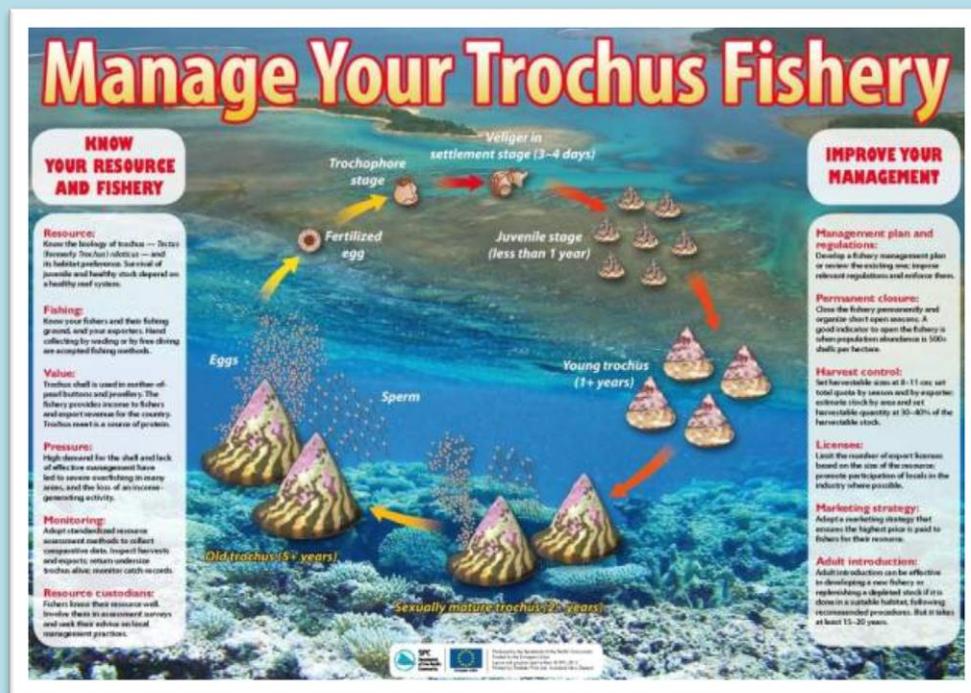


Assessment of the development impacts of the SciCOFish invertebrate work in Cook Islands and Vanuatu



December 2014

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Key words: SPC, SciCOFish, Development impacts, Cook Islands, Vanuatu

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Acronyms and terms

Acronym/term	Meaning
ACP	African, Caribbean, Pacific (regions)
AMRC	Aitutaki Marine Resources Centre (Cook Islands)
BDM	Beche-de-mer, sea cucumbers, holothurians
CEAFM	Community-based Ecosystem Approach to Fisheries Management
CIMRIS	Cook Islands Marine Resources Institutional Strengthening Project
CoFish	Pacific Regional Coastal Fisheries Development Project
COT	Crown-of-thorns starfish
DFAT	Department of Foreign Affairs & Trade (Australia)
EC	European Commission
EDF	European Development Fund
EEZ	Exclusive economic zone
ENSO	El Niño-Southern Oscillation
EU	European Union
FAME	Fisheries, Aquaculture, and Marine Ecosystems (division of SPC)
GIS	Geographic information systems
Green snail	<i>Turbo marmoratus</i>
IRD	Institut de Recherche pour le development
IUU	Illegal, Unregulated and Unreported (fishing)
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MFAT	Ministry of Foreign Affairs and Trade (NZ)
MMR	Ministry of Marine Resources (Cook Islands)
MPA	Marine protected area
MTR	Mid-term Review
NCD	Non-communicable disease
ND	No data
NGO	Non-government organisation
NIWA	National Institute of Water and Atmospheric Research (NZ)
NZ	New Zealand
NZAID	New Zealand Aid Programme, now MFAT (NZAP)
P-ACP	Pacific-African, Caribbean and Pacific
PIRFO	Pacific Islands Regional Fishery Observer (training standard)
PNG	Papua New Guinea
PROCFish	Pacific Regional Oceanic and Coastal Fisheries Development Project
RBM	Results-based Management
RFID	Reef Fish Integrated Database
RIP	Regional Indicative Programme
SciCOFish	Scientific Support for the Management of Coastal and Oceanic Fisheries in the Pacific Islands Region
SciFish	Scientific support for the management of oceanic fisheries in the Pacific Islands region
SPC	Secretariat of the Pacific Community
SPCFC	SPC Fisheries Coordinator
TAC	Total allowable catch
TDW	Tuna Data Workshop
Turban	<i>Turbo petholatus</i> and various other small Turbinidae used for food
UNDP	United Nations Development Programme
USD	United States Dollars
UVC	Underwater Visual Census

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1 SUMMARY

This study was commissioned by the Secretariat of the Pacific Community (SPC) as an independent review of the European Union (EU) funded Scientific Support for the Management of Coastal and Oceanic Fisheries in the Pacific Islands Region (SciCOFish) Project. The project is being run from 16th April 2010 till 3rd September 2015, a period of over 5 years under European Development Fund (EDF10) funding. The objective of the SciCOFish Project is the conservation and sustainable use of coastal and oceanic fisheries resources in the Pacific-ACP region, with the purpose of providing a reliable and improved scientific basis for management and decision making in oceanic and coastal fisheries. The project was designed to provide the P-ACP countries with the means to develop efficient fishery management measures, the skills to monitor their effectiveness, and some important tools to combat IUU fishing on the high seas. The project was designed with two components: Component 1 on scientific support for oceanic fisheries management; and Component 2 on monitoring and management of coastal fisheries. This assessment focuses on Component 2 of the project, the coastal activities, which was designed with four activities: 1. Stakeholder consultations; 2. Develop capacity for field monitoring; 3. Develop secondary data protocols for capturing data from other sources and the use of databases; and 4. Management advice. SPC is the implementing agency for the project.

The ultimate objective of the EU cooperation in the Pacific is development and poverty reduction. Given that the SciCOFish project is now in its final year of operation, this study was undertaken in two countries, Cook Islands and Vanuatu, to assess the impacts the project has had on countries and their communities in terms of economic development such as job creation, poverty reduction, food security and capacity development. This study was undertaken over a period of 20 working days between 10th October and 23rd December 2014 and was funded by the Secretariat of the Pacific Community (SPC).

This study was undertaken through a combination of reviewing project documents, conducting in-country meetings with fisheries directors and staff, making field visits to two communities (North Efate, Vanuatu only) and using two survey questionnaires (one for staff and another for fishers or traders). The impact evaluation is based on a model of how SciCOFish could be understood to produce its intended impacts using a 'theory of change' approach called a 'Results Chain' in which an intervention is represented as a sequence of changes often as activities, outputs, outcomes and impacts to report on results achieved in the short-term, medium-term and long-term. The study focused on investigating the impacts produced by the SciCOFish project that relate only to invertebrates, and particularly beche-de-mer (BDM), but other species were also considered. For this study, the results or changes achieved by the SciCOFish Project were estimated using indicators as a way of bridging the gap between the time scales on which the project has operated (<5 years) and the much longer times scales needed to see its most downstream effects in the form of social and economic results and benefits. Indicators were developed for selected project activities and an *a priori* Project Impact Model developed.

Insufficient time has passed for SciCOFish to show development impacts in the areas of income, jobs, food security and quality of life (poverty reduction) but there is evidence of capacity development and sustainable management of invertebrate resources. Other influences also acted to reduce movement towards impacts including: (i) A tension that has developed between SPC and the fisheries departments in Vanuatu, and to a lesser extent in Cook Islands, because the departments are becoming increasingly capable and independent, and want to lead in the development of management of their resources; (ii) Low visibility and/or coordination of the project; (iii) A clash with a similar project working on the same subject in Vanuatu; (iv) Problems with database access and utility (Vanuatu); and (v) Issues of staff upskilling, training of new staff being too *ad hoc* and loss of capacity

as staff shift their focus between local duties, several donor projects and/or are sent overseas on training or secondments.

The SciCOFish project operated in an environment of increasing capability and independence of fisheries departments and in the case of Vanuatu the presence of other sources of training and advice. This meant that training, data systems and advice sometimes conflicted with each other and with the aspirations of the fisheries departments. The country differences and presence of an alternative project in Vanuatu acted to reduce some of the progression from Activity → Outputs → Outcomes → Development Impacts for the project.

Overall, more progress along the results chain for the selected indicator groups and development impacts of SciCOFish were identified in Cook Islands than in Vanuatu. For Cook Islands, time is likely to be the greatest factor for realising benefits to individuals, communities and the country. For Vanuatu the situation is more complex because the Fisheries Department is taking a different approach than the one agreed to as part of SciCOFish.



An unexpected impact of SciCOFish was found in Cook Islands where the presence of SciCOFish and SPC in general was seen as a stabilising influence that ensured that management instruments were not manipulated through local or national politics. Regional benchmarks and practices were seen as an important way to ensure that management would “stay honest.”

Recommendations for improving the development impacts of the SciCOFish Project include:

1. Improving marketing / visibility of the project to increase the context, recognition and participation in the project. Visibility plays a large role in the transference of activities and outputs to outcomes and impacts because it provides a narrative and context for the changes the project brings;
2. Improving database access and utility to allow for more flexibility given changing needs. Countries are becoming more independent as their capacity increases and now have different requirements for data collection fields and queries for analysis;
3. Increasing attention to the working environment including a (preferably national) in-country project coordinator to build cohesion of the activities and better coordinate with other projects operating in similar fields. Discussion is needed to determine whether this might best be a national staff member nominated for the role, or a person hired by SPC;
4. Changing the mode of operation to a country-leads approach with less emphasis on regional commonality. This approach would align with the FAME Strategic Plan 2013-2016 which calls for policies and systems rather than providing individual case-by-case advice and management plans; and
5. Developing a strategy for upskilling existing staff and training new staff, especially as the current momentum on managing coastal resources continues and new positions are needed. In Vanuatu it was suggested that long-term mentoring by scientists placed in-country would be better than intermittent inputs.

2 INTRODUCTION

The Scientific Support for the Management of Coastal and Oceanic Fisheries in the Pacific Islands Region (SciCOFish) Project funded under European Development Fund 10 (EDF10) has been running since 16 April 2010 and will conclude on 3 September 2015, a period of over 5 years (this includes an extension from March 2014). SciCOFish complements the EDF-funded SciFish (Scientific support for the Management of Oceanic Fisheries in the Pacific Islands Region) Project, while following on from the Pacific Regional Oceanic and Coastal Fisheries Development Project (PROCFish) and Pacific Regional Coastal Fisheries Development Project (CoFish), to fulfil the vision of the Regional Strategy Paper and the Regional Indicative Programme (RIP) for Pacific ACP/EC cooperation in fisheries, and will broaden the growing cooperation between the Pacific ACP countries and the EC in fisheries generally¹.

The objective of the SciCOFish Project is the conservation and sustainable use of coastal and oceanic fisheries resources in the Pacific-ACP region, with the purpose of providing a reliable and improved scientific basis for management and decision making in oceanic and coastal fisheries. The project was designed to provide the P-ACP countries with the means to develop efficient management measures, the skills to monitor their effectiveness, and some important tools to combat IUU fishing on the high seas. A 'demand-driven' approach to implementation is intended to ensure that assistance is provided to those countries which are most likely to take up management advice (EU, 2010). The project was designed with two components: Component 1 on scientific support for fisheries management; and Component 2 on monitoring and management of coastal fisheries.

The overall expected results of SciCOFish in 14 SPC member countries² plus Timor Leste arising from the two components of the project were to strengthen scientific understanding of oceanic and coastal systems and to facilitate addressing crosscutting issues such as ecosystem relationships and the impacts of climate change through linking results using databases.

This assessment focuses on Component 2 of the project, the coastal activities, which were designed to be adapted by means of initial stakeholder consultations, on projects combining an urgent resource management issue with a strong local capability to address the issue and maintain a long-term programme (EU, 2010). Sustainability of the project was to be achieved by developing in-country capacity to take over work previously carried out by SPC; developing sustainable financing mechanisms; SPC providing on-going backup for core functions; and developing new funding sources. The project activities for Component 2 include:

1. **Stakeholder consultations:** to assess needs and capabilities and identify specific projects and where possible prioritise the needs of women;
2. **Develop local capacity for field monitoring:** including underwater visual census (UVC), indicator organisms, and field training;
3. **Secondary data protocols:** for capturing data from markets, fishers, export records and other sources, including database development; and
4. **Management advice:** focusing on development of management measures and plans for fisheries based on monitoring and assessment results and consultations with local stakeholders. This includes on-going assistance with review and adaptive management.

SPC as the implementing agency has therefore been providing technical assistance through in-country training in a range of survey methodologies for invertebrate and finfish species and their habitats, primarily targeting sea cucumber / beche-de-mer (BDM) resources. After initial training, those staff

¹ <http://www.spc.int/fame/projects/scicofish/about-scicofish>

² Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu plus Timor Leste

trained continued surveys within their country, and when sufficient data were collected, a minimum of two staff were funded to SPC headquarters in Noumea on attachment to enter, analyse, and interpret the data to form the basis of management advice for the fishery. An informal preliminary report was then produced by the attached fisheries staff, with assistance from SPC staff, incorporating management recommendations based on the results of the data collected. This was followed up with a formal report that included background material on historical data and other information. The onus was then on the individual countries to take up the management advice, and develop and implement management arrangements accordingly. In support of the data collection and analysis, micro-servers and software/databases were also provided, along with training on using the databases and on the use of Quantum GIS software for spatial analysis of data. In addition to these formal aspects, SPC has also been providing more informal on-going assistance with the development of management arrangements and plans when requested.

The ultimate objective of the EU cooperation in the Pacific is development and poverty reduction. Given that the SciCOFish project is now in its final year of operation, this study was undertaken to evaluate whether there have been measurable positive development impacts of the project at country level. The study was undertaken in two countries, Cook Islands and Vanuatu, to assess the impacts the project has had on countries and their communities in terms of economic development such as job creation, poverty reduction, food security and capacity development.

This study was undertaken over a period of 20 working days between 10th October and 23rd December 2014 and was funded by the Secretariat of the Pacific Community (SPC).

3 APPROACH AND METHODS

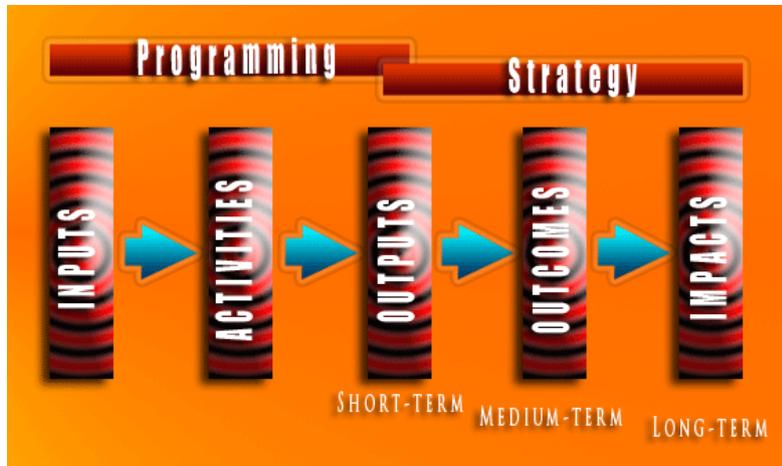
This study was undertaken through a combination of reviewing project documents, conducting in-country meetings with fisheries directors and staff, making field visits to two communities (North Efate, Vanuatu only) and using two survey questionnaires. Travel to Cook Islands and Vanuatu was undertaken between 22nd November and 6th December 2014. The impact evaluation is based on a model of how SciCOFish could be understood to produce its intended impacts using a ‘theory of change’ approach (Rogers, 2012). For context, some methods for representing a theory of change include:

- **Logical framework** (logframe) - classic format used in many development organizations, which uses a 4x4 matrix;
- **Results chain** – the intervention is represented as a sequence of changes often as inputs, activities, outputs, outcomes and impacts;
- **Outcomes chain/outcomes hierarchy/theory of change** – the theory is represented as a series of intermediate outcomes leading to the final intended impacts; and
- **Outcome mapping** – focuses on identifying the “boundary partners”- organizations or groups whose actions are beyond the control of the intervention, but are essential for the impact to be achieved – and then articulating what these partners need to do and how the intervention can seek to influence them (Rogers, 2012).

In this study a ‘**Results Chain**’ approach was used. A result or impact is a describable or measurable development change resulting from a cause and effect relationship. This may include positive and negative, intended and unintended, direct and indirect, primary and secondary effects produced by an intervention. Results chain (or pipeline logic) models represent program theory as a linear process with inputs and activities at the front and long-term outcomes at the end (Figure 1). This approach is used as part of broader Results-based Management (RBM) which is a philosophy or approach for the

design, management and monitoring of programmes and projects, or to report on results achieved in the short-term, medium-term and long-term and can include results chain, needs assessment, process evaluation, cost effectiveness and cost-benefit analyses (CIDA, 2000; Funnell and Rogers, 2011; Unesco, 2011).

Figure 1: Results chain concept



The present study focused on investigating the impacts produced by the SciCOFish project that relate only to invertebrates, and particularly beche-de-mer (BDM), as a part of Component 2 on coastal fisheries. In practice, it is often helpful for an evaluation to include both outcomes and impacts as this allows earlier indication of whether or not an intervention is working, and if it is not working, helps to identify where, and perhaps why (Rogers, 2012). The present study focuses on medium- and longer-term SciCOFish impacts and is an extension of the assessment undertaken as part of the mid-term review (MTR) in 2013 (Hosch and Nichols, 2013) and Steering Committee and Monitoring Reports against the project's logframe for Component 2 (shown in Annexe 7.2). The SciCOFish MTR focused on the 'front end' of evaluation criteria, namely project relevance and design, efficiency and effectiveness, while the 'back-end' evaluation criteria – impact and sustainability – were assessed only to the extent that predictions could be made by 2013 (Hosch and Nichols, 2013).

For this study, the results or changes achieved by the SciCOFish Project were estimated using indicators as a way of bridging the gap between the time scales on which the project has operated (<5 years) and the much longer times scales needed to see its most downstream effects in the form of social and economic results and benefits. That is, there are different levels of results that can capture the development changes that occur as short-term results or outputs, medium-term results or outcomes, and longer-term results or impacts. The results at each level aggregate to contribute to those at the next higher level, so dependencies and cross-links are formed as the project proceeds to impact the system it was designed to change. The results chain model used to assess the impacts of SciCOFish, shown in Table 1 and Table 2 as the 'SciCOFish Impact Model', was developed *a priori* to allow for the formulation of appropriate indicators that could be assessed empirically during the study in Cook Islands and Vanuatu. That is, indicators were developed for [selected project activities](#) carried out for [invertebrate](#) fisheries during the project, and indicators were formulated to estimate their outputs, outcomes and impacts to determine how far the project was able to create change along the results continuum (i.e. from left=outputs to right = impacts in Table 2). For example, a results chain approach could be used to show the training/ capacity building activities, that led to participants gaining increased skills/ knowledge, which in turn may lead to participants applying these skills/knowledge in their work, leading to improved management of coastal fisheries, and finally to improved food security/ jobs etc.

Table 1: Derivation of the Project Impact Model indicators from the Component 2 Activities for SciCOFish

Activities under Component 2	Impact Model – Indicator Group
Activity 2-1: Stakeholder consultations	
Activity 2-2: Develop local capacity for field monitoring	1. Training, Capacity-building, Manuals 2. Awareness, Information products
Activity 2-3: Secondary data protocols	3. Microserver/database
Activity 2-4: Management advice	4. Advice on management and regulations
Project Coordination & Communications	2. Awareness, Information products

The indicators used were mostly qualitative and assessed by consulting with fisheries staff, fishers, traders and other key stakeholders in each country. They were assembled as two questionnaires – one to be self-completed by professional staff and the other to be filled through an interview. These were designed to gather people's judgements, opinions, perceptions and attitudes of different aspects of the SciCOFish project and although many questions were common to both groups, there were some questions unique to each. The indicators used included satisfaction, relevance, awareness, understanding, attitude, quality, usefulness and perception indicators. The structured questionnaires and interviews used are shown in Annexes 7.3 and 7.4.

Because the project is operating in a complex interactive system, it was also necessary to be vigilant for unexpected impacts and consequences of the project. For this reason, the questionnaire included unstructured inputs on benefits and impacts through text responses and by asking for freeform comments and suggestions.

The data collected were entered into a purpose-built database for storage and analysis of the information. Some of the text answers were 'spanned' into concepts to create frequency distributions for the various ideas raised by respondents. Complete results of the survey are presented in Annexe 7.6 on page 38 and interpretation of these results against the SciCOFish impact model form the bulk of this assessment.

Table 2: The SciCOFish Impact Model: Used to indicate development impacts

Based on (CIDA, 2000). This framework illustrates some of the measurements that could be used to indicate that the project has stimulated change, including interim indicators (outputs and outcomes) for those aspects not yet likely to show effects. This includes vigilance for unexpected impacts. The activities shown are selected from the overall Activities for Component 2 focusing on invertebrates and so do not map directly to the logframe.

Effect Categories → Model Definition ↓	Outputs Short term	Outcomes Medium term	Development effect / Impact Long term
Indicator Group 1. Training / capacity-building / Manuals developed	Fisheries officers know how to carry out surveys, analyse data and understand options / types of management measures	<ul style="list-style-type: none"> ▪ Fisheries Departments monitor ▪ Develop effective strategies for management ▪ Put management actions in place 	<ul style="list-style-type: none"> ▪ National ability to sustainably manage fisheries and prevent loss of resources and wealth
2. Awareness / Education / Posters, Info sheets	Fishers, traders, public more aware of state of resources	Acceptance / understanding of management measures	<ul style="list-style-type: none"> ▪ Improved compliance with measures ▪ Food security ▪ Incomes enhanced (secure and/or increased) ▪ Standard of living
3. Microserver / databases	IT and Fisheries staff know how to maintain databases and datasets	Increased capability for handling and using data to understand state of resources	<ul style="list-style-type: none"> ▪ Better reactive management of resources
4. Advice on management /	Options for optimising	Closures, regulations and	<ul style="list-style-type: none"> ▪ Resources optimised

regulations	resources known & understood by national fisheries managers	other measures put in place by government	for maximum economic benefits and food security
5. Other		Unexpected outcomes	Unexpected impacts
Beneficiary reach	<ul style="list-style-type: none"> ▪ Fisheries officers ▪ Fishers ▪ Traders ▪ Communities 	<ul style="list-style-type: none"> ▪ Government officers ▪ Island Councils ▪ Fishers ▪ Traders ▪ Communities 	<ul style="list-style-type: none"> ▪ Island Councils ▪ Communities ▪ Broader society ▪ Sovereign wealth
Time frame	0-1 year after completion of activity	1-5 years after achievement of outputs	5 + years. Project expected to contribute to the impact, but the achievement of the impact will go beyond the life of the project
Risk level	Low Level of Risk: certain amount of stakeholder control over risk factors	Medium level of control over risk factors	High level of risk of intervention (political, economic, cultural) over which project stakeholders have limited control

Table 3: Distribution of questions used in the questionnaires for each Indicator Group showing the aspect of the results chain they estimate

The two questionnaires used are shown in Annexes 7.3 and 7.4. Values are numbers of indicators in each group. Note that although there was significant overlap in the questions, staff and fisher/trader questionnaires included different subsets of the overall list.

Indicator Group / Target Group	Background	Outputs	Outcomes	Impacts
Background, Overall & Unexpected	Q1-11, Q64 (N=12)			Q68-69 (N=2)
1 Training / Capacity / Manuals		Q15-17 (N=3)	Q18-25 (N=8)	Q22, Q26-28 (N=4)
2 Awareness / Education / Posters		Q12-14, Q29-32 (N=7)	Q33-35 (N=3)	Q36-52 (N=17)
3 Microserver / Databases		Q54-57 (N=4)	Q57-58 (N=2)	Q59 (N=1)
4 Advice on Management / Regulations		Q60-63 (N=4)	Q65 (N=1)	Q66-67 (N=2)
Fisheries / Government Staff	11	17	12	21
Fishers / Traders	11	7	3	19
Total number of indicators (N=69)	12	18	13	26

4 COOK ISLANDS

4.1 BACKGROUND: ACTIVITIES AND OUTPUTS

In Cook Islands, the SciCOFish Project focused on working with the coastal fisheries staff of MMR initially training them in survey methods for BDM (Pakoa, 2012), carrying out surveys on Aitutaki and producing a preliminary report for decision-makers on the results of the survey and options that could be considered for management (Pakoa and Bertram, 2012). This work was extended by MMR to three additional islands, Mangaia, Palmerston and Rarotonga. This work was followed up by attachment of 2 staff at SPC in Noumea for on-the-job training on entering, analysing and interpreting the data collected from the BDM surveys, with participants returning with a draft report (see Table 4 for listing of main activities undertaken).

A micro-server was installed with databases and a range of information for the Cook Islands, and users were trained in the use of the server and databases. Training was also provided in the use of Quantum GIS open-source software for spatial analysis of monitoring results. The First Training Workshop on Database Fundamentals for Coastal Fisheries (19-23 Sep 2011, Noumea, New Caledonia) was attended by Tuaine Turua, Fisheries Research Officer. A second workshop run in Noumea 20-29 February 2012 was attended by Teinakore Tuatai, Fisheries Officer.

Management advice was generated through these activities so that a comprehensive report was produced for four islands, with a broadening of the development of reference densities, management tools and strategies for BDM with the assistance of the SciCOFish Project (Raumea et al., 2013). This included quotas for some species of BDM in some locations and harvest strategies the government could consider. SPC continues to assist the staff doing the write-up of survey results with cross-checking of results as needed. SPC is also standing-by to assist with the development of regulations should MMR decide to allow harvesting of some species in some locations under a quota system.

Table 4: Summary of main activities and services provided by SciCOFish to Cook Islands and Vanuatu

This list includes outputs either expressly generated for the two countries, or that could be used to support or generate project impacts.

Indicators	Year	Activities and services	Cook Is.	Vanuatu
1. Training	2011	Safety checklist for underwater survey work	✓	✓
	2012	Aitutaki Sea Cucumber Assessment (Pakoa and Bertram, 2012)	8 staff	
	2013	The status of sea cucumber resources at Aitutaki, Mangaia, Palmerston and Rarotonga, Cook Islands (Raumea et al., 2013)	✓	
	2013	Attachment training in Noumea for data entry, analysis and interpretation into management advice	2 staff	2 staff
	2013	Aneityum Green snail surveys Vanuatu (Pakoa, 2013)		8 staff
	2013	Status of sea cucumber fisheries and resources in Vanuatu (Pakoa et al., 2013)		✓
	2013	National data from monitoring training	✓	
	2013	Attachment: Surveys relating to "The status of sea cucumber resources and recommendations for management in Samoa"		✓
	2014	The status of green snail (<i>Turbo marmoratus</i>) resource in Vanuatu and recommendations for its management		✓
	2014	Attachment: Surveys relating to "Solomon Islands sea cucumber resource status and recommendations for management"		✓
	2014	Meeting in Noumea for Creel and Market surveys	✓	
2. Awareness	2011	Deep blue video	✓	✓
	2011	Guide and information sheets on fisheries management for communities	✓	✓
	2011	Report "Gender in Oceanic and Coastal Fisheries Science and Management"	✓	✓
	2011	Brochure "Pacific women's participation in fisheries science and management"	✓	✓
	2012	Trochus poster	✓	✓

Indicators	Year	Activities and services	Cook Is.	Vanuatu
	2012	Guide and information sheets on fisheries management for communities	✓	✓
	2013	Brochure on men and women's jobs in fisheries	✓	✓
	2013	Identification cards for marine invertebrates surveys in the Pacific Islands	✓	✓
	2013	6 information sheets, 2 leaflets, 3 posters for Information kit for Communities	✓	✓
	2013	Invertebrate Survey Manual	✓	✓
	2013	Guide and information sheets on fisheries management for communities	✓	✓
	2014	Visitors to Vanuatu: Look after our disappearing shelled animals article (SciCOFish, 2014)		✓
	2014	BDM Poster for Vanuatu		✓
3. Servers / Database	2013	Micro-servers installed with database, coastal fisheries data, training materials and digital library with backup in Noumea	✓	✓
	2013	Regional database for export data expanded to include landing data	✓	✓
	2013	Market and Creel database finalised	✓	✓
4. Advice	2012	Advice for Minister of Fisheries on BDM in 2012 (SciCOFish, 2012)		✓
	2013	Initial management advice supplied soon after survey in Vanuatu		✓
	2013	Assistance in development of management plan / specific management arrangements		✓
	2013	Roadmap for inshore fisheries management / sustainable development 2014-2023 Spearhead Group with implementation plan		✓
	2013	Assessments and management advice for Vanuatu		✓
	2013	Status report: Pacific Islands reef and nearshore fisheries and aquaculture	✓	✓

4.2 RESULTS OF SciCOFISH INTERVENTIONS: OUTCOMES

According to staff, Cook Islands MMR was “*not a blank page*” when SciCOFish started and already had skills in BDM surveys, analysis and reporting. The main limitations for not carrying out more surveys are related to insufficient funding for field work³. There are also issues with new staff needing training, and a wish to see the data collectors be upskilled so that they can produce reports based on the fieldwork they are doing, as the group with these skills is small and there is a need for more fisheries-specific training for staff with degrees. All staff involved have benefitted from SciCOFish training and have “*come a long way*”, but there are still some staff who are not clear on what to do with the data.

The education and awareness materials are also being used with communities and teachers, but it is not always clear to staff which materials were specifically developed by SciCOFish. One of the senior staff is using the RFID database in the microserver, and this is being used to generate reports.

Flowing on from the SciCOFish work, regulations have been drafted for BDM (MMR, 2014b) which are expected to be approved in January or February 2015. Management plans and regulations have been developed for trochus (George et al., 2014) and bonefish (MMR, 2010), with some of this work receiving assistance from SPC since the period prior to SciCOFish. Trochus stocks are being assessed and opened to fishing on Aitutaki (yearly when there is enough stock and with a view to optimising the benefits). MMR is asking for tenders from traders able to buy the harvest from communities and ship the trochus to Italy. SPC is also assisting with a Coastal Fisheries Policy (Rongo, 2014) developed by MMR through extensive consultations on 8 islands and with funding from the ACP Fish II Project, and the EU. One staff member suggested that work will soon need to range into managing the wild pearl stocks (brood stock and spat fishing) that feed into commercial pearl farming. For the time being, MMR has decided to keep the BDM fishery closed until all islands have been surveyed, with only a few islands left to survey at the time of this study. There is also a fishery plan and measures that need to be developed for ornamentals (MMR, 2014a) and more mentoring from SPC is needed.

³ In a recent survey at Pukapuka, the cost of flight charter was NZ\$ 24,000

MMR responds to requests from island Councils to survey their resources and provide advice as part of the traditionally-based Raui System of MPAs. This work targets women who earn an income from invertebrates and there was considerable support from other stakeholders consulted during this study (Cook Islands Fishing Association) for the work MMR is doing with island councils, supplying assessment information to allow island leaders to open and close the areas for fishing. The island leaders manage the invertebrate fisheries based on advice from MMR, removing the need for policing. Surveys of invertebrates carried out to date include work on Rarotonga, Manihiki, Rakahanga, Mauke, Mitiaro and Pukapuka, e.g. (George and Kea, 2014; George et al., 2014; George and Story, 2014), with plans to work on Penhryn, with possible support from SciCOFish using Australian Department of Foreign Affairs & Trade (DFAT) funds.

4.3 ASSESSMENT OF DEVELOPMENT IMPACTS IN COOK ISLANDS

4.3.1 Indicator Group 1: Training / capacity-building / Manuals developed

SciCOFish contributed to a system for the management of invertebrates which has been evolving in Cook Islands for some years. Impacts of the project are sometimes hard to separate from those of other projects (including past SPC projects, and work carried out by NIWA, NGOs and NZ MFAT), but it is clear that the national ability to sustainably manage fisheries and prevent loss of resources and wealth has been established in the country as an on-going process that will adapt as needed. Evidence was found for all levels of the results chain (outputs, outcomes and impacts) for this Indicator Group.

Outputs: Eight staff were trained in BDM surveys in Aitutaki and 2 sent on attachment to Noumea for database training, with additional training on GIS and Creel and Market surveys (Table 4). Of 6 trainees who completed the survey questionnaire the self-assessment of in-country training suggested improvements in theory, field surveys, manta tows, transects and data entry as ‘a little better’ (12 scores of 25), ‘much better’ (11), or ‘excellent improvement’ (2). For attachment training, improvements in data entry, cleaning, analysis, interpretation and reports were assessed as ‘much better’ (6 scores of 10) or ‘excellent improvement’ (4). The most important lessons were in data handling, safety at sea and species IDs, and there was a spread in how often people thought they would use what they had learned in their work (some daily, others rarely). More details on these outputs are given in Annexe 7.6.3.

Outcomes: The training, along with other past and on-going interventions has led to MMR carrying out a range of invertebrate monitoring programmes which will soon cover all of the islands. This includes BDM, trochus and general invertebrate monitoring, the development of management plans and regulations, including working with island councils and communities including women within the traditional Raui System, and the emerging system of quotas and tendering for traders to safely and efficiently utilize the stocks for maximum benefit to communities as detailed in Section 4.2 above.

Impacts: The impacts leading on from these changes have meant that there is now an established national ability to manage invertebrates emerging, though it will take some time to be able to assess long term sustainability and flow-on effects on income, jobs, food security and quality of life for Cook islanders. The early signs are that people are confident that there are or will be *“monetary benefits with the trochus harvest for the community and also increase in food security”* and that *“food Security could be enhanced by having trustworthy data produced by MMR using training by SPC SciCOFish which may promote the use of MPAs to ensure there is plenty of invertebrates”*. It is likely that 5 or more years of testing and adjusting these feedback monitoring and management systems will be needed before effectiveness will be measurable and impacts on human quality of life can be estimated.

4.3.2 Indicator Group 2: Awareness / Education / Posters, Info sheets

Information products developed under SciCOFish included information sheets, brochures, identification sheets, manuals and articles that are available for community engagement and education. It has not always been clear to those consulted which of the materials are of SciCOFish derivation. Further, those consulted did not often have a clear idea of the state of their resources and noted the need for monitoring to quantify them.

Outputs: In the survey 9 of 11 (82%) of the respondents said that they had heard of SciCOFish, and 2 (18%) had not. Of 9 people who explained what SciCOFish was, 5 (56%) had a good understanding of the project, 2 (22%) a partial understanding and 2 (22%) little understanding. None of the people surveyed quoted the results of monitoring surveys as part of their rationale for how the abundance of invertebrates is changing. At this point there appears to be low uptake of awareness of the SciCOFish Project and the need for monitoring and management in relation to SciCOFish activities in Cook Islands. There are signs that communities and schools are using at least some of the information generated by SPC FAME, and based on SciCOFish work, because of the noted demand by island communities for monitoring information to feed into the Raii System. Some of this appears to use SciCOFish materials, but NGOs and other initiatives are probably more important so far.

Outcomes and impacts: It is difficult to find evidence of outcomes and impacts related to awareness, education and materials.

4.3.3 Indicator Group 3: Microserver / databases

Outputs: Two people in Cook Islands received database training, one of whom returned a questionnaire. Competence at using the database (RFID) for that person increased as a direct result of the training (self-assessed) from 'OK' to 'good' (one unit shift on a 5 unit scale). It appears the microserver is maintained by SPC. At the moment one person is using the database to store monitoring data and to generate reports. The second trainee has moved to the Pearl Division and is now focusing on other issues. It is not clear whether others will be able to assist with data management, analysing and interpreting results as the number of monitored sites continues to increase.

Outcomes: For the moment MMR is carrying out surveys and has produced reports on invertebrate monitoring on most of the islands. This appears to have led to a good ability to understand the state of resources, but time will need to pass before it will be clear whether the capability is sufficient for on-going management.

Impacts: There is no evidence yet that use of the microserver and database is leading to better managed resources with downstream improvements in income, jobs, food security and quality of life. Time will be required for MMR to adjust its strategies and several open seasons to pass before these impacts can become apparent.

4.3.4 Indicator Group 4: Advice on management and regulations

Outputs: The SciCOFish project has through the training programmes, as well as through assistance with producing reports for surveys undertaken as part of the project, provided advice for the government to consider on managing invertebrate resources (mainly BDM, giant clams and trochus). This work has been supplemented by on-going informal assistance and mentoring. However, these interventions are just part of the environment within which MMR is evolving its systems for managing invertebrates. Past SPC projects, CIMROS, the work of NGOs, and MMR's own momentum have all played a large part in the development of management systems.

Outcomes: MMR has with the assistance of SciCOFish made major progress in developing management plans and regulations for BDM and trochus as well as for finfish (showing capability is

flexible beyond SciCOFish assistance). Working with communities through the Raui / MPA system, and fielding requests from communities to inform them on the status of stocks so that the island leaders can do the enforcement shows that these gains are now becoming mainstream.

Impacts: It is early to be able to assess the effectiveness of the relatively new management measures on sustainability and optimised use of the resources. By experimenting with the best mechanisms for ensuring the benefits are efficiently distributed to fishers and exported through tendering for traders able to pay fishers on the spot and handle export, MMR is demonstrating strong moves towards generating impacts on income, jobs, food security and quality of life. The communities are already benefiting from trochus harvests and expect that with help from MMR resources will be assured in the future.

4.4 FACTORS AFFECTING THE DETECTION AND MAGNITUDE OF DEVELOPMENT IMPACTS

The SciCOFish Project appears to have lacked a core presence in MMR and operated largely without a coordinator and clear responsibilities. There was a coordinator on the Component 1 side of the project till around 2011, but no one since then to oversee the activities and ensure cohesion in an operating environment with several other projects and initiatives. Given the intermittent interventions of SciCOFish it is likely that attention to this would improve the impacts of the project. This could take the form of elevating the status and responsibilities of the national Focal Point person.

It was also not always clear which education and awareness materials were developed under SciCOFish (versus other projects and the activities of NGOs). According to staff there have been several other advocacies over the past 6 years promoting traditional resource management and MMR's system of working with communities has been evolving rapidly leaving some of the SciCOFish materials behind. Some of the materials were seen as less useful because they deal with regional issues that don't apply in Cook Islands. Materials dealing with issues outside the current focus are still seen as useful for general knowledge, but there was a wish to be more involved in the development of materials more relevant to current work. It may not be clear to the staff involved that there is scope under SciCOFish for requesting materials to be specifically developed.

An unexpected impact of SciCOFish was the role of the project and SPC in general in "stabilising agreements" to ensure stock levels. That is, it was suggested that use of regional benchmarks and practices were being used to ensure that management instruments were not manipulated, that they would "*stay honest*". This benefit is carried through from a report card method established during the NZ-funded Cook Islands Marine Resources Institutional Strengthening Project (CIMRIS) in 2008.

The main lessons learned from Cook Islands are:

- SciCOFish came in as a project within a much broader context of an evolving MMR mechanism for monitoring and managing invertebrate resources in Cook Islands. As such it cannot be specifically identified as the sole cause of the development of management for invertebrates, though it is likely to have been a timely and significant contributor.
- Senior staff "*gained in analysis and reporting*" and junior staff were trained in many aspects of data collection, but are still weak in the handling of information. Some staff already had advanced training and were capable of carrying out surveys, analysis, reporting and managing the resources in general. As one officer put it "*We were not a blank page*". The greatest needs seem to be to move junior officers now doing data collection through to being able to handle the information and produce reports.
- The main impediments to broader monitoring and management of resources is funding at the operational level. There are insufficient resources for surveys and transportation, especially to the outer islands. There may also be insufficient staff to meet all the requests for resource

management, especially as the idea catches on with outer islands communities and councils. This was articulated as a need for more senior staff because they are seen as being able to undertake the full process from data collection to reporting.

- A strategy could be considered for training junior fisheries officers. Although there are senior staff in MMR generally capable of managing the invertebrate fisheries, juniors are trained on a more *ad hoc* basis, partly by the seniors, and partly opportunistically when programmes or projects, particularly SPC, bring in a focal topic with training. This has been valuable, but it is never clear how such training will be continued for renewal of capability as older officers retire or for on-going strengthening of capability.
- The wild harvest part of pearl farming is not fully recognised as a capture fishery that needs monitoring and management. Focusing on spat collection, it may be necessary to establish monitoring of adults and spat on a systematic basis in Manihiki to ensure the harvests in the future. This will require different techniques than those now established for BDM, trochus and other invertebrates that are best harvested as adults.
- The Island Councils have become effective implementers of management recommendations by MMR, particularly on Aitutaki. Together with an emerging system of tendering a buyer to pay fishers on the spot and ensure the sale of the invertebrates, open seasons can be strictly enforced and fishers are not paid for undersized catches⁴.

5 VANUATU

5.1 BACKGROUND: ACTIVITIES AND OUTPUTS

Survey training was undertaken for BDM in North Efate (Paunangisu Village) and the Maskelyne Islands in June 2011, and for green snails, trochus and giant clams on Aneityum Island and Efate, with additional data collected from other locations. Green snail training at Aneityum Island (30/9/13-21/10/13) included 8 participants⁵. These were followed by four of the staff attending an attachment in Noumea with one pair working on BDM and the other on green snail and trochus for training on data entry, analysis and interpretation, followed by the production of trip, informal and preliminary reports, the latter containing recommendations for management (Pakoa, 2011; Pakoa, 2013; Pakoa et al., 2013; Pakoa et al., 2014; SciCOFish, 2012).

A workshop on Basic Monitoring Needs for Effective Management of Coastal Fisheries and Resources for Pacific Island Countries and Territories (Nadi, Fiji, 26-29 April 2011) was attended by Mr Vatumaraga Molisa, Marine Biologist, Department of Environmental Protection and Conservation. Additional training was provided through fisheries staff assisting with the Solomon Islands BDM surveys in 2014 and one assisting with the Samoa trochus surveys in 2013. The Vanuatu staff were involved in the training of local staff in these locations (see also Annexe 7.5.1).

A micro-server was installed with databases and a range of information suitable for Vanuatu, followed by training in the use of the server and databases. Training was also provided in the use of Quantum GIS open-source software for spatial analysis of monitoring results. The First training Workshop on database Fundamentals for Coastal Fisheries, Noumea, New Caledonia, 5-14 March 2012 included Ms Leisei Sope (Fisheries Coastal Data Entry Clerk).

⁴ Although undersized catches are still included in the shipments, revenues are returned to the Island Councils rather than fishers, acting as a no-benefit enforcement of illegal fishing.

⁵ George Amos (FDO-Sanma Province), Pita Neihapi (CC project officer), Andrew William (Research Officer), Malcolm Tabe (FDO-Penama Province), Donald Samuel Public Relation Officer (VFD), Clay Sara (Fisheries Engineer), Roger Wanieng (Mystery Island Tourism Project, Aneityum), Reuben Neriam (Mystery Island Tourism Project, Aneityum)

Advice on Management was included in formal reports for BDM and green snails (Pakoa et al., 2013; Pakoa et al., 2014; SciCOFish, 2012). These include detailed information on state of the resources, considerations for management and make recommendations the government could consider. The SciCOFish Project provided assistance with developing management advice for lobsters at Aneityum Island using existing marketing data, and provided management advice for the BDM fishery to continue its moratorium for an additional 5 years.

5.2 RESULTS OF SciCOFISH INTERVENTIONS: OUTCOMES

The SciCOFish working environment in Vanuatu has been complex, and like Cook Islands, the Fisheries Department has made major progress in managing invertebrates over the past 20 years (e.g. (Leopold et al., 2013; Raubani and Arnason, 2006)). In fact Vanuatu has been a leader in the development of closures through using a trochus hatchery for re-seeding, in conjunction with a community-agreed moratorium on harvesting, initially on Erakor island (Lee, 2000). Although re-seeding was shown to contribute little to stock enhancement, the 3 year closure led to stock replenishment and consequently larger harvests, showing the potential of management. This led to other communities engaging in closures, spreading this to BDM and other species. Nevertheless, trochus management remains problematic in Vanuatu and further advice will be provided by SPC early in 2015. On-going work by SPC, Institut de Recherche pour le developement (IRD), Japan International Cooperation Agency (JICA) and other organisations and projects means that the contributions of SciCOFish are difficult to isolate.

The awareness materials (posters, pamphlets etc.) printed by SciCOFish were used by extension officers with communities. They are also being used to carry out management awareness with any groups or individuals.

BDM: Advice for the BDM fishery provided by SciCOFish was to continue the moratorium for an additional 5 years, which was implemented. IRD scientists developed separate advice to SPC, to allow controlled harvesting in some areas of specific species to agreed quota levels. As a result, the government decided to allow some controlled harvests, and the Fisheries department went on to combine the advice of SPC and IRD, with the fisheries remaining closed and some rotating controlled harvests of some species in specific locations being used to set quota levels. The regulations used for the controlled harvesting were extracted from the management plan for the sea cucumber fishery (Pakoa et al., 2013). **Trochus:** Management advice provided by SciCOFish was incorporated into a national management plan for the trochus fishery. **Lobsters:** Management advice for lobsters around Aneityum Island was provided by SciCOFish based on existing marketing data for the island.

For BDM the Fisheries Department is in the process of developing TACs based on biomass, but a report describing the rules for opening the BDM fishery has not yet been produced. Biomass is estimated through counts and collecting length and width measurements of the animals and converted to biomass using length:weight relationships developed earlier. Using this information a conservative TAC is developed, though the criteria for this are still under experimentation. Local chiefs will be consulted and must agree to the harvest. A trader will purchase the total allowable catch (TAC) and must consult with the chief, which can lead to complexity if there is more than one chief in an area (in one village in North Efate there has been no harvest because the chiefs do not have an agreement with the trader). In the future the Fisheries Department will try negotiating with chiefs first and then selling the license to a trader.

5.3 ASSESSMENT OF DEVELOPMENT IMPACTS IN VANUATU

The Vanuatu fisheries staff felt that impacts of SciCOFish were greater for the oceanic component compared with the coastal component. This could be expected since the oceanic fisheries are managed using regional instruments with significant on-going and focused support, while coastal

fisheries involve many stocks in interaction with local communities with widely divergent needs and expectations.

As for Cook Islands, SciCOFish contributed to a management system that has been evolving in Vanuatu for many years, so isolating development impacts due specifically to the project is difficult. It is clear that national ability to sustainably manage coastal fisheries and prevent loss of resources and wealth has been established in the country and will continue to evolve or adapt as needed.

Indicator Group 1: Training / capacity-building / Manuals developed

Evidence was found for all levels of the results chain (outputs, outcomes and impacts) for this Indicator Group.

Outputs: A total of ten staff were trained by SciCOFish in surveys in Vanuatu and through attachments in Samoa, Solomon Islands and New Caledonia, focusing on data, analysis and reporting, databases and GIS (Table 4). Six trainees, all male, completed the survey questionnaire, attending 6 training courses and/or attachments, with 2 people attending 2 training sessions each and one attending 3. The self-assessment of in-country training suggested improvements in theory, field surveys, manta tows, transects and data entry as 'a little better' (9 scores of 22), 'much better' (8), or 'excellent improvement' (1). For attachment training improvements in data entry, cleaning, analysis, interpretation and reports only 1 trainee responded, with a self-assessment of 'excellent improvement'. The most important lessons were in conducting surveys, safety and data analysis. One person said: *"I learned from SciCOFish, understand each species – improved my knowledge of species"*, while another commented: *"I learn to run queries"*. As in Cook Islands, there was a spread in how often people thought they would use what they had learned in their work (some daily, others rarely). More details on these outputs are given in Annexe 7.6.3.

Outcomes: The training, along with other past and on-going interventions, has led to the Vanuatu Fisheries Department carrying out a range of invertebrate monitoring programmes for BDM, trochus, green snails and 'all invertebrates', the development of management plans and regulations, including working with villages and chiefs. Much of this work is now being done using the biomass technique promoted by IRD and the 'national database' developed in cooperation with the North Province of New Caledonia, and there is a move away from techniques taught by SciCOFish and using the RFID database. These positive outcomes can still be considered to be partially attributable to the SciCOFish Project. Without the training in field survey methods, attachments and database use, Vanuatu Fisheries Department is unlikely to have been able to consolidate its gains from past projects and IRD assistance into the coherent management system now emerging in the country. One respondent to the survey questionnaire said that SciCOFish *"gives me a wider understanding and practical knowledge"*.

Impacts: The impacts of SciCOFish in Vanuatu in the area of training and capacity building is difficult to attribute because of the alternative approach now being taken and the fact that it will still be some time before it becomes clear how management of invertebrates is impacting the community. It is clear that Vanuatu is moving towards managing all of its commercial invertebrate species and that in the longer term flow-on effects on income, jobs, food security and quality of life can be expected. For now, there is no real evidence that this has yet occurred.

Indicator Group 2: Awareness / Education / Posters, Info sheets

Information products developed under SciCOFish included information sheets, brochures, identification sheets, manuals and articles that are available for community engagement and education (Table 4).

Outputs: Half of the people who completed the survey for this study reported that they had heard of SciCOFish (5 out of 10 answering this question), with the remaining 5 saying they had not heard of the project. Those that had not heard of the project included one Fisheries staff, the Environment staff and 3 of the community people interviewed. Of the 6 people who answered a question to gauge understanding of the project just 1 had a good understanding of the project, 2 had partial understanding and 3 little understanding of the project and its aims. Of 5 responses on the funding source for the project, EU was identified by 4 people and SPC by 1 person (see also Annexe 7.6 on page 38). When queried on the reasons why invertebrate resources might be increasing or decreasing now, 5 of 6 people responding to the survey were able to say that either bans/moratorium, management or better awareness were influencing abundance, including all 4 of the community members interviewed in North Efate. It is not clear how much of this understanding derives from SciCOFish awareness materials, but it is likely that the community information sheets and posters are at least part of the mechanism for increasing awareness.

Outcomes and impacts: There were clear signs from the surveyed community members that they have an understanding of the need for and agree to management measures being put in place by their chief with advice provided by Fisheries. This appears to be leading to good compliance to the management measures in at least one community in North Efate. Most people said that management would be of benefit to their family, community and country. Very little response was obtained on questions about impacts on income, some because they have changed to another fishery, or because their income base is so diverse (fishing and farming) they can just change their source of benefits. One person said that we have *“local management (not BDM) in some areas - just opened last month. Lot of good big clams taken for market in November 2014”*. The long-term work of the Fisheries Department coupled with work by NGOs, UNDP, IRD and other initiatives are likely to have been important along with SciCOFish for making this happen.

Indicator Group 3: Microserver / databases

Outputs: Two people in Vanuatu received database training and returned a questionnaire. Competence at using the database (RFID) increased as a direct result of the training (self-assessed) from ‘OK’ to ‘good’ for one person and zero to poor for the other (representing a one unit shift each on a 5 unit scale). It appears, however, that people are no longer able to access the RFID in-country database via the micro-server as it was taken off-line a year ago. This has meant that SPC is unable to maintain the server or database by remote means. A new server was purchased by IRD in 2013.

Outcomes: The SciCOFish database is not currently being used and instead, Fisheries has chosen to use the ‘national database’ brokered by IRD as the main vehicle for data management and analysis.

Impacts: There is no evidence that the microserver and database is leading to better managed resources with downstream improvements in income, jobs, food security and quality of life.

Indicator Group 4: Advice on management regulations

Outputs: The SciCOFish project has, through the training programmes as well as assistance with producing reports for surveys undertaken as part of the project, provided advice for the government to consider on managing invertebrate resources (mainly BDM, trochus and green snails).

Outcomes: Vanuatu Fisheries is now working with communities on resource-based management, allowing fishing only in areas with sufficient resources – otherwise the areas remain closed. The advice given by SciCOFish has contributed overall to the development of management systems in the country mainly through advice, which was accepted, to maintain the general moratorium on BDM harvesting for another 5 years and use of the regulations for BDM being extracted from the management plan. The moratorium was, however, overridden after advice received from IRD to allow limited opening of the fishery in some areas so that TACs could be developed.

Impacts: The contributions by SciCOFish are significant in terms of the overall development of management systems for Vanuatu's invertebrate resources and are therefore contributing to the maximisation of benefits in the long run. One staff member said: *"It is yet very early to determine if the stock are managed well but our TAC system was kick started this year 2014 and we will monitor the changes in stock over the next 5 years with continuous stock assessment after every harvest"*.

To date however, there is little evidence that SciCOFish has improved income, jobs, food security or quality of life. According to one staff member *"employment is worse now because of management, trochus will close soon and there will be no jobs. BDM has been closed 5 years. Overall there has been a 5:1 reduction in jobs in coastal fisheries"*.

5.4 FACTORS AFFECTING THE DETECTION AND MAGNITUDE OF DEVELOPMENT IMPACTS

Fisheries staff expressed some confusion regarding the scope of SciCOFish and were concerned that they might accidentally misrepresent impacts of the project. Despite this, several staff said that although they appreciated the SciCOFish work, the project *"did not do enough"*. The visibility of the project is not only low with stakeholders as noted above, but also with some of the staff, even those working on the monitoring of invertebrates. As one staff put it *"we are benefitting from SPC programmes, but they run so many programmes..."*

Several issues with SciCOFish were raised by staff that contributed to the project having *"little impact on the coastal side"*. The comments appear to relate to how and with whom training was done and the presence of two projects using different methodologies. Comments were also made about the programmatic approach being used by SPC and EU.

Training and surveys: There was some concern expressed that the Research Section was not sufficiently consulted or included in the training and that *"SciCOFish walked on its own"*. At one site BDM surveys were undertaken twice, by SciCOFish and IRD, with the SciCOFish work said to have been done separately from Fisheries. This was seen as a waste of funds. It should be noted however that SPC does not select trainees, sites or communities with which to work and is subject to the requirements of the Fisheries Departments in all of its activities in-country.

Methodological approach and databases: The quality of the method used for surveys and particularly analysis was in question, with the techniques used by SciCOFish considered *"difficult to use for good management"*. The staff consulted said that SciCOFish was using density estimates to inform management and that IRD had suggested a biomass approach. The staff were convinced that density data are not suitable for management or setting policy. From this year, with SPC's help and inputs from IRD, there is a new BDM Management Plan and IRD is working with Fisheries on trochus, green snails and others. Staff are convinced that *"if we rely on densities, we will degrade the resource"*. SPC's assistance has been on-going since the PROCFish Project, but the report from that project was delayed, conditions changed and the recommendations, when they came, were no longer relevant. Vanuatu is now evolving its approaches to coastal fisheries management using the inputs of IRD, the support of which will soon end. Next year a biomass approach will be used for trochus management for which there will be a total allowable catch (TAC), size limits and tendering of traders. It should be noted here that both methods, density vs biomass, are associated with certain strengths and weaknesses, that methods can be neither right nor wrong, and that the method chosen needs to take these into account along with a consideration of the resources and support available.

IRD also assisted with procuring a new national database⁶ which is shared with North Province, New Caledonia. Staff have been trained and are now using the national database, collecting the data, cleaning them and using the data for BDM management without further IRD inputs. The SPC regional database (RFID) was seen as too generic and did not deal with biomass information. It was also seen as being kept for SPC purposes, more than meeting national needs and does not produce all of the outputs (queries) required. Access to the SPC database is also problematic.

SPC programme approach vs country-specific needs: Some staff were quick to point out the importance of SPC and its contributions, including the SciCOFish Project. It was requested, however, that future SPC / EU work be more collaborative. That is, SPC should assist with funding and scientists to work on programmes that Fisheries sees as in the interests of the public – namely using the biomass methodology and database being used now, with local fisheries officers as partners. At the moment *“SPC is not in collaboration, EU funding goes to SPC to contract fisheries staff who do their own business. [We need a] different approach from mentoring in the countries...”* SciCOFish funding was used to collect data, and funding for operations is still needed, but there is an issue with planning which sometimes occurs with only 2 weeks’ notice. This implies that annual work planning driven by Vanuatu Fisheries and working with SciCOFish is needed. Some of the staff suggested that the transfer of capacity worked well with IRD posting staff for 5 years within the department where the interaction was sustained rather than the intermittent inputs through SciCOFish.

Reduced local capacity: It was also suggested that instead of attachments in Noumea, training should be conducted in-country where more of the staff could benefit. Drawing staff away from their normal duties for a month means that normal work priorities become disorganised and local operations suffer. Further, 3 ni-Vanuatu are working at SPC and have been removed from the local pool of capacity actually reducing capacity at a time when it is needed.

These issues have led to the perception that Vanuatu has lost access to some of the resources expected on the SciCOFish Project and led to frustration.

6 CONCLUSIONS

6.1 PROGRESS TOWARDS PROJECT IMPACTS IN COOK ISLANDS AND VANUATU

Insufficient time has passed for SciCOFish to show development impacts in the areas of income, jobs, food security and quality of life (poverty reduction) but there is evidence of capacity development and progressively more sustainable management of invertebrate resources. Other influences also acted to reduce movement towards impacts including:

1. A tension that has developed between SPC and the fisheries departments in Cook islands/ Vanuatu because the latter are becoming increasingly capable and independent and want to lead in the development of management of their resources;
2. Low visibility and/or coordination of the project
3. A clash with a similar project working on the same subject in Vanuatu;
4. Problems with database access and utility (Vanuatu); and
5. Issues of staff upskilling, training of new staff being too *ad hoc* and loss of capacity as staff shift their focus between local duties, several donor projects and/or are sent overseas on training or secondments.

⁶ Vanuatu’s share of the cost being 1 million Vatu.

The SciCOFish project operated in an environment of increasing capability and independence of fisheries departments and in the case of Vanuatu the presence of other sources of training and advice. This meant that training, data systems and advice sometimes conflicted with the aspirations of the fisheries departments. This was recognised also by the MTR that found that project relevance in coastal fisheries was slightly diminished by a lack of attention paid to the recognized needs of strengthening management frameworks in coastal fisheries (Hosch and Nichols, 2013; Palin, 2013). SPC's FAME Strategic Plan for 2013-2016 (SPC, 2013b) recommended management policies and systems, rather than management advice and plans (see also (Palin, 2013)). The country differences and presence of an alternative project in Vanuatu acted to reduce some of the progression from Activity → Outputs → Outcomes → Development Impacts for the project.

Overall, more progress along the results chain for the selected indicator groups and development impacts of SciCOFish were identified in Cook Islands than in Vanuatu (Figure 2). For Cook Islands, time is likely to be the greatest factor for realising benefits to individuals, communities and the country. For Vanuatu the situation is more complex because the Fisheries Department is taking a different approach than the one agreed to as part of SciCOFish.

Figure 2: Summary of progress towards impacts of the SciCOFish Project using a results chain

Partial progress in the case of Vanuatu means that SciCOFish contributed to changes in the indicator to the level shown but the result of the activity was altered to a new approach no longer in alignment with the project.



An unexpected impact of SciCOFish was found in Cook Islands where the presence of SciCOFish and SPC in general was seen as a stabilising influence that ensured that management instruments were not manipulated. Regional benchmarks and practices were seen as an important way to ensure that management would “*stay honest*”.

6.2 RECOMMENDATIONS FOR IMPROVING IMPACTS

The message coming from the two countries is that they had already established a certain level of capacity from which they are now, with assistance from SciCOFish and others, in the process of evolving systems suitable to their specific needs for commercial harvesting and subsistence use of the resources. This includes national plans and regulations as well as community / traditional approaches. Recognising this, the following recommendations are made for SciCoFish and any future work of this nature.

Visibility: Improve marketing / visibility of the project – people had a hard time attributing impacts to the project because they were not aware of it and/or what it does and how it is working for them. This is true for many stakeholders, including some fisheries staff, and probably requires the use of the media (radio, TV, videos). Some of the materials produced were not marked as SciCOFish productions (e.g. Vanuatu BDM poster) so that recognition of their impacts was difficult. The Fourth Steering Committee Report, in reviewing the MTR recommendations commented on the importance of good visibility of the activities for the project and the EU (SPC, 2014). Visibility plays a large role in the transference of activities and outputs to outcomes and impacts because it provides a narrative and context for the changes the project brings.

Database access and utility: Improve the database arrangements for countries that are having trouble accessing the RFID and be more flexible about how databases work (Vanuatu has chosen not to use the SPC database, but other countries like Tuvalu are having difficulties with access). Countries are becoming more independent as their capacity increases and now have different needs for data collection fields and queries for analysis. Information technology is meant to provide a service in response to the needs of the users, not the other way round.

More attention to the project working environment: Cook Islands identified the need for an overall in-country project coordinator to ensure cohesion of the project activities. In Vanuatu there was a need to better coordinate SciCOFish activities with those of IRD, though this is also true of other projects operating in each country that led to staff having unclear responsibilities. Preventing overlapping or conflicting activities is needed to create a more harmonious environment for impacts of the project to develop and be recognised. Discussion is needed to determine whether this might be a national staff member nominated for the role, or a person hired by SPC.

EU/SPC collaboration: Change to a country-leads approach with less emphasis on commonality to more tailored interventions, despite the likely increase in project costs that would entail. SPC was seen as setting the agenda too much and creating monitoring and data systems for its own purposes and not tailored sufficiently for country needs. This approach would align with the FAME Strategic Plan 2013-2016 which calls for policies and systems rather than providing individual case-by-case advice and management plans (SPC, 2013b).

Staff strategy: A strategy for upskilling existing staff and training new staff is needed, especially as the current momentum on managing coastal resources continues and new positions are needed. This need was also recognised in the SciCOFish Steering Committee reporting (SPC, 2013a). The strategy should recognise existing capacity and build on it, and needs operate systematically to support the development of project impacts. In Vanuatu it was suggested that long-term mentoring by scientists placed in-country would be better than intermittent inputs.

7 ANNEXES

7.1 PERSONS TRAINED AND/OR CONSULTED

G=Gender; T=Trained by SciCoFish; C=Consulted during the present study

7.1.1 Cook Islands

Name	G	Organisation	Position	Contacts	T	C
Alice Mitchell	F	MMR, AMRC	Fisheries Officer	fisheries@aitutaki.net.ck	✓	✓
Ben Poinia	M	MMR	Director	b.poinia@mmr.gov.ck		✓
Georgia Langdon	F	MMR	Data Manager, Senior Fisheries Officer, Offshore Fisheries Division	g.langdon@mmr.gov.ck		✓
Katangi (Joe) Kaukura	M	MMR, AMRC	Fisheries Officer	fisheries@aitutaki.net.ck	✓	✓
Koroa Raumea	M	MMR	Director of Inshore Fisheries & Aquaculture	k.raumea@mmr.gov.ck		✓
Ngereteina George	M	MMR	Senior Fisheries Officer	n.george@mmr.gov.ck	✓	✓
Raymond Newnham	M	Moana Gems	Trader, Director	raymond@moanagems.co.ck		✓
Rebekah Daniel	F	MMR	Information Officer	r.daniel@mmr.gov.ck		✓
Richard Storey	M	MMR, AMRC	Senior Fisheries Officer / Clam Hatchery Aitutaki	fisheries@aitutaki.net.ck	✓	✓
Sonny Tatuava	M	MMR	Senior Fisheries Officer	s.tatuava@mmr.gov.ck		✓
Teariki Rongo	M	MMR	Project Manager GCCA:PSIS MMR Component			✓
Trinilobe Kea	M	MMR	Fisheries Officer	t.kea@mmr.gov.ck		✓
Tuaine Turua	F	MMR		t.turua@mmr.gov.ck	✓	✓
Vaine Wichman	F	Cook Islands Fishing Association	Project Officer	arama@oyster.net.ck		✓
Trained by SciCOFish but not consulted during this survey						
James Kora	M	MMR			✓	
Matara Taimana	F	MMR			✓	
Ngametua Atingakau	M	MMR			✓	
Toumiti Matangaro	F	MMR			✓	

7.1.2 Vanuatu

Name	G	Organisation	Position	Contacts	T	C
Andrew William	M	Fisheries Department	Aquaculture Officer	Andrewwilliam101@gmail.com	✓	✓
Clay Sara	M	Fisheries Department	Fisheries Engineer	maratinol@gmail.com	✓	✓
Edleen Kaltapiri	F	None	Community: Housewife, Marketer, Fisher, Farmer, Sewing			✓
George Amos	M	Fisheries	Development Officer	gamos@vanuatu.gov.vu	✓	✓
Jack Kaltabil	M	None	Community: Fisher	7789382		✓
James Ralee	M	None	Community: Fisher, Farmer	7797611		✓
Jayven Ham	M	Fisheries	Fisheries Biologist	jham@vanuatu.gov.vu	✓	✓
Joby Siba	M	Fisheries	Fisheries Observer & Port Sampler	jsiba@vanutau.gov.vu		✓
John Leggatte	M	Fisheries (Maskelyn)	Resource Monitor			✓
Leisei Sope	F	Fisheries	Data Officer	lsope@vanuatu.gov.vu	✓	✓
Lucy Joy	F	Fisheries	Senior Data Officer	ljoy@vanuatu.gov.vu		✓
Malcolm Linawak Tambe	M	Fisheries	Penama Fisheries Development Officer	mclinawak@vanuatu.gov.vu	✓	✓
Sompert Gereva	M	Fisheries	Research	sgereva@vanuatu.gov.vu		✓
Vatu Molisa	M	Department of Environment	IUCN Project Liaison Officer	vatumaraga@gmail.com	✓	✓
Wallace KALFAPIRU	M	Fisherman	Community: Chairman	775172		✓

Name	G	Organisation	Position	Contacts	T	C
		Association	Fisherman Assoc. and Secretary Paunagisu Football Club			
William Naviti	M	Fisheries	Director	wnaviti@gmail.com		✓
Trained by SciCOFish but not consulted during this survey						
Jason Raubani	M	Fisheries			✓	
Keven Mores	M	Fisheries			✓	
John Lackette	M	Community			✓	
Pita Neihapi	M	Fisheries			✓	
Roger Wanieng	M	Community			✓	
Reuben Neriam	M	Community			✓	

7.2 LOGFRAME FOR COMPONENT 2 OF SCI COFISH: COASTAL FISHERIES

Extracted from Mid-term Review (Hosch and Nichols, 2013)

Intervention logic		Verifiable indicators	Sources of verification	Assumptions
Overall Objective	Conservation and sustainable use of coastal and oceanic fisheries resources in the Pacific Islands region	At least some management measures adopted in each of 5 coastal areas with measureable signs of recovery observed in baseline monitoring (indicators to be established under this project).	National stock assessment reports Comparisons to baselines established in this study	
Project Purpose	To provide a reliable and improved scientific basis for management advice and decision making in oceanic and coastal fisheries	At least 5 P-ACP countries adopt coastal fisheries management measures in line with project recommendations.	National regulations and management plans	P-ACP governments have the political will to fully consider the best scientific advice when taking decisions
Result 2:	P-ACP governments, private sector and communities are equipped to monitor coastal fisheries to provide scientific advice in support of sustainable management of these resources P-ACP governments, private sector and communities will be provided with technical methods and training to monitor coastal fisheries, scientific advice to inform management decisions, and development of in-country capacity to evaluate their effectiveness.	Country specific needs prioritised for all P-ACPs Assessments and management recommendations given for at least 5 major coastal fisheries. Standard monitoring protocols implemented and sustained in at least 5 P-ACPs Regional data repository maintained and national data provided for backup from at least 5 countries/fisheries.	Project reports National databases SPC repository database	P-ACP governments will commit the human resources for initial and sustained fishery monitoring. P-ACP governments will implement identified management measures
Activities	2.1 Conduct Stakeholder Consultation 2.2 Develop and Implement Field Monitoring Protocols 2.3 Develop and Implement Secondary Data Collection Protocols 2.4 Develop Management Advice			P-ACP governments can commit human resources for coastal fisheries training and attachments. Adequate local equipment and infrastructure are available for maintenance of coastal fisheries databases

7.3 QUESTIONNAIRE FOR GOVERNMENT STAFF



Development Impacts of SPC SciCOFish invertebrate work Government / Fisheries Officers

Thank you for agreeing to fill out this survey. We are collecting this information from those involved in the SPC SciCOFish Project and the invertebrate fisheries for which it has provided training and management advice. The purpose of the survey is to try and understand what the likely impacts of the project might be. We are interested in your perceptions of benefits of the project leading to improvements in fisheries management, with effects on improved jobs, quality of life, food security, and other benefits at personal, community and national levels.

Information:

- The answers you provide will not be connected with your name, but used together with all other responses we collect to obtain lessons learned. Your name will be included as one of the persons consulted in a separate list.
- If you encounter any questions for which you do not know the answer, feel free to write “don’t know.”
- If you encounter two questions that appear similar, please read them carefully, small differences in what we are asking are important to the diagnosis of benefits.
- Invertebrates includes sea cucumbers, trochus, green snails and lobsters. But we are not asking here about finfish.
- The survey may take up to an hour of your time.
- We would like to collect this form back from you by COB Friday 21st November at the latest and would greatly appreciate any returned earlier.
- The electronic version of this form has fields for the information you provide, and you can simply tab through from field to field to fill out. The text fields will expand to any amount of text you wish to enter.
- If you need any clarifications, please feel free to email Uschi Kaly at uschi@tautai.com

1. Today's Date	2. Location
Background	
4. Title (Mr, Ms etc)	5. First name
5. Last name	6. Gender
7. Email	
8. Age group	<input type="checkbox"/> <21 <input type="checkbox"/> 21-25 <input type="checkbox"/> 26-30 <input type="checkbox"/> 31-35 <input type="checkbox"/> 36-40 <input type="checkbox"/> 41-45 <input type="checkbox"/> 46-50 <input type="checkbox"/> 50+
9. Organisation (if any)	
10. Job / position	
11. Do you have any interest in invertebrates (sea cucumbers, green snails, trochus, lobsters or any others) in your work / income / food?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain:	
12. Have you heard about / are you familiar with the SPC SciCOFish Project?	<input type="checkbox"/> Yes <input type="checkbox"/> No
13. What is the SPC SciCOFish Project for? What does it do?	
14. Who funded SPC SciCOFish?	
Training & Capacity-building	
15. Did you personally receive any training as a part of SPC SciCOFish Project?	<input type="checkbox"/> Yes <input type="checkbox"/> No
16. Please tick any training / meetings attended (add any not included here):	
Cook Islands	
<input type="checkbox"/> Training workshop on database fundamentals for coastal fisheries, 5-14 March, Noumea, 2012	
<input type="checkbox"/> Training attachment in Noumea 2013	
<input type="checkbox"/> GIS (QGIS) training 2014	

<input type="checkbox"/> Market and Creel Survey Database training Oct 2014	
<input type="checkbox"/> In-country invertebrate assessment training	
Vanuatu	
<input type="checkbox"/> Training during Aneityum green snail assessment, 30 Sep-21Oct, Aneityum Island, 2013	
<input type="checkbox"/> Creel and Market survey training, 6-17 August, Tonga, 2012	
<input type="checkbox"/> Training attachments on the Reef Fish Integrated Database (RFID), 2-20 July, Noumea, 2012	
<input type="checkbox"/> Training workshop on database fundamentals for coastal fisheries, 5-14 March, Noumea, 2012	
<input type="checkbox"/> Training workshop on database fundamentals for coastal fisheries, 20-29 February, Noumea, 2012	
<input type="checkbox"/> Basic monitoring needs for effective management of coastal fisheries and resources for Pacific Island countries and territories, 26-29 April, Fiji, 2011	
<input type="checkbox"/> In country training invertebrate assessment with a focus on sea cucumber	
<input type="checkbox"/> Staff attachment to Solomon Islands sea cucumber assessment	
<input type="checkbox"/> Staff attachment to Samoa trochus assessment training	
16a. Any other training or meetings you attended as part of SPC SciCOFish not listed here?	
16b. If you did an <u>in-country survey training course</u> how would you rate your understanding and skills now compared with before the course in the following subject areas:	
Survey theory	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Field survey methods	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Manta tows	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Transects	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Data entry	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
16c. If you did an <u>attachment in Noumea</u> how would you rate your understanding and skills now compared with before the course in the following subject areas:	
Data entry	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Data cleaning	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Data analysis	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Interpretation to management advice	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
Drafting reports	<input type="checkbox"/> Same <input type="checkbox"/> A little better <input type="checkbox"/> Much better <input type="checkbox"/> Excellent improvement
17 What are the 3 main things you learned / lessons learned during the training you did?	
1.	
2.	
3.	
18 How do you think the training you had affects your job and ability to manage invertebrates?	
19 How often would you use what you learned in your training with SPC SciCOFish in your job?	
<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Rarely <input type="checkbox"/> Never	
20 Are you / Fisheries carrying out monitoring of any invertebrates now? <input type="checkbox"/> Yes <input type="checkbox"/> No	
What monitoring of what species?	
21 Is the current monitoring setup by SPC SciCOFish or is it a Fisheries initiative?	<input type="checkbox"/> SciCOFish <input type="checkbox"/> Fisheries <input type="checkbox"/> Other
Please explain	
22 Are there any plans for invertebrate monitoring in the future? <input type="checkbox"/> Yes <input type="checkbox"/> No	
What species?	
23 Please list all invertebrate monitoring programs active right now	
24 Have you / Fisheries established any management actions for invertebrates over the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Please explain	
25 Is the current management of invertebrates directly based on advice from SPC SciCOFish, some other party	

or is it a Fisheries initiative? Please explain	
26 Were there any new positions created in Fisheries for managing invertebrates by government, directly through SPC SciCOFish or some other way?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain	
27 Are there any new positions for invertebrate fisheries in the pipeline?	<input type="checkbox"/> Yes <input type="checkbox"/> No
How many?	When might they start?
28 Will those position be kept after the project completes in Sept 2015?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Awareness	
29 Have you noticed any changes in abundance of invertebrates over the past 10 years?	<input type="checkbox"/> Greatly decreased <input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased <input type="checkbox"/> Greatly increased
Which species does this cover?	
30 What in your opinion is happening with abundance of invertebrates at the moment?	<input type="checkbox"/> Increasing <input type="checkbox"/> Same <input type="checkbox"/> Decreasing
31 Please explain why you think the invertebrates are changing right now (if same go to 32)	
33 Are invertebrates being managed right now?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, which species and in what ways?	
34 Do you think invertebrates should be managed?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, how and why? / If No, why not?	
36 How do you think the abundance of invertebrates (BDM/GS/Trochus etc) will change over the next 10 years?	<input type="checkbox"/> Greatly decrease <input type="checkbox"/> Decrease <input type="checkbox"/> Same <input type="checkbox"/> Increase <input type="checkbox"/> Greatly increase
37 What will cause the abundance to change over the next 10 years?	
38 Would there be any benefits / losses from management of invertebrates for you and your family?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for you and your family?	
39 Would there be any benefits / losses from management for the community?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for the community?	
40 Would there be any benefits / losses for the country?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for the country?	
43 Has your standard of living changed as a result of SPC SciCOFish? (The level of wealth, comfort, material goods and necessities available to a person or community)	<input type="checkbox"/> Yes <input type="checkbox"/> No
In what ways?	
45 How has the number of invertebrate fishers changed over the past 2-3 years?	<input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased
What caused the change?	
46 Is there room for more invertebrate fishers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Under what conditions if any? / or Why not?	
47 How has the number of traders changed over the past 2-3 years?	<input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased
What caused the change?	
48 Do invertebrates contribute in any way to your food security? (having reliable access to a sufficient quantity of affordable, nutritious food)	<input type="checkbox"/> Yes <input type="checkbox"/> No
How? / or why not?	
50 How do you think your food security would be impacted if invertebrates were overfished?	
51 How do you think your food security would be impacted if invertebrates were well managed?	
Microserver / Database	
53 Did you attend any IT or database training as part of SPC SciCOFish?	<input type="checkbox"/> Yes <input type="checkbox"/> No
54 How competent were you in using databases before the SPC SciCOFish project?	<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> Zero
55 How competent would you rate yourself at using databases now?	

<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> Zero	
56 What were the 3 most useful things you learned about databases?	
1.	
2.	
3.	
57 How will you use the database(s) in your work in the future?	
58 Will the use of databases change the way you manage invertebrates?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain how	
59 Can the database(s) be used to ensure sustainability of resources?	<input type="checkbox"/> Yes <input type="checkbox"/> No
How?	
Advice on Management	
60 How would you rate your knowledge of options for managing invertebrates before SPC SciCOFish?	
<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> None	
61 How would you rate your knowledge of options for managing invertebrates now?	
<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> None	
62 How confident do you feel about using data triggers to decide when action is needed?	
<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> None	
63 How well do you feel you could devise management actions based on data you collect?	
<input type="checkbox"/> Excellent <input type="checkbox"/> Good <input type="checkbox"/> OK <input type="checkbox"/> Poor <input type="checkbox"/> None	
64 What management measures were put in place before SPC SciCOFish? Please list all:	
65 What management measures were put in place as a result of SPC SciCOFish? Please list all:	
66 What management measures are you / Fisheries planning for the future? Please list all:	
67 Is there any evidence that stocks of any invertebrate are improving due to management?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain which species and the evidence	
Overall	
68 Would you say there have been any benefits of this SPC SciCOFish Project on income, jobs, quality of life or food security for you or the community?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits?	
69 Do you have any other comments or suggestions?	

Thank you for taking the time to fill out this form.

7.4 QUESTIONNAIRE FOR FISHERS AND TRADERS



Development Impacts of SPC SciCOFish invertebrate work Fishers and Traders

Thank you for agreeing to be interviewed for this survey. We are collecting this information from people fishing or trading invertebrates (like sea cucumbers, lobsters, green snails, trochus or any others) to find out what the impacts a project being run by Fisheries and SPC might have had on you. We are interested in your perceptions of benefits of the project leading to improvements in income, jobs, quality of life, food security, and other benefits at personal, community and national levels.

Information:

- The answers you provide will not be connected with your name, but used together with all other responses we collect to obtain lessons learned. Your name will be included as one of the persons consulted in a separate list.
- If you encounter any questions for which you do not know the answer, feel free to write “don’t know.”
- Invertebrates includes sea cucumbers, trochus, green snails and lobsters. But we are not asking here about finfish.
- The survey may take up to an hour of your time.
- If you need more space for a question, please use the back of the page or add pages.

1. Today's Date	2. Location
3. Surveyor name	
Background	
4. Title (Mr, Ms etc)	5. First name
5. Last name	6. Gender
7. Email	
8. Age group	<input type="checkbox"/> <21 <input type="checkbox"/> 21-25 <input type="checkbox"/> 26-30 <input type="checkbox"/> 31-35 <input type="checkbox"/> 36-40 <input type="checkbox"/> 41-45 <input type="checkbox"/> 46-50 <input type="checkbox"/> 50+
9. Organisation (if any)	
10. Job / position	
11. Do you have any interest in invertebrates (sea cucumbers, green snails, trochus, lobsters or any others) in your work / income / food?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain:	
12. Have you heard about / are you familiar with the SPC SciCOFish Project?	<input type="checkbox"/> Yes <input type="checkbox"/> No
13. What is the SPC SciCOFish Project for? What does it do?	
14. Who funded SPC SciCOFish?	
Awareness	
29 Have you noticed any changes in abundance of invertebrates over the past 10 years?	
<input type="checkbox"/> Greatly decreased <input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased <input type="checkbox"/> Greatly increased	
Which species does this cover?	
30 What in your opinion is happening with abundance of invertebrates at the moment?	
<input type="checkbox"/> Increasing <input type="checkbox"/> Same <input type="checkbox"/> Decreasing	
31 Please explain why you think the invertebrates are changing right now (if same go to 32)	
32 Have you fished invertebrates in the past year?	
<input type="checkbox"/> Yes <input type="checkbox"/> No	

Which species, about how many times per month?	
33 Are invertebrates being managed right now?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, which species and in what ways?	
34 Do you think invertebrates should be managed?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If Yes, how and why? / If No, why not?	
35 If you are no longer fishing invertebrates why did you stop?	
36 How do you think the abundance of invertebrates (BDM/GS/Trochus etc) will change over the next 10 years?	
<input type="checkbox"/> Greatly decrease <input type="checkbox"/> Decrease <input type="checkbox"/> Same <input type="checkbox"/> Increase <input type="checkbox"/> Greatly increase	
37 What will cause the abundance to change over the next 10 years?	
38 Would there be any benefits / losses from management of invertebrates for you and your family?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for you and your family?	
39 Would there be any benefits / losses from management for the community?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for the community?	
40 Would there be any benefits / losses for the country?	<input type="checkbox"/> Yes <input type="checkbox"/> No
What benefits or losses for the country?	
41 About what percentage of your yearly income is directly from invertebrates (fishing or trading)?	%
42 Have you seen any change in your income from invertebrates since management?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Please explain	
44 Has your standard of living changed as a result of invertebrate management?	<input type="checkbox"/> Yes <input type="checkbox"/> No
In what ways?	
45 How has the number of invertebrate fishers changed over the past 2-3 years?	
<input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased	
What caused the change / no change?	
46 Is there room for more invertebrate fishers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Under what conditions if any? / or Why not?	
47 How has the number of traders changed over the past 2-3 years?	
<input type="checkbox"/> Decreased <input type="checkbox"/> Same <input type="checkbox"/> Increased	
What caused the change?	
48 Do invertebrates contribute in any way to your food security? (having reliable access to a sufficient quantity of affordable, nutritious food – includes direct access and through markets)	<input type="checkbox"/> Yes <input type="checkbox"/> No
How? / or why not?	
49 Are you familiar with the idea of managing fisheries?	<input type="checkbox"/> Yes <input type="checkbox"/> No
50 How do you think your food security would be impacted if invertebrates were overfished?	
51 How do you think your food security would be impacted if invertebrates were well managed?	
52 Do you follow BDM/GS closures/management rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Please explain why / why not?

Overall

68 Would you say there have been any benefits of this SPC SciCOFish Project on income, jobs, quality of life or food security for you or the community?

Yes | No

What benefits?

69 Do you have any other comments or suggestions?

Thank you for taking the time to complete this interview with us.

7.5 LIST OF SCICOFISH PUBLICATIONS AND OUTPUTS

This list covers both components and all countries and is included to show the volume and diversity of material produced under the project. Some materials not specifically targeting Cook Islands or Vanuatu are nonetheless available as part of the larger body of knowledge and materials available to the countries. Sources: <http://www.spc.int/FAME/en/projects/scicofish/documents> and <http://www.spc.int/FAME/en/projects/scicofish/meetings>

Year	Output
7.5.1 SciCOFish Productions	
2014	<ul style="list-style-type: none"> ▪ The status of sea cucumber fisheries and resources and management for Palau ▪ Solomon Islands sea cucumber resource status and recommendations for management ▪ The status of sea cucumber fisheries and resources in Vanuatu ▪ The status of green snail (<i>Turbo marmoratus</i>) resource in Vanuatu and recommendations for its management
2013	<ul style="list-style-type: none"> ▪ The status of sea cucumber resources and fisheries management in Fiji ▪ The status of sea cucumber resources and recommendations for management in Samoa ▪ The status of sea cucumber resources - at Aitutaki, Mangaia, Palmerston and Rarotonga, Cook Islands ▪ Status report: Pacific Islands reef and nearshore fisheries and aquaculture ▪ Wawata Topu - Mermaids of Timor Leste video ▪ Careers for women and men in the tuna industry brochure ▪ The fisheries Observer: a career for women and men in the fisheries industry ▪ Policy brief: Balancing the needs - Industrial versus artisanal tuna fisheries ▪ Identification cards for marine invertebrates surveys in the Pacific Islands ▪ Guide and information sheets on fisheries management for communities
2012	<ul style="list-style-type: none"> ▪ Guia as folhas informativas sobre gestao das pescas para comunidades ▪ Hook, line and tuna video ▪ Trochus poster ▪ Guide and information sheets on fisheries management for communities ▪ Creel and Market Survey Manual (Draft) March 2012
2011	<ul style="list-style-type: none"> ▪ Safety checklist for underwater survey work ▪ Deep blue video ▪ Guide and information sheets on fisheries management for communities ▪ Report "Gender in Oceanic and Coastal Fisheries Science and Management" ▪ Brochure "Pacific women's participation in fisheries science and management"
7.5.2 SciCOFish Contributions	
2014	<ul style="list-style-type: none"> ▪ Fisheries Newsletter n°143 ▪ Fisheries Newsletter n°142
2013	<ul style="list-style-type: none"> ▪ Fisheries Newsletter n°141 ▪ Fisheries Newsletter n°140
2012	<ul style="list-style-type: none"> ▪ Fisheries Newsletter n°139 ▪ Fisheries Newsletter n°138 ▪ Fisheries Newsletter n°137 ▪ Marine species identification manual for horizontal longline fishermen (re-edition) ▪ Fisheries Newsletter n°136
2011	<ul style="list-style-type: none"> ▪ Tuna Fisheries status of stocks ▪ Fisheries Newsletter n°134
7.5.3 Project documents	
2013	<ul style="list-style-type: none"> ▪ SciCOFish monitoring report 2013 ▪ SciCOFish mid-term evaluation
2012	<ul style="list-style-type: none"> ▪ SciCOFish monitoring report
2010	<ul style="list-style-type: none"> ▪ SciCOFish concept note ▪ SciCOFish Contribution Agreement
7.5.4 Annual reports and work plans	
2013	<ul style="list-style-type: none"> ▪ Year 4 progress report and Year 5 work plan
2012	<ul style="list-style-type: none"> ▪ Year 3 progress report and Year 4 work plan

Year	Output
2012	<ul style="list-style-type: none"> Grant and procurement 2012 contracts
2011	<ul style="list-style-type: none"> Year 2 progress report and Year 3 work plan
2010	<ul style="list-style-type: none"> Year 1 progress report and Year 2 work plan SciCOFish 2010 Work Plan
7.5.5 Steering committee meeting reports	
2014	<ul style="list-style-type: none"> 2014 Steering Committee report
2013	<ul style="list-style-type: none"> 2013 Steering Committee report
2012	<ul style="list-style-type: none"> 2012 Steering Committee report
2011	<ul style="list-style-type: none"> 2011 Steering Committee report
7.5.6 Meetings & Training	
2014	<ul style="list-style-type: none"> Meeting in Noumea for Creel and Market surveys Basic observer training course, 18 August- 19 September 2014, Santo, Vanuatu Observer training workshop (refresher) and debriefing, 14 July- 15 August 2014, Nuku'alofa, Tonga Basic observer training course, 9 June- 2 July 2014, Nauru Basic observer training course, 28 April- 29 May 2014, Majuro, Marshall Islands 8th Tuna Data Workshop, 14-18 April 2014, Noumea, New Caledonia
2013	<ul style="list-style-type: none"> Basic observer training course, 3 November - 7 December 2013, Pohnpei, Federated States of Micronesia Basic observer training course, 28 September - 02 November 2013, Suva, Fiji Training during Aneityum green snail assessment, 30 September - 21 October 2013, Aneityum Island, Vanuatu Basic Observer training course, 19 August - 20 September 2013, Espiritu Santo, Vanuatu PIRFO Trainer's workshop, 22 July - 2 August 2013, Noumea, New Caledonia Sea cucumber resources assessment training, 10 June - 28 June 2013, Pohnpei, Federated States of Micronesia 7th Tuna Data Workshop, 15-19 April 2013, Noumea, New Caledonia Christmas Island Basic observer course, 22 March - 24 April 2013, Kiritimati, Kiribati
2012	<ul style="list-style-type: none"> Observer training on longline fisheries, 7 - 19 November 2012, Tarawa, Kiribati Basic observer training for Kiribati, 1 October - 31 November 2012, Tarawa, Kiribati Basic observer training for Marshall Islands, Federated States of Micronesia and Solomon Islands, 10 September - 12 October 2012, Majuro, Marshall Islands Sub-regional observer training for Tokelau, Fiji, Tonga and Vanuatu, 16 July - 17 August 2012, Santo, Vanuatu PIRFO Assessor's workshop, 13-24 August 2012, Noumea, New Caledonia Creel and market survey training, 6-17 August 2012, Nuku'alofa, Tonga Training attachments on the Reef Fish Integrated Database (RFID), 2-20 July 2012, Noumea, New Caledonia Observer Debriefing Workshop, 7-14 May 2012, Noumea, New Caledonia Tuna Data Workshop, 23-27 April 2012, Noumea, New Caledonia Training workshop on database fundamentals for coastal fisheries, 5-14 March 2012, Noumea, New Caledonia Training workshop on database fundamentals for coastal fisheries, 20-29 February 2012, Noumea, New Caledonia Regional Observer Coordinators Workshop, 13-17 February 2012, Nuku'alofa, Tonga
2011	<ul style="list-style-type: none"> Marshall Islands observers training, 14 November-16 December 2011, Majuro, Marshall Islands Database fundamentals for coastal fisheries training, 19-23 September 2011, Noumea, New Caledonia Upgrade training for Kiribati observers on longlining, 16 August - 16 September 2011, Tarawa, Kiribati Observer trainers workshop, 25 July - 5 August 2011, Noumea, New Caledonia Solomon islands basic observer training, 30 May-17 June 2011, Honiara, Solomon Islands Regional Observer Coordinators workshop, 20-25 May 2011, Honiara, Solomon Islands Basic monitoring needs for effective management of coastal fisheries and resources for pacific island countries and territories, 26-29 April 2011, Suva, Fiji Fifth Tuna Data Workshop (TDW-5), 18-22 April 2011, SPC Headquarters, Noumea, New Caledonia PNG Observer training in biological sampling, 18-22 April 2011, Kavieng, Papua New Guinea Biological Sampling Workshop, 14-13 March 2011, Pohnpei, Federated States of Micronesia Senior Debriefing and Debriefing Assessor Certification Workshop, 28 February - 18 March 2011, SPC Headquarters, Noumea SciCOFish First Steering Committee Meeting, 28 February 2011, SPC Headquarters, Noumea Regional Workshop on Approaches to the Implementation and Monitoring of Community-based Ecosystem Approach to Fisheries Management (CEAFM), 29 November –3 December 2010, SPC Headquarters, Noumea

7.6 RESULTS OF SURVEY OF STAFF, FISHERS AND TRADERS: IMPACTS OF SciCOFISH

7.6.1 Background (Q10-11)

A total of 21 fisheries staff, fishers, traders and others with an interest in coastal fisheries were interviewed or filled out a survey questionnaire. This included 11 people from Cook Islands and 10 from Vanuatu and a total of 4 females and 17 males (Table 5). Many of those interviewed were from the government agency responsible for fisheries (67% of total), with some people from Fishers' Associations, who were fishers themselves (no organisation) or who were traders (buyers of trochus or BDM) (Table 6). The jobs people held included Fisheries Officers (juniors, senior levels and directors), project officers, a chair of a fishers' association, marketers, fishers and traders. Some interviewed also counted themselves as housewives and farmers in addition to their role in one of these.

Table 5: Location of people surveyed (Q2)

Country	Location	Female	Male	Total
Cook Islands	Aitutaki	1	2	3
	Rarotonga	2	6	8
Vanuatu	Emua Village, N. Efate	1	1	2
	Luganville, Santo		1	1
	Paunagisu Village, N. Efate		2	2
	Port Vila		4	4
	Saratamata		1	1
Total		4	17	21

Figure 3: Age distribution of people surveyed (Q8)

Units are number of people in each age category disaggregated by gender

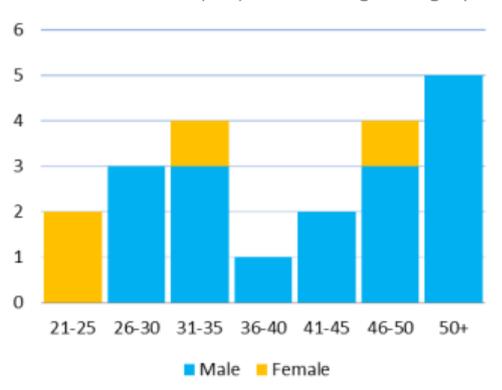


Table 6: Organisations included in the survey (Q9)

Country	Organisations	Number	%
Cook Islands	Cook Islands Fishing Association	1	5
	MMR Ministry of Marine Resources	9	43
	Moana Gems	1	5
Vanuatu	Fisheries Department	5	24
	Fisherman Association Paunagisu	1	5
	IUCN / Department of Environment	1	5
	None	3	14
Total		21	100

Ninety-five percent of those answering the survey said they had an interest in invertebrates, such as for work, income, food or other reasons (Q11). The most common interests were for income (43% of surveys completed) and for food (38%). Other interests were less direct or personal and included wanting to quantify the resources and manage them for the future (total of 24%). One person involved in environmental work saw invertebrates as indicators of environmental change and another

used trochus and turban snail as bait whilst fishing for groupers. One person said he did not currently have an interest in invertebrates (although he did have in the past): *“Don't fish for invertebrates because the population is high and there is competition in resource harvesting, so I went to deep bottom snapper fishing”*.

Table 7: Responders’ interest in invertebrates (Q11)

For this and following tables that summarise text answers % Responses is the percentage of all the categorised responses received for this question for each category (row) reported. In this table there was a total of 25 responses to this question. In contrast, %Surveys refers to the occurrence of each response as a percentage of the 21 survey questionnaires. In this table 119% total in the %Surveys column shows that some people chose more than one of these categories.

Interest	Number	% Responses	% Surveys
Food	8	32	38
Income / Employment / Commercial / Trader	9	36	43
Quantify / manage for future harvest	3	12	14
Seeing them developed / managed for food / economics / environment	2	8	10
Survey at request of community (also MPAs)	1	4	5
Indicators of environmental change	1	4	5
Bait when fishing	1	4	5
Total	25	100	119

7.6.2 Understanding of SciCOFish (Q12-14)

Overall 33% of those responding to this survey said that they had not heard of SciCOFish before this survey. An assessment of the degree of understanding of SciCOFish aims and design (Q13 of the questionnaires) revealed that 33% of respondents did not know what SciCOFish was designed to do or what its aims were, while 27% had a partial understanding and the remainder (40%) a good understanding. Five agencies were quoted as funding SciCOFish (Q14), with one responder quoting 2 agencies, and 2 quoting 3 agencies co-funding the project. The European Union was identified as funding agency (not necessarily exclusively) in 43% of the surveys (Table 8).

Table 8: Who funded SciCOFish? (Q14)

Funding	Number	% Surveys
EU European Union	9	43
SPC Secretariat of the Pacific Community	4	19
Don't know	3	14
MMR Ministry of Marine Resources, Cook Islands	2	10
AMRC Aitutaki Marine Resource Centre	2	10
FFA Pacific Islands Forum Fisheries Agency	1	5
Total	21	100

7.6.3 Training and Capacity Building (Q15-28)

Overall, 57% (12 of those answering the survey) did undertake SciCOFish training, with 35% not involved in any training, or did not answer this question (and are therefore unlikely to have undergone training) (Q15). The 12 people who undertook training attended a total of 20 courses, attachments and in one case, informal training through access to SciCOFish resources and personnel (Table 9). This is not a list of all trainees for each of the two countries.

Table 9: SciCOFish training undertaken by survey respondents (Q15-16)

Country	Course	Number
Cook Islands	GIS (QGIS) training 2014	1
	In-country invertebrate assessment training	5
	Informal assistance	1
	Market and Creel Survey Database training Oct 2014	1
	Training attachment in Noumea 2013	2
Vanuatu	Basic monitoring needs for effective management of coastal fisheries and resources for Pacific Island countries and territories, 26-29 April, Fiji, 2011	1
	In country training invertebrate assessment with a focus on sea cucumber	3

Staff attachment to Solomon Islands sea cucumber assessment	1
Training attachments on the Reef Fish Integrated Database (RFID), 2-20 July, Noumea, 2012	1
Training during Aneityum green snail assessment, 30 Sep-21Oct, Aneityum Island, 2013	3
Training workshop on database fundamentals for coastal fisheries, 5-14 March, Noumea, 2012	1
Total	20

The effects of training as assessed by the people surveyed varied by type of training (in-country or attachment in Noumea or Solomon Islands) and by topic, although overall the numbers responding to the self-assessment tended to be too low to obtain strong signals (Table 10). For in-country survey training (11 respondents) people tended to say that they were a little better or much better than before the training, with very few saying that they had stayed the same and not improved. For in-country training 13% of the responses received across all topics indicated a significant improvement resulting from the course. The greatest improvements were reported in transect methods, fieldwork and theory in that order (see indicator values in Table 10). The least improvement overall was noted in the topic of data entry.

Fewer responses were obtained for attachment training, with only 3 people reporting their experiences. Where responses were given, more (60%) tended to assess their improvement as excellent.

Around 17 topics were raised as the main lessons people learned during their training with SciCOFish. Most people responded with an indication of the topics that they liked or responded to the most, but a few responded with aspects of personal or professional development as a result of the SciCOFish training. The most frequently mentioned topics were safety or safety at sea (24% of surveys), survey methods (24%) and report writing (14%) (Table 11). In terms of personal and professional development mention was made of benefits in being able to update/upgrade skills (continuous learning), team work and the need for thoroughness in data handling.

In terms of effects of the training on jobs and ability to manage invertebrates (Q18), people said that they now understood the habitats and resources better, how to manage them, and understood better the reasons behind why certain methods are used: *“It makes our job easier to do and also having a clear understanding of the reason you use these methods”*. As one manager put it: *“... there is more confidence on my staff whom were involved in the training, and continues to support their work, both field work and data analysis, and report writing”*.

Table 10: Self-assessment of the effects of training on respondents (Q16)

Top: In-country survey training; bottom: Attachments. For each type of course respondents were quizzed on their performance in each topic covered. The ‘Indicator’ value is calculated by multiplying the number of responses in each improvement category by values as follows: Same=0 (i.e. no improvement); A little better=1; Much better=2; and Excellent=3. The resulting value gives an indication of topics with the best contribution to improvement.

In-country Survey	Theory	Field	Manta	Transects	Data Entry	Total	% Responses
Same					2	2	4
A little better	5	4	5	4	2	20	43
Much better	4	5	2	5	3	19	40
Excellent improvement	1	1	1	2	1	6	13
Total	10	10	8	11	8	47	100
<i>Indicator</i>	16	17	12	20	11	<< 76	
Attachment training	Data Entry	Cleaning	Analysis	Interpretation	Reporting	Total	% Responses
Same						0	0
A little better		1				1	7
Much better	1		1	2	1	5	33
Excellent improvement	2	2	2	1	2	9	60
Total	3	3	3	3	2	15	100
<i>Indicator</i>	8	7	8	7	8	<< 38	

Table 11: Lessons learned during training (Q17)

Lesson	Number	% Responses	% Surveys
Safety / at Sea	5	16	24
Surveys / Methods / Transects	5	16	24
Report writing	3	10	14
Data analysis	2	6	10
Data handling / Care / Filling forms correctly	2	6	10
Practical work	2	6	10
Species IDs	2	6	10
Assessment procedures	1	3	5
Continuous learning	1	3	5
Data interpretation better / understood	1	3	5
GPS / Plotting points	1	3	5
Habitat IDs	1	3	5
Mechanical maintenance	1	3	5
SCUBA	1	3	5
Team work	1	3	5
Technical capacity	1	3	5
Thoroughness is needed	1	3	5
Total	31	100	148

Most respondents fell into two groups for how frequently they thought they would be using what they learned in SciCOFish training in their work (Q19). One group centred on the occasional use of the information (33%) and the other group said that they would use what they learned on a daily basis (25%). About 1/5th of the respondents said they would never use what they had learned in their work (Table 12).

Table 12: How often would you use what you learned in your training with SPC SciCOFish in your job? (Q19)

Frequency	Number	% Responses
Never	2	17
Rarely	4	33
Monthly	2	17
Weekly	1	8
Daily	3	25
Total	12	100

Just 38% of respondents said that they were now involved in monitoring invertebrates in their job (Q20). In Cook Islands the monitoring reported during the survey included trochus and BDM, but several people said simply that all invertebrates were being monitored on some islands, some in marine protected areas (MPAs). In Vanuatu monitoring was of “*Most on commercial species*” and one person said monitoring was of crown-of-thorns starfish. The monitoring was reported mostly as a Fisheries/MMR initiative, though some people said that was in collaboration with either SciCOFish or the communities (Table 13). Monitoring as a SciCOFish initiative alone, was reported by just one person. About half of the respondents said that there were plans for monitoring in the future (Table 14). In Cook Islands this would include pearl oysters, clams, BDM and trochus and other species. In Vanuatu, future monitoring would be of BDM or “*all commercial invertebrate species*”.

Table 13: Who’s initiative is the current monitoring? (Q21)

Who’s initiative?	Number	% Surveys
No Data (ND)	13	62
Fisheries	4	19
Fisheries + SciCOFish	2	10
Fisheries + Community	1	5
SciCOFish	1	5

Total	21	100
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Table 14: Plans for future monitoring? (Q22)

Country	ND	No	Yes
Cook Islands	3	3	5
Vanuatu	5		5
Total	8	3	10
Percent	38	14	48

Management actions established over the past 5 years (Q24) were reported by 43% of respondents in both countries. In Cook Islands these actions included drafting of a BDM Management Plan and a ban on commercial export of BDM, with these actions now being expanded to 2 additional islands. MMR has also in collaboration with communities established Raui Action Plans (traditional management) *“and that’s work well in managing the invertebrate harvest in the last 5 years”*. There is also a Trochus Management Plan and other arrangements now being developed: *“These management regimes involving both Ministry of Marine Resources and Local Governments, e.g. Aitutaki Trochus Fishery in Aitutaki, 1990? ban of export of shellfish from Aitutaki, including clams, bonefish and turban snail meat. Resolution by both Penrhyn and Manihiki, banning the export of Clam meat. This would require approval from Island Council although MMR would be required to assess the harvestable quota (assessments) to provide to Island Council”*.

In Vanuatu both Fisheries and Environment have established management actions. This includes: *“Trochus (draft plan), sea cucumber (almost finalized plan), Green snail (still closed until 2020), [and] coconut crab”*. These responses show that both centralised and decentralised management actions are well on the way to becoming established as mainstream activities in both countries.

In Cook Islands the current management actions are seen as an MMR initiative or as a collaboration between MMR and SPC in general, with SciCOFish mentioned by one respondent: *“It is a Fisheries Initiative however SPC SciCOFish was also involved for advice”*. In Vanuatu, the management is seen as a Fisheries initiative and *“SPC and other institutions are helping in the current set up of the management of the resources (e.g. IRD)”*.

Most people who responded to the question (62% did not answer this question, recall that 67% of respondents were non-fisheries staff, see Table 6) of whether any new positions had been created in their Fisheries Departments said that no new positions had been created (88%). Just one respondent said that new positions were created during the SciCOFish Project in Vanuatu, however this response was not accompanied by any details, but simply *“Fisheries can explain”* and was provided by staff of the Environment Department. A few people suggested that there may be new positions in the future for invertebrate fisheries (Table 15), but there was little accompanying information on how many positions, when they might come online and whether they would be kept after the SciCOFish project completes.

Table 15: Are there any new positions for invertebrate fisheries in the pipeline? (Q26-27)

Country	ND	No	Yes
Cook Islands	7	3	1
Vanuatu	7	1	2
Total	14	4	3
Percent	67	19	14

7.6.4 Awareness of invertebrate issues and management (Q29-52)

There was little agreement among respondents within a country in their perceptions of changes in the state of invertebrate resources in the past, present and future. Overall, people in Cook Islands tended to suggest that resources had been declining or increasing in the past, they were decreasing now and

at best might stay the same as now into the future (Table 16, Table 17). This contrasts with the perceptions from Vanuatu where more people thought that resources were either static or increasing.

In Cook Islands when resources were thought to be decreasing right now, the main reasons given were that people were overharvesting or poaching, the lack of legal standing of MPAs, climate change, and/or nutrient enrichment of the sea (from the land): *“My answer is in two parts - Yes it decreasing, if I compare this to areas during then and now, however for the areas I have just seen just once (now) I could not make any comparison, only through what that community fishers tell me... clams abundance ... is the most depleted species from most of the islands lagoon & reef habitat. In terms of it biological preferences of existence, there are certainly other climatic influential factors which could be responsible for its demise, i.e. temperature changes, coral bleaching, algal blooms, COTS outbreaks and pollutions from inland etc”*. In cases that resources are thought to be increasing, it is thought that this was due to *“no regular harvesting”*.

In Vanuatu, people who said the current trend was for resources to be in decline also said that the main reasons were related to population growth and human behaviour. Increasing abundance of resources was said to be due to the presence of management plans, by-laws, fisheries regulations and policies, the lack of a market for and moratorium on BDM, and greater awareness by people.

Table 16: Perceptions of changes in invertebrate abundance in past, present and future (Q29,30,36)

Cook Islands	Past	Present	Future	Vanuatu	Past	Present	Future
ND	2	2	2	ND			
Greatly decrease	1			Greatly decrease	2		1
Decrease	3	5	3	Decrease	1	1	1
Same	1	2	5	Same	3	4	2
Increase	4	2	1	Increase	2	5	4
Greatly increase				Greatly increase	1		2
Variable				Variable	1		
Total	11	11	11	Total	10	10	10

Table 17: Perceptions of change in abundance of species over the past 10 years (Q29)

Turbo could include several species; BDM=Beche-de-mer or sea cucumber; Clams=Giant clams

Last 10 years	↓ Decreased	→ Same	↑ Increased
Cook Islands	BDM, giant clams, trochus, turbo, urchins, lobsters	Turbo, clams, trochus	Trochus, BDM
Vanuatu	Turbo, trochus, octopus, triton, clams, BDM	BDM, turbo	BDM, turbo, clams

Only one of the people responding to the questionnaires said that they had fished invertebrates in the past year – a fisher from Vanuatu. Four people said that they had not fished invertebrates, and no answer was given by 16 of the respondents. The one person that had fished had targeted BDM and fishes them about 3 times per month.

Overall 57% of respondents said that invertebrates were being managed right now (this includes fishers and traders) and 14% said that there was no current management (the remainder did not answer this question). In Cook Islands, the management being used included use of designated or protected areas (Raui System), managing BDM under MMR management plans and trochus and clams under Aitutaki/Manuae Fisheries By-laws 1990, and a ban on trochus commercial harvesting. In Vanuatu tambu areas may be used and sea cucumber, trochus, green snail, clam are controlled through local chiefs in collaboration with the Fisheries Department. In addition: *“green Snail (turbo) and Sea cucumber (Ban according to fisheries regulation). Trochus size limit is managed under Fisheries Regulation. Sea Shell are banned till March 2015”*. In Emua Village, North Efate, local rules

are used: “Trochus only harvest at certain times, limited days; Clams only big ones; Lobsters only big ones; Green snails are no take. The Chief sets up these tambus”.

When asked whether the invertebrates should be managed the majority of people, 81% agreed that management was needed. Some of the reasons given included: “We should manage them for the new generation to come” and “Invertebrates have a very important role to play in lagoon ecosystems where they balance out algae growth and filter out microorganisms. Some species even have symbiotic relationship with other invertebrates, if you remove one invertebrate the other will not survive. e.g. corals and tridacnas”. One respondent said: “Definitely, food source and for the future, economic benefits, like lagoon tours, dive sites and cultural significances”.

Several people indicated that they are no longer or not currently fishing invertebrates. The main reasons given were from Vanuatu because there is not enough allowable catch and because competition for invertebrates (BDM) is high and there is less competition for deepwater snapper.

Most people, 61% in Cook Islands and 87% in Vanuatu agreed that there would be benefits and/or losses associated with management at all societal levels: for themselves and their family, the community and the country (Table 18) (Q38-40). Most of the most commonly-cited effects of management were seen as benefits, with increases in income and better livelihoods cited in 86% of surveys, most at community and family level (Table 19). Retaining resources for the future, an increased food supply, increased tourism and healthy marine environments were also cited as important benefits of management in between 24 and 52% of the surveys. Some of the negative impacts of management included loss of food security at family level, loss of income at all levels and having to find alternative food sources during closures.

Table 18: Would there be any benefits / losses from management of invertebrates for your family, the community and the country? (Q38-40)

Cook Islands	ND	No	Yes	Yes/No	Total
Family	2	2	7		11
Community	2	2	6	1	11
Country	2	2	7		11
Total	6	6	20	1	33
Percent >>	18	18	61	3	100

Vanuatu	ND	No	Yes	Yes/No	Total
Family		1	8	1	10
Community			10		10
Country	1	1	8		10
Total	1	2	26	1	30
Percent >>	3	7	87	3	100

Table 19: Benefits and losses identified at personal/family, community and country level resulting from management of invertebrates (Q38-40)

Benefit or Loss	Family	Community	Country	Total	% Responses	% Surveys	
Money / income / livelihoods	6	9	3	18	20	86	
Resource available for long time / future generations	4	3	4	11	12	52	
Food increased	5	5		10	11	48	
Tourism increases because better lagoon	1	2	4	7	8	33	
Healthy Marine Environment	2	1	2	5	6	24	
There are other options for food and income	2	2	1	5	6	24	
Export earnings			5	5	6	24	
Food security	1	3		4	4	19	
Invertebrate population increases / more to harvest	2	1	1	4	4	19	
Loss of income	1	2	1	4	4	19	
Declining resource / Loss of sustainability	2	1		3	3	14	
Having to stay out longer / find alternative foods	1	1		2	2	10	
Less fishing/collecting time	1			1	1	5	
School fees paid	1			1	1	5	
Seeing the resources in abundance	1			1	1	5	
Animals able to breed		1		1	1	5	
Fish life increases		1		1	1	5	
Lower catches with closures		1		1	1	5	
Management initiatives increase		1		1	1	5	
Economic growth			1	1	1	5	
Employment			1	1	1	5	
Imported foods less			1	1	1	5	
Resilience to Climate Change			1	1	1	5	
Total	30	34	25	89	100	424	
					Benefit	Loss	Neutral

Information on the impacts of management and specifically SciCOFish, on income and standard of living was not well collected by this survey. Overall just an average of 7% of the yearly income of fishers in Vanuatu was attributed to invertebrate fishing, but this varied up to 25% (N=4 responses).

Overall 19% of those surveyed said that their standard of living had changed due to SciCOFish, with 38% stating no change and 43% not responding to the question. Only 1 respondent said that management of invertebrates (as such) had affected their standard of living. When asked in what way SciCOFish had affected their standard of living people offered the following responses:

- *“Training that was conducted by SPC SciCOFISH had some impacts”*
- *“Can't say that the current management practises in place are attributed to the SPC SciCOFish. More to the fact that we have a very 'on to it' Ministry of Marine Resources”*
- *“Positive feedbacks and enlightenment towards the 'Way Forward' initiatives and funding assistance towards some fisheries development projects”.*

Respondents were varied in their perceptions of how the numbers of fishers and traders had changed over the past 2-3 years (Q45, 47). Overall most people indicated that the numbers had stayed the same or declined over that period for both groups associated with invertebrates. Few respondents said that the numbers had increased (Table 20). Some of the reasons given for a decrease in the number of fishers included depopulation in Cook islands or increasing population in Vanuatu, declining resources, climate change, nutrient enrichment and bans on use of resources. Reasons given for increasing numbers of fishers included population increase (Vanuatu) and participation by a wider cross-section of the community (men, women and children). Other factors given for numbers staying the same included greater public awareness and poor enforcement of rules. People were split evenly overall (38% each way) on the question of whether there was room for more invertebrate fishers to operate in their area and nationally (Table 21). There may have been slightly more tendency for agreement that there could be more invertebrate fishers in Cook Islands.

Table 20: How has the number of fishers and traders changed in the last 2-3 years? (Q45, 47)

Trend	Cook Islands		Vanuatu	
	Fishers	Traders	Fisher	Trader
↑ Increasing	3		2	
→ Same	3	6	3	4
↓ Decreasing	3	1	4	3
ND/Don't know	2	4	1	3
Total	11	11	10	10

Table 21: Is there room for more invertebrate fishers? (Q46)

Country	ND	No	Yes
Cook Islands	3	3	5
Vanuatu	2	5	3
Total	5	8	8
Percent	24	38	38

Most people (62%) responding to the survey agreed that invertebrates contribute to their food security in some way (Table 22) (Q48). In Cook Islands respondents who answered “Yes” said that family members, especially women harvest them for food and income, and that the income could then be used to buy other items (e.g. vegetables) to balance the diet. When there is not enough money to buy food, invertebrates are used as the food source. Invertebrates are an ‘affordable’ food source because they are easy to collect. Those that did not see invertebrates as part of food security said that they did not eat invertebrates or only ate them infrequently.

In Vanuatu reasons given for why invertebrates are seen as part of food security (no negative reasons were given) included that they are used for food, especially [giant] clams, and they are sold at roadside or other markets for income.

The impacts of overfishing contrasted with good management focused on the attainment or loss of food security, the health of resources or the ecosystem in general, livelihoods and the quality of protein with downstream effects on non-communicable diseases (NCDs) (Table 23) (Q50-51). Some people mentioned the role of invertebrates in keeping costs of living low and improving health (as a ‘natural food’). The role of invertebrates for people unable to access other resources was also mentioned. For several people, alternatives either through fishing, use of land or through supermarkets, presented enough of a safety net to ensure food security. Some of the text responses included:

- *“I will have to resort to other suppliers and it could be imported from overseas, which could be more expensive. Or else there could a chance that my protein intake could be altered to cheaper protein types such as chicken (at \$2/kg) while fish / invertebrates are around \$15-\$20/kg. Or to cheap corned beef. This would contribute to NCD, a health issue”.*
- *“...over 80% of Vanuatu's population live in the rural depend on these resources for daily subsistence living”*
- *“Would be hugely impacted where cost of food now days is very expensive and there is a huge reliance on this important protein source to offset the cost of purchasing groceries”.*
- *“It will impact me because sometimes I prefer to have some invertebrates in my diet. But overall it will not affect my food security as a whole”*
- *“Perhaps [there would be], some healthier cook islanders, with less NCD cases - food security is pretty much secured”.*
- *“We would stop buying meat and rely more on seafood. Nowadays some people cannot dive or go far. If managed, everyone can have access”.*
- *“There will be no impact because we do not rely on invertebrates for food security”*

Table 22: Do invertebrates contribute in any way to your food security? (Q48)

Country	ND	No	Yes	Total	% Surveys
Cook Islands	2	3	6	11	52
Vanuatu	1	2	7	10	48
Total	3	5	13	21	100
Percent	14	24	62	100	

Table 23: How would food security be affected by overfishing vs good management? (Q50, 51)

Impact	50 Overfishing	51 Managed
Food security	2	3
Health / more resources / ecosystem	2	3
Fish / other still available to eat	3	1
Livelihoods / income improved / lost	1	3
Protein improved / poor or limited (leading to NCDs)	3	1
Will miss the food / food diversity / natural food	3	1
Greater expense for food / use supermarket / Cost of food	3	1
Have to get the food from other sources: suppliers / overseas	2	1
Little impact		3
Improved health / National health		2
Access to resources hard for some people while invertebrates easy		1
Forced to other areas	1	
National wealth		1
Reduced costs of fishing (distance, time, travel costs)		1
Some harvesters have land to use to offset	1	
Total	21	22

Benefit Loss Neutral

Five of the respondents said that they comply with management rules (Q52) whilst fishing invertebrates, the remainder of people did not answer the question. The reasons given for following the rules included the wish to have bigger and more abundant resources, to prevent their loss and to take care of the environment. The risk of fines was mentioned by one person:

- “Because want resources plenty, bugger. In this village if there is a rule by Chief and Fisheries everybody follows. Sometimes they are afraid of fines from Fisheries. Not all villages are like this”.
- “Because I like to look after the sea and there creatures”
- “I want the goodness”
- “Because if we don't manage it, resource will finish”.

7.6.5 Microserver and Databases (Q53-59)

Information on the impacts of IT and database training is limited since just 3 people completing this survey who said that they had undertaken training as part of the SciCOFish Project (Q53). For the 3 people completing the course competence in databases shifted from “OK” to “Good” (N=2) and “Zero” to “Poor” (N=1) representing 1 scale shift towards improvement in each case (Q54-55). The lessons learned by people who did the database training included all aspects of how to enter, clean, analyse and report data, but also included more theoretical aspects such as understanding the types of data, that data must be accurate, that it should be backed-up (preferably on a server) and to have some knowledge of how the database calculates values in queries (Q56).

When asked how the databases would be used in their work (Q57), responses were received from 5 people. The responses included using the database to examine changes in invertebrates over time, provide technical advice for management, or use it for policymaking. The responses received were:

- “I am at the moment using the RFID database for MPA surveys for inverts and I don't see any reason why I should change it in the future”

- *“I will collate the present and the past years data to determine the changes and the gap in between to see how that affects our livelihood. If there are impacts, then determine the best solution through communication to the internal and external agencies for best advice”*
- *Provide technical advice to director resources management”*
- *“Use the data for economic ecosystem evaluation for both community and national policy making”*
- *“I can't use the data base because data process was not efficient”.*

Five responses were received on whether the use of databases will change the way people manage invertebrates (Table 24) (Q58). Where the response was “Yes” that main changes expected were in being able to use the data to make informed decisions, with in one case the proviso that the data had to be understood and processed by the database users. As one respondent put it: *“Upon analysing the previous data and the present data will only determine whether changes have occurred or not. Base on this assumptions will provide best practices in managing the invertebrates”*. One person responded that databases would not change the way invertebrates are managed stating that even without a database the invertebrates could still be managed: *“Although RFID makes life easier the data obtained can also be obtained without a database and analysed data that could be used to manage invertebrates is analysed the same way with or without a database”*.

When asked whether databases could be used to ensure the sustainability of resources (Q59) four people responded, all saying “Yes”. Just one explanation was given for how: *“Data from database can be used to provide advice to decision makers who may cause a change in peoples attitude towards the resources ensuring it is sustainability”*.

Table 24: Will the use of databases change the way you manage invertebrates? (Q58)

Country	ND	No	Yes
Cook Islands	9	1	1
Vanuatu	7		3
Total	16	1	4
Percentage	76	5	19

7.6.6 Advice on Management (Q60-67)

Respondents were asked to rate their knowledge of options for managing invertebrates before SPC SciCOFish; knowledge of options for managing invertebrates now; confidence in using data triggers to decide when action is needed; and how well they feel they could devise management actions based on data collected. Responses were received from 12 people and it should be noted that advice on management was not provided as training specifically designed to increase capacity in these areas.

Overall respondents assessed an improvement in their knowledge of options for management after receiving advice from SciCOFish compared with before (Figure 4). The category of “Excellent” knowledge increased from 5% to 9% of respondents and “Good” increased from 9% to 14%. At the same time “Poor” reduced from 5% to 0% and “Zero” knowledge from 14% to 10%. Table 25 shows in more detail that 7 people assessed no change in their knowledge, 4 assessed an improvement of 1 category higher in assessed knowledge than before SciCOFish and 1 person a 2 category jump in knowledge. However, the overall result is that 23% of respondents thought that they had “Excellent” or “Good” knowledge of options for management, a standard which may not be sufficient for ensuring good management in the future.

Overall 24% of respondents thought that they had “Excellent” or “Good” abilities to use data triggers to decide when management of invertebrates is needed (Figure 5). For devising management actions, respondents self-assessed that only 23% were “Excellent” or “Good” in this skill. These results suggest that three-quarters of the people surveyed do not consider themselves highly competent in deciding on and devising management measures.

Figure 4: Results of self-assessment of knowledge of options for managing invertebrates before SPC SciCOFish and now (Q60-61)

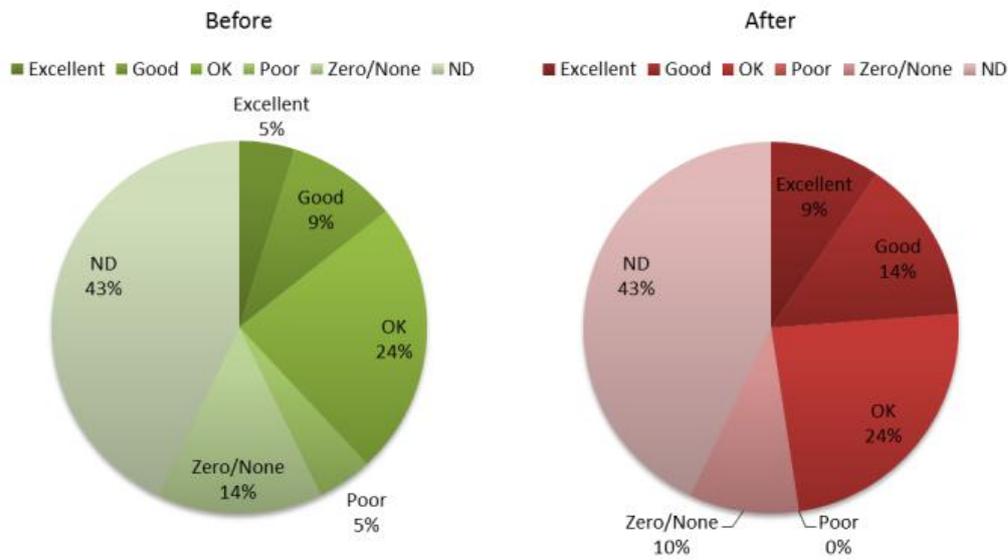
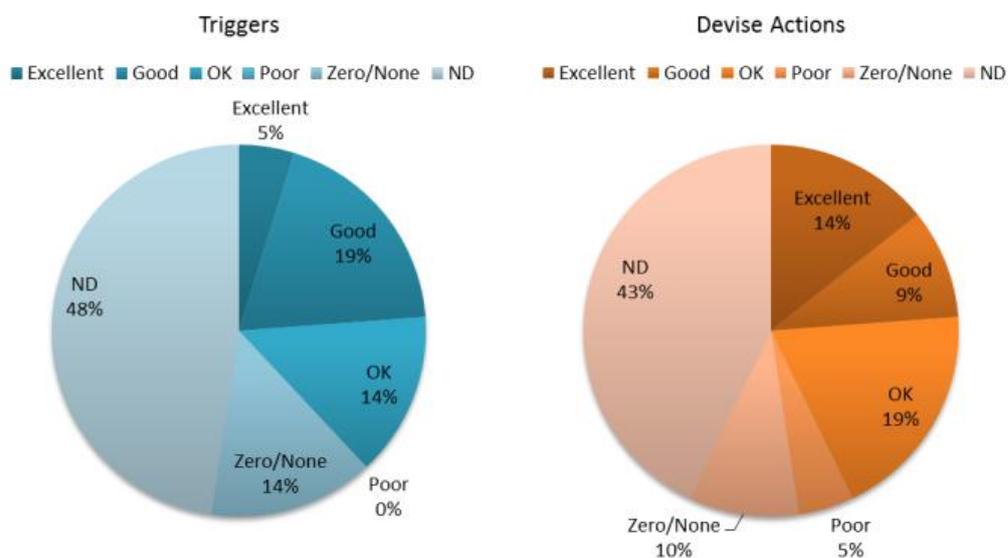


Table 25: Improvements in knowledge of options for managing invertebrates

Values are frequencies (number of respondents) and percentage that self-assessed their knowledge before SciCOFish and now, showing those that did not change competence category, and those that improved by 1 or more categories. Note that the maximum possible improvement would be from Zero knowledge to Excellent, which would be a jump of 4 categories.

Improvement	Number	% Responses
+0 No change	7	58
+1 improvement	4	33
+2 improvement	1	8
+3 improvement	0	0
+4 improvement	0	0
Total	12	100

Figure 5: Results of self-assessment of confidence in using data triggers to decide when management action is needed and how well people feel they could devise management actions based on data collected



The information on management measures is complex and management in both countries has been developing for at least 15-20 years. The SciCOFish Project appears to have contributed to the establishment of invertebrate management in both countries but is part of a larger process. The main contributions identified by respondents in Cook Islands includes:

- The Cook islands BDM Management Plan has benefitted and is being refined;
- Raiu Management Plan used SciCOFish for better management measures;
- Assistance for trochus and clam management; and
- Bonefish management measures.

The Vanuatu respondents did not identify specific management plans or measures that resulted from or benefitted from SciCOFish (Table 26).

Four respondents from Cook Islands said that there was evidence for improvement in invertebrates stocks as a result of management (Q67), and one reported that there was no evidence. Examples of the evidence included:

- *“Yes, our trochus and sea cucumber stocks. Our trochus is still being under monitored. In regards to sea cucumber, is still not harvested yet but management plan is being drafted”*
- *“Trochus, but only in Aitutaki”*
- *“Clam numbers have gone up as seen in our surveys but after a lot local visitors at the end of the year, those numbers dwindle down to normal”*
- *“All species. There are plenty of them in the lagoons now and in the Pa Enuu, the communities there know how to harvest sustainably”.*

Only a single response was received for Vanuatu, saying that it is too early: *“It is yet very early to determine if the stock are manage well but our TAC system was kick start this year 2014 and we will monitor the changes in stock over the next 5 years with continuous stock assessment after every harvest”.*

Table 26: Management measures put in place before and as a result of SciCOFish, and plans for the future (Q64-66)

Country	Management before SciCOFish	Management resulting from SciCOFish	Future management planned
Cook Islands	<ul style="list-style-type: none"> ▪ Trochus Harvest upon advice by MMR ▪ Raiu Management Plan and Regulations (MPAs) (MMR and the Koutu Nui Raiu systems and regulations and lagoon monitoring work) ▪ Aitutaki Trochus Management Plan ▪ Aitutaki / Manuae By-law 1990 ▪ Cook Islands Sea Cucumber Management Plan ▪ Management measures for clams ▪ Bonefish 	<ul style="list-style-type: none"> ▪ Cook Islands Sea Cucumber (BDM) Management Plan drafted and is constantly refined ▪ Raiu Management Plan and regulations (MPAs) used SPC SciCOFish for better management measures ▪ Management measures for trochus and clams assisted by SPC ▪ Bonefish ▪ Don't know 	<ul style="list-style-type: none"> ▪ BDM Management Plan in force ▪ Continue survey/monitor all invertebrates stock in Rarotonga and the outer islands ▪ Hatchery to restock the lagoon (Aitutaki) ▪ Sea-urchins ▪ Cater for women fishers who are the main harvesters of this area ▪ Ornamental Fisheries, Aitutaki Lagoon Management Plan ▪ Palmerston Parrotfish Management Plan
Vanuatu	<ul style="list-style-type: none"> ▪ Size, gear restriction, quota & management plans ▪ Sea Cucumber Ban ▪ Green Snail (Turbo) Ban ▪ Trochus Size limit ▪ Government regulation on size limits and an annual 	<ul style="list-style-type: none"> ▪ Management Plan ▪ None 	<ul style="list-style-type: none"> ▪ Quota system based on biomass (IRD method) not density as SciCOFish method ▪ Licensing of traders

	quota for some commercial species		
	<ul style="list-style-type: none"> Other sea shells managed under seasons 		
Total	10 responses	9 responses	9 responses

7.6.7 Overall impact of SciCOFish (Q68)

Overall benefits of the SciCOFish project on income, jobs, quality of life and/or food security were recognised by 57% of the people who completed this survey, with 19% stating that there had been no benefits (Table 27). In Cook Islands the main benefits mentioned were:

- Benefits of money from harvests;
- Increased food security such as *“Food Security could be enhanced by having trustworthy data produced by MMR using training by SPC SciCOFish which may promote the use of MPAs to ensure there is plenty of invertebrates”*;
- Best management tools *“It [SciCOFish] provides the best management tools to use so that our invertebrates are sustainable for our livelihood and for the future generations”*; and
- Quality of life *“I would concur with all of the listed benefits above, one really shines is the quality of life”*.

In Vanuatu, the main benefits overall of SciCOFish were:

- Improved knowledge & skills of Fisheries Officers, capacity building;
- Community participation in resource management;
- Community development: *“One small MPA. The Chief with advice from Fisheries closed it for several years. Opened last month (November 2014). Harvested fish and invertebrates with money going to the community. Used for community basket to run operations. Like building hall”*;
- “... well-managed fisheries leads to a better, more secure future”*;
- “... i would say ... it is yet too early to measure changes on income , jobs, quality of life and food security”*; and
- Better economic potential for communities.

Table 27: Would you say there have been any benefits of this SPC SciCOFish Project on income, jobs, quality of life or food security for you or the community? (Q68)

Country	ND	No	Yes
Cook Islands	3	1	7
Vanuatu	2	3	5
Total	5	4	12
Percent	24	19	57

7.6.8 Final comments (Q69)

The final comments provided by respondents are reproduced here with only light editing for spelling and omitting “no comments” responses.

- I have learned a lot from this project, most of all the one on one training at SPC where specific issues were raised and the actual people that developed the varies training can be consulted face to face. Also this was an opportunity to raise other question also relating to other projects that is also affected by the SPC SciCOFish Project.
- From the Cook Islands perspective, I think black lipped oysters need to be included as an invertebrate resource. Assessing wild brood stocks is an important aspect of managing the black pearl industry here in the Cooks and which requires specific assessment methods in order to do so. Similarly, there is a need for quantifying spat fall of oysters.
- I think that there needs to be more focus on database development, specifically focusing on report outputs (i.e. simple tables that you can produce graphs from). I find that a lot of data gets collected but never processed, input or analysed and therefore when we get *ad hoc* requests

from third parties on for example, how many black pearls are produced, it becomes difficult to extract such information. Typically it is sitting in a random spreadsheet somewhere or stuck on someone's personal computer instead of an easily identifiable and accessible database/location.

- Website development is also crucial for disseminating data to the public and other stakeholders. We do have a website under construction but having the ability to have regular rolling updates and to be able to upload various reports would be useful. We have so much information but no method of getting it to our stakeholders besides hard printed copies which is resource consuming and expensive. Having an interactive website could also be useful in allowing the public to voice their concerns, or share any information about their resources that they may have.
- Assistance/training in simply report writing/summarising for the average public is crucial. Communicating scientific information and transcribing technical jargon into simplified language for the everyday person is a difficult task and requires specific training. This is something that many Pacific Island countries could benefit from.
- Additional GIS training in a standardised program (i.e. MapInfo or Quantum GIS) would be useful. Knowing how to store layers and have them saved into a database instead of recreating new layers each time.
- Quantifying invertebrate stock is important to a lot of these islands, it gives them an idea of what they need to put together when designing management plans. Administrators should also know the life cycle of these invertebrates so they may have an idea why there is a decrease or increase in numbers. I have heard arguments in meetings when presenting these management plans where the community blames these management plans for the decrease of their invertebrates, cause there was no sound explanation from the presenter of these management plans. An example of this suggestion is that when we analysed the trochus population for Aitutaki, it seemed like there has not been any new recruitment of trochus for a number years, I mentioned this to one of the SPC staff and he mentioned that he has seen this occurrence in other parts of the Pacific and they will normally start producing in the near future. This information is very important when designing management plans.
- The need to advocate that we must consultate with the community when making an decisions on marine resources and \$ should be able to cater for this gathering, most often these some of the activities that most donors fail to address(especially funding it).
- What activities still needed to get these 4 impacts (jobs, income, food security, standard of living)? Jobs - Once the fisheries are open for development, although, the trochus fishery in Aitutaki is creating some odd job for the villagers / fishers. In Aitutaki and Rarotonga, some of the snorkelling sites / dive sites are being replanted with live corals and trochus/clams adding more things for tourist to see. Income -At this stage some income are generated, as directly benefit from sales of trochus shells to buyers / export. Same time the indirect benefit for the visitation of lagoon tours. More staff being employed on the boat tours. Food security - When the fisheries is open. Work needs to be focused on getting the approval process completed. Standard of living - same as above. Basically the main activities required for all 4 impacts are 1) getting the approval of the fisheries management plan and the regulations; 2) A wide Awareness / Consultation with the general public of what's required under these regulations / management plan; 3) Training / MCS and empowering local compliance; and 4) Implementation.
- We need more scientific research for these species. Need to conduct more awareness on this SPC SciCOFish Project. Find ways to adapt climate change and control crown-of-thorns.
- We need more awareness for most of the invertebrates. Most people don't know what they are. They know fish. Some people have not even seen some invertebrates, they don't know them. Kids don't see trochus. Fisheries needs to do more awareness with the community so everyone knows what to do to manage the resources.
- Encourage management because of the population growth.
- 1) There are distractions on resources: Reefs continuously dying. Request assistance to identify areas to be protected for resources to recover. 2) Insist to have more management awareness; 3)

Concern - integrated approach. Land owned by customary owners and linked with the sea. So encourage integrated and enhance marine ecosystems.

- SPC SciCOFish Project should have been improved better to address specific country needs in terms of priorities. E.g. Vanuatu has developed further to determine the stock estimate of each commercial species survey, however SPC SciCOFish is still using density estimates to determine stock. We as an SPC member country believe that SciCOFish should better assist us financially because we have developed capacity building [and] we need only funds to do assessments. We also have developed our own database system which is more user friendly and is efficient (country need) than the RFID. We could do assessment and used our simple database to process and produce results at community whenever an assessment has been carried out in an island.
- Thank you SPC SciCOFish, Please keep up the good work!!

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