



Tuna, coastal fisheries, beche-de-mer and aquaculture development in the Western and Central Pacific: current issues and future needs

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Introduction

This article gives a personal overview of the current status of tuna, coastal fisheries, beche-de-mer (BDM) and aquaculture in the Western and Central Pacific. It highlights issues associated with the sustainable management of resources at a scientific and at a policy level. Recommendations are made for a fisheries/tuna research centre, more effective management of coastal fisheries, and better planning for aquaculture development.

Tuna

Commercially and financially, tuna fishing dominates fisheries in the Western and Central Pacific. This industry, which produced 2,621,511 tonnes of tuna valued at US\$6.2 billion in 2013 (Williams and Terawasi, 2014) is serviced by several regional organisations including the Forum Fisheries Agency (FFA), the Secretariat of the Pacific Community (SPC) and the Western and Central Pacific Fisheries Commission. Currently, activities such as monitoring, control and surveillance (MCS), including observer training, are managed by regional organisations, individual island states and donors.

In addition, organisations such as the Parties to the Nauru Agreement (PNA) are working to ensure that countries within the region increase their share of the socio-economic benefits. Significant resources are invested in this industry, but well below those for other major fisheries around the world. Tuna fisheries in the Western and Central Pacific could be operated on a total cost recovery system.

Whilst organisations such as FFA and SPC service the day-to-day management and the long-term monitoring of tuna stocks, respectively, there is no integrated science, policy, education and training centre. Further studies including the impact of tuna on species such as sharks are required. As the demand increases and sustainable fishing becomes more challenging, alternative methods for sourcing tuna species must be explored. Tuna aquaculture (Metian et al., 2014) is practiced in the Mediterranean, Australia, Japan, Korea Republic and Indonesia on various species, at different stages of development. The Western Pacific, home of most of the world's tuna resources, should consider collaborating with these countries to ensure the region benefits from and contributes to the knowledge generated.

Management changes are far too slow to address the dramatic decreases in populations of many of the most valuable tuna species, including the bluefin (Farley et al., 2014) and bigeye tunas (Sibert et al., 2012). A SPC press release (2014) indicated that *“bigeye, the mainstay of the tropical longline fishery, has now been reduced to less than 20% of its unfished stock size.”* This is despite scientific evidence that could guide policy for improving their management. A new tuna centre would help develop local talent and could provide assistance to small island developing states (SIDS) of the Western and Central Pacific in better understanding and managing their own tuna resources. A concept for a new fisheries centre is currently being developed at the University of the South Pacific that would provide a focus for both tuna and coastal fisheries capacity building, R&D and improved resource management. This could augment the science and regional capacity to better support this key industry.

Coastal fisheries and beche-de-mer

Coastal fisheries management is important for livelihoods and food-security. However, these multi-species reef fisheries are poorly understood, are data-poor and their management is in its infancy. Whilst progress has been made in some countries such as Fiji, through the development and management of locally managed marine areas (LMMAs) on a community basis, there is significant concern regarding overfishing, reduction in catches, average size of fish caught and other key parameters. Government fisheries agencies have very limited resources and the demands of the tuna sector generally leave little for coastal fisheries management. A 2014 regional workshop in Fiji called for the following actions (from Call to Action document, Pacific beche-de-mer & the Future of Coastal Fisheries meeting, Nadi, Fiji 6-8 August 2014):

1. *Pacific island nations take political leadership and urgent action to implement more robust coastal fisheries management regimes at a national and sub-national level, by ensuring effective, practical and enforceable policies are in place and implemented, targeting essential capacity at national and sub-national levels, reviewing budgetary commitments and strengthening coordination of implementing partners.*
2. *Review and harmonize regional framework for coastal fisheries including the role of current regional and international institutions, agencies and NGOs to promote collaboration and integration, to ensure countries receive strong, coordinated and effective support on coastal fisheries management.*

Beche-de-mer (BDM), or processed tropical sea cucumbers, are in high demand in all Chinese markets (Purcell, 2014). BDM fishing is characterised by high catches, often followed by years of very poor yields whilst stocks recover. It is the second most valuable fishery resource after tuna, which in Melanesian countries is worth US\$20m per annum (Carlton et al., 2013). As shallow-water invertebrates, BDM are easily gathered by hand, skin diving, scuba diving or other simple fishing methods. For many coastal communities they provide a hugely important source of income on an irregular basis. At present, many countries in the Western Pacific have closed their fisheries to enable stocks to recover. As the higher-value species have become rarer, lower-value species have been progressively targeted until, in many areas, populations of these species have themselves been over-fished.

There are few examples of BDM fisheries where management regimes have resulted in long-term sustainable fisheries. However, options include rotation of harvest areas, closures (by time, area, fishery and gear type), size limits and annual total allowable catches that can be utilised (Purcell et al., 2014). There are serious problems in enforcing these in fisheries from a resourcing perspective, and high product values encourage fishers with few income alternatives to break the rules, especially when active middlemen seek to buy them for export. Aquaculture techniques have been developed for a few of the more valuable species, so stock enhancement is a possibility, as is sea ranching, as long as appropriate management arrangements and enforcement regimes can be established. Establishment of a regional body to coordinate the conservation, management and economic benefits from BDM is proposed.

The 2014 Fiji workshop also called for immediate action on BDM management including:

1. *Improved structures and processes for sharing data and information on buyers, markets and best practices at a regional level with SPC and interested parties;*
2. *Targeted research on opportunities and market mechanisms that will improve the value of BDM to Pacific Island Nations and other areas to improve knowledge and management of BDM;*
3. *A special meeting in early 2015 of interested Pacific Island governments, respective private sector organisations and the civil society to progress BDM management and investigate opportunities for a “Parties to the Naru Agreement–like initiative” for BDM.*

Aquaculture Development

Aquaculture in the Pacific comprises a sector focused on food security (Bell et al., 2009), e.g. tilapia, and another on generation of various socio-economic benefits from farming of higher-value products, e.g. pearls.

Aquaculture and mariculture development in the region has been extremely slow, compared to elsewhere, partly through a lack of national planning and appropriate zoning for aquaculture. For example, aquaculture planning has preceded significant aquaculture development in many countries including Norway (Hovik and Stokke, 2007), Chile and Australia (Carvalho and Clarke, 1998). Well-prepared plans can contribute to growth in aquaculture as a major component of an integrated coastal zone management regime, where tenure issues are clarified, and communities are fully consulted and involved. With few exceptions this has not occurred in the region.

Most aquaculture development in the region has been government or R&D led via donor funding, often operating without any plans for commercialisation. The missing link has been industry development planning and incentives for the private sector to invest in aquaculture, within a policy and regulatory framework that supports the industry.

Aquaculture planning requires expertise in geographic information systems, community consultation, policy development, environmental assessment (to determine areas suitable for different types of aquaculture and their long-term management), a practical aquaculture policy framework and economic modelling to assist in determining the feasibility and maximising the value of the sector to each country. This planning is required both for land-

based and sea-based aquaculture. Aquaculture planning can also include issues such as a regional approach to aquatic biosecurity. Without aquaculture planning, the industry will continue to develop slowly and in a very *ad hoc* manner.

The University of the South Pacific

The University of the South Pacific is one of the few regional universities in the world, providing tertiary training for 12 Pacific island nations. Its main campus is in Suva, Fiji. It provides vocational, graduate and post-graduate training in marine sciences and related fields. As detailed in its most recent strategic plan, the university aspires to become '*amongst the leading universities in the world in Pacific Ocean and Marine Resources*' by 2018.

The University has many projects relevant to tuna, coastal fisheries, beche-de-mer and aquaculture underway, including the following:

- Value-adding and supply chain development for fisheries products in Fiji, Samoa, and Tonga;
- Diversification of Seaweed Industries in Pacific Island Countries;
- Post-harvest fisheries training in the Pacific: emphasis on community women and youth;
- Rapid identification of tuna trunks;
- Monitoring and understanding fisheries practices in the Dawasamu district of Fiji to build a sustainable ecosystem-based management plan;
- Metapopulation dynamics, socio-economic and fisheries science of the albacore tuna (*Thunnus alalunga*), with particular emphasis on the Fijian tuna industry.

Conclusion

Tuna fishing is a major source of income in the Western and Central Pacific, but is at risk. Improved management of coastal fisheries, including BDM, is critical for both food security and income generation and there is a real need to adequately resource the future development of these fisheries to ensure their long-term sustainability.

Aquaculture has yet to demonstrate its true potential in the region and new approaches are required to further its effective development. This will require improved collaboration between industry, farmers, regional organisations, governments, educational and training providers and a paradigm shift, so that aquaculture development is demand-driven and led by the private sector. To address tuna, coastal fisheries and aquaculture in the region, the development of a regional centre of excellence could help build local capacity and contribute to R&D in the field, both of which could contribute to managing and developing aquatic resources more effectively.

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