



BUILDING CAPACITY
IN THE LEAST DEVELOPED
COUNTRIES TO FULLY HARNESS
THE POTENTIAL OF FISHERIES
AND AQUACULTURE

Training Manual



© 2020, United Nations Conference on Trade and Development

The designations employed and the presentation of material on any map in this work do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This publication has not been formally edited.

UNCTAD/ALDC/MISC/2020/4

ACKNOWLEDGEMENTS

This publication is the outcome of United Nations Development Account Project 1415M titled, “Building the capacities of selected LDCs to upgrade and diversify their fish exports”, covering Cambodia, the Comoros, Mozambique, Myanmar and Uganda. The UNCTAD secretariat would like to express its thanks and appreciation to the United Nations Development Account for financing the project.

It was delivered by UNCTAD, under the overall guidance of Paul Akiwumi, Director, Division for Africa, LDCs and Special Programmes (ALDC). The publication, as part of the overall project, was prepared by a team led by Mussie Delelegn, Chief, Landlocked Developing Countries Section, and consisting of Moritz Meier-Ewert (Economic Affairs Officer), Johanna Silvander (Programme Management Officer), Alberto Munisso (Associate Expert), staff members of the Landlocked Developing Countries Section, and Stefanie Garry (Economic Affairs Officer, Office of the Director, ALDC). Patrick Osakwe, Head, Trade and Poverty Branch, UNCTAD, provided valuable inputs to the present Training Manual.

Valuable consultancy services were provided by Lahsen Ababouch (former Director of the Food and Agriculture Organization of the United Nations (FAO)), Kim Anh Thi Nguyen (Nha Trang University), Le Anh Tuan (Nha Trang University), Mai Thi Tuyet Nga (Nha Trang University), and Curtis Jolly (Auburn University). The support of Hassan Moustahfid (Senior Fishery Officer, FAO) on fish stock assessments, David Vivas Eugui (Legal Officer, UNCTAD) on fisheries subsidies, Sara Montanaro and Stefania Vannuccini for the provision of updated statistical data, and Chorouk Bennabbour for secretarial support are gratefully acknowledged.

The project and this Manual benefitted from substantial inter-agency cooperation, and were strengthened through the delivery of regional training sessions held in Vietnam in October and November 2018 and Mauritius in May 2019. The discussions at the meetings provided valuable inputs that were incorporated in the final draft of the Manual. The expertise of the UNCTAD Centers of Excellence at the Nha Trang University of Vietnam, and the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping of the Republic of Mauritius served to strengthen the contents of the Manual.

Project management support was provided by Yan Zhang (TCS) and Marina Cartier-Kayayan (RMS). Secretarial and administrative support to the project, and in the final preparation of the Manual was provided by Regina Ledesma and Paulette Lacroix. The cover design was prepared by Magali Studer. Rostand Ngadjie Siani formatted the document.

¹At the First Regional Training Course on Harnessing the Potential of the Fisheries Sector for Economic Development in Least Developed Countries held in Vietnam in October and November 2018, modules were delivered by experts from Nha Trang University. Additional experts delivered modules including: Huynh Nguyen Duy Bao (Nha Trang University), Nguyen Van Minh (Nha Trang University), Alister Dalrymple, (International Organization for Standardization), Dinh Xuan Lap (International Collaborating Centre for Aquaculture and Fisheries Sustainability, Vietnam Fisheries Society), Curtis Jolly (Auburn University), Le Thi Kim Lanh (Hai Vuong Tuna Company), Nguyen Huu Huy Hoang (Vietnam Tuna Association), Nguyen Van Giap, (University of Economics, Ho Chi Minh City), Nguyen Viet Dung, Vo The Dung, Dinh Xuan Hung, and Vu Cong, (Ministry of Agriculture and Rural Development, Vietnam), Tran Van Hao (Vietnam Tuna Association), Ho Hoa Dong (FIMEX Vietnam), Do Quoc Dung (Chinh My Shrimp Aquaculture Company), Pham Viet Tich (Department of Science and Technology, Quang Nam) and Le Hang, (Vietnam Association of Seafood Exporters and Producers). The following UNCTAD colleagues also contributed: Paul Akiwumi, Mussie Delelegn, Marco Fugazza and David Vivas Eugui.

²Presenters in the Second Regional Training Course on Harnessing the Potential of the Fisheries Sector for Economic Development in Least Developed Countries included Lahsen Ababouch (former FAO), Curtis Jolly (Auburn University), Michael Marriott (Marine Stewardship Council), Kim Anh Thi Nguyen (Nha Trang University), Dave Mull (International Maritime Organization), and L.P. Soobramanien and M. Bheecary (Mauritius Standards Bureau). The contribution of experts from the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping of the Republic of Mauritius are gratefully acknowledged. The following UNCTAD colleagues also participated in and/or delivered training modules: Paul Akiwumi, Mussie Delelegn, Stefanie Garry, Regina Ledesma, and Subramanya M Vidalar Divvaakar.

TABLE OF CONTENTS

Acknowledgements	4
Table of Contents	5
Figures	6
Tables	7
Abbreviations	8
General Introduction	11
 Chapter 1: Environmental, social and Economic Roles of Fisheries and Aquaculture	 13
1. Environmental benefits	13
2. Social benefits	14
2.1. Food and nutrition security	14
2.2. Employment	16
3. Economic benefits	16
3.1. Fish utilization and processing for value addition	16
3.2. International Fish Trade	17
3.3. The potential of exports from LDCs	20
4. Challenges for harnessing the potential of fisheries and aquaculture	22
4.1. Capture fisheries: decline, future trends and recovery	22
4.2. Illegal, unregulated and unreported fishing	23
4.3. Fisheries subsidies	24
4.4. Aquaculture development and environmental concerns	25
4.5. Market access/market entry requirements and non-tariff measures	26
5. The future of sustainable fisheries and aquaculture	29
5.1. Main challenges for developing countries	29
 Chapter 2: Fisheries management in the context of the 2030 Sustainable Development Agenda	 31
1. Introduction	31
2. Fisheries management and SDG 14	32
3. Global fisheries governance	33
3.1. Fisheries management	36
3.2. Illegal, unreported and unregulated fishing	46
3.3. Fisheries subsidies	48
 Chapter 3: The potential of aquaculture production to sustain food security, human nutrition and economic growth	 53
1. Introduction	53
2. Global aquaculture production: key facts and figures	54
3. Aquaculture systems and species	55
3.1. Inland aquaculture	55
3.2. Marine and coastal aquaculture	56
3.3. Aquaculture production with and without feeding	56
3.4. Aquatic plants	56
3.5. Major producers	56

4. Challenges	58
5. The future of aquaculture development	59
5.1. Future of Aquaculture in Asia	61
5.2. The future of aquaculture in Africa	68
6. The Ecosystem approach to aquaculture	70
7. Conclusion	73
Chapter 4: Best practices for value addition along the fisheries and aquaculture value chain	75
1. Introduction	75
2. Best post-harvest practices for handling and processing	75
2.1. Basics of fish and seafood spoilage, safety and preservation	76
2.2. Fish and seafood quality and safety management	84
2.3. Sustainable fish and seafood value chains and economic performance	94
Chapter 5: Standards and certification in international fish and seafood trade	103
1. Introduction	103
2. Public vs. private standards	104
2.1. Key definitions	105
2.2. Public vs. private standards	106
3. International framework for fish and seafood standards and certification schemes	110
3.1. The SPS and TBT agreements of the World Trade Organization (WTO)	107
3.2. The Codex Alimentarius Commission	108
3.3. The Code of Conduct for responsible fisheries	109
3.4. The world organization for animal health (OIE)	110
3.5. The International Standards Organization (ISO)	111
3.6. Standards and certification schemes of major importing countries	112
4. Private standards and certification schemes	116
4.1. Product and process standards	118
4.2. Focus linked to standard developers	119
4.3. Certification and compliance	119
4.4. Business-to-Business versus Business-to-Consumer models	119
5. Meeting fisheries and aquaculture standards and certification requirements	120
5.1. Meeting public standards and certification in fisheries and aquaculture	120
5.2. Meeting the requirements of private standards	124
5.3. Integrated traceability	126
6. Conclusion	130
Glossary	131
References	135

FIGURES

Figure 1.1. World fish and aquaculture production	15
Figure 1.2. Employment in fisheries and aquaculture in 2016 (FAO, 2018a)	16
Figure 1.3. Utilization of the global fisheries and aquaculture production	17
Figure 1.4. International fish trade (in US \$ billion or million tonnes)	18
Figure 1.5. Net food trade income (export value – import value) of developing countries	19
Figure 1.6. Reported global capture fisheries production 1950 – 2016 (million tonnes)	22
Figure 1.7. Global trends in the state of the world's marine fish stocks (1974 – 2015) (FAO, 2018a)	23
Figure 1.8. World production of farmed aquatic animals and plants (1990 – 2016)	26

Figure 2.1. Development of legal, environmental and fisheries related international instruments	34
Figure 2.2. Legal boundaries of the oceans	34
Figure 2.3 Schematic representation of fish stock movement	36
Figure 2.4. Process and activities for developing and implementing a fishery management plan	48
Figure 2.5. Global fisheries support estimate,(2010-2015)	48
Figure 2.6. Incidence of support on fishery commodities exports of major fishing nations (2015)	49
Figure 2.7. World prices (2018) of Marine Gasoil (MGO) in the world's largest ports	61
Figure 3.1. Major aquaculture producers (FAO, 2018b)	78
Figure 4.1. Quality changes in fish stored in ice (0°C) (Huss, 1995)	87
Figure 4.2. Fish and seafood safety management in fisheries and aquaculture (Ababouch, 2014)	89
Figure 4.3. Example of a flow chart for aquaculture (only for illustrative purpose)	91
Figure 4.4. Steps required in HACCP audit and verification	95
Figure 4.5. Value chain and examples of distribution of costs and benefits during fishing and secondary processing (for illustration purposes only)	97
Figure 4.6. Seafood value chain of Icelandic cod in 2009	98
Figure 4.7 The pillars of Ocean's Economy promoted by UNCTAD in LDCs and SIDS	101
Figure 5.1. Hierarchy of trade-related SPS management functions (World Bank, 2005)	123
Figure 5.2. Justification for a fishery improvement project	127

TABLES

Table 1.1: Examples of services rendered by marine and coastal ecosystems	14
Table 1.2. World fisheries and aquaculture production and utilization	15
Table 1.3. Top ten exporters and importers of fish and fish products	19
Table 1.4. Top three fish export commodities of LDCs, 2012–2013	21
Table 2.1. Main international instruments governing international capture fisheries	35
Table 3.1. Aquaculture production of main groups of fish species by continent, 2016 (thousand tonnes, live weight)	54
Table 3.2. Aquaculture food fish production by region and selected major producers (thousand tonnes; figures in brackets are percentage of world total)	57
Table 3.3. Main characteristics of the process for scoping, zoning, site selection and area management for aquaculture	71
Table 3.4 Main tasks and data needs to conduct a spatial planning and zoning exercise for marine aquaculture development	71
Table 3.5. Policy, institutional and legal aspects of sustainable aquaculture	72
Table 4.1.Types of fish and seafood borne illnesses	79
Table 5.1 Comparison of fish import systems in the European Union, United States of America and Japan	115
Table 5.2 Main private standards and certification schemes operating in fisheries and aquaculture	117
Table 5.3 Main eco-labels, retail labels and consumer guides for fish and seafood (FAO, 2014)	118
Table 5.4 Traceability systems: purpose/driver, objective, attributes, standards and examples	128

ABBREVIATIONS

ACP	African, Caribbean and Pacific Group of States
AfDB	The African Development Bank
AHPND	Acute Hepatopancreatic Necrosis Disease
AMR	Antimicrobial Resistance
ASCM	Agreement on Subsidies and Countervailing Measures
BCBS	Bureau of Customs and Border Security
BGI	The FAO Blue Growth Initiative
BTI	BioTrade Initiative
B2B	Business to Business
B2C	Business to Consumer
CAADP	Comprehensive Africa Agriculture Development Program
CAF	Development Bank of Latin America
CAMFA	The Conference of African Ministers of Fisheries and Aquaculture
CCP	Critical Control Point
CCRF	Code of Conduct for Responsible Fisheries
CFCs	Chloro Fluoro Carbons
CITES	Convention on International Trade of Endangered Species
CoC	Chain of Custody
COFI	FAO Committee on Fisheries
CSOs	Civil society organizations
CSR	Corporate Social Responsibility
CSW	Chilled Sea Water
DAP	Defect Action Point
DOALOS	United Nations Division for Ocean Affairs and the Law of the Sea
DWPE	Detention (of a shipment) Without Physical Examination
EEZ	The Economic Exclusive Zone
EHP	Enterocytozoon hepatopenaei
EMP	Environmental Monitoring Plan
EPA	The US Environmental Protection Agency
EU	The European Union
EUS	Epizootic Ulcerative Syndrome
FAO	Food and Agriculture Organization of the United Nations
FIP	Fishery Improvement Programme or Project
FiTI	Fisheries Transparency Initiative
FSMA	Food Safety and Modernization Act

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_8498

