**Principles and Practices to Enable Incentive Based Change in (Tuna) Fisheries in ABNJ**

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# Abstract

Fisheries that intersect with the high seas, or areas beyond national jurisdictions (ABNJ), are complex in many dimensions; ecologically, institutionally and politically. They also generate enormous wealth and have the potential to generate even more wealth if managed better. These fisheries are broad in scope and scale and composed of heterogeneous States and fishers with varied incomes and motivations. Thus, risks, expected costs, speed of transformation, scale of investments and returns are variable across this spectrum that presents diverse challenges and opportunities for innovative design that incorporate incentive based tools.

This work develops a theory of change for ABNJ fisheries management reform using nine smart intervention mix principles. This examination builds on the current literature across multiple disciplines and draws on the decades of practical experience in fisheries management embodied by the members of the Common Oceans Global Think Tank on ABNJ fisheries. The nine principles for smart intervention mixes are:

1. Prefer policy mixes incorporating compatible instrument combinations
2. Calibrate interventions towards points of least resistance, lowest cost and maximum impact
3. Sequence or scale interventions as necessary to achieve the goals of fisheries management
4. Empower participants best able to act as surrogate regulator
5. Maximize opportunities for net gain outcomes
6. Bottom-up Matters; Consider and harness the responsiveness of stakeholders
7. While Advocating for Bottom-Up Design Consider Top-Down Logics and Constraints
8. Assess and adapt the regime in light of its effectiveness
9. Impact assessment

The document defines and explains each principle and demonstrates the principle in action in case studies from management reforms in ABNJ fisheries. Emerging from this discussion is not a set of actions to be taken, but a format for an adaptive process to effect change. The complexity and heterogeneity of ABNJ fisheries makes it impossible to be more prescriptive.

# Introduction

The management of transboundary fish stocks, especially those in areas beyond national jurisdiction’ ‘ABNJ’ face a series of challenges (Ardron et al 2014). ABNJ fisheries are complex and heterogeneous presenting a number of challenges, as listed in Table 1. Fish stocks form part of a highly complex ecosystem facing negative impacts from overfishing, destructive fishing practices, increased shipping, marine pollution and potential seabed mining activities. Climate change induced ocean warming and acidification present additional challenges (Cochrane et al 2009). These are compounded by problems of governance: coordinating and ensuring compliance of multiple actors and local, regional and global levels capitalizing on success, and of incentivizing change in line with best practices (Blanchard 2017).

Table 1. Management Challenges in ABNJ Fisheries; Complexity and Heterogeneity.

|  |  |
| --- | --- |
| **Characteristic** | **Challenge Level** |
| Multiple Actors: Local, Regional, Global | **High** |
| Have vs. Have-nots | **Medium** |
| Freedom of the Sea: Common Pool Resource and Free Riding | **High** |
| Data Consistency | **Low** |
| Highly Complex and Large Ecosystems | **High** |
| Complex International Governance Framework | **Low** |
| Rules at Global Level Yet Enforcement Rests with States | **Medium** |
| Consensus Based Decision Making at RFMO Level | **Medium** |

The term ABNJ describes the areas of the ocean that are not subject to the exclusive jurisdiction of any individual State. It includes both the high seas and the sea-bed beyond the outer limits of the continental shelf. The regulation of fisheries in ABNJ must account for two fundamental things: first, the nature of the resource base and its location, and, second the wider international governance framework (Barnes 2009). It is usually more difficult or costly to exclude access to the resource compared to resources that are in the exclusive economic zone. Since fisheries within ABNJ are not exclusive to any State, States must cooperate in order to regulate such resources (Barnes 2016).

Fish stocks in ABNJ are common property, common pool resources, meaning they are non-excludable and harvesting remains competitive (Barnes 2009). Excludability may exist to some degree, as a product of limitations on physical access to the fish stocks and efforts to restrict or condition access under international law. Such excludability is imperfect. In fisheries management information is critical and there are common gaps and weaknesses in information systems, including lack of data on the resource base, complex interactions in natural systems, precise data on catch levels and incidental fishing mortality. Moreover there is no single informational management structure. Information is generated at local or national levels. It may be coordinated regionally, but the quality and method of data may vary considerably. Areas beyond national jurisdiction are governed principally through controls on flag State vessels (Barnes 2015). This may be coordinated through regional fisheries management bodies operating under rules of international law (Rayfuse 2015). Such rules focus on managing the conduct of fishers.

In tuna fisheries in particular there are conflicts between the haves and the have-nots (McCauley 2018). The haves are nations that developed fishing infrastructure and processing capacity before many RFMOs were established. Typically, they have been fishing the high seas and in the EEZs of small island developing states (SIDS) and coastal developing states for a long time. Therefore they may have some claim to those resources based on historic entitlement or legitimate expectation. The have-nots, on the other hand, are the SIDS and coastal developing states who now want to pursue their development aspirations to fish their own EEZS and the high seas. When most of the world’s tuna resources are nearing fully exploited or over exploited, it sets the stage for conflict. This conflict is exacerbated by the decision-making framework within RFMOs that generally requires consensus-based decisions (McDorman 2005). For fairness and equity, development aspirations must be recognized but recognizing them without also cutting harvest somewhere else is a recipe for continued declines (Serdy 2010). It is against the haves’ best interests to take all the cuts, setting the stage for gridlock in the RMFO process. Often, the haves own much of the processing capacity and/or control the main supply chains. To alleviate the conflict and move forward, it is sometimes necessary to make concessions.

The complexity of transboundary fish stocks means there is no single blueprint for management, nor is it possible to prescribe fixed roles and functions to state and non-state actors. Complicating management further, rules are formed at the global level through RFMOs, but it is the states that must implement laws governing the conduct of fishers and who have the enforcement power (Gilman and Kingma 2013). This may create further space for conflict when such rules or enforcement is not taken. Or when it is taken and generates resistance from domestic fleets. Along those same lines, data collection requirements rest with the state where the fish were landed and depends on those states to have adequate and transparent systems in place to document harvests.

Creative solutions must embrace smarter approaches to the governance of resource. Smart instrument mixes are thought to improve upon the effectiveness of more conventional forms of State-centric regulation by combining multiple actors and modes of societal steering (Gunningam and Sinclair 1999). Smart instruments are a pluralist approach involving a mix of public and private forms of control, in the hands of public, private and third sector bodies. Mixes of public and private regulation are characterized by sequentially flexible and dynamic processes of learning and institutional change. It is claimed that ‘in the majority of circumstances, the use of multiple rather than single policy instruments, and a broader range of regulatory actors will produce better regulation” (Gunningham and Sinclair 2017). As such it is well suited to the complexities managing fisheries in ABNJ, with multiple heterogeneous actors and complex global/regional supply chains Barnes in press).

Our report draws on past performance and the future outlook of innovative incentive-based tools applied towards the development of a theory of change in the reform highly migratory and transboundary fisheries at the regional and global scales. This can inform the deliberations to address project challenges and conceptualize a broader longer-term innovative vision for ABNJ management. In doing so we develop the following set of nine principles based on multi-disciplinary insights from scholars and practitioners in the area of ABNJ management.

1. Prefer policy mixes incorporating compatible instrument combinations
2. Calibrate interventions towards points of least resistance, lowest cost and maximum impact
3. Sequence or scale interventions as necessary to achieve the goals of fisheries management
4. Empower participants best able to act as surrogate regulator
5. Maximize opportunities for net gain outcomes
6. Bottom-up Matters; Consider and harness the responsiveness of stakeholders
7. While Advocating for Bottom-Up Design Consider Top-Down Logics and Constraints
8. Assess and adapt the regime in light of its effectiveness
9. Impact assessment

These principles will be described in detail and case studies developed to support them.

# Interventions and Drivers of Change

Improvements to the management of shared and highly migratory fish stocks can be implemented at different levels (international, regional, national and local) (Lodge et al 2007). It can be achieved through smart instruments, using a wide range of legal, financial and economic tools, and combinations thereof (Hahn and Stavins 1991; Grafton et al 2006). The term ‘incentive based tool’ generally refers to a range of interventions that change or motivate change in behavior (Pascoe et al 2010). This is typically done through changing or introducing the economic incentives for individual behavior, whilst allowing the actors to decide how to respond to those incentives. Some innovations can evolve at local levels, the benefits of which are captured by States, NGOs and industry, and then rolled out in other fisheries (Bailey et al 2016). Some reform can be driven at higher levels through international and regional agreements, which then influence practices at national and local levels (Barnes 2019). Legal reform can be a means to facilitate the operation of certain incentive-based tools (eg individual transferable quotas), as well establishing better enabling conditions for reform to take place (eg security of rights). Incentives may also include financial incentives (eg investment), which in turn can directly influence behavior or leverage change by supporting legal or economic initiatives. Often change requires a combination of approaches.

It is very important to understand who to incentivize when designing incentive compatible interventions (Smith 2012). Is it States, RFMOs, consumers or fishers? Defining the incentives into two broad groups, push or pull, helps narrow the focus. Figure 1 diagrams the two basic types of incentives; push and pull. Push incentives originate on the consumer side of the seafood equation. These incentives can include consumer labels or certifications that are driven organically by consumers, retailers demanding a certain level of certification or traceability that is driven by importing State governments. Market based incentives include fishery improvement plans (FIPs) that lead to certifications, Marine Stewardship Council (MSC) certifications (or other independent certification bodies), catch documentation schemes (CDS) and/or traceability requirements (Parkes 2009). These incentives encourage consumers to increase purchases of sustainable seafood in hopes that increased demand and enhanced prices for these types of products encourage higher production of sustainable products using sustainable practices (Bush 2013).

The push side includes incentives that concern the production side of the seafood supply chain. These kinds of incentive compatible interventions include, but are not limited to, technology investment (bycatch reduction devices for instance), bycatch taxes, Coasian bargaining and rights based management (RBM). These incentives act by directly impacting the production function of the harvesting firm or the value generated for States leasing access rights. Taxes on bycatch, for instance, increase the cost of catching fish that are discarded, creating an incentive to avoid bycatch. RBM can increase dockside prices and reduce fishing costs generating higher profits incentivizing more sustainable harvesting practices. Defining these separately helps in the discussion but does not mean that they are mutually exclusive.

Figure 1. Push Versus Pull Incentives (Gentner 2018).



There are points within the harvesting and supply chain where interventions can be more effective (Purcell et al 2017). Effective intervention points are those where changes adopted by a smaller number of influential actors can have wider systematic impacts on the behavior of a wider range of actors up and down the global supply chain. Changes in rules at the global or regional level may influence more actors, but it is more difficult to secure due to political and legal barriers. Local interventions may be easier to secure at local levels due to but may influence fewer actors and practices.

Regional fisheries management bodies can adopt rules that must be implemented by member States. Although this is a highly politicized process (McDorman 2005), it provides the main opportunity for influencing the conduct of harvesting activities in ABNJ. It is also possible for sub-regional arrangements to influence regional arrangements. The harvesting sector is still quite diffuse and operating under different national legal regimes. However, all catch must be landed. Port States can impose controls on landings. This means ports, and particularly at major entry points to markets or processing facilities are potential locations where change can be leveraged on downstream harvesting activities. Consumer preferences can influence practices in the supply chain, including processing and harvest sectors. Whilst consumers operate within widely varying markets, it is possible to influence behavior through high profile or common marketing practices, such as certification and product labeling schemes. Focused campaigns by NGOs and industry champions can help leverage interventions (Jacquet and Pauly 2007).

Given the highly contextual nature of management, any advice on developing, applying individual or combinations of incentive based tools needs to be informed by clear, functional and regulatory design principles (Barnes 2019). These are parameters or criteria that policy-makers and managers can use to determine the potential success and effectives of any given management tool or combination of tools.

Interventions cost money. Some interventions build enabling conditions, like stock assessments and monitoring, control and surveillance (MCS) that are mostly public goods. Some interventions, like pull incentives, build on those public good enabling conditions to increase business success and build private wealth. Purely private goods should be paid for by the business that will benefit from those interventions. As such, they are suitable for typical business financing tools like debt or equity investment. Purely public goods, or those goods or enabling factors that produce benefits that can’t readily be tied to business profits can’t be financed by typical business means. It is important to realize that a smart mix of interventions will require a smart mix of financing. That financing package may include public sector money or private, investor money, depending on whether the interventions is a public or private good.

The following smart mix design principles are advanced as a way of guiding decision-makers through the challenge of framing and evaluating interventions. These design principles are drawn from smart regulatory theory, and provide a point of reference for fisheries managers or regulators seeking to enhance incentive structures and regulatory regimes. The point here is not to evince any particular governance arrangement or virtue of any specific principle. Instead the following principles and case studies provide a tool kit for decision-makers to work within when trying to evaluate potential interventions in current fisheries management arrangements.

# Principle 1. Prefer policy mixes incorporating compatible instrument combinations

No single management tool is able to manage complex natural resource systems. Since any regulatory instrument has strengths and weaknesses, a combination of different instruments is required to deliver desired regulatory outcomes (Gunningham and Sinclair 1999). For example, command and control measures are certain and predictable, but often inflexible and inefficient Gunningham and Garbosky 1998). Information based measures are often non-intrusive and cost effective, but unreliable because the costs of non-compliance are low. Instrument combinations or portfolios well suited to complex real world situations where perfect solutions are impossible or too costly and second best approaches are required.

To date the governance of fisheries in ABNJ has presented different mixes of management tools. These mixes may vary at different local, national, regional and global scales. They may also interact across different management scales (Barnes 2019).

The first principle of good intervention design is to accommodate a range of intervention tools and techniques. This includes international or transnational measures (such as treaties), State-based public regulation (eg legislation), private property, contracts, and market-based mechanisms, informal (ie non-legal/non-binding) measures, and financial tools (Barnes 2019). These tools need to be able to operate at different geographic scales and address a wide range of actors, from the States to individuals. They also need to be adapted to the different physical characteristics of the target resource base or wider ecosystem. For example, rights-based measures grounded in national law (eg ITQs) may not work for fish stocks in ABNJ because other fishermen do not recognize or are not bound to respect the exclusivity of the holder’s rights.

Simply maximizing the size of the toolkit is not enough. Policy makers should seek to develop the *most effective* mix of instruments. This requires an understanding of the scope effect, potential and limits of different instruments, and of their interactions. Not all instruments are compatible with each other or with underlying socio-political and economic systems. Instruments have different degrees of compatibility with each other and this may generate conflict or contribute to overfishing. This could occur, for example, if two States fishing the same stock adopted fixed quota allocations on the one hand, and effort based control rules on the other. Some instruments cannot exist without others, or will be significantly restricted in their scope of application. For example, investment is strongly influenced by the general regulatory conditions within a fishery, and may be stimulated through increases in tenure rights (See Case Study 1 below). Too many instruments in the mix can cause complexity or regulatory overload. This is often the case in traditional command and control regimes where regulatory growth is a response to regulatory slide. Therefore, it is critical to focus on complementary instrument mixes. Identifying the best mix of instruments is difficult and may likely emerge only over time through an iterative process. It will be determined contextually, and in light of the other design principles below.

Certain legal and non-legal instruments and processes form an essential part of the mix of tools governing high seas fisheries. They establish basic legal, market or financial capabilities. They enable cooperation or transactions between States. They enable other instruments to be put in place. They ensure that all stakeholders and affected subject matter are factored into the management of the resources base.

Most instruments operate in relation to, or depend upon, other instruments in the mix. For example, certification schemes depend upon compliance with regulatory standards as a requirement of certification, and these are often drawn from international standards/best practices (Barnes 2018). It is sometimes not enough that an international agreement exists. Certain technical or institutional follow up may be required to give the instrument force of law or make its provisions operative. These core instruments include, but are not limited to:

**Instruments at the global level can include:**

* The United Nations Convention on the Law of the Sea (UNCLOS)
* The United Nations Fish Stocks Agreement (UNFSA)
* FAO Compliance Agreement
* FAO Port State Measures Agreement

Legal instruments must be ratified, and supported with implementation measures under domestic law. Where one or more elements of the mix is absent, then States individually or collectively must address that gap

**Instruments at the regional level can include:**

* Regional fisheries management agreements establish institutional frameworks, including the power to make specific conservation and management measures
* Regional fisheries management organizations can adopt binding conservation and management measures such as TACs, bycatch limits, time/area closures, etc.
* Sub-regional arrangements may also adopt conservation and management measures.
* Allocation of fishing rights to States, through access or harvest rights
* Granting membership and requiring fees

**Instruments at the national level can include:**

* Generally any national legal and regulatory instruments that establish rules binding on private persons and companies within a State
* Typical command and control regulations
* Input controls
* Output controls
* Rights based management – weak community access rights to strong individual rights
* Importation standards for health and safety
* Private supply chain controls for sustainability (eg Walmart)
* Traceability or catch documentation requirements

Private law measures such as supply contracts, leases, financing rules and loan arrangements.

Looking at the sequencing of the various international law gives a window into the type of progression and mix necessary to achieve incentive compatible instruments and interventions (Barnes 2018). And those represent the umbrella under which compatible instrument combinations must be made at the regional and then national level.

Cutting across these governance levels are a range of financial and market-based instruments. Some tools are implemented and actively used by the State. Others are facilitated by the State and used by private actors. This may allow for regulatory efficiencies by permitting regulators to focus their limited resources accordingly. These general depend upon: good governance; and a certain degree of management infrastructure, capable of developing implementing and enforcing harvest control rules(Barnes 2018). What is critical is to understand the enabling conditions that affect these efforts.

The consultancy research reports show that nearly all management regimes comprise a smart mix of interventions (Gentner 2018).

**Case Study 1: Investment and RBM (Barnes 2018).**

Investment requires a strong and secure regulatory environment. The introduction of RBM can provide part of this, but needs to be built on the proper institutional foundation. Thus, investment can be a tool to drive the creation of RBM, but only after the proper institutions are in place. If there is excess capacity, or fishing capacity is not distributed fairly across participants in a fishery, then investment can be used to facilitate capacity transfers or removal. In many fisheries, capacity reduction has been done through state funding initiatives (eg European Maritime and Fisheries Fund). The removal or transfer of capacity could be driven by private investment, or combinations of public and private investment. However, this is likely to require some form of return on the initial investment. More specifically, investment requires some form of security in fisheries, typically in the form of secure tenure rights, catch limits and robust monitoring and enforcement capacity. If these conditions do not exist then investors will not be interested in providing investment. The lack of property or security for investment is the main reason why capital input into fisheries has mainly taken the form of grants and so few debt/equity or PRI investments have gone into emerging market fisheries projects. This speaks directly to the need for instrument mixes that contain the correct, or compatible, instrument combinations to reach the goal of privately financed capacity reductions.

In 2014, an ISSF-led expert workshop on capacity transfer explored the conditions for a successful investment environment (ISSF 2014). Whilst this was done in the context of evaluating capacity transfer options, the general investment conditions are relevant to any scenario where investment in fisheries is being considered. The various conditions enabling investment included: a conducive political and economic environment; a secure legal framework for investment; cultural/social ties and networks; economic conditions/production inputs; availability of fish; market accessibility, trade agreements and partnership; entrepreneurship; willingness to invest and risk; availability of finance; voluntary and market-based transfers/investments.

The point here is that to provide a successful smart mix of interventions that will utilize private investment requires a sequence of other interventions to be successful.

# Principle 2. Calibrate interventions towards points of least resistance, lowest cost and maximum impact

Interventions can be prescriptive (setting the rules of the game) and coercive (ensuring the rule are followed). Not all interventions will have the same impact. As a general rule, least interventionist measures should be preferred (Gunningham and Sinclair 1999). Regulators have finite resources and capacity so they must target interventions at points where they will be most effective. Assuming the same outcomes are possible from different kinds of interventions, then least cost, low friction options are generally to be favored – or non-interventionist approaches. This should be combined with a targeting strategy that identifies points of maximum impact.

It’s difficult to disagree that interventions should be low cost, low conflict and targeted. But it should be emphasized that combinations of regulations should not lead to more cost or conflict or become too untargeted; that these principles need to be kept in mind simultaneously. By viewing these three points holistically, the point moves from an absolute statement, which isn’t always possible, to a principle for introducing mixes of interventions for which these three dimensions are not commonly thought about.

Low costs interventions. Regulation can be an expensive (Hahn 1998, Nielsen 2003). All forms of prescriptive intervention through public regulation entail human and capital costs associated with researching, designing and progressing regulation through legislatures (Arnason 2009). Once adopted regulations may have continuing monitoring, compliance and enforcement costs to be borne by the State or other agencies. Highly coercive measures are likely to be expensive because they require administrative resources for monitoring or policing. The cost of intervention will depend upon the level of intervention. Local interventions, targeting a smaller number of actors will generate lower transaction costs than interventions at the global scale. For example, negotiating a global agreement to curtail harmful fishing practices entails higher transaction costs than a regional or sub-regional agreement because of the number of parties and diversity of interests to be accommodated (Libecap 2014).

Low conflict interventions. Less interventionist measures may produce less resistance from participants in tuna fisheries because they do not challenge authority of those actors: individuals, companies or States. In common parlance, ‘no-one likes to be told what to do’. Less interventionist measures may be perceived as more legitimate because they do not infringe individual autonomy. If interventions are less challenging and perceived as more legitimate, this can enable quicker decision-making and response to environmental or market circumstances (Jentoft 2000). This favors interventions that are designed through collaboration or engagement with stakeholders; bottom-up design. Also, low-level intervention forms of regulation allow a scaling up of measures in the face of non-compliance. Cast Study 2 details the use of a rapid assessment tool, the Fishery Performance Indicators (FPI), that while not specifically a stakeholder engagement tool, can be utilized in that fashion in addition to collecting triple bottomline baselines in individual fisheries.

**Case Study 2: Interventions and Fishery Information and Performance indicators (Gentner et al. 2018a).**

An intervention strategy is fundamentally underpinned by research and information about the state of the resource, the actors and institutions, including market and consumer expectations. Enhancing information can be regarded as a low level intervention and a precursor to stronger and target interventions.

Fishery researchers and management professionals have developed toolkits to rapidly assess the generation of ecological, economic and community wealth from fisheries, and to identify the management structures, governance methods, and regulatory instruments that promote successful wealth generation. The Fishery Performance Indicators (FPIs) are designed to capture how fishery resources are contributing to the wealth of communities that depend on them, and to document benchmark factors that support wealth generation. Both recreational and commercial sectors can be captured using this rapid assessment tool (Anderson et al. 2015).

The FPIs include over 60 measures to assess wealth accumulation on multiple dimensions of stock, harvest industry performance, and post-harvest industry performance; and over 50 measures of enabling factors—including management and governance—to associate with variation in wealth outcomes. Each measure is scored—accurately, but with low precision—on a one-to-five scale using data where possible, but relying primarily on non-quantitative factors that can be scored by experts in any fishery or fishery sector. This feature makes it particularly well suited to applications in data-poor countries or industry sectors.

When FPIs are used as the first stage of a larger more holistic fishery development project design, as used in the Caribbean OPP project, they can become the platform for data collection, financial modeling, stakeholder engagement and, ultimately the design of the entire intervention package being put forward for investment in Grenada and perhaps the Dominican Republic. Gentner et al. (2018a) details this entire process, from FPI to completed business case, that show that the whole can be greater than the sum of the parts when these three items, cost, conflict and targeting, are taken holistically using an established and structured rapid assessment tool such as the FPIs.

Targeted interventions. Tuna fishing is a global industry, operating within a global governance framework with variations at regional and national levels. The governance structures cover all elements of the supply chain from ‘hook to plate’. This encompasses pre-catch management, harvesting, landing, processing, supply chains, marketing and consumer protection. Our research demonstrates that there are optimum points of intervention in this process (See Case Study 3 on targeting key actors).

**Case Study 3: The Role of Key Actors in the Value Chain (Bailey et al. 2016).**

A study by Bailey et al (2016) investigates the influence of key actors in the value chain for tuna in South East Asia in order to identify engagement points for fishery interventions. Certification schemes are intended to contribute to sustainable development by establishing trading conditions that are transparent and equitable. This requires improved market access and strengthened producer organizations. In South East Asia ‘middlemen‘ play a key role in fish trading and providing fishers with access to capital, infrastructure and other services. This may result in market benefits not accruing to primary producers who engage in more sustainable practice, thereby not passing price incentives from the market down to the harvester. Research interviews and analysis was conducted in a Fair Trade USA fishery scheme operating for handline-caught yellowfin tuna from Molucca in Indonesia. The research shows that middlemen contribute but also control the full range of assets required to enable fishers to fulfil their value chain functions. The introduction of certification scheme has facilitated a reorganization of value chain structure in the fishery, and has also changed fishermen’s perceptions of the resource and the market. The opportunities and challenges for scheme to be force for positive change still depends on fishermen/middlemen dynamics being considered.

This is an example of looking at multiple aspects of a project holistically to reduce cost, reduce conflict and target interventions. If the middle man connection had been ignored, it is unlikely that the certification scheme would have been successful as the incentive would not have been passed back to the consumer.

Levels of compliance will vary between different sectors of the fishing industry within the fishing sector, and even within the same sector (Sutinen et al 1990; Hatcher et al 2000). There may be sectors that lag behind, refuse to comply, or remain indifferent to interventions for social, cultural, economic, or political reasons. As such interventions may be have to be selectively targeted. This in turn may determine the choice of intervention(s). The potential points of intervention are illustrated below in Figure 2.

Figure 2 is a schematic of how interventions, top, interact with international legal frameworks, the links in the supply chain and property rights within ABNJ fisheries. The rights conveyed post-harvest lend the security necessary to pass incentives to the actors in the supply chains to impact behavior. Finance, investment and capacity building work up from the bottom of this schematic through the

Figure 2. Overview of ABNJ Fisheries Value Chains as they Relate to Regulatory Frameworks and Intervention Nodes.



various entities and organizations to finance these interventions. Each node in this schematic is a potential entry point for developing the smart mix of incentives and regulation to reform the management of ABNJ fisheries. The job of initial assessment and project development is to identify the deficiencies in providing the triple bottom line outcomes to target interventions.

A major finding from the technical report by Gentner (2018) is that balancing these three sub-principles is the key to long term success. At heart, looking at this principle holistically is akin to not letting the perfect be the enemy of the good. Projects need to be approach holistically and from the bottom upwards, focusing on these principles from the bottom to the top in all the dimensions examined for this report (Gentner et al. 2018a). The PNA VDS is a perfect example of this in practice. The first best right would have been a catch right assigned to individual vessels. However the right was designed as an access right assigned to member countries for two reasons. One, the monitoring, control and surveillance burden of a catch right was viewed as too expensive and perhaps completely unobtainable, and, two, the countries wanted to retain ownership of the rights so that the rents that are being realized would accrue to the member countries and not the vessel fishing the quota. Contrary to this example, the vessel hold capacity tradeable quotas are an example of the best intentions not working as intended because these three principles were not adhered to in the design phase (Gentner 2018).

# Principle 3. Sequence or scale interventions as necessary to achieve the goals of fisheries management

The next strategic principle is to adopt a scaled or sequenced approach to interventions (Gunningham and Sinclair 2017;van Gossum et al 2010). Sequencing may form part of a program of reform and part of a general regulatory strategy. A pathway to reform should identify a series of steps to be taken to achieve an outcome. This usually begins with an assessment of the current position, mapping of stakeholders and training and educational activities before implementation stages. The design of interventions is to suit context and needs, but is often adaptive in practice. (See Case Study 4 below)

As part of regulatory strategy, scaled interventions start with voluntary/cooperative measures, before becoming progressively more punitive or coercive. Up-scaling could be internal to an instrument (eg increasing level of up of fines for infringements) or by introducing new, more coercive measures (eg sanctions for failing to switch on remote observation systems or obscuring their use). Sequenced interventions identify a range of alternative interventions (sometimes by different actors) that can be used alone or in combination in order to encourage compliance. They can be at the same or different scales. Scaled responses work more effectively in domestic fisheries management regimes where the State has singular authority to take coercive measures. Sequenced responses are better suited at regional or international levels. Here there is no supra-national authority capable of securing compliance by sovereign and equal States (Barnes 2018).

The design and availability of sequenced interventions can positively influence cooperation and compliance at earlier or lower stages (Guzman 2002; Nielsen 2003). For example, the threat of serious interventions (regulatory controls, sanctions) may encourage actors to design and comply with self-regulatory measures. To be effective the scaling or sequencing of interventions must be signaled to industry. Principles, tools and techniques of good fisheries management are located in non-legally binding instruments, rather than binding agreements. This can be a step towards consolidating stronger governance frameworks. As regards compliance, it is common for States to prioritize and pursue diplomatic settlements in order to avoid compulsory third party dispute settlement.

In some circumstances, scaling may not be appropriate – e.g. responding to crises Khan et al 2018). Here the urgency of the situation may require quick, comprehensive and unequivocal action. This normally requires regulatory intervention (eg emergency moratorium on fishing following a stock collapse)

Interventions need not be limited to restrictive or punitive measures. They can accommodate positive interventions that can facilitate compliance (Hanich et al 2008). For example, capacity-building measures to improve skills (Hanich et al 2008). Or financial assistance to stimulate new practices (Encourage Capital 2016).

Interventions will change attitudes of stakeholders and institutions over time (Cunninham et 2009). As part of an adaptive approach, interventions may be scaled up or down or restructured over time as patterns of non-compliance drop (Hilborn and Sibert 2009). For example, initial efforts to address IUU fishing through non-binding instruments have evolved into binding instruments because levels of IUU fishing remained high.

**Case Study 4: Development of the Purse Seine Vessel Day Scheme under the PNA (Gentner 2018).**

The implementation of rights-based management is often the result of a path or progression from completely open access to regulated open access to limited entry and finally to right creation. The PNA and the vessel day scheme are a clear example of this. It started with the adoption of the Nauru Agreement in 1982 to organize the management of fishery resources of contracting States EEZs. This agreement established the PNA for the Cooperation in the Management of Fisheries of Common Interest. The main objective of this agreement was to give coastal state preference over access to resources, require/enhance development of domestic fisheries, ports and infrastructure and provide for local employment. The Palau Arrangement came out of concerns that yellowfin tuna stocks were being overexploited and measures should be formulated to reduce harvests. The agreement capped vessel numbers initially at 164 and increased those numbers to 205 in 1993 and came into force in 1995. However simply limiting entry did not improve the value of access fees. Limited entry did not create competition and hence high fees, because the entry cap was set too high and the limited entry permits were given to the vessels and not PNA members. There was a slight increase in fees, but the increase stalled out at between 5%-6% of landed value.

Before giving the Palau agreement much time to work, the Federated States of Micronesia Arrangement (FSMA) was created. The FSMA followed in 1995 and discounted access licenses and reciprocal access if the vessel would use local labor, buy local provisions and offload locally (Havice 2010). However, the FSMA simply increased the license numbers without removing other licenses so capacity increased. Unfortunately, the FSMA did not reach its goals of improving local economic conditions because there was a general lack of transparency and few development opportunities (Yeeting et al. 2016).

The limited entry conveyed rights to the flag states, which guaranteed individual fleets a set number of licenses (Havice 2013). This functionally eliminated competition for access between fleets. By preventing boats from entering and competing for access, it set the stage for any benefits to accrue to the flag state that held the licenses instead of the coastal state. As a result, limited entry did not improve access fee revenue.

Additionally, neither agreement had any positive impact on stocks. While the PA limited the number of boats, it did not address capacity and license holders began to increase their vessel size creating effort creep (Yeeting et al. 2016). Also, PNA countries were allowed to license new vessels within the cap on vessels, increasing capacity. Capacity under the vessel cap also increased through the use of geo-referenced FADs. Catches continued to increase, albeit more slowly (Havice 2013, Yeeting et al 2016). By 2000, the goals listed above were still not being met (Yeeting et al. 2016).

The Vessel Day Scheme (VDS) grew out of the failure of these previous agreements to reduce pressure on the stock and improve local economic conditions through increased access fees and local infrastructure development. The PNA decided to cap total effort, eliminate limited entry and create a transferable effort program (Squires et al 2013). It was designed to generate a real limit on fishing days thereby creating a demand for days and competition among users for those days (Yeeting et al 2016). It was hoped it would drive up access prices. The VDS eliminated limited entry and allows for new entrants as long as those new entrants can secure fishing days. The primary reason an effort quota was chosen over a catch quota was to make monitoring easier as it is easier to monitor location and fishing time than it is to monitor harvests from DWFs that land their fish at ports outside of the region (Havice 2010, Yeeting et al. 2016). Initially the PNA had planned to ratchet down effort through time to reduce harvests to sustainable levels. The PNA were not against tradable catch quotas, but knew the MCS infrastructure to monitor catches would be far more challenging (Havice 2013).

Another interesting motivating factor developed by Havice (2013) was a desire to maintain control of fisheries management in the face of the newly created WCPFC, which came into force in 2004 (Aranda et al. 2012). Yeeting et al. (2016) also point to a perceived erosion of state sovereignty as a motivating factor for creating VDS. By developing and defining their regional sovereignty over their tuna, it prevented the WCPFC from usurping control (Dunn et al 2006, Havice 2013). WCPFC recognized the VDS and made it binding at the RFMO level with a legislative instrument that was agreed to by consensus (Shanks 2010).

Implementation followed generally along four phases as identified by Yeeting et al. (2016). 2007-2010 marked the first phase. It was ratified in 2007 but many design elements were still being worked out. It took three years to hammer out the allocation strategy alone (Shanks 2010). The second phase started in 2011 with full implementation. There now were hard limits on Party Allowable Effort (PAE). 2012 marks the third phase which can be characterized by full adoption by all parties. All members had agreed to a benchmark price for days, ensuring that access fees would increase. The fourth and final phase, which is still ongoing, began with a commitment to trade days across members. They also agreed to increase flexibility to more efficiently allocate effort and agreed to work on staying within the Total Allowable Effort (TAE).

Performance in brief:

* Access fees up from 6% of landed value to 14%
* Access fees up 280%
* Earning $3,689/day more than pre-VDS
* Vessel owner revenues up by as much as 56%
* Still some issues on the stock side and exclusivity side

# Principle 4. Empower participants best able to act as surrogate regulator

This principle seeks to empower the right mix of decision-makers to ensure sure that the decision-making authority rests in the right place (Gunningham and Sinclair 1999; Boström 2015). The State (through its legislature or fisheries administration) is normally is best positioned to initiate interventions. Yet it is not the only actor capable of influencing or initiating change in the management of fisheries. Other actors can influence and improve fisheries management. These are referred to as surrogate regulators (Hatanaka and Busch 2008). This includes other States, companies (using self-regulation and market based measures), non-governmental organizations, consumer groups, industry interest groups and combinations of actors.

Sometimes surrogate regulation occurs spontaneously, for example the determination of fishing practice within a family of community based organizations. However, where specific regulatory outcomes are desired, such as changing allocations of fishing rights or removing convenient but harmful fishing gear, this is unlikely to happen naturally (Gunningham and Rees 1997).

There are two ways to empower surrogate regulators. First, non-State actors can be empowered to act through delegated legal power (Gunningham 2009). An example of this might be the legal authority of an industry group to decide how fishing quotas are allocated among its members. This occurs in many fisheries, where ‘producer organizations’ manage commercial fishing opportunities of the members (Hatcher 1997). Other examples of delegating legal power include allowing third parties to report IUU activities for action in legal proceedings and allowing private parties to provide capacity building through training and support services through the use of different vehicles such as joint ventures (Case Study 7 and 8)

Second, non-State regulators can be designed into management regimes by having their capacity to act or influence behavior recognized as a factor in a regulatory process (Bush and Oosterveer 2015). This can be done in varying degrees. For example, at a minimal level the provision of adequate information can stimulate responsive action (self regulation) from an industry (See case Study 5). This include the setting of standards for any number of things including sanitation and data collection/information systems. Industry or NGO led FIPs and certifications are another example of designing empowerment into interventions. Certifications in tuna fisheries often start with a fishery improvement plan (FIP). FIPs are often owned by non-State regulators who apply pressure to the State, supply chain actors and harvesters to achieve management goals that will allow certification. It is in this way that bottom-up, FIP to certification interventions empower the right mix of non-State and State actors to achieve a conservation goal that also improves incomes.

FIPs and certifications can be used to determine risks and liabilities, and so feed into commercial initiatives (eg insurance or investment) (Bush et al 2017). Information mechanisms can be intensified. For example, a fisheries management regime based upon scientific advice can stimulate and accommodate the provision of technical advice from a range of agencies. If the advice is used to determine regulatory parameters (such as the setting of the total catch, or designation of a closed area), information providers can influence regulatory behavior. Another example is the creation of a system of tradable quotas (Havice 2013). Here private parties, through market mechanisms become de facto responsible to determining how quotas are allocated. More intensive third-party input can be stimulated by the provision of funding and support to third parties, or the direct designation of industry groups as self-regulators. Here investment groups can use financial incentives to leverage change in parts of the value chain (See Case 6). As a final example, States can empower surrogate regulators by recognizing the value of codes and guidelines from third parties (eg fisheries good practices guides (FAO Code of Conduct/BSI Code on due diligence on establishing the legal origin of seafood products and marine ingredients – importing and processing Code of Practice).

There is greater scope to directly authorize surrogate regulators at the national or local level of fisheries management that at an international level. National authorities can depend upon legislative processes to establish, empower and monitor subordinate regulators. In contrast, international law limits the ability to hold rights and duties to States. Thus fisheries treaties are concerned with the conduct of States. Non State actors (eg fishing vessels, fishers) are merely the targets of regulation. Private persons, NGOs and other non-State actors only enjoy limited rights and duties in exceptional circumstances.

Regional fisheries management organization can be viewed as a form of surrogate regulator in the sense that they collectively exercise/coordinate the original legal authority of members to manage fishing activities of their flag ships. That is, the direct power to regulate resides only with the States. The power of an RFMO, or sub-regional fisheries arrangements such as the PNA, is limited to that authority granted by the founding member States in its constituent treaty. As a result, RFMOs have very little ability to regulate directly, beyond setting the allocation of fish stocks or, in some cases, effort or capacity caps. Once those goals are set, it is up to States, to actually formulate direct measures. States can then empower non-State actors to act as surrogate regulators, but that is at the discretion of the state. At the international level, surrogate regulators are best accommodated through indirect means, acting through the State process or through industry initiatives enabled by the State.

There are three reasons why empowering surrogate actors is important in fisheries management. First, empowering stakeholders in the regulatory process may legitimize the regulation and encourage compliance with it. For example, fishers may be more willing to accept gear restrictions or rights that they have helped design (Pomeroy 1995). Second, surrogate regulators may be able to reach actors that the State cannot, either because it is unaware of the identity of actors or they are simply too diffuse to target through regulation (McClanahan 2009). For example, subsistence fisheries. Third, State resources are limited, even in wealthy States. As such regulatory efforts must be carefully targeted. By empowering surrogate regulators, the regulatory reach of the State is enhanced. This may allow the State to target limited resources on critical issues upon which there is no alternative to public regulation. Finally, some private actors may be far more potent than States. For example, a lending agency that imposes terms on its loan, or which threatens to foreclose on the loan, may have more immediate and effective control over the conduct of the borrower.

Empowering surrogate regulators does not free the fisheries administration of its responsibilities because intervention may still be required to stimulate or ensure the surrogate regulator acts in accordance with policy rather than commercial or self –interest. For example, a financial agency may require direction or stimulus to impose environmental conditions upon a loan. Or it may require the provision of information to help it assess the conduct of the borrower. It may then require mechanisms to ensure these are imposed when this becomes fiscally superfluous.

**Case Study 5: Fishery Certification Schemes**

Certification schemes are defined as voluntary, non-discriminatory, independent auditing and verification procedures, incorporating reliable data. These often begin with FIPs in tuna fisheries which are voluntary assessments of fishery performance and voluntary pledges to improve performance to reach certification. Often, a FIP alone is enough to grant access to better markets for product and achieve a price premium. The certifier acts as a surrogate regulator in that they assess compliance with regulatory standards in a fishery. This may relieve burdens on fisheries administration by using market-based incentives to secure compliance with regulatory standards. A successful certification process results in an eco-label on a product which communicates the quality of the product to the consumer, which may add a premium to the product or allow access to a restricted market. Thus market benefits are used to leverage improvements in sustainable fishing practices.

There is variability in the performance of certification. Some research shows positive impacts on the management and conduct of fishing. Also, certification can operate at the level of a fishery not just a specific stock. This means it can encompass a wider assessment of fishing practices, and influence the governance of not just target species. Other research shows certification favors larger scale fishing operations in developed States over small-scale fisheries in developing States. High certification costs may deter small-scale fisheries. This may exclude such fisheries from the benefits of certification, which in turn can reduce the opportunities to access new markets or secure investment. It is generally agreed that the benefits of certification are highly contextual.

Certification schemes are linked to other fisheries management tools. For example, fisheries using catch share schemes (a form of RBM) have been more likely to secure high certification scores (Parks et al. 2016). Generally, this is due to the fact that RBM needs strong MCS and a hard TAC to be successful.

From a governance point of view, certification operates as a form of quasi-private regulation, raise important concerns. These include the absence of any formal standards and control of certification schemes, the liability of certifiers for their assessments and scope for corruption or bias in the process. Tightening up the control of certifiers and schemes could provide a strong stimulus to such schemes and increase confidence in the results.

**Case Study 6: ISDA Investment Strategy**

Another example of non-State regulators being designed into management regimes by placing restrictions on investment is the ‘ISDA strategy’ for Philippines Tuna fisheries, which advocates funding the provision of VDS to vessels and support for a CDS, which can be used to help eliminate IUU fishing activities. One has to be cautious here since unilateral measures may have limited effect in multilateral fisheries, since fishing effort is subject to multiple jurisdictions and ‘leakage’ via third party access. Another example is the financing of a Nexus scenario, which considers the provision of a ‘fisheries information management system’ (FIMS) to the Philippines and WCPFC. This would enhance management capacity, but alone does not necessarily result in improved fish stocks. It is viewed as a lever or catalyst to regulatory change that would include fishery wide vessel registration system and the setting of maximum catch limits. Whilst such changes could be introduced without investment, the introduction of capital can overcome political or economic barriers to change. Other PPP investments are targeted at the provision of improved supply chain infrastructure, such as less damaging gear, better catch storage, transport and processing facilities, and measures to cultivate brand and product value (marketing).

Another example is the partnership between the US and private investors: In 2016, Althelia Ecosphere and the US Agency for International Development (USAID) signed a risk sharing agreement under USAIDS Development Credit Authority, which will assist the newly launched Althelia Sustainable Ocean Fund to provide impact financing to ocean projects in developing countries. The initiative is intended to catalyze investments in sound and responsible fishing and ocean practices

**Case Study 7: PNA/Pacifical Joint Venture (Gentner 2018).**

Recognizing the need to end recruitment overfishing of bigeye tuna and yellowfin tuna in the PS fishery over FADs, the PNA felt pressure could be placed on the industry by certifying “clean” skipjack tuna fisheries. Seeing weaknesses in the sustainability claims with pole and line fishing, the PNA moved to certify free school PS sets which protect bigeye and yellowfin tuna juveniles (Yeeting et al. 2016). Approximately 60% of WCPO landings are from free school sets.

In order to pursue these objectives, the PNA entered into a joint venture in 2010 with the Dutch based Pacifical BV to promote and market MSC skipjack tuna (Yeeting et al. 2016). This was to be a 50/50 joint venture. If fishers were able to verifiably follow the MSC label rules, they would receive a 10% price premium at the landing. Canneries that handled the MSC fish would receive a 3% premium for canning the product and PNA/Pacifical BV would retain a 7% premium, for a total price premium of 14% over non-certified product (Yeeting et al. 2016).

MSC was granted in 2011 and the fishery received chain of custody certification in 2013 (Yeeting et al. 2016). It took two years from certification of the chain of custody to get the product in the marketplace. This can be blamed on three things. First, there was a brand conflict between the Pacifical and Ell Dolphin Safe label that had to be resolved (Yeeting et al. 2016). Second, there was, and still is, a limited supply of certified tuna available. Third, there were supply chain delays in delivering the product to Europe (Yeeting et al. 2016).

It is still too early to assess economic outcomes of this certification. Annual net wholesale value is up to $4.5 billion and the PNA could generate up to 5% of net wholesale value with this label above the value of access fees (Yeeting et al. 2016). Control has been increased in two dimensions. First, the certification reinforces existing state based MCS such as 100% observer coverage. The observer coverage allows the separation of FAD free catches which the entire certification hinges upon. This additional coverage is expected to have spillover effects for the overall VDS MCS (Yeeting et al. 2016). Second, the certification program has increased transparency on where, when and how a fish is caught and processed, which was one of the original goals of the Federated States of Micronesia Arrangement (Yeeting et al. 2016). al. 2016).

**Case Study 8: Australian/Japanese joint venture in the bluefin tuna fishery (Gentner 2018).**

Another example of using joint ventures to provide training that empowers harvesters to improve their harvest technology was a joint venture started in 1989-90, under which the Japanese would train the Australian longliners and provide payment for research purposes ($500,000 over three years). This facilitated the transfer of farming technology to Australian companies. The RBM had created an institutional structure for having the joint venture agreement. In 1995, the joint venture catch was diminished, which caused the value of the Australian fishery to fall by nearly 50% (from $86.3 million in 1994-95 to $47.5 million in 1995-6) (Campbell et al. 2000). By the end of 1996, the joint venture was terminated.

Principle 5: Maximize opportunities for net gain outcomes

Any regulatory interventions should stimulate or create opportunities for net gain outcomes (Gunningham and Sinclair 1999). While win/win is an over-used statement that generally can’t be achieved often, searching instead for balancing the gains against the losses is the heart of this principle. On the one hand, we have bounded rationality, and, on the other hand, the social conditions that enable such rationalities to be exerted. It is about structuring individual decision making, or (in social science terms) enabling individuals to act. That goes beyond win/win.

Interventions should stimulate the ‘right’ choices by fishermen (Bladon et 2016). Interventions should incorporate the social or relational conditions that enable fishers to make decisions producing triple bottom-line outcomes. At one level, this may be simply about creating full awareness of the costs and benefits of different regulatory outcomes, where some ‘wins’ are not known and counted. Incentives to go beyond basic environmental standards may enhance corporate branding and position, open up new markets, improving product quality, and fostering positive consumer relationships. They may also result in the removal or reduction of the risk of legal liabilities. Further, creating opportunities to exceed basic standards might stimulate new technologies and opportunities. However, some of these interventions come with near term costs and, to be successful, losers must be compensated by winners.

Most studies only engage single tools, regulations or mechanisms when looking at affecting change through incentive-based interventions (ITQs, TURFs, or certification). These are all presumed to work through the bounded rationality of individual actors. But this principle stands to make the point that when multiple instruments are in play we need to understand the interaction between these rationalities (Muradian 2013). Are they the same for each instrument or not? And, returning to structure, what are the social conditions/relations that enable or hinder individuals to respond to these multiple instruments in a way that produces the desired outcomes?

Even if the benefits are known by participants in a fishery or supply chain, the state of the domestic, regional regulatory environments may fail to incentivize firms or individuals to adapt their fishing practices to improve environmental impacts or sustainability. This may be in part due to the motives of fishers. Here obstacles to change include: bounded rationality (limited knowledge or ability to formulate a pathway to change behavior) or a focus on short-term rather than long-term benefits. It may also be due to limitations in the structure of the fisheries management system. For example, there may be institutional barriers or choke points which prevent private actors taking action. For example in fisheries, disagreements about benefit distribution or vetoes may impede the adoption of rights-based entitlements. In both instances, the market alone cannot deliver changes. This means regulators have a role to play in removing regulatory obstacles, and stimulating improved performance when bounded rationality exists or the short-term costs outweigh longer terms gains.

Interventions may take many forms; education, training, capacity building, legal reforms or other paths. Legal reform introduces formally binding changes in the institutional landscape right now. The other interventions, generally conducted by non-State actors like NGOs, industry groups or RFMOs, either push States toward legal reforms or towards empowering actors to be surrogate regulators. A challenge is to assess the behavioural impacts of any intervention that isn’t a direct legal reform because it is difficult to trace the impact of the indirect interventions. Adding additional complexity, each type of intervention impacts different actors in different ways. For example, some fisher may respond to profit related incentives, whereas other may respond to social or community benefits.

Consistent with Principles 2 and 3, initial low impact interventions should focus on improving information within the fisheries management system. Data on individual performance can help stimulate conformity with social norms. Case Study 9 details some interventions conducted with low impact designed to improve information or raise capacity.

**Case Study 9: Low Impact Interventions and Sequencing**

NGOs participate in low impact interventions all the time to increase information and build capacity in the RFMO and ABNJ space. NGOs often hold workshops focused on particular capacity building or high impact legal reforms in order to educate and organize stakeholders around larger reforms. ISSF is an NGO solely focused on providing these low impact interventions in the ABNJ space and, more specifically in the tropical tuna space.

WWF has been involved in considerable pre-implementation work for RBM in the southwest Indian Ocean (SWIO) under the aegis of the Coastal East Africa Global Initiative (CEAI). The CEAI was initiated in 2010 with the goal was to build political coalitions around justifying tuna management reforms, raising awareness of triple bottom line benefits of improved engagement in tuna governance, lobbying SWIO governments, the African Union, SWIO Fisheries Commission and regional economic communities and facilitate a process for SWIO states to agree on a collective approach to engage in tuna management reforms (IOTC 2015). The original focus was on the countries of Kenya, Tanzania and Mozambique but that scope was expanded to include Seychelles, Comoros, Madagascar and Mauritius. Suggestions to encourage the development of RBM included developing pilots to show livelihood improvements, build capacity to capture EEZ rents, support better fishery access agreements and set allocations that recognize aspirations.

These efforts have begun to pay off in the region as Mozambique and the Maldives joined the IOTC. Additionally, SWIO countries have been involved in making management proposals. Seychelles and Mozambique have adopted FAO port state measures as part of national efforts to end IUU. Kenya, Tanzania and Mozambique have adopted the Maputo Declaration on Regional Minimum Terms and Conditions. Finally Kenya, Tanzania, Mozambique and Madagascar have adopted and began to implement of National Tuna Management and Development Strategies (IOTC 2015). WWFs work has also led to a focus on the precautionary approach using reference points and moving forward with allocation as part of an RBM process

Through this engagement in pre-implementation work, NGOs have learned a lot. Adequate socio-economic advocacy is important to secure regional engagement. Pre-implementation discussions need to include the incentives and benefits that will come from improved management. It is important to engage with the relevant institutions (Gentner et al. 2018a). Regional processes require a long-term commitment. That commitment can include building internal, coastal state capacity. If the region is heterogeneous, it is important to build the platform on common goals and to build trust. Sub-regional RFMOs can influence the process upwards. It means engaging and synergize with regional economic communities in the region. Empowering civil society organizations and the private sector is a necessary but not sufficient condition to ensure civil society engagements in offshore fishery reforms. Building a comprehensive approach to fisheries reform requires addressing the entire range of tunas, must include all the different sub-sectors and supply chain groups while recognizing that the artisanal sector presents complex issues for RBM institution (IOTC 2015).

A similar process was followed, albeit truncated in time, for the Caribbean OPP project. Through stakeholder engagement by all project partners, Grenada was convinced to join ICCAT. Additionally, a small investment was made in electronic landing data collection terminals to better meet their data responsibilities under ICCAT. Those terminals will also be used to foster traceability and improved market access as the business case in Grenada moves forward (Gentner et al. 2018).

As part of a process of sequenced interventions (Gunningham and Sinclair 1999), information flows could be managed proactively. This could intensify to include regulators giving product or process demonstrations, running trials and simulations, and disseminating best practice and successful case studies (Case Study 9).

Moving beyond informational strategies, fisheries administrations or surrogate regulators can encourage fishers to make improvements. This means making active and targeted interventions using information tools, such as FPIs (Anderson et al 2015) in order to change behavior. This may include making loans, granting subsidies, or the increasing the availability of accounting/audit services. Positivie Subsidies are a good vehicle to avert market and financial risks and promote innovation (eg subsidy of research and development costs) (Young 2009).

Regulators can design cost and accounting systems that accommodate a fuller range of environmental costs. If business is aware of the costs and benefits it can be encouraged to adapt its behavior (Arnason et al 2000). The administrative costs and benefits in a fisheries management system (eg preferential allocation of quotas, differential level of license fees and quota prices) could be adapted to reward fishers that go beyond minimal standards (eg inclusion of all catch against landing quota). Thus a fisher using certain gear could receive licenses at reduced rates. Managers can motivate actors onto a green track.

Further increasing the level of intervention, States or fisheries managers can set targets or goals outcome that capture the net positive outcome, which private actors must then achieve. For example, this might specify that a fishery must achieve MSC certification, either as a general threshold for the domestic harvest sector, or as condition for the entry of products into its market Wessels et al 2001).

Rights-based measures are a form of incentive towards win-win outcomes. By vesting fishers with secure harvesting rights, they can enjoy a secure and more direct flow of benefits from their fishing activities (ISSF 2011). At the individual level, secure rights can encourage fishers to fish at lower costs, increase the value of landings through selective fishing or catch handling, or change product from (from frozen or fresh catch). In order to prevent high grading and discards, other controls may be required. Within rights-based management schemes, side payments become very important to balance the benefits against the costs (Libecap 1989). Side payments then are the Coasian bargain between the winners and the losers to keep the losers at the same level of benefits so they continue to participate in the coalition and the work towards sustainability. Even outside the use of RBM, side payment or benefit redistribution through Coasian bargaining can be essential to interventions achieving triple bottom line outcomes.

In every case study detailed in the technical report by Gentner (Gentner 2018), all interventions detailed grew out of a State led-initiative, but generally non-State actors were involved in developing the benefits of the intervention and promoting that the benefits outweighed the costs to all stakeholders. This is a point the GloTT has focused on since its inception: putting the benefits, net of cost, front and center in any implementation strategy. Another point worth mentioning is the value of industry testimonials in promoting the benefits of reform and ending the race to fish, particularly evidences in US catch share development. That is essentially the Environmental Defense Fund strategy in the US. They regularly pay the travel for wealthy quota holders to every region where they want to institute a new catch share and/or pay the travel for fishers in the regions where an intervention is desired to see the success and wealth of the industry under catch shares (Gentner 2018).

# Principle 6: Bottom-up Matters; Consider and harness the responsiveness of stakeholders

Fisheries regulation is targeted at fishers and other actors within the catch sector and seafood supply chain (Grafton et al 2010). This means regulators must take account of, and respond to, the cultures and understandings that operate within the sector (Baldwin and Black 2001). For example, fishers are often attached to historical practices or favor localized control. They may resent bureaucratic or technical management processes, or question scientific expertise. Regulation that accounts for and adapts to this is described as ‘sensitive regulation’. The attitude of regulates is a key variable in determining whether or not intended behavioral changes will flow from specific regulatory interventions.

Bringing this back to the overarching smart mixes of interventions framework, these mixes have to work across different jurisdictions in transboundary fisheries, so understanding the institutional and social context that enables or constrains engagement by fishers in both public and private forms of regulation are vitally necessary for implementation (Barnes 2019). This report began by outlining the complexity and heterogeneity of ABNJ fisheries. This principle seeks to address that by working from the bottom up across all sectors. If these constraints are understood we can better design and implement mixes that will be more clearly targeted and effective in setting a mix of market and legal incentives for changing fishing behavior.

At the international level, this means being sensitive to the motivations and capacity of States involved in the tuna fishery. The full range of motivations and drivers cannot be captured in this paper, but a few key elements are addressed here. Actors may be conditioned by particular cultures and values. For example, fairness of allocation of fishing opportunities may be of tantamount importance for SIDS, while historical practices or status quo bias may rule the day at the RFMO (Parris and Lee 2010). These may make it more difficult to change or challenge these attitudes. In many SIDs, fisheries act as the employer of last result and therefore capacity reductions may be antithetical to the organic acts that motivate their fisheries management. Similarly, for processing heavy industries like tuna canning. Processing capacity represents massive stranded capital and industries and government may not support actions that will reduce the flow of product to those plants. In the exploration of the use of RBM, many States do not have a history of capitalism and participating in markets, increasing the transactions costs for any scheme that involves tradability. Food security for some nations may have a higher priority than reforming fisheries management, even though the two are inextricably linked in the long run. That different regions, States and localities have different enabling conditions, include state of socio-economic development, political systems and cultures (See Case Study 10 and 11).

Joseph et al. (2010) identify a dichotomy between the haves and have not’s that exacerbates management issues in ABNJ fisheries. They label the DWFS as the “haves” and the coastal states the “have not’s.” The DWFS generally arrive in a region with the most fishing capacity first and the RFMOs first action is often a total quota, creating the race to fish. Most allocations within RFMOs are set using catch history which favors the haves (Gentner 2016). The haves, with all the capacity, are winning that race to fish still. The haves prefer the common pool regime because they have the capacity advantage to win the race to fish. The coastal states, on the other hand, have much less capacity. The conflict between these two groups has made agreement on conservation impossible in many RFMOs.

At the national or local level, the focus moves to private actors: individual fishers, commercial and industry groups, NGOs and consumers. A range of goals motivates actors in the fishing industry:

* Market factors: pursuit of profits, consolidation of market position, and brand reputation;
* Reputation: congruence with industry norms, standing amongst peers and influence
* Personal factors: familiarity with regulatory regimes and approaches, morality or ethical standards, balance of community/self interests, skills training and enterprise.
* Specific cultural norms and practices within the fishing community

Regulatees (from the global to local level) may respond to regulation in different ways. These can be categorized in five ways: acquiescence, compromise, manipulation (game-playing), avoidance or defiance. Stakeholders may respond to different incentives: threats or rewards (Honneland 2001).

At the harvest stage, there are particular challenges with detection of conduct and compliance with rules. The marine spaces to be covered are extensive and distant from shore. Inspections at sea are expensive. Vessels are mobile and may operate across different jurisdictions. There are multiple and diffuse fishing concerns. There are multiple landing points for catch. As such there may be many ways to avoid detection. Most detection and compliance strategies depend upon a high degree of self-reporting and self-compliance. Compliance with rules will depend upon, in part, upon the attitude and culture of regulatees. For example, regulations that expect unnatural conduct (discarding fish, using less efficient gear) may undermine self-regulation and give way to subversive conduct (landing catch under the radar).

**Case Study 10: Bay of Bengal and the Caste System.**

A particular feature of fisheries in the Bay of Bengal region is the influence of India’s caste structure, which general means that only certain sections of society participate in fishing. As a result, this can act as a de facto form limited entry. It could also be viewed as a form of community based structure for the fishery. However, this position is gradually changing. At the national level, the fishery management regime is very under-developed. Putting in place strong regulatory and governance arrangements is a key development goal. In principle this would be easier to achieve before the fisheries are and interest groups emerge which may be resistant to regulatory intervention (Barnes 2018).

**Case Study 11: Taking Advantage of Existing Rights Structures (Gentner 2016).**

The Dominican Republic commercial pelagic fishery uses a large number of inexpensive FADs scattered in an area of high recreational billfish effort in the most popular recreational billfish destination in the Caribbean. One of the goals of the OPP project in the Caribbean was to reduce billfish harvest in the commercial sector and rationalize FAD use through a Coasian bargain between the two sectors. Early in the project, a TURF type right was proposed with FADs being the property right. The right is considerably weaker as excludability can only be enforced on the FAD itself. As soon as the fish swims off that FAD, it is subject to caught on other FADs or in the open ocean. As a result, a TURF on FADs is unlikely to have a positive stock impact unless all FADs in the region are protected, core areas are included in the FAD management area and there is no billfish harvest allowed off FAD, which is initially unlikely given the level of enabling conditions in the country. However, a TURFs assigned to FADs would be best suited for reducing congestion and conflict that happens between commercial fishermen and between commercial and recreational fishermen. It may be possible to improve stock conditions as well if side payments or FAD improvements can be utilized to convince FAD fishermen to use circle hooks when using bait and/or to release all billfish alive.

This approach is attractive for a number of reasons. First, congestion and conflict is very high in some regions and that congestion and conflict is rent reducing. Second, it is unlikely that a region wide solution can be orchestrated in the very short time frame and RFMO level individual or community rights are extremely difficult, if not impossible for legal reasons, to adopt at this time.

Pertinent to this principle, TURFs on FADs are being considered because rights to FADs already exists and trades are occurring between the recreational sector and the commercial sector in this region. It is important to examine existing rights based structure embodied in current use. For example, recreational anglers will pay cash and trade non billfish catch for the exclusive right to fish over FADs over an agreed upon period of time. In other locations, recreational fishermen have built and installed FADs with the understanding from the local community that they have first rights to fish that FAD when they fish but the small scale fishers in the community can utilize the FAD at other times as long as they release all billfish alive. Other payment mechanisms have also emerged for the many billfish tournaments in the region.

Many details have to be worked out and many enabling conditions need to be met before a full program of tradeable rights could be developed. In the near term, however, it has been proposed that the recreational sector contribute to a conservation fund that will advance those enabling conditions, register vessels and FADs and begin the process towards a stronger, more tradeable rights system and compensate commercial fishermen for use of their FADs. While some exchange of money is occurring, it is ad hoc and not transparent. It is also apparent that the payments for FAD use in certain ports has driven and increase in capacity to simply fish for payments. This type of Coasian bargain speaks exactly to many of the principles presented here. In this context it is a good example of building on systems and incentives already in place and using those to move toward adaptive co-management to empower both sectors to be surrogate regulators

# Principle 7: While Advocating for Bottom-Up Design Consider Top-Down Logics and Constraints

Regulators should recognize and respond to the institutional limitations and opportunities that condition both regulators and regulates (Baldwin and Black 2008). This includes the availability of resources, fisheries infrastructure, fishing patterns and allocations of authority. Regulators should also account for different regulatory logics operating within regimes (eg punitive measures, sanctions, restorative practices, or commercial incentives). This principle is concerned with examining the complete intervention plan and examining it for conflict with existing regulations and legal constraints. It also means that interventions should be mindful of unintended consequences and spillover effects (Taylor et al 2013). The goal here is to focus on the umbrella overarching a bottom-up intervention design strategy. Success of a bottom-up strategy at the ABNJ level requires scaling those interventions up across States and ultimately RFMOs. It is important to be aware of the differences in jurisdictions and levels of governance, and accommodate this these in the application of incentive based tools wherever possible. This involves understanding how incentives for compliance are distributed across these different levels of governance and recognizing that different instruments may have impacts at different levels of these overlaid governance structures that need to be accounted for when designing and implementing interventions.

Legal and institutional constraints. The law of the sea is strongly institutionalized (Barnes 2018). Each agreement builds on and supports previous agreements. Treaties are only binding on States parties. They do not as a general rule create rights and duties for non-parties. This means the effectiveness of rules for the high seas depends upon securing maximum agreement among States. The law is strongly integrated, with many rights and duties linked to others. States are careful not to upset existing balances of interests. This means that States are inclined to follow establish practices and rules. The process for change in treaties is slow and difficult, which forces invocation into non-legal approaches.

The high seas are governed by the fundamental principle of freedom of the high seas, which includes fishing. On the high seas, fishing is subject to the exclusive control of the flag States. This is a strong legal (and political) value and it is difficult to modify (Barnes 2018). It treats the oceans as a public or common good. The freedom to fish is conditional, subject to general obligations to cooperate, conserve and manage resources. This limits the capacity of RFMOs governing high seas fisheries to adopt measures, such as RBM. RFMOs and States cannot guarantee the exclusivity that such rights require to function or deliver optimal outcomes. Third States that do not recognize such rights can undermine them by fishing stocks to which the rights pertain.

At the international level, fisheries conservation and management must be done with due regard to the rights and interests of other States,[[1]](#footnote-1) reaffirming the connectivity of issues and regulatory logic of UNCLOS.

The wide management discretion possessed by RFMOs means there is no legal impediment to the adoption of incentive-based tools (Serdy 2010). The only restriction is that the choice of regulatory tool or approach should deliver conservation outcomes. Most RFMOs allocate rights to States, rather than individuals. Case Study 12 looks at the allocation issue relative to the legal and institutional constraints facing allocation decisions. Unless this changes, then further use of incentive based tools will need to be directed by individual States.

Regulatory logics. If instruments with different logics are used they can come into tension with each other, for example RBM entails a higher degree market input. Holders of RBM may then resist command and control measures because they impact upon the value and operation of market forces (Barnes 2009). Most fisheries have a tradition of using command and control regulation.

At the international level, the dominant logic is that law is the product of State consent or consensus (Guzman 2002). As such, there is strong resistance to regulatory frameworks that impose rights and duties automatically, or which empower intergovernmental organizations to make binding decisions. Thus RFMOs operate through consensus based decision-making combined with opt out procedures (McDorman 2005). This means decision-making is invariably based upon compromise and individual States can hold out or free ride on the acts of other States (eg benefit from restrictions in fishing effort) (Kaitala and Munro 1997). Other less dominant logics include: sensitivity to the needs of developing States (eg Article 25 of the UNFSA).

RFMOs possess sufficient authority as is required for them to carry out their functions (Serdy 2010). This will vary according to the function of the RFMO, but could be potentially broad in so far as is necessary to conserve and manage fish stocks. This may extend to obtaining and holding and making of investment agreements with financial institutions.

**Case Study 12: Allocation Issues in International Fisheries**

The impact of institutional structures and regulatory logics can be illustrated by looking at how fishing opportunities are allocated.

International fisheries law has poorly defined and backwards looking approaches to allocation (Barnes 2018). This strongly favors historical fishing activities (Cox 2009, Serdy 2016).As such, it may be difficult to accommodate other socio-economic or conservation considerations, such as credit for conservation or sustainable fishing practices (Bailey et al 2013). The introduction of RBM presents a challenge and opportunity to the allocation of fishing entitlements. RBM can use markets to distribute rights more efficiently. However, they can threaten existing distribution of fishing rights. The ISSF Cordoba Conference concluded that an effective allocation framework is fundamental to the implementation of rights-based management (ISSF 2011). There is a linkage between compliance and enforcement and allocation of fishing opportunities. If allocations are perceived as unfair, then there may be incentives to ignore restrictions or subvert the rules (Nielsen 2003). This means legitimacy (ie fair allocations) needs to be built into a management regimes (ISSF 2011).

Initiatives are underway to develop allocation criteria in some RFMOs, and this may provide an opportunity for pressing for the inclusion of criteria to incentivize sustainable fishing. Participatory rights and allocations are a key lever to incentivize non-Members to adhere to RFMO measures. However, they remain contentious since new members may require reductions in existing allocations and benefits. Also, more concrete allocation criteria would undermine the ability of individual States to negotiate more favorable allocation of fishing entitlements.

There are some general parameters influence allocations under international law but this is a negotiated process, heavily influenced by historic patterns of fishing. Legally, any state with a real interest in a fishery must be able to participate in an RFMO.

The UN Fish Stocks Agreement provides some parameters for participatory rights for States:

* status of stocks and existing levels of fishing;
* respective interests and fishing patterns/practices of existing and new members;
* contributions to conservation and management;
* needs of dependent fishing communities; needs of dependent coastal States;
* interests of developing States in the region.

Historic fishing patterns also dominate national and local allocation of fishing rights. This combination of factors at the institutional level runs counter to a goal of allocations should be ‘transformative’: they should change practices and promote conduct, rather than lock in existing patterns.

# Principle 8: Assess and adapt the regime in light of its effectiveness

Responsive regulation should respond to the regime’s performance (Baldwin and Black 2008). This means monitoring the extent to which regulation performs in light of its goals, and modifies its approach accordingly. It accommodates ‘regulatory learning’ by the regulator. Yet it also assumes the capacity to adapt its approach.

Regulatory approaches should be adaptable to changed circumstances. This may be internal, such as adapting to changed policy, or external, in response to new technology or environmental conditions.

Some aspects of the high seas fisheries governance regime are able to adapt more easily than others (Barnes 2018). UNCLOS contains mechanisms for amendment or modification, but these impose procedurals barriers so stringent that amendment or modification is all but impossible (Boyle 2006). The same is true of the UN FSA. However, UNCLOS, and the UNFSA are sufficiently broad to sustain a wide range of regulatory options, including incentive based tools. (See Case Study 13)

Change to the legal regime is best advanced at regional and local levels. This can be done through the reform of the RFMO constituent instrument. Another option is to establish sub-regional arrangements. This has occurred in the Western Central Pacific with the PNA sub-regional body.

**Case Study 13: Review of UN Fish Stocks Agreement – reflective international law-making**

Although international law can be difficult to formally amend, governance systems provide opportunities to reflect upon and recommend changes in international practices, either through RFMOs or State management regimes. The United Nations Review Conference for UNFSA found that improved were still required in the management of marine capture fisheries (UNGA 2016).[[2]](#footnote-2) Its report called upon States to take measures, consistent with international law, to ensure that only fish caught in accordance with applicable conservation and management measures reach their markets, and to take steps consistent with international and domestic law to require those involved in fish trade cooperate fully to this end. It presented a number of recommendations, including the adoption of market-related measures. These are important because it is one of the main levers of change (Barnes 2018).

If this is to work, then there must be consistency between actions of States and those of RFMOs, and particular attention paid to landing of fish in ports other than the port of the flag State (Roheim 2008). This latter point indicates a potential weak point in securing strong chain of custody measures. These steps require greater use of catch documentations schemes (CDS) and other market related measures (unspecified). To this end, the FAO voluntary guidelines on CDS (FAO 2017a[[3]](#footnote-3)) need implementation and support for initiatives like the International Monitoring, Control and Surveillance Network for Fisheries-related Activities (IMCS Network) enhanced (FAO 2017b)[[4]](#footnote-4)..

These measures cannot readily be introduced through the UNFSA, but can filter down into RFMOs and be adopted either through regional initiatives or national level initiatives (See further Case Study 14)

**Case Study 14: Performance Review of the PNA Vessel Day Scheme (Gentner 2018).**

The evolution of the whole scheme has been a gradual process of incremental changes with the overarching goal of higher rents retained in the local islands and regional sovereignty. However, the regimes have responded to recommendations or insights drawn from external review and have begun making changes based on the results of that review. This review and changes from the review have been a major impetus for the LL VDS program.

#### Performance

This is one of the only interventions discussed in this paper that has undergone a complete independent review (PNA 2015). Additionally, because of its novelty on the global stage, the VDS has been a nearly constant topic of discussion in the fishery management journals. Overall the project has been quite successful and has demonstrated marked success for incentive compatible management. Access fees have gone from less than 6% of landed value to 14% of landed value in a relatively short period of time, raising economic returns dramatically (Yeeting et al. 2016, Havice 2013). This has driven total access fees up by 280% and parties are therefore earning $3,689 more per day for access from a 2006 baseline (Havice 2013). Benchmark prices for access have increased to nearly $8,000/day in 2015 (Yeeting et al. 2016). These increases meet one of the major goals of VDS and have strengthened the resolve of the Parties (Yeeting et al. 2016). Additionally the acceptance of the program by the WCPFC, and the demonstrated success, has increased the PNA’s bargaining power with DWFNs (Yeeting et al. 2016). Vessel owner revenues are up as well; by as much as 56% and vessel owners are earning $11,542 more per day, again from a 2006 baseline (Havice 2013).

VDS has shown that it is possible in the management of highly migratory and transboundary fisheries it is possible to directly strengthen rights and take ownership of the resource. It has demonstrated that exercising these rights allows collective and direct negotiations for access without difficult and slow moving RFMO process or complicated bilateral treaties (Yeeting et al. 2016). Along those same lines, success of the VDS increases the PNA’s leverage over vessels in the FSMA and US Treaties, both of which have been loopholes in the VDS plan in and of themselves (Yeeting et al. 2016).

While the VDS is largely viewed as a success, there have been several criticisms. These criticisms center around several design loopholes and a general inability of the program to improve stock conditions (Yeeting et al. 2016). Regarding the loopholes, there is still great concern about what is locally termed “effort creep” or increasing capacity within the definition of a fishing day (Yeeting et al. 2016 , Havice 2013, PNA 2015). Another effort loophole arose when Tokelau became a party (Havice 2013). They entered and claimed 1000 days. This total was beyond what would otherwise have been arisen under allocation formula applied to other parties. This may be a trade-off to secure participation, but also represents further effort creep. This may encourage other nations to join and may increase effort further.

In 2015, the PNA commissioned a full review of the VDS completed by Ragnar Arnason and Michael Harte (PNA 2015). Extensive recommendations were provided regarding governance, design objectives, allocation mechanisms, participation and management of substitutes, trading arrangements, system integrity, compliance, transparency, TAE and legal instruments. Overall, they suggested separating the broader governance of the PA, NA and FSMA from management of the VDS. Along these same lines, the management of the VDS should be organized much like a corporation with a strong VDS administrator governed by a board of directors (PNA 2015).

The VDS administrator should be given the authority to ensure consistency and uniformity. The board of directors should adopt and implement a clear definition of vessel day that has very few exceptions. The administrator then should have the authority for implementing this new definition. The administrator should also have the authority to develop and operate an efficient market trading mechanism that includes setting benchmark prices, operation of the exchange and the development of a day auction system. The administrator should develop and keep a vessel registry that is real time and includes vessel location, trading information and unused VDS information. Finally, this administrator would develop and implement sanctions for violation of any of these new rules as well as any existing rules (PNA 2015). Regarding compliance, VDS rules should be examined and rewritten to be clear, complete and eliminate loopholes. There should be a clear and transparent process for dealing with violations and a clear definition of penalties that should be strong enough to curb violations. Also, a formal adjudication process should be developed (PNA 2015).

The primary goal of the VDS was to assert control over coastal state tuna resources and maximize the fee revenues for fisheries access. To develop the potential contained in the VDS, the authors created a bioeconomic model to look at the potential rents available in the fishery. They concluded that maximizing fee revenue is a function of the stock size and the days available in the VDS. While there was substantial uncertainty regarding the optimal number of days, they showed that there is room for significant growth in the value captured by fees. Given 2011-2013 operating conditions in the fishery, the maximum daily fee was between $12,000 and $17,000/day generating an annual total maximum revenue of between $370 million to $1.15 billion. However, maximizing the rent recovered left harvesters with very low, 6-10%, profit margins.

To reach maximum fees, the PNA might need to increase fishing days to as many as 67,000 days, however the model as not very sensitive to maximum days between 32,000 and 67,000 days (PNA 2015). It is very likely, however, that if the TAE is raised, more bigeye tuna and yellowfin tuna will be caught unless FADs are simultaneously addressed. The PNA should examine using pricing schemes to address FAD effort, move to a harvest based system or focus on technical solutions to FAD bycatch. If instead, the TAE was reduced enough to improve the bigeye tuna stock, fees would drop 40% from current levels. Others have recommended catch retention requirements and time/area closures for FADs to address the continued bycatch problem (Shanks 2010). The reviewers fully admit that there is much uncertainty in their estimates but the magnitude of the rent potential advocates for developing a permanent research group to examine maximizing this value. That research group should focus on technical studies to improve the selectivity of PS gear, enhance trading and develop a day auction system.

To address these concerns and suggestions, the PNA has instituted both FAD charges and time/area closures for FADs. Currently the FAD closure is four months long (Kumasi 2016). The FAD charge has two objectives. One, the FAD charge is hoped to reduce bigeye tuna overfishing by placing a disincentive on FAD use. It is hoped that this would eliminate the need for total FAD day limits or time/area closures. The second objective is to generate funds to pay for bigeye tuna conservation. Currently the management of the impact of FADs is falling disproportionately on PNA Parties (Kumasi 2016). The FAD charge is levied for each a vessel sets on FADs and is set at $1000 per day on top of the VDS fee. The trial began in January of 2016.

Instead of setting fees through a research committee, the reviewers also suggest encouraging a more robust market for days to develop (PNA 2015). To that end, they suggest that TAE shares be given for a longer duration. Also, transferability should be substantially increased and trades of PAE to other parties should not affect allocations of PAE in future years as it does now. They also suggest that the PNA should examine a move to catch, rather than effort, based shares as it would also open the door to reducing harvests of bigeye tuna and yellowfin tuna while maintaining rents. Another potential solution to the bycatch problems is to include the longline fleet in the VDS system and set fees, or allow the market to set fees, to minimize artificial distortions between fishing methods. Currently, the LL VDS is being implemented as a response to this advice (PNA 2016).

From an exclusivity standpoint, the reviewers and others have suggested improvements including permanent closures of high seas enclaves, or donut holes (Shanks 2010, PNA 2015). The reviewers also see the external competitive fringe as a threat to the value of the VDS and the PNA should expand the coalition or seek their cooperation (PNA 2015).

The reviewers suggest that there are gains to be had with freer trade and advocate making the VDS right more homogeneous so that they can be used across EEZs. They also suggest free trading within the Palau Agreement parties along with developing a framework that facilitates open trading. They feel that fishermen should be allowed to switch their days across EEZs but the transfer of VDS between vessels should continue to be off limits until a better way to account for individual vessel capacity differences can be developed. These trades must be transparent and any changes or trades that impact others must be treated as public information. Trade prices should be reported but treated as confidential information but available to all parties. The administrator should publish an annual report that summarizes trade information in a non-confidential way. This annual report should be reviewable and the administrator and the board should be required to clarify any questions (PNA 2015).

Finally, the reviewers discussed amending legal instruments to improve the VDS. They suggest amending the Palau Agreement or enter into a new integrated legal instrument allowing for a range of appropriate mechanisms to manage effort creep through remedying weaknesses in existing legal documents. Additionally, there may be a need for additional legal backing for the compliance enhancements suggested above. This may mean replacing the existing document or amending the existing legal arrangements (PNA 2015).

# Principle 9: Impact assessment

Regulatory strategies and decisions should be planned (Baldwin, Cave and Lodge 2012). This may involve two elements: some form of cost/benefit analysis of a new regulatory tool (regulatory impact assessment); and the assessment of the impact of a particular decision (eg environmental impact assessment or social impact assessment) (Barnes 2019). Some assessments may be required by law, or are a common feature of institutional practice.

There are obligations to States conduct impact assessments g and other activities on target stock under the UN Fish stocks Agreement (Article 5(d)); WCPFC (Article 5(d)); IOTC (Article XII(4)(b)). These focus on the impact of fishing on fish or related species, rather than wider environmental impact assessments. There is no commitment to conduct impact assessments at a regional level in the Caribbean. These commitments vary in quality, but do not preclude fisheries managers conducting more thorough impact assessments.

Outside of the regulatory process, the growth of investment opportunities will drive other forms of impact assessment because investors will require detailed appraisals of either social outcomes from investment, or financial returns. This will entail assessment of contextual and regulatory changes on fisheries, ie investment risks and returns. It may also drive potential for regulatory reform as a way of securing investment returns. (See Case Studies 15 and 16 below)

Assessments should seek to present data and scenarios that informed the development of incentive based tools. The assessment should be supplemented by data from expert studies. Beyond assessment of current measures, there are three areas of particular concern to impact assessment: impacts of changing market conditions; and new technology.

Market changes: Tuna markets are global, so fluctuations in supply and demand in regional fisheries cannot be assessed in isolation. For example, demand for skipjack tuna is likely to be met by the WCPO since Atlantic stocks are at current limits, and the WCPO seems to have the greatest capacity to expand (World Bank 2016). Global population and demand for protein (inc seafood) is rising, especially in China, India and in developing countries. It is expected that much of this will be met by aquaculture. This could be as a result of high process due to increased demand, or increasing pressure from China for larger allocations of fishing entitlements. The cost of fishing must factor in increased fuel costs, which comprise the largest cost for both purse seine and long line fishing PS and LL (estimated at 25% and 44% respectively) (Conservation International 2015). Fuel costs are expected to increase 100 in real terms by 2040.

Harvesting technology is expected to improve and become more efficient, offsetting some costs associated with fuel. Advances in fisheries monitoring and surveillance (eg VMS, satellite monitoring, surveillance drones, and electronic fishery information systems) should reduce enforcement costs and facilitate improvement management. Improvements in vessel capacity and storage could enhance product quality (World Bank 2016). Increased efficiency, larger vessels and higher dependence on fishing technology will make it more difficult for new fishers to enter the market and compete with existing fleets. Access to technology will require investment. This will come from larger more profitable and possibly other actors in the supply chain (canneries, retailers), or from external investors. There is scope to combine capital flows into the industry with investment-based incentives. The need for investment will drive a move towards greater legal security over fishing rights. There is evidence to show the positive impacts of certification on the management and conduct of fishing.

**Case Study 15: Business Case Studies: Mapping out future development options**

Impact assessment is not limited to regulatory processes, or decision-making on specific projects by public bodies. It also forms an integral part of business planning. This can be integrated into broader policy agendas when new development opportunities are being considered. This is demonstrated through the regional business cases developed as part of the OPP programme.

Generating the benefits of the Caribbean and Eastern Pacific Ocean projects is also a big part of their pilot projects. The above discussion on the PNA VDS external review estimates the benefits of pursuing improvements to the VDS, which are being adopted.

The project is structured in such a way that in a 3 to 4 years period it can achieve the following results:

Result 1.1. Enhanced knowledge and understanding of the socio-economic and ecological value of Billfish resources in the Western Central Atlantic and a clear value proposition for reform of current billfish governance structures.

Result 1.3. Pilot trials established in at least two Caribbean states (countries or overseas territories) to test and validate innovative management and supporting arrangements. Lessons learned will inform regional approaches in developing and adopting the billfish management and conservation plan for the Western Central Atlantic.

Result 4.1. Business plans for pilot investment projects on sustainable management and conservation of billfish in up to two locations in the Caribbean

Using a business case approach disciplines the process of looking at impacts of an intervention in a way that is also beneficial to outside funders. It is a process that will identify the strengths and weaknesses of a particular fishery and how those conditions can be addressed outside investment. A business case will also identify the right mix of funding for the success of a particular project. Any intervention contains investment in both public goods, like stock assessments and data collection, and private goods, like improved supply chains and better market access. Understanding the impacts of each type of investment is highlighted by the business case process. Gentner et al. (2018) details the holistic process of rapid assessment to final business case development in the two Caribbean pilot countries of Grenada and the Dominican Republic.

The Common Oceans web page has a repository of all the supporting documents generated under the OPP projects. The documents for the OPP can be found here: <http://www.fao.org/in-action/commonoceans/documents/en/?user_extextender_option_list_1=60799> . This resource contains the outputs of all the projects feeding into the business cases. Most examine the impacts of interventions being considered. Gentner 2018 summarizes all the projects under the OPP and includes a summary of the outputs of each pilot projects, their business cases and impact documents.

**Case Study 16: Management Options and Investment Potential in IATTC (Bucaram 2017).**

This case, also detailed on the OPP website in Case Study 15 and summarized in Gentner (2018) is a good example of a cost/benefit analysis of interventions in the Eastern Pacific Ocean to address recruitment overfishing of yellowfin tuna and bigeye tuna in purse seine FAD sets. The overarching motivation is can there be some sort of mechanism to avoid longer time/are closures to avoid this bycatch?

There does seem to be enough dissipated rent to compensate the PS fleet as a side payment or under some sort of Coasian bargain. Generally the stakeholder meetings found that quota systems were preferred over day based rights because of experience with DMLs. Days at sea would not work for bigeye tuna because they are not uniformly distributed in PS sets over FADs. Days might work for yellowfin tuna if they were coupled with FAD set limits. A sub-regional agreement might work as only five countries catch 80% of tuna catches. The PS sector vehemently opposed a bigeye tuna tax, but fines or penalties for exceeding individual or country quotas were not opposed. Another option discussed was to form a bigeye tuna corporation that would own and manage PS bigeye tuna and could trade quota with the LL fleet. It was very clear that all key actors want to avoid a 25-day PS closure. Ecuador alone could solve the bigeye tuna recruitment overfishing problem, pointing to the possibility of a sub-regional solution.

Using the outputs from the Fishery Performance Indicators, initial data collections and the stakeholder input, the WWF commissioned a cost/benefit analysis of the use of country quotas for bigeye tuna and yellowfin tuna compared to longer FAD closures. IATTC biologist developed equivalent scenarios to meet the TAC reductions necessary for stock recovery. This utilized the quotas set by the IATTC in February 2017 for Class 4, 5 and 6 boats that fish on FADs. Ecuador and Columbia, at the February meeting, proposed individual vessel quotas for Class 6 boats that fish for bigeye tuna using FADs and Columbia extended their proposal to also include yellowfin tuna fishing on FADs. Both countries put these proposals out pro-actively because they do not want more closures. These two proposals prompted the IATTC to set the global quota for all PS sets for bigeye tuna and yellowfin tuna. They simultaneously set catch limits for LL boats targeting bigeye tuna applying only to Asian boats over 24m (Bucaram 2017).

Bucaram (2017) conducted an ad hoc cost and earnings survey of the fleet and was able to estimate cash flow profiles for five vessel size classes. The study also estimated the costs of increased MCS including electronic monitoring (EM), annual observer coverage and improvements to observer safety. The report examined accomplishing the MCS goals strictly with EM or a combination of EM and observers. It was concluded that EM alone would be more complex and more costly. Also, if EM cooperation was low or implementation flawed, EM alone would fail to meet the catch monitoring objectives for this catch based rights system. The author concluded that monitoring objectives have to be driven from the bottom up focusing first on the design of the catch system. The design of EM should be optimized to fit the characteristics of the fleet, not trying to fit some top down design onto heterogeneous vessels. This will require active engagement with the stakeholders. Also, current technology limits the EM capabilities. For instance, bycatch identification will be tough with cameras alone and handling processes on the vessels may have to be altered for EM to work. For these reasons, a mix of EM and observer coverage is recommended in the near term at least.

The report estimates that the NPC of compliance costs per vessel to be $13,467 for boats that have observers already and $24,054 for vessels that don’t currently carry observers. The NPV of increasing observer coverage and security is $19,621/vessel. That puts the total NPV of costs per vessel between $33,088 and $43,675 per boat depending on whether or not they currently carry observers.

As mentioned above, IATTC biologist estimated the intervention equivalencies for this analysis. An increase in the PS closure to 25 additional days is equivalent to an IVQ for bigeye tuna 10% less than the historic catch level or an IVQ for both bigeye tuna and yellowfin tuna 10% below historic catches for both species. An increased in the closure of 10 days would be equivalent to an IVQ for bigeye tuna set 4% below the historic catch rates or an IVQ for yellowfin tuna set at 8% less than historic catches. He also analyzed a simultaneous 4% and 8% catch drop for bigeye tuna and yellowfin tuna respectively.

While it is hoped that an IVQ would be tradable eventually, Bucaram (2017) modeled no trading and no rent gains due to trading and other features of tradable catch rights. Instead, the interventions were simply modeled as reductions in individual TACs. Any reduction in cost over a closure would be the flexibility to reduce bycatch of bigeye tuna and yellowfin tuna and increase revenues by targeting skipjack tuna with less bycatch (likely not on FADs).

From the analysis and with the costs of MCS included, all scenarios analyzed resulted in negative cash flow at worst and breaking even at best. Larger vessels were better off than smaller vessels under the IVQ scenarios. Closures reduce flexibility and reduced flexibility is costly. Also, the fleet that focuses primarily on yellowfin tuna, the Mexican fleet primarily, will be hit the hardest. It was also found that the bigeye tuna restrictions matter little as few boats depend on bigeye tuna.

10 more days of closure would cost the fleet between $10.1-$26.3 million per year in lost revenue. Looking at the IVQ equivalent scenarios, the bigeye tuna only scenario would cost between $705,000 and $2.4 million annually, the yellowfin tuna only scenario between $3.2 and $22.6 million annually and both species together would cost between $4.8 and $26.6 million per year. 25 more days of closure would cost between $25.2 and $61.6 million per year. Looking at the IVQ equivalent scenarios, the bigeye tuna only scenario would cost between $1.7 and $28.4 million annually and both species together would cost between $12.6 and $59.7 million per year. The lower end figures in the estimates allow the boats to catch more skipjack tuna to make up for the lost revenue in bigeye tuna and yellowfin tuna fisheries. None of these figures include the costs of additional MCS. Including MCS costs, accepting closures instead of an IVQ will cost $2-4 million more or $9,000 - $16,000 more per vessel than the IVQ. It is important to point out that adding a market and allowing resource rents to return to the vessels would change that calculus dramatically in favor of the IVQ.

WWF (2017) used this analysis to develop an investment document. In 2014 the IATTC set interim HCRs that would produce a SSB of 8% of the unfished level. The scenarios analyzed in Bucaram (2017) were projected to meet that stock goal using IVQs. Other options, including a vessel buyback and FAD limits, are being considered but WWF has selected to examine the IVQ scenario was thought to be less costly than a buyback and the analysis in Bucaram showed it was less costly than a closure.

The investment concept involves pursuing traditional loans or a tuna trust to raises enough money to cover some or all of the cost of transitioning towards an IVQ. The traditional financing path would seek $7 million dollars at traditional 5-10% rates amortized over five years. The difficulty of the traditional path is the lack of an asset to securitize the loan. Also, some sort of borrowing entity would have to be developed. The loan could be paid back with either a landings tax or a landings commission.

The other option proposed is a tuna trust. The trust would acquire a 0.3% share of the newly issued IVQ using loans with the IVQ as security. This option would seek $9 million for 10 years in non-traditional financing that might require higher returns (12-15%). However, since the quota would act as security, the terms might be more favorable. $7 million would be used to purchase quota and $2 million would be used to develop a quota leasing body. The trust would use the funds from leasing quota to cover the initial start up costs and act as a proof of concept for the development of a market across all IVQ holders that could eventually control capacity and earn those vessels resource rents. The investment options paper is clear to point that there are risks including biologic uncertainty, market price and demand volatility, regulatory uncertainty, credit risk and execution risk. IVQ adoption would require investment in EM, analysis of data gathered by EM and increases in observer coverage and observer security (WWF 2017).

# Summary of Findings

This document summarizes a vast literature and decades of experience in reforming ABNJ fisheries management into the following nine principles:

1. Prefer policy mixes incorporating compatible instrument combinations
2. Calibrate interventions towards points of least resistance, lowest cost and maximum impact
3. Sequence or scale interventions as necessary to achieve the goals of fisheries management
4. Empower participants best able to act as surrogate regulator
5. Maximize opportunities for net gain outcomes
6. Bottom-up Matters; Consider and harness the responsiveness of stakeholders
7. While Advocating for Bottom-Up Design Consider Top-Down Logics and Constraints
8. Assess and adapt the regime in light of its effectiveness
9. Impact assessment

Clearly, this topic’s complexity is difficult to capture in nine concise principles and even more difficult to distill into a summary discussion on how these principles come together in a coherent way to structure our understanding of the role of smart intervention mixes across different jurisdictions. Some key points do emerge however. These recommendations are design recommendations and not prescriptive directions on how institutions should be changed. The biggest take away is there is no single solution or path. Instead this summary assembles solid directions to proceed tempered by general conditions found across case studies presented here and in the wider OPP body of knowledge. Overall, design of successful smart intervention mixes for ABNJ fisheries is a long process and the process itself should be iterative and adaptive. The theory of change presented here is not necessarily different than a theory of change that could be applied to any fisheries management reform. The difference for the ABNJ case is the heterogeneity of players and the complexity of all the layers involved and the enormous scale and scope of the issue. But by taking small bites of the problem and scaling up over time, the larger ABNJ problem can be tackled.

Definitions are important.

If one agrees that process and graduality is important to the successful design smart mixes, the process of defining the intervention will help pave the way to successful implementation. It is important to first define the scope of the intervention and who has a legitimate claim to the fishery. Some have more at stake than others (history, value, standing in community, etc.). Second, what capacity should these representatives have in the process? Will they represent a group or just themselves? Third, how much should they be involved? Both their capacity to participate and the burden participating places on their lives should be taken into consideration. Fourth, are there historic tenure arrangements that can be tapped to take advantage of existing social capital? Finally, designers must define the system that organizes participation in the design process. Also, what are the legal and institutional settings and constraints?

This process requires a deep knowledge of the community. Tenure rights are already embedded within the existing social and political relationships and those should be recognized and codified in the new institution. The focus should be on capability and the existing social and political processes already at work. FPIs are an excellent rapid assessment tool that provide a great lead in to discovering this context.

The central question of many interventions leading to triple bottom line outcomes is the redistribution of wealth. Those that are having wealth taken away from them will resist and those that will gain wealth will accept the change. Allocation is therefore an important tool for gaining agreement and allocation can be used to also compensate those that will not do as well after the change. To be able to address this issue means adequately defining economic, social and ecological impacts.

The process has to be both top down and bottom up.

 Motivation and cohesion within the regulated entities is very important to encourage and maintain. The most important finding from this work is that the design of any new management regime must be participatory and start from the bottom up. That has to be tempered by the political and institutional realities coming down from the top at the same time.

Discussion should begin as soon as possible to evaluate the existing communities and how existing rights structures and tenure in those communities could be used to formulate changes that improve livelihoods. All institutions emerge through a bargaining process. In a top down system, participants attempt to capture the process and seek rent across groups with varying power and potentially conflicting interests. In the movement towards new institutions, existing successful institution members will try and dominate the discussion and will resist change strongly. It is very important for fairness and equity to carefully define who gets a seat at the table moving forward. Another caution is including too many interest groups, particularly outside groups, weakens the power of the community. It is difficult but necessary to balance these issues.

More data needs to be collected on the stock and on the political and economic structure of the countries where these changes are being considered. Conducting assessments of current infrastructure and governance will allow the targeting of scarce program funds to insure success and be able to gauge success. All solutions will involve enhanced monitoring and data collection. This evaluation must include the wider systemic consequences of intervening. Failure to include all factors can result in unforeseen threats to the intervention.

Another important conclusion from this global examination is that the crisis needs to be felt by stakeholders. That crisis can be an economic or a stock crisis, but generally those two crises go hand in hand. It is also important define how much better economic conditions could be and use those estimates to motivate stakeholders. To that end, it is helpful to collect economic and fisheries data as part of a holistic design process and to use rapid assessment tools like the Fishery Performance Indicators that foster a holistic and synergistic approach to discovery (Gentner et al. 2018; Anderson et al. 2015). It is important to develop estimates of the benefits and costs of the intervention up front and use those to advocate for reform.

## Importance of combined approaches using sequences or combinations of financial, legal and economic measures.

In many cases, this translates into starting locally with small projects and scaling those up to the sub-regional or regional level because high level reform of international agreements difficult, but alternative approaches through codes of practices and sub-regional reforms are possible.

Any intervention to improve the value chain needs to be part of a holistic program to retain economic gains for local communities. If value improvements are piecemeal and not part of a larger effort to prevent free-riding, value improvements will be dissipated. FIPs and fishery certifications can move fisheries towards better management by incentivizing stakeholders through improved access to markets. Joint ventures can be use to provide needed capital for market interventions.

It is currently unclear in the literature or the practical experience in the ABNJ fisheries detailed above, that using the value chain to leverage change in the harvest system (push interventions) will have a strong link to changing harvest behavior. This is born out in other certification programs in other resources. It is important to focus on capturing the “trickle up” of benefits. However, FIPs and certifications can improve enabling conditions that lead to better ICM outcomes and creating interventions that can have a positive impact on harvesting behavior.

## Adaptive approach required.

It is important to highlight that systems of regulations and combinations of interventions will emerge serendipitously from following these principles if the process is properly defined, scaled and adaptive. Process is the important part. The process needs to focus on the first best, but that perfection is goal should not prevent the good from emerging. Good governance, after all, is the end of process, not the starting point. This is the essence of graduality. This means often following a phased implementation. Proceeding slowing allows for data collection that defines benefits and educates participants reducing the naivety mentioned in the presentation above. Educating participants reduces transactions costs which are always a concern in RBM and market systems. Reducing transactions costs and educating participants generally helps small scale fishers the most.

Enabling conditions and public goods versus private goods in the intervention mix.

The literature, and practical experience, is full of the need to improve basic management tools, like monitoring and enforcement or governance structures, and these management tools are generally called “enabling conditions.” While the first best RBM solution has very strict enabling condition requirements, it is very important to point out that many of these enabling conditions are public goods that benefit all of society and many of these conditions would be necessary to improve struggling command and control regimes as well. As a result it is important to evaluate the existing governance structures and start from there. It is also important to evaluate the costs of the enabling conditions relative to the costs of providing them.

When seeking funding, it is important to recognize that the investments will likely span a continuum from purely public goods to purely private goods. This is very important when seeking funding sources. For instance, seeking private equity for investment in a public good is probably not a good idea if the benefits from that public good cannot be harnessed from the supply chain. Instead, those types of investments will come from grant funding. Building a smart mix of interventions takes a smart mix of funding types. The success, or lack thereof, in private investment in ABNJ fisheries has been hampered by a lack of focus on the proper mix of capital types. Harvesters and the supply chain cannot be expected to pay for all the public goods that go into good fisheries management.

## Is free riding that big of a deal?

Lack of formal exclusivity is not a deal killer. High seas are distant and expensive to reach and may represent a practical barrier versus creating de jure perfectly strong rights. It is important to search for the things that can discipline the scope of free riding. It is not necessary to control all free-riding, just enough of it to be successful. Too much free-riding will collapse incentive based interventions, but there is a certain level that is acceptable.

## Targeting of key actors or influencers is critical to leverage change.

Finding an industry champion has been a very important lever for all State level RBM activities. In ABNJ fisheries, industry owned or industry led FIPs are becoming more and more common. There is no better example of an industry champion than one that originated organically to push for reform.

In-person testimonials have been very successful to motivate change in the US and elsewhere. Bringing captains who have benefitted financially from other successful RBM or market actions is a very powerful tool for winning over stakeholders and cultivating industry champions

Champions can also be coalitions of States at a sub-regional level or NGOs. Individual coastal States can make a difference, but coastal States acting collectively can make a bigger difference. The PNA VDS is a perfect example of this in action.

NGOs have played an important role in the reformation of ABNJ fisheries as independent champions, educators and investors. From meeting convener to local organizer to data gatherer, NGOs are uniquely positioned as independent arbiters and influencers in the design and implementation of ICM. They have pursued financing for everything from outreach to improving enabling conditions. They held numerous stakeholder listening and education workshops. They have paid consultants to collect economic data and analyze that data to provide estimates of the costs and benefits of ICM. All in all they have shown to be great facilitators of the design and implementation process because of their independent position.

## Side payments and Coasian bargains

Side payments come in many forms and are the necessary grease that keeps the machine of ICM implementation moving smoothly. There are all sorts of ways to make side payments and all sorts of reasons to make them. Generally, however, there are two ways to make side payments in practice; allocation of the right or the re-distribution of rents through Coasian process. The allocation of rights can be carried out in a nearly infinite number of ways. Grandfathering allocation through the use of catch histories rewards highliners and protects their highliner rents making them more likely to participate. Allocations based on regional catch history take that a step further by respecting national interests. Allocations based the value of existing capital is similar to protecting highliners but may also protect recent entrants and nations that have recently made significant investments in harvesting or processing capital. Speaking of processing capital, some allocation can be given to the shoreside business to protect their investments in what will surely be a changed marketplace post intervention. Allocations based on EEZ abundance have been used as side payments to small island developing states to honor their development aspirations. These are just a few of the methods encountered in this review to make side payments using allocations.

While not typically considered side payments, many trade restrictions act as side payments in practice. Caps on quota aggregation are concessions made to small communities and small scale fishermen. These include quota aggregation caps, vessel size trade limits and total trade limits. Quota set asides for new entrants or to use as incentives for conservation activities are also ways to make side payments. Along the same lines, quota re-balancing can be used as an incentive with direct value consequences. Quota price floors, like those used for the VDS, are effectively side payments to the member states. Finally, the easing of certain current command and control regulations like minimum size limits, gear restrictions, access limitation and time and area closures can be used as side payments.

As sure as there will be winners, there will also be losers. The disadvantaged may have no way to access allocation and benefit from the other side payments mentioned above. That does not mean they cannot or should not be compensated. Instead, Coasian bargains can be had that collect the new, higher rents in the fishery and distribute them back to the disadvantaged. This can include allocation-based quota set asides that can be sold or lease on behalf of the disadvantaged or can involve other rent collection mechanisms such as landings taxes or levies on the trade of rights. These collected rents can be used for any number of community investments like job training, infrastructure, education, etc. Really the options are limitless.

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1. See eg UNCLOS, Arts 56(2), 58(3), 60(3), and 80(2). [↑](#footnote-ref-1)
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