

## Compliance of Regulations in Tuna Fisheries in the Solomon Islands

*David Mapuru and Rafia Naz*

### ABSTRACT

*A resource that Pacific island Countries have in abundant supply is tuna. The Ocean surrounding Island States supply one third of the world's tuna and between 40 to 50% of raw materials for the global canneries. The high concentration of tuna stock in the Western Central Pacific Ocean and the depletion of this resource in the other oceans have attracted increased fishing activities in the Region. This emanates with high illegally unreported and unregulated fishing activities. Despite formulations of fisheries rules to control harvesting of tuna resources, illegal fishing continues to exist. This paper examines this problem in the Solomon Islands' fisheries by addressing three basic questions: (1) Why fishers break rules? (2) the circumstances in which fishers break them? and (3) the objective of complying with rules.*

*A qualitative methodological approach using in-depth interviews with former and current fishers of various ranks and other key stakeholders was conducted. This included about thirty three personal interviews and two focus group interviews.*

*The study shows most fishers resolved to Illegal Unreported and Unregulated (IUU) fishing activities for economic gain. They thrive to maximise their profits which makes deterring such activities difficult. The study also reveals that Solomon Islands has weak enforcement and stumpy penalties. Additionally, politicians often compromise their decisions in favour of violators. All these factors have compounded to the difficulty of countering IUU activities difficult. Theoretically, 'The Tragedy of the Commons' by Hardin (Colebatch and Larmour 1993) clearly explains that if fishers continue to serve their interest, every fisher will become worse off in the long run. Solomon Islands tuna fisheries are lowly moving in that direction if enforcement continues to be weak and fishers are not aware of this threat.*

**KEYWORDS:** *Compliance, tuna, regulations*

## INTRODUCTION

Tuna is a gigantic and money-spinning industry in the world today. Currently, the major tuna markets are the European Union (EU) and the United States of America (USA); however, other emerging markets which are evolving fast are Asia, North Africa and the Middle East (Globefish, 2012). The high mandate for tuna has increased the total universal aggregate procured by approximately 89.97% from 1950 -2002 (Globefish nd). Fishers try and achieve this by intensifying their fishing activities, accumulating their fleets and investing in high tech equipment. As a consequence, tuna has virtually experienced death/extinction in most of the oceans (Public Radio International (PRI) 2013; World Bank 2000). The Pacific Ocean nonetheless, is the only ocean that has the world's remaining stock (Cyranowski, 2010; Public Radio International (PRI), 2013; World Bank, 2000). This has attracted Distance Water Fishing Nations<sup>1</sup>(DWFNs) such as China, Taiwan, Korea, Japan, the United States of America (USA) and the European Union (EU). Most of these nations have entrée to fish in the islands' 200 miles Exclusive Economic Zones (EEZs) via the acquisition of 'access fees' and 'fishing licenses'.

Apart from the USA, the other DWFNs fish under the bilateral agreements<sup>2</sup> which they have with Pacific island countries (PICs). Such negotiations entail allowing the DWFNs to fish in their waters, and the stipulated benefits go directly to the coastal States. USA, alternatively signed the multilateral agreement<sup>3</sup> with the Forum Fisheries Agency (FFA)<sup>4</sup>, and the benefit from fishing in a particular island State goes collectively to all the member countries (World Bank 2000; FFA monitoring officer number 1, personal communication, December 26, 2012). Under the 'U.S.-Pacific Islands' tuna fisheries treaty', the US government grants USD \$63 million to Pacific Islands' countries per year for 'access' and 'licenses' (Bureau of East Asian and Pacific Affairs 2012).

Despite the establishment of bilateral and multilateral agreements, there are reported proliferations when it comes to 'Pirate fishing' in the region. This is commonly known as 'illegally, unreported and unregulated (IUU) fishing activities. Illegal fishing activities are committed in various ways. The most obvious ones are, fishing without license, fishing on forbidden territories, violation of by-catch rules, discards of untargeted species and landing of protected stocks' (Edeson, Freestone & Gudmundsdottir, 2001; Solomon Islands Fisheries' ACT, 1998; Xepapadea, 2003). Unreported activities in contrast, involve under reporting and/or no reporting of the catch. For instance, fishers might catch five tonnes of tuna in one set but only record four tonnes (Observer number 3, personal communication, December 26, 2012).

Unregulated fishing activities deal with fishers that are not registered under any of the countries which have been accepted to fish in FFA member countries. Countries that are permitted to fish in FFA member countries are Taiwan, China, Korea, EU and USA. It is a requisite; to register should any other country wish to pursue fishing activities in the Pacific under their countries' flag. However, most of the cases relating to IUU fishing involved vessels that have been licensed to fish in FFA member countries under the multilateral and bilateral agreements (Edeson et al, 2001).

Additionally, other relevant issues of concern are 'corruption'<sup>5</sup> involving the negotiation of

access agreements and license by DWFNs (Tsamenyi et al. 2008). Corruption is not IUU but it is perceived as a proxy for IUU fishing. For example, fishing companies bribe the responsible government minister(s) to either lessen the penalties or forfeit such violating relating to the rules/regulations. Such practice(s) services in boosting IUU fishing activities to linger. Most PICs including FFA, Western Central Pacific Fisheries Commission (WCPFC)<sup>6</sup> and Parties to the Nauru Agreement (PNA)<sup>7</sup> are very fretful about IUU fishing activities as it can cause extinction precipitately, if there are no robust measures to deter IUU fishing activities.

The main issue is the fishers' lack of 'compliance' to fisheries' regulations. Compliance means '*conforming to generally accepted practices or standards*'; or '*the act of obeying, dutiful or submissive behaviour to another person or the authority* (Oxford mini English Dictionary, 2009, p.109). Therefore, compliance in this context refers to commercial fishers obeying fisheries' and boundary regulations set in the Solomon Islands' Fisheries' ACT 1998.

Should the issue of 'compliance' not be addressed, a negative downturn shall be faced as tuna is a major natural resource. Extinction of tuna will distress the social, economic security and harmony of small island states (Hanich, 2013).

## **OVERVIEW OF SOLOMON ISLANDS (SI): COMPLIANCE AND REGULATIONS**

Despite putting in place numerous laws and management policies by the PICs' governments, non-compliance in the form of IUU fishing activities continues in the region.

Fascinatingly, DWFNs have had higher incidences of violating regulations in contrast to locally based industrial fishers (Island Sun, 2010; Lilomo, 2012; SIG Audit Report, 2012) which is quite apprehensive given that the mainstream fishers operational in the Western Central Pacific Ocean (WCPO) are the DWFNs. In the Solomon Islands, only eight (8) fishing boats are locally based while two hundred and seventy six (276) are DWFNs' vessels from Taiwan, Korea, Japan, EU and USA (Fisheries Officer, personal communication, January 3, 2012). According to Tsemenyi et al. (2008), tuna caught by DWFN through IUU and corrupt practices have cost the Solomon Islands' economy 5 million US dollars in 2005.

There was an upsurge in IUU fishing activities over the last three years. A report conceded by the office of the Auditor General stated twenty six (26) cases to be reported and investigated between 2009 and 2011 (Lilomo, 2012). Most fishers that were arrested were DWFNs (Island Sun 2010).

Solomon Islands face lots of flaws linking to non-compliance issues. First, it has a very large ocean, approximately 1,340,000 square kilometres (km), which marks the high level of strain in carrying out effective surveillance and monitoring. This is also compounded by the high cost, lack of adequate manpower and patrol vessels (Department of Marine Fisheries nd; Officer number 1, personal communication, December 20, 2012). Also, contributing further is the weak governance and institutional problems (Sasako 2012).

Besides, the national government is also finding it difficult to implement its policies against DWFNs because most of them are major development partners of the Solomon islands. For

illustration, Taiwan is a significant development partner to the Solomon islands government; nonetheless most of their vessels are the ones that recurrently violate the rules (SIG Auditors' Report, 2012). The national government finds it challenging to apply the full strength of the laws because they fear possible repercussions from the Taiwanese' government.

Moreover, these types of rules also play a noteworthy part in determining compliance. Rules that act as pre-conditions for fishers to benefit economically were found to be easy to follow. For example, the rule that requires fishers to take on board observers before they could go out for fishing is relatively easy for purse seiners to obey. In contrast, fishers found rules that restrict them from maximising their gains illegally problematic to follow. For example, reportage of catch is a difficult rule. This is because fishers misreport or not report at all to procure economic gain. Another example is fishing in territorial waters. Some fishers intrude into forbidden areas to set their nets whenever they find concentrated schools of tuna. This gives them economic advantage (Officer number 1, personal communication, December 20, 2012).

Also, some fishing gear<sup>8</sup> do not meet conditions set by the rules. The most obvious one is 'purse seining'. Purse seining is a destructive fishing method because it does not select the size and types of fish. It kill undersized tuna<sup>9</sup> and by-catches<sup>10</sup> indiscriminately. This poses serious threat to the tuna stock because killing undersized fish will deplete the stock; similarly catching by-catches affects the tuna food chain (Officer number 9, personal communication, January 5<sup>th</sup>, 2012).

Getting all the fishers to comply with the regulations is difficult. Based on the theories of Ostrom et al. (1994) and Xepapadea (2003), fishers realised it is difficult to achieve 'complete compliance'. Authorities can only deter IUU but will not completely eradicate it. This is because it is demanding to resist people who are subjective to their 'self-interest'.

Additionally, some interviewees claimed that fishers always operate a step ahead of enforcers. Even if PICs and Regional Bodies such as FFA and PNA collectively try to come up with measures to stop IUU fishing, fishers will still find their way to abuse the system by exploiting the weak link. Hence, regulators and enforcers should not view fishers as merely passive recipients of rules, but as active opponents who scan their external environments and exploit the available opportunities. A typical example is the electronic device – Vessel Monitoring System (VMS). Whilst, such technology is very effective in monitoring the fishers' position, it could not detect their activities. Fishers exploit this weakness by engaging in 'misreporting' and 'not reporting their catch' (FFA monitoring officer number 2, personal communication, December 20<sup>th</sup>, 2013). Fishers no longer commit explicit IUU activities.

The government and FFA must be warned that fishers could still come up with new ideas to commit IUU fishing secretly. Fishers depend on the tuna for economic survival. The island states therefore, need to continuously scan the situation and with the help of regional organisations and universities engage in continuous research on this issue.

Interest on this issue becomes stronger when latest journal revealed that less research has been conducted on compliance and regulations (Sunderstrom, 2012). The few studies carried out were done in Europe, the Americas, Africa and Asia.

This paper seeks to test the following objectives:

1. To identify why fishers break rules?
2. To describe circumstances in which they break rules.
3. To identify when compliance is effective.

## **THEORETICAL CONTEXT TO FISHERIES COMPLIANCE**

It was argued that long-term sustainable management of tuna fisheries will not be achieved if IUU fishing is not addressed effectively (FAO, 2014). However, the policies and measures needed to address this problem depend on the knowledge of the various factors that causes non-compliance.

Existing studies have revealed fifteen conditions that influenced fishers' level of compliance to fisheries regulations (Ostrom et al. 1994; Kuperan et al. 1995; Spalding & Sibert 1997; Gunningham & Grabosky 1998; Honneland 2000; Hatcher 2000; Xepapadea 2003; Jenny et al. 2006; Abusin & Hassan, 2009; Alayon, 2011). To help understand, these conditions were broken down to three main categories: (1) Conditions that influence fishers to break the rules (2) Conditions that influence fishers to obey them, and (3) Biological & Social factors.

### **1. CONDITIONS THAT INFLUENCE FISHERS TO BREAK THE RULES**

Review of existing literatures has categorised six main conditions why fishers break rules. They are as follows:

1. Economic Gain (Ostrom et al., 1994; Kuperan et al., 1995; Hatcher, 2000; Xepapadea, 2003; Jenny et al., 2006; Abusin & Hassan, 2009; Alayon, 2011). Most fishers break rules for economic benefits, which are mostly motivated by business and personal interests. Their decision to break them often arises when they know that the gain far exceeds the costs;
2. Lack of Knowledge of the Rules (Alayon, 2011). Fishers break rules if they have insufficient knowledge of the rules and if they misunderstand them;
3. (3) Border Issue (Honneland, 2000). Rules can be broken if the national border between two neighbouring countries is disputed (ibid); For example, the dispute between Fiji and Tonga over Minerva Island has forced either party to go and fish on that Island (Field, 2011);
4. Common Pool Resources (CPRs) (Ostrom et al., 1994). The fact the 'commons' are non-excludable and no one owns them, make it easier for fishers to violate the rules;
5. Fish Behaviour. Tuna does not know about the boundaries or the rules. They move and migrate according to environmental and psychological conditions (Spalding & Sibert 1997). Fishers often break the rules when they cite schools of tuna concentrated in forbidden territories or less than 7 miles off land. Sometimes, they pursue them to other EEZ and set

their nets, particularly if enforcers and observers are not present; and

6. Regulators' Behaviour. Regulators make rules and amend legislation to further strengthen tuna management; but most of the time they behave controversially. Such behaviour encourages non-compliance (Gunningham & Grabosky 1998).

## 2. CONDITIONS THAT INFLUENCE FISHERS TO OBEY THEM

These conditions are further broken down into two main groups namely, voluntary and non-voluntary. Voluntary compliance is where fishers willingly cooperate with the rules. There are seven factors under this category. These are; (1) moral behaviour and personal development (Alayon 2011; Gezelius 2008; Honneland 2000; Jenny et al. 2006; Kuperan et al. 1995). Some fishers value obeying rules as important, this is influenced by their personal development; (2) social norms (Ostrom et al. 1994; Honneland 2000; Jenny et al. 2006; Eggart and Lokins 2008; Gezelius 2008;). The overall 'perception of others' or 'how others think of them' also has a strong influence on fishers' obedience to rule. Fishers do not want to be seen negatively by the community. Thus, if majority of the fishers follow rules, the others will do the same (ibid); (3) nationality (Gezelius 2008: Havice & Campling 2010). Some societies practice and emphasise strong moral values. The Norwegian communities for example are very high law abiding people. This influences their attitudes towards compliance (Gazelles, 2008); (4) legitimacy of rules (Kuperan et al., 1995; Jenny et al., 2006; Eggart & Lokina, 2008; Alayon, 2011). The authors argued that fishers voluntarily obey the rules if they perceive them as fair (ibid); (5) sense of belonging (Alayon, 2011). It was argued that local people obey rules more than foreigners. Existing research mentioned that local fishers tend to take ownership of the resources and ensure that the resources benefit their communities and the future generation. However, the foreigners are more focused on their immediate personal gains (ibid); (6) community work (co-management). Studies indicate that fishers voluntarily comply with rules when they are involved in the management of the resources (Hatcher et al., 2000; Gezelius 2008;). This also includes asking for stakeholders' input in formulating policies (Hatcher, 2000; Havice & Campling, 2010). This suggests, fishers may break rules if they are not consulted during the formulation of rules. Another reason why fishers break rules under this condition is that they misunderstand the rules. However, sometimes fishers intentionally break the rules even if they understand them to express their disagreement; and (7) communication; communication helps improve compliance but it does not totally achieve 100% compliance (Ostrom et al., 1994).

Non-voluntary compliance on the other hand refers to obedience to rules by force (Punitive). The 'Bureaucratic Model' of management sets rules, policies and procedures, and puts in place enforcements and penalties to ensure the rules are followed (Hughes, 2003). Fishers obey rules because they fear being punished. This is also known as a 'coercive approach'. There are two main conditions that could force fishers to obey rules. These are (1) enforcement (Kuperan et al., 1995; Honneland, 2000; Eggart & Lokina, 2008; Gezelius, 2008; Abusin & Hassan 2009; Alayon, 2011; Sasako, 2012). Most fishers tend to obey rules when there is a strong presence of enforcement. However, their level of compliance is weak when enforcement is low (ibid); (2.a) penalties (Kuperan et al., 1998; Eggart & Lokins, 2008). It was argued that high penalty

scares off fishers; (2.b) graduate sanctions (Ostrom 1994). Graduate Sanctions appear to be very successful in achieving compliance in a community set up. Ostrom through an experiment, found that fishers tend to obey rules when they are punished gradually (ibid). This is in accordance to the nature of the rules broken the nature of the rules broken. For example, if a fisher breaks one simple rule, he will be warned verbally. If he breaks the rule again, a harsher punishment shall be imposed. And if he breaks it for the third time, he will be expelled.

### 3. BIOLOGICAL AND SOCIAL FACTORS

This includes (1) biological reasons (Ostrom et al., 1994; Homeland, 2000; Gezelius, 2008). Fishers obey rules if they know that the fish are juvenile. This is to allow time for them to grow. But they break the rules again when the fish are big (ibid)

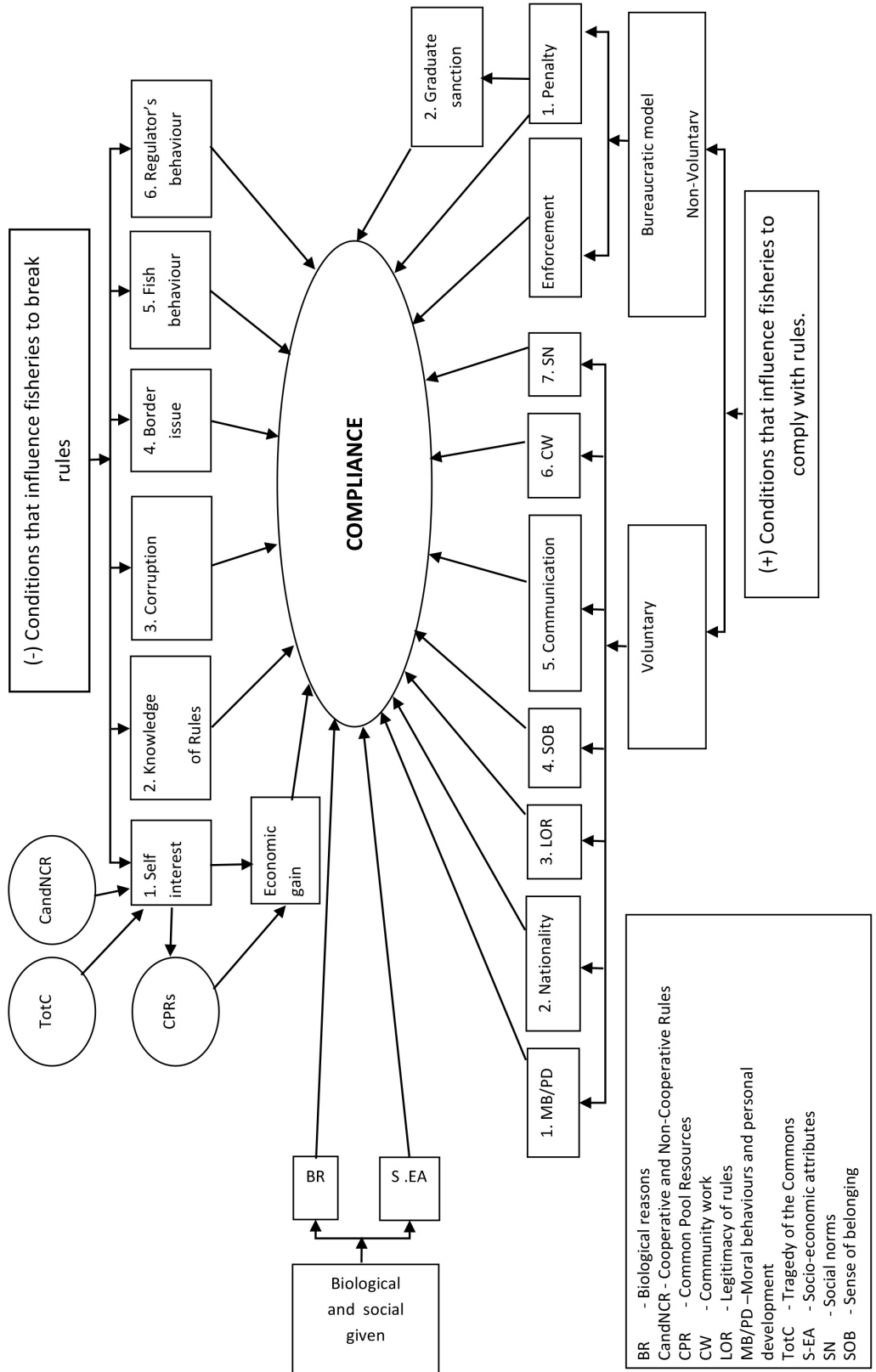
(2) socio-economic attributes (Abusin & Hassan, 2009). Those who have attended secondary education and above comply with rules better compared to those who have less education, and those who are well-off obey rules more than those who are marginal (Abusin & Hassan, 2009). This could also be associated with self-interest (economic gain), in the sense, that those who are economically well-off or have other alternative sources of income,, do not break rules compared to those who only depend on fishing.

### THEORIES AND CONCEPTUAL FRAMEWORK

Two interesting theories drawn from existing studies that set a base for ‘compliance’ are from Ostrom (1990) and Xepapadea (2003). Ostrom (1990) argued that it is difficult to achieve 100% compliance because self-seeking <sup>11</sup>fishers would break rules even if the majority comply. This theory was further complemented by Xepapadea (2003) with his theory of co-operative and non-cooperative rules. It argues that there are two rules in existence for harvesting of fisheries resources; one that involve obeying rules and the other that violate them. He maintains that these two rules have to co-exist to maintain equilibrium. If the two forces are not balanced, they will naturally stabilise themselves. This makes it difficult to achieve total compliance.

However, the ‘tragedy of the commons’, Ostrom (1990), stressed that fishers acting on ‘self-interest’ will be worse off in the long run. Overfishing based on self-interest leads to extinction of the stocks. This paper tries to understand fishers’ behaviour as a first step in integrating these three variables amicably.

FIGURE 1: Factors that influence compliance to fisheries regulations both directly and indirectly





## METHODOLOGY

This ‘field study’ was conducted with a ‘qualitative’ methodology. Information was gathered through personal interviews and focus groups.

The research was conducted in Honiara and Noro where offloading and transshipment of fish were done. Selection of informants was : through non-random sampling using a mixture of stratified, accidental and snowball sampling. Methods were conducted mostly through the intercept method.

Emails were also used to gather information from experts that were located in another country and to refer back to officers who had been interviewed earlier in the Solomon Islands to reconfirm certain information.

Secondary sources such as reports, newspapers, online and archival information were used to complement primary findings and to give figures and other relevant facts useful for this paper.

## FINIDNGS AND ANALYSIS

### WHY FISHERS BREAK RULES?

Violating fisheries’ rules is a criminal activity predominantly driven by economic goals, self-interests and greed. Fishers break most of the rules secretly, when they know their chance of getting caught is low. This results in maximising their profits<sup>12</sup>. Simultaneously, they make extra money through bonuses from their employers. The size of the bonus depends on the volume of the catch; i.e. the higher the catch volume the greater the bonus (Enforcement Officer number 1, personal communication, December 1<sup>st</sup>, 2012 ).

One of the senior monitoring officers working for Forum Fisheries Agencies (FFA) mentioned; ‘vessels involved in IUU because they want more money. Their payments depend on their catch (FFA Monitoring Officer number 2, personal communication, December 22<sup>nd</sup>, 2012).

Another current fisherman, an engineer of one of the purse seiners mentioned; ‘the main reasons for illegal fishing is to make money. You can break rules for emergency reasons and to save life, but the rest is to make money’ (. Fisherman number one, personal communication, December 22<sup>nd</sup>, 2013)

However, with the introduction of advanced technologies in monitoring and surveillance activities, fishers also do not commit clear cut IUU fishing. Instead , they do it secretly in ways that are difficult to detect. Example, misreporting, tampering of VMS and setting fishing nets when transiting through other exclusive zones within FFA member countries (FFA Monitoring Officer number 2, December 22<sup>nd</sup>, 2013).

Secondly, on a micro-level, fishers break rules such as catching undersize d tuna, shark fining and so on for personal gain (money and material goods). Fishers catch undersized tuna and other because they intend to sell them for extra cash. other times they exchange fish for material goods

such as cigarettes, vegetables, crops and fruits.

Thirdly, there are other non-commercially driven reasons for breaking rules. Some of them are throwing of plastics and other non-biodegradable items overboard, discharging bilge and waste water, and failure to paste fishing license at the wheel house ( Observer Programme Coordinator number 2, personal communication, January 6, 2013 Fishers and enforcers may not see breaking these rules as serious. Furthermore, violating them also reduces the tuna population. Some of the reasons fishers may break these rules are ignorance, negligence and laziness.

Fishers may also break them because of lack of knowledge or awareness of their actions. Similarly, enforcers may not emphasise these rules enough as they do with those that try to restrict maximisation of profits through illegal means.

Whilst island states may not put strong emphasis on countering such violations, it is becoming a concern because rules broken through ignorance and negligence are widely committed by most fishers in general. Also, the rate at which they are committed is increasing. Spalding and Sibert (1997) argued that tuna preferred a clean and pollution free environment. If they sense the environment is polluted, they move or migrate to other cleaner environments.

Fourthly, fishers break rules to fulfill social obligations. Most families, relatives and friends of fishers expect them to bring some fish home. Fishers often feel obliged to respond positively to such requests. They mostly fulfill such expectations by catching undersize d tuna. Families and relatives are important backbone for fishers. Most of them work as fishermen to help and support their families and relatives. Catching undersize d tuna to take home to families and relatives is an example of this bond. Sometimes fishers deliver trays full of fish to villages for church festivals, feasting and other important occasions. This is a common practice by locally based vessels.

#### CIRCUMSTANCES IN WHICH FISHERS BREAK RULES

There are three main conditions that determine the level of compliance; these are motives, 'enforcement' and 'community' conditions. Motives are the factors that drive fishers to break rules. The findings revealed that the conditions that influence fishers to break rules are (1) Self-Interest (2) Social Obligation and (3) Misunderstanding of Rules. Self-interest is predominantly monetary pursuance. There are six attributes that are related to 'self-interest'. These are (i) Economic Gain (profit maximisation) (ii) Personal Gain (income and material goods) (iii) Nationality<sup>13</sup> (iv) Fishing Gear <sup>14</sup>and (v) Un-licensed Vessels<sup>15</sup>. The general perception is that 'fishers' motives' are economically driven.

Punitive, on the other hand, are the mechanisms put in place under the 'bureaucratic management model' to deter violation of rules. However, it was revealed that 'punitive' conditions are weak and ineffective. This makes 'non-compliance' difficult to extinguish. One of the main components of 'punitive' is 'enforcement'. Enforcement is weak because the Pacific class patrol boats that are mandated to enforce rules are inadequate. Moreover, the sea boundary is too big for two assets to monitor effectively. Furthermore, inadequate financial resource does not allow

these assets to patrol regularly . Another limitation is lack of fuel depot to refuel patrol vessels that monitor the eastern region.

Other areas that have contributed to weak enforcement are the limitation of the VMS and the forgiving attitudes of fisheries officers. While the VMS has strengthened monitoring and surveillance activities, it could not detect specific IUU activities such as misreporting and no reporting. This left a gap , allowing fishers to exploit. Moreover, the fact that fisheries' observers are so forgiving and helpful to violators encourages such activities to continue.

In contrast, the Fisheries' Observers program me that was previously criticis ed for suspected 'informal activities'<sup>16</sup> has improved. The current system is designed in such a way that 'informal behaviour' can be easily identified from the data. The coordinators interviewed confirmed that the data collected so far has revealed absence of such behaviour. However, the 5% observers<sup>17</sup> coverage in the long liners and pole and line is still a concern. This is because fishers can still engage in IUU fishing in those vessels that do not have observers on board.

The second factor that has contributed to the weak enforcement is, the less severity of 'penalty'. The penalties imposed by the government appeared to be low<sup>18</sup>. This does not help deter potential violators. Also, there were existing penalties that were further reduced out of court.

The third factor is 'political influence'. There are instances where enforcements have been undermined by both political and public administrative interventions. This concerns situations where violators have been arrested and escorted for further investigations at the patrol boat base but political leaders and senior bureaucrats intervened. This discourages and weakens enforcements. One of the reasons for this is the strong diplomatic ties between Solomon Islands and some of the DWFNs' governments. A typical example of this is Solomon Islands and Taiwan. Another reason is the way in which Fisheries' Ministers go to sign fishing access agreement with overseas countries. Due to the 'red carpet' treatment they received the Minister agreed with terms that were not specified in the licenc e conditions

The community attributes namely 'positive norms' and 'communications' have never been practised. There has never been a standard positive norm practised in the tuna industry. Fishers seem to behave independently trying to fulfill their own interests. Similarly, there is no such practice as stock is updated from responsible authorities in the form of pamphlets, reports, brochures, awareness . The community model has never been practised.

The other two factors under this model are 'community work' and 'legitimacy of rules'. The findings revealed DWFNs have not actively taking part in formulation of rules .nor have they been actively involved in surveillance activities. Despite, most fishers perceiving the rules as fair, it does not stop them from breaking them.

#### WHEN COMPLIANCE IS EFFECTIVE?

Fishers obey rules either involuntarily (by force) or voluntarily. The findings revealed that fishers obey rules involuntarily because they fear getting into trouble. Fishers have families who depend on them for financial support. Hence, they fear termination from their job if they violate rules.

Also, they mentioned that the presence of observers makes it difficult to violate rules nowadays. Also, the technology currently used such as the VMS makes it quite difficult to commit IUU activities.

In contrast, factors that influence fishers to voluntarily comply vary. One of them is their long term interests. Fishers voluntarily avoid catching undersize d tuna so that they could be fit for sale. This is for their best interest.

Secondly, there are other fishers who have high moral values. This makes them believe that violating the rule is wrong. Such beliefs are influenced by their personal development.

Thirdly, some local fishing masters obey rules because of their strong sense of belongingness. They care more about the rules, claiming they belong to their country. This helps them take ownership of the rules.

Lastly, other fishers obey rules because they sympathise with the fish. They perceive that the fish also wants to live; hence they see no reasons to capture and kill them if they are not required by the buyers or for canning.

Rules that fishers find difficult to follow are classified under three categories; those that are related to 'economic interests', 'negligence' and the type of 'gear' used. Rules that have economic interests are; - catch retention<sup>19</sup>, casting nets on whale sharks, casting nets 7 miles off shores, and misreporting of catch. Fishers experienced difficulties in complying with them because this would restrict them from earning extra income.

However, there are other rules fishers found difficult to follow because of negligence, ignorance, or laziness. These rules are, failure to display license at the wheel house, throwing of rubbish (plastics), discharging of oil, and misreporting. Misreporting also falls into this category because sometimes fishers just fail to accurately report catch such as the by-catches due to negligence.

The other reason fishers may find it hard to comply is due to the type of gear used. Purse seining and long linings frequently breach the rules that forbid catching and killing species of special interest such as 'turtles', 'whale sharks', 'dolphins', 'other fish, and 'undersize tuna'. Often the types of gear used such as purse seining<sup>20</sup> makes it difficult to save the untargeted species.

## CONCLUSION

When looking at the reasons why fishers break fisheries rules and relating them to the 3 objectives, it is clear that 'economic gain' was the hub of the issue because it has direct link to all the objectives. Captains and fishers break rules to maximise their companies' profits; and in return their employers reward them with incentives such as bonus. This encourages such practices to continue.

There are other environmentally harmful habits that were practised by fishers although these are non-IUU related. One of them is sea pollutions<sup>21</sup>. Most fishers throw plastics and other harmful liquid substances such as bilge, brine and so on into the sea out of ignorance and lack of knowledge of their impacts.

The weak enforcement together with low penalties imposed by the government make it difficult to deter 'non-compliance'. These are caused by lack of resources, manpower, capacity and advanced surveillance technologies.

However, this research revealed that biological reasons, sympathising with the fish, moral value and sense of belonging could help achieve 'voluntary compliance'. The lack of sufficient resources to effectively implement a 'coercive approach, requires the government and stakeholders to consider increasing the level of 'voluntary compliance'. This should be adopted into their tuna fisheries management policies.

## ENDNOTES

- 1 Distance Water Fishing Nations (DWFNs) are fishers from other countries that have sought access to fish for tuna in the Solomon Islands' or other Pacific Islands countries' 200 miles exclusive economic zones (EEZ). DWFNs vessels that are currently fishing in Solomon Islands waters are Taiwan, Japan, European Union and the United States.
- 2 Bilateral Agreement refers to fishing agreement between Distance Water Fishing Nations and a particular Pacific Island country.
- 3 Multilateral Agreement regulates conditions signed between a DWFN and the Forum Fisheries Agency' on behalf of its member countries.
- 4 The Forum Fisheries Agency (FFA) based in Honiara, consists of 17 South Pacific Islands countries namely, 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. Its objective is to strengthen national capacity and regional solidarity in ensuring member countries manage their fisheries resources that falls within their 200 mile exclusive economic zone.
- 5 Corruption is the abuse of position of trust by regulators and fisheries' enforcers to gain unfair advantage.
- 6 The Western and Central Pacific Fisheries Commission (WCPFC) was established by the 'Convention for the Conservation and Management of Highly Migratory Fish Stocks' in the Western and Central Pacific Ocean (WCPFC Convention). This body manages tuna in the high seas. It has 32 member countries which include all sovereign PICs, participating territories, colonial ruler and DWFNs. It also has 12 non-members which comprise other emerging DWFNs.
- 7 Parties to the Nauru Agreement (PNA) is a sub-regional group consisting of eight FFA member countries; Papua New Guinea, Solomon Islands, Kiribati, Tuvalu, Palau, Federated States of Micronesia, Marshall Islands and Nauru. These eight countries control 25% of the world's tuna supply. They established sub-regional agreements on the terms and conditions of purse seiners' licenses. Also it brings together these eight countries to sustainably manage their tuna and to increase their benefits.
- 8 Fishing gears refers to the equipment used for catching tuna. In this context fishing gears refers to pole and line, purse seining and long linings.
- 9 Undersize tuna referred to tunas below 1 kilogram.. These sizes are rejected by buyers (importers) or canneries.
- 10 By-catch is marine creatures that have little commercial value but are often caught and killed in the nets. This includes dolphins, turtles, seabirds, sharks, juvenile fish and other fish that are not targeted in the tuna operations.
- 11 Self-seeking fishers are those who only concern about maximising their profit.
- 12 This is the profit made by the fishing company.
- 13 Nationality – fishers from certain countries such as Taiwan have a poor record of complying with the rules. They are mostly driven by 'self-interest' for economic benefit.

- 14 Fishing Gear – using ‘purse seining’ for fishing. This method is destructive as it does not select the size and type of fish (including by-catches). Anything that is trapped in the net is killed. Selection of fishing gear is influenced by economic gain.
- 15 Unlicensed Vessels – although vessels know that they do not have the license to fish in some EEZ, this is motivated by ‘economic benefit’.
- 16 Informal activities is a more respectable way for describing ‘corruption’ the way in which observers are bribed to allow fishers to violate rules such as under reporting, FAD fishing, fishing without license etc without reporting them.
- 17 The 5% observers’ coverage in the long liners and pole and lines means some of the vessels do not necessarily need to have observers.
- 18 Low penalties do not deter fishers because the benefits would outweigh the costs encouraging fishers to continue with IUU.
- 19 Fishers must not dispose any fish caught dead into the sea even if they are dead. They have to take them ashore. Fishers do not like this because it restricts the storage capacity for the targeted size (species).
- 20 Purse seining is a fishing method that uses fishing nets to capture the tuna. Such fishing technique does not select the fish and often captures anything that is trapped in the net. Furthermore, it is difficult to save most of the species that are entangled in the net. Most of them die as a result.
- 21 Pollution which includes throwing plastics and other non-bio gradable items overboard.

## REFERENCES

The referencing details need to be thoroughly checked according to the type of item it is and how it should be referenced using APA style. There are several inconsistencies and missing details.

- Abusin, S., & Hassan, R. (2009), *Non-Compliance with Fishery Regulation/ the determinants of frequency of violation in Sudan*. Center for Environmental Economics and Policy in Africa (CEEPA), Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa. Retrieved from [www.csae.ox.ac.uk/conferences/2011-EDiA/papers/182-Abusin.pdf](http://www.csae.ox.ac.uk/conferences/2011-EDiA/papers/182-Abusin.pdf)
- Alayon, M. L. (2011). *Regulatory compliance in small-scale fisheries in Old Providence Island (Colombia)*. Retrieved from <http://aer103.aerl.ubc.ca/r.sumaila/FisheriesEconomics/Literature/Part3Topicalissues/Sutinen.pdf>.
- Bureau of East Asian and Pacific Affairs Fact Sheet. (2006). *U.S. Relations with Solomon Islands*, U.S Department of States. Retrieved from <http://www.state.gov/r/pa/ei/bgn/2799.htm>.
- Colebatch, H., & Larmour, P. (1993). *Market, bureaucracy and community; student's guide to organisation*. London and Colorado: Pluto Press.
- Cyranoski, D. (2010). 'Pacific tuna population may crash at any time.' *Nature international weekly journal of science*. 465, 280-281. Retrieved from <http://www.nature.com/news/2010/100519/full/465280b.html>
- Edeson, W., Freestone, D., & Gudmundsdottir, E. (2001). *Legislating for sustainable fisheries: a guide to implement the 1993 FAO compliance agreement and 1995 UN fish stocks agreement*. Washington: The World Bank.
- Eggert, H & Lokina, B R (2008). *Regulatory compliance in Lake Victoria Fisheries*, [Retrieved from, [www.efdinitiative.org/...regulatory-compliance-in-lake-victoria-fishe...](http://www.efdinitiative.org/...regulatory-compliance-in-lake-victoria-fishe...)]
- FAO. (2014). *Illegal, Unreported and Unregulated (IUU) fishing*, FAO. Retrieved from [www.fao.org/fishery/topic/3195/en](http://www.fao.org/fishery/topic/3195/en).
- Field, M. (2012, February 5), *Chinese tuna fleets doubled in two years*, *Solomon Star*. Retrieved from: <http://www.solomonstar.com/news/national/15493-chinese-tuna-fleet-doubles-in-2-year>
- Gezelius, S.S., (2008). *Paths from law enforcement to compliance: cases from the fisheries*: Retrieved from [http://www.redorbit.com/news/science/1204246/three\\_paths\\_from\\_law\\_enforcement\\_to\\_compliance\\_cases\\_from\\_the/](http://www.redorbit.com/news/science/1204246/three_paths_from_law_enforcement_to_compliance_cases_from_the/)
- Globalfish Research Programme; World Tuna Markets*. *Global Fish*, (74):2-104 :Retrieved from [http://www.globefish.org/upl/Publications/GRP74TUNA\\_Mailing.pdf](http://www.globefish.org/upl/Publications/GRP74TUNA_Mailing.pdf)

- FAO Globefish (2012). *Globefish*. Retrieved from [www.globefish.org/tuna-december-2012.html](http://www.globefish.org/tuna-december-2012.html)
- Gunningham, N. & Grabosky, P. (1998). *Smart Regulation*. New York: Oxford University Press.
- Hanich, Q. (2013, February). From 'arc of instability' to 'arc of opportunity'? -Paper presented at (The Australian National University) Workshop.
- Hatcher, A., Jaffry, S., Thebaud, O., & Bennett, E. (2000). Normative and social influences affecting compliance with fishery regulations'. *Land Economics*, 76(3)448-461.:Retrieved from <http://www.jstsw.org/stable/3147040>
- Havice, E., & Campling, L. (2010). *Shifting Tides in the Western and Central Pacific Ocean Tuna Fishery: The Political Economy of Regulation and Industry Responses*. *Global Environmental Politics* 10(1) 89-114.:Retrieved from <http://musejhu.edu/journals/gep/summary/v010/101havice.html>:
- Honneland, G. (2000). *Coercive and discursive compliance mechanisms in the management of natural resources*. Dordrecht: Kluwer Academic Publishers.
- Hughes, E.O. (2003). *Public Management and Administration* (3<sup>rd</sup>ed). New York: Palgrave Macmillan.
- Island Sun. (2010, March 23 ). Bodo charges \$2m on fishing boats'. *Island Sun* Retrieved from <http://www.islandson.com.sb/index.php?option=com-on-fishing-boatandcatid=36:latest-newsandItemid=79>
- Jenny, A., Fuentes, F.H., & Mosler, H.J. (2006). *Psychological factors determining individual compliance with rules for common pool resource management: the case of Cuban community sharing a solar energy system*. Retrieved from <http://sozmod.eawag.ch/pdfs/30.pdf>
- Kuperan, V.K., Abdullah, M.N., and Ticao, C.S.M.I. (1995). *Enforcement and Compliance with Fisheries regulations in Malaysia, Indonesia and the Philippines*:Retrieved from [dlc.dlib.indiana.edu/dlc/bitstream/handle/.../18%20Kuperan.pdf?...1](http://dlc.dlib.indiana.edu/dlc/bitstream/handle/.../18%20Kuperan.pdf?...1)
- Lilomo, P. (2012):, *Investigated cases of illegal fishing increases*; *Island Sun*:Retrieved from <http://www.islandson.com.sb/index.php?option=com>:
- Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Ostrom, E., Gardner, R., & Walker, J. (1994) *Rules, games, and common-pool resources. The United States of America: The University of Michigan Press*.
- PRI (2013). *Pacific island nations band together as overfishing takes toll on global tuna supply*. Retrieved from <http://www.pri.org/stories/science/environment/pacific-island-nations-band-together-as-overfishing-takes-toll-one-global-tuna-supply-12762.html>
- Sasako, A. (2012). *Islands lack Resources, Ability to Manage*. *Island Business Magazine* issue number? Pages? Retrieved from [http://www.islandsbusiness.com/islands\\_business/index\\_dynamic/co](http://www.islandsbusiness.com/islands_business/index_dynamic/co)



- Solomon Star (2014, August 15). *Why I was sacked: Pokajam*. *Solomon Star Online*. page 8  
Retrieved from
- Sundstrom, A. (2012). *Corruption and regulation compliance: experimental findings from South African small-scale fisheries*. *Marine Policy*, 36(3012), 1255-1264.
- Sylvia, S., Sibert, J. (1997) *Tuna behavior and Physiology*. *Pelagic Fisheries Research Program*. 2(4)1-8 Retrieved from <http://www.soest.hawaii.edu/PFRP/>.
- The World Bank (2000). *Chapter 3 managing tuna resource*. *The World Bank*. Retrieved from [http://search.yahoo.com/search;\\_ylt=A0oGdXw3GaBRny8AYnNXNy0A?p=Chapter%203%20Managing%20Tuna%20Fisheriesandfr2=sb-topandfr=chrome&mandtype=EGMBandtype\\_param=EGMB](http://search.yahoo.com/search;_ylt=A0oGdXw3GaBRny8AYnNXNy0A?p=Chapter%203%20Managing%20Tuna%20Fisheriesandfr2=sb-topandfr=chrome&mandtype=EGMBandtype_param=EGMB)
- Tsamanyi, M., & Hanich, Q. (2008). *Addressing corruption in Pacific Island*. Retrieved from [http://www.illegal-fishing.info/item\\_single.php?item](http://www.illegal-fishing.info/item_single.php?item)
- Xepapadea, A. (2003). *Regulation and evolution of compliance in common pool resources*. Retrieved from [ideas.repec.org/p/crt/wpaper/0312.html](http://ideas.repec.org/p/crt/wpaper/0312.html)
- Please refer to Annex 1 for other sources obtained from other materials.

## APPENDICES

### ANNEX 1. MATERIALS OBTAINED FROM OTHER SOURCES

- 2012 License conditions for local companies chartering foreign purse seine vessels to operate in Solomon Islands waters (Ministry of Fisheries SIG)
- Foreign pole and line license conditions (Ministry of Fisheries SIG)
- Foreign purse seine vessels' license conditions (Ministry of Fisheries SIG)
- Locally-based foreign long line vessels' license conditions (Ministry of Fisheries SIG)
- Locally-based foreign purse seine vessels' license conditions (obtained from the Ministry of Fisheries SIG)
- Local pole-and-line vessels (Ministry of Fisheries SIG)
- Nauru's Fisheries Act 1997 Retrieved from [http://www.thecommonwealth.org/Shared\\_ASP\\_Files/UploadedFiles/2C99E4AA-3D36-4759-B0E6-BB085905CC62\\_FisheriesAct1997.pdf](http://www.thecommonwealth.org/Shared_ASP_Files/UploadedFiles/2C99E4AA-3D36-4759-B0E6-BB085905CC62_FisheriesAct1997.pdf) > [accessed 22 July 2013]
- Solomon Islands Fisheries Act 1998 (SIG, Published by SI Printers Limited)
- Solomon Islands Government Performance Audit Report (2013) *Managing Sustainable Fisheries (Tuna fishery) in Solomon Islands Fisheries Exclusive Economic Zone* (Office of the Auditor General SIG)