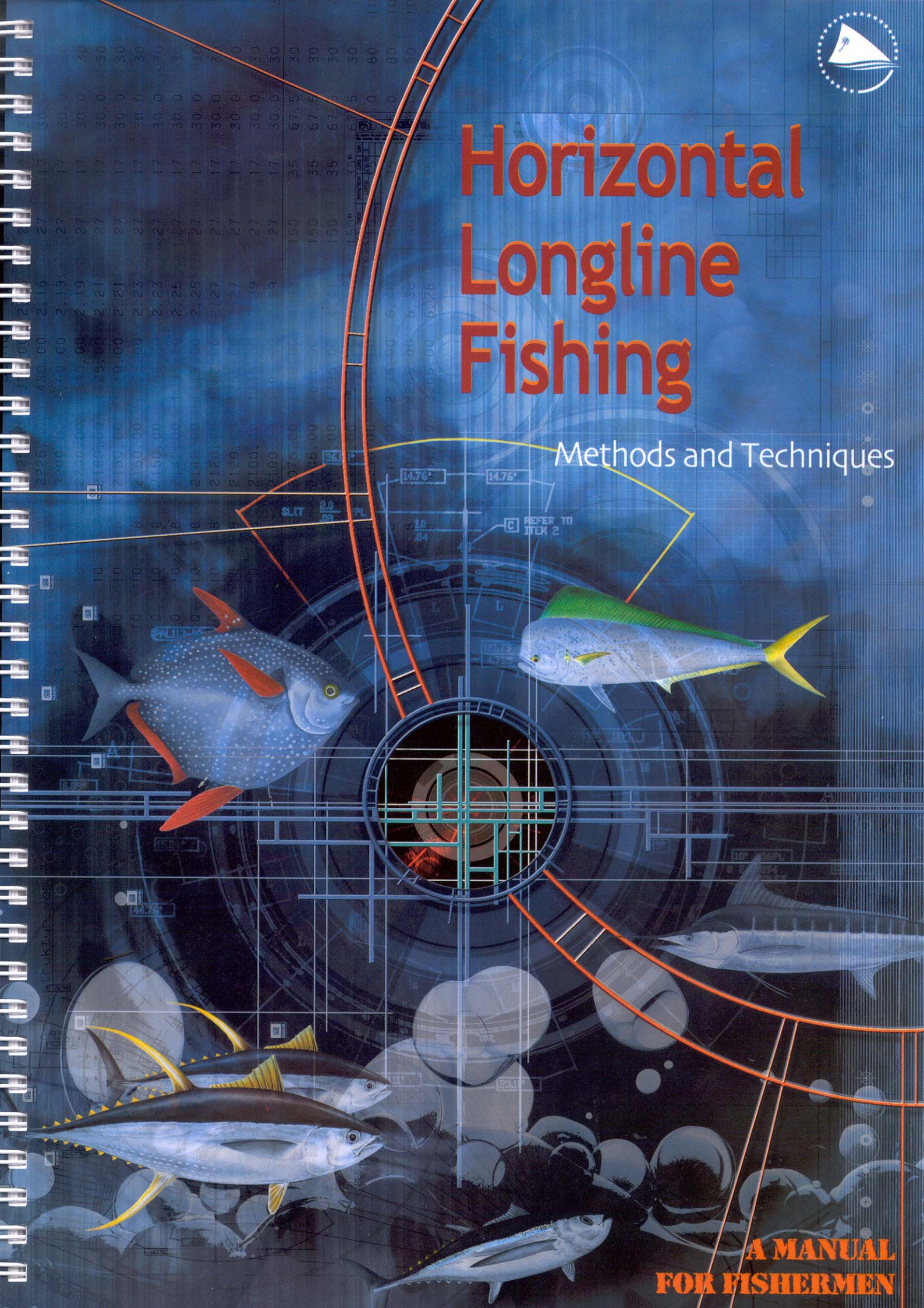




# Horizontal Longline Fishing

Methods and Techniques



**A MANUAL  
FOR FISHERMEN**







Secretariat of the Pacific Community

# Horizontal Longline Fishing Methods and Techniques

## A Manual for Fishermen

by

*Steve Beverly, Lindsay Chapman and William Sokimi*



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Original text: English

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Secretariat of the Pacific Community Cataloguing-in-publication data

Beverly, Steve

Horizontal longline fishing methods and techniques: a manual for fishermen  
/ by Steve Beverly, Lindsay Chapman and William Sokimi

1. Longlining (Fisheries) – Oceania – Handbooks, manuals, etc.
2. Tuna fisheries – Oceania.
1. Title 2. Secretariat of the Pacific Community 3. Chapman, Lindsay
4. Sokimi, William

639.2099

AACR2

ISBN 982-203-937-9

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Preparation of this manual was funded by the Australian Government and the New Zealand Government

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Prepared for publication at  
Secretariat of the Pacific Community, Noumea, New Caledonia  
and printed by  
Multipress, Noumea, New Caledonia

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## ACKNOWLEDGEMENTS

The Secretariat acknowledges contributions from the following people: from SPC — Mr Juan-Jose Areso, Mr Keith Bigelow, Ms Deirdre Brogan, Mr Aymeric Desurmont, Mr Sifa Fukofuka, Mr Jean-Paul Gaudechoux, Dr John Hampton, Ms Lyn Lambeth, Mr Tim Lawson, Dr Patrick Lehodey, Ms Marie-Ange Roberts, Mr Peter Sharples, Mr Wade Whitelaw and Mr Peter Williams; from Hawaii — Mr Scotty Barrows, Mr Paul Bartram, Mr Jeff Broad, Mr Ray Clarke, Mr Jim Cook, Mr David Itano, Mr Mike Madden, Mr Sean Martin, Mr Mike McCoy, Mr John Myking, Mr Joseph O'Malley, Mr Smokey Oshiro and Mr Allan 'Samson' Willingham; from Fiji Islands — Mr Ian Chute, Mr Grahame Southwick and Mr Dave Lucas; from PNG — Mr Rusty Strickland; from Tonga — Mr Bill Holden; from New Caledonia — Mr Vincent Puluiueva; from Tahiti — Mr Gilles Leboucher and Mr Coco Chung Shing; from Pohnpei — Mr Gerry Russo; and from Australia — Mr Ian Cartwright.

The authors acknowledge the contributions of Ms Youngmi Choi for the production of many of the diagrams used in this manual, and for the formatting and laying out of the manual, Ms Patricia Martin for the design of the cover, and Ms Maureen Wright for editing the text.

## UNITS AND CONVERSIONS

For the most part, metric units are used in this manual. Fathoms and nautical miles are often referred to, as many fishermen prefer fathoms to metres and nautical miles to kilometres. Conversion between metric and Imperial or US units is as follows:

1 mm = 0.039 in	1 km = 0.62 nm	1 oz = 28.3 g
1 cm = 0.393 in	1 nm = 1.85 km	1 kg = 2.2 lb
1 m = 3.281 ft	1 l = 0.22 Imperial gallons	1 mt = 2200 lb
1 m = 0.546 fa	1 l = 0.26 US gallons	1 short ton = 2000 lb
1 in = 25.38 mm	1 kt = 1.8 km/h	1 PSI = 6.895 kPa
1 in = 2.54 cm	1 kt = 31 m/min	1 PSI = 0.070 kg/cm <sup>2</sup>
1 ft = 0.305 m	1 kW = 1.34 HP	1 bar = 14.5 PSI
1 fa = 6 ft	1 HP = 0.74 kW	1 GPM = 4 l/m
1 fa = 1.83 m	1 g = 0.03 oz	

### Circumference of a circle

The formula for finding the circumference of a circle is: Circumference = Diameter x  $\pi$ .  
 $\pi = 3.14$  for practical purposes.

### Speed, distance, and time

The formulas for speed, distance, and time are: Speed = Distance/Time or Distance = Speed x Time or Time = Distance/Speed.

### Temperature

To convert °F to °C subtract 32, multiply by 5 and divide by 9  
To convert °C to °F multiply by 9, divide by 5, and add 32

## DISCLAIMER

For convenience, when referring to specific tasks and who does them in this manual, the male gender is used. Any reference to members of the crew or their jobs, however, may be interpreted as meaning both male and female. Thus, 'fisherman' means anyone, man or woman, who fishes; and the pronoun 'he' means 'he or she'. The use of the generic term 'fisher' has been avoided and the use of the awkward pronoun 'he/she' has been avoided. Reference or mention of specific commercial products or brand names should not be interpreted as an endorsement by the SPC.

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# CONTENTS

	Page
ABBREVIATIONS AND ACRONYMS	vii
INTRODUCTION	1
CHAPTER 1: BASIC INFORMATION AND TECHNIQUES	3
A. What is horizontal longlining?	4
B. The western and central Pacific Ocean tuna longline fishery	6
C. The catch: target species	8
D. The catch: byproduct and bycatch species	10
E. Bait used in longline fishing	12
F. Handling, preparing and splicing ropes and lines	14
G. General knots	16
H. Knots used with monofilament and the use of crimps	18
I. Working with ropes and lines	20
J. Longline boats	22
K. Sea safety appliances and equipment	24
L. Sea safety and the rules of the road	26
CHAPTER 2: FISHING GEAR AND EQUIPMENT	29
A. The longline: basic gear configuration and storage	30
B. Hydraulically powered machinery used with longline gear	32
C. Mainline and branchline materials and connection points	34
D. Branchline hardware	36
E. Making up branchlines	38
F. Floats, flagpoles and floatlines	40
G. Radio buoys	42
H. Vessel electronics	44
I. Vessel hydraulics	48
CHAPTER 3: FISHING OPERATIONS	51
A. Preparing for a fishing trip	52
B. Deciding where to fish: when leaving port	54
C. Deciding where to fish: when arriving at the fishing ground	56
D. Deciding where to fish: during the trip	58
E. Targeting the gear: the surface layer and the thermocline	60
F. Targeting the gear: depth of set	62
G. Setting and hauling the gear: general	65
H. Setting monofilament gear	66
I. Setting rope gear, setting time, data recording and soak time	68
J. Some variations on setting	70
K. Finding the gear	72
L. Hauling basket gear	73
M. Hauling monofilament gear	74
N. Encountering problems when hauling the gear	76
O. Fish on the line	78

---

CHAPTER 4: HANDLING AND PRESERVING THE CATCH	79
A. The basics and the tools needed	80
B. Landing, killing and bleeding the catch	82
C. Dressing sashimi tuna ready for chilling	84
D. Dressing swordfish ready for chilling	85
E. Dressing and loining albacore ready for freezing	86
F. Onboard preservation: icing the catch	88
G. Onboard preservation: CSW and RSW	90
H. Onboard preservation: freezing	91
I. Cleaning and sanitising	92
CHAPTER 5: MARKETING AND BUSINESS OPERATIONS	93
A. Marketing and grading in general	94
B. Packing fresh fish for export	96
C. Shipping and marketing export fish	97
D. Running a longline boat as a business	98
E. Fixed costs and the boat's accounts	100
CHAPTER 6: RESPONSIBLE FISHING	103
A. Marine debris and derelict fishing gear	104
B. Bycatch from tuna longlining	106
C. Releasing hooked turtles alive	108
D. Avoiding seabirds and bait loss	109
E. Depredation by toothed whales	110
F. Recording catch and effort data	111
G. Recording and reporting tagged species	112
H. Observers and port samplers	113
CONCLUDING REMARKS	114
APPENDICES	115
A. Weather conditions and sea state	117
B. Important radio frequencies and the phonetic alphabet	119
C. Glossary of nautical terms	121
D. Main species caught on a horizontal longline in the Pacific	125
E. Sample pre-departure checklist	127
F. South Pacific Regional Longline Logsheet and instructions	129

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## ABBREVIATIONS AND ACRONYMS

$\pi$	pi
ADCP	acoustic doppler current profiler
ALC	automatic location communicator
BTG	bathythermograph
BTS	burnt tuna syndrome
°C	degrees centigrade
CIF	cost, insurance, freight
cm	centimetre
CO <sub>2</sub>	carbon dioxide
COLREGS	International Regulations for Preventing Collisions at Sea
Cospas-Sarsat	Cosmicheskaya Sistyema Poiska Avarinich Sudov – Search and Rescue Satellite Aided Tracking, a cooperative search and rescue satellite system operated by USA and Russia
CPR	cardio-pulmonary resuscitation
CPUE	catch per unit effort
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
CSW	chilled seawater
dia	diameter
DSC	digital selective calling
DSL	deep scattering layer
DWFN	distant water fishing nation
EEZ	exclusive economic zone
EPIRB	emergency position indicating radio beacon, linked to Cospas-Sarsat
ETA	estimated time of arrival
etc.	et cetera
ETD	estimated time of departure
EU	European Union
°F	degrees Fahrenheit
fa	fathom
FFA	Forum Fisheries Agency
ft	foot
FAD	fish aggregating device
FAO	Food and Agriculture Organization of the United Nations
FOB	free on board
G&G	gilled and gutted
GMDSS	Global Maritime Distress and Safety System
GMT	Greenwich mean time (also called universal time coordinated — UTC)
GPM	gallons per minute
GPS	global positioning system
g	gram
GRT	gross registered tons
GT	gross tons
HACCP	hazard analysis and critical control point system
H&G	headed and gutted
HF	high frequency (radio)
HP	horsepower
h	hour
IALA	International Association of Lighthouse Authorities
IDO	industrial diesel oil
IMO	International Maritime Organization
in	inch



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Inmarsat	International Maritime Satellite Organization
Inmarsat-C	a two-way data messaging system based on digital technology that enables users to transmit and receive telex and fax messages to and from ships and land stations via satellite; does not provide voice communications; it is the system most often used in VMS systems
IRD	Institut de Recherche Pour le Développement (formerly ORSTOM)
ITU	International Telecommunications Union
JFIC	Japan Fishery Information Service Center
JV	joint venture
kg	kilogram
kHz	kilohertz
km	kilometre
kt	knot (nautical miles per hour)
kPa	kilopascal
l	litre
lat	latitude
lb	pound
LC	letter of credit
LCD	liquid crystal display
LES	land earth station
long	longitude
LPG	liquid propane gas
m	metre
mb	millibar (also hectopascal)
°M	magnetic course
mHz	megahertz
mm	millimetre
mono	monofilament
mph	miles per hour
mt	metric tonne
nm	nautical mile
NIWA	National Institute of Water and Atmospheric Research (New Zealand)
NOAA	National Oceanographic and Atmospheric Administration (USA)
NT	net tons
oz	ounce
PC	personal computer
PFD	personal flotation device
PICTs	Pacific Island countries and territories
PSI	pounds per square inch
PTO	power take-off
RCC	rescue coordination centre
RDF	radio direction finder
RPM	revolutions per minute
RSW	refrigerated seawater
R-22	one type of Freon
SAR	search and rescue
SART	search and rescue transponder
sec	second
SOLAS	Safety of Life at Sea Convention
SPC	Secretariat of the Pacific Community
SR	sagging rate
SSB	single sideband (radio)
SST	sea surface temperature
°T	true course

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TDR	temperature–depth recorders
TT	telex (or telegraphic) transfer
UHT	ultra heat treated
ULT	ultra-low temperature
UNCLOS	United Nations Convention on Law of the Sea
USA	United States of America
UTC	universal time coordinated (also called Z or Zulu time or Greenwich mean time — GMT)
VHF	very high frequency (radio)
VMS	vessel monitoring system
WCPO	western and central Pacific Ocean
XBT	expendable bathythermograph

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## INTRODUCTION

The Secretariat of the Pacific Community has been active in promoting fisheries development in Pacific Island countries and territories for over 30 years. A particular area of strength has been SPC's programme of training in fishing and boat-handling techniques for small- and medium-scale fishermen. This programme, initiated in 1978, has been carried out by SPC's team of Fisheries Development Officers (formerly called Masterfishermen), who, at the request of Pacific Island governments, conduct training courses, visit fishing communities and work with private sector companies to carry out practical fishery demonstration activities. The information contained in this manual has been compiled from the discussions and written records of the SPC Fisheries Development Officers and other fisheries development staff. In fact, part of the reason for compiling the manual was in order to capture, at least partially, the largely unwritten specialist knowledge and practical experience accumulated by SPC's fishing staff during their commercial activities before working for SPC and during their field activities with SPC.

The main purpose of the manual, however, is to introduce the horizontal longline fishing method to Pacific Island fishermen, as well as to assist those currently involved to improve their fishing success, particularly in commercial or semi-commercial situations. The manual is intended to act as a guide to the principles and techniques of good horizontal tuna longline fishing, for use by fishermen who want to start, refine or broaden their skills. We have tried to give as much detail as possible on the rigging and use of monofilament longline fishing gear, and to provide brief descriptions of rope gear and other possible variations to these gears and the fishing methods. We have included information on fish handling practices which will lead to top prices for fish sold on both local and export markets. Environmental and conservation issues and concerns have also been included to raise awareness and to present ways to minimise impacts on unwanted species or the environment as a result of horizontal tuna longline fishing activities.

A further aim of the manual is to serve as a resource in formal training activities carried out by the SPC fisheries programme as well as national fisheries development agencies and extension officers. The manual is intended for use as a training aid to help introduce and explain fishing topics to small- and medium-scale fishermen and others. To support this aim, we have tried to present as much information as possible in a visual form, for the benefit of the many Pacific fishermen whose first language is not English. For the same reason, the text has been kept as simple and non-technical as possible.

In compiling this manual, we have split the many interwoven aspects of horizontal tuna longline fishing into topics, organised into six main chapters, which deal with tuna longline basics, preparation of the fishing gear and equipment, fishing operations and procedures, handling and preserving the catch, marketing and business operations, and responsible fishing practices. This is followed by several appendices. Appendix A provides useful information and tips on weather conditions and sea state, Appendix B provides important radio frequencies and the phonetic alphabet, and Appendix C provides a glossary of nautical terms. Predictably, it has proven impossible to avoid overlap altogether. However, we hope that the cross-references in the text, together with the detailed topic headings and sub-headings presented in the contents list, will enable readers to follow a given theme in the text, or to find the specific information they seek.

SPC has produced a number of other manuals, handbooks and training materials on fishing and related topics. *Trolling Techniques for the Pacific Islands: A Manual for Fishermen* provides complete information on trolling methods and gear. The two manuals, *Vertical Longlining and Other Methods of Fishing Around Fish Aggregation Devices* and *Deep-bottom Fishing Techniques for the Pacific Islands* explain the techniques involved in these types of fishing. The three volumes of the SPC FAD Handbook are aimed at helping fisheries departments to establish FAD programmes that will provide maximum benefits for the local fishing industry. Various other SPC training and public information materials (including lecture notes, videos, overheads, brochures and posters) on fishing, FADs, environmental concerns, and safety at sea are also available, as are construction diagrams and specifications for the FAO wooden fishing handreels. For more information write to SPC or visit the SPC's website on <http://www.spc.int/coastfish>.

# CHAPTER 1

## BASIC INFORMATION AND TECHNIQUES

- A. What is horizontal longlining?
- B. The western and central Pacific Ocean tuna longline fishery
- C. The catch: target species
- D. The catch: byproduct and bycatch species
- E. Bait used in longline fishing
- F. Handling, preparing and splicing ropes and lines
- G. General knots
- H. Knots used with monofilament and the use of crimps
- I. Working with ropes and lines
- J. Longline boats
- K. Sea safety appliances and equipment
- L. Sea safety and the rules of the road

### INTRODUCTION

This chapter provides information on the origin and history of horizontal tuna longlining, the latest science, and the current importance of this fishing method to developing domestic tuna longline fisheries in the Pacific region. The main target, byproduct and bycatch species are examined, looking at the habits that fishermen can use to their advantage in locating them and the baits that can be used. Knots and splices suitable for making up the different components of gear are described, as well as the use of ropes and lines for both fishing activities and general boat handling. It also briefly looks at the different types of tuna longline vessels used in the region, for small-, medium- and large-scale operations. Finally, sea safety and the relevant rules of the road are covered to emphasise the importance of taking precautions and being prepared, as tuna longlining can be a hazardous occupation if not conducted in a safe and professional manner.