REPORT

Pacific Regional Oceanscape Programme

Sea cucumber fisheries and management in Melanesia: Review and policy briefs

Hugh Govan, 20/11/2017

Preface

As part of the World Bank Pacific Regional Oceanscape Program implemented by the Secretariat of the Pacific Community the following report has been produced as part of "Evaluating and providing management options and assistance for the bêche-de-mer (BDM) fishery in the four Melanesian countries of Papua New Guinea (PNG), Solomon Islands, Fiji and Vanuatu" which includes working closely with the Melanesian Spearhead Group Secretariat.

The following report succinctly reviews the status of sea cucumber management, provides chapters on specific areas of interests to countries including options for harmonizing data and management tools and concludes with the agreed actions and standards adopted by the 4 countries subsequent to considering the contents of this report at the 6th MSG Fisheries Technical Advisory Committee.

Contents

Summary

MSG countries have made steady progress in developing sea cucumber management systems over the last 5 years. Three of the four countries have produced new management plans that include updated minimum sizes and /or higher levies and licence fees. These plans, along with the improved capacity evident in fisheries agencies, provide the basis for improving the sustainability of the fishery and increasing revenue for fishers and national coffers.

Two major challenges are now evident: ensuring political and public support for fishery management interventions and prioritizing the implementation of the most feasible and effective management actions from the range of tools afforded by updated legislation.

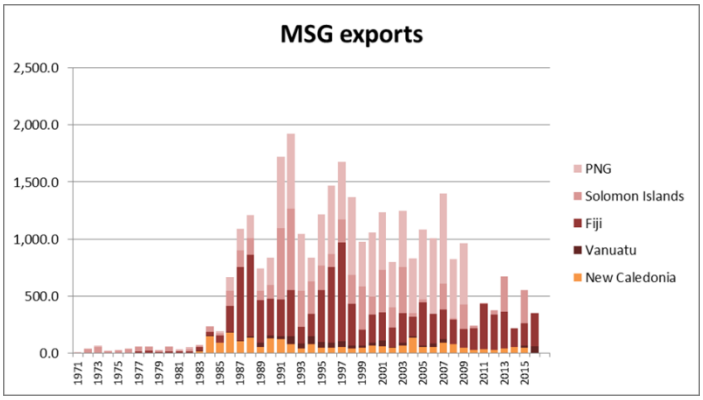
This report provides briefs on the major options including for harmonization and addressing public and political support.

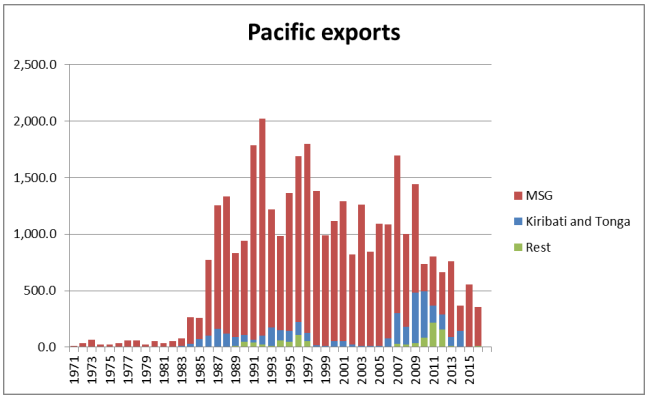
Review of status of sea cucumber fisheries and management in Melanesia

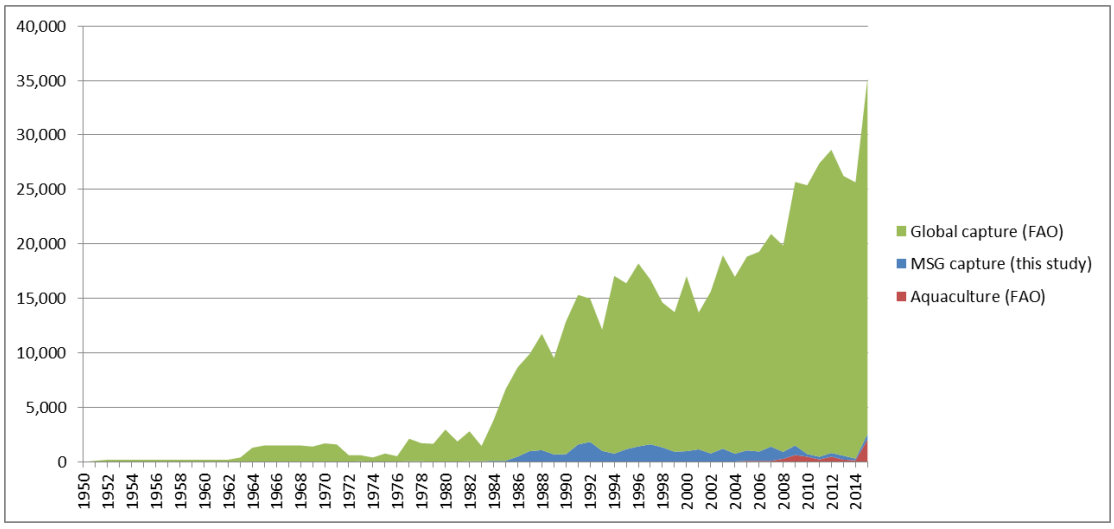
Status of global and Pacific region sea cucumber fisheries

Records on landings, exports and value of the fishery are not ideal but the available information from fisheries agencies, supplemented by those from customs authorities which combined can be compared to FAO landings data and global trade information allow some conclusions.

- Pacific landings and exports of bêche de mer have declined from peaks of around 2,000 tonnes in the 1990s to less than a fifth of that in recent years in which most countries have had to impose moratoria on the fisheries. The MSG countries have lost all their international and much of their regional dominance even though they are still the major regional producers.
- Global landings have increased with an expansion in to new countries and different species, the MSG countries at present do not represent a significant proportion of global landings.







Status of MSG sea cucumber fisheries

The boom and bust nature of the MSG countries' sea cucumber fisheries and the imposition of moratoria obscures the trends. Comparison of 5 year rolling averages show decreases in yearly average exports compared to 5 and 10 years previously in most countries and a major decrease in the combined MSG exports. In the last 15 years exports averaged 680 tonnes per year compared to the average of the previous 15 year period of 1,140 tonnes (i.e. a 60% decrease).

Harvests in tonnes	PNG	Solomon Islands	Fiji	Vanuatu	MSG4
Average (1980-2016)	**302.5**	**165.5**	**277.5**	**20.5**	**766.1**
Max	**791.0**	**715.4**	**862.0**	**66.0**	**1,840.7**
Total (1980-2016)	**11,191.9**	**6,125.2**	**10,269.2**	**759.3**	**28,345.6**
Last year of harvest/data	**2017**	**2015**	**2016**	**2016**	**2016**
5 yr average preceding last year of harvest	158	126	257	16	464
Previous 5 yr average (i.e. 6-10 yrs before last harvest)	212	92	248	6	716
Preceding 5 yr average (i.e. 11-15 yrs before last harvest)	609	202	247	18	923
Last 15 years average	326	103	239	13	682
Previous 15 years average	447	278	375	36	1,137

- Three countries have had moratoria and recent short opening of the fisheries (1-4 months), Fiji has just recently banned exports.
- There is a shift from high value to lower value species in all countries (data available from Fiji, Vanuatu and Solomon Islands).
- Large proportions of catch are undersize in Fiji (>31%) and Vanuatu (>80%) and anecdotal reports suggest the same in all MSG countries
- Data collection is improving but does not allow historical data on value for comparison of changes in value and real time monitoring of landings or first purchase for quota tracking has been a major challenge.

The following tables summarize available data. Green, yellow and red highlights positive outcomes, potential issues and problems respectively.

	Fiji		PNG		Solomon Islands		Vanuatu	
Year of last harvest		2017 (2016 data)		2017		2015		2015
Export (Fisheries data - t)		NA		764		286		77
Export (Customs data - t)		289		791		328		
Last harvest (FOBvalue)	FJD	18,550,000	PGK		SBD	32,225,876		
Last harvest (Export value)	FJD	18,550,000	PGK	81,530,092	SBD	29,460,332	VUV	300,000,000
Last harvest (value USD)	USD	8,912,348	USD	25,213,181	USD	3,794,491	USD	2,805,000
Value of imports to HK for that year (WTF)	USD	7,148,880	USD	NA	USD	2,581,106	USD	278,863 (375,269 inc. 2014)
Value (USD)/tonne	USD	30,839	USD	33,002	USD	13,267	USD	36,429
Export markets (for last year of harvest)		Hong Kong (90%), Vanuatu (7%), USA (2%), Australia/New Zealand (1%)		NA		Hong Kong (75%) and Vietnam (23%) with 1% to Sri Lanka and New Zealand combined		Hong-Kong (97.7%) and Fiji (2.3%)
Main species by weight		In 2012 65% of exports comprised (in order): Lollyfish, amberfish, snakefish, tigerfish and brown sandfish		NA		In 2015 50% of exports comprised (in order):Lollyfish, Ripplefish, Pinkfish, Lemonfish, Snakefish, Brown sand four fish, Hong Kong payfish		In 2014-15: Surf Redfish 30% with tigerfish, brown sandfish and black teatfish accounting for 37%

Management of sea cucumbers

- Three countries have recent management plans (2015-16)
- Vanuatu tested, implemented and evaluated a comprehensive management plan
- PNG and Vanuatu set Total Allowable Catches based on stock assessments
- Customs authorities collect valuable and potentially independent or at least complementary data but require better support from Fisheries Agencies
- TAC were significantly exceeded where applied and the lengths of harvest season exceeded technical recommendations

- Enforcement capability and/or will is generally low - fines and licence suspensions were only recorded in Vanuatu
- Village and provincial enforcement has not proven logistically feasible
- Exporter enforcement is not implemented and there is much room for improvement:
  - Few checks on sizes (except Vanuatu) and no penalties
  - Little if any verification of exporters' reported data (value, species, grades) and suspected under valuing

	Fiji	PNG	Solomon Islands	Vanuatu
Management plan	No, in draft	2016	2014	2015
National TAC	No	350 tonnes dw	No	21 tonnes dw
Provincial TAC	No	Yes - 150%-680% over	No	Yes but not issued
Individual species TAC		Possible but not applied		Yes but not enforced
Quota per export licence	No	No	No	No
Compliance with quotas	Not applicable	223% overharvest (but TAC had been precautionary)	Not applicable	240% overharvest (but TAC had been precautionary)
Length of last season	open until 1/11/17	1 April - 30 September 2017 6 months	1 December 2014 - 31 March 2015? 4 months	September-December / 4 months
Size limits	Yes, too low (7.6cm)	Yes, (c)	Yes (B)	Yes, updated (A)
Estimate of undersize harvest?	35% below legal (2), 60-100% below biologically recommended limits	No?	"Sizes getting smaller"	>80% (1)
Community management	Some access control	1 example (Manus)	Unreported	A few communities / conflicts reported
Other prohibitions	Recent UBA ban	Various, no UBA	Long list in licence conditions: No UBA	Long list: Only harvest by resource owners, no UBA, daytime, presence of an authorised officer
Enforcement	Patrols / MoF staff	Compliance officers in provinces	Several cases of enforcement. No fines	Observers / DoF staff
Penalties	Low (FJD 500?), not applied	Compliance bond and penalties not exceeding for: crew member K25,000 natural person K500,000 corporation K5,000,000	SBD500,000 or imprisonment up to 4 months or both (regs 2014) / not applied	4 fines (up to VT150k) / 2 licence suspensions
Penalties max (USD)	240	7,700; 150,000; 1,500,000	64,400	1,403

A: Size limits calculated relatively precisely, 7,10,12,15,17, 20 cm
B: Size limits in 3 groups: 10, 15, 20
C: Size limits in 3 groups 8, 10, 15

Economics, market and prices

- Hong Kong remains the major market with small reported exports to Vietnam (both of which are "grey routes" to China), Australia, New Zealand or USA which may be commanding higher values in some cases.
- Export is by sea and increasingly by air (PNG, Van, Fiji?) though data are not comprehensively collected.

- Comparison of prices paid to fishers and to exporters is complicated by the variety of grades and differences between wet and dry products. This is increasingly needed as there appears to be room for increasing value left in country through setting of minimum prices.
- Increase in government revenue generated in Solomon Islands and Vanuatu – through increased licence fees and export levy (SI)
- Solomon Islands is moving towards market price certification to control export price (declared) and guidelines on fisher buyer prices

	Fiji		PNG		Solomon Islands		Vanuatu	
Export licence (local currenc	FJD	15-150 (3)		Export+storage+5 buyers = ~10,000	SBD	210,000	VUV	3,000,000
Export licence (number)		5?		80 (buyers' licences 395)		10		6
Export licence (USD)	USD	50?	USD	3,093	USD	27,048	USD	28,050
Processing licence (local currency)		?			SBD	50,000	VUV	120,000
Processing licence (number)		?				0		12
Processing licence (USD)		NA			USD	6,440	USD	1,122
Export levy		No ("tax" 2,000) (3)		PNG removed tariffs on seafood products		10% (SBD 3,222,587 export duty)		5% not implemented
Export fee		30-4000 (3)				Permit fee SBD200		
Value of harvest tracked : fishers / export		?? / 18.5 million FJD		~40,000,000 / ~82,000,000		Collected but not tabulated / SBD32,225,876		105 million / 300 million vatu
Government revenue (last year of harvest)	FJD	licences??	PGK	Licences ~800,000	SBD	5,322,587	VUV	22,000,000
Government revenue (USD)	USD	Negligible	USD	247,400	USD	685,549	USD	205,700

3: Mangubhai et al. 2016

Recommendations of review for consideration

Country experiences and improved legislation and management plans provide adequate basis for moving towards strategic implementation of management actions. National institutional capacity is limited and staff are rarely able to invest the time and effort needed, experience strongly suggests focussing on one or two specific areas for improvement that have most likelihood of regulating fishing pressure and increasing returns.

National actions

The main technical recommendation is to ramp up control of exporters and exports with a view to progressively implement export quotas and rigorously enforce these and associated rules (minimum sizes, prices etc.). Particular support will be needed from trade/economic specialists and media/public relations.

- Prepare strategy for control and enforcement of exporters including:
  - Declared export prices and accuracy of reported exports (size, grade, species)
  - Develop and improve procedures with customs and/or inland revenue
  - Improve transparency and process of consultative mechanisms with exporters together with other stakeholders.
  - Define and implement TAE as main or backup catch control mechanism
- Specific country actions as defined elsewhere such as review fees, size limits, information programs, improve process for sharing information and access important MSG level information on markets etc.

Political will

The major impediment to regulating the BDM trade and increasing the value to countries relates to political or other influence exerted by exporters, traders and communities as well as lack of clarity of both public and politicians relating to the intent of management regulations. This may be influenced/improved by:

- Targeted use of regional mechanisms to work with leaders and ministers (including MSG, PIDF, SPC, PIFS)
- Specifically designed support for proactive media and public relations strategies as well as information and awareness campaigns targeting leaders and public for increasing understanding and support

Regional

Regional support includes technical support from SPC as well as ACIAR, universities and NGOs. These can varying address regional political influence as above and building the capacity of MSG to share and collect information. Data collection, minimum sizes, and licence fee schedules, markets and prices are improving and aligning but should benefit from increased sharing.

- Establish MSG trade and information sharing office with staff (supported initially by SPC/PROP)
- Develop basis for common terms and conditions that all countries can adopt to improve overall control and value retained including on standard grades/quality (SPC/PROP with MSG in the interim)
- Provide economist/trade advice to countries in specific areas including calculation of minimum buyer prices, minimum export prices, appropriate level of penalties, fees, licences and levies
- Initiate or complete data collection and sharing of companies and prices paid etc.
- Continue supporting the exploration of longer term opportunities (e.g. branding, PNA/cartel opportunities)
- Address political will as above.

Other issues

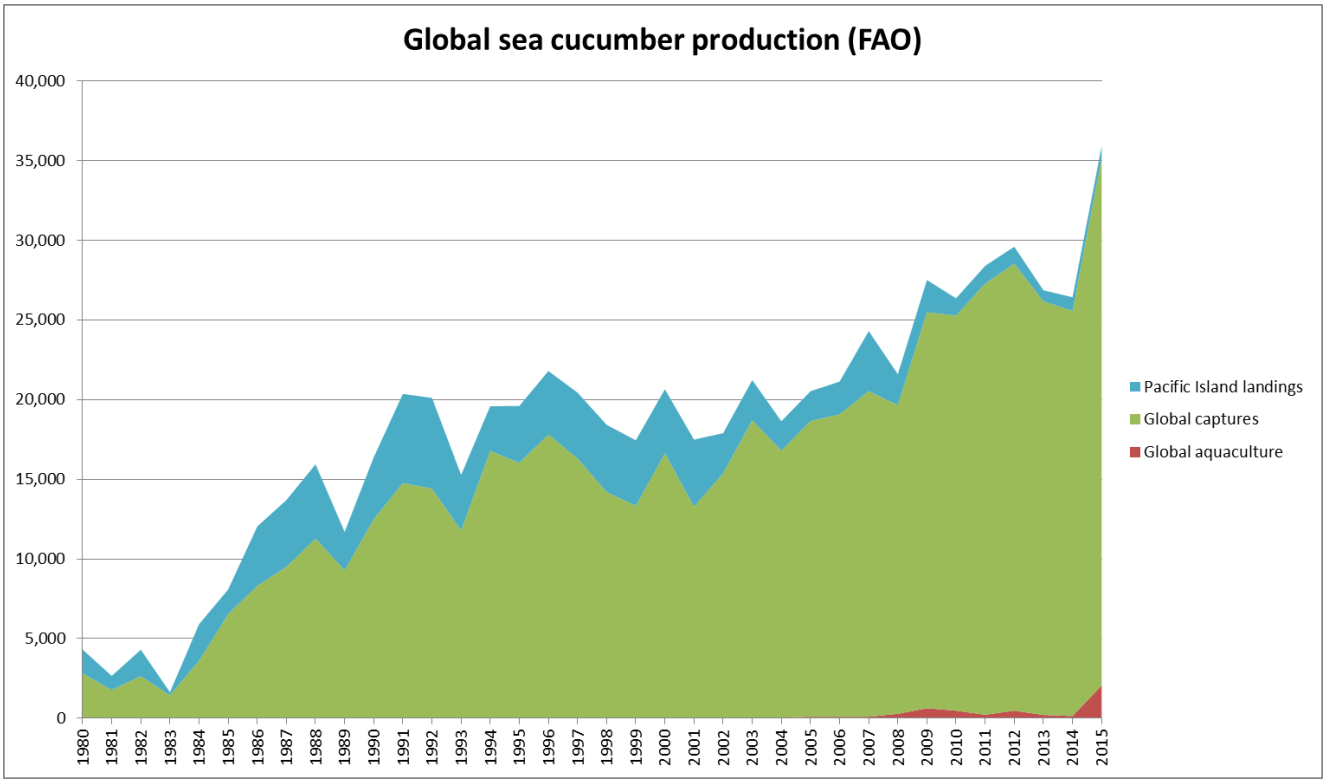
Processing remains a major issue but further information is required as to the proportions and quality of BdM processed at village and provincial level. Major efforts may be required to maximize value but this will be distracting from the proposed first priority actions above and it is suggested this be addressed in a second phase.

Appendix

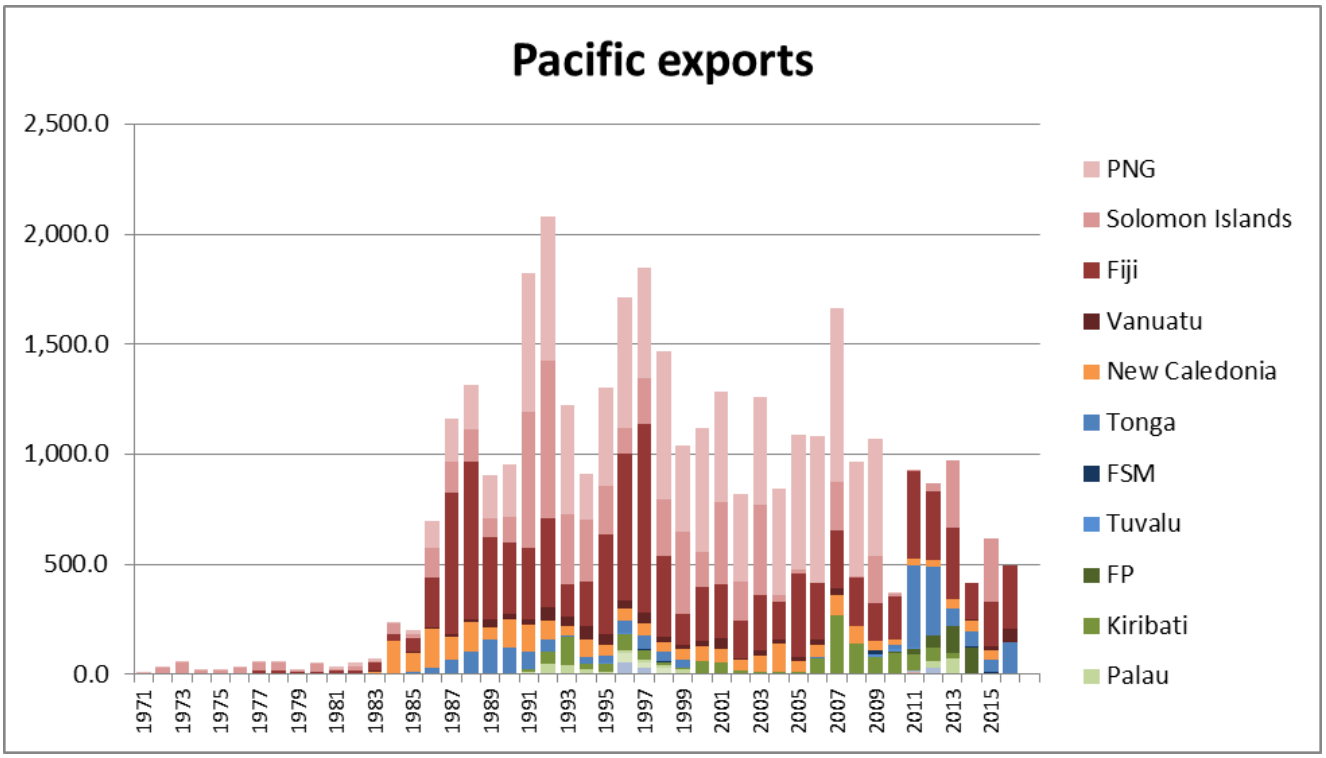
This section appends analyses and data not referred to in the summary review.

Status of global and Pacific region sea cucumber fisheries (FAO data)

FAO data does not appear to match country records. There may be mismatches in whether data provided is in dry weight or wet weight and other inconsistencies. The FAO data is illustrated in the graph below.



This review and data held by SPC provide the following graph of exports in terms of dry weight.



Comparison of global trade data in relation to Pacific Islands

It is becoming increasingly possible to use trade data to provide additional checks and balances on exports of BdM in the Pacific. The World Bank World Integrated Trade Solution (WITS) online at http://wits.worldbank.org/default.aspx provides an

interesting comparison though it has to be noted that while Hong Kong appears relatively meticulous in its reporting (at least as far as weight is concerned) the same cannot be said for other importing countries such as mainland China and Vietnam.

Table: Comparison of sea cucumber imports in tonnes recorded by Hong Kong (WITS) and estimated landings in Pacific Island countries (this study).

	2012		2013		2014		2015		2016		Total 2012-2016	
	WITS	SPC	WITS	SPC	WITS	SPC	WITS	SPC	WITS	SPC	WITS	SPC
American Samoa	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
Fiji	334.8	309.0	296.0	323.0	287.2	165.9	299.0	200.4	320.8	288.7	1,537.8	1,287.0
Kiribati	76.8	63.1	17.2	20.8	7.2	0.0	0.0	0.0	0.0	0.0	101.2	83.9
Marshall Islands	30.0	27.6	3.4	0.0	4.0	0.0	13.0	0.0	1.5	0.0	51.9	27.6
Micronesia, Fed. St	26.7	1.1	4.4	2.6	30.5	0.0	10.5	0.0	24.3	2.0	96.4	5.7
Papua New Guinea	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0
Samoa	0.0	0.0	9.0	0.0	4.5	0.0	3.7	0.0	0.0	0.0	17.2	0.0
Solomon Islands	5.7	35.0	338.2	304.9	0.0	0.0	339.2	286.2	0.1	0.0	683.1	626.1
Tokelau	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0
Tonga	31.6	67.9	87.6	56.0	45.9	142.6	0.0	0.0	0.0	0.0	165.1	266.5
Vanuatu	0.0	0.0	0.0	0.0	1.2	1.9	10.7	18.6	45.3	58.9	57.2	79.3
Pacific total	505.5	503.7	759.2	707.3	380.5	310.4	676.5	505.2	391.9	349.6	2,713.6	2,376.1
Global Total	7,864.5		8,905.6		7,698.6		6,961.3		6,510.4		37,940.4	

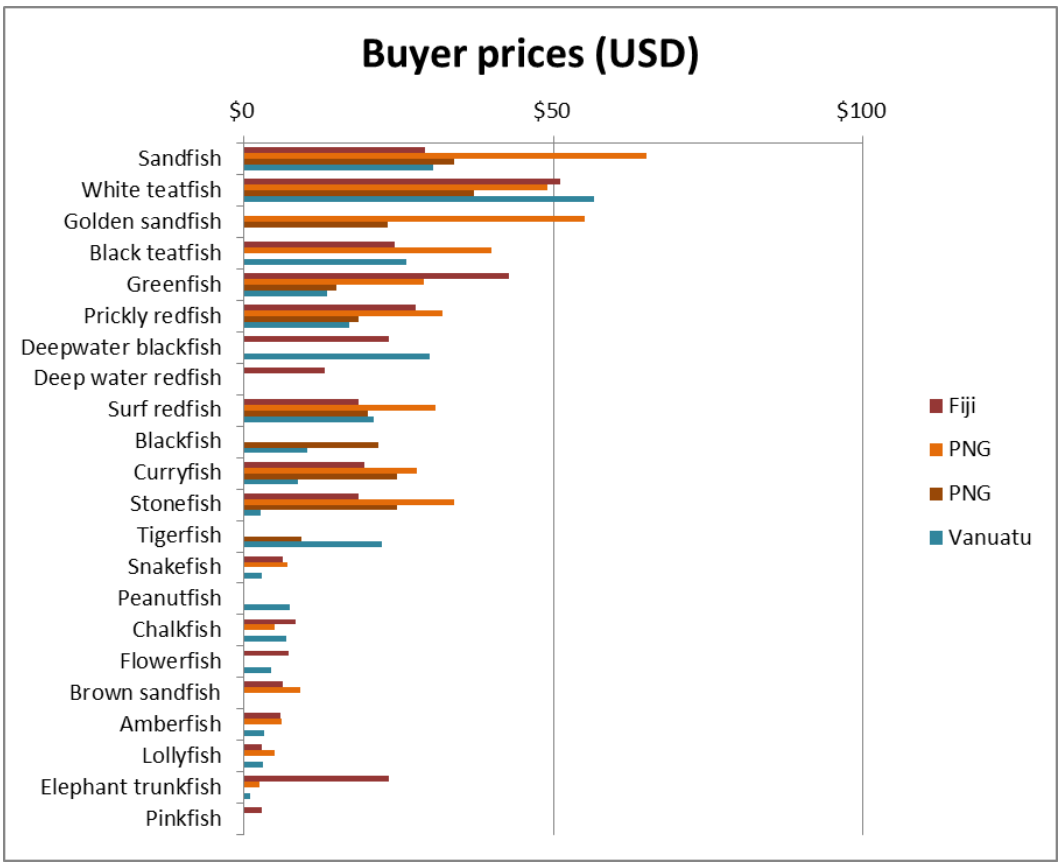
1: Fiji and RMI also recorded by WITS to export a total of 1.5 tonnes over the same period to China
2: French Polynesia and New Caledonia were not recorded by WITS

Table: Value of sea cucumber imports recorded by Hong Kong from Pacific Island countries (USD)

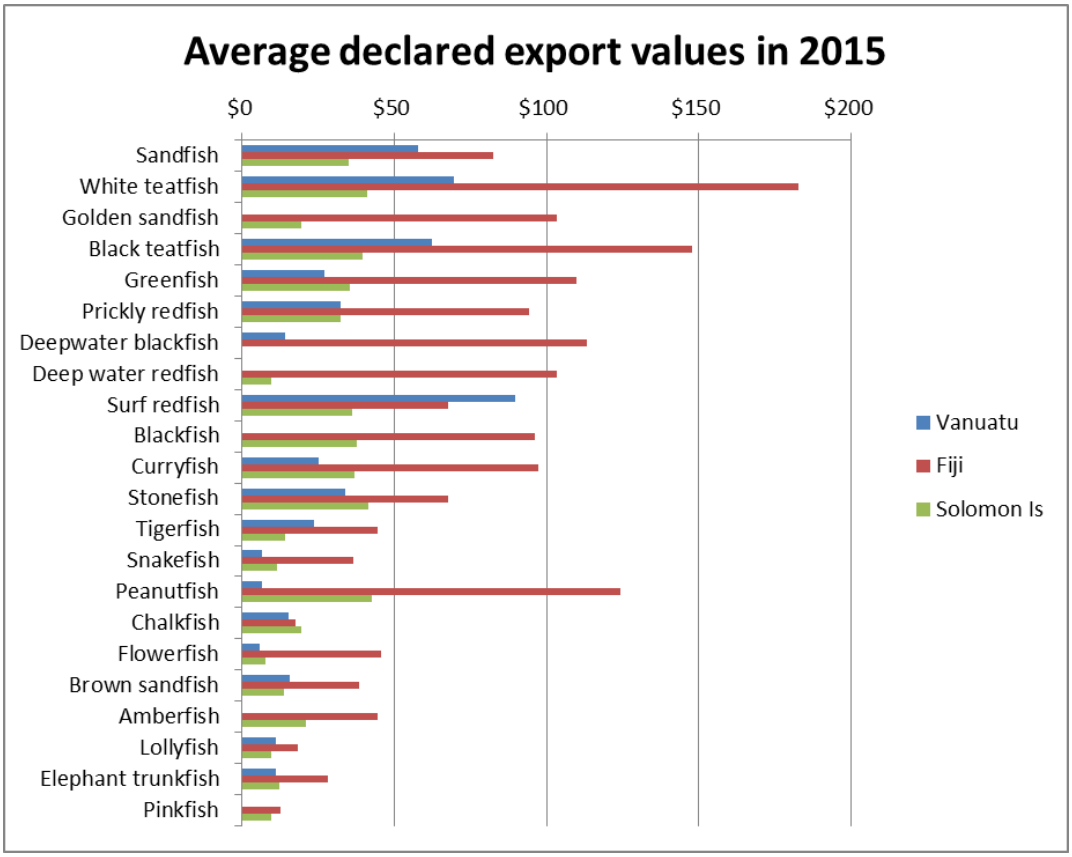
	2012	2013	2014	2015	2016	Grand Total
American Samoa	0	0	0	2,322	0	2,322
Fiji	5,375,294	4,511,045	3,552,078	4,468,364	7,148,880	25,055,661
Kiribati	607,769	206,452	69,198	0	0	883,419
Marshall Islands	116,950	20,473	25,793	185,757	6,953	355,926
Micronesia, Fed. S	670,447	143,568	658,421	332,171	526,744	2,331,351
Papua New Guine	0	339,560	0	0	0	339,560
Samoa	0	54,095	27,341	22,361	0	103,797
Solomon Islands	278,667	3,697,610	0	2,581,106	1,507	6,558,890
Tokelau	0	0	0	3,576	0	3,576
Tonga	277,258	577,305	292,267	0	0	1,146,830
Vanuatu	0	0	96,406	278,863	692,405	1,067,674
Pacific total	7,326,385	9,550,108	4,721,504	7,874,520	8,376,489	37,849,006
Global Total	347,029,755	350,542,844	296,802,214	273,372,725	293,307,419	1,561,054,957

Graphs on buyer prices and declared export declared values

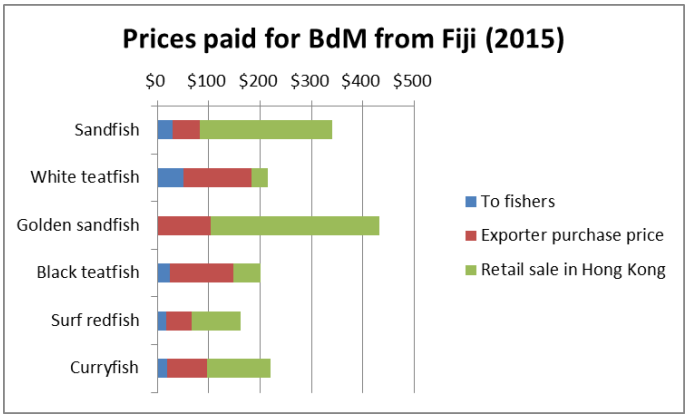
Buyer prices as per policy brief and references therein.

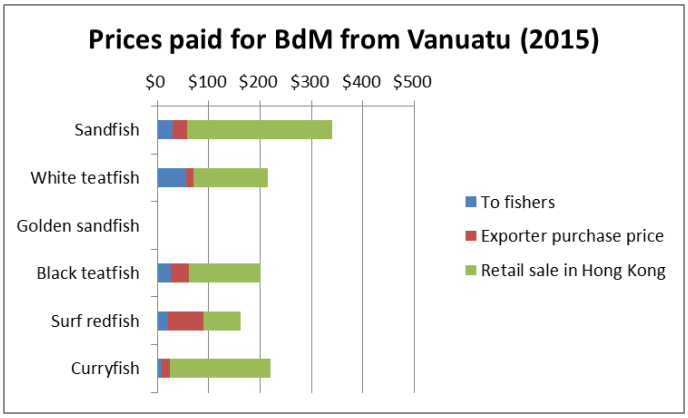


Export values as declared in customs declarations / not verified



Comparison of available information on local prices received by fishers, export value declared by exporters and retail prices in Hong Kong





Evidence of shift from high value to lower value BdM exports

Table: Comparison of different species of bêche de mer landed in harvests in 2013 and 2015 in Solomon Islands (source MFMR data).

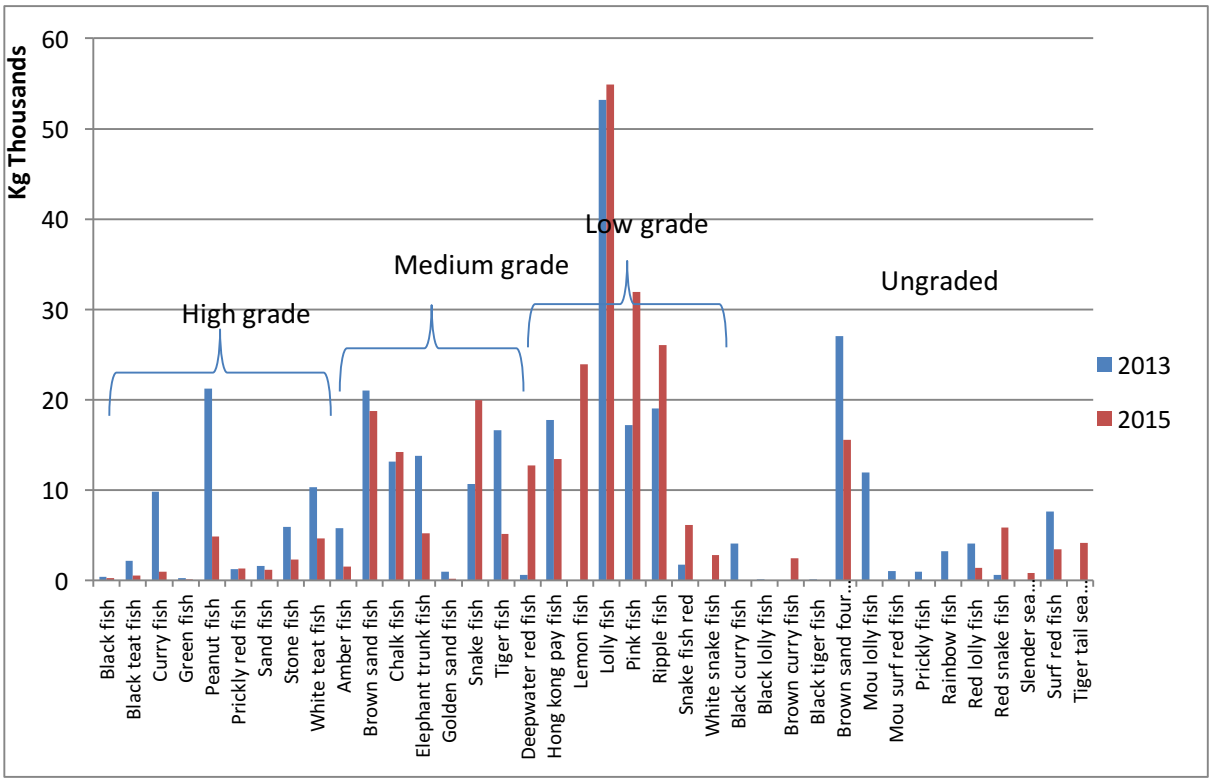
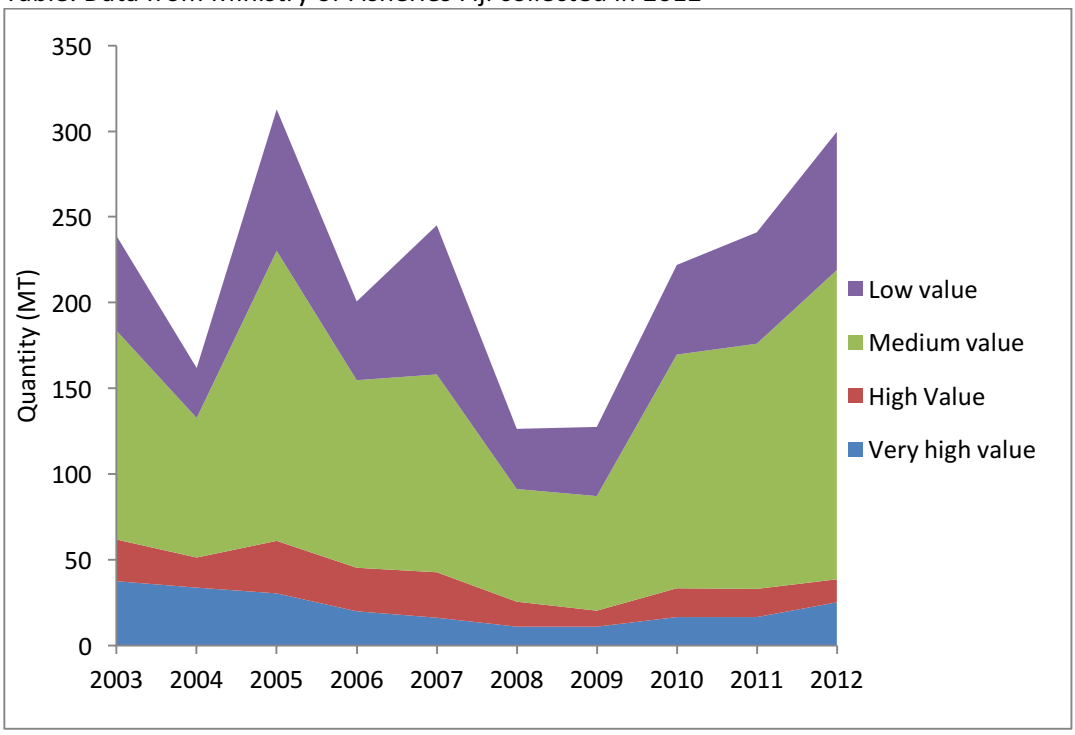


Table: Data from Ministry of Fisheries Fiji collected in 2012



Brief 1: Maximising long-term economic value and ecological sustainability of sea cucumbers

The implementation of effective mechanisms for the management, maintenance and restoration of sea cucumber stocks to maximise long-term economic value and ecological sustainability is a priority identified and committed to by MSG leaders in the **MSG Roadmap for inshore fisheries management and sustainable development 2015-2024** and **The Memorandum of Understanding on technical cooperation in coastal fishery and aquaculture development**

Policy background

FTAC 6 will be able to review progress and plan future activities in achieving **MSG Roadmap Objective 3.1**: Implement effective mechanisms for the management, maintenance and restoration of sea cucumber stocks to maximise long-term economic value and ecological sustainability.

Additionally, **the MoU** specifies:

Strategy (i) To develop harmonized systems for the sea cucumber fishery in the area of policy, development and management measures that address marketing issues and fishery development strategies which are suited for the MSG governments and communities;

Areas of Collaboration: 5.1 The Members agree to develop harmonised systems for sea cucumber fisheries in the areas of policy, technical cooperation development and management. The measures that may be taken in developing the harmonised system for sea cucumber fisheries may include but not limited to the following:

> i) No person or company may export beche-der-mer without a valid license;
>
> ii) Members will put in place a country specific national beche-de-mer management plan which includes national management measures such as prohibitions on the use of scuba or hookah and other breathing apparatus, size restrictions, closure periods etc. and considers other economic measures for management and compliance within the fishery;
>
> iii) Align management, monitoring and compliance approaches within the MSG sea cucumber fisheries to avoid illegal transhipment of product between Member countries to get around local management measures;
>
> iv) No person or company may conduct commercial farming of beche-de-mer without a valid aquaculture licence. Permitted export sizes for beche-de-mer may be different for farmed specimens than from the wild caught fishery.

The Outputs of the MSG roadmap include:

- Review BDM management systems, including consideration of species and area based total allowable catches and ensure measures to aid stock recovery in each country
- Ensure BdM management systems are integrated with, and provide momentum to, the development of comprehensive inshore fisheries management systems
- Improve data collection and sharing by and between Fisheries Departments and Customs Departments.
- improved coordination and sharing of harvesting, operators and market information between MSG members to increase prices and facilitate control
- Investigate establishment of producers' cooperatives and other innovative management practices
- Examine harmonisation of prices, licence conditions etc and the maintenance of a regional database including detailed information on all exporters.

Progress: Substantial progress and new challenges

FTAC 6 will be able to review progress in MSG members' countries and note the achievements made in the areas of management plans, licencing and management regulations. The efforts of fisheries agencies and the support of regional organizations should be noted, particularly that of SPC most recently through the World Bank funded PROP project.

In the light of the progress review the meeting will be in a position to strategize the best approaches and timelines to address the major outstanding areas including:

- Aligning management, monitoring and compliance approaches within the MSG sea cucumber fisheries
- Improve data collection and sharing by and between Fisheries Departments and Customs Departments
- Improved coordination and sharing of harvesting, operators and market information between MSG members to increase prices and facilitate control.

- Working towards harmonisation of prices, licence conditions etc. and the maintenance of a regional database including detailed information on all exporters.

Brief 2: Recovering the value of sea cucumber fisheries in Melanesia

Summary

- Improved management of sea cucumber fisheries could approximately **double the value of bêche de mer** remaining in MSG countries:
    - Management would include regulating the fishery in each country to reduce the boom and bust cycle, enforce minimum size limits and limit catches (e.g. through export quota and/or reduced harvest season length).
    - This could increase the average annual value of BdM exports by **80-105%** based on recent historical exports and prices.
- The value that **exporters are able to pay could likely increase at least 40% and possibly up to 200%**. Increased control of exports through price certification or even auction mechanisms could substantially increase the margins left in country, preliminary indications are that this could be in the order of 40-200%.
- Improvements in **processing** are expected to increase value of BdM by **at least 20% and up to 50%.**
- Enforcement of biologically appropriate **minimum size limits** would not only allow better replenishment and ongoing ecological function of the sea cucumbers but should increase the overall **harvest value of some species by up to 50%**
- **Taken together, improved management, regulation of exports and handling of sea cucumbers could reasonably be expected to at least triple the value of bêche de mer to countries.**

Value projections based on Carleton et al. (2013)

Carleton et al. (2013) tried to illustrate through somewhat simplistic modelling, based on historic harvests, how moderation of the boom and bust cycle could result in about the same volume of saleable dried bêche de mer over a fifteen year period, but showing a significant improvement in value as harvests of the higher value species are kept at modest but more consistent levels (Figure 1).

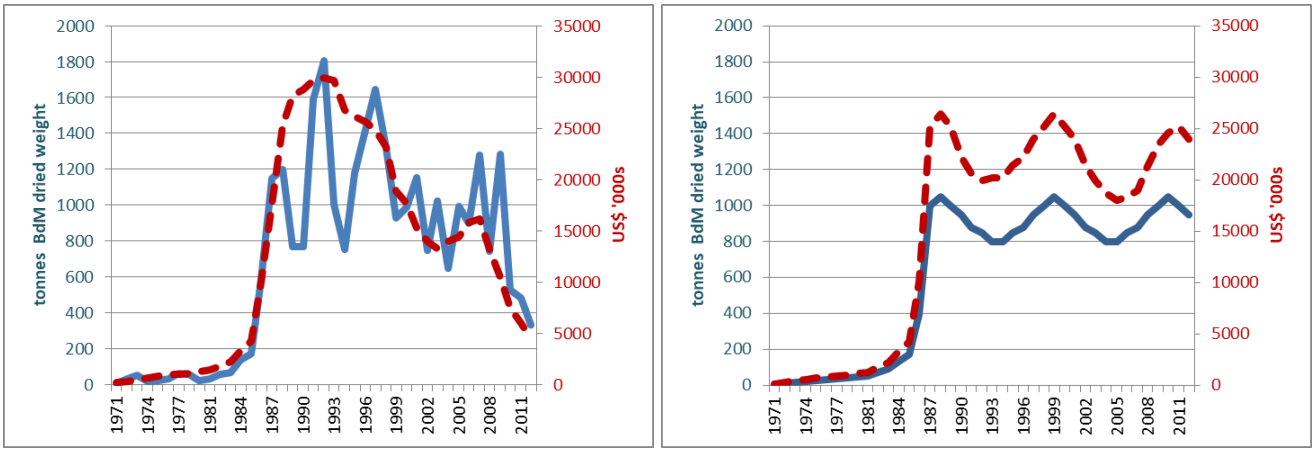


Figure 1: Estimated value (red dashed line/right hand axis) and exports (solid line/left axis) of bêche de mer in PNG, Solomon Islands, Vanuatu, Fiji and Tonga. Left-hand graph based on actual export data and estimated values and right-hand graph based on a reduced amplitude and periodicity boom and bust cycle with a more constant mix of sea cucumber species taken of more consistent size. Data include Tonga which only accounted for 6% of harvests in that time period. Source Carleton et al. 2013.

According to Carleton et al. (2013) the bottom line is that over the 15 year series of high volume harvesting (1998 to 2012), harvests for these five countries totalled 13,351t, with an imputed value of US$204M. If a more conservative management system had been applied this could have generated, over the same period, harvests of 14,010t valued at $371M or 82% more. With more pessimistic pricing (i.e. suggesting that harvests included still higher proportions of lower value species), the value may have increased under better management by 106% i.e. from $163m to $335M.

> The take home message from this is that the average annual value to countries of bêche de mer exports could well be an additional 80-105% based on more conservative management and more rigorous enforcement of regulations. This does not include potential improvements in processing which could add around 20% further. Another benefit is the improved maintenance of ecological functions by leaving lower value and smaller animals in the ecosystem.

Value projections based on current study

The MSG countries have recorded total exports of around 28,000 tonnes in the period 1980-2016 which averages about 766 tonnes per year. Fisheries decline and the need to impose moratoria has resulted in a yearly average over the last five years of around 460 tonnes compared to 720 tonnes for the preceding 5 year period (56% more) and 923 tonnes for the 5 year period

before that (i.e. 100% more). Taking a 15 year period the figures are similarly stark; the last 15 years saw exports averaging 680 tonnes per year compared to the average of the previous 15 year period of 1,140 tonnes (i.e. 67% more).

Harvests in tonnes	PNG	Solomon Islands	Fiji	Vanuatu	MSG4
Average (1980-2016)	**302.5**	**165.5**	**277.5**	**20.5**	**766.1**
Max	**791.0**	**715.4**	**862.0**	**66.0**	**1,840.7**
Total (1980-2016)	**11,191.9**	**6,125.2**	**10,269.2**	**759.3**	**28,345.6**
Last year of harvest/data	**2017**	**2015**	**2016**	**2016**	**2016**
5 yr average preceding last year of harvest	158	126	257	16	464
Previous 5 yr average (i.e. 6-10 yrs before last harvest)	212	92	248	6	716
Preceding 5 yr average (i.e. 11-15 yrs before last harvest)	609	202	247	18	923
Last 15 years average	326	103	239	13	682
Previous 15 years average	447	278	375	36	1,137

The value of exports has not been systematically recorded. Prices have potentially increased over time but this may have been negated to some extent owing to the switch to lower value species and smaller sizes as stocks are overexploited. Between 2015 and 2017 exporters declared a value of between 31,000 and 36,000 USD/tonne for mixed exports in Fiji, PNG and Vanuatu. Assuming the highest value (which is still probably an under-declaration) and projecting this to historical catch data above (again an underestimate as healthier stocks would have a higher proportion of high value animals) then it would appear that a potentially USD 25-35 million / year fishery is currently yielding around USD 14 million or less than 50%.

Value at 2016 USD prices	PNG	Solomon Islands	Fiji	Vanuatu	MSG4 Total
Average (1980-2016)	10,889,416	5,959,654	9,991,605	738,820	27,579,496
Max	28,476,000	25,754,400	31,032,000	2,376,000	66,265,200
Total (1980-2016)	402,908,400	220,507,200	369,689,400	27,336,354	1,020,441,354
Last year of harvest/data	**2017**	**2015**	**2016**	**2016**	**2016**
5 yr average preceding last year of harvest	5,695,200	4,536,720	9,266,400	571,271	14,345,591
Previous 5 yr average (i.e. 6-10 yrs before last harvest)	7,626,240	3,297,600	8,928,000	216,000	25,781,760
Preceding 5 yr average (i.e. 11-15 yrs before last)	21,916,080	7,273,440	8,892,000	662,400	33,225,840
Last 15 years average	11,745,840	3,709,920	8,618,400	464,024	24,538,184
Previous 15 yrs average	16,101,600	10,007,040	13,515,720	1,293,600	40,917,960

At the country level there are some nuances but similar proportions for PNG and Solomon Islands (around 50% of potential value) while the recent history for Fiji and Vanuatu is more mixed but nevertheless similar on 15 year timescales (40-60% of potential value). Some of the country level information requires more scrutiny and better data sets but it is expected that the above logic holds for all cases.

Increased profit margin capture in country

The above calculations not withstanding it appears that currently much of the declared value does not remain in country or does not accrue to the community fishers. Recent auction data from Solomon Islands suggested that buyers are willing and able to pay significantly more and still make an acceptable profit from export sales. The winning bid for a mixed species confiscated consignment of 35.5 tonnes equated to 51,000 USD/tonne but average bids were higher and several bids were higher than 80,000 USD/tonne. It is possible that the species, grade and size selection was above average but these bids still suggest

between **40% - 200% higher** potential value of better regulated and selected BdM harvests, significantly higher than regionally declared export values of 30-35,000 USD/tonne,.

Increased focus on large size and high value species

Recent Hong Kong price data collected and a trial fishery by Rick Hamilton focusing on sandfish and white teatfish suggest that prices above 100USD/kg are achievable even up to 200 USD for larger specimens (Waldie and Hamilton, Pers. Comm.).

Thus the increased values estimated under a well managed fishery and controlled export (about double current values) could be further increased by improving the margin left in country (a reasonable estimate could be double again). Such improvements could take place through setting minimum export and buyer prices, export price certification or the use of auctions.

Processing and value adding

Ram et al. (2014) found a loss in value due to poor quality of the final dried product in Fiji ranges from 10% to 50%. Carleton et al. (2013) estimated that regionally around 30% of value of bêche de mer is currently lost through poor processing and that "if greater care and attention were paid to the quality of processing, a further uplift in value of between 10 and 20 per cent could be achieved (i.e. in practice it would not be possible to reverse all losses due to poor processing)".

Other potential areas that have been proposed for value adding but require further assessment include:

- Environmental certification either as sustainably managed or from high quality processing or environments
- Centralized processing to high standards
- Development of local or regional brands
- Niche marketing, freeze drying, individual packaging etc.

Calculations on potential biomass and value increased if size limits are enforced

A separate report aims to describe the losses/gains expected through allowing the current proportion of undersize harvest to reach minimum size. Early indications are that natural mortality plays a significant role and overall biomass is not significantly larger at minimum size but value is significantly increased. Additionally the ecosystem benefits of leaving these ecologically important organisms in the ecosystem for longer and the contribution to wild stocks by allowing them to breed needs to be considered.

Brief 3: Setting minimum size limits for MSG sea cucumber fisheries

Summary

- Minimum size limits are an important management tool for sea cucumber fisheries.
- These size limits bear review and improvement in all 4 MSG countries.
- Adopting simple more easily enforceable categories based on reasonable biological advice is a good first step
- **MSG countries are encouraged to review and harmonize these size limits to be implemented by the next harvest period.**

Rationale

Setting minimum size limits is a strongly recommended strategy for ensuring sustainability and improving value for sea cucumber fisheries. Minimum sizes:

- Allow animals to reproduce and replenish stocks
- Help fishers earn more for each sea cucumber they catch[1]
- Encourage fishers to shift effort once catches drop below a threshold
- Provide a break on fishing effort and slowing a "free-for-all" approach or mentality

The minimum legal sizes in all MSG countries bear review and improvement. A common standard minimum sizes would be advantageous for:

- Reducing the focus of companies on countries with least ecologically sustainable regulations
- Common technical studies, awareness materials and training for communities, fisheries and customs officers

The proposed size limits should be:

- Based on best available biological data relating to reproductive sizes
- Relatively easy to apply
- For live and dry animals as well as providing number of animals per given weight (e.g. 1 kilo).
- Have a reduced number of size classes to reduce complexity and confusion owing to species identification
- Enforced as a minimum at point of export and would need customs authorities to be involved and trained in their application and for shipments to be separated by species and, optimally, sizes.
- Subject of a intense and thorough awareness program of all communities, fishers and stakeholders involved in the fishery
- Reviewed in future on a regular basis (possibly along with management plans).

Proposed size limits

The most recent work that addresses the criteria raised above relevant to Melanesia was produced in Fiji in 2017 by Ministry of Fisheries Fiji/Wildlife Conservation Society (MoFF/WCS). The national minimum sizes are compared to the proposed minimum size limits for dry and wet individuals in Table 1. Green shading represents sizes that would not need modification (i.e. could be adopted) in a first phase, other shading highlights discrepancies. These MoFF/WCS sizes (Table 2) are presented for adoption and could be incorporated in management plan and regulations for the next open season. In Fiji's case a period of moratorium would present the opportunity to subsequently implement the sizes without major impact on established fishers. Correct estimations of maximum number of pieces per kilo need to be estimated for the species for which Vanuatu has not already provided estimates (11 of 33 species).

[1] In general larger sized bêche de mer command higher prices. Market preferences for some species such as *Holothuria fuscogilva* and *H. fuscopunctata* are for medium sized animals but these still are larger than the proposed minimum legal sizes so imposing limits would not represent a foregone commercial opportunity. *H scabra, H lessoni,* and *H fuscogilva* show exponential increase in price with size and larger size limits should be considered that will increase fishery economic performance in the long term (Purcell 2014 and Pers. Comm.).

Table 1: Comparison of wet and dry minimum size limits for the 4 Melanesian countries in 2017

			Live length				Dry length				
			MoFF/WCS Proposed	PNG	Solomon Islands	Vanuatu	*MoFF/WCS Proposed*	Fiji current	PNG	Solomon Islands	Vanuatu
scientific name	**FAO code**	**common name**	***LL cm***	LL cm	LL cm	LL cm	***DL cm***	DL cm	DL cm	DL cm	DL cm
Thelenota anax	HLX	Amberfish	*40*	20	40	40	*15*	7.6	10	15	15
Holothuria whitmaei	JDG	Black teatfish	*30*	22	30	30	*15*	7.6	10	15	15
Actinopyga miliaris	KUQ	Blackfish/Hairy blackfish	*25*	15	20	20	*10*	7.6	10	10	10
Bohadschia vitiensis	BDV	Brown sandfish	*35*	20	25	25	*15*	7.6	10	10	12
Bohadschia similis	BDX	Chalkfish	*25*	20	20	15	*10*	7.6	10	10	7
Stichopus herrmanni	JNG	Curryfish	*35*	25	35	35	*15*	7.6	10	15	15
Actinopyga echinites	KUE	Deep water redfish	*25*	25	20		*10*	7.6	15	10	
Actinopyga palauensis	YGP	Deepwater blackfish	*30*	20		30	*15*		10		15
Holothuria fuscopunct	HOZ	Elephant trunkfish	*35*	45	40	40	*15*	7.6	15	20	20
Pearsonothuria graeff	EHV	Flowerfish/Black spotte	*30*	25	30	30	*15*	7.6	10	15	15
Holothuria lessoni	JCO	Golden sandfish	*25*	22	25	25	*10*	7.6	10	10	12
Stichopus chloronotus	JCC	Greenfish	*20*	20	20	20	*10*	7.6	10	10	10
Holothuria atra	HFA	Lollyfish/Reef lollyfish	*30*	30	30	20	*10*	7.6	15	15	10
Stichopus horrens	KUN	Peanutfish /Dragonfish	*20*	20	15	20	*10*	7.6	10	10	10
Holothuria edulis	HFE	Pinkfish	*30*	25	20	20	*15*	7.6	10	10	10
Thelenota ananas	TFQ	Prickly redfish	*45*	25	35	35	*20*	7.6	10	15	17
Holothuria scabra	HFC	Sandfish	*20*	12	25	20	*10*	7.6	10	10	10
Holothuria coluber	HHW	Snakefish	*40*	30	30	40	*20*	7.6	15	20	20
Actinopyga lecanora	YVV	Stonefish	*20*	15	20	20	*10*	7.6	10	10	10
Actinopyga mauritiana	KUY	Surf redfish	*25*	20	25	25	*10*	7.6	8	10	12
Bohadschia argus	KUW	Tigerfish/Leopardfish (S	*30*	20	30	30	*15*	7.6	10	15	15
Holothuria fuscogilva	HFF	White teatfish	*35*	35	35	35	*15*	7.6	15	15	16
Holothuria flavomacul	JCI	Snakefish red		30	20	30			15	10	15
Holothuria leucospilota	HFQ	Snakefish white/White threadsfish		25	20				10	10	
Thelenota rubralineata	JDZ	Lemonfish/Candyfish		25	30				10	15	
Stichopus vastus	JPW	Brown curryfish		25		20			10		10
TBC		Honpai fish, pigfish			NA					NA	
TBC		Labuyo		30					15		
TBC		Ocellated curryfish		25					10		
TBC		Pink Curryfish		25					10		
Holothuria hilla	JCK	Tigertail sea cucumber		25					10		
TBC		Brown curryfish	*25*				*10*				
TBC		Loli's mother	*40*				*20*				

The FAO species codes are not commonly used but there is a need for countries to adopt a common and agreed coding for species that will reduce confusion caused by varied local names.

Table 2: Proposed initial harmonized size limits for bêche de mer in Melanesia. For dry lengths there are 3 size categories (10, 15, 20cm) and for wet lengths 6 (20, 25, 30, 35, 40, 45 cm). Note these sizes are broadly comparable to those in place in New Caledonia (red = requires review).

			Proposed MSG		
			Proposed MSG		Vanuatu
scientific name	**FAO code**	**common name**	**LL cm**	**DL cm**	**Pcs/1kg**
Thelenota anax	HLX	Amberfish	40	15	12
Holothuria whitmaei	JDG	Black teatfish	30	15	10
Actinopyga miliaris	KUQ	Blackfish/Hairy blackfish	25	10	29
Bohadschia vitiensis	BDV	Brown sandfish	35	15	35
Bohadschia similis	BDX	Chalkfish	25	10	128
Stichopus herrmanni	JNG	Curryfish	35	15	25
Actinopyga echinites	KUE	Deep water redfish	25	15	*TBC*
Actinopyga palauensis	YGP	Deepwater blackfish	30	15	12
Holothuria fuscopunctata	HOZ	Elephant trunkfish	45	20	4
Pearsonothuria graeffei	EHV	Flowerfish/Black spotted sea cucumber	30	15	53
Holothuria lessoni	JCO	Golden sandfish	25	12	19
Stichopus chloronotus	JCC	Greenfish	20	10	222
Holothuria atra	HFA	Lollyfish/Reef lollyfish	30	15	71
Stichopus horrens	KUN	Peanutfish /Dragonfish (SI)/Selenka's sea cucumber	20	10	132
Holothuria edulis	HFE	Pinkfish	30	15	166
Thelenota ananas	TFQ	Prickly redfish	45	20	11
Holothuria scabra	HFC	Sandfish	25	10	66
Holothuria coluber	HHW	Snakefish	40	20	73
Actinopyga lecanora	YVV	Stonefish	20	10	30
Actinopyga mauritiana	KUY	Surf redfish	25	12	33
Bohadschia argus	KUW	Tigerfish/Leopardfish (SI)	30	15	31
Holothuria fuscogilva	HFF	White teatfish	35	16	8
Holothuria flavomaculata	JCI	Snakefish red	30	15	100
Holothuria leucospilota	HFQ	Snakefish white/White threadsfish	25	10	*TBC*
Thelenota rubralineata	JDZ	Lemonfish/Candyfish	30	15	*TBC*
Stichopus vastus	JPW	Brown curryfish	25	10	96
TBC		Honpai fish, pigfish	0	0	*TBC*
TBC		Labuyo	30	15	*TBC*
TBC		Ocellated curryfish	25	10	*TBC*
TBC		Pink Curryfish	25	10	*TBC*
Holothuria hilla	JCK	Tigertail sea cucumber	25	10	*TBC*
TBC		Brown curryfish	25	10	*TBC*
TBC		Loli's mother	40	20	*TBC*

Brief 4: approximating buyer and market prices for bêche de mer for Melanesia (October 2017)

Summary

- Data are sometimes urgently required to support unforeseen management actions at national level. Such an occasion arose in Solomon Islands in September 2017 with the unexpected opening of the fishery.
- Data required for management decisions include prices afforded to fishers by buyers, export values and buyer prices in Hong Kong and China that can be used to set minimum recommended prices for fishers, fair market price for export levy calculations and to determine license values.
- More emphasis on routine collection and sharing of available information on buyer prices, export values and trade information in both published and grey literature can provide a factual basis for decisions at short notice

Prices paid by buyers to fishers

Table 1 provides a sample of recent prices from other MSG countries. Note large variation between and within country's which may be affected by quality and size of processed BdM. Some traders have wet weight and dry weight prices. Wet weight prices are often higher than the proportional dry weight. The absence of national or regional standards for grading of BdM is a challenge.

Table 1. Prices are average price for **dry weight (kg) high grade** unless otherwise specified. Prices are USD.

scientific name	common name	code	value	Fiji 2015 (2)	PNG 2017 (3)	PNG 2017 (4)	Vanuatu 2015 (5)
Holothuria scabra	Sandfish	SF	H	$29	$65	$34	$30
Holothuria fuscogilva	White teatfish	WTF	H	$51	$49	$37	$57
Holothuria lessoni	Golden sandfish	GSF	M		$55	$23	
Holothuria whitmaei	Black teatfish	BTF	M	$24	$40		$26
Stichopus chloronotus	Greenfish		M	$43	$29	$15	$13
Thelenota ananas	Prickly redfish	PRF	M	$28	$32	$19	$17
Actinopyga palauensis	Deepwater blackfish	BF	M	$23			$30
Actinopyga echinites	Deep water redfish	DRF	M	$13			
Actinopyga mauritiana	Surf redfish	SRF	M	$18	$31	$20	$21
Actinopyga miliaris	Blackfish	BF	L			$22	$10
Stichopus herrmanni	Curryfish	CF	L	$19	$28	$25	$9
Actinopyga lecanora	Stonefish	STF	L	$18	$34	$25	$3
Bohadschia argus	Tigerfish	TF	L			$9	$22
Holothuria coluber	Snakefish	SNF	L	$6	$7		$3
Stichopus horrens	Peanutfish	PNF	L				$7
Bohadschia similis	Chalkfish	CHF	L	$8	$5		$7
Pearsonothuria graeffei	Flowerfish	FF	L	$7			$4
Bohadschia vitiensis	Brown sandfish	BSF	L	$6	$9		$8-27
Thelenota anax	Amberfish	AMF	L	$6	$6		$3
Holothuria atra	Lollyfish	LF	VL	$3	$5		$3
Holothuria fuscopunctata	Elephant trunkfish	ETF	VL	$23	$3		$1
Holothuria edulis	Pinkfish	PKF	VL	$3			

2. Mangubhai et al. 2016. Average purchase price
3. Kinch, J. Personal Comm. New Ireland, Best trader price
4. Kinch, J. Personal Comm. Kiwali, Milne Bay.
5. Using DW conversion ratios from Carleton et al 2013

Export value declared to government at point of export

Values declared by exporters to national customs authorities are detailed below. To date only Solomon Islands levied an export tax based on percentage of the declared value and this may account for the low value reported. For 2015 the average value per tonne of BdM was in Fiji: USD 30,839 in Vanuatu USD 36,429, in PNG approximately USD 32,000 but in Solomon Islands it was only USD 13,267. Note that because these data rely on voluntary declarations Carleton et al 2013 proposed that exporters should show a commercial invoice from the Hong Kong importers with the buying value in Hong Kong. The feasibility of obtaining such an invoice needs to be tested.

Table 2: Sample of recent average vales declared to Government from other MSG countries

common name	code	Fiji 2015 (Avg)	Solomon Is 2015	Vanuatu 2015 (Avg)
Sandfish	SF	$83	$35	$58
White teatfish	WTF	$183	$41	$70
Golden sandfish	GSF	$103	$19	
Black teatfish	BTF	$148	$39	$62
Greenfish		$110	$35	$27
Prickly redfish	PRF	$94	$32	$32
Deepwater blackfish	BF	$113		$14
Deep water redfish	DRF	$103	$10	
Surf redfish	SRF	$68	$36	$90
Blackfish	BF	$96	$38	
Curryfish	CF	$97	$37	$25
Stonefish	STF	$68	$41	$34
Tigerfish	TF	$45	$14	$24
Snakefish	SNF	$36	$11	$7
Peanutfish	PNF	$124	$42	$7
Chalkfish	CHF	$17	$19	$15
Flowerfish	FF	$46	$8	$6
Brown sandfish	BSF	$38	$14	$16
Amberfish	AMF	$45	$21	
Lollyfish	LF	$18	$10	$11
Elephant trunkfish	ETF	$28	$12	$11
Pinkfish	PKF	$13	$10	

Hong Kong and China buying prices

Exporters do not necessarily report accurate selling prices and so gaining an independent estimate of the Hong Kong buying price is useful. Recent studies have shown that this is possible but data are still emerging.

Table 3: Estimated wholesale prices in China (Guanghzou) and Hong Kong based on 2011 data from Purcell 2012 inflated to 2015 prices at 2.9% per year. USD.

Common name	Guangzhou retail/wholesale 2015 in SBD	Hong Kong retail 2015 in SBD
Sandfish	153.60	339.71
White teatfish	134.54	215.26
Greenfish		431.64
Golden sandfish	76.24	201.81
Black teatfish	88.57	
Prickly redfish	145.75	
Deepwater blackfish	118.84	
Deepwater redfish	70.63	
Surf redfish	84.09	162.57
Hairy blackfish	88.57	
Curryfish	135.66	220.87
Stonefish	105.39	
Leopardfish	65.03	
Snakefish	42.60	
Peanutfish	77.36	
Brown sandfish		
Amberfish		
Elephant trunkfish	53.81	
Dragonfish	24.67	
Eye-spot curryfish		
Burying blackfish	16.82	

This exercise demonstrated that based on publicly available information, contact with select regional experts and advise from SPC staff it is possible to compile a defensible estimation of prices at various levels though this could be more up to date and complete.

- The PROP regional project responded to the request to provide best available data at short notice for improved decision making.
- The exercise also tested whether ongoing low level data collection by staff at regional organizations such as SPC or MSG could provide useful information in this type of scenario.

Brief 5: Political will, transparency and information

Summary

- Estimates suggest that a well-managed sea cucumber fishery could double or even triple the income accruing to community fishers, national traders and government revenue.
- Improvements in sea cucumber fishery management by fisheries agencies are increasingly negated by poorly informed political interventions for often unclear motives.
- It is of paramount importance to improve constructive engagement by political actors that supports rather than undermines sustainability and community/national benefits and reducing or eliminating political or other vested interest interventions that are not in the public interest.
- Two non-confrontational strategies are offered: 1. Pursuing regional and national policy processes that raise attention to the benefits of addressing the issue; 2. Increasing awareness and capacity to present information on the issues at stake to both the public and politicians.

Benefits of a well-managed sea cucumber fishery

The importance of coastal fisheries has long been recognized in regional and sub-regional policies such as the Framework for a Pacific Oceanscape, the Melanesian Spearhead Group roadmap for inshore fisheries management and sustainable development (2015–2024), and culminating in the New Song for Coastal Fisheries – pathways to change", the Noumea Strategy, 2015 and the Future of Fisheries Roadmap endorsed by the PIF Leaders in 2015.

Improved management, regulation of exports and handling of sea cucumbers could reasonably be expected to at least triple the value of bêche de mer to communities and countries from a well-managed sea cucumber fishery (see separate Brief). The potential of the region's second most valuable fishery after tuna is reflected by the priority placed on BdM in the MSG Roadmap and MoU on coastal fisheries.

A recent review (see Review paper) concludes that the MSG member Fisheries Agencies have all made substantial progress in addressing technical aspects of the management of sea cucumber fisheries but in all cases this is undermined by political or vested interest interventions.

Lack of clarity, transparency or understanding may underlie some of the unsupportive actions that political figures have imposed on government authorities in all MSG countries. In many cases these have the effect of allowing the interests of traders to supersede the national or community interest. Examples include:

- Declaring open season of the sea cucumber fishery before stocks were adequately recovered according to technical advice (SI, Vanuatu)
- Declaring open season dates before regulations and/or management systems were in place and operational (PNG, SI, Van)
- Interfering with enforcement of regulations or penalties (Vanuatu, SI?)
- Exemptions or other mechanisms that suspend technical or best practice precautionary regulations (Fiji)
- Undue influence in licencing procedures (all)
- Lack of emphasis or support to implement regulations or criteria under the management plan (exporter criteria, export levies, minimum sizes). (all)

It is imperative that political will and public opinion understand and support the intent of management regulations designed to ensure the sustainability and maximize long term income to communities, national traders and government income.

Ways forward

National and inter-governmental technical agencies are constrained in their ability to engage on topics of political will. However, consultations with national and regional agencies as well as civil society groups have suggested two complementary and constructive approaches: 1. Increasing awareness and capacity to present information on the issues at stake to both the public and politicians; 2. Pursuing regional and national policy processes that bring attention to the benefits of addressing the issue.

1. Increasing awareness and capacity to present information to the public and politicians

Regional fisheries policies and guidelines already place high priority on increasing the availability of information to stakeholders and raising awareness on factors affecting sustainable management of coastal fisheries (MSG Roadmap Objective 2, Noumea Strategy Outcomes 1 and 2, Future of Fisheries Roadmap Strategy 2). Raising awareness and understanding of communities but also the general public and politicians will be crucial in enabling stakeholders to understand the intent behind BdM plans and regulations and discerning legitimate from illegitimate political interventions. This requires:

- Prioritization and increased emphasis/resourcing of information and awareness programs in each country with appropriate national and regional support to improve messaging and targeting relevant to the issue above.
- Increased capacity to handle media and public relations for campaigns (e.g. preceding BdM open seasons) or in responding to media or pressure from vested interests. This requires different skill sets from those traditionally provided by donors and inter-government agencies and should be prioritized.

2. Pursuing regional and national policy processes

Regional and national policy declarations on natural resource management are clear but not being adequately interpreted into national implementation and daily operations. Drawing the attention of policy makers and politicians to this issue requires engagement by regional, national and civil society actors across a range of different processes i.e. not to rely on one strategy alone. The following suggestions for a multi-pronged regional engagement strategy are made for consideration:

What	When	Strategy	Who
MSG FTAC	November	Endorsement of the strategies for consideration of other regional and national stakeholders as well as next MSG meeting. Potentially task regional PROP to implement/follow up	MSG FTAC
Pacific Islands Forum Framework on Pacific Regionalism (FPR)	November – February	Coastal fisheries are already on leaders' agenda and SPC has the opportunity to report to the leaders on progress and issues emerging. An additional option includes a fresh FPR submission by either regional governmental or civil society organizations.	SPC
Coastal Fisheries Working Group (CFWG)	December	This mixed group could decide or endorse the issue of political will as a priority. The group can refer the issue to PIFS, Tuna Task force, CRGA and/or FFC.	SPC or CFWG members
PIFS Non State Actor (NSA) dialogue	March – onwards	NSAs may include this issue on the list to take to PIF leaders	NSAs e.g. LMMA
Forum Economic Ministers Meeting (FEMM)	April	Economic ministers may be interested in receiving a paper on economic losses and maximizing the benefits from BdM.	PIFS
PIFS Leaders meeting, Nauru	September	A venue for formal reporting and NSA engagement as above.	SPC, PIFS, NSAs
Others		CROP Heads meeting, Tuna Task Force (PIFS), FFC, Ensure regional policy indicators and monitoring are sensitive to political will issues	CROP, SPC, PIFS

Brief 5: Harmonization of conditions for sea cucumber fisheries management in Melanesia

Background

The MSG's **Memorandum of Understanding on technical cooperation in coastal fishery and aquaculture development** 2015 (MoU) called for cooperation and collaboration on coastal fisheries and aquaculture. The MoU in relation to sea cucumbers states:

> "The Members agree to develop harmonised systems for sea cucumber fisheries in the areas of policy, technical cooperation development and management".

And agrees to:

> "Align management, monitoring and compliance approaches within the MSG sea cucumber fisheries to avoid illegal transhipment of product between Member countries to get around local management measures;"

The **MSG Roadmap for inshore fisheries management and sustainable development 2015-2024** committed Heads of Governments to further detail:

- Improve data collection and sharing by and between Fisheries Departments and Customs Departments
- Improved coordination and sharing of harvesting, operators and market information between MSG members to increase prices and facilitate control
- Harmonisation of prices, licence conditions etc and the maintenance of a regional database including detailed information on all exporters.

Objectives of harmonizing terms and conditions

- Share information that is useful to improving the sustainability of the BdM industry and maximizing the proportion of the value that stays in countries and with fishers
- Reduce or remove the incentive for illegal transhipment of product between Member countries to get around local management measures.
- Engage Melanesian solidarity to increase control over the value and sustainability of the sea cucumber fisheries and to maximize benefits to communities
- Adopt common standards that are more resilient to local interference and reinforce sustainable management and local value maximization
- Ensure a common high standard that improves the international image of Melanesian BdM as sustainable and high quality products from pristine environments

Aligning management, trade and market policy and information sharing

It is proposed that MSG fisheries agencies seek to align at the earliest feasible opportunity policies to achieve the mutually agreed objectives above in the following broad areas:

a. Harvest control rules and regulations
b. Pricing and market information and standards
c. Fiscal, economic, trade, companies and customs measures

The following short briefs summarize the areas proposed for harmonization, current status and proposed way forward.

Brief 5a: Harvest control rules and regulations

Harmonizing harvest rules and regulations may provide one of the major steps towards preventing "illegal transhipment of product" and "getting around local management measures" as requested in the MoU as well as providing robustness to local political interference.

Ideally and under the right management regimes, the BdM fishery could remain open and sustainable. This may be a long term goal but in the medium term, the goal should be to have regular, predictable and probably short openings every year. With this in mind the following standard HCRs are proposed.

Item	Current status	Proposal	Notes
Minimum size limits (MSL) Establish biologically optimum size limits that provide the foundation for sustainable harvests and producing higher value species and sizes	Improved across most countries but not completely harmonized	Compare countries (see Review paper 4.1) Evaluate challenges in adopting best current advice (this meeting) Agree standard Minimum Size Limits (MSL) and pathway for adoption (this meeting) Adopt MSG nationally (next harvest period)	See briefing note 4.3a.
Banned gear Underwater Breathing Apparatus and "bombs", others to be agreed	Already banned: UBA (SI, PNG, Van, FJ) Night diving (SI, Van) Trawl (SI, Van), Bombs (SI, Van) Use of torches (PNG)	Ensure ban on UBA is MSG wide and permanent (this meeting) Discuss and agree if possible whether MSG countries can adopt SI and Vanuatu ban on all other methods apart from "hand picking or collecting through free diving or wading (reef walking) and during daylight hours;" (this meeting and implement for next management plan/regs)	The MSG MoU proposes banning UBA and harmonizing other management methods
Seasonal opening Harmonizing seasonal openings would reduce illegal transhipment and foreign / non-local opportunistic exporters	All countries now practice limited openings. Illegal transhipment between countries happens Traders shift operations between countries	Discuss advantages and obstacles to harmonizing seasons (this meeting) Agree next steps	Potentially unattractive politically, may need to have an allowable set of criteria for exemptions (e.g. natural disasters)
Moratoria Harmonizing moratoria would reduce illegal transhipment and foreign / non-local opportunistic exporters	All countries now practice moratoria. Transhipment between countries happens Traders sometimes shift operations between countries	Discuss opportunities for synchronizing open seasons (this meeting) Discuss or assess whether this could reduce prices Agree next steps	Opening dependent on stock status which may vary between countries. May still be possible to agree a season for openings when they happen e.g. pre-Christmas / Chinese New year
CBFM / CBRM	Encouraged in all countries	Discuss any experiences but approaches are country/site dependent	Continue to profess support

Brief 5b: Pricing and market information and standards

Information on local and export prices of BdM is not readily available to decision-makers.

Item	Current status	Proposal	Notes
Fisher buyer price: Establish a minimum buyer price for different species and grades so that community fishers receive fair prices	Not routinely collected or shared SI and Vanuatu outlined buyer prices but these are not compulsory	Collect and share national data. Dec' 2017 onwards Produce MSG comparative list. June 2018 and 6 monthly thereafter Propose formula for national minimum buyer prices. July 2018 Agree MSG local buyer price strategy/ standard. FTAC second half 2018	Costs of operating in different countries or provinces within a country may vary as do the risks of doing business. Proposed solution is either a low minimum buyer price or a standard price that can be adapted to the national or provincial context through a fixed formula Needs shared understanding of, or standards on grades
Trader / exporter buyer price: Establish prices received by exporters from overseas to ensure fair pricing and export values are recorded and taxed	Not routinely collected or shared Data are increasingly available from academic and other research program	Sharing available information (this meeting and brief) Agree mechanisms to obtain and share export data from: Exporters: Provision of commercial invoices etc (see below) Overseas markets: Survey of markets (by MSG Sec, national missions or others)	Opportunities for a small office or coordinator to source and share information regularly (e.g. bulletin). Countries would need to collect and share information from exporters either from licence applications or export paperwork.
Export value A fair estimation of export value is needed in those countries that charge export levies either to determine the fair market price or to check declarations	Not standardised or shared Solomon Islands is starting to certify market price for exported BdM	Discuss the SI experience and the possible mechanisms for using export prices to calculate a certified market price for exporters (this meeting) Commission further economic work if necessary (this meeting)	Relates to trader/export prices but may involve a formula to account for risks and costs of doing business. This formula should be robust and transparent
Standard quality grades: Buyer prices are determined to a large extent by size and quality of the processed products	Buyers are usually the sole judge of grades and this is open to abuses when fishers are negotiating prices	Discuss the possibility of commissioning or supporting an initiative to describe standard grades to match to standard buyer prices above (this meeting) If agreed outline timeline and opportunities (this meeting)	Existing (e.g. PARDI 2) or new project could address.

Note: Buyer prices

Purpose: Increased scrutiny and awareness of buyer prices should increase pressure on traders to offer fairer prices as long as such prices can eventually be standardized and regulated. Increased value should be retained. A common standard across countries should reduce the incentive for more opportunistic investors to concentrate on countries with the most favourable conditions (for them) to the detriment of fishers and sustainability.

> Proposal: Share and compare as many local buyer prices as possible as well as trader prices and value at point of export. Comparison between these and prices of importers in China and Hong Kong should be evaluated and considered in transparently in licence issuing processes and be widely publicised to increase pressure on buyers to offer higher prices.

Brief 5c: Fiscal, economic, trade, companies and customs measures

Item	Current status	Proposal	Notes
Export quota (TAE) More powerful and immediately implementable than TAC Requires allocation of export quota as part of licencing Recommended by all reviewers and staff	Not implemented Customs already capture timely and at least partially relevant data TACs alone are not sufficiently robust	Discuss options Agree timeline to consult further with customs and inland revenue to implement and improve collaboration and data sharing between Customs and Fisheries Agencies	First few seasons will generate complaints until companies sort out their communications and strategies with fishers Requires closer partnership with Customs / inland revenue which provides check against corruption Provides vital cross check on data collection See note 6
Export levies Important opportunity to recover cost of management and increase revenue to countries for a depleting natural resource	SI has implemented and is now improving the export levy system. Vanuatu has provision for it but did not implement on last open season. PNG and Fiji could but so far do not have a levy	To be discussed and pursued along with above	If levies are not legally feasible the equivalent value could be added to licence fees Levies capture value of harvests even where these have exceeded TAC – licence fees do not. Work towards common customs procedures and standards
Buyer and export licence criteria Licencing provides a unique opportunity to enforce regulations and gather information that is under utilized. Can enable a black list	Countries have developed a variety of criteria for licence applications These need to be compared seeking the most beneficial ones for maximizing value and sustainability and other agreed policy outcomes	Discuss Compile and compare national systems between each other and best practice advice (Carleton et al 2013 and others). Draft template for next meeting or circulation	Criteria should eventually include mandatory minimum buying price from fishers, data provision, commercial invoices on export, company ownership and capital etc. (see notes 2 and 3 below)
Licence fee value Fees can be used to raise revenue and ensure genuine and committed buyers/exporters enter the trade	Licence fees have increased substantially in SI and Vanuatu PNG and Fiji have low or virtually no licence fees	Discuss feasibility for harmonization Discuss mechanism to ensure value of licence is proportional to value of expected returns Decide next steps (this meeting)	See note 1 below and Review paper 4.1
Company information required Information is required in detail on companies and their source of capital to enable better policies and control Enables a black list if needed	Licencing processes generally collect company information including some details on proportion of national ownership The information is not easily accessible or comparable within or across countries and a register is needed	Collect and compare formats of information collected Discern key and useful information and gaps Design data storage and retrieval system that for national and then MSG level Implement national and regional registers	See note 4 below

Ensure national data entry Most countries already collect more information than is currently retrievable from their databases	Most countries are not able to produce key data rapidly and are not routinely storing other important data collected	Review data collection and data entry procedures in each country Plan improvements needed in each country	Vital for improving international reporting on the trade in BDM, including eventual traceability for food safety and quality; regional trader database; and CITES listing.
Annual reports on national and regional industry performance Vital to informed decision making and transparency as well as harmonized management	Annual reports are deficient or absent in most countries for key coastal species. Lack of information and transparency enables poor decisions or corruption	Define basic and optimum content of BdM national and regional annual reports Support countries to produce first annual reports	See note 5
Penalties and bonds Financial mechanisms to incentivize compliance may also serve to offset management costs and raise revenue	Countries have not or cannot effectively implement penalties. Some penalties are too low. PNG has trialed the use of compliance bonds	Penalties need review (see Review paper 4.1). Calculate appropriate penalties where necessary and align countries. Too early stage to determine role of compliance bonds but PNG may share experiences	

NOTES

1. Appropriate and comparable export licence fees

Purpose: reflect the value of the trade, recover management costs, discourage unreliable and opportunistic operators. To note that even if TAE are exceeded at least state revenue is not lost for any excess exported whereas relying on licence fees alone may result in no state returns on the excess. In countries which do not allow export levies on BdM this fee may be added to licence fees or bonds.

Proposal: Compare (done – see Regional review paper 4.1), agree and put in process for implementation

2. Restrict and monitor eligibility criteria for export licences and enforce a black-list

Reduce likelihood of non-compliance, maximize benefits for nationals.

Proposal: Sample full company information available to each country, compare, determine any confidential or restricted portions, consult Trade and Investment authority if necessary, draft common database entries and determine whether information is sufficiently detailed (e.g. to parent company or source funding level) to be worth proceeding.

3. Conditions of licence to include data provision

As a minimum provide:

- Province of harvest (PNG smaller scale?). Purpose: long term stock management and monitoring
- Species and average size in each bag. Purpose: allow for monitoring in shifts in sizes and species value as indicator of stock status. (SI Customs records, PNG? Not Fiji or Vanuatu)
- Commercial invoice from overseas importer stating FOB value per species and size and grade. Purpose: ensures correct export levy where applicable and accurate information for monitoring and ensuring fair buying prices and licence fees. [Must check feasibility in all countries]
- Schedule of buying prices for each exporter (from local buyers and fishers). Purpose: provides additional information for monitoring the value left in communities and export levies/licences.

Proposal: Review and compare national requirements (partially done – see Review paper 4.1)

4. Company information to collect:

As a minimum:

- Who owns (nominated in company law)
- Who manages (who deals with day---to---day practice, sales negotiation, and quality control – a matter of practice)
- Who funds (shareholders, source of loans and source of working capital / advance payments)

National trade and investment bureaux as well as Fisheries Agencies should be consulted further on this.

- **Commercial invoices as part of customs clearance**: Confirm veracity of the prices quoted (i.e. that the prices quoted are a genuine market price agreed between buyer and seller, and that transfer prices are not being used);

Important given that in many (or at least some) businesses it is the importer that is providing the working capital for BdM supply chain networks in---country (a system that offers considerable potential for transfer pricing).

5. Annual reports on national and regional industry performance

Clear and unambiguous annual declarations on industry performance including regulatory and administrative framework.

Purpose: Reduce petit corruption, illegal activity and increase public support and awareness (Carleton et al 2013 R3).

> Proposal: Determine/discuss feasibility. If agreed then examine national PR/publicity systems, discuss strategies and content and possibility of SPC or PROP support. Produce common materials (e.g. on value lost of BdM, basics of management strategy). Define national information strategies including campaigns.

6. Factors to consider in developing export quota (TAE)

Country will first need to determine a TAC then develop criteria for subdividing and allocating this TAC to TAE.

Need to determine penalty for TAE overruns, e.g. remove the proportion of TAE overrun from the export company from the following harvest, or additional tax, levy on each ton exceeded, confiscation etc.

To consider. What would happen to the sea cucumbers, BDM that have been harvested which exceeded the TAE?