

Sea ranching of sandfish in an Indigenous community within a well-regulated fishery (Northern Territory, Australia)

Ann E. Fleming^{1*}

Abstract

The Northern Territory is in a unique position to support sandfish (*Holothuria scabra*) ranching as it has an intact wild fishery and low poaching pressure. Indigenous people own 85% of the coastline, and are keen to develop economic opportunities through their natural resources. The commercial wild-caught sector has well-established markets, and has expressed a willingness to partner with Indigenous coastal communities. Research currently underway is focused on the biological and economic feasibility of sea cucumber ranching as well as developing effective facilitation and evaluation approaches to ensure that Indigenous people drive enterprise development themselves.

Introduction

A wild sea cucumber fishery operates across northern Australia, extending from the tropical regions of Western Australia, across the Northern Territory (NT), to tropical Queensland in the east. This paper reports on the fishery within the NT, which comes under the management and regulation of the Northern Territory Government (2009).

Compared with countries also working to develop sea cucumber ranching, the NT is in a unique position. It has an intact and sustainable wild-catch fishery with well-established supply chains and markets. This is largely due to a strong management regime and the efforts of the commercial sector, which consists of a single operator who owns all six available licences. In addition, the NT has a large population of coastal Indigenous Australians who own 85% of the coastline, and who aspire to pursue economic development through the use of their natural marine resources. The recent recognition of Aboriginal people's legal ownership of the intertidal zone within the NT offers

further opportunities for marine-based economic activities. The commercial wild-catch operator has demonstrated a willingness to partner with Indigenous communities to establish sea-ranching enterprises, and is currently operating a commercial hatchery in the NT, and conducting pond-based grow-out and sea-ranching trials, the latter with a community on Groote Eylandt (Bowman 2012).

Another unusual factor that exists within the NT is the absence of significant sea cucumber poaching activity. This is largely because local people, both Indigenous and non-Indigenous, do not eat sea cucumbers, and because illegal take by Indonesian fishers has been drastically curtailed in recent years due to enhanced surveillance and apprehension operations.

The implications of this unique set of factors in the NT will be discussed in this paper in the context of opportunities for sea cucumber aquaculture by Indigenous people living in remote communities.

The wild fishery context

A modern wild fishery, targeting the high-value sea cucumber, sandfish (*Holothuria scabra*), has operated in the NT since the 1980s. It continues

¹ Aquaculture Branch, Fisheries Group, Department of Resources, Darwin, Northern Territory, Australia

* Corresponding author: <AnnE.Fleming@nt.gov.au>

to be sustainable today due to the precautionary management approach by the NT Government and a unique set of circumstances around the nature of the commercial sector and the characteristics of the operating environment.

The fishery is divided into two zones, three licences per zone, with six licenses in total. The government's conservative approach includes a limit on the number of licences and the area of the fishery (within 3 nautical miles of the coast to preserve deeper sea breeding stocks considered important for recruitment). Collection of sandfish is by diving from vessels, using hand methods only.

Fishery management aims to ensure intergenerational equity of stocks, and it does this by having a range of performance indicators, any one of which can trigger a management response. The performance indicators are:

- a breach of a total catch of 300 t/year (wet weight)
- a variation in the rolling 3-year average catch per unit effort by a factor of 30% from the current year value
- a decrease in the average weight by more than 20%
- a change in species composition to over 30% of total catch
- a change in licence ownership.

The government takes this precautionary management approach due to the limited knowledge of the biology and ecology of sandfish. Consequently, there is a push, initiated by the Australian Government, towards addressing key research priorities to fill the knowledge gaps and develop meaningful yield estimates.

The second set of factors that contribute to sustainability are around the nature of the commercial sector and the characteristics of the operating environment:

- There is only one licensee, so there is no 'gold rush' mentality around fully harvesting the good stocks.
- The company has the ability to rotate harvests.
- Crocodiles, poor visibility, monsoon season and extreme tidal range restrict access to many fishing grounds, and limit the ability of divers to pick up all harvestable stocks.
- There is relatively low poaching activity (at least in recent years).

In the past, the incidence of illegal fishing in northern Australian waters, predominately by Indonesian sea cucumber vessels, has been considerable. However, recently, there has been a significant increase in the apprehension of illegal vessels, from 60 in 1999 to 210 in 2005.

In 2006, the Australian Fisheries Management Authority (AFMA) set in place an extensive surveillance and apprehension program within the Australian Fishing Zone using aircraft and sea vessels, together with extensive data gathering. As a result of this concerted effort, by 2009 the apprehension rate was down to nine vessels in the first 5 months (AFMA, pers. comm.). Clearly, the message had filtered back to illegal fishermen in Indonesia that surveillance had increased and apprehension was likely.

It is interesting to consider this illegal activity by Indonesian fishers in the context of the long history of sea cucumber (or 'trepang' as they are traditionally known) fishing in northern Australian waters by the Macassans from Sulawesi. They came each year in the monsoonal months and fished for trepang, often working in collaboration and mutually beneficial trade with the coastal Aboriginal people (Macknight 1976). They had been doing this since around the mid 1700s until Europeans put a stop to it in 1907 to allow local white people to take over the trade. As a result of this historical sustained contact with Indonesians, Northern Territory Aboriginal people have a cultural affiliation with trepang and with the fishing activity, even though they do not eat sea cucumber.

In addition to the unique factors around the wild sector, there are also some quite unusual characteristics around current sea-ranching aspirations, by both Indigenous people and the commercial sector. In 2008 the High Court of Australia gave legal recognition to Indigenous Australians' ownership of the intertidal zone within the NT (Altman 2008). Negotiations are currently underway to determine access to marine resources in that zone. Irrespective of the final outcome of negotiations, there are opportunities for Indigenous people to conduct sea ranching and on-sell to the commercial sector, which has demonstrated a willingness to partner with Indigenous people in this enterprise, committing to buy all postharvest or first-process product.

The sea-ranching trials

In 2009 the NT Government began working with the commercial operator on two trials to assist Indigenous communities to establish sea-ranching enterprises. One is in partnership with the Warruwi community of Goulburn Island and the other with the Umbakumba community on Groote Eylandt. The former is an Australian Centre for International Agricultural Research (ACIAR) project in partnership with a

broader project involving Vietnam and the Philippines that is led by the WorldFish Center.

On Goulburn Island an 18-ha research site has been established and four research pens set up to monitor growth and survival according to the methods developed by Purcell (2004, 2012) and Purcell and Simutoga (2008). The site is a perched reef, accessible only at low tides when water levels are 10–30 cm deep. Suitable daytime low tides occur only between August and March. The danger of crocodile attack precludes diving or snorkelling. Surveys have shown that standing stocks of wild sandfish are healthy in the trial area. These will be removed prior to release of juveniles produced by the private sector in collaboration with government staff. Releases of approximately 10,000 fluorochrome-stained 5-g juveniles are planned using a cage release method developed by the private sector. The release cages are designed to exclude most predators, and protect animals from extreme water currents resulting from the 5-m tide difference. Animals are expected to move out of the cage as they become acclimatised. The logistics of working at the site make the research very difficult, primarily due to extreme currents, crocodiles, infrequent daytime low tides and the cost of flights to these remote areas. Data from the sea-ranching trials will be used to assess economic and biological viability. Assuming the trials demonstrate that sandfish sea ranching is viable, future work is likely to see expansion of trials to other sites within the West Arnhem region.

Strategic approach to Indigenous engagement

The NT Government's Aquaculture Branch seeks to identify aquaculture enterprises that meet a set of social and economic criteria that increase the likelihood of Indigenous enterprise success. The focus is on selecting species and farming activities that:

- have low capital requirement and low, infrequent management/operational demands
- meet social and cultural criteria suitable for Indigenous engagement and job participation (e.g. culturally relevant species, culturally familiar and engaging operational activities, flexible weekly working hours, work that enables people to attend to cultural activities and obligations for extended periods of time)
- have high market value and strong to medium market demand, with existing supply chains and/

or clear commercialisation pathways. However, it is recognised that a staged approach where people develop familiarisation with farming through first engaging in more culturally aligned activities and outcomes is more likely to achieve success. Thus, target species, and the products and uses of those products, may be developed for purely social and cultural outcomes as a staged approach to longer term economic outcomes

- have a commercial partner and/or project enterprise champion and facilitator.

Sandfish sea ranching meets the criteria for suitable Indigenous development projects in terms of these social, technical and economic assessments. Nevertheless, capacity to engage in western-style commerce and participate in the mainstream workforce is low for most communities. To overcome these barriers, the Aquaculture Branch is partnering with social scientists and trained Indigenous research practitioners to ensure that people define their vision for their community and their work style aspirations (in their first language), conduct research to develop successful engagement and governance models, gauge effectiveness in meeting community aspirations, and measure both community and individual social and economic outcomes. Such evidence is critical to identifying success and failure points, thus ensuring that a culture of continual learning is embedded in current activities to inform future ones.

Community-based organisations and agencies play an important facilitation role in this 'bottom-up', community-driven approach, particularly in assisting people to develop appropriate governance arrangements and capabilities, and providing job-specific training. However, enterprise facilitators must ensure that they do not influence enterprise development choices, but allow the community to decide what the outcomes for aquaculture enterprises will be in the short term. In this way external non-Indigenous people are less likely to unwittingly impose culturally inappropriate development choices on people.

Another important aspect of facilitating community enterprise development is to work with the children. The Aquaculture Branch has worked with the Warruwi school on Goulburn Island to enhance awareness of the current trepang trials on their lands, as well as the history of trepanging with Macassans by their grandparents and distant ancestors on the island. The education program also seeks to communicate the potential future opportunities and benefits of aquaculture enterprises if the trials prove



Warruwi community members inspecting sandfish holding pens on Goulburn Island, Northern Territory, Australia (Photo: Wayne Tupper)

successful. In this way the community's youth will foster aspirations to take advantage of such opportunities when they become young adults. Job-specific training will be developed for current participants if the trials prove successful, enabling them to readily progress to paid work when enterprises become profitable.

The above approach requires the Aquaculture Branch to form effective working partnerships between agencies to facilitate enterprise development. The Branch is therefore developing a policy on Indigenous aquaculture development that identifies the key guiding partnerships, activities and principles to underpin Indigenous aquaculture development in communities. This policy will guide the activities of the Aquaculture Branch and its partners when facilitating aquaculture enterprises and activities in communities.

Summary

The unique context in the NT—where Indigenous communities own most of the coastline (now including the intertidal zone), the commercial sector has well established markets and is keen to partner with Indigenous communities, and there is largely no

poaching—offers culturally and socially suitable natural resource-based opportunities for Indigenous people living in remote coastal communities. In relation to pursuing sea-ranching enterprise development, facilitators must recognise the following:

- Social disadvantage and cultural differences require facilitators to take a whole-of-community perspective of physical and human resource development. They must commit to a long-term course of facilitation, and must install processes to ensure that Indigenous people drive the visioning, planning and implementation process. Thus, partnerships between agencies must be formed to bring together the broad range of skills necessary to facilitate enterprise development.
- Selection of species and sea-ranching methods must meet social and cultural criteria suitable for Indigenous engagement and capacity.
- The terms of collaboration between the commercial sector and Indigenous communities must allow for a win-win outcome to work in the long term.
- Evidence must be gathered to identify success and failure points, thus ensuring that a culture of continual learning is embedded in current activities to inform future ones.

Further, in relation to sea cucumber ranching, facilitators must recognise that time frames must be appropriate (i.e. long) to ensure gradual development, because:

- technologies are not yet established
- many logistical factors have to be addressed
- the capacity to identify suitable sites is not certain
- economic returns are yet to be determined
- Indigenous engagement for many communities is not yet adequate for effective participation.

The government is keen to take a cautious approach to facilitating development so that expectations can be managed. Indigenous people are accustomed to waves of failed ventures coming and going through their community. The government wants to see this enterprise develop in a way that maximises the chances of success, both socially and economically. Past evidence from successful natural resource based enterprises point to a gradual, measured, community-controlled approach as the way to achieve this.

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