Cost	948.00	5% Pacifical Premium	1,814.78
Recovery	0.40	50% PNA Share/container	907.39
Cost per Cleaned Ton	2,370.00	Share/PNA Members	113.42
Cost per KG	2.37		
Cost per Gram	0.00		
Grams per Can	132.00		
Fish Cost per Can	0.31		
Fish Cost per case (48)	15.02		
Can Cost (48 cans)	5.75		
Other Packaging	0.75		
Conversion Cost (labour)	7.24		
Full product cost FOB	28.76		
Freight/case	1.25		
CFR EMP port	30.01		
Duty	0.00		
CFR EU port duty per case	30.01		
At 40% recovery no. of cases from 1mt raw fish	63.00		
Landed value for 1mt landed and processed	**1,890.40**		
Plus MSC 20% premium	**2,268.48**		
MSC premium/mt of fish (tuna)	**378.08**		

Source: PNAO (2015)

In summation, the landed value for 1 mt of landed and processed MSC caught tuna at retail end is $1, 890.40. Add the 20% premium and the final invoice delivered at retail end is $ 2, 268.48. Hence, Pacifical would receive $ 113.42 per mt (5%) and the balance of USD 264. 66 per mt paid directly to the processors (15%). Assuming that PNG sells

16 mt of MSC certified tuna, Pacifical would receive USD 1, 814.71 (113.42/mt x 16). From this, PNAO receives $907.36, which is distributed equally among the PNA members.

Basing on this model, there a number of issues that warrant a discussion. First, the fishing processors are the high earners in this simplistic scenario. However, my empirical research has shown that there is a general lack of participation from purse seine fishing operators in PNG in supplying MSC caught and certified tuna. Specifically in PNG, purse seine operators had initially refused to join the PNA MSC scheme in 2010. Three years on, Frabelle PNG Ltd joined the scheme after pressure from local authorities, while RD Tuna Canners still refuses to join. One of the main factors causing resistance was that these companies were members of the EII Dolphin Safe scheme. A key informant showed texts of the emails that EII sent in September 2011 to all tuna processors that said the following;

> "No tuna factory on the EII DOLPHIN SAFE LIST is to pack tuna for Pacifical until it is certified as a dolphin safe tuna company".

In February 2012, following EII's audits in PNG and regional processors, the following text was issued:

> "In the audits, we need confirmation that these companies WILL NOT source or process any tuna regardless of catch from PACIFICAL BV. This company is not Dolphin Safe approved. The monitors are to discuss this issue with each PNG Company. Confirm that this will in be the audit discussions. There is to be no tuna sourced from PACIFICAL BV nor processed for PACIFICAL BV by any company on our dolphin safe lists."

The implication of EII's resistance affected Pacifical's production in its first year of operation. PNAO (2015) data show more companies joining the Pacifical, however, supply of MSC certified tuna traded was limited (PNAO 2015; PNAO 2015b). This caused a shortage of supply for Year 1 (2012), due largely to EII's embargo on production (PNAO 2015).

In addition, the PNA members and processors interviewed in this research are apprehensive about the Pacifical model, mainly because of the current premium distribution, which they do not support. A key industry informant from the PNA bluntly said, "what is there to gain for my country. As far as I am concerned, the VDS is the primary revenue earner for my country". This suggests that revenue generation from the Pacifical model is an influential factor that determines a PNA members' participation. For now however, the VDS is the primary revenue earner for PNA countries. Nevertheless, the Pacifical model should be seen as complementary to the VDS by increasing revenue for the PNA.

Secondly, the distribution of shares between the PNA members is worth discussion. The decision by the PNAO to distribute the PNA shares equally among its members is strategic. It promotes regional solidarity and integration and the notion that no one should be worse off. Supposing that the shares were distributed proportionately, only those Members that have participated in Pacifical would receive their share. This would negate the further development of the Pacifical in PNA and cause division within the PNA.

Third, not all PNA members have the capacity to process MSC products onshore. In 2012- 2014, data[11] obtained from the PNAO show leakages of frozen whole round tuna from Micronesia (FSM), Kiribati, Marshall Islands, and PNG to Thailand. Despite PNG's capacity to process onshore, less than a third of total catch in PNG waters is landed and processed (Banks and Lewis, 2013). The leakage suggests the lack of commitment from the processors in PNG and PNA to supply MSC products. In addition, onshore processing is limited to PNG, Solomon Islands and to a lesser degree, Marshall Islands. This in itself could also cause divergence in participation in PNA countries whose primary concerns are to maximise economic returns from sustainable management and harvest of the tuna resource.

Furthermore, the PNA Pacifical models needs to be promoted and marketed well within the PNA. Empirical data from this research show that PNA members interviewed generally lack thorough understanding on the MSC and the Pacifical model. While they

[11] See appendix 4

generally concur that MSC is a credible scheme and promotes the sustainability of skipjack tuna, PNA members and including processors interviewed are apprehensive about the Pacifical model, particularly its distribution of premiums between Sustunable and the PNA. This is exacerbated by lack of access to information and data regarding the operations of the Pacifical. This includes access to information on PNA MSC exports and MSC accredited vessels. Nevertheless, PNAO maintains that all Pacifical transaction, information and data are commercially sensitive as it involves third parties (retailers) in its core business.

The findings of this study have shown that the state plays a very important role in establishing and legitimising NSMD governance. The findings also show the partnership between the state and the MSC in developing a hybrid approach that strengthens and improves the management of tuna stocks in PNG and the PNA. Moreover, the PNA's Pacifical model attempt to vertically integrate fishing, processing, and market faces a number of challenges but if it is designed well, it could be successful in the future. Importantly, the research shows the challenges of managing tuna resources sustainably and maximising economic returns from the resources in a changing landscape of fisheries governance.

5 Conclusions

5.1 Role of state in promoting NSMD governance

Empirical evidence from this research shows that the state plays a very important role by providing the enabling legal and regulatory framework for the NSMD governance to proliferate. It has been postulated that states do not have the capacity to effectively and efficiently manage, enforce and monitor its regulatory measures on natural resources (Eden & Bear 2010; Klooster 2005; Gulbrandsen 2005; Vandergeest 2007). The state lacks the technical know-how, human resources, financial capacities and coordination of its measures among interest groups.

However, the case study in PNG demonstrates that without the involvement of the state, the MSC would not have been successfully implemented in PNG. The regulatory measures established by the state complemented the NSMD governance of the MSC.

Importantly, the state measures were critical to ensure the credibility and legitimacy of the MSC scheme in PNG.

Furthermore, the interaction between the public and private actors in managing fisheries resources in PNG created the 'unintended' hybrid governance to ensure long term sustainability of the tuna resources. The traditional rule making authority by the state is gradually shifting to incorporate market driven governance that is responsive to consumer demand and welfare, social and ethical standards, and global commodity trade dynamics. Conversely, the NSMD governance of the MSC recognised the importance of the state's role and its measures complemented that of the state. Hence, fisheries resource governance was strengthened and improved through hybrid governance between the state and the MSC.

5.2 Governance of Pacifical

The PNA uses its MSC certification of free school skipjack tuna to market and promote the PNA brand – Pacifical, through co-branding and private labels. The Pacifical changes the landscape of traditional fisheries managers from sustainable fisheries management and conservation to marketing and business management. It attempts to vertically integrate the supply chain from fishing and processing to consolidate processing and marketing of PNA MSC free-school skipjack tuna products. This would typically consolidate supply, generate income through premiums, but more importantly promote and market the Pacifical brand to the rest of the world. This is consistent with the literature on global value chains (GVC) framework that focuses on the vertical relationship between buyers and producers and subsequent flow of goods from the producer to consumers (Ponte & Gibbon 2005). Within this framework, Klooster (2005), Ponte and Gibbon (2005;2008), and Gibbon et al. (2008) identify two types of approaches – (i) producer driven chains and (ii) buyer driven chains.

Despite the claims by these authors that the GVC is increasingly becoming buyer-driven chains, it is difficult to situate the Pacifical model into either of the approaches. First, while the Pacifical is less vertical and relies on independent producers, it is in its infancy stage and its full potential is yet to be realised by the PNA group. Second, while fishing is a capital-intensive sector, the role of leading firms to coordinate productions

is less visible. Furthermore, the Pacifical governance structure between a group of States and a sole company (Sustunable) does not situate in producer driven nor the buyer driven chains. It is a new type of approach under the GVC framework where the producers' sources raw materials and produce finished products based on supply contracts from the retail end. Between the producer and the retail end, Sustunable markets and promotes the PNA products under the Pacifical brand to private brands. There is limited coordination of the roles of lead firms in this approach but through middleman in the value chain.

5.3 Broader implications

The introduction of the MSC scheme in the PNA has strengthened and improved the existing governance framework by introducing reforms in line with MSC's scientific principles. It signifies the gradual shifting of rule making from PNA states to private actors such as the MSC. The challenge for the PNA states going forward is how far they are willing give up their rule making authority to market based governance. In the end, such partnerships between public and private policy makers will strengthen and improve fisheries management and ensure the long-term sustainability of tuna resources.

The vision and ambition of the PNA Pacifical model should be applauded as it attempts to increase revenue for the PNA and promote sustainability of skipjack tuna resources. However, there are number of pertinent issues that should be addressed. Importantly, the distribution of Pacifical shares between its shareholders has the potential to divide or cause divisions among PNA members as they seek to increase their economic returns. But the reality is that only those who have the capacity, and resources will generate higher returns.

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Appendix 1 Detail profile of existing onshore processing plants in PNG

Production	***RD Tuna Canners***	***Frabelle***	***SSTC***	***IFC***
Location/Year established	Siar, Madang – cannery Vidar, Madang – private wharf, cold storage, value-added processing, Established 1997	Lae City, Morobe Established 2006	Wewak, East Sepik Established 2003	Lae, Malahang Established 1997
Ownership	RD Group of Companies (Philippines)	Frabelle Fishing Corporation(Philippines)	FCF (Taiwan) (95.5%); Bank South Pacific (PNG) (3%); East Sepik Provincial	Malaysian state-owned enterprise, FIMA Company
'Project' definition (as per original Project Agreement)	Not available	Integrated tuna processing facility; initial capacity 70mt/day, potentially up to 120mt/day; 20 fishing licences.	Integrated tuna processing facility; up to 200mt/day; 14 fishing licences.	Up until 2011 was primarily a mackerel canning operation. 10 licences (PNG flag)
Maximum production	200 mt/day	100 – 120 mt/day	200 mt/day	120 mt/day
Current production (mt/day)	130 mt/day	70-80 mt/day	70-80 mt/day	3 mt/day
Current annual raw material throughput	~ 23,500-30,000 mt	~20,400 mt	~17,500-mt	~750 mt

Source: Banks and Lewis 2013.

Labour Profile of existing processing plants

Labour	**RD Tuna Canners**	**Frabelle**	**SSTC**	**IFC**
Total number of employees	3,283	1,359	2,061	1,389
Absenteeism (%)	20%	36%	25-30%	<10%
Labour turnover (%)	19%	56%	30%	5%
FTE Employment	2,101	870	1,494	885
FTE employment	10	15	12	n.a

Source: Banks and Lewis 2013.

Appendix 2 Key issues identified by the EC

Action/Issues	Description
Revision of the legal framework in order to ensure the compliance with international and regional rules applying to the conservation and management of fishing resources	The competent PNG authorities should revise the existing legislation (Fisheries Management Act, Fisheries Management Regulation) to ensure compliance with UNCLOS, and Article 7 of the UNFSA to fulfill its obligation as coastal state to ensure responsible and long-term sustainable management of this resource and promote the objective of optimum ulitilisation of the living resources in its EEZ; and to ensure compliance of nationals of other States fishing in its EEZ with conservation and management measures. PNG should ensure clear and transparent transposition of international and regional conservation and management measures in its national law. The competent PNG authorities are encouraged to take into consideration and comple with the Port State Measures Agreement 2009 pertaining to the management of fishing resources. The competent PNG authorities should adopt a national plan of action against IUU fishing (NPOA) in line with recommendations set in the International Plan of Action to Prevent, Deter and Eliminate IUU Fishing (IPOA IUU).
Revision of the legal framework in order to develop and integrate conservation and management measures in PNG archipelagic waters compatible and in compliance with the international and regional rules applying to the conservation and management of fishing resources	The competent PNG authorities should ensure develop clear, transparent and compatible conservation and management measures for PNG archipelagic waters in compliance with UNCLOS, the UNFSA, and the overall objective and relevant rules in the WCPFC Convention. This would appear necessary to fulfill it duty, responsibility and obligation as a coastal state to adopt measures compatible to those applying in the region and in high seas to ensure long term sustainability of straddling and highly migratory fish stocks and promote the objective of their optimum utilisation. The competent PNG authorities should ensure integration of such measures in their revised national law in a clear and transparent way and make them publically available. The competent PNG authorities should ensure that conservation and management measures are based on best scientific advice and evidence and should apply the precautionary principle.

Revision of the PNG national tuna management plan	The competent PNG authorities should take immediate action to revise the existing 1998 Tuna Management Plan, taking into account changes in the fisheries sector, including, amongst others, regional and sub-regional conservation and management measures. It should be in conformity with international and regional, provisions and obligations. The competent PNG authorities should ensure that conservation and management measures are based on best scientific advice and evidence and should apply the precautionary approach. The competent PNG authorities should ensure comprehensive collection of scientific data in all waters under its jurisdiction and make it available to WCPFC.
Ensure effective implementation and enforcement of revised national legislation	The Competent PNG authorities should ensure implementation of its revised fisheries legislation (Fisheries Management Act, Fisheries Management Regulation, Tuna Management Plan) through preparation of relevant clear and transparent implementing provisions. The competent PNG authorities should ensure enforcement of its revised fisheries legislation in all waters under PNG jurisdiction.
Ensure effective implementation of existing national and regional legal framework and measures, including for management and conservation in all waters under PNG jurisdiction.	The competent PNG authorities should ensure immediate application of the existing provisions of their national Fisheries Management Act and Regulation and Tuna Management Plan which are not fully implemented in all waters under PNG jurisdiction, in particular archipelagic waters. The competent PNG authorities should ensure implementation of WCPFC conservation and management measures in waters under its jurisdiction.
Ensure effective enforcement and follow-up of infringements of the existing legal provisions in order to put in force a deterrent sanction system for all vessels operations in waters under PNG jurisdiction.	The competent PNG authorities should ensure effective enforcement and follow-up of infringements and dissuasive sanctioning in relation to all vessels operating in its waters. The competent PNG authorities should ensure effective enforcement and follow-up of infringements and dissuasive sanctioning all waters under its jurisdiction (territorial, archipelagic, EEZ).
Strengthening and improvement of fishing licenses system and management	The competent PNG authorities should ensure..

	The competent PNG authorities should ensure.. The competent PNG authorities should ensure…
Rectification of shortcomings identified regarding the Monitoring, Control and Surveillance (MSC) systems in the framework of the catch certification system as well as in the framework of the WCPFC for which PNG is a contracting party.	The competent PNG authorities should ensure..
Strengthening of the administrative capacities in order to ensure effecting monitoring of the vessels operating under PNG's flag and in the waters under the PNG jurisdiction.	The competent PNG authorities should ensure.. The competent PNG authorities should ensure..
Improving traceability of fishery products	The competent PNG authorities should ensure..

Source: European Commission, 2014

Appendix 3 Summary of EU IUU Regulation four main element

Key element(s)	Basic design
Port control over third country fishing vessels	Deals with inspections and control of third country fishing vessels seeking access to the ports of EC member States.
Catch certification requirements	In general, the importation of fishery products into the EC is only allowed when accompanied by a catch certificate, completed by the master of the fishing vessel and validated by the flag State of the vessel.
Establishment of the Community IUU vessel list	The Community IUU vessel list contains information on vessels identified by the EC and the member States to have engaged in IUU fishing.
Establishment of a list of non-cooperating third countries.	A State may be identified as a non-cooperating third country if it fails to discharge the duties incumbent upon it under international law as flag, port, coastal or market States and to take action to prevent, deter and eliminate IUU fishing activities

Source: Tsamenyi et al. 2008

Appendix 4 Thailand imports of frozen whole round tuna, 2012-2014

THAILAND - IMPORT OF FROZEN W/R TUNA IN [PERIOD JAN-NOV 2014]			
	2012	**2013**	**2014**
Taiwan	152,714	132,112	145,976
USA	87,274	103,927	108,111
Korea	77,541	81,482	40,373
Vanuatu	70,659	76,367	40,241
Indonesia	41,996	41,501	44,190
Japan	37,085	40,626	47,239
Marshall Islands	35,679	38,915	27,073
China	24,363	30,609	45,693
Philippines	32,874	16,760	23,608
Kiribati	15,999	31,255	24,448
Maldives	11,773	29,635	22,361
Micronesia	20,314	8,786	8,428
Spain	7,547	9,062	16,196
New Zealand	4,660	12,715	11,133
PNG	13,547	3,568	9,624
Others	50,947	39,094	37,058
Grand Total	**684,973**	**696,414**	**651,750**