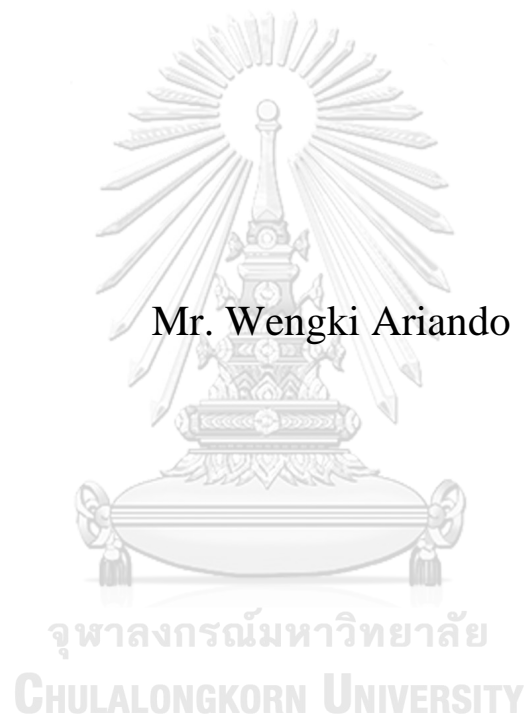


Developing A Model for the Integration of Bajau Traditional
Ecological Knowledge in the Management of Locally Managed
Marine Area: A Case Study of Wakatobi Regency, Indonesia



A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in Environment, Development
and Sustainability

Inter-Department of Environment, Development and Sustainability

GRADUATE SCHOOL

Chulalongkorn University

Academic Year 2021

Copyright of Chulalongkorn University

การพัฒนาตัวแบบเพื่อบูรณาการความรู้พื้นบ้านของชาวบาเจาในการจัดการพื้นที่
ทางทะเลที่บริหารจัดการโดยท้องถิ่น: กรณีศึกษาเขตวากาโทบี อินโดนีเซีย



วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรดุษฎีบัณฑิต
สาขาวิชาสิ่งแวดล้อม การพัฒนา และความยั่งยืน สหสาขาวิชาสิ่งแวดล้อม
การพัฒนาและความยั่งยืน
บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2564
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

Thesis Title	Developing A Model for the Integration of Bajau Traditional Ecological Knowledge in the Management of Locally Managed Marine Area: A Case Study of Wakatobi Regency, Indonesia
By	Mr. Wengki Ariando
Field of Study	Environment, Development and Sustainability
Thesis Advisor	Associate Professor Narumon Arunotai, Ph.D.

Accepted by the GRADUATE SCHOOL, Chulalongkorn University in
Partial Fulfillment of the Requirement for the Doctor of Philosophy

..... Dean of the GRADUATE
SCHOOL
(Associate Professor YOOTTHANA
CHUPPUNNARAT, Ph.D.)

DISSERTATION COMMITTEE

..... Chairman
(Dr. Albert Salamanca)

..... Thesis Advisor
(Associate Professor Narumon Arunotai, Ph.D.)

..... Examiner
(Associate Professor AJCHARAPORN
PIUMSOMBOON, Ph.D.)

..... Examiner
(Associate Professor DAWAN WIWATTANADATE,
Ph.D.)

..... External Examiner
(Dr. Dedi Supriadi ADHURI)

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

เวงกี เอเรียนโด : การพัฒนาตัวแบบเพื่อบูรณาการความรู้พื้นบ้านของชาวบาเจาะในการจัดการพื้นที่ ทางทะเลที่บริหารจัดการโดยท้องถิ่น:
กรณีศึกษาเขตวากาโทบี อินโดนีเซีย. (Developing A Model for the Integration of Bajau Traditional Ecological
Knowledge in the Management of Locally Managed Marine Area: A Case Study of Wakatobi
Regency, Indonesia) อ.ที่ปรึกษาหลัก : รศ. ดร.นฤมล อรุโณทัย

การบริหารจัดการทรัพยากรอย่างยั่งยืนครอบคลุมความท้าทายหลายระดับและแนวทางสหวิทยาการตั้งแต่ระดับรากหญ้าไปจนถึงระดับข้อตกลงระหว่างประเทศ ในบริบทของ การจัดการทางทะเล และ ชายฝั่ง ความซับซ้อนในหน่วยท้องถิ่นระบอบการปกครองและการสนับสนุนเชิงสถาบันถือเป็นความท้าทายในความพยายามดำเนินงานเพื่อความยั่งยืนในปัจจุบัน ความท้าทายดังกล่าวยังคงมีอยู่ในกลุ่มชุมชนจารีตประเพณีซึ่งอาศัยอยู่ตามชายฝั่งและพื้นที่ทางทะเล เช่น ชุมชนบาเจาะ (Bajau communities) จากความท้าทายดังกล่าว งานวิจัยนี้ได้เสนอรูปแบบปฏิบัติการสำหรับการบูรณาการความรู้พื้นบ้านเชิงนิเวศ (Traditional Ecological Knowledge หรือ TEK) เข้ากับพื้นที่ทางทะเลที่มีการบริหารจัดการโดยท้องถิ่น (Locally Managed Marine Areas หรือ LMMA) ในกรณีของชุมชนบาเจาะในเขตวากาโทบี จังหวัดสุลาเวสีตะวันออกเฉียงใต้ อินโดนีเซีย การศึกษานี้ใช้ระเบียบวิธีวิจัยเชิงคุณภาพ โดยวิธีชาติพันธุ์วรรณาหลายสนาม (multi-sited ethnography) และวิธีการสัมภาษณ์ความรู้พื้นบ้านเชิงนิเวศในฐานะที่เป็นแนวคิดนั้นมีจุดมุ่งหมายเพื่อเสริมสร้างแนวปฏิบัติในท้องถิ่นเพื่อการใช้ทรัพยากรอย่างยั่งยืน และเพื่อพัฒนาข้อเสนอแนะเชิงนโยบาย อย่างไรก็ตาม ในกรณีของชุมชนบาเจาะ มิใช่ของความรู้พื้นบ้านเชิงนิเวศครอบคลุมแนวทางการอนุรักษ์ ความเชื่อทางวัฒนธรรม ระเบียบจารีตประเพณี และกระบวนการในการจัดการแบบปรับตัว ความรู้พื้นบ้านเชิงนิเวศจำเป็นต้องรวมไปถึงความรู้ที่เกิดจากการแลกเปลี่ยนกัน เนื่องจากประวัติศาสตร์และธรรมชาติของชาวบาเจาะในฐานะกลุ่มเร่ร่อนทางทะเลในอดีตมักจะมีปฏิสัมพันธ์และการแลกเปลี่ยนกับกลุ่มอื่นๆ ความสัมพันธ์ข้ามวัฒนธรรมระหว่างชาวบาเจาะและกลุ่มจารีตประเพณีที่มีอำนาจเหนือกว่าในวากาโทบี ทำให้ชาวบาเจาะมีตำแหน่งที่เป็นเพียงผู้พหุและเป็นคนชั้นรองทั้งในด้านสังคมและวัฒนธรรม และเป็นชายขอบในกิจกรรมอนุรักษ์ต่างๆ โครงการจัดการร่วม (Co-management programs) ที่เกี่ยวข้องกับชาวบาเจาะดูเหมือนจะไม่ได้คำนึงถึงความจำเป็นและแนวปฏิบัติพื้นฐานของกลุ่มนี้ในการจัดการทรัพยากรอย่างยั่งยืนในปัจจุบัน สถานการณ์นี้ส่งผลกระทบต่อชาวบาเจาะในวากาโทบีกลายเป็นชายขอบและยังทำให้ภัยคุกคามที่มาจากพัฒนานั้นหนักหน่วงมากขึ้น นอกจากนี้ลำดับความสำคัญของโครงการพัฒนานั้นยังไม่ได้มีการพิจารณาถึงความซับซ้อนในสภาวะร่วมสมัยของชาวบาเจาะอย่างเพียงพอ โครงการต่างๆ รวมทั้งพื้นที่ทางทะเลที่มีการบริหารจัดการโดยท้องถิ่น ไม่ได้มีส่วนร่วมจากชุมชนบาเจาะ แม้ว่าพวกเขาจะมีบทบาทสำคัญในการหล่อเลี้ยงระบบนิเวศทางทะเลด้วยแนวปฏิบัติของความรู้พื้นบ้านเชิงนิเวศที่หลากหลายและด้วยวัฒนธรรมทางทะเล โดยสรุปแล้วแบบจำลองที่เป็นผลลัพธ์จากงานวิจัยนี้ศึกษาเพื่อให้อ่านและถอดความท้าทายในเรื่องอัตลักษณ์ทางวัฒนธรรม สิทธิและทรัพย์สินทางปัญญา การเสริมสร้างศักยภาพ การสร้างความรู้ ความหลากหลายให้กับการดำรงชีพ และสร้างพื้นที่ส่วนกลางในชุมชนบาเจาะในวากาโทบี ข้อเสนอแนะในการนำแบบจำลองไปใช้ยังมีเรื่องการสำรวจคุณลักษณะสำคัญที่เกี่ยวข้องกับสถาบันจารีตประเพณีของชาวบาเจาะ รัฐท้องถิ่น และอุทยานแห่งชาติวากาโทบีอีกด้วย

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

สาขาวิชา
ปีการศึกษา
สิ่งเวดล้อม การพัฒนา และความยั่งยืน
2564

ลายมือชื่อนิติ
ลายมือชื่อ อ.ที่ปรึกษาหลัก

6288331420 : MAJOR ENVIRONMENT, DEVELOPMENT AND SUSTAINABILITY

KEYWORD: Traditional Ecological Knowledge, Locally Managed Marine Area, Co-management, Bajau, Sea Nomads, Wakatobi

Wengki Ariando : Developing A Model for the Integration of Bajau Traditional Ecological Knowledge in the Management of Locally Managed Marine Area: A Case Study of Wakatobi Regency, Indonesia. Advisor: Assoc. Prof. Narumon Arunotai, Ph.D.

Attaining sustainable resource management encompasses multilevel challenges and interdisciplinary approaches from grassroots efforts to international agreements. In the context of coastal and marine management, the complexities represented by the variety of local entities, regimes, and institutional supports are captured as current challenges in sustainability efforts. Such challenges, unfortunately, persist in the group of customary communities such as those of the Bajau, who live in coastal and marine areas. In an effort to address the aforementioned challenges, this research proposes a model for integrating the Traditional Ecological Knowledge (TEK) of the Bajau into Locally Managed Marine Areas (LMMA) scheme in Wakatobi, Southeast Sulawesi. A qualitative approach involving multi-sited ethnography and interviews was employed in this study. TEK as a concept is drawn upon to strengthen the local practices for sustainable resource use and therefore develop policy recommendations. However, in the case of Bajau communities, the dimensions of the TEK encompass conservation practices, ethno-fisheries, cultural beliefs, customary laws, weather and cultural astronomy, and adaptive management. The manifestation of the TEK needs to add the term 'exchange knowledge' due to the history and nature of former nomadic groups that interacted and exchanged knowledge and goods with other groups with whom they were in contact. Intercultural relations between the Bajau and dominant customary groups in Wakatobi position the Bajau as migrants and second-class people, both socio-culturally and in the context of various conservation activities. The co-management programs that involve the Bajau do not seem to consider the basic needs and practices of this group in current sustainable resource management. This situation indirectly contributes to the marginalization and growing development threats for the Bajau in Wakatobi. In addition, the complexities in the realm of contemporary Bajau society are not adequately considered in Wakatobi's development priority programs. The culturally inclusive projects and LMMA model do not engage Bajau communities, even though this group is pivotal in nurturing marine ecology in alignment with multiple TEK practices and a maritime culture orientation. In brief, the output model of this research examines the various terms to disentangle the challenges in cultural identity, intellectual property and rights, capacity building, livelihood diversification, and communal space in the Bajau communities in Wakatobi. In advance of making recommendations to implement the model, this research explored key attributes related to Bajau customary institutions, local government, and Wakatobi National Park.



Field of Study:	Environment, Development and Sustainability	Student's Signature
Academic Year:	2021	Advisor's Signature

ACKNOWLEDGEMENTS

This work would not have been completed without the help and support of many individuals. My most tremendous thanks go to my distinguished supervisor, Assoc. Prof. Dr. Narumon Arunotai, whose broad knowledge, experience, enthusiasm, and wisdom have constantly encouraged and guided me to complete this three-year academic journey. Assoc. Prof. Dr. Dawan Wiwattanadate, Assoc. Prof. Dr. Ajcharaporn Piumsomboon, Dr. Dedi Supriadi Adhuri, and Dr. Albert Salamanca helped providing valuable support, comments, and guidance to my study since the beginning of this doctoral endeavour.

From the bottom of my heart, I want to thank the foster family in Sampela, Lohoa, Mantigola, Lamanggau, and Mola for their acceptance and guidance during ethnographic fieldwork, and to all Danakang of Bajau communities in the Wakatobi Regency and around Indonesia, to Wakatobi National Park Authority, WWF Seascape Wakatobi, Kamelia and all key informants in this research for providing valuable information, hospitality, and unforgettable memories in Wakatobi. They have generously shared their knowledge, experience, and wisdom with me. Without their incredible contributions, my research would not have been possible.

I would like to thank Assoc Prof. Dr. Abdul Manan, Jonthon Coulson, and I Wayan Veda Santiaji for those intense but enjoyable brainstorming sessions during co-authoring research papers. Also, thanks go to Akbar Sudarmo and students from Halu Oleo University for providing geographical mapping assistance. Special thanks go to my proofreaders (Try Sutrisno, Jason Sanglir, Prasetyo Pamungkas, Puput Kusumawardhani Moehas, Hijjaz Sutriadi, and Ella Nandasari) who took the time and energy to read this doctoral dissertation and help to improve the final product of my research.

I am grateful to the sponsors of my Ph.D. program, which was fully funded by the ASEAN-Non-ASEAN Scholarship Chulalongkorn University between 2019 and 2022. This research was also supported by a Doctoral Dissertation Research Scholarship for the 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund) No. GCUGR1125631048D Batch #46 Round 2/2020 Academic Year

2019 granted by Chulalongkorn University. This generous funding enabled me to carry out multi-sited fieldwork and research without financial worries.

Furthermore, I would like to express my deepest gratitude to my parents and siblings Wiwi Arianti, Wita Ariani, Wilda Andriana and Wira Mutia Wahyu for their unconditional love, profound support, and encouragement. Sincere thanks are also conveyed to all lecturers and program officers of the Environment Development and Sustainability Program (EDS), especially to Mr Wiwat Lertwilaisak, for continuous assistance. Also, many thanks go to my classmate from EDS-2019, especially to my teammate Sofia Cavalleri and Orgil Balgansuren, seniors, and juniors in EDS. I thank my Indonesian colleagues in Bangkok for their emotional support and for their appetizing Indonesian cuisines.

Wengki Ariando

TABLE OF CONTENTS

	Page
ABSTRACT (THAI)	iii
ABSTRACT (ENGLISH).....	iv
ACKNOWLEDGEMENTS.....	v
TABLE OF CONTENTS.....	vii
LIST OF TABLES	xii
LIST OF FIGURES	xiv
LIST OF ABBREVIATIONS.....	xviii
PREFACE.....	xx
CHAPTER I INTRODUCTION.....	1
1.1 General introduction.....	1
1.1.1 Indonesian coastal communities	3
1.1.2 Marine resources management	5
1.1.3 Sea nomads in Indonesia	6
1.1.4 Research objectives	9
1.2 The Research questions	9
1.3 Conceptual framework	10
CHAPTER II LITERATURE REVIEWS AND METHODOLOGIES	13
2.1 Traditional ecological knowledge	13
2.2 Interdisciplinary approaches to coastal and marine resources management	16
2.3 Co-management system and locally managed marine area	18
2.4 Institutional complexity	22
2.5 Co-management of the Bajau in Wakatobi	23
2.6 Methodology	23

2.6.1 Research design	24
2.6.2 Scope of the study.....	26
2.6.3 Data collection.....	27
2.6.4 Data analysis.....	33
2.6.5 Limitations and constraints.....	35
CHAPTER III THE BAJAU IN WAKATOBI: HISTORICAL, GEOGRAPHICAL, AND CULTURAL BACKGROUND.....	37
3.1 The Bajau in Wakatobi in History.....	37
3.1.1 Bajau originalities and maritime culture.....	40
3.1.2 Colonialism and Independence Day of Indonesia (the 1900s to 1945) ..	52
3.1.3 Darul Islam / Tentara Islam Indonesia DI/TII (1951-1965)	54
3.1.4 New Order of Indonesia (1966-1998).....	55
3.1.5 New face of Bajau	57
3.2 Demography	63
3.3 Geographical Settings: Wakatobi Islands.....	64
3.3.1 Climate.....	66
3.3.2 Island characteristic	67
3.3.3 Marine resource	68
3.4 The Sampela Bajau	69
3.5 The Lohoa Bajau	72
3.6 The Mantigola Bajau.....	75
3.7 The Lamanggau Bajau	78
3.8 The Mola Bajau	81
3.9 Conclusions	84

CHAPTER IV BAJAU TRADITIONAL ECOLOGICAL KNOWLEDGE AND SUSTAINABLE RESOURCE USE.....	85
4.1 Introduction	85
4.2 Understanding to Bajau TEK	86
4.3 Manifestation of Bajau TEK	89
4.3.1 Examining ‘exchange knowledge’ in Bajau TEK	95
4.3.2 Dimension of Bajau TEK	99
4.3.3 Justification of Bajau TEK	101
4.4 Nature and Property of Bajau TEK	114
4.5 TEK: conservation and sacred areas in coastal and marine areas	117
4.5.1 Contesting the meaning of ‘Conservation’ for the Bajau	118
4.5.2 The Bajau sacred areas in Wakatobi.....	121
4.5.3 Deliberating conservation regime for the Bajau in Wakatobi	126
4.6 Threats of Bajau TEK.....	130
4.7 Sustainable resource use and Bajau TEK.....	135
4.8 Conclusions	139
CHAPTER V THE CONTEMPORARY BAJAU TRADITIONAL ECOLOGICAL KNOWLEDGE AND THE IMPLICATION OF CO-MANAGEMENT.....	141
5.1 Introduction	141
5.2 Coastal Communities in Wakatobi.....	142
5.3 Wakatobi marine national park.....	144
5.3.1 Management challenges	144
5.3.2 The Bajau and marine national park.....	148
5.4 Institutional complexity.....	150
5.4.1 Stakeholders' interests and influence.....	150

5.4.2 Interrelation of the Bajau governance system	159
5.4.3 Development initiatives and implementation	162
5.5 Co-management program related to the Bajau in Wakatobi	165
5.6 Deliberation of co-management in the Bajau lens	172
5.6.1 The key attributes to co-management	172
5.6.2 Transition of co-management.....	175
5.6.3 The Bajau and contemporary management system	180
5.7 Socio-economic challenges and threats to TEK and co-management.....	182
5.7.1 Transformation of Bajau TEK.....	184
5.7.2 Mobility of the Bajau in the 21 st century.....	190
5.7.3 Destructive and illegal activities as intergenerational cultural dissonance	202
5.7.4 Bajau toward land-based community.....	208
5.7.5 Tourism development.....	213
5.7.6 Climate change adaptation	218
5.8 Conclusions	222
CHAPTER VI A MODEL FOR THE INTEGRATION OF BAJAU TEK IN THE CO-MANAGEMENT OF COASTAL AND MARINE RESOURCES.....	225
6.1 Introduction	225
6.2 The Bajau and Locally managed marine areas.....	227
6.3 Developing indicators for the Bajau LMMA	239
6.4 Integrating Model to adaptive co-management	242
6.5 Cultural sensitivity in the implementation of the model in Wakatobi	245
6.6 Recommendation for future policy direction	248
6.6.1 Bajau community	249
6.6.2 Local Government	250

6.6.3 Wakatobi National Park.....	250
6.6.4 Timeframe for policy recommendation.....	251
6.6.5 Further research.....	251
6.6 Final Reflections.....	252
REFERENCES	254
APPENDICES	284
VITA.....	300



LIST OF TABLES

	Page
Table 1. Different types of coastal communities in Indonesia and their definition	3
Table 2. The Bajau informants based on location and sex ratio	29
Table 3. The Bajau informants based on identified category.....	29
Table 4. The Informant from related institutions to Bajau communities in Wakatobi	31
Table 5. Measurement of scores on the role of interests and stakeholder influences	35
Table 6. The livelihood of the Bajau in Wakatobi	63
Table 7. The Population of Bajau communities in Wakatobi.....	64
Table 8. Climate data of Wakatobi regency.....	67
Table 9. The island characteristic in Wakatobi.....	67
Table 10. Key attributes of Bajau TEK.....	88
Table 11. Bajau TEK manifestation.....	91
Table 12. Dimension of Bajau TEK.....	100
Table 13. Bajau TEK: conservation	102
Table 14. Bajau TEK: ethnos-fisheries	104
Table 15. Bajau TEK: cultural beliefs	105
Table 16. Bajau TEK: customary laws.....	108
Table 17. The Bajau Philosophy	108
Table 18. Bajau TEK: weather and cultural astronomy	110
Table 19. Bajau TEK: adaptive management.....	112
Table 20. The TEK mapping based on ecology.....	115

Table 21. Bajau perspectives on eight important resources of Wakatobi National Park	128
Table 22. The typology of direct threats to Bajau TEK	131
Table 23. The typology of underlying threats to Bajau TEK	133
Table 24. The management system of future TEK in Bajau communities	136
Table 25. Challenges of Wakatobi National Park	147
Table 26. Stakeholders related to coastal and marine areas management in Wakatobi and with Bajau communities	151
Table 27. Co-management programs in Bajau Wakatobi from 2003 to 2021	165
Table 28. Profession term of the Bajau	193
Table 29. Climate change impacts on Bajau in Wakatobi	219
Table 30. Comparison of MHA and ILMMA model in coastal and marine management	228
Table 31. The development stage of MHA and ILMMA	229
Table 32. The legal references of MHA and ILMMA	229
Table 33. Key attribute management of LMMA and MHA models	235
Table 34. Development of Bajau LMMA Model (Extended Indicators)	242
Table 35. The key problems in the Bajau communities in Wakatobi	249

LIST OF FIGURES

	Page
Figure 1. User rights and duties of coastal communities shift in times	4
Figure 2. Sea nomads' location in Indonesia.....	8
Figure 3. Illustrated conceptual scheme of the research	10
Figure 4. Co-management hierarchies.....	19
Figure 5. Research phases	24
Figure 6. Research method illustration.....	28
Figure 7. Bajau villages in Wakatobi National Park	39
Figure 8. Tentative history of the Bajau migrations.....	42
Figure 9. Migration routes of the Bajau in Wakatobi	46
Figure 10. Bodi boat TS from wood (green) and fiber (white-green) (13 May 2021).....	50
Figure 11. The Sampela Bajau in the regent election (9 December 2020)	59
Figure 12. The Mantigola Bajau in the village leader campaign (15 May 2021)	59
Figure 13. Bajau elders living separated from their children in Sampela (30 September 2021)	62
Figure 14. Bajau Sampela Village in South Wangi-wangi subdistrict	72
Figure 15. Bajau Lohoa Village in South Kaledupa subdistrict.....	75
Figure 16. Bajau Mantigola Village in Kaledupa subdistrict.....	78
Figure 17. Bajau Lamanggau Village in Tomia subdistrict	81
Figure 18. Bajau Mola Village in South Wangi-wangi subdistrict	84
Figure 19. The location of Tubba Dikatutuang in Bajau Sampela Village	87
Figure 20. The classification of Bajau TEK	89

Figure 21. Relationships and dimensions of the manifestation of Bajau TEK.....	94
Figure 22. Analysis dimensions from Bajau TEK based on dimensions from previous works.....	95
Figure 23. Model of manifestation TEK of Bajau in Wakatobi.....	98
Figure 24. The dimension of Bajau TEK	101
Figure 25. The human nature relation of the Bajau	109
Figure 26. Identification of nature of Bajau TEK.....	115
Figure 27. Maduai Arak locations of the Bajau Villages in Wakatobi	123
Figure 28. Sacred areas of Bajau in Wakatobi.....	125
Figure 29. Map of Wakatobi coastal communities	143
Figure 30. Bajau spearfishing activities in Wakatobi Atoll (15 June 2021).....	149
Figure 31. Stakeholder mapping of Institutional supports to Bajau LMMAs.....	154
Figure 32. MHA forum in Wakatobi (19 January 2021).....	167
Figure 33. Reclamation of land from piling reef stones in the Mantigola Bajau (15 May 2021).....	170
Figure 34. Densely populated village in the Bajau Mola (24 August 2021)	172
Figure 35. The situated model of co-management in WNP and its indicators	174
Figure 36. Factors of TEK transformation in the Bajau communities.....	185
Figure 37. The Papela Bajau boat was expelled and flagged by the Australian Navy (2 December 2022)	188
Figure 38. Sustainability perspective of Pongka' seasonal migration.....	194
Figure 39. Lilibu with Lepa boat (10 October 2021).....	195
Figure 40. Katinting boat (23 January 2021)	195
Figure 41. Pongka' to Wakatobi atoll and overnight at Bodi boat (31 March 2021)	196
Figure 42. Bodi boat situation during Pongka' (30 March 2021).....	196

Figure 43. Pongka' to Wakatobi atoll and overnight at stilt house (1 April 2021) .	197
Figure 44. Babaroh in Kaledupa atoll (15 April 2021)	197
Figure 45. Lambo in Wakatobi from the Mola Bajau (2 April 2022)	198
Figure 46. Bajau Village in Tanjung Pasir, Papela (1 Dec 2021)	199
Figure 47. Women are cleaning the sea cucumbers or Tripang (Balok) from the Australian Fishing Zone in Papela Bajau village (2 December 2021).....	200
Figure 48. A group of the Lamanggau Bajau is preparing to visit Papela for fishing in the Australian Fishing Zone (5 June 2021).....	201
Figure 49. Bodi boat for sailing to the Australian Fishing Zone (1 December 2021)	201
Figure 50. Destructive and illegal fishing activities of Bajau communities in Wakatobi.....	208
Figure 51. Cemetery area for The Mola Bajau in Otawe Island (1 September 2021)	210
Figure 52. Women of the Sampela Bajau buy freshwater in Sampoabatu Market Kaledupa (20 November 2020).....	211
Figure 53. The Lohoa Bajau and seaweed farming (20 February 2021)	215
Figure 54. The contained information in LMMA village regulations	234
Figure 55. Manifestation of LMMA, MHA, and the Bajau	234
Figure 56. Site of LMMA in Hatta Island, Central Maluku Regency, Maluku Province (21 March 2021)	235
Figure 57. MHA Barata Kehedupa area in Darawa Island, Wakatobi Regency, Southeast Sulawesi Province (22 September 2021).....	236
Figure 58. Location of Tubba Dikatutuang in Bajau Sampela Village.....	238
Figure 59. Core Principle of LMMA	240
Figure 60. Integrated LMMA Model into Bajau context.....	243
Figure 61. Adaptive Management and Bajau LMMA model	244
Figure 62. Bajau LMMA model implementation steps.....	245

Figure 63. Sacred areas mapping of the Bajau in WNP zonation246

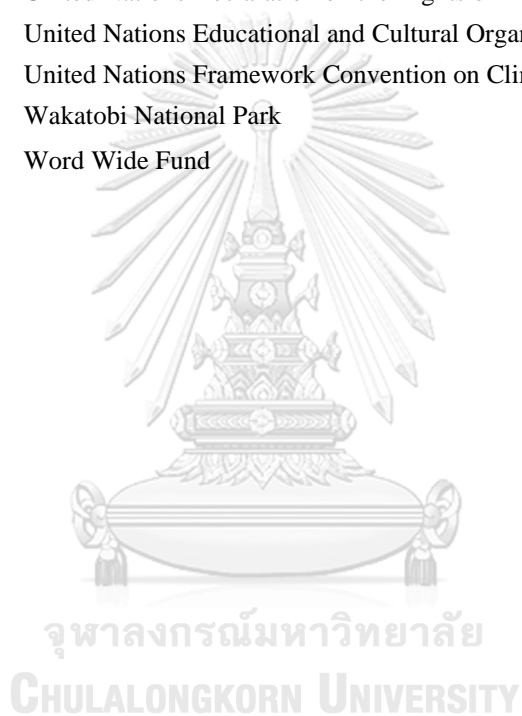
Figure 64. Policy recommendation timeline251



LIST OF ABBREVIATIONS

ACM	Adaptive Co-Management
AFZ	Australia Fishing Zone
AMAN	<i>Aliansi Masyarakat Adat Nusantara</i> / Indigenous People Alliance of Nusantara
CBAM	Community Based Adaptive Management
CBCM	Community Based Coastal Management
CBT	Community Based Tourism
CBD	Convention on Biological Diversity
CCA	Community Conserved Area
CMT	Customary Marine Tenure
Covid-19	Coronavirus Disease 2019
CSO	Civil Society Organization
CTI	Coral Triangle Initiatives
DI/TII	<i>Darul Islam/Tentara Islam Indonesia</i> , Darul Islam / Indonesian Islamic Army
EDS	Environment Development and Sustainability
EEZ	Exclusive Economic Zone
FAD	Fishing Aggregation Device
FPIC	Free Prior and Informed Consent
GTRA	<i>Gugus Tugas Reformasi Agraria</i> , Agrarian Reform Task Force
G20	Group of Twenty, Presidency agenda
ICCA	Indigenous Peoples and Community Conserved Territories and Areas
ICZM	Integrated Coastal Zone Management
ILMMA	Indonesia Locally Managed Marine Area
IP	Indigenous Peoples
IPLC	Indigenous Peoples and Local Communities
IPRA	Indigenous People Rights Act
IRB	Institutional Research Board
IUU	Illegal Unregulated and Unreported
KAT	<i>Komunitas Adat Terpencil</i> , Remote Indigenous Peoples
KNTI	<i>Kesatuan Nelayan Tradisional Indonesia</i> / Indonesian Traditional Fisherman Association
LMMA	Locally Managed Marine Area
MHA	Masyarakat Hukum Adat, customary law communities
MoU	Memorandum of Understanding
MPA	Marine Protected Area
NGO	Non-Government Organization
OECM	Other Effective Area-Based Conservation Measures
PAAP	<i>Pengelolaan Akses Area Perikanan</i> ,
PDAM	<i>Perusahaan Daerah Air Minum</i> , State-owned Water Utility Company

PKPM	<i>Padat Karya Penanaman Mangrove</i> , Mangrove Labor Plantation Program
RBFM	Right Based Fisheries Management
RZWP3K	<i>Rencana Zonasi Wilayah Pesisir dan Pulau-pulau Kecil</i> (Coastal and Small Islands Area Zonation Plan)
SDG	Sustainable Development Goal
SME	Small Medium Enterprise
SPAGs	Spawning Aggregations Sites
SSF	Small-scale Fisheries
ST	Sustainable Tourism
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TEK	Traditional Ecological Knowledge
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNESCO	United Nations Educational and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WNP	Wakatobi National Park
WWF	World Wide Fund



PREFACE

In August 2009, a *Minangnese* boy burst into tears on the outskirts of Jakarta Capital City while waiting for his sister to transfer him the first month's allowance after departing from his family. Meanwhile, in a village on the coast of Sumatera Island, his father was chastised by his customary group about a choice to allow his only son to attend school on Java Island. His father got intimidation: "*Why do you send your son to Java Island? Is he smart enough to study at that best university? Ask him to go home and just enroll him in local universities, your son will only spend your money and give you problems*" -- His father said to always give his only son trust and freedom to decide his life.

That imperfect coastal boy has now completed undergraduate, magister, and doctoral degrees with scholarships. He is mature in his decision and ready to sail to encounter his extensive dream lists.

Resilient, independent, consistent, and humble are the soundest motivational remarks for him. No matter how far he wanders the world, his heart remains attached to the place of birth (seashore) that raised him to be where he is today. This research is dedicated to profound adoration for Indonesia's coastal issues and customary communities.

Wengki Ariando

CHAPTER I

INTRODUCTION

1.1 General introduction

The movement recognizing the knowledge of communities is growing. Many countries worldwide are beginning to acknowledge the importance of Indigenous Peoples and Local Communities (IPLCs) values and practices. IPLCs imply the practice of nurturing nature based on their cultural practices and beliefs. Such practices of IPLCs, have steadily increased over the last 50 years and have always been valuable to gaining deep ecology practices and theories.

Persisting on the connection between practice and beliefs in sustainable resource management, Traditional Ecological Knowledge or TEK has been used to identify and strengthen the IPLCs in the contemporary world. Some scholars have introduced the contribution of TEK into academic debates, which is inevitably recognized (Berkes et al., 2000). The TEK can be passed down from one person to another as substantive knowledge or as a method for observing, discussing, and understanding new information in indigenous ways of knowing (Berkes, 2009b). TEK refers to the knowledge acquired by IPLCs over hundreds of years through direct contact with the environment (Berkes, 1993). These knowledge systems become a highly valued source of information not only for anthropologists or sociologists but also for ecologists, biologists, ethnobotanists, marine scientists, geologists, climatologists, and others (Drew, 2005; Gómez-Baggethun et al., 2013; Usher, 2000; Whyte, 2013).

As an archipelagic country, Indonesia has 68,216 kilometers of coastline (Statistics Indonesia, 2016). About 60 percent of Indonesia's population lives within 50 kilometers of the coastline (Statistics Indonesia, 2018). Indonesia's coastal ethnic groups have unique local wisdom in sustainable resource management, known in the literature as TEK.

Indonesia leads in promoting Locally Managed Marine Area or LMMA. LMMA is an area of nearshore waters and its associated coastal and marine resources that are mainly or wholly managed at a local level by the coastal communities, land-owning groups, partner organizations, and collaborative government representatives who reside or are based in the immediate area (Govan et al., 2008). LMMA recognizes community practice in coastal and small island areas, including TEK. So that, its incorporation into existing management practice can be seen as a form of co-management.

Following the Law of 2014 (See Table 1), there are three categories of coastal communities in Indonesia, namely 1) Customary Laws Communities (MHA), 2) local communities, and 3) traditional communities. These categories do not include a group living in nearshore marine areas referred to as sea nomads. These people do not fulfill the requirement of being an MHA due to the misconception that they do not have land territories because of their nomadic existence (Jeon, 2019). The same can also be said for the other two categories (local and traditional communities).

This study focuses on the Bajau, a group of sea nomads in Indonesia. The Bajau communities are the largest sea-based nomadic group globally (Nagatsu, 2017). However, the Bajau communities are left behind and not recognized by local government policies and programs. Thus, they occupy a peripheral role in conservation, especially in the customary managed area. In general, the Bajau communities are marginalized in the political, economic, and cultural arenas (Hoogervorst, 2012). They assimilated themselves into the majority groups (such as Bugisnese, Butonese, Javanese communities, and other Indonesian ethnic groups) that occupy the dominant position through intermarriage and socio-cultural acculturation (Sopher, 1965). The case of the Bajau in Wakatobi reflects widening friction and conflict with Butonese communities as highly resource-dependent land-based communities. This situation is due to the establishment of protected areas (Clifton, 2009). The Bajau communities in Wakatobi are also vulnerable to climate threats (Ahmad Wani & Ariana, 2018) and socio-cultural marginalization (Isiyana Wianti et al., 2012; Katili et al., 2018; Suyuti, 2004). So, this study aimed to develop a model on how to integrate Bajau TEK into the

policy and practices of promoting co-management of coastal and marine resources in Wakatobi.

1.1.1 Indonesian coastal communities

Indonesia has 17,504 officially listed islands, with 16,056 islands have been verified by the United Nations Group of Experts on Geographical Names (UNGEGN) (Statistics Indonesia, 2016). As the largest country in Southeast Asia, with approximately 1.86 million square kilometers, Indonesia is committed to cultural diversity to strengthen its national identity and maritime culture (MMAF, 2020). Coastal communities in Indonesia are defined based on Law No. 1/2014 Articles 33, 34, and 35, as shown in Table 1.

Table 1. Different types of coastal communities in Indonesia and their definition

No	Category	Definition
1	<i>Masyarakat Hukum Adat</i> or MHA Customary Law Communities (Law No. 1/2014 Article 33)	A group of people who have traditionally settled in certain geographical areas in the Unitary State of the Republic of Indonesia because of ties to ancestral domains, strong relationships with land, territories, and natural resources, and having customary governmental institutions and customary legal arrangements in their customary territories under statutory regulations.
2	Local Communities (Law No. 1/2014 Article 34)	A group of people who practice daily living based on customs that have been accepted as public values and do not depend entirely on coastal and small island resources.
3	Traditional Communities (Law No. 1/2014 Article 35)	A group of traditional fishery communities whose traditional rights in fishing activities or legitimate rights are still recognized areas within the archipelagic waters following the rule of international law of the sea.

The term MHA was introduced through the basic agrarian law of Indonesia (Article 3 Law No. 3/1960) and referred to “indigenous communities” (Joesoef, 2020). The term “Indigenous Peoples” (IPs) was later removed by the Suharto Regime (1996-1998) and replaced by the term “customary communities” (Murray Li, 2000). Then, MHA was adopted in various development programs by several ministries, including its use for

coastal and small island communities under the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia.

Since Law No. 27/2007 was an amendment to Law No. 1/2014, there has been a shift in coastal communities' categorization, user rights and duties, and policy approaches, as described in Figure 1.

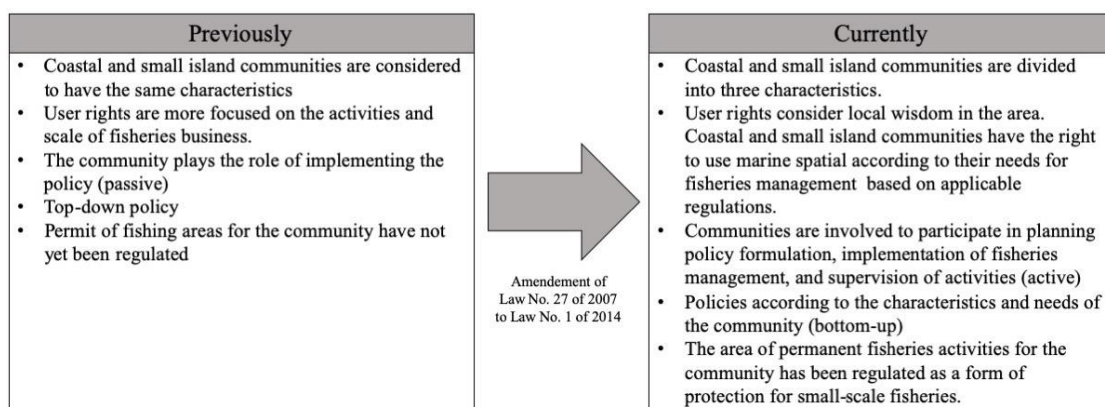


Figure 1. User rights and duties of coastal communities shift in times

Figure 1 exhibits a paradigm shift from centralized to participatory coastal management to reduce common property problems. The Government of Indonesia realized that state control and privatization did not successfully reduce the overexploitation of open-access resources such as marine areas. As the appreciation grew in Indonesia, the such shift has been welcomed by local commitments. As a result, Community Based Coastal Management (CBCM) in Indonesia, through Law No.1/2014, accelerated the participation of coastal communities in natural resources management.

Furthermore, the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. 8/2018 recognized guidelines for MHA recognition in the coastal zone and small island management, commonly called the MHA model. The MHA- granted communal rights is a model for acknowledging and protecting the MHA, which contains processes and practices related to communal right protection and LMMA. The MHA model's process involves several stages: identification, verification,

validation, and determination. The output of the MHA model is the regent regulations, known as *Perbub* MHA.

In the case of the Bajau communities, however, the MHA does not recognize them due to the misconception that they do not have land territories and see marine as open-access resources. However, the sea nomads in Southeast Asia are scattered in some parts of Thailand, Myanmar, the Philippines, Malaysia, and Indonesia, and they are called *Moken-Moklen*, *Orang Laut-Urak Lawoi*, and *Sama-Bajau*. They all face similar problems with regard to the lack of recognition of their ethnic identities and the impact of environmental persistence on their lives and livelihoods (Ariando & Limjirakan, 2019; Arunotai, 2006; Chou, 1997; Jeon, 2019; Lenhart, 1997; Sather, 2006).

1.1.2 Marine resources management

Coastal and small island communities in Indonesia are prominent users of marine resources, and they can play important roles in the management. Due to a paradigm shift from centralized state-led conservation to participatory management in Indonesia, coastal communities and their traditional resource management have become more relevant in Marine Protected Area (MPA) management (Estradivari et al., 2022). This process involves planning, utilizing, supervising, and controlling coastal resources and small islands (Wiadnya et al., 2011). These commitments have practiced that are important for the management of small-scale fisheries (SSF), such as *Sasi* in Maluku (Harkes & Novaczek, 2002) and Papua (McLeod et al., 2009), also other LMMA practices across Indonesia (Berdej & Armitage, 2016).

The such shift has been instrumental in the management of MPA towards LMMA. Thus, the recognition of LMMA as a traditional marine resource management approach is becoming a concern of the Government of Indonesia (Siry, 2011). In Indonesia, MPA is defined as a coastal and marine area covering coral or rock, a forest of mangroves, or other habitats that have been protected parts or the entire enclosed environment by law (Glaser et al., 2010; McNeill et al., 2018). Thus, LMMA is subsumed written in the definition of MPA in Indonesia.

There are three types of management areas in Indonesia: government-led, community-led or customary, and private-led (Estradivari et al., 2022). Government-led management areas such as marine national parks and conservation areas are more complicated than customary management areas due to a lack of community participation and coordination among ministries in Indonesia. However, state-led management area focused on conservation often ignores local communities (Bohorquez et al., 2019; Cabral et al., 2019; Odote et al., 2015). The private-led management area seemed more effective in ecological restorations and meeting alternative sources and income than other management systems in protected areas (Bottema & Bush, 2012). Lastly, communities such as IPLCs actively initiate, engage in, or implement areas-based management practices that lead to positive biodiversity outcomes. One of the practices is LMMA which employs a bottom-up initiative and co-management (Govan et al., 2008). The LMMAs have sought to balance conservation and sustainable livelihoods in marine resource management (Fache & Breckwoldt, 2018; Odote et al., 2015).

1.1.3 Sea nomads in Indonesia

The Indonesian Sea nomad communities live in coastal and small island areas in the straits. The sea nomads in Indonesia are classified into *Orang Suku Laut* and *Sama-Bajau*. The *Sama-Bajau* is the sea nomad communities living in the eastern part of Indonesia (Sather, 2006; Zacot et al., 2008), while the *Orang Suku Laut* areas are situated in the western part of Indonesia (Chou, 2003; Lenhart, 1997). The *Orang Suku Laut* fish on shallow fishery systems, mangrove ecosystems, and other coastal resources. However, *Bajo* or *Bajau* or *Sama-Bajau* fish on coral reefs and shallow waters for reef fishes and sedentary species such as sea cucumbers, shellfish, and seaweeds (Tomoya & Dedi, 1996).

Presently, there is no regulation and law enforcement from all the governmental levels which protects the rights and local knowledge of the Bajau in Indonesia. However, in the western part of Indonesia, Lingga Regency, Riau Islands province, the Regent Decree No. 44/2021 promotes community empowerment for the *Orang Suku Laut* in

Lingga Regency. It was the first effort to acknowledge and culturally support Indonesia's sea nomads.

This study is focused on the Bajau sea nomad communities. Many studies have been carried out on the Bajau communities, but none aim to protect their TEK through a transdisciplinary approach. Most studies investigate traditional fishing methods and the socio-cultural, historical, or environmental threats they face.

Previous research on the Bajaus has revealed several unique characteristics that distinguish them from other customary groups in Indonesia. The Bajaus are very skillful in breath-hold diving (Abrahamsson & Schagatay, 2014), deep knowledge of their marine and coastal environment (Clifton & Majors, 2012; Pauwelussen & Verschoor, 2017; Tomoya & Dedi, 1996; Warsito et al., 2020), and land area (Majid Cooke & Johari, 2019), use of traditional weather forecasting and fishing calendar (Nakano, 2020), unique cosmology (Santamaria, 2019), customary laws (Muslim et al., 2020; Nolde, 2009), and other adaptive management practices (Ismail & Ahmad, 2015; Lynch & Turner, 2021).

The Bajau population in Indonesia is estimated at approximately 180,000 inhabitants (Nagatsu, 2017), but the current figure may be higher. The Bajaus are spread in five of seven marine national parks in Indonesia and domiciled in 14 provinces (See Figure 2), namely Central Java, East Java, South Kalimantan, East Kalimantan, North Kalimantan, North Sulawesi, Gorontalo, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Maluku, North Maluku, West Nusa Tenggara, and East Nusa Tenggara. The Southeast Sulawesi Province is the most populous of the Bajau communities, with around 48,000 people in over ten regencies and cities (Nagatsu, 2017). The regency with the largest Bajau population is Wakatobi Regency.

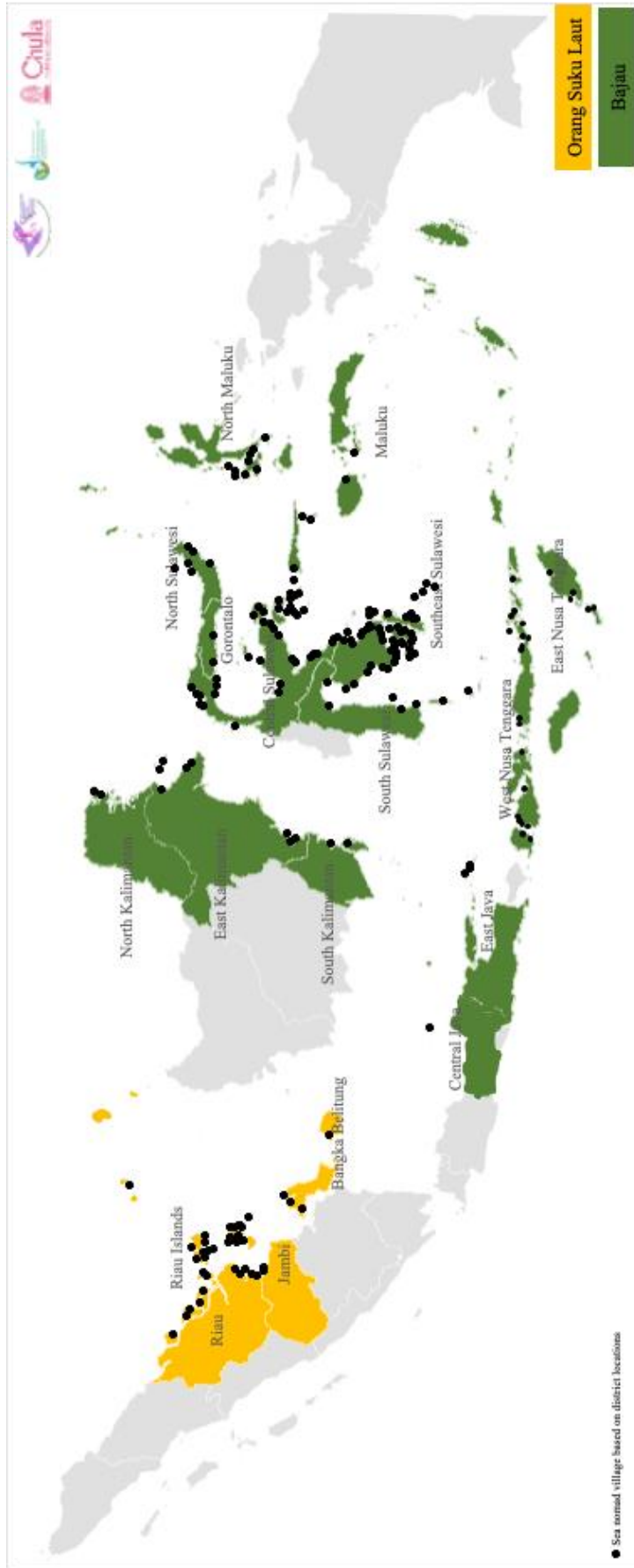


Figure 2. Sea nomads' location in Indonesia
Source: Secondary data from several articles, Bajau colleagues, and online resources

1.1.4 Research objectives

The approach used in this study has never been carried out in Bajau communities in Indonesia. This study examined how the interdisciplinary approaches take part in the coastal and marine management issues, the dynamics behind implementing a participatory marine conservation program, and the context of contemporary Bajau people in Wakatobi Regency, Southeast Sulawesi Province. The complexity of the institutions and social-economic in Wakatobi and the Bajau's cultural transformation makes this research important.

This research contributes to the academic debates and the concept of alternative development toward sustainable resources management from the IPLCs. In addition, this research is also applicable to stakeholders who will and are currently working with sea nomad communities, especially issues related to coastal resource management, strengthening local wisdom, and dealing with institutional complexity through cultural recognition and proper management. There are three objectives in this research.

1. To analyze how and why progressive Indonesian policies towards recognizing local knowledge and co-management of coastal and marine resources are inadequate in the context of the Bajaus of Wakatobi.
2. To explore the role of Bajau TEK as an entry point in re-conceptualizing the co-management of coastal and marine common pool resources in Wakatobi.
3. To recommend how to integrate Bajau TEK into the policy and practices of promoting co-management of coastal and marine resources in Wakatobi.

1.2 The Research questions

This research intends to develop a practice model for integrating Bajau TEK in LMMA. This study has three following research questions.

1. How do Indonesian policies recognize the local knowledge of the Bajaus in Wakatobi and co-management of its coastal and marine resources?
2. How can the Bajau traditional ecological knowledge be reconceptualized for co-management of the coastal and marine common pool resources in Wakatobi?
3. How can the Bajau traditional ecological knowledge be integrated into the policies and practices of co-management of coastal and marine resources in Wakatobi?

1.3 Conceptual framework

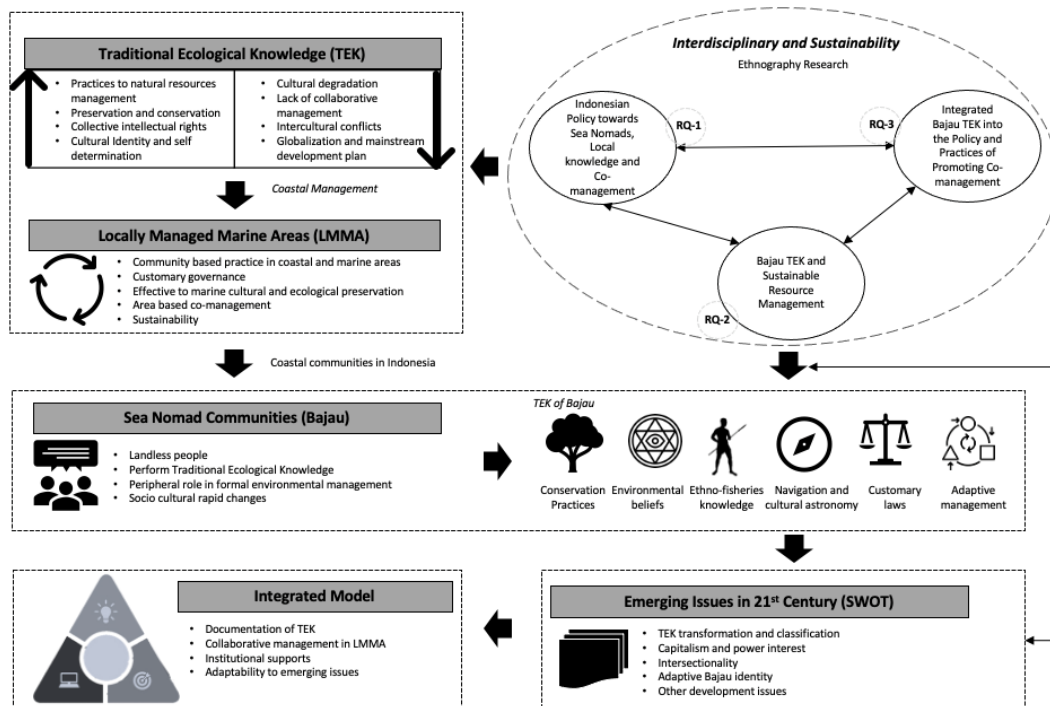


Figure 3. Illustrated conceptual scheme of the research

The conceptual framework consists of 5 parts that guide the themes in this research. **The first part** in the upper right-hand circle represents the three main research questions that are explored through ethnographic research and stakeholder interviews. **The second part**, which is the box in the upper left corner, represents TEK which has its' strengths and challenges (signified by upward and downward arrows), and this TEK has a potential to contribute to LMMA, whose characteristics are listed in the lower box in the second part. **The third part** represents the result of the analysis of the community data, especially the detail of TEK in 5 domains of conservation practices, environmental beliefs, ethno-fishery knowledge, navigation and cultural astronomy, customary laws, and adaptive management. **The fourth part** is the prioritization of current situations and emerging issues that are crucial towards forming and shaping **the fifth part**, which is the integrated model of Bajau TEK in LMMA.

TEK and LMMA

In the current global challenges, TEK of the IPLCs is rudimentary as the vision of the community-based practice toward sustainable resource management and is related to preservation and conservation (Berkes et al., 1995; Rist & Dahdouh-Guebas, 2006; Tang, 2012). Apart from being an adaptive practice in the nature-based solution, the existence of TEK is related to the recognition of cultural identity and self-determination for IPLCs (Early-Capistran et al., 2020). TEK can also be seen as collective intellectual rights which have been discussed in various environmental forums, including at the international level (Burton & Riley, 2018). In Indonesia, the concept of recognizing collective intellectual rights in the form of TEK or other local wisdom has been addressed in several written laws and regulations (Warman, 2014). TEK and other local wisdom from customary groups in Indonesia are regarded as creating several sharing benefits for their social, cultural, and spiritual values. TEK is also related to the identity and rights of IPLCs as it has been passed down for generations (Huntington, 2000; Nadasdy, 1999)

On another side, TEK nowadays needs consideration to figure out the threats and typology of its transformation (Berkes et al., 2000; Ludwig & Macnaghten, 2019). TEK is experiencing degradation from globalization, the lack of collaborative management systems, and intercultural conflicts. Those challenges have cornered IPLCs into mainstream and ethnocentric development plans. Those IPLCs who live in coastal and small island areas are vulnerable to development and environmental threats (Bishop-Williams et al., 2017; Ford et al., 2012). Such TEK challenges have not received much attention from policymakers and academia globally (Astomo & Asrullah, 2019; Neis et al., 2016; Raharjo et al., 2018). This TEK phenomenon shows a necessity for continuity and commitment in strengthening TEKs to deliberate those challenges in the contemporary world.

The Asia Pacific archipelagic region has looked at the value of customary-based coastal and marine management and its contribution to co-management practice (Govan, 2009a; Pomeroy, 1995). One of these concepts is LMMA, a community-based practice in the coastal and marine areas managed as collaborative action by a different group of

actors (Govan, 2009b; Newell et al., 2019). In its implementation, the LMMA strengthens customary governance and accelerates the effectiveness of ecological preservation and also marine tenure for IPLCs (LMMA Network, 2020). Therefore, LMMA has become a leading practice implemented as an integrated form in various archipelagic countries (Govan et al., 2008; Jupiter et al., 2014; Roccliffe & Peabody, 2013). In practice, LMMA varies and greatly depends on TEK, maritime culture, and protected area management. In Indonesia, the practice of LMMA is found in several communities in the central and eastern regions and is strengthened by various legal frameworks at the village and district levels (Hadiyanto et al., 2018; Harkes & Novaczek, 2002; Novaczek et al., 2001; Putri et al., 2020).

Strengthening TEK and LMMA will be different if implemented in marginalized coastal customary communities. The categorization of coastal communities in Indonesia is not yet inclusive because it seems that the Government of Indonesia excludes former nomadic communities, namely the Bajau. As a group fully oriented to the maritime culture, the Bajau have TEK on sustainable coastal and marine resource use (Clifton & Majors, 2012; Sather, 1997; Stacey, 2007). However, they have peripheral roles in coastal and marine management programs that several organizations conduct (Clifton, 2014; Saat, 2003; Stacey et al., 2018).

The current gaps in the literature regarding 'Bajau,' 'TEK,' and 'LMMA' showed a need for in-depth research that connects these three keywords. In addition, current Indonesian policy also shows a wide gap in terms of recognition of marginal communities like the Bajau. Although Indonesia is progressive in promoting TEK and community-based resource management, the policy and practice leave the Bajau communities out of various co-management programs. It is thus necessary to explore the TEK of the Bajau communities to address its contribution to sustainable resource management and to the future LMMA. Eventually, the integrated model for the integration of Bajau TEK in LMMA will be proposed.

The key literature that detailed this integrated scheme is discussed in the next chapter.

CHAPTER II

LITERATURE REVIEWS AND METHODOLOGIES

Nowadays, TEK has no longer been defined as a contemporary practice that is backward and neglected by western science (Briggs & Sharp, 2004; Nadasdy, 1999). The recognition of TEK as a form of community-based management in the context of sustainable resource use entails the reinvestigation and application of such knowledge in community based-conservation, co-management, and several sustainable guidelines like Voluntary Guidelines for Securing Sustainable Fisheries (SSF), so TEK has been an important part of the real practice in community development and the principle of actions at policy-making level (Berkes et al., 2000; Huntington, 2000; Martin et al., 2010). The Bajau community in Indonesia is the subject of this research, and they have maritime-oriented TEK over generations. The current co-management regime of community-led management in Indonesia's coastal and marine areas also acknowledged TEK in several levels of policies.

2.1 Traditional ecological knowledge

The academic term 'traditional ecological knowledge' (TEK) was initially defined in the 1970s, and it has become widely used since the 1980s until now. There is no universally accepted definition of TEK, but a widely quoted report was developed by Fikret Berkes and his colleagues in 2008 through a book entitled 'Sacred Ecology':

[TEK is] a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmissions, about the relationship of living beings (including humans) with one another and with their environment (Berkes, 2012).

Then this definition continues growing and counting the local context and complexity of the institutional system in the community. Sustaining indigenous livelihood, well-being, cultural identity, significance, and empowerment through TEK is noteworthy and valuable in linking them into mainstream conservation practice (Tang, 2012). Over time, TEK is used predominantly for natural resource management and environmental assessment.

Exploring the body of TEKs in an interdisciplinary system has been regarded by many scholars from various fields. Many researchers adhered to western concepts and questioned the TEK as a form of science (Aikenhead & Ogawa, 2007; Antweiler, 1998; Rist & Dahdouh-Guebas, 2006). According to Huntington (2000), the validity and relevance of the reasons behind the various forms of TEKs are still debatable because sometimes the TEK would be misinterpreted. Apart from being questionable to the scientific form, TEK is often influenced by tactical politics, bound to one regime, or overlapping with interests for self-determination of a marginal group (Brosius & Hitchne, 2010; Corntassel, 2008; Nadasdy, 1999). Due to misleading management, the TEK, in terms of cultural practice, can damage the local ecosystem and undermine biodiversity (Lauer & Aswani, 2010). Also, the TEKs are widely treated as secular knowledge and brought into conformation with existing national and international law frameworks (Williams & Hardison, 2013).

The TEK refers to the knowledge base acquired by indigenous and local peoples over hundreds of years through direct contact with the environment (Berkes, 1993). However, with the strengthening of the cultural identity of Indigenous Peoples (IPs) across the world after colonization, the TEK is increasingly becoming a 'new' scientific concept. Works of literature about TEK is wide spreading and well written (Burton & Riley, 2018), ranging in decolonizing knowledge, best practices, challenges, and other emerging issues. One of the most frequently used is the implementation of TEK for environmental management and all-natural systems because TEK can be seen as part of the general self-organizing process of an entity and presents an opportunity for rediscovering new principles for more sustainable uses of the natural environment (Berkes et al., 1995; Rist & Dahdouh-Guebas, 2006).

Presently, TEK resources have been growing to grab the attention of interdisciplinary researchers. TEK research publication predominantly explored agricultural systems, followed by social-ecological systems, indigenous governance, natural resource management, biodiversity conservation, climate change studies, and a few numbers about landscape management (Adade Williams et al., 2020). It is started with the identification process, collaborative management, formal management, policymaking

process, self-determination, and development programs. The TEK is even being predicted as one of the development alternatives for the 2030 Agenda (Aikenhead & Ogawa, 2007; Aswani et al., 2018; Radcliffe, 2015).

On the other hand, the existence of TEK is also increasingly being degraded. It might be driven by a complex web of threats acting at different spatial and temporal scales (Tang & Gavin, 2016). Several research findings were discussing the driver of TEK degradation predominantly highlight rapid ecosystem changes (Godwin et al., 2018; Gómez-Baggethun et al., 2013), environmental justice (Fernandez-Llamazares et al., 2015; Parsons et al., 2021; Schlosberg & Carruthers, 2010), institutional complexity (Brosius & Hitchne, 2010; Raymond et al., 2010; Weiss et al., 2013), western educational system (Hoppers, 2005; Martin et al., 2010; McCarter et al., 2014), transformations and intensification of resource uses (Berkes, 2009b; Naess, 2013; Nesheim et al., 2006), modernization and urbanization (Aworu et al., 2015; Brosi et al., 2007; Loch & Riechers, 2021), market-economy mechanism (Arunotai, 2006; Aswani et al., 2018; Gomez-Baggethun et al., 2010), religious and language conversion (Essed, 2010; Santamaria, 2019; Turner & Turner, 2008).

In the Indonesian context, these two phenomena of TEK as a resource of development alternative and TEK as degraded practices shown from the literature debates have been seen in community practice, especially in customary communities living in coastal areas and small islands. These community groups depended on marine resources as their main livelihood, cultural activities, and other sources of life. A well-known practice that involves TEK in coastal areas is *Sasi* and its *Petuanan Laut* in Maluku and Papua areas (Hadiyanto et al., 2018; Harkes & Novaczek, 2002; Novaczek et al., 2001). This practice is generated as a customary activity to protect certain marine areas through both temporary and permanent closures (Bubandt, 2005). In this activity, customary regulations and fines are issued to the people who violate this *Sasi's* practice (Boli et al., 2014; Ellen, 2018). The TEK used in this practice can be seen from the governance system, the protection of biodiversity associated with conservation, customary beliefs, and the collective adaptability of the community. Referring to previous literature debates, this practice is also decreasing in terms of activities, social

constructions, and youth involvement. Besides, the village intervention, religious roles, technology adoption, co-management by organizations, and marine conservation areas regulations are the current momentum changes of *Sasi* (Putri et al., 2020) that influenced its existence.

The TEK has two recent faces: (1) the tool for preserving community-culture links and sustainability in the view of IPLCs, and (2) Although TEK is faded over time, there is still 'innovation space' to strengthen the practices such as co-management and other approaches adhered to collective community rights. In the sense of modern and growth-oriented technologies, innovations are common sources of the erosion of TEK (Ludwig & Macnaghten, 2019). The chance of TEK to be incorporated as a practice model in the development alternative is needed to accelerate community-based development and other policy-making processes (Astomo & Asrullah, 2019; Raharjo et al., 2018). Such implementation, adaptability, and innovations are the key to shortening these TEK gaps. Undoubtedly, TEK is now not only an IPLCS exclusive identity but can be extended into a mixed approach towards sustainability (Berkes et al., 2000; Huntington, 2000).

2.2 Interdisciplinary approaches to coastal and marine resources management

Sustainability efforts and competition for coastal resources have transformed local management practices. Community concerns about environmental threats and losses of coastal resources have gradually been increased and thus created new emerging issues such as food security, biodiversity, socio-economic transformation, and climate risks. The innovative and collaborative approach is essential to the social and environmental issues of coastal and marine resource management. It could range in coastal resource management transformation, from integrated coastal zone management to the notion of adaptive co-management (ACM) (Mazé et al., 2017). However, a science-based interdisciplinary and knowledge integration approach is a key issue for sustainable and successful coastal management (Poto et al., 2021; Tintoré et al., 2009). Also, the participatory process through multiple lenses helps bridge the communication gap between scientists and TEK holders in coastal restoration and protection (Bethel et al., 2014; Thornton & Scheer, 2012).

This research style, particularly in coastal area management and IPs, is not new but still relevant. It is just a new sophisticated term labeled as an interdisciplinary approach. The expected outcomes obtained from this kind of study are maintaining human-nature utility and being more inclusive and varied (Pezzey, 1992). An interdisciplinary approach and sustainability have been referred to in this research framework because it covers the documentation of TEK, its relationship with the co-management concept, and analysis of adaptive management from Bajau communities. Previous research by Neis et al. (2016) illustrated some potential benefits of combining data from TEK holders and organizations with other traditional sources. The result showed that TEK was an alternative foundation for sustainable resource management in coastal areas. Berkes (2015) found socio-ecological resilience that may be used to build such an interdisciplinary science of resource management for coastal and marine environments.

Bridging science with the TEK system can lead to approaches that more accurately and coherently address social and ecological challenges (AM, 2019). The robust integration of TEK data with ecological science is of critical value for conservation and management, as it contributes to a holistic view of a species' historical and contemporary conservation status (Early-Capistran et al., 2020). However, TEK holders have directly been involved in management processes through community-based, adaptive resource decision-making institutions (Casimirri, 2003). The interdisciplinary approach could cover the complexity of the governance system and institutional support from the community and organizational sides. Fostering policy processes based on an interdisciplinary research program is practical and increases the likelihood of success (Christie, 2011). According to Mauro and Hardison (2000), there are three principal considerations in implying interdisciplinary research on TEK: (1) following cultural developments, (2) institutionalizing this participation at all levels of scientific activity, and (3) respecting the value of TEK.

Indeed, multidisciplinary is now moving to interdisciplinary in the sustainability debate. As a form of a multidisciplinary approach, various perspectives from society, institutions, academics, and other organizations look at intersectional issues that do not

arise when using mono-discipline. The interdisciplinary approach is the basis for transitioning from current management to co-management. This conceptual framework aligns with the current sustainability debate, including TEK, the cultural transformation of IPLCs, and the good governance model reinforcing the 2030 Development Agenda from locally based evidence.

2.3 Co-management system and locally managed marine area

The complexity of coastal communities toward sustainable practices has become a concern of coastal managers. The project-based and top-down coastal community development paradigms have shifted to collaborative management or co-management. This concept continues to be adopted in developed countries and developing countries. For instance, an archipelagic country with a maritime culture like Indonesia relies on marine resources for its livelihood. In the Asia-Pacific archipelago regions, co-management is associated with strengthening the practice of IPLCs living in coastal areas and small islands (Bailey & Zerner, 1992; Clifton, 2003). They have implemented customary practices in managing coastal resources efficiently, wisely, and sustainably. These customary practices were practiced long ago, before the establishment of the nation-state of Indonesia.

Through a paradigm shift from state control to community control in marine and coastal management, the communal rights of coastal communities in carrying out their customs were strengthened. Both government and non-government organizations also welcome this opportunity to work together with coastal communities in a co-management system. This co-management can be in the form of knowledge exchange as a strategy to enhance substantive changes in the outcomes of a management process that leads to promoting social learning (Xavier et al., 2018). The participatory approach was then considered important in the coastal community development process. The sea sharing to sea sparing approach as a paradigm shift in marine management has been seen as interdisciplinary, and sustainability is part of the process and its implementation (Wolff, 2015).

In the case of fisheries and coastal management, co-management predominantly involves the coastal community stakeholders in sustainable resource uses. The involvement of coastal communities includes sustainability covering environmental, social, cultural, economic, and institutional issues. Several previous studies examined the use of co-management, for instance: marine conservation and related resource use (von der Porten et al., 2019; Voorberg & Van der Veer, 2020), biodiversity (Early-Capistran et al., 2020; Tien & Nguyen, 2019), marine spatial and modeling (Hepburn et al., 2019; Karlsson, 2019; Kluger et al., 2019; Noble et al., 2019), indigenous knowledge (Stori et al., 2019), coastal community livelihood and assessment (Francis et al., 2019; Hornborg et al., 2019), governance system (Abelshausen et al., 2015; Lynch & Turner, 2021; Nickols et al., 2019; Patankar, 2019), social capital, equity and conflicts (Bennett et al., 2021; Siegelman et al., 2019; Watson et al., 2019), tourism and related economic system (Rodríguez-Rodríguez et al., 2019; Tilley et al., 2019). However, the practice in co-management regimes sometimes fails to see the complex issues and the social relations between actors (Singleton, 2000). Co-management debate induces the neglect of key empirical features of fisheries commons practice due to a lack of enforcement capacity, equity, economic drivers, and political interests (Jentoft, 2000; Murray, 2007; Quimby & Levine, 2018).

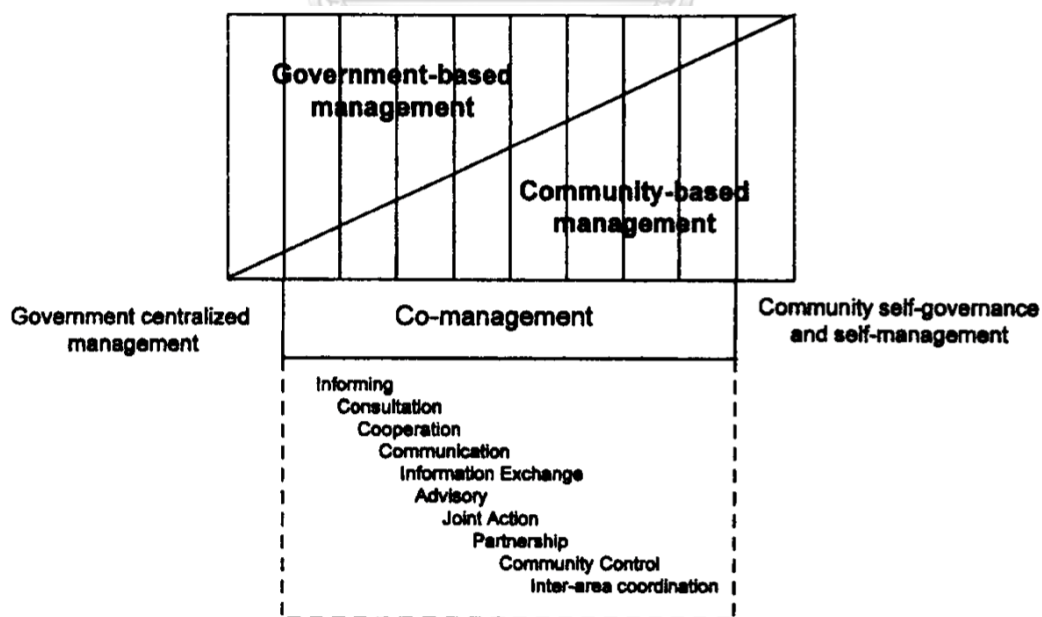


Figure 4. Co-management hierarchies
Source: Berkes (1994)

Co-management involves delegating management responsibility and authority between the local level (resource user/community) and the state level (national, provincial/state, municipal). There is a hierarchy of co-management arrangements (Berkes, 1994) (See Figure 4). This hierarchy shows that co-management is closely related to the transition of centralized government management into community self-governance and self-management. It means co-management can play a middle course between state-level concerns in fisheries management for efficiency and equity and local concerns for self-governance, self-regulation, and active participation (Pomeroy, 1995). Regarding fisheries and development, co-management can also serve as a mechanism and economic development by promoting the participation of fishers and the community in actively solving problems and addressing needs.

Co-management is an interdisciplinary field that uses concepts and methods drawn from various scholarly and applied disciplines (Spaeder & Feit, 2005). When researching the concept of co-management in various implementations, the principal object must be the IPLCs. One co-management concept that bridges this dissertation's research questions is the Locally Managed Marine Area or LMMA. This concept looks at linking existing practices at the grassroots level or potential practices to be developed as co-management (Plummer & Fitzgibbon, 2004).

LMMA is a term for local community-based marine management. By definition, LMMA is an area of nearshore waters that are either actively and wholly (or largely) being managed in a 'local' practitioner context by residing or neighboring communities and or families, which could be collaboratively managed by both resident communities and the local government representative (Govan et al., 2008). LMMAs offer a means of legal formalization to respect the traditional knowledge, practices, and values of local communities, which already have established conservation and sustainable use concepts as part of their traditional culture of resource use (Govan, 2009a; Syakur et al., 2012). Policy support for the LMMAs nationally and locally is key to successful implementation and meeting both national and international goals surrounding biodiversity, coastal and marine ecosystem health, and conservation (Adhuri, 2018;

Govan, 2009b; Katikiro et al., 2015; Mills et al., 2011; Moraes, 2018; Roccliffe et al., 2014).

The Indonesian organization on LMMA (I-LMMA) uses village regulations schemes to strengthen community identity. The I-LMMA helps delineate the LMMAs by using the grassroots movement in Papua and Maluku as coastal-based community resource management. This network is formally recognized by a global network that involves practitioners in various marine conservation projects. The communities view LMMAs as enabling recovery of natural resources, improved food security, improved governance, access to information and services, health benefits, improved security of tenure, cultural recovery and community organization, exclusion of other stakeholders from fishing areas, working with outside agencies, and their increased control over local resources (Govan, 2009a; Newell et al., 2019).

Furthermore, the LMMAs are usually 'managed' to achieve local conservation and sustainable development objectives (Jupiter et al., 2014). Therefore, LMMA emerged as a response to the increased need to involve local communities in managing natural resources, generally under the concept of co-management (Odote et al., 2015; Roccliffe et al., 2014).

This LMMA has great potential to be adopted by landless people such as sea nomads. Although this group does not have ancestral land domains, they have adequate knowledge of coastal and marine areas. Sea-based nomadic people know how to practice conservation, protect certain species and other resource use issues based on their customary practices and knowledge (Ariando, 2018; Arunotai, 2006; Chou, 1997; Clifton & Majors, 2012; Sopher, 1965). However, the problem of co-management by marine nomads like the Bajau is the absence of acknowledgment and legal protection for intellectual property rights, socio-ecological system, and social security from the State to the Regency.

2.4 Institutional complexity

Institutional support can strengthen community-based management because it can bring the precise mechanism for promoting social capital and increasing power distribution (Jones et al., 2013; Steenbergen & Warren, 2018; Tennant, 1994; Tladi, 2019; Tuda & Machumu, 2019). Linking to sustainable coastal and marine resource management practices, institutional support is also the main focus of supervision, regulation, and protection in formal management (Ostrom, 1990; Schnegg, 2018). A model of an institutional mechanism promotes scientifically sound decision-making in Marine Protected Areas (MPA) (Tladi, 2019).

The inter-institutional gap in sustainable natural resource management is co-existing due to geographical locations, governance levels, and social-ecological systems (Rahman et al., 2017). The customary institutions generally lacked fundamental interactions with organizations operating at larger scales (Cinner et al., 2012). In contrast, a formal institution such as the government sometimes fails to incorporate the IPLCs in good order. The complexity of this institution system can be seen when there is a conflict of interest and issues of development gaps. According to Leach et al. (2012), this institutional complexity enhances the social differences in various development discourses. Political ecology and socio-cultural friction among communities will make the positionality and relationships of institutions more complex.

In Indonesia's practices of coastal community-based management, such as *Sasi*, the institutional analysis assists in designing integrated management schemes between traditional and modern government structure. In addition, interdisciplinary perspectives are needed to understand and synchronize the obligation and needs of the community and organizations (Hernandi et al., 2012). Local communities in Indonesia have the right to manage their resources, but they lack institutional support from formal management (Purwaka & Sunoto, 2001). In order to tackle the institutional complexity, the concept of good governance has been introduced to connect customary governance and formal institutional supports. Good governance plays a central role in how effective fishery management can simultaneously increase food security, livelihoods, and conservation outcomes (Costello & Ovando, 2019). This research elaborates on the

institutional complexity and the relation of the inter-customary institution of both IPLCs and related organizations in the issues of TEK and LMMA.

2.5 Co-management of the Bajau in Wakatobi

In the context of the Wakatobi Bajau, the co-management program has been carried out in several fields and various institutions but has not yet fully involved the Bajau community and their TEK. These programs include TEK in the downstream process, such as implementation, supervision, or institutional roles. Of the several co-management programs in the Bajau community in Wakatobi, only *Tubba Dikatutuang* in Bajau Sampela has included TEK in the whole package (Hasrawaty et al., 2017), which aims for marine conservation. The TEK embedded in this practice is the knowledge about sacral marine sites (spawning and nursery ground) in front of Hoga Island. However, this program has ended due to several factors, like the lack of support from village administrators and the lack of manager commitments. Also, the conflict over ownership of the *Tubba Dikatutuang* management area with the dominant customary community was identified. This co-management program has a secondary mission of establishing areas for ecotourism and research businesses on Hoga Island (Bahar & Fauzi, 2020; Galley & Clifton, 2004) and setting up an observation and field station for guests and researchers from Operation Wallacea (2007-2012).

2.6 Methodology

The method postulated in this study was multi-sited ethnography and other qualitative methods to collect data from field observations. The selected method aimed to explore the concept of interdisciplinary research that targets a community approach to probe intersectional issues in TEK mapping, justification for co-management and emerging issues, and institutional support for the Bajau communities in Wakatobi. The piles of this qualitative data were arranged into the thematic cluster, and grounded theory was used to build an integrated model of TEK and LMMA in Wakatobi.

2.6.1 Research design

This research was divided into three phases, as shown in Figure 5. Each phase was carried out to strengthen the argument and shape the finding based on the research flow from the beginning of the idea to the targeted model.

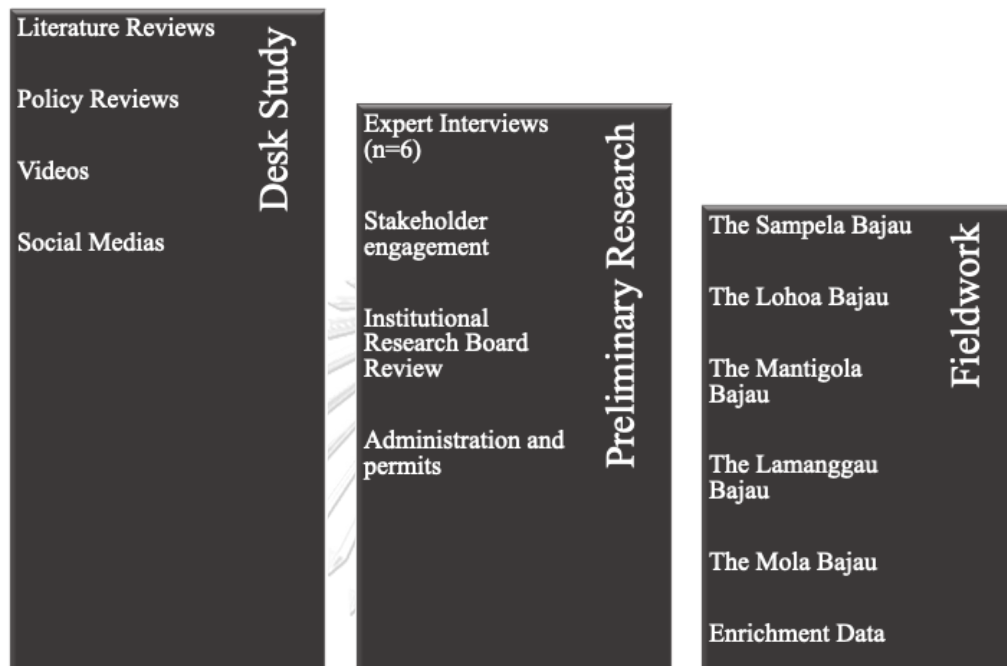


Figure 5. Research phases

Phase 1: Desk Study

In this phase, baseline data was reviewed from various literature sources, including journal articles, book chapters, policies, reports, and other related documents. Secondary data collected at this stage was used to find research gaps, frameworks, updates, and urgency of the issues raised in this research. The exciting thing at this stage was examining information through social media, both in the form of visuals like photos, videos, and textual posts. Using the information from social media in the desk study phase help to gain news and information and community trend as preliminary sources for the researcher before fieldwork (McKenna et al., 2017; Nurdin, 2017).

Social media usually focuses on adventures and tourism because the romanticism AND narrative about the Bajau community have been portrayed at local, national, and

international levels. This situation is also actual with mainstream media. One location selected in this study has been the setting for a famous movie in Indonesia.

Phase 2. Preliminary Research

Preliminary research describes research studies to understand better the issues discussed in this research. This phase was divided into three stages. The first one was expert interviews with a total of six informants consisting of academics (n=2), government (n=1), NGOs (n=2), and Bajau communities (n=1). Interviews were conducted with experts to see the possibility and relevancy. It also aimed to criticize the research design and synthesize data from the desk study phase. The second stage was stakeholder engagement to map relevant people or groups involved in the Bajau issue in Wakatobi. This stakeholder engagement helped the researcher to coordinate during fieldwork, learn the basics of the Bajau language, and to take care of permits and other administrative requirements. The researcher got a lot of new connections at this stage by joining the Bajau community on social media such as *Facebook* groups and *WhatsApp*. The list of names from the stakeholder engagement step implied the snowball sampling method to connect the researcher with other potential stakeholders. The third is submitting an Institutional Research Board (IRB) review to test the feasibility of socio-cultural research related to marginal communities such as the Bajau. Then the last one is administration and permit arrangements from the national to the local level, which must be done before fieldwork.

Phase 3. Fieldwork

This research was primarily conducted through fieldwork using the multi-sited ethnographic method. The researcher lived with foster Bajau parents to get etic and emic perspectives during fieldwork in Wakatobi from October 2020 to October 2021. The research locations were all Bajau villages in Wakatobi Regency, Southeast Sulawesi Province, Indonesia, namely Mola, Sampela, Mantigola, Lohoa, and Lamanggau. Although the research sites spread across the archipelagos, the researcher stayed and observed intensely for two to three months at each Bajau location. In addition, the researcher visited specific Bajau villages on certain important occasions to collect data about activities and events.

After six months of fieldwork, the researcher started to collect data regarding the perceptions and views of related stakeholders in parallel to field data collection. This strategy purposed to give the researcher an overview of data and time for reexamining the locality and research framework. Data collection was carried out periodically from May to October 2021. The questions raised during the later interviews were about the informants' views on the existing co-management concept in Bajau communities, the development programs and policies (past, current, and future) implemented in Bajau communities, situated development for the Bajau, and related issues. The data obtained from these interviews were also validated with the data from ethnographic observations in the field while living with Bajau communities.

2.6.2 Scope of the study

The scope of the study is described below in terms of community/population, themes, geographical location, time period, and topic. Some points are stated as scopes of the study. The details follow:

People and location

1. The study focused on the Bajau communities and the LMMA practice in Indonesia with a case study from Wakatobi Regency, Southeast Sulawesi Province.
2. Five Bajau communities, namely Mola, Sampela, Lohoa, Mantigola, and Lamanggau, were studied in this research.

Methodology

1. The TEK of the Bajau was studied in general practices regarding the concept of the LMMA towards sustainable resource management.
2. The mapped TEKs, according to the proposed indicators and groupings made prior to the fieldwork, were then validated and adjusted according to the localities found when conducting multi-sited ethnography.
3. Primary and secondary data were used based on the study's objectives in the case of Wakatobi Regency, Southeast Sulawesi Province, Indonesia.
4. The secondary data of this research were obtained from desk studies.

5. The primary data were collected using qualitative methods such as multi-sited ethnography, interviews, informal talks, participatory mapping, and visual methodologies.
6. The data collection and analysis in this study examined the interdisciplinary perspectives consisting of qualitative approaches.
7. The data expected from primary data were gathered from multilevel stakeholders with informed consent and privacy based on IRB guidelines.
8. The number of informants for this research was selected based on the purposive sampling method in the qualitative environment.
9. The data collection of this research was conducted for 13 months in a multi-sited ethnography setting to overcome the entire season in the field, social, environmental, and cultural challenges and gain a deeper understanding of community complexities.

Policy and development

1. In terms of policy analysis, this study used the general perspective following the official Indonesian laws of hierarchies and policy structure, which reveals in the local, provincial, and national documents.
2. This study analyzed the shifting policies timeline after the Indonesian reform era.
3. The development concept in Bajau was scoped after the Indonesia Independence Day (17 August 1945) and selected phenomena to the Bajau in Wakatobi.

2.6.3 Data collection

This study used a multi-sited ethnography method as the primary qualitative setting. Multi-sited ethnography is located within new spheres of interdisciplinary work, including media studies, science and technology, and cultural studies (Marcus, 1995). This multisided ethnography time gives a deeper understanding of the current intersectionality issues and their connection to the global context (Falzon, 2016; Hine, 2007), particularly the social space, unique culture, and phenomenology of the Bajau scattering in the WNP.

Ethnographic knowledge is an integral component of any holistic approach and can provide potentially important information and complexity on coastal resource management and the socio-ecological interaction system (Fabinyi et al., 2010; Mazé et al., 2018). In addition, this method was used to overcome contemporary phenomena, perceptions, and attitudes of the Bajau communities regarding co-management regimes. The nature of this research method is illustrated in Figure 6.

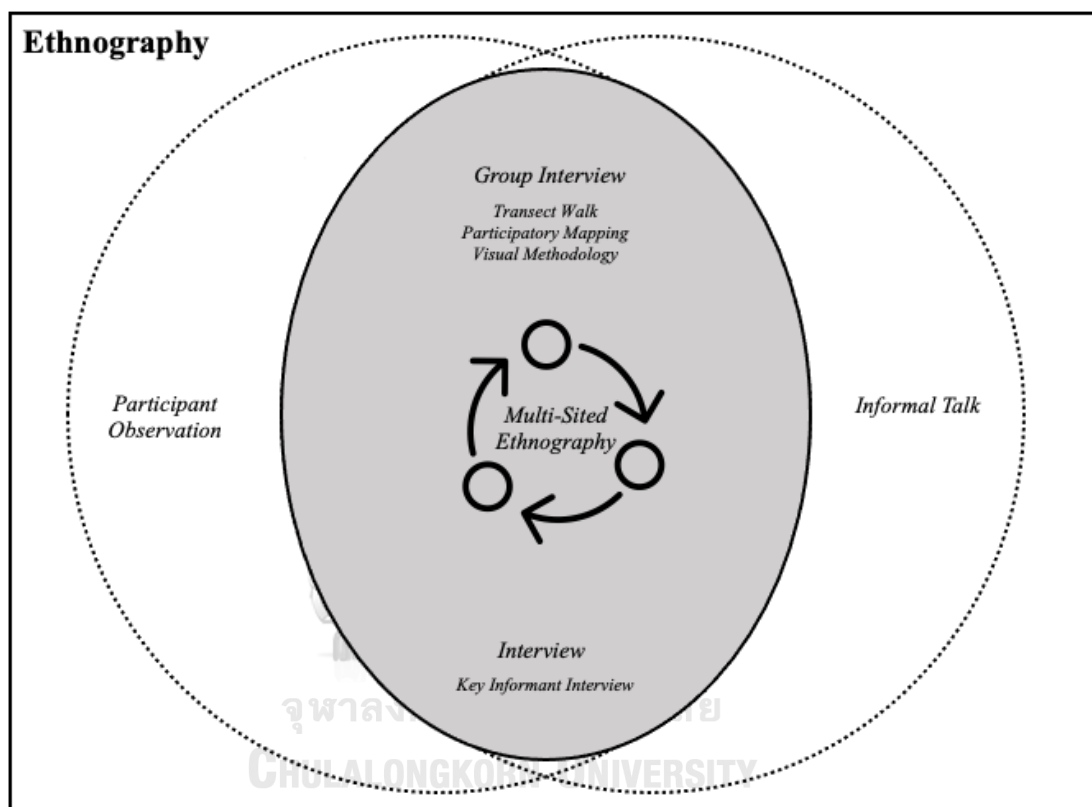


Figure 6. Research method illustration

The main instrument of data collection for qualitative form consisted of desk study and ethnography. However, the following methods aligned with ethnography are participant observation, informal talks, group interviews, and key informant interviews. The targeted informants were divided into Bajau communities in Wakatobi and related stakeholders. The key informant interviewed from each village was fishers (traditional and modern), women group, youth, religious leaders and shaman, and elders. However, the related stakeholder's non-Bajau communities were also interviewed to seek interrelation of the research issues. These stakeholders included the Bajau from outside

Wakatobi Regency, such as the Papela Bajau in East Nusa Tenggara Province. Purposive sampling was used in selecting the number of Bajau informants and related Bajau stakeholders, and the list is shown in Table 2 and Table 3.

Table 2. The Bajau informants based on location and sex ratio

Bajau Village	Number of informants	Percentage (%)	Sex ratio	
			Male (%)	Female (%)
Sampela	51	32.90	72.55	27.45
Lohoa	40	25.81	50.00	50.00
Mantigola	20	12.90	70.00	30.00
Lamanggau	26	16.77	85.00	15.00
Mola	18	11.61	88.89	11.11

Table 3. The Bajau informants based on identified category

Category	Number of informants (%)	Percentage (%)
Fisherman	72	46.45
Women group	36	23.23
Youth	20	12.90
Religious leader and shaman	3	1.94
Elder	18	11.61
Others (e.g., Tourism, Activist)	6	3.87

Desk study

Various literature sources were reviewed as background information and practices of the Indonesian sea nomads (particularly the Bajau), co-management practices, and LMMA. Desk study included the current review of journal articles, historical data, policy reviews, reports, social media, and other related documents before the fieldwork. Its purpose was to construct a keen understanding of the topic and study fields, the nature of Bajau communities, and recent issues. Also, the manifestation of desk study improved the depth and breadth required and formulated appropriate research questions and instruments (WFP, 2009).

Participant observation

This participant observation is the primary derivative of the ethnographic method as the umbrella of this research. Observation is an important method to identify the overall basis of limitations and performance information in the field area. As a qualitative

research setting, this instrument aimed to access data on the way of life and dynamics of the Bajau in the Wakatobi Regency. The researcher immersed themselves in a social setting for an extended period and observed behavior from emic and etic points of view (Bryman, 2012).

Informal talk

Another data collection method was from informal talks, wherein the researcher struck up a conversation with stakeholders who could provide information and perspectives contributing to the research (Bryman, 2012; Neuman, 2014). The interviews and informal talks were recorded with an audio recorder and ethnographic notes. The researcher stayed and interacted exclusively with the locals (the Bajau).

Key informant interview

The key informant interviews were conducted to get comprehensive information on co-management, LMMA practices, the intersectionality of TEKs, and institutional supports in the study area. These interviews were optimal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when exploring sensitive and non-normative topics. The informants of this method were selected using a purposive sampling method, a non-probability form of sampling that aims to sample the cases or participants strategically and is relevant to the research questions posed (Bryman, 2012). Additionally, this method can identify the typical case sampling by exemplifying a dimension of interest in the qualitative research design.

The key informant interviews emphasize interviewing a selected group of individuals who are likely to provide needed information, ideas, and insights on a particular subject with a small number of interviewees (Kumar, 1989). During this study, key informant interviews were explicitly conducted with multilevel stakeholders at the sub-national and national levels. The targeted respondent of this study is detailed in Table 4.

Table 4. The Informant from related institutions to Bajau communities in Wakatobi

Sector	Institution Name
Governments	<ul style="list-style-type: none"> - Ministry of Maritime and Fisheries Affairs of The Republic of Indonesia (N) - Wakatobi National Park Authority (N) - Provincial Government (P) - Department of Marine and Fisheries of Wakatobi (L) - Regional Development Planning, Investment, Research, and Development Agency of Wakatobi (L) - Department of Tourism and Creative Economy of Wakatobi (L) - Environmental Agency of Wakatobi (L) - Public works and Settlement Office of Wakatobi (L) - Agrarian and Land Planning Office of Wakatobi (L) - Women's Empowerment and Child Protection Office of Wakatobi (L) - Marine Police (L) - Navy and Army (L) - Public School Teacher (L) - Primary Health Center (L)
Non-Government Organizations	<ul style="list-style-type: none"> - World Wide Fund for Nature (WWF) (I) - <i>Yayasan Konservasi Alam Nusantara</i> or the Nature Conservancy (N) - Rare Indonesia (N) - Sustour (I) - Operation Wallacea (I) - I-LMMA Pulau Hatta (L) - <i>Persatuan Orang Sama-Bajau Indonesia</i> (Bajau Indonesia) (N) - WWF-CTI Indonesia (N) - Indigenous People' Alliance of Nusantara (AMAN) (N)
Customary Institutions	<ul style="list-style-type: none"> - MHA Kadiye Liya (L) - MHA Barata Kahedupa (L) - MHA Kawati Tomia (L) - MHA Sara Sarano Wali (L) - Sara Mandati (L) - Sara Vance (L) - Kekar Bajau (N)
Civil Society Organizations	<ul style="list-style-type: none"> - Komenangi (L) - Forkani (L) - Komunto (L) - Foneb (L) - Lepa Mola (L) - Kamelia (L) - Padakawang Sama (L) - Conservation group Horuo Mantigola (L) - Padakuan Sama Mola (L) - Palilibu Bajau (N) - Indonesian Traditional Fisherman Association (KNTI) (N)
Academics	<ul style="list-style-type: none"> - Halu Oleo University (P) - Wakatobi Community College for Marine and Fisheries (L) - Muhammadiyah Institute of Technology and Business of Wakatobi (L) - Visiting researchers (N) - National Research and Innovation Agency (BRIN) (N) - Apintlaw (N)
Private sectors	<ul style="list-style-type: none"> - Wakatobi Dive Resort (I) - Tour operators (L) - Pulau Mas (N) - Where there be dragons (I) - Aruna Jaya Nusantara (N)

	<ul style="list-style-type: none"> - Lagundi Corporative (L) - Si Karimanan Bajau Crafts in Mola (L) - Local Corporative/<i>Koperasi Uang Harian</i> (L)
--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Note: I (International), N (National), P (Province), L (Local)

Group Interview

The group interview is purposed to gather the information phenomenologically. This method can be set in a formal or informal environment. Group interviews can be used for various purposes, not just developing procedures and questionnaires for subsequent quantitative studies or exploratory research. It can be used independently to gather information about any social setting being researched ethnographically (Frey & Fontana, 1991). The group interview provides multi-source data from local communities. This research arranged group interviews in every Bajau community (five villages) to seek the multi-perspective regarding local management of waters areas and to deliberate the community views related to research outcomes. However, the group interview used in this study was adopted with several complementary research methods, including participatory mapping, transect walk, and visual methodologies.

Participatory mapping is the ‘bottom-up approach’ that allows the masses to create maps for all. It can be a process that attempts to make the association among communities visible by using commonly understood and recognized language and cartography (Robinson et al., 2015). Participatory mapping plays an important role in helping marginalized groups such as IPLCs and nomadic communities, pastoralists, forest dwellers, or sea nomads work towards the legal recognition of customary rights (Corbett, 2009). This method facilitated the Bajau community mapping their practices for the LMMA and TEK. Participatory mapping was also used to map stakeholders and intergroup relations, opportunities and threats of TEK, and co-management issues in each Bajau village in Wakatobi. This method also determined the concept of mobility, territory, property, and tenure of the Bajau community.

In implementing particular objectives, the selected method for participatory mapping was used in this study in the transect walk. A transect walk is a social mapping method based on ecological information in a community and can be used as a baseline for

further research (Hellier et al., 1999; Rojas et al., 2021). In the Bajau community in Wakatobi, the transect walk method is carried out to map the nature of TEK and its challenges. These data were mapped based on topography from high land, lowland, land community, coastal areas, mangrove areas, seagrass meadow, Bajau villages, coral reef areas, atoll areas, and depth sea. The starting point is determined based on sacred sites or spaces owned by the Bajau, such as the *Pangalila Hill* on Kaledupa Island. While the benchmark for the sea area is from the Bajau village to the atoll area in Wakatobi, as a practice of seasonal migration, they are still doing. Ethnographic data and key informant interviews will strengthen the results of the transect walk.

The next participatory mapping practice is the visual methodologies method, which implies evidence from photos of the local communities. Photos were used as the media in interpreting the existing phenomenon, gaps, and challenges related to LMMA, co-management, and TEK. This method is ubiquitous in social research in capturing community events. Photographs give a visual inventory of the settings described in the text and present their meanings in terms of the people studied (Neuman, 2014). The researcher took the photos used in this method, and then during the group interviews, the Bajau community explained the photo's physical and social norms. These visual methodologies are used to identify the biodiversity, spatial, and temporal of an event captured through photographs. The researcher then analyzed this photo as material for discussing and identifying a phenomenon in the Bajau communities.

2.6.4 Data analysis

The data obtained from the results of the ethnography with Bajau Wakatobi were collected in the form of ethnographic notes, then presented and analyzed using thematic analysis. This thematic analysis method was used to describe the situation that occurs in a community in the form of cultural activities, and issues co-management in coastal and marine resource uses. The grouped data based on the theme of the reflection of the ethnographic notes were then combined with the data from the formal interviews. After combining thematically, the final data is combined with a desk study analysis of literature, research reports, and related policies written in descriptive writing. In the data validating process, researchers employed the triangulation data method through

presentations to the representative group and key informants from October 2020 to December 2021, which was arranged online.

The data obtained from multi-sited ethnography was then written down on detailed notes. Periodically, those records were evaluated and reflected to seek the depth of the data gathered and to create the strategy for extracting data and phenomena on the following day. Reflectivity is a central element of ethnographic work, owing to the relationship the ethnographer shares with participants and the ethical issues that flow from this close relationship (Reeves et al., 2008). Periodic reflectivity on the ethnographic method aims to group convergent and divergent data and determine the direction of observations during fieldwork on Bajau villages in Wakatobi.

The collected data was then narrated in a thematic setting. Thematic analysis encapsulated the ease with which a phenomenon can be briefly stated, summarized, and joined to a similar event (Altheide, 1987). The data from this thematic analysis was then synthesized with interviews and transcribed based on content analysis. All the combined data was packaged into a grounded theory form in the last stage. The grounded theory is both a methodology and a product. As a methodology, it consists of techniques and guidelines for data collection and analysis to produce a theory grounded in data (O'Reilly, 2009).

The grounded theory in this study was used for a deep understanding of the TEK Bajau community's manifestation, mechanism, and justification. The facet followed O'Reilly (2009), starting with coding and labeling segments of the results by combining ethnographic and other qualitative data. Then it was followed by identifying memo keywords and thematic issues in the form of a written structure. The next stage is about combining memo writing with theory, ideas, and sampling from supporting cases, and the last was a form of writing the concept. Indeed, the second phase of the literature review (1st was on the desk study phase) comes later, after the independent analysis.

Regarding the data for stakeholder mapping and institutional support, the influence and interest scale are placed on the x and y axes from zero (score 1) to high (score 5) participation (see Table 5). The data obtained from participant observation and interviews were combined with overlaying issues from the grassroots level with issues of institutions working with Bajau LMMA, and then scored by dividing qualitative data into several thematic categories as following the nature of grounded theory (Charmaz, 2006). The combined data was validated using triangulation techniques to reduce the information bias gap, especially in transcribing data from interviews. Finally, the data output was depicted in a quadrant matrix.

Table 5. Measurement of scores on the role of interests and stakeholder influences

Score	Interest	Influence
5	Has a high interest in Bajau LMMA	Has a high influence on Bajau LMMA
4	Has a moderate interest in Bajau LMMA	Has a moderate influence on Bajau LMMA
3	Has a low interest in Bajau LMMA	Has a low influence on Bajau LMMA
2	Lack of interest in Bajau LMMA	Has very low influence on Bajau LMMA
1	Has no interest in Bajau LMMA	Has no influence on Bajau LMMA

Adapted from Adimu et al. (2017)

2.6.5 Limitations and constraints

The limitation of the methods is the limited duration of fieldwork which does not align with the high complexity of the Bajau community in Wakatobi. In addition, prior to conducting this research, there is a need to document baseline data such as socio-economic and participatory mapping regarding the needs and complexities of Bajau in the contemporary world. Consequently, this study lacked appropriate baseline and reference data, which forced the researcher to work extensively on uncovered fundamental issues. The last is the limitation regarding the interpretation and narrative of the description of the Bajau people.

The main limitation of fieldwork is the Coronavirus disease (Covid-19) pandemic which entered Thailand in February 2020. Covid-19 caused closed borders between countries and disrupted activities at the community level and university lives. It caused this study to get stuck. This study experienced a fieldwork delay of seven months (from March 2020 to October 2020) due to various factors such as the lockdown policy in Thailand, vaccine development, and IRB administration. In addition, during the

fieldwork, limitations arise from the accessibility between islands that are challenging on Wakatobi island.

The primary constraint encountered in this dissertation writing is the tight time limit for study and scholarship support. The researcher felt overworked and hurried with all administrative preparations, funding, and reporting because Chulalongkorn University requires the researcher to complete the study within six semesters.



CHAPTER III

THE BAJAU IN WAKATOBI: HISTORICAL, GEOGRAPHICAL, AND CULTURAL BACKGROUND

3.1 The Bajau in Wakatobi in History

The Bajau people are a sea nomad group scattered in the central and eastern parts of the Indonesian archipelago. This group is also located on Malaysia's east and west coasts, parts of Sarawak, and the Southern Philippines. On the Eastern coast of Sumatera and Riau Islands, Indonesia, Malaysia, and Southern Thailand, another sea nomad group is called *Orang Laut* or *Orang Suku Laut* or *Urak Lawoi*. In addition to these two groups, *Moken* or *Moklen* sea nomads in Thailand and Myanmar. These three groups are geographically, linguistically, and culturally different in marine and island ecosystems (Sather, 1997). As Indonesia's largest marine nomad group than the *Orang Laut*, the Bajau have a more heterogeneous distribution and are skillful in sailing (Lapian, 2009).

The 'Sea nomads' term was first introduced during colonialism. Long before the narrative labeling of academia, the Bajau people received various names from the local communities around them. The terms "*Bajo – Bajau – Bajoe – Badjaw- Sama Bajau*" are the exonym interpretations for this group. In Sulawesi and the Southern Islands in Indonesia, the word "*Bajo*" is used, while in parts of the island of Borneo to Malaysia, the word "*Bajau*" is frequently used. The various exonyms of this Bajau vary greatly depending on the local dialect but cannot be identified in which period and communities labeled them (Gaynor, 2016). Then, their endonym is "*Sama*," the common term used to identify their internal group. "*Sama*" itself has various lexical meanings, it means 'same' in Malay, or it can also be interpreted as 'the identity of a group' as in the Philippines. Some describe "*Sama*" as a view of human life represented by one word: "*Sama*." This philosophy is explained by illustrating everyone who was born and lived in the same world.

The debate over the Bajau exonym in Indonesia derives from the deliberation of the word "Bajau" in the Indonesia Dictionary. The interpretations of *Bajo* and Bajau have narrowed meanings and misleading information. However, for the internal Bajau activist group, identification of the use of the term "Bajau" is considered the most suitable to describe their group identity. This term was later adopted as the official name for this group and community organizations currently developing on social media platforms in Indonesia. This justification reasons for this research using the term "Bajau."

The Bajau people have vast sea colony areas and are reliable in sailing. It is evidenced by the several Sultanates throughout Indonesia that connect with the history of the Bajau voyage, such as Lontara (the Bugis's history manuscript). The Bajau were known for visiting many coastal areas to sail and work as crew on Bugis *Pinisi* Boats. Those visited places are usually named with a Bajau point, for example, Labuhanbajo in Bima Bay (East Nusa Tenggara Province), Labuhanbajo in Tomini Bay (Gorontalo Province), Bajo on the east coast of Kalimantan, Tanjung Sibajo on Simeuleue Island (Aceh Province), and in the Bajo Anambas Islands in the South China Sea (Riau Islands Province). In several cases, the existence of Bajau villages tends to be associated with the Bugis communities. The interpretation appearing in the Indonesia Dictionary states that the Bajau people are part of the Bugis community.

As a group whose life and culture are oriented to the sea, 90 percent of the Bajau people in Wakatobi are dependent on marine resource livelihoods. The other 10 percent work in the informal, government, or private sectors. Bajau groups in Wakatobi are spread over five villages: Mola, Sampela, Lohoa, Mantigola and Lamanggau (see Figure 7). As of October 2021, the total population of the Bajau community in the Wakatobi Regency is 23 percent of the Wakatobi Regency population. Surprisingly the number is almost five times that identified in previous research, up from 5 percent before 2004 (Shepherd & Terry, 2004) and 10 percent before 2007 (Stacey, 2007). The least populated is Lohoa on Kaledupa Island. Currently, the Wakatobi Bajaus do not possess a customary organization system. They fully adhere to the state village administrative system. There is a customary organization called *Kekar Bajo* (Bajo Family Harmony)

or the Bajau Kinship Association, but this organization does not serve as a customary institution.

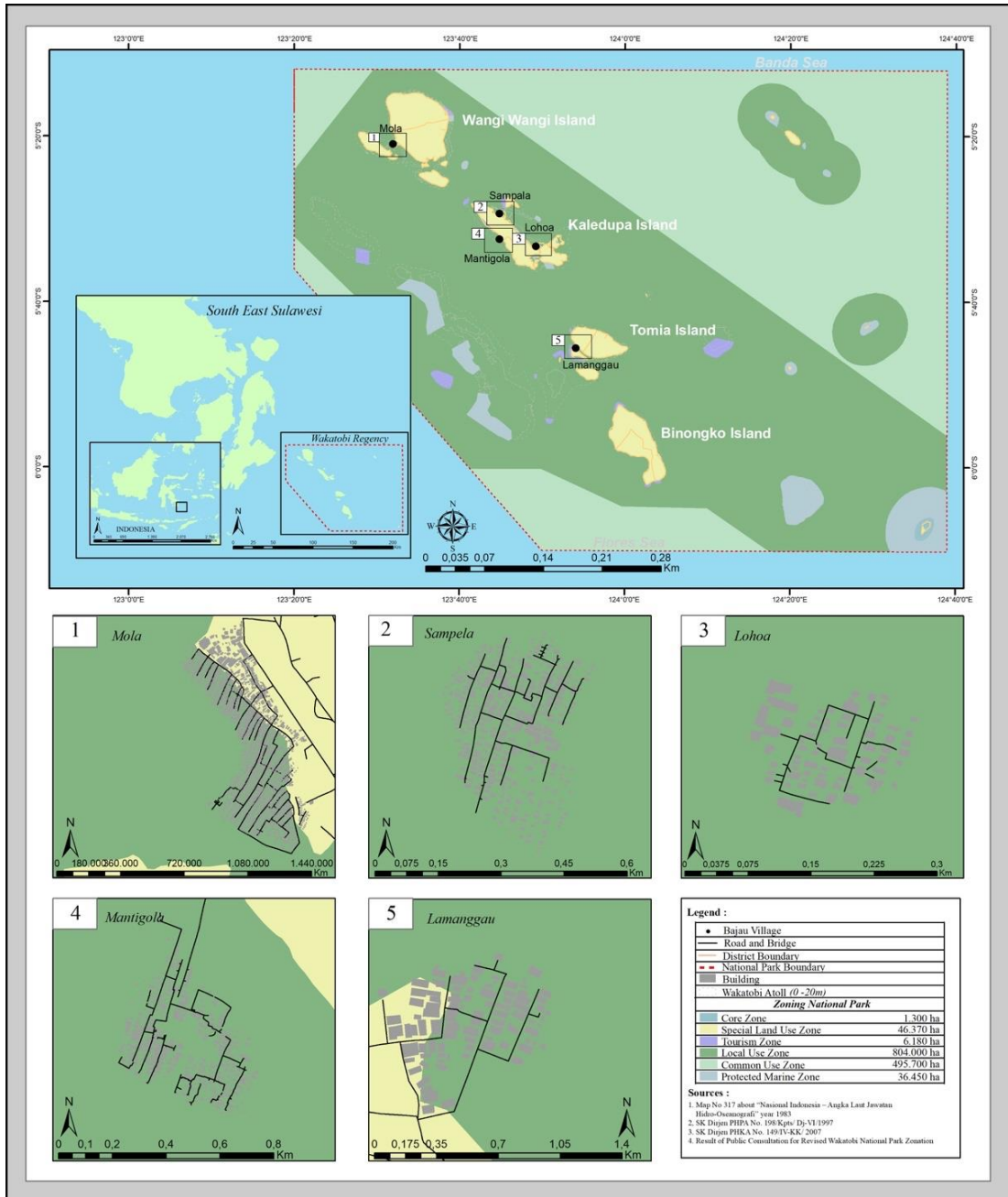


Figure 7. Bajau villages in Wakatobi National Park

3.1.1 Bajau originalities and maritime culture

A voyage across the archipelagos

The origin of the Bajau people is still a subject of current debates. Narratives currently circulating on the internet and mainstream media mention several versions of the originalities of the Bajau people. Nevertheless, the intersection of all these narratives is grouped into two origins: the first is from the Sultanate of Johor (administrative region of Malaysia), and the second is from the Sultanate of Sulu (administrative region of the Philippines). Based on four oral histories, Liebner (1996) concluded that the Bajau migration was caused by a background of conflicts, the romance between the royal family members, and inbreeding in the royal family. The oral history presented about the Bajau people has been mixed with saga and folklore. It is tougher to trace the Bajau historical evidence empirically based on trusted sources. The habits of the Bajau people with high mobility have influenced their hereditary story reasonably.

All written history about the Bajau was found in the Lontara, a Brahmic script traditionally used for the Bugis people. One reference that illustrates the Bajau origin in Indonesia is the *Assalenna Bajo* Lontara, found in the early 2000s in Lasolo, Southeast Sulawesi. This Bugis-language manuscript alluded to the Bajau origin in Sulawesi who came from the Ussu Area in Luwuk, South Sulawesi, and it was written on reigned from 1764 to 1767 (Abidin, 1971).

However, according to Bajau history researcher, some misinformation and history were interrupted prior to this Lontara. Furthermore, several Lontara from the Sultanate of Gowa has also indirectly mentioned the Bajau, namely the *Attoriolong* Lontara, a type of Lontara containing a collection of records regarding the origins (genealogy) of certain kings or noble families. However, there has been no further empirical study to what extent Bajau's historical information is clarified through this Lontara.

The Bajau language is classified as other Austronesian families. According to Sather (2006), the Bajau language family in Indonesia is part of the Barito Raya language family, one of the Malay-Polynesian families. However, in Indonesia, there are two dialects of the Bajau people, one of which is the Bajau dialect in Borneo (Sather, 2006).

The Bajau dialect in Wakatobi is included in the Sulawesi dialect. Their accent is strenuously influenced by the local language surrounding them. For example, in the local context in Wakatobi, the accents of the Bajau in Tomia are different from those in Kaledupa and Wangi-wangi due to the dialect of the people from Tomia, Kaledupa, and Wangi-wangi Island are also dissimilar.

Wakatobi Islands as a home

The Bajau elders in Wakatobi stated that the Bajau communities began to enter the Wakatobi islands around the early 18th century. In 1850, the Bajau village was founded in Mantigola (Stacey, 2007). It is supported by Nuraini (2012) that the migration pattern of Bajau in the Southeast and East coast of Sulawesi and to the Southern Islands of Indonesia ranges from 1820 onwards (See Figure 8). The arrival of the Bajau people in Wakatobi was a long journey and full of challenges. The pioneer group who came to the Wakatobi area came from Bajau on the coast of Buton Island, precisely located from Lagoro, Lasalimu.

This Bajau group in Lagoro was a "*Punggawa* System", which has earned the nickname "*Kapitah Sukana Eo*" (The Sunset *Punggawa*). *Kapitah* or *Kapita* is a term used for an extension of the Sultanate mandate to collect taxes in the form of money (Kasudia), which are paid annually by the Bajau community collectively. This *Kapitah* figure was then identified with "*Kepunggawaan*" in the colonial era because the *Punggawa* was the person who was responsible for paying the cash for their group. Then, each of these large groups has a leader called "*Punggawa*" and a customary banner called "*Ula-ula*." The pattern of Bajau acceptance by the mainland community starts from living in the boathouse (*Soppe*'), leaning on the coast, getting expulsion from indigenous land communities, and bartering (*Nyelo*) until being allowed to live in a stilt house (*Babaroh*) in littoral areas.

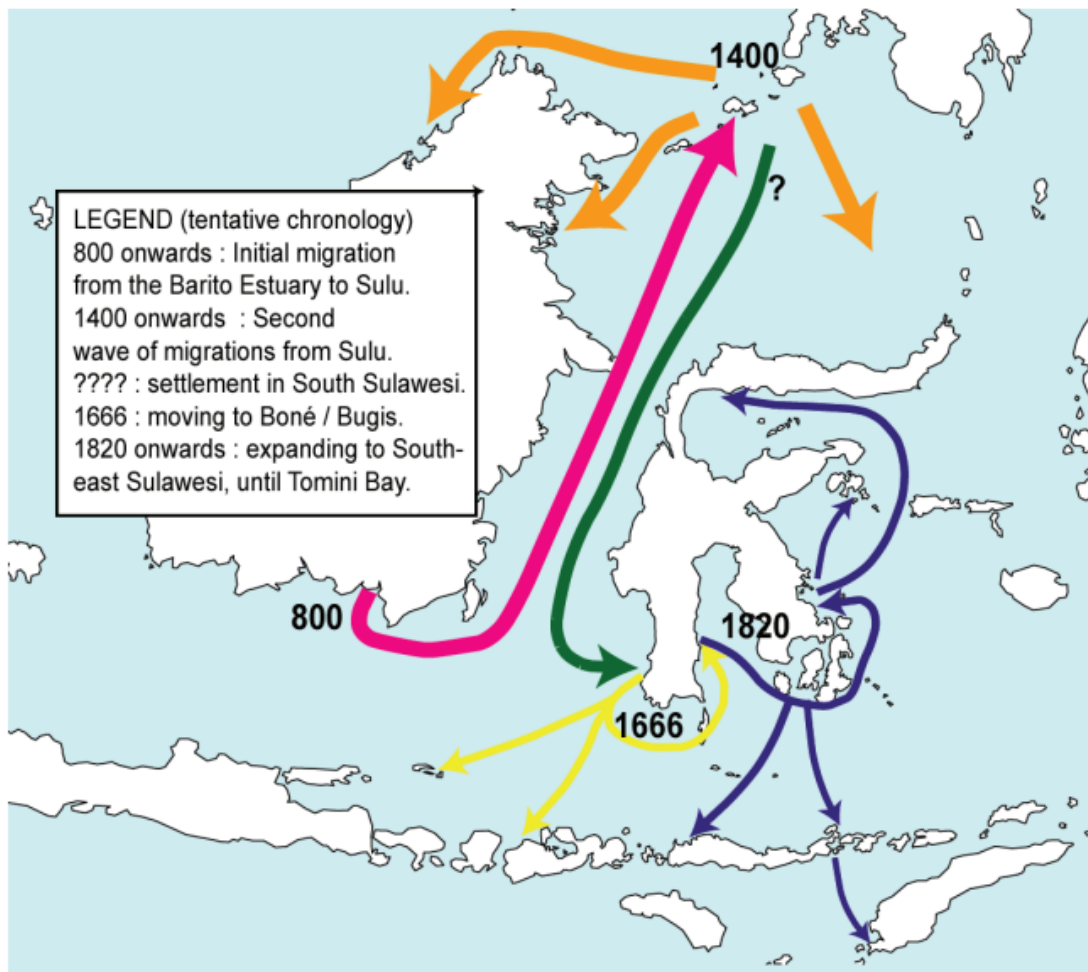


Figure 8. Tentative history of the Bajau migrations
Source: (Nuraini, 2012)

The arrival chronology of the Bajau in the Wakatobi archipelago differs on each island. In Wangi-wangi Island's version, the Bajau with eight *Soppe'* first came to the MHA Liya area, but they were expelled. Next, they went to the Sara Vance area and got a similar expulsion. Then they finally settled in the Sara Mandati area, where they got a conditional residence permit. This condition of permitting the Bajau community is known as "*Lempar Batu*," or 'stone-throwing agreement'. It was an informal oral agreement between the Sara Mandati and the Bajau elders.

There are two versions of the story in this agreement. The first is a stone-throwing from the seashore by the Sara Mandati leader. The falling point of the stone was the area boundary to the land where the Bajau people live (Mola-mola point, now part of North

Mola village). This version of the story states that the edge area of the Bajau is only the point where it is drawn towards the sea. So, Mola-mola was set as the boundary of the Bajau area. However, this area has rapidly developed into reclaimed land from hard reef stone piles since the 1970s.

In the second version, following the Bajau elder narrative from South Mola village, the stone-throwing was made from the houseboat towards the mainland Mandati on Wangi-wangi Island. The point where the stone fell is the permitted area granted to the Mola Bajau. So, they were permitted to access the coastal border area until the current Wangi-wangi central market. Around the early 1970s, this area was still possessed by the Bajau Mola. The young Bajau at that time piled up the spaces with reef stones and sands so that they could use it as a playing ground for kids, soccer, and other recreational activities. During that period, Sara Mandati did not have settlements around that coast because the people were peasant communities.

The dispute over the historical evidence of the ‘stone-throwing agreement’ is still contentious today. These two groups always argue about their territorial boundaries. Sara Mandati has more empirical and historical evidence regarding power because they are the customary communities that lived and owned the area. Hence, the customary institution of Sara Mandati still intervenes in any development in the Mola village. It includes the development program for tourist attractions on a side walking named “*Jembatan Pelangi*” (Rainbow Bridge) in Mola Nelayan Bhakti village. The hidden agenda of this bridge construction was to tackle the expansion of the Bajau Mola community settlement. Sara Mandati's initiative is prejudiced and restrictive of the basic needs of the Mola Bajau, which has a high population growth rate. This conflict continues at times.

Unlike the voyage of the Mola Bajau, the Bajau in Mantigola had already inhabited the Wakatobi area. This group was a large-scale migration under a united Punggawa System of more than 30 *Soppe*'. This group was known as "*Kapitah Matana Eo*" (The Sunrise Punggawa). This Bajau group was thought to have entered Wakatobi earlier before the Bajau migration to Mola from Lagoro. Narratives from the elders in

Mantigola informed that the Bajau movement received permission from the Sultanate of Buton to inhabit the Tukang Besi Islands area (formerly the Wakatobi Archipelago) as written by Stacey (2007). Permission was granted to occupy the Kaledupa Island area on the east coast of Limbonga. This area was chosen because it has a drinking water source for the Bajau people. However, the Punggawa stated that this place was not suitable for settlement because it was not fit in accordance with their TEK for the living environment. Then, this group chose to stay on the other side of Kaledupa Island, closer to Kaledupa atoll. This Bajau group then moved to the west coast of Kaledupa (Mantigola region) after obtaining permission from the local customary institution of Barata Kahedupa (now MHA Barata Kahedupa). They got permits to fish around Kaledupa Island and the atoll area, but they must help Barata Kahedupa as a sea guard. However, the migration from the east coast to the west coast of Kaledupa Island was not adhered to by all of the Bajau communities. There were three *Soppe'* who preferred staying on the west coast of Kaledupa Island, which was the origin of the Sampela Bajau.

Another narrative version states that the Mantigola group initially sailed from South Sulawesi and stopped at Kaledupa's atoll for fishing and gathering other marine resources. Due to good catches over time, the Bajau established a floating village on the west coast of Kaledupa Island. This location was close to the atoll and proximal to the mainland, and easy for the bartering of their catch for other goods. From this narrative, it was described that the purpose of the Bajau voyage was virtuously to earn a living without granting permission from the reigning sultanate at that time. This version of the story was continued by reasoning about the distribution of the Sampela Bajau on the west coast of Kaledupa Island. The Sampela Bajau was also initially from the Mantigola Bajau, who sought a livelihood during the hurricane season in the eastern part of the island of Kaledupa. Some of the Bajau groups (*Three Soppe' boats*) built a stilt house on the east coast of Kaledupa because it was a reason to stretch coral around Hoga Island. These three families became the forerunners of the Bajau people in Sampela.

The history of the Bajau community in Wakatobi is very memorable due to conflict between the MHA Barata Kahedupa community and the Bajau, who was accused of supporting the *Darul Islam / Indonesian Islamic Army (DI/TII)* separatist movement. There are three periods in the migration of the Bajau people in Wakatobi: the early 1800s, the DI/TII onwards, and the New Order era. Furthermore, after the burned village conflict in Mantigola village at the peak of DI/TII, the Bajau migration pattern was directed in four migration routes. After this conflict, several Bajau communities returned to Mantigola. Some migrated to a new place, such as Lohoa. Some decided to join other groups, such as the phenomena in Mola and Sampela. Figure 9 describes the historical flow of the Bajau people in Wakatobi.



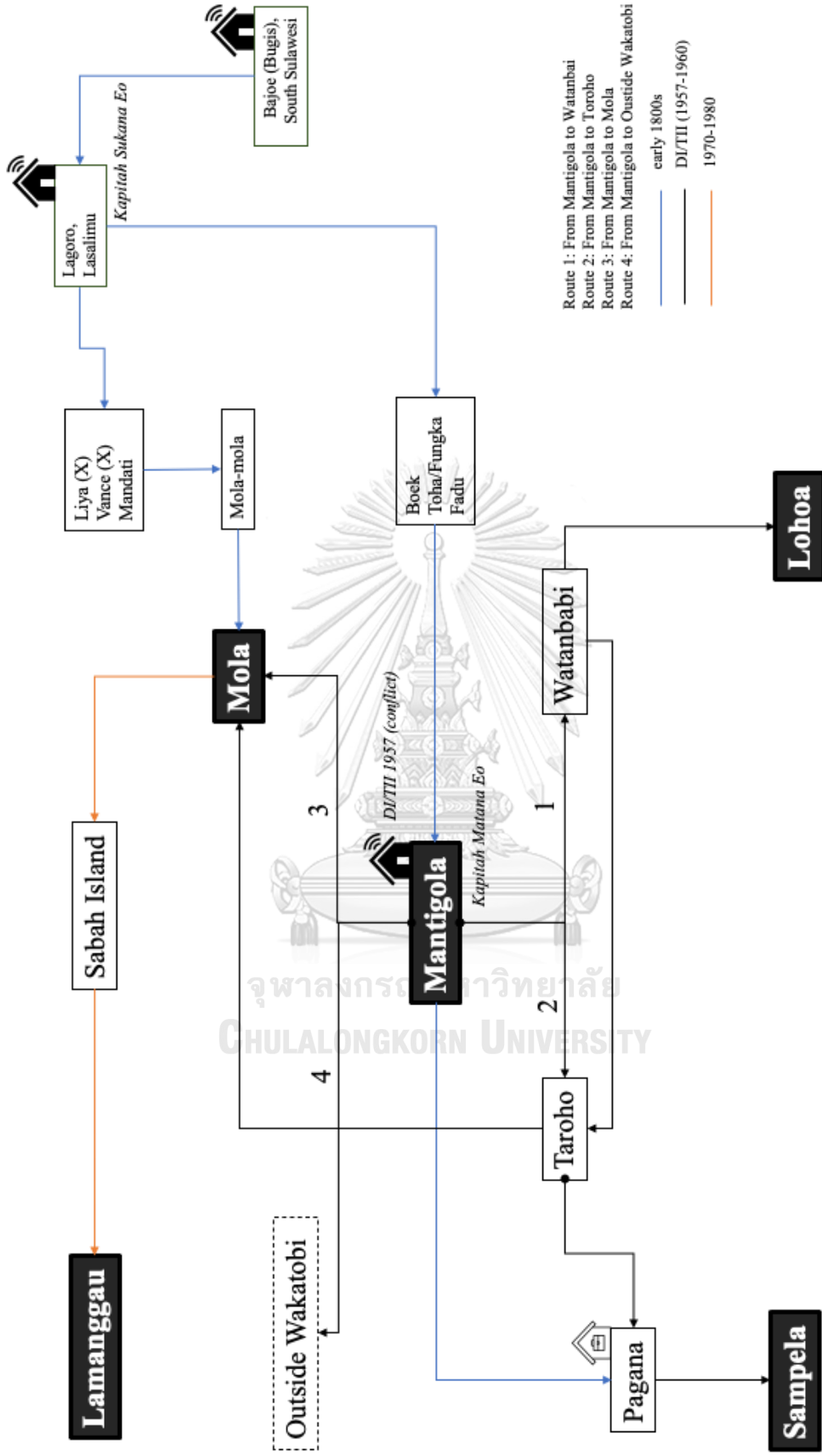


Figure 9. Migration routes of the Bajau in Wakatobi

Bajau Maritime Culture

As an archipelagic country, Indonesia has various customary communities living wisely in coastal and small island areas. Their livelihood depends on natural resources: land and marine, and nurturing and respecting nature. One of the customary maritime groups is the sea people group. This group has been utterly dependent on marine resources for generations because they live on the sea. As their main domain, the sea for the sea people is the same as land for people settled on the land. The marine environment and coastal fringes constitute their living spaces (Chou, 1997). This space does not only mean a place to live and a livelihood but also culture, spirituality, and other social sites. For the Bajau, they symbolize the sea as their economic dependence: '*Kebun Kita Adalah Laut*' or '*our garden is the sea*' (Stacey, 2007). Still, the sea strongly bonds with its identity, far from being just an economic resource. "*Isa' lau itu niak Saloh*" or '*If not today, tomorrow is still there*'; a philosophy states that Bajau depends on marine resources. This Bajau's bond with the sea reflects the presence of maritime culture in the 21st century.

The introductory bond of the Bajau community with the sea begins when they are still in their mother's womb. Bajau people believe that a fetus has a bond with the sea spirit in the form of "*Sumangak*" or "soul." *Sumangak* is tied to every Bajau people in their relationship to nature through the sea. When a fetus is born into the world, the Bajau believe that the placenta (*Tamoni*) accompanying the baby in the uterus is their twin sister or brother (*Kagumbaran*). Babies born belong to their parents (humans), while *Tamoni* is a twin who must be returned to the sea or known as "*Kaka*." The Bajau believed that *Tamoni* would grow like a 'human' but in a different form of sea spirits. Those spirits of *Kaka* might incarnate, becoming an octopus (*Kuttak*) or crocodiles (*Tulik*) under several terms and conditions. Before a Bajau is born, natural signs such as tides, body temperature, moon phase, and sacred animals can give signs of gender and the type of spirit sisters or brothers they have.

Their twin in the sea is the guardian of the Bajau community in all activities related to the sea. If they are getting sick, the shaman (*Panambar* or *Pamaduai*) will summon *Sumangak* from this sea to heal his twin from the sea. The ritual of summoning

Sumangak (Maduai) begins with the summoning of *Sumangak (Maduai sumangak)*, followed by *Maduai Kakak*, *Maduai Kutta*, and *Maduai Tulik*. This ceremony must be in good order based on how sick they are. The equipment, materials, time, and stages of each *Maduai* are also different. The Bajau still carries out all these rituals from pregnancy to adulthood. Ideally, it is done yearly, but most of them will carry out this ritual when they are sick. Nevertheless, the challenge is that the number of *Panambar* or *Pamuduai* decreases because their knowledge is not passed down to the younger generations.

The Bajau believe the sea is an integrated system that directs social functions such as spirit, healing, medicine, kinship, property, and territory. The sea is their primary separator from non-Bajau people. It not only becomes their primary source of capital for livelihood and connection to other places but also has the ecological function of their areas and species to support their cultural expression. However, the fact of those functions has been transforming in current sustainability debates. The shift toward marine capitalization, reification, and property regimes has penetrated the Bajau attitude. The protracted process experienced in intercultural relations, knowledge exchange in the context of TEK, institutional complexities, and land-oriented development programs accelerate metamorphoses in the function of the sea for the Bajau.

A deep understanding of sea spirits, living and unliving things, as an ideology reflects how the Bajau people are resilient to the social construction of the sea today. Their values and norms have shifted from being adequately ‘untransmitted’ to younger. As a result, the sea function shift does not always amplify their cultural survival and rudimentary subsistence foraging. The main challenge in shifting this understanding is the young's interest in land culture. Also, their exposure to the modern lifestyle they absorb from television, social media, and other influential platforms.

The young Bajau are the generation exposed to the formal education system in Indonesia. It may be considered a good start for them to develop their skills and knowledge of modern life. However, it stimulates the erosion of the customary system.

Indonesia's school institution requires a local-based curriculum regarding reintroductions of culture and history.

Nevertheless, the local culture studied usually comes from the dominant community group. As rich in local cultures and ethnicities, Indonesia becomes even more complex when discussing this local-based curriculum, especially in the context of customary groups for indigenous school initiatives. For example, in Wakatobi, most of their population identifies themselves as *Butonese* people and has curriculum lessons on the history and culture of the *Buton* Islamic Kingdom in formal schools. Undoubtedly, minority Bajau people understand Buton's history, governance, and culture better than the Bajau culture itself. The educational system of sea nomads should impart 'modern' skills and knowledge and instill a sense of cultural identity and prides (Arunotai et al., 2007). The education for the Bajau should be targeted to enrich their quality of life while simultaneously fulfilling their expectations and cultural transformations.

Besides, without the schools as an institution, the Bajau people would learn solely from the exchange of knowledge of their previous generation. The exposure to modern education has transformed the Bajau identity reconstruction from kinship in a particular village to cross-country online identity. Internet literacy has become a platform for them to exchange issues with fellow Bajau (*Danakang*) from various regions and countries. Also, the issues of sedentarization increase the degree of direct contact between the Bajau people and land culture causing them to have new troubles besides their hardships at sea (for example, a combination of political and environmental factors) (Clifton, 2014).

Reflection on TEK embodiment, maritime culture is influenced by institutionalism, environmental pressures, and knowledge exchange. If the Bajau group has ancestors who are experts in a fishing method (TEK ethnos-fisheries), then their subsequent generations will possibly convey those skills, as shown in the case of the Lamanggau Bajau. Their ancestors who migrated from Mola Bajau were skillful in *Ambai* gears (net-fishing) technique, and then they inherited these passing skills. Another condition is the managed resource areas, as seen in the Mantigola Bajau. Their close access to the

Kaledupa atoll makes their livelihood depends on the resources in the atoll. Their sacrality also influences it as the oldest Bajau village with customary solid practices and institutions. Further evidence in knowledge exchange, the Mola Bajau, which has the highest exposure to modified fishing gear and modern technology, interprets the remaining maritime culture as merging ethnos-fisheries with adopting appropriate technology. An example is a shift in boats made from wood to fiber boats with turbo engines to make activities at sea more efficient.



Figure 10. Bodi boat TS from wood (green) and fiber (white-green) (13 May 2021)

Accordingly, the maritime culture of the Bajau is a reciprocal relationship between activities in the sea and land resources, including social, cultural, and economic interaction and inter-institutional relations. The justification for this maritime culture will tend to vary in implementation for the Bajau community depending on the exposure to other temporary cultures. Their root in maritime culture is TEK in all its complexities. For example, for the Mantigola Bajau, their primary source of income is the atoll area (*Sapak*). The Mantigola Bajau represent their maritime culture, namely seasonal migration to the atoll (shallow water). In contrast to the Mantigola Bajau, the Kamanga Bajau represent their maritime culture as pelagic fishing activities, following cetaceans and seabirds on the vast seas hundreds of nautical miles from their village in the rainy season. Meanwhile, the Lamanggau Bajau will change their likelihood of

becoming grouper fishing in the calm season. This pattern is only discovered in the Lamanggau Bajau community.

Debatably, the concept of maritime culture that remains no longer characterizes the Bajau narrative of origins as a marine guard society. This transformation of maritime culture is shifting along with sea interpretation and ownership changes. This shift is a result of a series of modern discourses. In a global context, Mentz (2009) stated that this maritime culture shift was identified as a result of globalization, postcolonialism, environmentalism, ecocriticism, and the history of science and technology.

The Bajau as custodian of the sea

Historically, the complexity of Bajau's positionality as a migrant group in Wakatobi will not be as complicated as what is seen with the MHA regime and the current conflict of interest. Oral history evidence from Wakatobi islanders and the Bajau still leaves the recognition of the Bajau as part of the history of the land community's customary system. The mutual symbiosis and the Bajau community settled permit agreement given by land people proves the existence of Bajau in the past has an immense role. It can be seen from various information from elders (from customary communities and the Bajau) in Wakatobi, who stated that the Bajau people were given the right to protect the sea and to bear their livelihood in Wakatobi areas.

Evidently, the incident of the 'stone throwing agreement' between the Bajau Mola and Sara Mandati communities shows an agreement to recognize the Bajau community by giving them the task of protecting the sea and the right to access land. Another piece of evidence is information from Bajau Mantigola, who gave taxes (*Kasudia*) to the Sultanate of Buton through Punggawa. This story about *Kasudia* is also found in the Bajau in Tomini Bay (Obie et al., 2015) and the Bajau in Torosiaje (Zacot et al., 2008), which gradually gave *Kasudia* to Bone Sultanate (Bugis).

This historical information and evidence can be a mechanism to strengthen the positionality of the Wakatobi Bajau that they are not aliens but have received the given rights from the Sultanate of Buton and the small kingdoms that exist in Wakatobi today.

This information has not been passed down from generation to generation, thus making the ethnocentric gap between land people even bigger.

3.1.2 Colonialism and Independence Day of Indonesia (the 1900s to 1945)

The turmoil of colonialism and imperialism in the world impacts the cultural transformation of nomadism. In pastoral nomad groups, the impacts are the loss of cultural economy, livelihood changes, forced sedentarism, and other human rights issues (Bikku, 2022; Singh, 2009). Not much different from pastoral nomad groups, sea nomads also experienced the exact catastrophe in the colonialism regimes. For the Bajau, the occupancies of colonials in an area influenced the mobility of Bajau communities due to a force for sedentarization which impacted the monetized economy and the decline in physical and mental health (Clifton, 2014; Samson & Pretty, 2006).

In some Bajau communities, this colonial intimidation made them migrate to find a new place with more minor threats (Sather, 1997; Sopher, 1965). However, some of them had to omit the colonials' uniformity initiative, which affected their livelihoods diversification and the diminished story of nomadism. Today, the compliant Bajau group to colonials has evolved into local communities leaving their former sea-living, marine spirit laxity, and maritime economy such as Sama-Bajau in Westcoast Sabah (Saat, 2003). Besides, this colonialism regime pushed the descension of the Bajau culture and identity consolidation in the form of transversed social mobility and cohesive settlement (Ismail et al., 2015).

In the Indonesian context, colonialism exacerbated the dispersal of the Bajau people. The collapse of several Sultanates in the Southeast Asian Region due to colonialism forces added to this Bajau migration. Until the outbreak of World War II, colonialism still threatened the voyaging and fishing of the Bajau. Stacey (1999) stated that colonials jailed some Bajau in Wakatobi due to their mobility in selling their catches in several areas in Sulawesi. However, this was not much-written history discussing the impact of colonialism on the Bajau people empirically.

Crawford (1969) found that Bajau and another Indonesian voyaging to the Timor Sea were interrupted during World War II due to the Japanese invasion of Indonesia in 1942. The Bajau recalled this period as "*Saat Nippon*" (Japanese times), a period of adversity, anguish, and powerlessness over their dynamism and economic activities (Stacey, 1999). Today, this history was untraceable because the generation that had this experience has passed away. The current Bajau generation in Wakatobi remembers the DI/TII period better than Nippon or prolonged colonialism.

Throughout examining the migration pattern in Figure 8, Nuraini (2012) illustrated that the duration of the European colonialism era around the 15th century was a massive movement of the Bajau people in this region. The present ubiquitous diffusion of the Bajau is an impact of forced mobility. Today, this continuously shifts into unpredictable patterns or periodical migrations even after the Bajau sedentary.

The Bajau's rudimentary role in the fray for independence in Indonesia has also not been historically documented. Since the end of World War II and Indonesia's Independence in 1945, the Bajau were still in peril. The Bajau still had to endure difficult times because the DI/TII wave infiltrated the small islands. The Bajau people, especially those around the southern coast of the island of Sulawesi, experienced detrimental from the DI/TII movement, especially in terms of identity and intercultural relations. As reflected in the Bajau in Wakatobi, they conflicted with Kaledupa islanders.

The story was not over. After the DI/TII regime, the new order of Indonesia through military task forces has also set aside the maritime way of living of the Bajau people in Wakatobi. Added by several drivers from institutional complexity, malleability, and acculturation, their identity as seafaring people was increasingly extinguished. The Bajau community is a case of non-directed social change and acculturated to a non-Western society (Nimmo, 1969). Nonetheless, the Bajau case is the typology of social change in examining maritime cultures.

3.1.3 Darul Islam / Tentara Islam Indonesia DI/TII (1951-1965)

The dispersal of the Bajau community from their original home in Mantigola was due to the burning and looting of the Bajau village by the local people from Kaledupa island. It was because Mantigola Bajau was accused of helping the rebellious movement of *Darul Islam / Tentara Islam Indonesia* (DI/TII) or translated into the Islamic Armed Force of Indonesia that had a mission of spreading the religious mission to make an Islamic state in Indonesia.

DI/TII was an Islamist group that fought to establish an Islamic state in Indonesia. It was established in 1942 by a group of Muslim militias coordinated by a charismatic radical Muslim politician. In the South Sulawesi chapter, the DI/TII was led by army deserter Abdul Kahar Muzakkar (Harvey, 1974). This movement existed from 1951 to 1965 and targeted the rural and small island areas such as local communities in Wakatobi, Southeast Sulawesi. The DI/TII came from the Makassar Bugis community to occupy the Mantigola Bajau village around 1953. The Bajau elders in Mantigola mentioned that the DI/TII communities robbed ships while crossing Wakatobi waters and killed islanders who were considered to oppose their movement. The DI/TII targeted the Bajau people and other remote villages in the Wakatobi Islands (Nolde, 2009).

The Bajau themselves admitted that they were not involved systemically in the DI/TII. At that time, the Bajau in Wakatobi assisted the DI/TII sailors who landed in their villages for a mission of trading and teaching sharia Islam. The displacement peak was estimated in September 1957, and then the Bajau moved to find new settlements or join other groups who had already settled in the area, such as in Mola and Sampela. This conflict occurred between the Kaledupa people and the Bajau communities. The Bajau did not fight back because they realized their position as migrant sea people. Some of these dispersed groups returned to Mantigola after conditions became conducive around the 1960s. Some groups decided to migrate to the Bajau village outside the Wakatobi Islands. This historical episode is not written anywhere but hidden in the faint memory of the Bajau and land communities in Wakatobi. Mutual suspicion and negative labels are still found in the social relations of these two groups. Their social

and cultural relations seem utmost manipulative and limited only to economic-oriented activities.

3.1.4 New Order of Indonesia (1966-1998)

The New Order of Indonesia is also the momentous period in the Bajau cultural transformation in Indonesia. The settlement approach carried out during colonialism was continued by the new order regime of Indonesia. The sedentary initiative of these nomadic groups was fortified by the program "*Komunitas Adat Terpencil*" or KAT (Remote Indigenous Peoples) empowerment under the Suharto regime in the 1990s (Murray Li, 2000). The Bajau were one of the customary groups who were granted settlement aid from the government in several areas, such as in Mantigola village.

The centralization through the Pancasila ideology (five ideologies of Indonesia) in this regime assailed all IPLCs because they were supposed to be contrary to the development concept of President Soeharto's era. The development plan during that time was so decisive, forcing the IPLCs to relinquish their ancestral domains for the needs of the government and its power distribution regime. Meanwhile, in the context of sea nomads, the regime of the marine protected area and other zoning settings controlled by the state has displaced their fishing ground, nomadic territory, sacred marine areas, and TEK. The centralized management concept in this determination still lacks the human dimension in the environmental protection program. For instance, it can be seen in the establishment of the WNP in 1996 and several other marine national parks.

For the Bajau community in Wakatobi, the New Order regime was characterized by the state's control of small islands through initiatives in placing retired militaries as sub-district leaders. It was accompanied by the incessant program of community-development facilitators from militaries in Bajau villages. These military people forbade the Bajau from practicing traditional healing ceremonies, so they had to accomplish it discreetly. The development action from militaries in objectifying the Bajau community resulted in disrepute, repressive, and other negative remembrances.

Hence, the first experience traumatized the Bajau older generation with uniformed people.

In the past, the Bajau had a robust customary system and was retainable. The *Punggawa* Bajau, as the leader of the group, served as the customary leader who regulated the internal affairs of Bajau cultural systems. This system was gradually degraded by efforts to homogenize the state administration system during the New Order era in Indonesia. Military task forces' overtaking villages and sub-district systems caused customary practices and systems to evaporate.

During this era, religiosity weakened the Bajau customary system in Wakatobi. The terms *Islam Bagai* and *Islam Sama* (Islam including non-Bajau beliefs and only Bajau beliefs) were hotly debated (Baskara et al., 2014). By the 1980s, customary practices and beliefs, Contrary to religious law, had to be carried out clandestinely. The military on duty in this Bajau village were adherents of Islam (*Islam Bagai*). Their Islamic religious views forbade all customary practices because the Bajau communities were stated as shirking and contravening Islamic rules.

Meanwhile, the competition for capital in the New Order was desultory. The monetary crisis in 1998 impacted the increasing prices of goods in the region. The economic distress during that time demanded Bajau to commoditize TEK in various ways. In this regime, the Bajau community's modification of unsustainable fishing gear, overexploitation, and other destructive practices began to emerge.

The local migration of some Bajau from Mola to Tomia Islands happened in this period, approximately from 1970 to 1980. This migration started when a descendant of the Mola Bajau and Binongko people named Mbok La Bebe seasonal migrated to the Tomia atoll area. Mbok La Bebe's group built temporary houses on Sabah Island (Sawah Island) because they could access water sources there. Also, the geographical typology of Sawah Island is at the midpoint of Tomia Atoll and Kaledupa Atoll. Mbok La Bebe stayed on this island for the calm season (*Pamamiaan*) from August to December. Tolandono Island, a neighbor of Sawah Island, inhabited by MHA Kawati

Tomia, is their targeted market for their catches. Shortly, the Mbok La Bebe group was allowed by the people of the island of Tolandono to settle on its seashore. They have been known as the Lamanggau Bajau since then. The origin islander of the Lamanggau persisted in acculturation by interbreeding and knowledge exchanging, especially the *Lamba* or *Ambai* gear.

The Bajau have been using "*Ambai*" gear (*Ngambai*) since at least the 1920s, practiced in Wakatobi, Papela, and even in MoU Box areas (Stacey, 1999). Currently, Bajau's traditional practice of *Ambai* gear is less than ten. Most of them are in Mola and Mantigola villages. Other *Ambai* gear practices are modified forms, such as "*Ambai Timbalowah*" or "*Ambai needlefish*," practiced by many Mantigola Bajau. The shape and mechanism are far different from the *Ambai* gear in the past. In the past, *Ngambai* still used *Bagug* nets (*Ringgi Bagug*) from tree bark (*Bagug* Tree) and carried fish using rowing boats (*Lepa Kaloko*), but now the Bajau uses machines. In the former, *Ambai*'s ballast used tiger cowrie shells (*Bolle*) and now uses tins. The shape of the scoop net (*Bundre*) and drawstring net (*Bandong*) has also been modified based on nylon net sizes.

3.1.5 New face of Bajau

Nowadays, the Bajau in Wakatobi lives in five villages: Bajau Mola, Sampela, Mantigola, Lohoa, and Lamanggau. These five villages have different exposures to land communities, different levels of technology adoption, and different levels of integration into mainstream development. Where a Bajau settlement is established – whether temporary or for the long term – is not a random choice, it can indicate their deep collective knowledge and keen observation of their immediate region. The area where Bajau people live must be close to the trading center or a formal market due to their need to sell fishery products and buy necessities. Ecologically, the area where they live must have access to fresh water, located near stretches of coral reefs, mangrove forests, and seagrass beds, and be close to the sea continent slope, lagoon, and intertidal zone. Also, the Bajau's living criteria require a sea basin area for their boats to anchor.

The Bajau's settlements are usually nearby trading centers, meaning social and cultural relationships and interactions exist between the Bajau and land-based communities. The Bajau considered that the Wakatobi islanders were from peasant-based cultures. When the Bajau traveled and migrated to the coastal shore, the center of civilization of the islanders gradually moved from inland to the coastal area approaching the Bajau villages. This transactional economic relationship is fundamental for how the concept of intercultural exchange and customary maritime systems was formed in Wakatobi.

The Bajau people in Wakatobi are often treated as second-class because they are a sea foraging group. Such an association of sea-based communities with underdevelopment can express ethnocentrism on the part of land-based communities (Sather, 2006). The Bajau community is a minority group in Wakatobi Regency, but they are a key stakeholder in marine resources, trading, and influential voters for the election. In Wakatobi Regency, the Bajau often receive political threats from non-Bajau people regarding expulsion, prohibition of fishing, and expansion of settlement or access to land areas. Meanwhile, the Bajau are becoming candidates for political representatives.



Figure 11. The Sampela Bajau in the regent election (9 December 2020)



Figure 12. The Mantigola Bajau in the village leader campaign (15 May 2021)

Despite their nomadic and semi-nomadic life, the Bajau depend on land resources such as food, fuel, and building materials, so they need to be associated with land society.

Furthermore, discrimination and marginalization in terms of development policies are also felt by the Bajau in Wakatobi Regency. Restrictions on marine zonation by the WNP and management of access areas by existing customary communities. This condition has made the living space of Bajau in Wakatobi even more narrowed and stigmatized. Philosophically, according to the Bajau, the sea space is an area designated for marine-based people like them. The sea is not only a home but also a life for the Bajau. The sea is the spiritual place and center of culture, society, and education for Bajau communities over generations.

Memories of conflicts leave different cultural and social relations in every Bajau village in Wakatobi. For example, in Bajau Mola, the customary neighborhood community, Sara Mandati, pushes for their existence and social dynamics to be more complex. The Bajau people are facing cultural degradation because they are seen as a second-class group under the rule of the Sara Mandati customary institution. Problems they face due to this status include assignment to housing locations in coastal border areas and graveyards, as well as marginalization during elections of regional heads. Threats and discrimination are still observable in the social relations between these two customary groups.

On the one hand, economic relations and mutualism symbioses are more substantial due to consumption and production growth and the change in socio-economic patterns in the Bajau community. Mola plays an important role in fisheries trading in the Wakatobi regency because it is the main fishing center. Also, on the islands of Kaledupa and Tomia, Bajau villages play similarly necessary roles. Another example of intercultural relations emerges from the Bajau community in Lamanggau, on the island of Tolandono, Tomia. This group has adopted several local customary systems, from daily language use, cultural ceremonies, and intermarriage between the Bajau and the Tomia people. The asset-oriented land mindset has also observably influenced the Bajau Lamanggau people.

On Kaledupa Island, there are three Bajau communities. Every location has different relationships with islanders. The Bajau in Sampela is oriented toward economic and

transactional relationships and is involved in tourism and research activities. In Mantigola, the relationship between assets and customs has been harmonized with islanders. As the oldest Bajau village, this group has greater access to the mainland and is less influenced by the politics of islanders. They are now much more highly regarded, gradually filling essential positions in land-based village administrations. Mantigola thoroughly nourishes the customary system and practice of Bajau life, which still depends on marine livelihood and nomadic patterns. Most of the Mantigola Bajau's livelihoods are tied to the Wakatobi atoll, which they extensively fish during the calm season. Finally, the Bajau Lohoa, the most conventional Bajau group, entirely depends on self-determination from the village head from the mainland Kaledupa. The intercultural relationship in Bajau Lohoa has led to adopting a mixed customary system.

Furthermore, the patronage system in the Bajaus is currently motivated by family relationships (*Daparanakan*). *Daparanakan* is considered the 'glue' between local capitalist actors in Bajau Wakatobi. For the coordinator (patron), *Daparanakan* is a social security institution, securing its position as a small-dominated capitalist. However, this system stifles Bajau SFF without capital (clients) because the price set is lower than the market price. If these Bajau SFFs do not trade with the *Daparanakan* patron, the choice is to deteriorate their family relations. The concept of *Daparanakan* has also developed into an understanding of how the Bajau people should be able to live independently and apart from the family's economic system. This independent nature must be possessed in the maturity values of the Bajau. Regarding an example of this independent culture: the Bajau elders will choose to live alone and continue to work in their old age because they do not want to aggravate their children or grandchildren.



Figure 13. Bajau elders living separated from their children in Sampela (30 September 2021)

A mature Bajau is untied from the nuclear family but more engaged with *Daparanakan*. These mature Bajau must represent their parents in the *Daparanakan* system without reservation. The more heredity, the bigger the *Daparanakan*, which leads to the greater the patronage system. The young generation who realizes their suffering economic system will be confronted with in their Bajau *Daparanakan* system. Another example is when there is a government aid program for fishing gear or boat engines. This *Daparanakan* system will be an opportunist to take the rights of other family members if it is beneficial to their business. Likewise, the catch obtained must be sold to the family even at a lower price.

Currently, a livelihood shift is taking place in the Bajau communities in Wakatobi Regency. This livelihood shift demonstrates that the sea resources are no longer the only source of income for the Bajau people. Their preferences will be more alternated and shifted towards the land-based culture. Their livelihood diversification reveals in Table 6.

Table 6. The livelihood of the Bajau in Wakatobi

Livelihood	Products and Services
Capture Fisheries	<ul style="list-style-type: none"> • General reef fishes • Octopus • Tuna and other pelagic fish • Groupers • Napoleon fish • Sea cucumber • Lobster • Mantis Shrimp • Crabs • Sea turtle carapace • Kima • Shark fins • Sea clams
Aquaculture	<ul style="list-style-type: none"> • Seaweed • Simba fish or giant trevally
Tourism	<ul style="list-style-type: none"> • Guide (Divemaster) • Tour operator • Homestay • Arts and crafts
Agriculture	<ul style="list-style-type: none"> • Cultivator (Cassava, Coconut, <i>Kelor</i>, and Vegetables) • Farm workers
Trading and Business	<ul style="list-style-type: none"> • Buyers • <i>Palele</i> or Middlemen • Shop and Store
Other services	<ul style="list-style-type: none"> • Employee (Government, Private, and NGO) • Sand and coral miner • Entertainers • <i>Ojek</i> or Motorcycle taxi • Craftsman/Laborer • “Refugee” organizer • Purse sein fishing vessel • Passenger boat (owner or worker)

3.2 Demography

The WNP stated that 80 percent of their resource users in Wakatobi waters are the Bajau. The Bajau communities in Wakatobi have spread over ten administrative villages and 25 hamlets (see Table 7). They make up approximately 23 percent of the total population, and 98 percent depend on marine and coastal resources for their livelihoods (Wakatobi National Park, 2020).

Rapid economic growth and marine as a common pool are two causalities faced by almost all sea nomads. The government has a role in limiting marine tenure for coastal communities but is not present in the sea communities such as the Bajau. Their lives are utterly dependent on marine, coastal, and land resources. Their premature economic

system insufficiently has turned into an asset-oriented setting. The Bajau villages in Wakatobi are now connected to the global market system. The issue of culture, kinship, and indigeneity has evolved into a transactional issue.

Table 7. The Population of Bajau communities in Wakatobi

Bajau Group	Administrative Village	Hamlet	Population	Household	Population Total	Household Total
Sampela	Samabahari	Sampela	440	74	1999	404
		Wanda	463	119		
		Dikatutuang	561	93		
		Pagana	535	118		
Lohoa	Tanomeha	Lohoa	235	70	235	70
Mantigola	Mantigola Makmur	Sejati	365	116	1520	433
		Makmur	404	119		
	Horuo	Mantigola 1	538	133		
		Mantigola 2	213	65		
Lamanggau	Lamanggau	Lasoilo	330	72	330	72
Mola	Mola Bahari	Sambuah	418	151	7855	2235
		Bintanak	347	107		
		Bunging	514	124		
	North Mola	Teratai I	450	147		
		Teratai II	246	76		
		Segar	315	96		
	Mola Samaturu	Segar 1	366	109		
		Segar 2	333	103		
		Segar 3	428	104		
	South Mola	Nelayan	390	106		
		Bahari	706	249		
		Mekar 1	348	99		
		Mekar 2	547	135		
	Mola Nelayan Bhakti	Minabahari	1223	305		
Sejampangi		1224	324			
Total					11939	3214

Last updated data October 2021, collected by the researcher from each administrative village offices

3.3 Geographical Settings: Wakatobi Islands

Wakatobi Regency is a group of islands located in Southeast Sulawesi, Indonesia. The capital city's name is Wangi-Wangi. Officially, this regency was established by Law No. 29/2003. Prior to that, the name of the archipelago was *Tukang Besi*, and it was a part of the Buton Regency. During the Buton Sultanate this area was called *Liwoto Pataanguna* (Four Islands) or *Liwoto Pasi* (Coral Island). The name “Wakatobi” is an acronym that comes from the first two letters of the four largest islands name in the

Tukang Besi archipelago: Wangi-wangi (WA), Kaledupa (KA), Tomia (TO), and Binangko (BI). Wakatobi Regency's population is 95,737 inhabitants spreading over four big islands and 43 small islands (Statistics Indonesia, 2019). There are eight sub-regencies (districts) in Wakatobi Regency: Wangi-wangi, South Wangi-wangi, Kaledupa, South Kaledupa, Tomia, East Tomia, Binongko, and Togo Binongko.

Wakatobi Regency, the habitat of the MHA groups, local communities, and sea nomads, is proposed as the study area because of the suitable area based on the study's objectives. The Wakatobi Regency was nominated as a marine national park located in Coral Triangle Initiatives (CTI), becoming home to the highest marine biodiversity in Indonesia (Weeks et al., 2014; White et al., 2014). In terms of sustainable coastal management for customary communities, Wakatobi has unique cultural assets. Wakatobi represents a beautiful archipelago in Indonesia with rich maritime culture and underwater tourism potential. The ethnically diverse human population has made the area a learning laboratory in fisheries, conservation, and maritime cultures.

According to Statistics Indonesia (2019), this regency lies south of the Equator, stretching from 5°12' to 6°25' S and 123°20' to 124°39' E. The land area of the Regency extends approximately 823 square kilometers. The water area is estimated at around 17,554 square kilometers. Wakatobi has been acknowledged as a national park area or Wakatobi National Park (WNP) under the Ministry of Environment and Forestry of the Republic of Indonesia since 2002 by the Minister of Forestry Decision No. SK.7651/Kpts-II/2002. In 2012, Wakatobi was nominated as a UNESCO biosphere reserve. Since then, the proliferation of local, national, and international NGOs in Wakatobi has been extensive, with numerous marine-based development programs setting upshot each year. The Wakatobi government has declared its development priority is community-based tourism (CBT) and sustainable tourism (ST), which is evident from the increasing number of tourism actors such as culinary and hospitality businesses, tour operators, and other such actors. Tourism and hotels are the main sectors that generate the highest income for Wakatobi.

WNP, with a total area of 1.39 million hectares, consists of abundant marine biodiversity hotspots known as *Wallacea* and coral reefs, which condition and scale occupy one of the highest priorities of marine conservation in Indonesia (Clifton & Unsworth, 2010; Rathgeber & Kirana, 2018; Statistics Indonesia, 2019). With a community of around 100,000 residents, the WNP is Indonesia's third largest and most populated marine national park, with 5,000 hectares of coral reefs, a large offshore atoll, seagrass meadows, and mangrove forests (Clifton & Unsworth, 2010). Local fishing activity is prohibited in three WNP areas: the core, protected marine, and tourism zones. These three zones include most of the desirable fishing territory for people living in the village of Bajau communities in Mola (Elliott et al., 2001). All fishing activity is prohibited within the core, protected marine, and tourism zones, which collectively cover 3.4 percent of the total marine area of the WNP (Elliott et al., 2001; Rathgeber & Kirana, 2018).

There are shared working areas and interests in the field among the two ministries, and they might have overlapping responsibilities on some points. Helanda and Clifton (2015) investigated the fishermen from outside the park who come to the WNP to fish versus the fishermen from within the park and among different local groups creating a conflict in accessing natural resources around the marine ecosystem. In addition, the biosphere heritage in Wakatobi land has been a genuine artwork by the traditional society of Wakatobi, which has been based on Islamic values rather than ancient local beliefs (Udu, 2017). Nowadays, the WNP has become a priority tourism attraction in Indonesia in 2019, and it will be intended as the 'new Bali' in 2021 (Ramadhana & Kusumaha, 2022; Rathgeber & Kirana, 2018).

3.3.1 Climate

Like other regions in Indonesia, Wakatobi Regency experiences two seasons: the rainy and dry seasons. The following is Wakatobi's monthly climatic data from 2010 to 2020. This data highlighted the average temperature in Wakatobi as 22 degrees Celsius in the wet season (December to March) and 34.1 degrees Celsius during the dry season (August to November). The monsoon influences the rain pattern in Wakatobi. The west monsoon affects the wet season in Wakatobi, which occurs from November to March.

Meanwhile, the east monsoon winds from the southeast of Wakatobi occur from May to September and cause the dry season. The Bajau know this eastern monsoon as "*Pamamiaan*," especially at the peak of the dry season in August until the arrival of the new monsoon in November. Natural disasters that often occur in Wakatobi Regency are storm surges. However, it is sometimes impacted by tropical cyclones from the southern part of the Indian Ocean, which predominantly occur in the western monsoon.

Table 8. Climate data of Wakatobi regency

Month	T (C)			RH (%)			Wind Speed (m/s)			Atmospheric Pressure (mb)			Number of Precipitation (mm)	Number of Rainy Days (day)	Duration of Sunshine (%)
	Min	Ave	Max	Min	Ave	Max	Min	Ave	Max	Min	Ave	Max			
January	23.50	27.83	34.6	56	84.59	98	calm	1.72	5.14	1000.9	1005	1009.9	324.4	20	58.43
February	23.20	27.2	34.4	62	87.24	100	calm	1.38	5.14	1000.9	1005.99	1009.7	289.9	21	49.17
March	22.40	27.15	34.2	40	87.02	98	calm	1.31	5.14	1002	1005.79	1009.8	282.7	19	59.17
April	23.40	27.07	33.8	60	86.78	98	calm	1.43	6.17	1003	1006.1	1009.1	183	22	60.42
May	23.20	27.11	34	52	86.44	99	calm	1.41	6.17	1001	1005.94	1010.7	194.8	18	58.19
June	21.20	26.23	33.4	51	85.12	98	calm	1.39	7.2	1003	1006.55	1010	221.1	19	59.05
July	21.00	25.93	32.8	49	81.13	98	calm	1.8	8.75	1002.8	1006.1	1008.9	80.1	13	59.44
August	20.40	26.58	34.2	35	74.82	97	calm	1.83	7.2	1002.7	1006.79	1010.8	1.9	3	91.29
September	21.00	26.88	34.8	43	77.92	98	calm	1.74	6.69	1002.1	1006.16	1010.1	96.8	8	81.77
October	22.40	27.57	35.3	36	78.01	97	calm	1.65	7.2	1000.8	1005	1009	40.3	5	85.6
November	22.90	28	36.2	38	80.58	98	calm	1.69	7.72	1000.8	1004.86	1012.6	100.9	12	69.29
December	22.60	27.72	34	57	84.42	98	calm	1.8	6.69	1000.4	1003.64	1016.5	266.9	24	48.23

Adopted from BPS Data the year 2010 to 2020.

3.3.2 Island characteristic

The characteristic of the islands in Wakatobi as presented in Table 9 below.

Table 9. The island characteristic in Wakatobi

Island Name	Description
Wangi-wangi	<ul style="list-style-type: none"> The southern part has a flat to steep topography with a water depth range from 5 to 1,884 meters. The lowest semi-diurnal mixed tidal type is about 500 meters from the shoreline, especially in the southern part. The west, north, and east coast conditions are relatively steep. The speed of the water currents on Wangi-Wangi Island is 0.09 to 0.6 meters per second. The Banda Sea wind strongly influences the east monsoon waves, while the west monsoon is less because Buton Island blocks it.

Kaledupa	<ul style="list-style-type: none"> • The northern part has a flat topography with a water depth from 2 to 1,404 meters. • The coast is steep in the south and east, with 35 to 414 meters. • The deepest waters between the island and the Kaledupa Atoll are about 1,404 meters. • The tidal type tends to be the lowest semi-diurnal, about 500 meters from the shoreline. • The speed of the water currents ranges from 0.07 to 0.20 meters per second. • The waves are not high in the west monsoon season because Wangi-Wangi Island and Buton Island block the wind direction. • Some parts of the north to the east are protected by the west and east monsoon waves because of the barrier reefs of Hoga Island, Lentea Island, and Darawa Island.
Tomia	<ul style="list-style-type: none"> • Generally flat to steep topography with 0 to 1,404 meters of water depth. • The topography slopes in the southern part of Tomia Island, Tolandono Island, and South Lentea Island. • The maximum depth is 280 meters, while the steep or tilted in the northern part is 500 meters deep. • The lowest semi-diurnal tide is about 500 meters. • Intertidal currents are generally weak, except in solid strait marine areas • In the west monsoon season, the waves are not too strong because Buton Island blocks them
Binongko	<ul style="list-style-type: none"> • Generally steep topography with a water depth of 181 to 721 meters. • The southern part reaches 1,573 meters • The water depth of the islands in Binongko Sub-District ranges from 18 to 500 meters, and about 198 to 500 meters on Kontiolo Island (in Bajau language, it is Tintiolo Island) and Cowo-Cowo Island (in Bajau language, it is Tutubu Island), in Moromaho Island water depth ranges about 252 to 500 meters. • The Koko Atoll is relatively shallow. • The tidal type is semi-diurnal. • The current speed ranges from 0.10 to 0.19 meters per second. • Around the coastal area around the Binongko sub-district, there are turbulent currents.

Adopted from (Wakatobi National Park, 2020)

3.3.3 Marine resource

Based on Landsat imagery 2003, it was known that the reef area in Wakatobi was 54,500 hectares. On Wangi-Wangi Island, the width of the reef is 120 meters and 2.8 kilometers. However, for Kaledupa Island and Hoga Island, the width was 60 meters and 5.2 kilometers (Wakatobi National Park, 2020). Tomia Island has a reef average of 1.2 kilometers for the farthest distance and 130 meters for the nearest. The Kaledupa atoll complex has a reef width of 4.5 kilometers and 14.6 kilometers. Kaledupa atoll is approximately 48 kilometers long. Kaledupa Atoll is an atoll extending to the Southeast and Northwest of 49.26 kilometers and 9.75 kilometers wide (the longest single atoll in the Asia Pacific). There are 396 Scleractinia hermatypic corals divided into 68 genera, 15 families, and an average of 124 species in each observation station (Wakatobi

National Park, 2020). From the community perspective, the important habitats identified in Wakatobi include coral reefs, mangroves, sand, seagrass beds, and *Akar Bahar* or Bahar root (black coral) (Sugiyanta et al., 2019).

Furthermore, when compared to 12 seagrass species in Indonesia, the seagrass in WNP is 11 species (Harti et al., 2020). There are 28 species of mangroves, with 20 major and eight minor mangroves recorded in WNP (Setyaningrum et al., 2020). The Bajau community also recognizes the resources in WNP as a way of life. The Bajau people have TEK, including mangroves, seagrass, and other important resources, which are management priorities in WNP. However, there is no synergism between the needs of WNP in the practice of conservation and protection of biodiversity and the technology owned by the Bajau people.

3.4 The Sampela Bajau

The word Sampela or "*Sampe lah*" or "*Sampe Jadu*" was initially adopted from the Malay language, which means "arriving." The meaning of the word "Sampela" was comprehended as a philosophy of reaching a designated area after voyaging. So, Sampela is an expression of happiness when the Bajau encounter their expected areas. In the past, the word Sampela was named "*Bungin Sampela*," or the white sandy island that appears during low tides on the coral backs of the east coast of Kaledupa Island. This Bajau village is administratively known as the Samabahari village, consisting of four hamlets: Sampela, Dikatutuang, Wanda, and Pagana. In 1975 (about 30 stilt houses) became part of Ambeua Village, and in 1996 (about 87 stilt houses) were parted of Laolua village. This village was officially established in 2002 (about 137 still houses) with two hamlets, namely Sampela and Dikatutuang. The occupants of Samabahari Village are all Bajau people or small numbers of land communities who have intermarried with the Bajau people.

Historically, the origin of the Sampela community was part of the large Mantigola group. Before the DI/TII conflict, these people had detached from the Bajau Mantigola group. The first Bajau Sampela group consisted of three families, namely Mbok Slide, Mbok Safilang, and Mbok Lapah. These three families had previously built a non-

permanent stilt house on the back of the littoral between Kaledupa Island and Hoga Island, called Pagana or meaning 'the entrance.' After the DI/TII conflict, the population of Bajau Sampela village was added by the migrated Mantigola Bajau. Prior to join to Bajau Sampela, this Mantigola migrant group hid in Watanbabi and Toroho. However, they did not get good acceptance from the settled island people. Some of those Mantigola migrant people joined with Bajau Sampela, and some joined with Bajau Mola in Wangi-wangi from 1958 to 1960.

Bajau Sampela village is segregated from the mainland. This initiative to disconnect from the mainland is the nature of the Bajau community. So that the Sampela Bajau are not bothered or quickly intervened by mainland people. The facilities in this village are the most complete compared to other Bajau villages in Wakatobi Regency. The Bajau Sampela village has schools ranging from playground to high school, primary health care, homestay, and mosque. The complete facilities in Bajau Sampela village are compelled by the role of Operation Wallacea, which has been located on Hoga Island since 1995. Hoga Island is situated around two and a half kilometers from Bajau Sampela village. Operation Wallacea has a significant role in developing and exposing Bajau Sampela village to the world, especially in the research and tourism sectors. The typical Bajau Sampela community is also different from other Bajau communities in Wakatobi because they intermarriage with foreigners and have extensive exposure to tourism. There are well-trained tour leaders, divemasters, local interpreters, and other tourism-supporting facilities in the Bajau Sampela village.

Socio-culture in Sampela has been mixed up with Islamic teachings (*Islam Bagai*), as the person who nurtured Sampela is an Islamic religious leader from Binongko Island. However, several Bajau traditional leaders in Sampela still practice traditional healing ceremonies. There is acculturation between land and Bajau customs in various traditional events in Bajau Sampela village. Separate geography, traditional Bajau lifestyle, capitalism, intercultural relations to MHA Barata Kahedupa, land certificates, conflict with marine zoning, and other development challenges can be found in Sampela. On the one hand, co-management practices such as "*Tubba Dikatutuang*," tourism development, conservation group, youth movements, local politics, and other

livelihood diversification also emerge in Bajau Sampela. Indeed, Bajau Sampela can be considered a miniature of the complexity of Bajau in the contemporary world.

This village connected state electricity in January 2020 after using village diesel for years. The source of clean water is accessed through a privatization scheme from the Kaledupa community, whether it has been piped to their several houses or the Bajaus still need to buy it to the seashore. Access to grave areas has changed since the coming of Operation Wallacea, which was previously located on Hoga Island. Now their burial site is moved to the mainland of Kaledupa (Galua or Kalaa'a, Lefuto). However, this grave area is separated from the islander graves. Then the nearest market from Bajau Sampela village is the Sampoabatu market, approximately one kilometer from Bajau Sampela village.

There is no historically distinctive relationship between the mainland people and the Bajau in Sampela. The consequence of the relationship seen so far is only a transactional affinity for local economic needs. The labeling between the two groups still looks ordinary. However, the islanders from Kaledupa still underlook the Bajau Sampela communities. Likewise, on the side of the Bajau people, they still maintain distances and boundaries from islanders outside their daily interactions. Also, high exposure to strategic issues in Wakatobi has made the Bajau community in Sampela the most adaptive Bajau group to social and environmental changes and other development challenges.

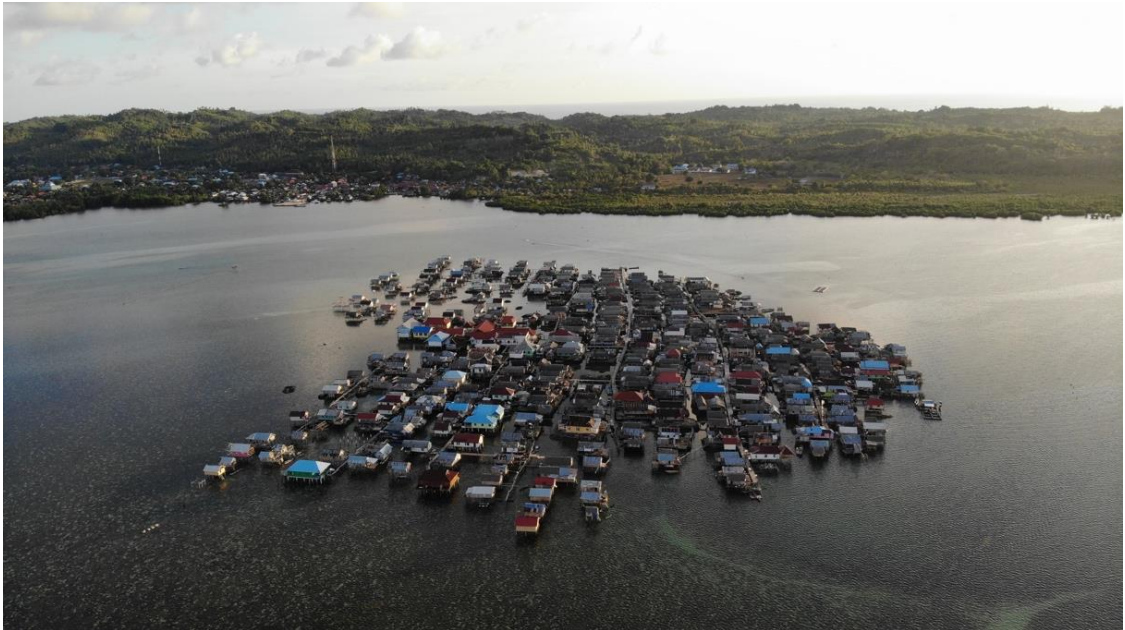


Figure 14. Bajau Sampela Village in South Wangi-wangi subdistrict

3.5 The Lohoa Bajau

The Bajau village in Lohoa is the most miniature Bajau village in Wakatobi Regency. This village is approximately seven nautical miles from Sampela, and both are located on the east coast of Kaledupa Island. Lohoa is also the Bajau village which has the furthest distance to the community on the mainland, approximately two kilometers from the administrative Tanomeha Village. Lohoa is a hamlet with remote school facilities from playgroup, elementary school, and junior high school. Their children have to study on Kaledupa Island at the high school level. Besides schools, the Bajau Lohoa village has a mosque. However, the school participation and literacy rate in the Bajau community is lacking. Currently, there are only six people from Lohoa Bajau who graduate from high school.

The Lohoa Bajau was part of the migrant group from the DI/TII conflict in Mantigola. This group first migrated to Watanbabi and had time to build stilt houses there. Then because they were too isolated, their ancestors moved to the Taroho area with other groups. The situation in Taroho at that time was also perilous because the islanders intimidated them to move. Hence, the Bajau scattered to find a safer location. Some joined Bajau Sampela village, some moved to Bajau Mola village, and some shifted

eastward to Taroho. Now, they are people of Bajau Lohoa village. The group that returned to Lohoa consisted of seven families, namely Mbok Daramin, Mbok Ndapik, Mbok Lalahin, Mbok Batinok, Mbok Teok, Mbok Gasok and Mbok Sanakong. All of their ancestors were one big family. The nuclear family ties are what make the Lohoa Bajau homogeneous. The sedentary Bajau in Lohoa was estimated around 1958-1960.

The meaning and philosophy of the origin of the word Lohoa are undefinable. The close match in writing Lohoa is "*Loho*" in the Bajau language which means 'porridge'. While in the Kaledupa mainland language, the word "*Loho*" also has a different meaning, namely "ants" in the mangroves. Lohoa village is very close to the mangrove forest in Lentea and Tanomeha. Alternative livelihoods from the Bajau Lohoa community depend on fishing traps (Bubu), mud groupers, and other sea clams.

As a small village of the Bajau community with a low level of education, the Lohoa Bajaus are highly dependent on the management system of the Tanomeha Village. The Tanomeha Village officials thoroughly dominated all intervention in the development concept for the Lohoa Bajau. Due to being a small and homogeneous community, the Lohoa Bajaus have to invite traditional healers from other Bajau villages for several cultural purposes. Mainland people have also influenced the cultural system of the Lohoa Bajau in terms of marriage and funerals.

The Southern Kaledupa sub-district is well-known for its rugged character. When Tanomeha were part of Langge Village before 2009, the Lohoa Bajau were frightened to visit the mainland of Kaledupa because they were always intimidated by the islanders. However, this stress has begun to diminish since the separation of Tanomeha Village from Langge Village. Even though the Lohoa Bajau are not yet free to access land, this fear is still memorable for them. It can be seen when the Lohoa Bajau never visits the mainland alone. They are always in groups and walk in one line on the edge of the roads. This habit protects their group from threats and boosts their confidence in a group setting. Hence, the character of the Lohoa Bajau is also formed because of this environment. The Lohoa Bajau has a tough character compared to other Bajau villages.

The socio-culture of the dominant group around their village influences their quality of living.

This village has not been connected to public electricity yet. The Lohoa Bajau only runs diesel three hours daily from 6 to 9 pm. The source of clean water is obtained through a privatization scheme from the Tanomeha mainland community. They must row to Tanomeha Village on the mainland for hours to buy water. The price of clean water in this area is five times the price of water in Ambeua for the Sampela Bajau. Access to the grave land is located in the Tanomeha hills next to the land community grave area. The nearest market from Bajau Lohoa village is Tanomeha market, less than two kilometers from their floating village. However, this market is only a building and not well functioned. To sell their catch, the Lohoa Bajau, especially women, have to walk around the mainland villages (from Tanomeha to Langge village) while shouting “*Te Kenta*,” which in the Kaledupa language means fish.

The Lohoa Bajau are the top mantis shrimp and crab fishers in Wakatobi. Their livelihood diversification is more varied than other Bajau groups in the Wakatobi Regency. Women and children in Bajau Lohoa village are very skilled in fishing and making money. There is stereotyping from other Bajau communities in Wakatobi against the Bajau Lohoa community. They stated that the Lohoa Bajau are backward communities with unduly conventional living. The stereotyping calls given to the Bajau Lohoa community are “The foreign Bajau” because their looks are dark skin, isolated, and tacky clothes.



Figure 15. Bajau Lohoa Village in South Kaledupa subdistrict

3.6 The Mantigola Bajau

'Mantigola' comes from the phrase "*Menanti Gula*," which means 'to wait for sugar' in Indonesian. Historically, this area was a harbor to wait for sugar from the Rote Island brought by traders from Binongko Island. These traders exchanged Lontar palm sugars (sugar water or *Gula Boek* in Bajau Language) with crops and catches from Kaledupa Island. Both the Bajau and islanders participated in this palm sugar trading. This Mantigola was the name given by the Kaledupa mainland community, later adopted as an area inhabited by the Bajau people, or well known as the Mantigola Bajau village.

During that period, the economic and socio-cultural relations of the Mantigola Bajau community with MHA Barata Kahedupa were pleasing. Trade and respect between cultures ensued (on some occasions until today). The Bajau people were given access to land in Tampara coastal and mangrove zones (Horuo village). This area was given as a burial place for the customary leaders of the Bajau community. This story could be traced from the name "Fungka Fadhu," which means 'The Bajau's hill.'

This socio-cultural relationship changed when DI/TII entered the Bajau Mantigola village. An expulsion conflict happened, and all the previously given areas were taken

back by MHA Barata Kahedupa. The post-DI/TII, the Bajau community was invited to return to Mantigola by MHA Barata Kahedupa. However, their former land areas were not given back, and the MHA Barata Kahedupa only acknowledged the coastline area in front of their village with smaller land given to the Bajau. According to some narratives from the Bajau elders, that land was not given for free but was bought by their grandparents from islanders. The only Bajau village with a land boundary and area was Bajau in Mantigola. This land is now the Bajau grave area.

The Bajau in Mantigola was joined in the administrative area of Sombano Village before 1994, then separated into Horuo Village in 2003. In that year, Mantigola village was divided into two new villages. One village called Horuo consists of two Bajau hamlets and one land community. Another village is Mantigola Makmur, with two hamlets, where all populations are the Bajau people. The ecology of the Bajau Mantigola village is close to the mangroves, similar to Sampela and Lohoa. However, in the middle of this village was a lagoon for a boat mooring area. This Lagoon is named "*Kolam Mantigola*" or Mantigola pool which is still used to anchor boats during high storm surges. Currently, the settlement pattern in Mantigola surrounds the Lagoon.

Bajau Mantigola Village, since the end of 2020, has been connected to the Kaledupa mainland. In 2002, the electricity had already connected to this village. The duration of the power is 13 hours, from 5 pm to 6 am (Monday to Thursday and Saturday), 17 hours on Friday and Sunday (10 am to 2 pm and 5 pm to 6 am). This duration is the same as the Kaledupa Island arrangement. The distance from the village to Kaledupa island is approximately one kilometer. However, this village received KAT assistance houses of approximately 50 houses in 1998. The last *Soppe'* in Bajau Wakatobi was founded in Bajau Mantigola around 1998. After that, all of *Soppe's* boats were changed to engine boats.

The existing facilities at Bajau Mantigola are schools from the playground to junior high school, a mosque, and a traditional market. This market building was a former village meeting room (*Rumah Adok*) constructed by the local government. Then, in early 2021, this building was turned into a market after the road was connected to

Kaledupa Island. The market in this village is still an informal setting. The Bajau Mantigola communities do not have to peddle by walking around the Kaledupa mainland like the Lohoa Bajau or taking their catches to the Sampoabatu market near Bajau Sampela village. Since the road was connected, the number of middlemen multiplied among the Bajau and Kaledupa people. The clean water access in this village was pumped from the land of Kaledupa, and it has become a business field for the land community. Some need to buy it from market areas such as people with far houses from the land.

Bajau Mantigola is the closest Bajau village to Kaledupa atoll or Sapak Kaledupa. Only about 13 nautical miles from their village. The primary source of income for Bajau Mantigola is atolls. Atolls for the Mantigola Bajau are a field or "*Koko*" that harvest in the western monsoon season from August to December yearly. Most Mantigola Bajau communities have temporary stilt houses (*Babaroh*) on the Kaledupa atoll. From the time of their ancestors, every calm season, all Mantigola people will do seasonal migrations to the Atoll.

This homogenous livelihood pattern makes the Bajau in Mantigola more ingenious in managing capital. They have reasonable concerns about pursuing higher education. Their children pursue educational diplomas up to college and work in various professional tracks. The Mantigola Bajau still maintains the custom as the oldest Bajau village in Wakatobi.



Figure 16. Bajau Mantigola Village in Kaledupa subdistrict

3.7 The Lamanggau Bajau

The word 'Lamanggau' is a Tomia language defined as a traditional dock for mooring boats. Currently, the Lamanggau Bajau belongs to the administrative hamlet under Lamanggau Village called Lasoilo. 'Lasoilo' word is also the Tomia language which means betel leaf. About 90 percent of the Lasoilo hamlet are Bajau people. This Bajau village still stands on the water body but is connected to the island of Tolandono in front of Tomia Island. As the newest Bajau village, Bajau Lamanggau describes a diminutive process of how adaptive approaches formed acculturation to mainland communities on Tolandono, Tomia Sub-district. In 1993, Lamanggau was a hamlet under Waitii village, and then in 2003, Lamanggau turned into an administrative village with three hamlets. This island was initially named Tolandono but is now better known as Lamanggau Island, adopted from the Lamanggau village name.

The arrival of Bajau Lamanggau was estimated around the early 1970s, led by a mixed-blood Bajau from Mola, Mbok La Bebe. He was a mixed-blood Bajau and Binongko people. It could be identified from his name, "*La*" calling for a man in Buton Woliyo

culture. Mbok La Bebe has expertise in Ambai gears. He modified these Ambai gears and operated them in littoral areas. As a skilled Bajau and known as a young Punggawa award for group fishing, Mbok La Bebe paved the way for establishing a *Babaroh* in front of Tolandono Island after several seasons of living on Sawah Island. Even though they had settled in Lamanggau village, this group still made seasonal migrations to Tomia atoll and spent the night on Sawah Island during the calm season in 1993 and backward.

According to the elder narratives from Bajau Lamanggau, the center of civilization on the island of Tolandono was in the upper land (Kampung Lama), where farming was the Tolandono people's main livelihood. Since the arrival of Bajau on this island, the center of civilization began to shift towards the coast. Mbok La Bebe, with his Ambai gears, recruited workers from the Tolandono people. Mbok La Bebe and the Bajau people trained the Tolandono people to use Ambai gears and other fishing techniques of the Bajau. However, the Lamanggau community took over the Ambai gears system over time. There are currently five groups of Ambai gears on Tolandono Island, all of which are not the Bajau.

The Lamanggau Bajau communities are a homogeneous group regarding kinship systems and livelihoods. All of Lamanggau Bajau are children or grandsons of Mbok La Bebe. There are two primary occupations seen in Bajau Lamanggau. The first is fishing for pelagic fish in the east monsoon season (August and November). Then the second one is fishing for groupers (*Sunu* and *Keapu*) in the late west monsoon season (January to March). This group of Bajau will generally adjust their profession according to this season. However, on the sidelines of this season, they catch octopus or fish around Fish Aggregation Devices (FAD) or *Rumpong*.

Economically, Bajau Lamanggau has a stable income because of their village's pristine marine ecology, and their access to Tomia Atoll is close. The Bajau Lamanggau village has eight nautical miles from the Tomia atoll area. A luxury resort subsidizing the Lamanggau Bajau on Tolandono Island, Wakatobi Dive Resort was established in 1996. They got access to electricity, job opportunities, and other development aids. It

is not only for the Bajau but for all Tolandono people. This resort has its airport on Tomia Island, connecting tourists directly from Bali Island. Since January 2021, Wakatobi Dive Resort has involved the Tolandono people in patrolling around their marine protected tourist area. This supervision is carried out in rotation for each household with a fee of IDR 1,700,000/month. In a monthly rotation, Wakatobi Dive Resort recruited three people.

Since 2008, there have been several protests from Tolandono people to Wakatobi Dive Resort regarding electricity problems that sometimes were broken. To avoid this situation, through Lamanggau village officials, Wakatobi Dive Resort pays IDR 55,000 on each house to substitute electricity costs. Regarding the accessibility to water, it has now been privatized from the mainland community of Tomia. Before 2010, the Bajau had to row approximately 800 meters to Tomia Island. The distance from Lamanggau village to the central market in Tomia is 2.4 nautical miles (pointed at Usuku market).

Unlike the previous group, the Bajau in Tomia has decreased to use the traditional Bajau culture. They have gradually transformed their culture into Tomia's cultural system, especially from the Tolandono people. The Lamanggau Bajau are intermarried and speak Tomia fluently. The atmosphere of discrimination is not seen on Tolandono Island. The Bajau here are very socializing in every activity in the Lamanggau village, and they have a notable role in the cultural ceremonies. The history of knowledge exchanges (*Ambai* gears) is still memorable to the Tolandono people because they are beneficiaries.

Like the Mantigola Bajau, the Lamanggau Bajau have concerns about pursuing their children to school. Almost all young people in Bajau Lamanggau have attended college level. The ratio of people who graduated from universities in the Bajau communities is probably higher than the Tolandono people. Because many young people have been pursuing education, the younger generation of Bajau Lamanggau is not skilled at fishing.



Figure 17. Bajau Lamanggau Village in Tomia subdistrict

3.8 The Mola Bajau

Mola is the largest Bajau village with five administrative villages: Mola Bahari, North Mola, Mola Samaturu, South Mola, and Mola Nelayan Bhakti. The Bajau village in Mola originally came from the Mola-mola area, which is now included in the administrative area of North Mola. In 1968, Mola officially became a village after separating from Mandati Village. Then in 1982, the Mola Village prospered into North Mola and South Mola. In 2007, it was split into Mola Bahari and Mola Samaturu villages as the former part of North Mola. After a few years, the South Mola was also divided into Mola Nelayan Bhakti village.

The name 'Mola' was absorbed from the Mola-mola spring on the coast of Wangi-wangi Island under the Sara Mandati customary area. Then it was abbreviated as Mola, which the Bajau inhabits today. Mola villages is a fishery center in Wakatobi Regency for the Bajau communities and capture fisheries market chain. The economic chain in Mola varies and includes power relations. This situation aligns with the complexity in the Mola Bajau with all the development challenges and kinship patronage systems.

Historically, the increased population in Bajau Mola village occurred during the last forced migrations from Mantigola during the DI/TII period. However, some narratives from elders estimated that before DI/TII, there was also a gradual population growth

from Bajau outside Wakatobi or mixed intermarriage with the Bugis and Butonese Woliyo people (Binongko people). However, some groups were not part of those migration patterns in the Bajau Mola village. They are initially Bajau from other Buton Islands, such as Lagoro, Kalisusu, and Pasar Wajo.

In the cross-cultural acculturation, the Bajau people from Mola intermarried with Bugis people from Southeast Sulawesi or Buton people from Binongko Island. These outsiders were voyagers and traders. These mixed descendants recognize themselves as Bajau in Wakatobi (*Bajau Daparanakan*). They can speak Bajau, but their life is not like other Bajau. Their fishing skills are also more modern than before.

Apart from being a cultural intermarriage community, the Bajau are familiar with the trading system, especially sea turtle meats and carapace, sea cucumber, and shark fins. They use their TEK, such as freediving (*Patuong*), longline fishing (*Rawai*), trolling (*Panongkol*), and other fishing techniques to catch those high-economy marine resources. Averagely, the Mola Bajau group has a higher education level than the Bajau communities in Wakatobi. Many Bajau people have the upper and middle-class economy (noble class) in Mola Village. Children of the Bajau people in this social class have the privilege to pursue higher education. The noble class of Bajau is located in Omega alley, South Mola village. Omega alley houses are permanently well constructed on reclamation land and accessible by cars. The Mola Bajau highly respects this developed Omega area. Some prominent Bajau figures and leaders in Wakatobi and Indonesia were raised in this alley.

Bajau Mola Village is located in the center of Wakatobi Regency on Wangi-Wangi Island and is approximately three kilometers from the government center and 23 kilometers from Matahora Airport. The existence of the Bajau Mola village is more 'admitted' than the other four villages in the government's view. The rapid population growth in Mola village has consequences of socio-economic and environmental problems. Hence, the government and related stakeholders emanate that Mola village is the most complex community in Wakatobi Regency. However, other Bajau villages

are no less complicated than Mola, especially in intercultural relations, power distribution, community participation in development plans, and other local issues.

Since 1989, clean water pumped from the mainland to Bajau Mola has been accessed through government programs, *Perusahaan Daerah Air Minum* (PDAM), or a state-owned water utility company. Currently, most of the water sources for the Mola Bajau have been privatized from the land communities of Wangi-wangi Island. The Mola Bajau communities are diverse in income, lifestyle, and exposure to technological advances. They have the most occupation diversification because of the village's position near the capital city of Wakatobi Regency.

The socioeconomic conditions of Bajau Mola are very near to the capitalist system. There are many groups of capital owners that conduct the patronage system. Their exposure to mainland communities and the city center also adds to the complexity of the Bajau community in Mola in terms of economic vulnerability. The consumptive lifestyle opens up new opportunities for land communities to create a capital loan service sector, both formal and informal. More than ten loan cooperatives (*Uang Harian Koperasi*) targeted the Mola Bajau. Now and further, The Bajau Mola village is like an urban slum environment with many social welfare problems. Apart from the fishing center, the Bajau Mola village is now the center for destructive and illegal fishing chains.



Figure 18. Bajau Mola Village in South Wangi-wangi subdistrict

3.9 Conclusions

The Bajau people in Wakatobi have a rudimentary journey to becoming a settled community. Expulsion, suspicion, confrontation, and marginalization are historical processes behind the cultural transformation of the Bajau community in Wakatobi today. The dispersal of Bajau Wakatobi into the five locations has its intricacy but is centered on development challenges. Intergroup relations, acculturation, and exposure to globalization are the determining factors in directing the way of life of the Bajau community in the Wakatobi Regency.

CHAPTER IV

BAJAU TRADITIONAL ECOLOGICAL KNOWLEDGE AND SUSTAINABLE RESOURCE USE

4.1 Introduction

TEK is considered a gateway to sustainable resource management and a focal point to strengthen the identity of landless and sea-oriented people such as the Bajau. Several previous studies have carried out the documentation of Bajau TEK, but none is inclusive and elaborates its relevance. The issues of intersectionality, internal and external drivers, policy strengthening, institutional supports, and the potential for developing LMMA are part of accentuating comprehensive TEK documentation. In order to make TEK a technical and adaptable issue, it is necessary to justify the TEK phase and its existence and develop TEK indicators inclusively. This justification aligns with co-management, where there is integration and collaboration from the community as resource users and institutional support toward sustainable socio-ecological practices.

The implementation of TEK is ideally regulated by customary institutions and strengthened by a formal administrative system (refers to government). Unfortunately, the Bajau have not yet received the protection of their customary identity. They must be forced to compete in a capitalist economic system with land communities even though they are not ready to leave their maritime-oriented livelihood for a whole islander. This readiness is described by mentality, resources, way of life, and acculturation with land community culture.

The existence of TEK is gradually starting to be marginalized and considered an occult practice that is not relevant to the construction conditions of today's society. The young Bajau tend to leave this maritime culture and seek their fortune with other jobs from non-sea sources. This identity challenge also becomes more complex when the Bajau are domiciled in MPA and customary communities' territories that receive legal recognition from the local government, such as in Wakatobi, Southeast Sulawesi,

Indonesia. The potential for marine tenurial conflicts in access to natural resources and intercultural relations is a challenge or opportunity to protect TEK and the Bajau's self-determination.

Despite these challenges, the need for TEK documentation and identification of sustainable resource management and practice are fundamental to overcome cultural degradation and strengthen the identity of the Bajau community. Although in Indonesia, legally, there is no specific protection for the Bajau, at least this TEK documentation provides a deep understanding and keen information about the existence of the Bajau customary system and sustainable resource management in coastal and marine areas.

4.2 Understanding to Bajau TEK

Understanding TEK demonstrates mutual comprehension, from exploring a local practice and concept to becoming an integrated and inclusive development. The Bajau in Wakatobi, with its internal and external complexities, added the documentation process of TEK even more complex. From this point of view, three perspectives are used to understand the Bajau TEK. This understanding is sufficiently presumed to explain the positionality and reflectivity of various institutions and communities in considering TEK from the Bajau communities.

The first is the perspective of institutions and organizations consisting of government, NGOs, and CSOs. The TEK of Bajau is described by the knowledge system and cultural values of the Bajau people in preserving the marine environment. However, the terms marine environment and conservation are judged and shifted to consider the Bajau as a destructive and illegal fishing community. This labeling has not yet been evidenced in how this paradigm shift occurred and the causalities. This labeling includes the emergence of the term 'mainstream conservation,' oriented to the target and the size of the protected area without thinking about its human conservation, such as the Bajau. The TEK understanding from this perspective is quite strong and says as a terminology but does not appear in the recognition and development of local-based development programs. The scope of TEK is still limited to the capability of fishing and the practice of the marine protected area "*Tubba Dikatutuang*" area in Bajau Sampela. It determines

that TEK lacks recognition by decision-makers in Wakatobi from the institutional point of view.



Figure 19. The location of *Tubba Dikatutuang* in Bajau Sampela Village

The second is the perspective of non-Bajau people, namely, customary land communities. TEK is simplified into the local wisdom of the Bajau in traditional fishing. For non-Bajau land communities, the Bajau difference is only their seafaring skills. The Bajau are still considered a community that does not have a customary system like the *Butonese* community in Wakatobi. This group of people 'proudly' stated that as long as the Bajau are in the territory of the Sultanate of Buton areas, their customs should follow the Butonese because the Bajau are still deemed a migrant and community. They specifically named the Bajau "*Fadhu*" the lowest class naming underneath enslaved people. In addition, the land customary communities also associate the Bajau as 'black magic' holders, whether it be magic, witchcraft, and invincibility. This land group does not well notice the labeling of Bajau ecological practices.

Lastly, from the Bajau perspective, TEK describes an interconnected hereditary behavior (human, environment, and spirit) and has become a cultural system as a feature of Bajau identity. Institutional aspects are also explicitly included in this category which is explained as institutions and values in the form of knowledge and beliefs and system-based norms carried out for generations. The capability as a sea-orientated community characterizes their uniqueness, making them different from islanders.

As a form of forced adaptation by rapid socio-ecological changes, the practice of the Bajau in signifying TEK is rather difficult to document in a limited time and methodology. Their TEK contains a complex knowledge system, norms, values, communal actualization, and institutions. There is a need and standard for TEK typologies in documenting the process. It will construct an easier way to communicate TEK for a more understandable by Bajau, decision-makers, and non-Bajau communities. This justification can also explain how another uninformed group, such as the researcher, can understand Bajau TEK as a customary communal identity. The researcher, at this point, is responsible for communicating Bajau TEK in the academic debates and bridging for recognition by decision-makers at various levels. Justification and identification of key attributes of Bajau TEK can also be connected with co-management needs and relevant development issues at the regional level.

Furthermore, this study groups thematically about the existence of TEK from the Bajau people in Wakatobi, Southeast Sulawesi Province. As a derivative form of TEK, six key attributes can be operated as references when demonstrating Bajau as a subject, as shown in Table 10.

Table 10. Key attributes of Bajau TEK

Code	Classification	Description
C	Conservation	The ability of the Bajau in conservation practices that are portrayed in their daily activities in utilizing the natural resources
F	Ethno-fisheries	The skill and knowledge of the Bajau in the keen marine and traditional captured fisheries that are environmentally friendly and become the significant identity of the maritime group

B	Cultural beliefs	The beliefs of the Bajau related to ecology elucidate how the Bajau live sufficiently and respectfully with nature
L	Customary laws	The unwritten law and regulation regarding the Bajau-nature relationship that contains norms, values, and beliefs in a socio-cultural construction
W	Weather and Cultural astronomy	The knowledge, attitude, and perspective of the Bajau as sea wanderers in weather prediction, navigation, and cultural astronomy
A	Adaptive management	All the robust coping strategies and practices of the Bajau community in adapting to environmental changes and other intersectional issues

This Bajau understanding of TEK can determine how they can adapt to ecological changes. These six key attributes are an extension of knowledge-practice-belief in a maritime-oriented group. Ethno-fisheries, as the main practice synonymous with the Bajau people, are the main differentiator of their TEK. In contributing to the global TEK discussion, adding adaptive management practices is key to glimpsing the transition from TEK, the threat and typology, and the ability of the Bajau to adapt to current world changes. Figure 20 below illustrates the relationship between Bajau's TEK.

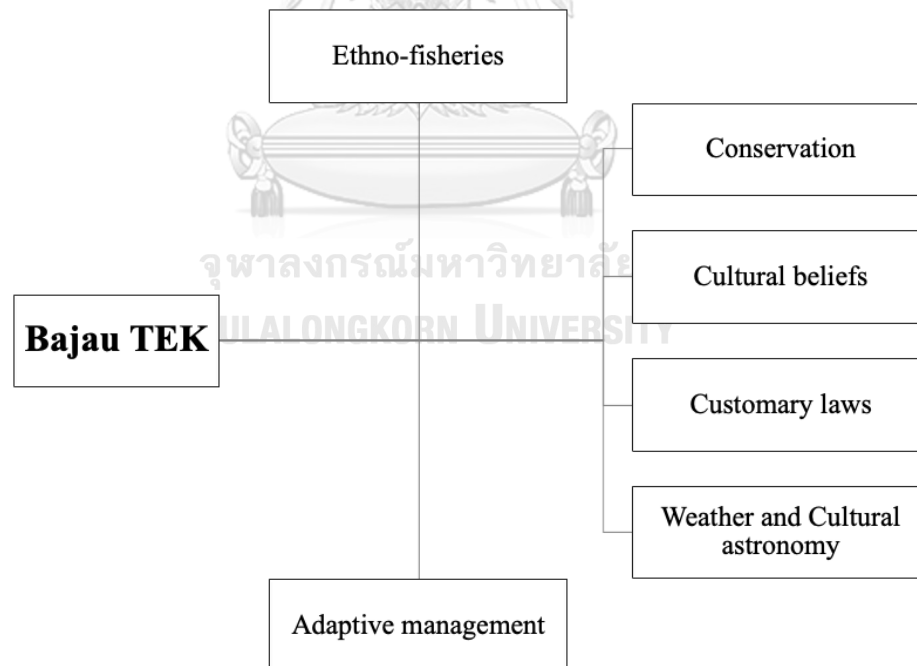


Figure 20. The classification of Bajau TEK

4.3 Manifestation of Bajau TEK

The nonexistent definition to be referenced in TEK has a hinted intention. On the one hand, this condition motivates the emergence of new research that tries to strengthen

the differentiation of TEK based on the group that is the subject of the study. It is reasonable because it flares great space as conceivable for researchers to explore practice and information about TEK. It leads diverse populations to constantly learn from one another about how each approaches the question of 'knowledge' in the first place (Whyte, 2013) and how TEK, in different approaches, can be integrated into proper management as a better steward of natural resources and adaptation.

Besides, the absence of this definition causes the direction and implementation of TEK development to be challenging. Constructing a comprehensive collaboration of TEK with western science requires a more intricate process. The complexity of TEK itself covers mechanisms, methodologies, and even the co-management system and interrelation. Former TEK was illustrated in a qualitative rather than quantitative approach, which sometimes confuses policymakers because they cannot estimate it into a measurable practice. However, with growing socio-ecology and multidisciplinary science, TEK is applicable for qualitative or quantitative. Currently, western science barely measures ecological attributes quantitatively, while TEK measures ecosystem quality in terms of eco-cultural characteristics, goods, and services (Burger, 2011). The gap that used to be debated has now become a broad interdisciplinary science.

From the concept Berkes (1993) developed regarding TEK and natural resource management, there is a discussion about the manifestation of identifying a practice that can be referred to as TEK. The issue being developed was to bring TEK into a co-management and its linking to the socio-ecological system (Berkes, 1994; Berkes & Folke, 1998). The development of this need was then recapitulated by Houde (2007) and reaffirmed in the form of sacred ecology (Berkes, 2012). Then it is clearly explained in Das et al. (2021) using a case study of North-East India to evaluate TEK and its role in natural resource management.

In the case of the Bajau people, its need is a demand for analyzing the use of TEK and the potential for coastal and marine resource management. This study discusses TEK's manifestations due to the social dynamics at the grassroots levels and how it links the global need and local practice. How does this TEK documentation represent protecting

cultural identity and other socio-ecological issues? The critical components found in this study were obtained from the modified manifestation of the TEK concept from previous works and local evidence from nomadic sea people, such as the Bajau, with their complex customs and social relations. The analysis of the key components of TEK and their interpretation in the context of the Bajau are presented in Table 11 below.

Table 11. Bajau TEK manifestation

Manifestation of TEK	Key Component	Dimension	Interpretation	Determinant Dimension to Bajau TEK
Factual Observation	<ul style="list-style-type: none"> • Empirical observations • Naming of places • Descriptions of ecosystem components • Understanding of interconnections • Spatial and population patterns • Ecosystem dynamics and changes 	<ul style="list-style-type: none"> • Identification • Interrelationships among species • Domain 	<p>These observations can identify the activities, biodiversity, and spatial of the practice from the Bajau.</p> <p>This practice is not only in the sea area but also on land as causality for their fishing needs.</p> <p>These practices are conservation, ethno-fisheries, weather and cultural astronomy, and adaptive management.</p>	<ul style="list-style-type: none"> • Classifications • Biodiversity • Spatial
Management System	<ul style="list-style-type: none"> • Practices adapted to the context • Methods for conservation • Methods for sustainable resource use • Methods for adapting to change • Appropriate and effective technologies 	<ul style="list-style-type: none"> • Strategies • Mechanism • Resource use • Livelihood 	<p>The concept of sacred ecology and important sites in coastal and marine areas is their possible management system for the Bajau.</p> <p>These relationships and activities show the mechanisms and strategies for survival with marine resources.</p> <p>As landless communities, the management system for the Bajau will be more complex.</p> <p>These practices are conservation and adaptive management.</p>	Activity

Manifestation of TEK	Key Component	Dimension	Interpretation	Determinant Dimension to Bajau TEK
Past and Current Uses	<ul style="list-style-type: none"> • Land-use patterns • Occupancy • Harvest levels • History of the cultural group • Location of cultural and historical sites • Location of medicinal plants 	<ul style="list-style-type: none"> • Time 	<p>The use of this resource is closer to the projection of the time, estimated availability, and usefulness of this practice from the past until now.</p> <p>The use of past and present practices has changed due to intercultural relations and other pressures; there is a need for projection to think about the existence of these practices in the form of co-management for the Bajau.</p> <p>These practices are ethnos-fisheries, weather, cultural astronomy, and adaptive management.</p>	Projection
Ethics and Values	<ul style="list-style-type: none"> • Correct attitudes to adopt 	<ul style="list-style-type: none"> • Norm • Institutionalism 	<p>The degradation of customary institutions is direct to attitude changes of the Bajau.</p> <p>One of the values that the Bajau current play is their connection to the spirit of human-nature philosophy.</p> <p>These practices are cultural beliefs and customary law.</p>	Spirit
Cultural Survival	<ul style="list-style-type: none"> • Links life on the land, • Language, identity, and cultural survival 	<ul style="list-style-type: none"> • Language • Stories • Adaptation • Social relation 	<p>The degradation of Bajau cultural identity will leave only their names and languages shortly</p> <p>To strengthen this cultural survival, it is necessary to re-explore spiritual values regarding the relationship between the human nature philosophy of the Bajau people.</p>	Spirit

Manifestation of TEK	Key Component	Dimension	Interpretation	Determinant Dimension to Bajau TEK
			<p>The influence of MHA and other dominant customary communities influence their cultural survival strategy.</p> <p>These practices are adaptive management, cultural belief, and customary laws.</p>	
Cosmology	<ul style="list-style-type: none"> Assumptions about how things work Beliefs Spiritual relationship to the environment 	<ul style="list-style-type: none"> Philosophy Belief Deep ecology 	<p>Cosmology as the fundamental grasp of the Bajaus is also threatened because of the influence of religious issues in Indonesia, which corners the cosmology of the Bajau.</p> <p>The philosophy of human nature is also the only indicator as a spirit to see this cosmology.</p> <p>These practices are cultural beliefs and customary law.</p>	Spirit

Adopted from Houde (2007)

Practically, TEK is based on data generated by resource users themselves. However, the dimension will be different for the Bajau case because of their maritime-oriented life. They are active users for coastal and marine over land. Even Bajau itself may differ according to its complexity, exposure to socio-ecological issues, and institutional support issues. These dimensions result from interpreting the Bajau community in an understandable definition (see Table 11).

The built-in simplification and localization dimension in the Bajau case generate six dimensions: classification, biodiversity, projection, activity, spatial, and spirit. Regarding the developed indicators of Bajau TEK in this research, the nature of qualitative evidence needs to be examined in advance if used as the dimension of natural resource management. This relation is then presented in Figure 21 and Figure

22 for the justification stage of Table X and the initiation of the dimension of Bajau TEK.

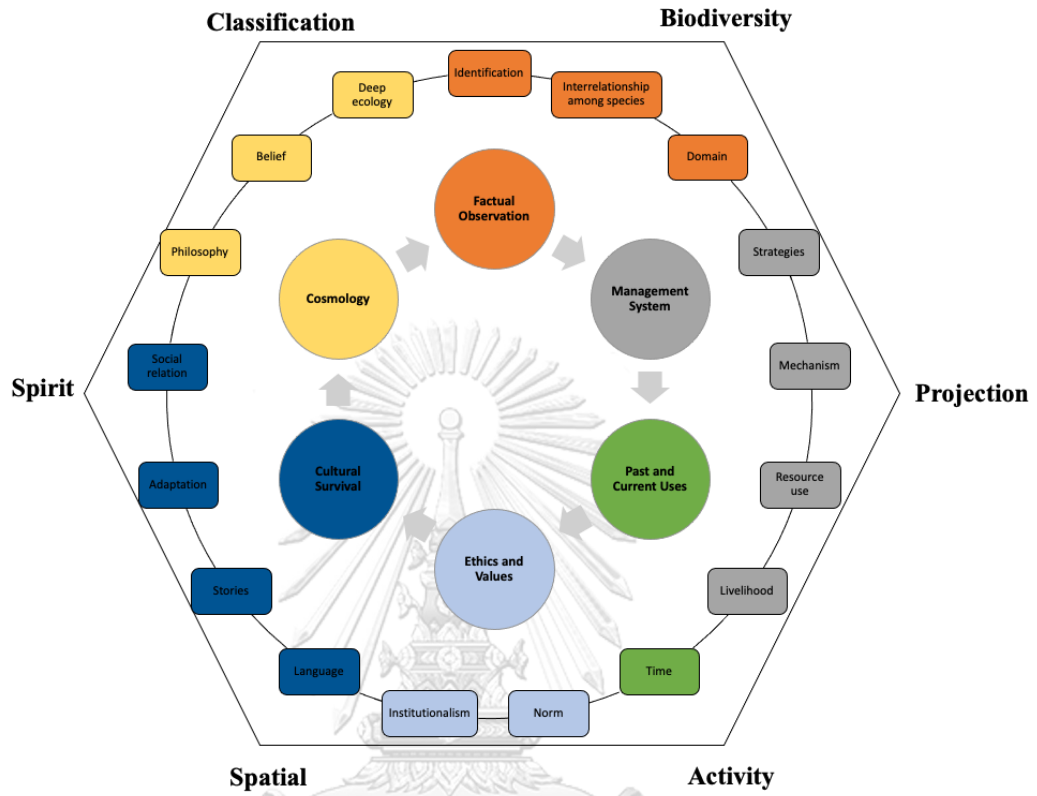


Figure 21. Relationships and dimensions of the manifestation of Bajau TEK

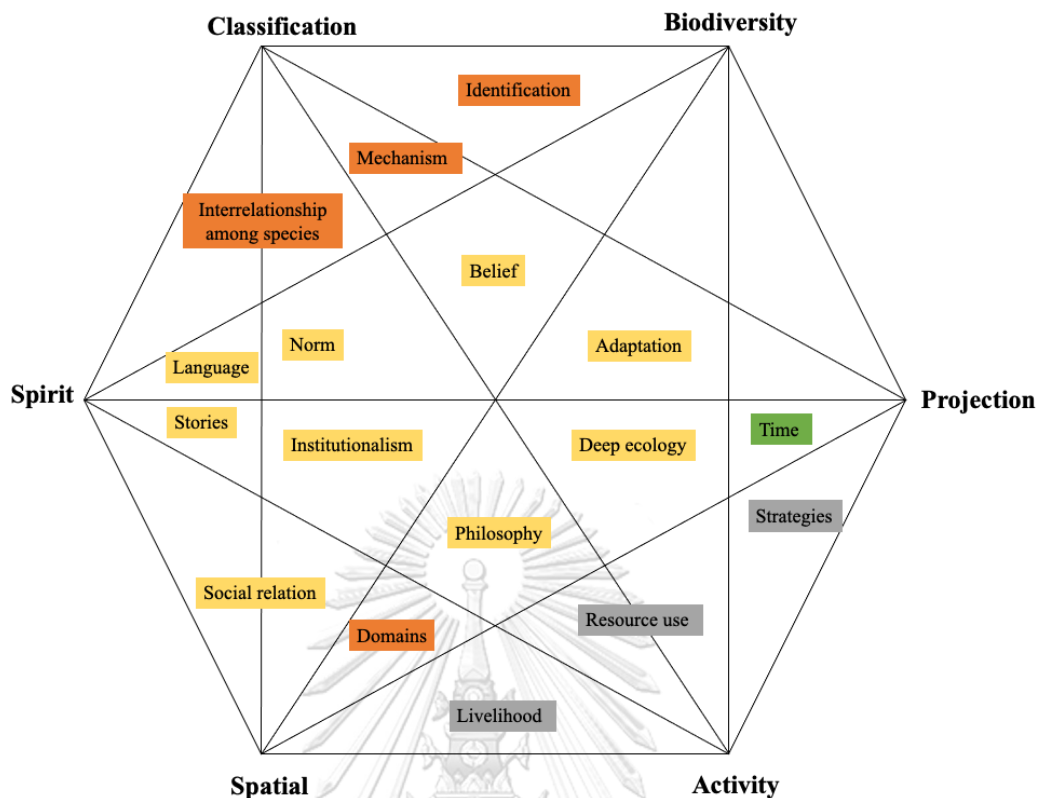


Figure 22. Analysis dimensions from Bajau TEK based on dimensions from previous works

4.3.1 Examining 'exchange knowledge' in Bajau TEK

Adding more to the concept of TEK manifestations introduced by Houde (2007), this study discovered that TEK had undergone a transformation and diversification. The incarnation of this Bajau TEK was principally motivated by cultural acculturation. This TEK face is called knowledge exchange, as a form of adoption of TEK from the surrounding environment intentionally or unintentionally within a certain period. It comprises new practices or refinements of existing TEK and is then claimed as the authentic practice of their community. Before this practice was established, the Bajau TEK indicators were qualified and identified (see Table 11). The ingenuity of this practice sometimes cannot be traced, and it can only be said to be a *Bagai* approach.

The term knowledge exchange is closely related to a community's concept process of forced adaptation and voluntary adaptation (Shabanova, 2014). The Bajaus can absorb practices from *Bagai* as an arrangement of voluntary adaptation. It is called voluntary

adaptation because there is no compulsion for the Bajau to adopt and modify that practice. However, this practice can also occur when acculturation is stressed by the dominant cultural system around their villages. It can be anointed as a forced adaptation of TEK, which also occurs in the interrelation of the dominant community around Bajau. Islanders adopted TEKs of the Bajau according to their abilities. The term knowledge exchange is generally seen in traditional fishing methods.

There are three countenances of evidence regarding the Bajau rationale for knowledge exchange of TEK. The first is Bajau's positionality as a society with high mobility and a wide-migratory area. Before settling down as they are today, the Bajau crossed the sea and met many other local communities alongside the CTI area. The customary practices of the Bagai they encountered were then adopted and/or combined with their existing TEK. This transformation can also be seen as a form of adaptation to climate change (Pelling et al., 2014). It makes the Bajau people have a high TEK transmission proportion.

Next is the 'exclusive' nature of the Bajau, which inherently separates itself from the non-Bajau community. It also makes interaction and adaptation of the particular practice quickly. The Bajau are self-exclusive because of their shared background, values, and identity. These factors create closed networks and informal social control among their bodies, known as the social cohesion concept (Harell & Stolle, 2011). This social cohesion demonstrates how the Bajau protect their group from outsider threats (Suyuti, 2004). Their high indigeneity spirit has enabled the Bajau people to prevail and adjust to TEK. This independence is carried out to protect themselves, individually and in groups, under their interests (Rowse, 2007). Indeed, this exclusivity makes the absorption and adoption of foreign cultures such as TEK evolve rapidly.

The third is the motive of TEK as a 'better management practice.' This practice is based on ecological needs rather than economics from the Bajau side. Not only in fisheries but this practice can also be seen in the initiation of coral and mangrove planting. The Bajau have not known these two practices for generations, but their necessities are tied to these resources. Knowledge exchange can also be identified as a 'specially

reconstructed' practice according to the institution's needs, such as conservation issues. This practice is then incorporated with the remaining Bajau TEK. This practice developed into a complete need and practice accompanied by cultural cosmology and Bajau TEK dimensions.

Considering that many TEKs have been degraded, lost, and mixed up, knowledge exchange can be a new form of TEK as a co-creation process in the Bajau body of knowledge. The factors underlying the loss of TEKs, and the mechanisms used by societies, schematize that the 'exchange knowledge' is essential to regenerate and transmit it in the face of environmental change (Gomez-Baggethun & Reyes-Garcia, 2013). This form of knowledge exchange is an enormous opportunity to develop TEK into co-management. Also, it is a persuasive approach to reduce illegal practices or damage to ecosystems as currently labeled for the Bajau.

This knowledge exchange does not always run smoothly for marginalized people like the Bajau. However, in this context, four possibilities can occur in maintaining the heritage and cultural identity towards a knowledge exchange from Bajau in coastal and marine resources. The most successful is integration, then assimilation and separation, and the worst scenario that results is marginalization (Berry, 2008). This marginalization in this context means if the Bajau TEK adopts unjust and environmentally unfriendly practices such as fishing gear modification (destructive practice) and chemical use. Addressing these concerns requires the role of customary institutions and an adequate supervisory system in the form of co-management.

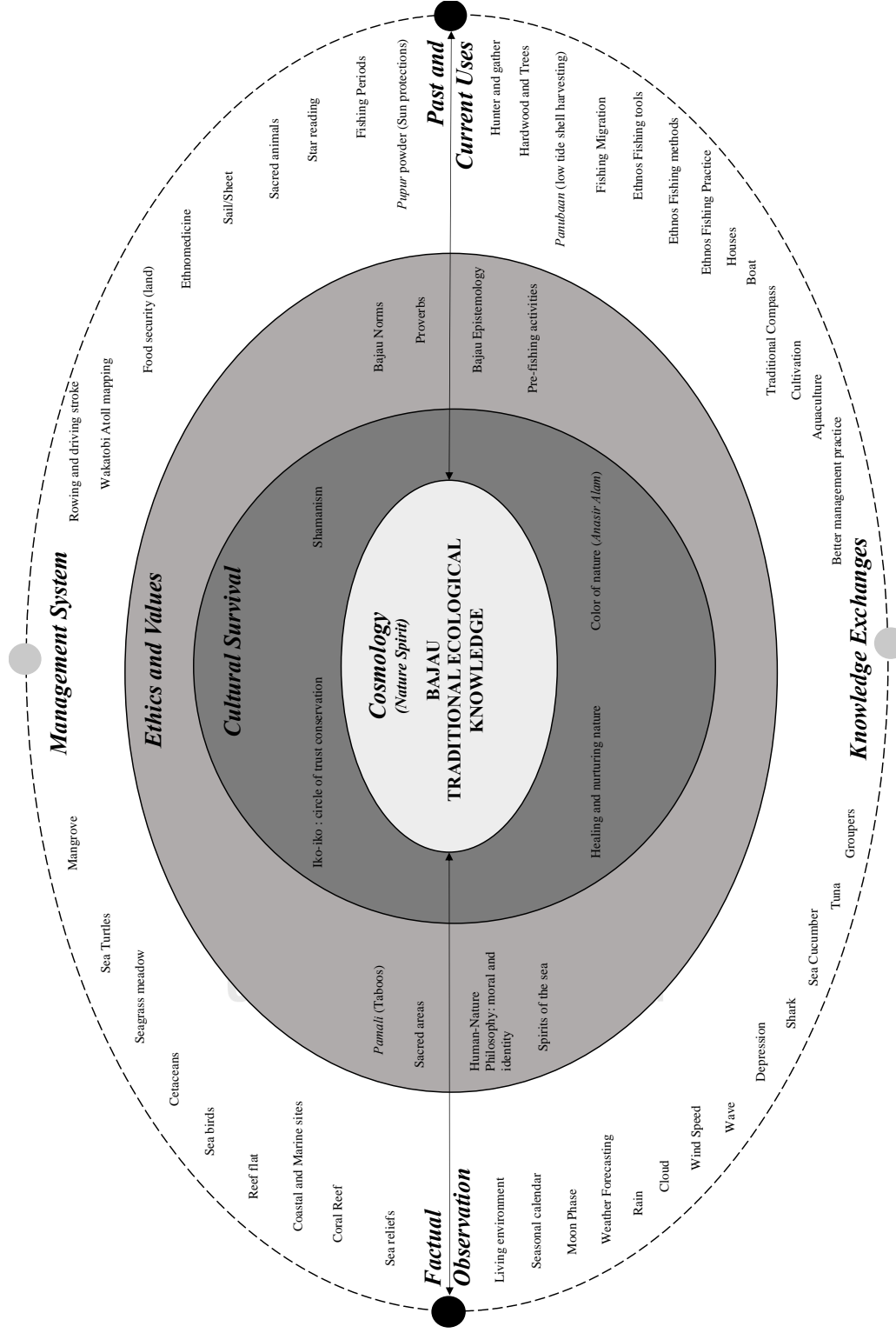


Figure 23. Model of manifestation TEK of Bajau in Wakatobi

Figure 23 illustrates the Bajau TEK distribution model, based on six faces TEK and one adding face 'knowledge exchange'. The Bajau TEKs, which are approaching the manifestation of knowledge exchange towards 'factual observation,' include biota identification, such as groupers, tunas, sea cucumbers, and sharks. Meanwhile, knowledge exchange close to 'past and current use' is better management practice, aquaculture, cultivation, and several adapted fishing gears.

The outer circle in Figure 23 is the TEK most widely known by outsiders because it is easier to observe and has excellent opportunities to be developed into programs and policies. In more detail, factual observation is attractive to many because it may enhance scientific knowledge about the environment and provide additional information to databases while monitoring environmental changes. Then followed by the management system and past and current uses are the common familiar TEK identified by non-native people to present TEK contesting western science.

4.3.2 Dimension of Bajau TEK

A situated dimension of the Bajau is required to define the categorization and documentation to determine the scattering of local practices under the TEK term. The development of this indicator is a simplification of the TEK classification constructed by Houde (2007) with rigid observations and enormous literature on TEK from western countries, especially Canada. The groups observed are the first nations communities inhabiting the forest and protected areas. The Western way of defining the manifestation of TEK and related dimensions will also be different when implemented in eastern countries, which are known for their complexity and cultural diversity. This circumstance affects the relationship between IPLCs with different cultures.

With its geography, demography, history, and ethnic diversity, a country like Indonesia requires a precise term according to its various ethnic groups. Especially in the case of the Bajau community, as a society that used to live a nomadic life and have diverse intercultural relations with other IPLCs. It is necessary to situate TEK indicators justifying the needs.

This dimension was constructed in two stages; the first was through a desk study of the Bajau TEK from various works of literature. This stage analyzed the nature and methodology of research on Bajau in placing a practice as TEK. The second stage was carried out after extracting data in the form of confirmation and justification. At this stage, the dimension in the first stage was used as a reference and elaborated using the grounded theory method performed in the field. This dimension was then validated using data triangulation techniques to determine the effectiveness and feasibility of this indicator.

This study proposes six dimensions to assess the TEK of the Bajau community. The definition that appears in this dimension is compacted according to the understanding and perspectives of the Bajau community (See Table 12). However, to meet the category of TEK, all the recorded practices must be related to these dimensions. Practices not captured in those dimensions are excluded from targeted observations or merged into practice with a broader scope. The practice that seems to be TEK is usually noticed intrinsically during observation based on an etic perspective. The researcher's keen sense of observation will determine the TEK complexity in each practice.

Table 12. Dimension of Bajau TEK

Dimension	Description
Classification	This knowledge can identify a living or non-living thing, mechanism, type of activity, or belief that is performed in the present time
Biodiversity	This knowledge contains information on biodiversity issues and understands the ecosystem services of these practices, areas, or beliefs, which can then be developed into issues of protection and conservation of natural resources.
Projection	This knowledge contains projections of the time setting in the form of seasons, life cycles, or specific moments that are commemorated and practiced communally in the past, present, and future times as customary identity
Activity	This knowledge contains customary practices, management system, and their significance that include daily activities in using marine resources and livelihoods
Spatial	This knowledge contains information about landscape and seascape, property rights, and access, which are places of practice and values of traditional beliefs
Spirit	This knowledge contains the ancestral stories, norms, and sacredness of an object or practice in accordance with the beliefs and values held

Tracing from the past, all IPLCs practices are embodied in TEK because they position nature and humans in one space that coexists. However, the shifting and other determining factors that drive this TEK practice must be categorized for its existence,

usefulness, and relevance to the development issues. These six dimensions, namely classification, biodiversity, projection, activity, spatial, and spirit, reduce this methodological gap. The components of this Bajau TEK dimension are related to each other as a cumulative knowledge-practice-belief. This differentiation makes it more straightforward to disseminate TEK, and its mechanism also effortlessly evolves into co-management. For instance, the projection dimension enables construction and prediction with the sustainability transition of resource population and use (Moller et al., 2004) through Bajau's term for adaptive management. Figure 24 illustrates the identification of a practice known as TEK.

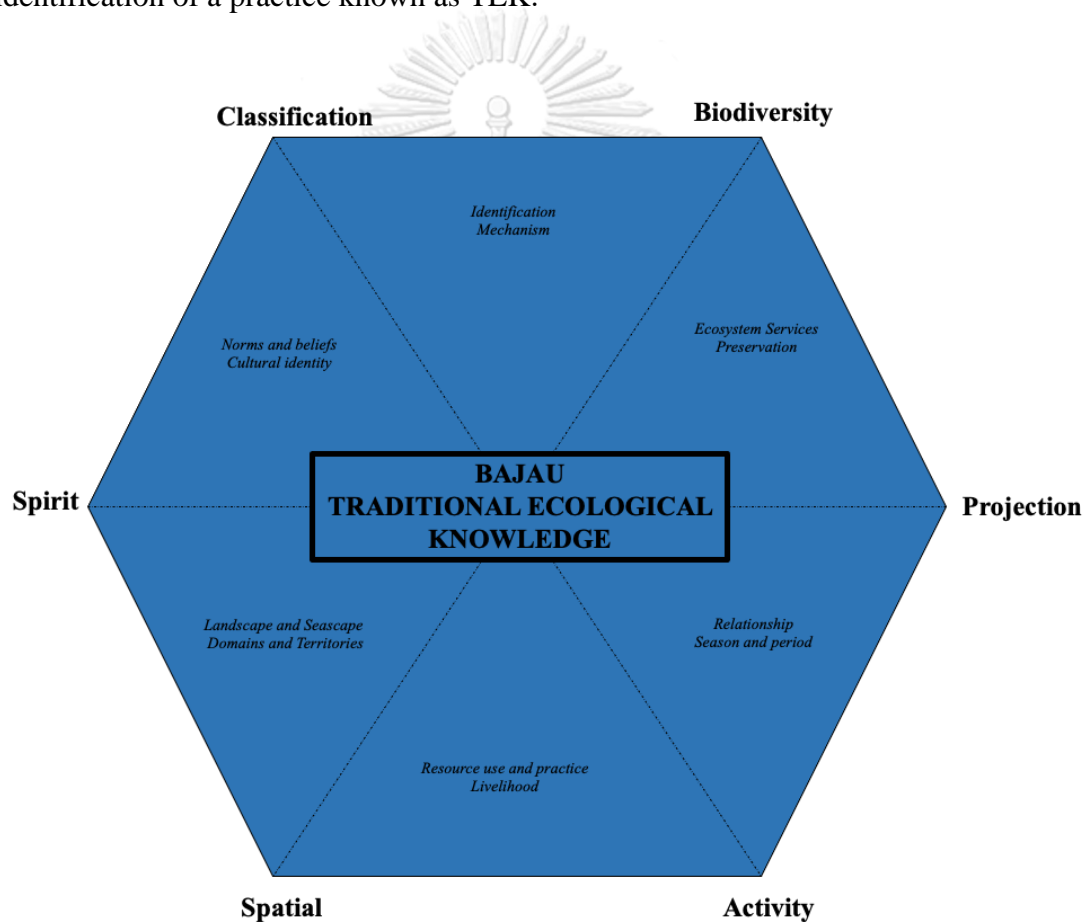


Figure 24. The dimension of Bajau TEK

4.3.3 Justification of Bajau TEK

After grouping and analyzing dimensions, TEK mapping is continued with identifying practices discovered in the field as grounded theory. There are 56 practices examined in this study. These practices are presented to be related to the classification and fulfill

the dimensions. This TEK cluster was defined according to observations and validated by the Bajau. The number of these practices could be more progressive, but with the limited time and resources of researchers, this number is assessed to represent some of the TEK practices that are still uncovered in the Bajau community in Wakatobi.

Conservation

Conservation practices for the Bajau are not only about areas and cultural sites but also about biota, living, and unliving things. This study found 18 practices related to conservation issues, whether in the land, coastal or marine areas. This practice illustrates how the Bajau people have the ability and potential to manage natural resources sustainably through conservation terms. The conservation practices of the Bajau are presented in Table 13 below.

Table 13. Bajau TEK: conservation

Code	Traditional Ecological Knowledge	Description
C1	Coastal and Marine sites	Knowledge of coastal and marine area mapping based on practices and beliefs passed down over generations consisting of mangrove areas, fishing ground, spawning ground, nursery ground, and seasonal migration
C2	Reef flats	Knowledge of the types of coral reef beds and reef flats in the marine areas based on the type, extent, and biodiversity <ul style="list-style-type: none"> • <i>Sapak</i> (atoll) • <i>Lana</i> (small atoll) • <i>Timpusu</i> (pinnacle reefs) • <i>Pupunsu</i> (small pinnacle reefs) • <i>Bintanak</i> (patch reef/back reef)
C3	Coral Reef	Knowledge of coral and reef species.
C4	Sea reliefs	Knowledge of sea relief based on the slope of an island or atoll
C5	<i>Panubaan</i> (low tide shell harvesting)	Knowledge of marine biota capture systems at low tides such as types of shellfish, snails and sea grapes, and others
C6	Mangrove	Knowledge of species identification (11 species), distribution, season, and the usage of mangroves for ecosystem services
C7	Seagrass meadow	Knowledge of species identification (10 species), distribution, season, and the usage of seagrass for ecosystem services
C8	Sea Cucumber	Knowledge of species identification (24 species), distribution, season, and the usage of sea cucumber for ecosystem services
C9	Shark	Knowledge of species identification (25 species), traditional fishing (<i>Goro-goro</i>), and the role of sharks in the food chain and marine ecology
C10	Tuna	Knowledge of species identification (9 species), distribution, migration routes, seasons, and traditional fishing
C11	Cetaceans	Knowledge of species identification (11 species) consisting of whales and dolphins regarding distribution, migration routes, functions in ecosystems, and traditional fishing practices using

Code	Traditional Ecological Knowledge	Description
		nature signs from cetaceans for catching tuna and other pelagic fishes
C12	Sea bird	Knowledge of the identification of seabird species that helps for fishing as nature signs and includes knowledge of seasons and breeding locations of those birds
C13	Sea Turtle	Knowledge of the identification of turtle species (6 species), spawning season and location, life cycle, and their roles in the ecosystem
C14	Hardwood and Trees	Knowledge of land ecosystem areas regarding the types of wood (33 species) used to make boats and tree-worship culture for healing purposes
C15	Living environment	Knowledge of determining the location of the settlement that considers marine resources, land resources, and social, and economic relations
C16	Groupers	Knowledge of reef fish (groupers) as the primary commodity with identification of species (24 species), season, location, life cycle, and effective traditional fishing methods
C17	Sacred areas	Knowledge of sacred areas both on land and in marine areas which becomes locations of traditional healing or ceremonies, and as important siting ancestral histories and spirits
C18	Sacred animals	Knowledge of biota that has ties of origin with ancestors in the form of location and socio-cultural issues: on land, brackish water, and marine areas
C19	Wakatobi Atoll	Knowledge of identifying atoll areas based on ontology, history, migration patterns, biodiversity, and the spirit found in the area

Ethno-fisheries

As the main maritime community in Indonesia, the Bajau, with its ethnos-fishing, is moved to become the actors in small-scale capture fisheries. Traditional fishing practices have become an inherent identity for the Bajau people. In areas where Bajau villages are scattered, such as Wakatobi, they place fishing centers in their villages. The sea as a living space has turned into a space that the Bajau community can exploit. This TEK has influential roles because it contains unique practices and functions as a mechanism to earn money and race along with capitalism. However, this mindset shift needs special attention because TEK is manipulated according to market demands, such as overfishing or illegal and destructive practices.

The variability of TEK in ethnos fishing is an exclusive means naturally passed down by their ancestors. This TEK covers activities before fishing, fishing gear, methods, practices, and hunting and gathering (see Table 14). This intellectual property is designated according to the type of biota, fishing time, human resources, and fishery organization system (the *Punggawa-Sawi* system).

Table 14. Bajau TEK: ethnos-fisheries

Code	Traditional Ecological Knowledge	Description
F1	Ethnos Fishing tools	Knowledge of various fishing gear used based on biota type, season, and fishing system
F2	Ethnos Fishing methods	Knowledge of fishing methods and systems according to certain types of biotas, fishing gears, and practices
F3	Ethnos Fishing Practice	Knowledge of marine resource fishing practices and activities
F4	Hunter and gather	Knowledge for hunting and gathering as a unified system that includes methods, practices, and specific fishing gear
F5	Pre-fishing activities	Knowledge in the form of customary norms and beliefs in the practice of catching marine resources which are carried out before carrying out fishing activities

As a society that is quick to learn about this fishery technology, the Bajau TEK has started to be juxtaposed with adopting fishing techniques that are considered more effective and make money faster. TEK ethnos fisheries Bajau is also slowly being absorbed by the mainland community in Wakatobi. The Bajau teaches fishing techniques to the islanders, such as *Ambai* gears (Bajau Lamanggau), kite fishing (Bajau Mola), catching sea cucumbers on the reef (Bajau Mantigola), and other related traditional fisheries systems.

This traditional fishing practice closely communes with the fishing rotation. The Bajau practice this fishing rotation following the targeted fish, season, and resource abundance. For example, The Lamanggau Bajau folks will fish using the hand-line technique during the grouper fishing season. Meanwhile, they change professions during the tuna fishing season to become kite-fishing drift fishers seeking dolphins, whale sharks, and sea birds to fish for schooling tuna. This fishing rotation also prevails in the Lohoa Bajau, the fishing rotation between octopuses, mantis shrimps, and mud crabs. Broader understanding, this practice shows that the variability of TEK in ethnos-fishing is very adjustable because of the robust capabilities of the Bajau.

Cultural beliefs

Cultural belief is one of the foundations of TEK. The relation between cultural beliefs and customary mechanisms can be leveraged to solve environmental problems (Chunhabunyatip et al., 2018). However, the development of this practice program is

not noticed because it talks about occult issues. This TEK is often marginalized because cultural beliefs are uninterpreted through the western science lens. In Wakatobi Bajau communities, their TEK receives more threats than protection to determine their cultural practice. The threat is the view of this practice as not aligning with officially acknowledged religions in Indonesia, such as Islam. The polemic between recognized religions in Indonesia and cultural beliefs spread throughout the region is one of the problems in the relationship between religion and the state (Sirait et al., 2015).

However, this concept is a determinant of the attitude and direction of a TEK development activity. This cultural belief for the Bajau can explain identity, norms, relations, human rights, and other sacred issues in a socio-ecological system. The normalization of these cultural beliefs is the impact of colonialism. At that time, the term *Adat* (custom) was used by the people of the Archipelago (refer to pre-Indonesian) without any clear definition to distinguish it from religion. The consequence of this colonial-era construction of *Adat* has led to the marginalization of the religious dimension in the practice of customary communities (Tuhri et al., 2019). Even some of their cosmology system with a strong relationship with nature and the environment (TEK philosophy) is understood to no longer contain religious elements. In the Bajau community, five TEKs were identified, observed in the study, and shown in Table 15 below.

Table 15. Bajau TEK: cultural beliefs

Code	Traditional Ecological Knowledge	Description
B1	Spirits of the sea	Knowledge in the form of customary beliefs in the spirits that exist in the sea (<i>Mbok Madilao'</i>) can provide convenience or damage to humans and nature
B2	Color of nature (<i>Anasir Alam</i>)	Knowledge in the form of belief in the colors of nature as outlined in every cultural activity
B3	Healing and nurturing nature	Knowledge in the form of customary beliefs in providing community healing and ecosystem sustainability as an integrated cultural system of human-nature relation
B4	Shamanism	Knowledge in the form of traditional healers (individual) about guidance and direction to preserve ecosystems with graduated sanctions based on ancestral beliefs (taboos)
B5	<i>Iko-iko</i> : circle of trust conservation	Knowledge in the form of spoken stories and songs over generations about the pristine of nature, romanticism, adventure, and history leads to moralism and community understanding of ecological preservation

The relationship between cultural and ecological beliefs in coastal and marine management has been widely practiced in Indonesia. Practices in the eastern part of Indonesia, such as *Sasi*, have been noted as practices of customary beliefs for protecting areas or biota both on land and at sea. In Wakatobi, MHA Sara Sarano Wali also has a kind of practice named *Kaombo*. Like the Bajau people, previous research has explained evidence regarding the role of sea spirits, especially *Mbok Madilao*' (B1). However, as discussed in this study, many cultural beliefs and practices related to preserving nature if explored deeper.

Two exciting discussions in this finding provide a new position in the Bajau lens regarding natural resource use and preservation. The first is shamanism (B4), an elder figure or knowledgeable person with the influence and power to drive the community's attitudes and behavior regarding their spiritual values toward nature. The Bajau people still believe in traditional beliefs (spirit and cosmology) and have more trust and respect in shamans than village officials, priests, and preachers. The sacred view of reality demonstrated by the Bajau shows the potential for collaboration with this shamanic concept. The Bajau people identify the categorization of shamans who treat and heal sicknesses because they are intermediaries between humans and sea spirits. A shaman is knowledgeable and skillful in concocting traditional medicines. Shamanism thus becomes a powerful force in controlling and managing natural resources (Reichel-Dolmatoff, 1976). Reenchanted shamanism and conservation in western science views were developed as collaborators for ecological or neo-shamanism issues (Pirri, 2019; Stuckrad, 2002).

Secondly, the uniqueness of Bajau cultural belief is *Iko-iko*, an art of speech that articulates past life situations, one of which contains an ecological message. *Iko-iko* is the platform for indigenous education for cross-generational teaching, entertainment, and a circle of trust in a deep ecology understanding for the Bajau. The message in *Iko-iko* is deemed a traditional belief that combines fictional stories spiced up with Bajau cosmology. *Iko-iko*, as a belief, describes how nature and humans coexist. The existence of these *Iko-iko* has started to verge extinction because it is less attractive to the younger generations and cultural protection by local governments (Muslim et al.,

2020; Nuraini, 2012). For the Bajau, who do not have a written heritage, *Iko-iko* is one of the media to convey this information over generations (Adri & Anwar, 2019).

Belief as the foundation of effort and action has a paramount role because it regulates the cosmological facets such as the Bajau. The existence of cultural beliefs is identical to other elements of Bajau TEK. Its presence exists due to it being strengthened by other TEK elements. Compared to other TEKs, cultural beliefs are way vulnerable to socio-dynamic influences, especially the impact of acculturation and religious points. Identifying cultural beliefs as heretical instructions from the dominant Islamic group is the strongest peril in this TEK degradation.

Customary Laws

Customary law is a form of extension of a cultural belief that is linked to practices and rules, both written and unwritten. Customary laws play a significant role in TEK because they regulate people's way of life, actions, views, and attitudes in social interaction. For the Bajau, their customary laws are all unwritten and disseminated by oral sacredness, distinguished as identity, norm, taboo, and ancestral proverb. As a cultural expression, customary rules must be enclosed in sustainable resource management. The preservation of TEK in customary laws has bestowed sustainable resource management, such as marine conservation (Techera, 2008), forest conservation (Astoria et al., 2022), and also biodiversity loss (Robinson & Raven, 2019).

The taboo concept for the Bajau communities goes beyond cultural beliefs but is interconnected with each other. Customary laws strengthen a cultural belief in conducting an action. This study categorizes taboos as part of customary laws over the cultural beliefs governing every Bajau community practice. However, many previous studies introduced the concept of customary laws as part of cultural beliefs. One of them is introducing the concept of *Pamali* or taboos (L3) (Djohani, 1996; Maulidyna et al., 2021) as an element of spirituality for Bajau conservation practice. This study identifies four customary laws as part of the Bajau TEK (Table 16).

Table 16. Bajau TEK: customary laws

Code	Traditional Ecological Knowledge	Description
L1	Human-Nature Philosophy: moral and identity	Philosophical knowledge of interpersonal and intrapersonal relations with nature as a communal ideology
L2	Bajau Norms	Knowledge of the rules of life and socio-cultural preference that become the standard of behavior in society
L3	Pamali (Taboos)	Knowledge of the socio-cultural rules over generations that regulates the daily guidance in every activity (taboos)
L4	Proverbs	Knowledge about the philosophy of life of the ancestors as outlined in quotes and proverbs that are always relevant to this social condition

The Bajau recognize five fundamental ideologies representing their customary relations (Figure 25). Besides norms (L2) and taboos (L3), human and nature relation (L1) is the basic rules of the Bajau in life. The meaning of the word "Si" is an affirmation of the nature that defines what the Bajau communities "must-have," such as the following characteristics:

Table 17. The Bajau Philosophy

Philosophy	Definition	Reflection
<i>Si Karimanan</i>	Caring	The relation of the Bajau to sea spirits
<i>Si Kamaseang</i>	Loving	The relation of the Bajau to nature (living things)
<i>Si Katutuang</i>	Nurturing	The relation between the Bajau and nature (unliving things)
<i>Si Pakarisa</i>	Understanding	The relation of the Bajau to humans (acceptances)
<i>Si Tutuloh</i>	Helping	The relation of the Bajau to humans (actions)

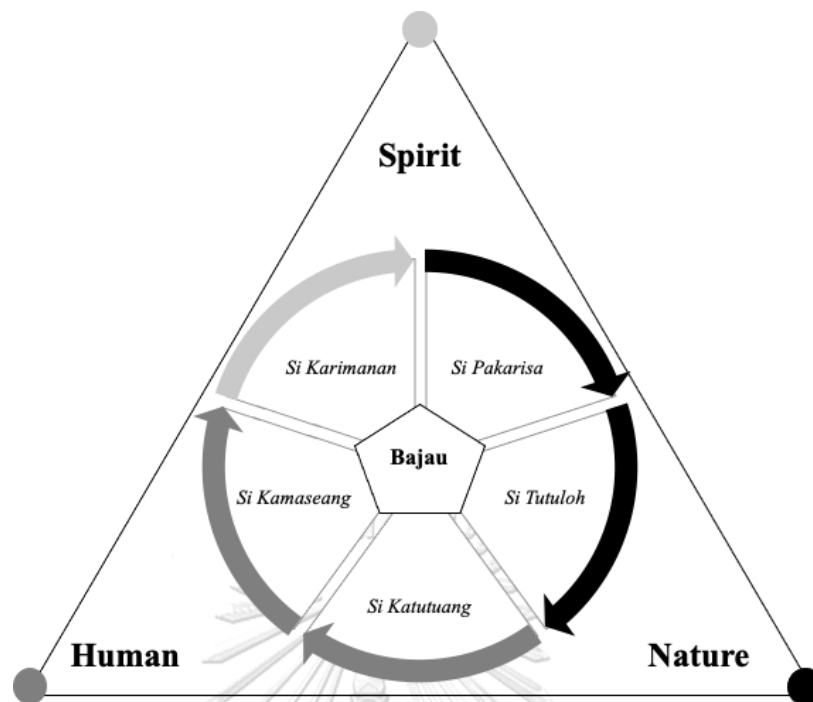


Figure 25. The human nature relation of the Bajau

The customary law system links spirituality and environment intrinsically, and changes in beliefs and ecology reflect each other in complex ways (Simonin, 2015). This situation clearly shows how a TEK is without customary laws. The implementation of TEK is needed supervision and management from a customary institution. In Indonesia, the integration of customary law into natural resource management is stated in Law No. 32/2009 on environmental protection and management. This law only grants legal status but does not provide vital access and inclusivity to its natural resources for customary communities, including sea people. As an umbrella act that also defines MHA terms, several debates occur about the objectivity and implementation of this law.

As a TEK, the customary laws can regulate the practice of the Bajau communities regarding various conservation efforts, including marine waters, coastal ecosystems, mangrove forests, and marine resources. Such taboos for an ecosystem (for instance: sacred areas) contain a prohibition on exploiting these resources. If the Bajau violate, they will obtain social or karmic sanctions in the form of *Taruak Panyala*. This living karma expresses a person tortured by nature in this world because he/she has damaged nature.

Weather and Cultural Astronomy

As a marine-oriented group dependent on natural phenomena, the Bajaus are a dedicated group in meteorological and astronomical observations. These TEKs aim to become guideline and mean of survival in sailing, fishing, and adapting to hydrometeorological threats. This TEK shows how the Bajau position the moon, stars, and sun as a direction, time, and seasons. They combine detailed knowledge of the positions of stars, moon and sun, and constellations with appropriate terrestrial events, such as changing weather patterns, animal behavior, the availability of plants, and seasonal diseases.

Some of this TEK is documented in an oral history passed down through generations (*Iko-iko*) demonstrated in seasonal weather calendars and natural disasters. The Bajau is highly valued by these TEK today. The Bajau communities use these TEK to direct sailing and fishing to manage food variability, prevent threats, and inform seasonally dependent cultural events. Apart from being skillful in fishing and diving, outsiders label Bajau communities as specialists in distinguishing the nature signs. Bajau TEK in this categorization consists of 11 types in the form of identification, adaptive capacity, folklore, and natural resource availability, as described in Table 18 below.

Table 18. Bajau TEK: weather and cultural astronomy

Code	Traditional Ecological Knowledge	Description
W1	Star reading	Knowledge of the ability to read constellations used as navigational references, seasonal changes, cultural ceremonies, and other natural signs
W2	Traditional Compass	Knowledge of making traditional compasses used when unable to see stars or other natural signs in case of bad weather.
W3	Bajau Epistemology	Knowledge of the relationship of natural phenomena related to daily activities through the justification of practices and rationality of beliefs as outlined in simple symbols
W4	Weather Forecasting	Knowledge in predicting weather changes by observing natural signs from both living and nonliving objects
W5	Cloud	Knowledge of identifying cloud types (6 types) and their impacts
W6	Rain	Knowledge of identifying rain types (7 types) and their impacts
W7	Wind Speed	Knowledge of identifying types of wind speed (5 types) and their impacts

W8	Wave	Knowledge of identifying types of waves and waves (6 types) and their impacts
W9	Depression	Knowledge of identifying the type of tropical depression (male or female) based on the direction of arrival, time of day, predicted strength, and size of cyclone eye
W10	Seasonal calendar	Knowledge of seasonal changes in the form of climate, social and cultural activities, gender role, income, and the planting season of mainland people
W11	Moon Phase	Knowledge of the phases and number of lunar days associated with fishing activities and the occurrence of other hydrometeorological disasters

The capabilities of the Bajau authenticate that their socio-ecological value that links the relationship between knowledge-practice-spirit is still remarkably substantial in several TEKs. While highlighting synergies with the modern weather and climate knowledge system for co-production of knowledge, these TEK conforms to be incorporated into a local-based management system (Balehegn et al., 2019; Ebhuoma & Simatele, 2017; Green et al., 2010; Nyadzi et al., 2020). More advanced weather knowledge can be used for climate change assessment, resilience, and adaptation (Bohensky & Maru, 2011; Lefale, 2009; Nakashima et al., 2012).

Furthermore, astronomy is recognized as the oldest human science, connected worldwide for millennia by celestial cycles, objects, and events recorded in the calendars and rituals of our ancestors (Venkatesan et al., 2019). In this cultural astronomy, Bajau TEK portrays the interaction between the moon, stars, and the sun, indicating the contemporary nature changes in land, sky, and sea, including human interaction. This phenomenon is a definite pattern observed for generations by the Bajau people. This phenomenon transcends into the written Bajau sign in Epistemology (W3) and is documented as tangible heritage. Undoubtedly, this cultural astronomy has a unique grounding in the cultural and scientific practices of the Bajau through TEK. Similar to TEK about weather and climate, the cultural astronomy of the Bajau community can also be combined with western science into a management system. The implementation challenges are the availability of data documentation, validation, institutional support, and regional commitment to using community-based management in the form of TEK development.

Adaptive management

Adaptive management for the Bajau community is their capability to heal up and come back with a solution in adapting to their complex natural resource management challenges and unhealthy intercultural relationships. TEK in this category is adaptive to changes in its surroundings, including ecological, socio-cultural, or economic influences. In adapting to those changes, the Bajau, with its coping strategies, must survive to be accepted by the surrounding community. This social mechanism of a TEK contains several adaptations for the generation, accumulation, and transmission of knowledge, institutionally for social regulation, cultural internalization of traditional practices, and the development of appropriate worldviews and cultural values (Berkes et al., 2000). Also, this TEK can be used to analyze the gender environment and development in Bajau communities.

Adaptive capacity towards a more expansive approach pays attention to ecosystem dynamics and environmental change. Reflecting on the Bajau TEK, adaptive management has an important role as a savior for degraded TEK and an opening for knowledge exchange and management systems. Some Bajau adaptive management practices have evolved into a commodity with value as an economic source. Their expertise invites the interest of capital owners to employ Bajau exclusively. This transactional relationship emerges in boat building, rowing sports, and driving strokes. In addition, in this TEK adaptive management, other development issues and small-scale fisheries are also observed in this research. Hence, these TEKs are relevant to co-management in facing global changes. There are 12 TEKs related to adaptive management as follows.

Table 19. Bajau TEK: adaptive management

Code	Traditional Ecological Knowledge	Description
A1	Boat	Knowledge of boat making, spiritual connection, and types of boats used for fishing by the distance and fishing activities
A2	Sail/Sheet	Knowledge of the type of sail used according to wind speed, boat dimensions, and materials.
A3	Rowing and driving stroke	Knowledge of rowing techniques and driving strokes of a boat according to wind direction and wave height

A4	Fishing Periods	Knowledge of fishing period based on accessibility and fishing area (4 types), which is also identified as a term of 'work'
A5	Fishing Migration	Knowledge of ancestral fishing grounds that require migratory practices, such as living in a houseboat
A6	Food security	Knowledge of food systems both from land and sea as the primary and alternative food sources for certain seasons
A7	Houses	Knowledge of the identification of house types (7 types) as living spaces for generations
A8	Aquaculture	Adaptive knowledge about aquaculture
A9	Cultivation	Adaptive knowledge about permanent and shifting cultivation
A10	<i>Pupur</i> powder (Sun protection)	Knowledge of skincare from the sun using natural ingredients and traditionally handmade
A11	Ethnomedicine	Knowledge of traditional medicines sourced from the sea and land
A12	Better management practice	Adaptive knowledge of sustainable fisheries systems integrating traditional practices and modern knowledge

Furthermore, the development of these TEKs is mainly associated with the concept of Adaptive Co-management (ACM), an extended concept of co-management that an idealized narrative has formed with relatively logical and empirical evidence (Marschke & Nong, 2003; P. Olsson et al., 2004; Plummer & Armitage, 2007). ACM has the potential to broaden the area of desired management, stabilize existing domains, and make social-ecological systems more adaptable to change. ACM is one of the potential techniques for modifying unsustainable social-ecological feedback as a governance option (Armitage et al., 2009).

The concept of ACM and Bajau TEK can persist while strengthened by adequate recognition and situated programs according to the needs and socio-ecological threats in the villages. If tracing back to Bajau history, this adaptive management was the first TEK mastered by the Bajau when transitioning their life orientation from the land-to-sea movement regime (Liebner, 1996) or currently from the sea-to-land (sedentarization). Alternatively, previous works regarding the origin of the Bajau have genetic similarities to mainland communities on Borneo Island (Kusuma et al., 2017). For example, it is the process of genetic adaptation with a larger spleen size (Ilardo et al., 2018) than people living on land.

4.4 Nature and Property of Bajau TEK

Many people are misunderstood in investigating the Bajau TEK regarding the living orientation towards the sea. Complex historical evidence and reference information in the literature about the Bajau indicate their 'cultural relation' with land resources. Moving on from this hypothesis and then linked to the TEK, the nature of Bajau have a connection ranging from social, economic, and cultural with mainland communities. This interaction cover accessibility to land ecosystem service and human security.

This research proves that TEK from the Bajau community is also practiced on the land. The conditions of Bajau communities are sedentary, both on land and on the water, indicating that they need access on land not only to sell their fishery products but also for basic needs. These intentions are physiological needs such as food, water, raw material for shelter, boats, clothes, and public facilities provided by the government. In Wakatobi Bajau, their ancestral domain on land is not found. However, Bajau elders stated that in several places outside Wakatobi, the Bajau have customary territories on the mainland, especially in small islands they have inhabited over generations. On the East Coast of Malaysia, the Bajaus have an ancestral domain on the mainland (Acciaioli et al., 2017; Walton & Moody, 1984). In addition, many relics, myths, rituals, and historical traces of Bajau are encountered around that place (Hussin, 2019; Jubilado, 2010).

Nature mapping of TEK in Bajau Wakatobi is presented in Figure 26. These data were mapped using the transect walks method based on land and sea topography. To discuss the result, group interviews were conducted. This TEK mapping is based on ecology, as shown in Table 20.

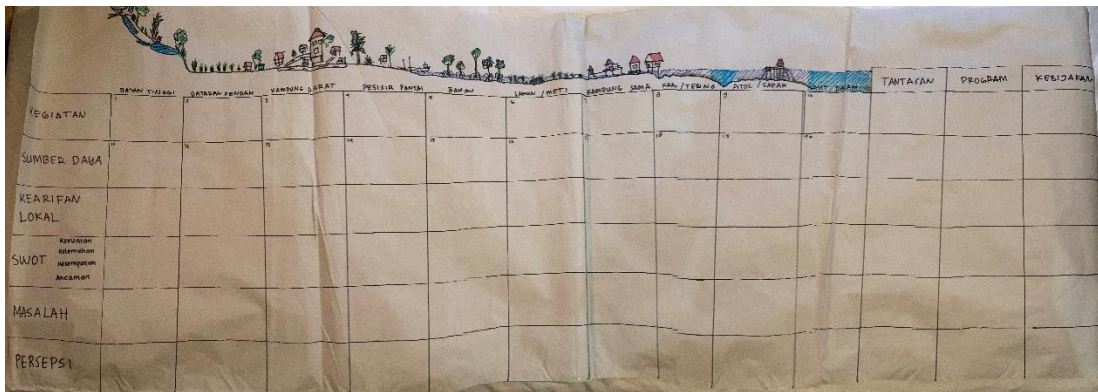


Figure 26. Identification of nature of Bajau TEK

Table 20. The TEK mapping based on ecology

TEK Ecology	C	F	B	L	W	A
High land	C14		B2 B3	L1 L2 L3 L4	W1 W2 W3 W4 W5 W6 W7 W8 W9 W10 W11	A1 A6 A11
Low land			B2 B3			A1 A6 A9 A11
Land Community	C18					A1 A3 A4 A5 A6
Coastal areas	C1 C13 C17	F1 F2 F3 F4	B1 B2 B3			A1 A2 A3 A4 A5 A6 A7 A11 A12
Mangrove area	C1 C6 C12 C17	F1 F2 F3	B1 B2 B3			A1 A2 A3 A6 A11 A12
Seagrass meadow	C1 C4 C7 C8	F1 F2 F3 F4	B1 B2 B3			A1 A2 A3 A6 A11 A12
Bajau Village	C4 C15 C17	F5	B2 B3 B4 B5			A1 A2 A3 A7 A8

						A10 A12
Coral reef area	C1 C2 C3 C8 C17 C18	F1 F2 F3 F4	B1 B2 B3			A1 A2 A3 A4 A5 A6 A11 A12
Atoll area	C1 C2 C3 C8 C16 C17 C18 C19	F1 F2 F3 F4	B1 B2 B3			A1 A2 A3 A4 A5 A6 A12
Depth-sea	C1 C2 C16 C3 C9 C10 C11 C13 C17 C18	F1 F2 F3 F4	B1 B2 B3			A1 A2 A3 A4 A5 A6 A12

The Bajaus in Wakatobi have not thoroughly relished the public facilities. In particular, the issue of providing a clean water system. Privatizing water in Wakatobi has become a significant issue for the Bajau communities. In all Bajau villages, water resources have been privatized by islanders. The Bajaus have to spend money to meet their clean water needs. There are Bajau villages where water pipes have fed, and some still buy water to land. Their hereditary wells and other water sources have been turned into private settlements, markets, or tourism points. These water resources are also vulnerable to political material by those who have water during a democratic party. The intimidation of the issues cut off the clean water source, and not selling water to the Bajau was raised to terrify them for political reasons. In this context, TEK (C15) for discovering water resources has been wholly graded into a political issue of natural resources.

Another example of Bajau TEK's relationship is access to graves on land. The Bajau people need land to bury the dead bodies of their families in Islamic care. To access

this area, the Bajau must request permission from surrounding customary communities to let them a square land for the graves. The responses given by these dominant customary groups also differed in Wakatobi. Some provide the access land for free as a cultural mutualism history, or some sell it to the Bajau communities (in the context of village assets).

One of the places considered to be the burial area of the Bajau people is Hoga Island in Kaledupa as the burial place of the Sampela and Lohoa Bajau. Bajau people are forbidden to bury their dead on this island. Nevertheless, in 1995, Operation Wallacea -an observation station, was established. The government took Hoga Island from Bajau as a tourism and educational field. Also, this island is located in the MHA Barata Kahedupa, it is their cultural asset. The same situation has also happened in Lamanggau Bajau, where the grave area of the Bajau was isolated from the land people. They needed to approach the islanders and intermarry to obtain these grave areas. However, this grave land case is often associated with identity politics. The landowner or islanders intimidate the Bajau to vote for their representative during a democratic party. TEK on the living environment (C15) can also be ecologically politicized in this context.

However, the conditions in Wakatobi, which are in a state control protected area, and the government's initiation for MHA (granting marine tenure and communal property) have complicated the meaning of the 'sea' from the Bajau positionality. This complexity indirectly affects their TEK and its implementation. The Sea is glorified to communities (MHA) or states target (conservation and economic visions) and restricted to powerless maritime people like the Bajau. The perception of this concept of property regime needs to be equalized forth (Acheson, 2015; Ostrom, 2008), such as common, private, or state property for Indonesia. Moreover, economic dependability and tenure arrangements in marine ecosystems determine maritime property rights (Acheson, 2015).

4.5 TEK: conservation and sacred areas in coastal and marine areas

“As discussed in the Sub-chapter 4.3 and 4.4, the Bajau TEKs were grouped into six justifications. This chapter expands on the selected TEK most significant to the

research discussion. There is the TEK on conservation (C1-C19) and more detail about TEK on sacred areas (C17).”

The concept of Bajau TEK is illustrated by the philosophical human-nature relationship based on their spirit and cultural beliefs. Moreover, the most observable practice of the Bajau regarding coastal and marine management is the embodiment of sacred area understanding. The sacred area near means the concept of marine protection based on customary beliefs or refers to the LMMA definition. The acquaintance of conservation itself is categorized as TEK justification, and so is the meaning of sacred areas. TEK for conservation practice and sacred areas are not segregated in the daily life of the Bajau.

4.5.1 Contesting the meaning of ‘Conservation’ for the Bajau

In Indonesia, the paradigm shift in conservation was increasingly sticking out during the new order (1966-1998). In 1978, marine conservation in Indonesia began with the “*Lokakarya Taman Laut*,” or ‘Marine Park Symposium,’ which initiated the proposal of marine conservation in the form of the marine national park (Halim, 2014). Through this event, the development of natural protection and conservation in marine waters was accepted as a new concept and discussed at the cross-sectoral national level.

The initiation of water or marine conservation was formulated later than forest conservation which existed during the colonialism era, around the beginning of the 19th century (Yudistira, 2014). During this period, the term ‘centralized democracy’ meant uniformity in Indonesian society, which pushed the practice and existence of customary communities cornered. In land-based customary communities, this phenomenon was most felt in the weakening of traditional institutions and TEK and land grabbing, which were deemed incompatible with the concept of guided development in Indonesia (Muchlis et al., 2016). This phenomenon affected top-down sedentarization in marine nomad communities such as the Bajau until the early 1990s. Also, it contributed to the cultural degradation and identity, then changed their way of life to become more land-based oriented (Clifton, 2014). As a result, their concept of deep ecology is slowly buried in the harsh competition of cultural survival and capitalism.

The Bajau were born in the sea and spent most of their time in the vicinity of the vast ocean. The sea for the Bajau is a living space that has no boundaries. The sea is also identified as a symbol of freedom and independence (Sather, 1997; Sopher, 1965). Bajau's perspective on conservation includes human activities, TEK, and social values that depend on natural resources for survival and the continuation of cultural heritage.

The Bajau is conscious that their rudimentary philosophy connects humans and nature through TEK. This relation is momentous for the Bajau to deliver a critical gaze where nature is not only capital but also a cultural space and deep ecology. It advances their belief that the sea and its biodiversity will continue to support the life of the Bajau community in the future. For the Bajau, there is no clear distinction or dividing line between conservation, life, and culture. Nevertheless, on the implementation side, the knowledge assets of the Bajau are still overlooked as a potential community-based conservation practice.

Apart from being a place to grow, the sea has a social dimension that allows the Bajau to survive. This social dimension relates to values, norms, rules, and roles in coexistence with nature. Three basic categories can be found in the Bajau community regarding the meaning of this social dimension from ethnoecology. Ethnoecology bridges hybrid knowledge from locally relevant knowledge with globally relevant scientific principles (Barrera-Bassols & Toledo, 2005; Berkes et al., 2000; Pauli et al., 2016). The first is the body of knowledge or *Corpus* dimension, the relationship between the Bajau people and nature, which can be interpreted as TEK. The second is the *Praxis* social dimension or cultural practices, which describes the relationship between the Bajau and their community in a social and local management system and customary institution. While the last is the social dimension of the *Cosmos* or beliefs associated with the traditional beliefs of the Bajau people in the spirit of the sea or *Mbok Madilao'*.

Concerning conservation terms, Bajau's social dimension signifies opportunities for SDGs with a community welfare approach. Bajau and their TEK can be synchronized toward natural resources because they have traditionally discussed conservation

strategies and autonomous implementation. Although they are encountering rapid global changes and economic pressures, their adhesive to the marine ecosystem indicates that the Bajau are a group that upholds sustainability. The sea is more than just a place to live for the Bajau; they have more traditional, cultural, and spiritual connections to the sea rather than simply economic (Stacey, 2007). This knowledge is deeply intertwined with the Bajau worldview, a syncretic form of Islam with its cosmology (Sather, 1997).

The Bajaus do not have the equivalent of the word conservation specifically. They have intersectional connotations to represent the conservation terms connected. Those words have a broader meaning than just 'conservation.' *Taruak Panyala*, or 'getting a reprimand from the spirit of the sea,' is the most instantaneous term that illustrates how the Bajau people have the prevalent belief not to enter a prohibited area, damage the ecosystem, or speak disrespectfully to nature. Those Bajau who violates these unwritten customary laws will get a calamity either in worldly warnings such as minor illness or even lead death.

Taruak Panyala might have long-term impacts and can be inherited according to the level of disgrace made by the Bajau. Practically, *Taruak Panyala* is closely related to daily activities such as fishing at sea or known as Mamia Madilao (Utina, 2017). Apart from being prescribed as an activity, *Taruak Panyala* can also be associated with sea or land areas, living and non-living objects that the Bajau believe have a spirit in that area. Compared to sacred ecology by Berkes (2012), this strengthened cosmology by practices is more effective in familiarizing the mainstream conservation issues.

The government and NGOs have a crucial role in restoring the conservation identity of the Bajau community. Through TEK documentation and locally based development approaches, at least one can restore the remaining conservation practices and discuss them in a collaborative program. Strengthening conservation governance and granting access rights with a participatory approach is a meeting point between institutional needs for conservation targets and the sustainability of the livelihoods of the Bajau. Similar to the supply-demand concept, there is no need for mutual accusations or

labeling Bajau as un-ecofriendly exploiters at this time. In the long term, those negative views lead to the degradation of Bajau TEK in marine resources (Do Khac, 2018). The identification of sustainable, self-reliant alternative methods of fishing and livelihoods together with the Bajau people is the key to their participation in the planning and implementation of management in marine protected areas (Djohani, 1996).

4.5.2 The Bajau sacred areas in Wakatobi

As a marine-oriented community, the Bajaus have a bond to ecosystems both on land and at sea. They expressed this relationship in a quote, "*Lamong para daong ma dara, para dayah ma dilao,*" or 'the more the leaves on the land, the more the fish in the sea.' Bajau people believe that the sea and land have a horizontal affinity based on the people who inhabit them. As simple as the land is planned for people on land (*Bagai*), while the sea is designed for the Bajau (*Sama*). These two characteristics are interdependent: the food supply and demand, market system, resource mobilization, and other issues. The Bajau philosophy deciphered the understanding of coastal and marine resources, placing the connection between nature, spirit, and humans in the same position. The concept of knowledge-practice-spirit is outlined in a deep ecology understanding.

The Bajau believe that spirits occupy every space on earth. Humans who want to enter the territory must respect the spirits who own its space. Customary belief is a core of this respect to spirituality. For the Bajau, as a maritime-oriented community, cultural activities and traditional beliefs are dominated by the spirit that exists in the seascape. The Bajau acknowledge the term *Mbok Madialo'* (spirit in the sea), who oversees guarding, supervising, and allowing Bajau people to conduct any activities there. *Mbok Madilao'* is believed as the Bajau ancestors who have supreme powers and stay in the sea. *Mbok Madilao'* consists of eight ancestors and believes in their respective skills to give healing or warnings to the Bajau people when they do not nurture the sea. This belief is still abode by the Bajau, which can be seen in the *Maduai* practice (healing activities) by giving offerings to the spirits at sea for various cultural ceremonies and when they are sick.

The existence of this spirit is associated with the protection of space and species. The shape of this sea spirit can be transformed into an animal or other sacred object. If the Bajaus meet this spirit, they possibly get lousy luck or help when they have trouble during fishing. One of these incarnations is a giant octopus (*Kutta 'Sillah*) with odd tentacles (five or seven) believed by the Bajau to live in a particular sea area. The Bajau sacred this area because they fear life-or-death karma. It is caused when they violate customary norms and beliefs through cursed words or other taboo terms (*Pamali*). The Bajau people who receive this karma or *Taruak Panyala*. Regarding the conservation and protection of marine resources, the idea of sacred ecology is MPA and has the prospect of being molded as ICCAs (Day et al., 2019). Due to these practices arranging matters relating to the survival of ecosystems and marine biota and essential things is the right of customary communities to their domains.

Based on ecological characteristics, the Bajau people divide these sacred areas into three features: inland areas, seashores, and high seas. The inland sacred areas contain graves, dense forests, caves, hills, rivers, and water sources. In seashore, the areas consist of shallow water where large sacred shells are sheltered, dead coral stored under the sand, large trees on the coast for offerings, mangrove forests, and small islands for resting when a hydrometeorological disaster occurs hits. The last sacred area is the high seas, consisting of atolls, straits, and other underwater morphology. Various cultural activities are located in these sacred areas. One is the *Maduai Arak* ceremony, which drops bottles of traditional wine on the fragmented reef wall area (Pakito) around their village for healing purposes (See Figure 27).

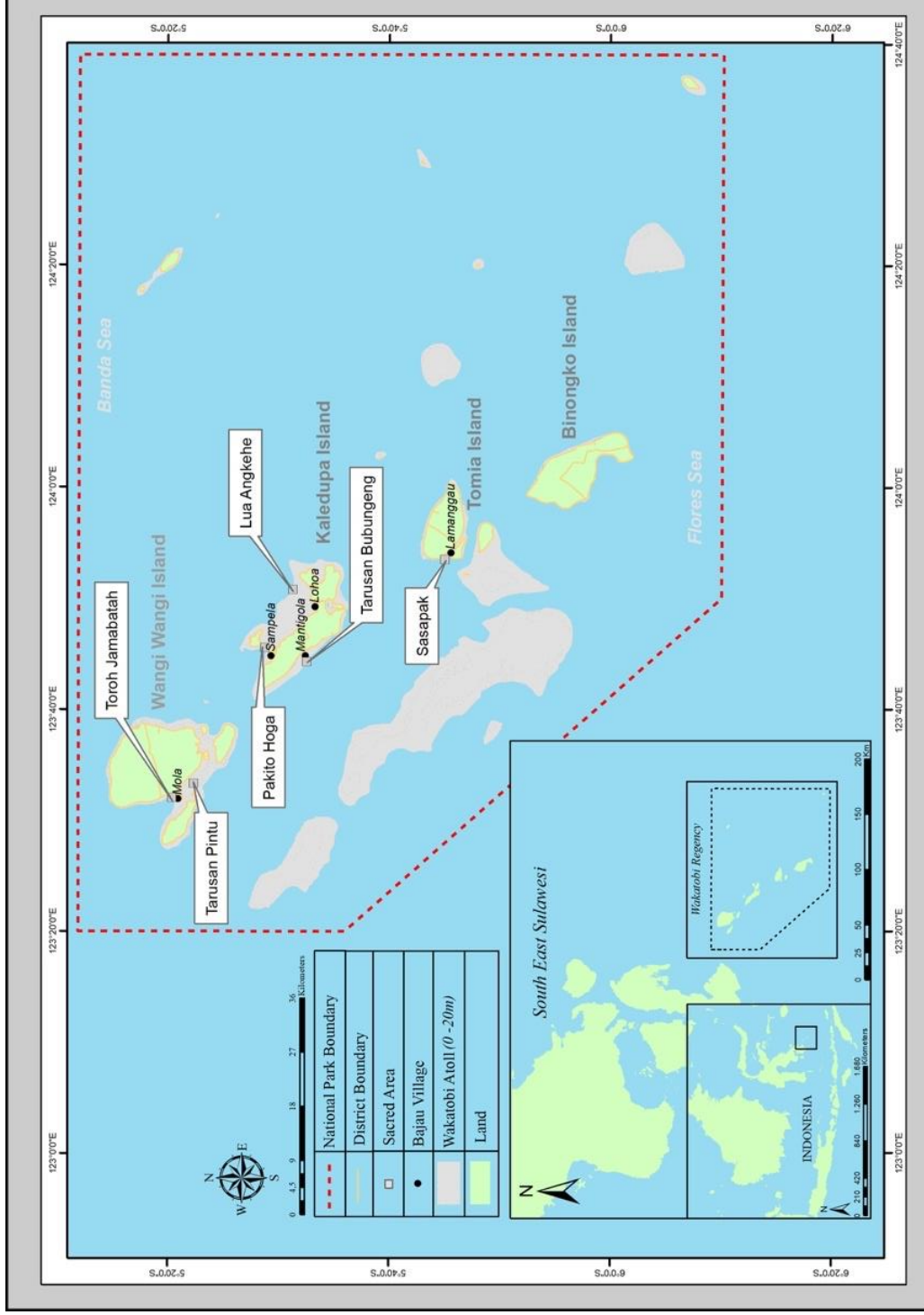


Figure 27. Maduai Arak locations of the Bajau Villages in Wakatobi

The atoll area in Wakatobi is the second-longest atoll in the world. There are several atolls in Wakatobi, and the top three biggest are Kapota Atoll, Kaledupa Atoll, and Tomia Atoll. The distance from Bajau village is more than 13 nautical miles from their villages (depending on their village location). The atoll area (*Sapak*) is the main fishing ground of Bajau communities in Wakatobi or even Bajau outside Wakatobi. Previously, when the Bajau were still living in the boathouse (*Soppe'*), they would gather on the *Sapak* in the calm season (*Pamamiaan*), ranging from August to December. Their activities in Wakatobi atoll are shell harvesting and spearfishing. Currently, the Bajau livelihood in Wakatobi is entirely dependent on the *Pamamiaan* season. In the past, they carried all their family members, but now predominantly only men. Since *Soppe'* was no longer there, the Bajau initiated building stilt houses around the atoll to keep their stuff and sleep during *Pamamian* season.

The Bajau followed this rotational fishing practice, where they fish in a particular area based on the fishing season. They believe that rotational fishing was part of marine seasonal closures regarding the time for the species to regenerate. In the past, outside of that *Pamamiaan* season, the Bajau did not fish in the Wakatobi atoll because fish and other marine resources were still abundant around their village. However, this practice has changed lately because of their vulnerability to economic pressures to maximize their financial capital. They began to overexploitation of atolls and other opportunities to earn money. This situation results from changes in the socio-cultural pattern and capitalism practice of the Bajau community, where their mindset is now asset oriented. The sea is not only a socio-cultural space but has changed its function into a space that can be exploited optimally.

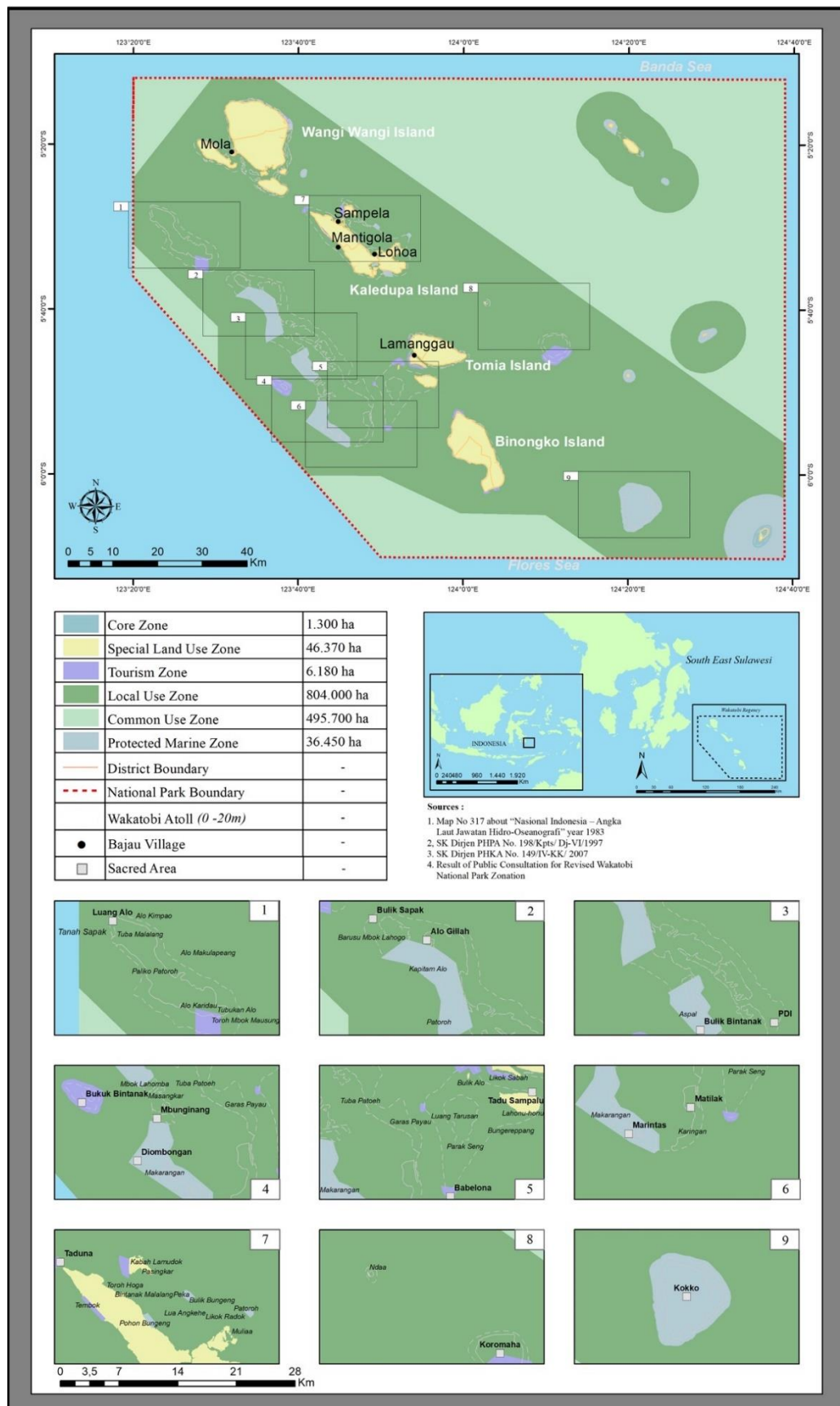


Figure 28. Sacred areas of Bajau in Wakatobi

The Bajau sacred areas in Wakatobi are scattered healthy marine ecosystem areas. Figure 28 shows the intersection of the WNP zonation and the Bajau sacred areas. Those overlaid areas have the potential to be developed as ICCA co-management in marine areas. A negotiation scheme is needed to confess the Bajau needs and institutional issues. If the overlaid site locates in the MHA area or other customary communities in Wakatobi, further deliberation must be conducted wisely to reduce the possible customary conflicts. However, these Bajau sacred areas still take a peripheral role in WNP. The WNP should amalgamate their contemporary conservation methods into collaborative work with Bajau sacred areas, including their TEK institution. Advance consideration and documentation are required in terms of the needs of sacred areas to become a co-management program in the WNP area.

4.5.3 Deliberating conservation regime for the Bajau in Wakatobi

The readiness and existence of Bajau TEK conservation are significantly different for each. Not only from the frequency of use but also how deep this knowledge can be likened to conservation. The conservation practice that has attracted the institution's attention is sacred sites. 'Sacred' refers to any expression of TEK that symbolizes or pertains to religious and spiritual beliefs, practices, or customs (Gervais, 2003). This practice is required to protect marine areas linked to 'conservation targets' by organizations. The targets include mangrove areas and spawning grounds.

This understanding is a good indication of the Bajau TEK development schemes in terms of conservation. However, the dominance and identification of TEK as a privilege to only 'conservation' are one of the degraded meanings of customary practice. In sustainable resource management, a human dimension is assigned as the leading actor in conservation. Inadequately, conservation practice on different dimensions of human well-being remains unclear, dispersed, and inconsistent (McKinnon et al., 2016).

This situation is seen in the context of Bajau in Wakatobi on how 'society and organization' impose their ethnocentrism understanding of conservation as outsiders to the Bajau. Instead of exploring the lexical and practical meaning of conservation within Bajau, they accuse Bajau of not having a conservation practice due to their coral mining

practice and destructive fishing. Whereas destructive practices are also found in inland communities of Wakatobi, for example, the installation of *Bubu* and *Sero* (traditional fish traps), sand mining, and marine littering. Although some concepts of capture fisheries are defined as TEK from land communities, they also imply techniques that might damage the environment. However, their skeptical views among the dominant communities have never questioned destructive practices and do not adhere to this conservation principle.

TEK, the spearhead of conservation practices of the Bajau, must be documented first, rather than bringing new conservation issues to their livelihood. If these needs are adequately met, the issue of Bajau TEK conservation can be strengthened by conservation introduced by the organizations in Wakatobi. Actions to conserve nature and natural resources are closely related to community communal rights, significantly the Bajau, to ensure their livelihoods, enjoy healthy and efficacious environments, and live with dignity.

The Bajau in Wakatobi is located in the marine national park area and must adapt to the WNP conservation management model. The conservation management model of WNP is divided into several areas of activity, namely nature conservation patterning and information, conservation area management, species and genetic conservation, and utilization of conservation forest environmental services (Wakatobi National Park, 2020). This management concept follows the mainstreaming of the Indonesian central government through the Ministry of Environment and Forestry of the Republic of Indonesia. In terms of mainstreaming socio-cultural capital, TEK with social institutions in the community is a form of internalizing values and utilizing cultural assets to support the entire development process. The WNP authority sees TEK as the embodiment of the socio-cultural values of the community and must be considered in the planning process and the formulation of national development policies and programs.

The WNP authority has determined eight necessary resources for achieving the conservation target and program implementation. These resources include conservation

practices on biodiversity, areas, and economic values. Concerning the Bajau TEK, these conservation practices closely connect to their livelihood and contain cultural activities. On the WNP authority side, activities associated with these resources include monitoring, area security patrol, education, socialization, and tourism. From the Bajau perspective, those resources embody TEK, providing knowledge-practice-belief. Some practices also need further consideration and protection as conservation partners with the Bajau, such as conserving sea turtles, so they are no longer eaten. Table 14 below shows how Bajau's perspective on the concept of conservation protection aligns with this TEK.

Table 21. Bajau perspectives on eight important resources of Wakatobi National Park

Code	Traditional Ecological Knowledge	WNP outcomes	Bajau perspective
C1 C5	Spawning Aggregations Sites (SPAGs)	Monitoring, area security patrol, education, and socialization	SPAGs are the area for the livelihood practice of the Bajau people. They classified this fishery area for spawning, nursery, and seasonal fishing ground for the abundance of specific fishes. The Bajau people safeguard this area because it has been the territory and home of their ancestors for generations. SPAGs are accessed to earn money for daily needs or places for traditional ceremonies and healings.
C2 C3 C4	Coral reef	Monitoring, area security patrol, education, and socialization, tourism	TEK Bajau on coral reefs includes identifying species, coverage area, and distribution of coral reefs. The Bajau have a close relationship with coral reef sustainability because their livelihoods depend on this coral's health.
C6	Mangrove	Monitoring, area security patrol, education, and socialization, tourism	Mangroves are a buffer zone for coastal ecosystems and are a place of transition before reaching land that the Bajau can access without getting permission from the islanders. Mangrove is a resource for firewood, traditional medicine, the area for finding shells and snails, and a sacred area for several traditional healing ceremonies. In former times, the mangrove area was a hiding place for the Bajau when islanders threatened them. The Bajau can identify mangrove species, biodiversity, and growth patterns.
C7	Seagrass	Monitoring, area security patrol, education, and socialization	Seagrass beds are an important area that must exist in a Bajau village. For the Bajau, this seagrass meadow contains various shellfish, nursery grounds for most types of fish, and other marine biotas. They go fishing during low tides in the seagrass meadow. The Bajau are knowledgeable about the types, covered areas, and the blooming season of seagrass. Several types of seagrasses are used as food and medicine.

C11	Cetaceans	Monitoring, area security patrol, education, and socialization	Cetaceans, especially dolphins and whale sharks, are biota that brings sustenance to the Bajau. Using traditional fishing techniques, these two animals are used as nature signs to lure pelagic fish such as tuna. Bajau can identify the types of cetaceans and their migration patterns.
C12	Seabird	Monitoring, area security patrol, education, and socialization	Like cetaceans, seabirds are protected by the Bajau because it helps them allure pelagic fish such as tuna using traditional fishing techniques. The movement of this seabird has sure signs for the Bajau in fishing. The Bajau know the location of this bird's breeding and spawning season.
C13	Sea turtle	Monitoring, area security patrol, education, and socialization	Sea turtles are marine animals that symbolize Bajau's freedom. They know the philosophy of sea turtles' loyalty to their homeland and adaptability on land and marine. Bajau people can map lay sea turtle landing areas, nesting seasons, and life cycles. Turtles are still a source of protein fiber for the Bajau and are still used as offerings for traditional healing ceremonies. There requires to be a mutual agreement to conserve sea turtles with a win-win solution procedure rather than cornering the Bajau as catching protected animals.
C8 C10 C16	High economic fishes	Monitoring, area security patrol, education, and socialization	Reef fish and octopus are fishery commodities that are a source of income for the Bajau in Wakatobi. From the Bajau perspective, their practices for the fisheries sector with this high economy are all done in traditional and environmentally friendly ways. Such as groupers and octopuses need a healthy aquatic environment to grow pleasingly. WNP authority refers to this practice as their scope of work because it aligns with achieving coral reef conservation and sustainable fishing.

Adopted from (Sopari et al., 2014; Wakatobi National Park, 2020)

This study observes that the two needs (Bajau and WNP) are one destination: sustainable natural resource management. The needs of WNP as a governmental organization are to map conservation practices and targets that synergize with TEK of the Bajau in terms of collaboration or co-management programs. WNP has realized this concern and dilemma that needs to be addressed in the management issue. The Ministry of Environment and Forestry of the Republic of Indonesia created a scheme regarding conservation partnerships to diminish the gap. Conceptually, this practice focuses on the community as partners for natural resource management through customary institutions or TEK practices. The WNP authority has started to develop this program in several Bajau villages. However, it is still constrained by identifying local

champions, effective public communication, environmental educator, and community acceptance.

Another point to be discussed for TEK engagement in the conservation field is the commoditization of TEK, such as local tourism, whether it is managed by a community organization or by small-medium enterprises (SMEs). The WNP and Wakatobi government were actors who dominated the access of tourism governance because both actors had a set of rules which could control tourism activities (Kodir et al., 2020). The WNP also targets environmental services and conservation, similar to all of the marine national parks in Indonesia. This initiative is a practical approach for community encouragement to build a sense of belonging and increase economic values from ecosystem services. This term is closely meant for Sustainable Tourism (ST) or eco-cultural tourism, the mastermind for commoditizing TEK or handicraft products from customary communities. In the Bajau case, this practice can be caught in the development of locally based tourism to watch dolphins (Lepa Mola, Bajau Mola Village), Bajau crafts small medium enterprise or SME (Si Karimanan craft store, Bajau Mola Village), or the living with experience in the Bajau village program in Samabahari (Sampela). Due to the tourism-based Wakatobi Regency development model, the need for TEK commodities from Bajau in Wakatobi is expected to be even more massive in a couple of years.

4.6 Threats of Bajau TEK

TEK is projected to face many threats to the sustainable world vision as a complex system. This scenario will happen if there are no intensities for TEK's existence and implementation. This threat emerges both from inside and outside of a community, making a shift in knowledge-practice-belief into doubt. Tang (2012) illustrated these threats as causality with several underlying threats from a TEK practice from significant publications worldwide. These elements are then rephrased and compared to Bajau TEK conditions in Wakatobi in order to see the direct typology implemented and reflected. There are two mechanisms used in this framework: TEK threats and their categories (see Table 22) and the second is the typology of underlying TEK threats (see Table 23).

Table 22. The typology of direct threats to Bajau TEK

Threats of TEK	Categories	Reflection to Bajau
Loss of pathways of TEK transmission	Loss of traditional language	It depends on the portion of dominant or minority positionality of them. In Wakatobi, their language is still sufficiently practiced.
	Influence induced by a formal educational system	The Bajau kids are hit by a mainstream curriculum and a formal educational system teaching style that weakens their TEK and school participation.
	Younger generations' absence from the traditional community	It makes the migration of the younger generation of Bajau look for a life that is considered better than the livelihood of the older generation of Bajau because their life and culture are considered backward and ignorant.
	Influence induced by dominant societies & reduced incentive and interest in TEK	It can be seen in Bajau Wakatobi, surrounded by dominant customary communities (MHAs) with more power and communal legal recognition.
Change of traditional livelihood practices	Reduced land-based/ sea-based activities	It is only seen in the tendency of young Bajau, but the older generation is still wholly dependent on marine resources.
	Reliance on modern products and/or technologies	The Bajau quickly adopt modern technology, such as boat machining foods, clothes, and electronic products
	Use of Westernized primary production systems	It can be seen in telecommunication products such as smartphones and reliance on the internet and online market system.
Change of traditional religion and beliefs	Conversion to other dominant religions	There is no religious conversion generally in the Bajau communities because their identity is Islam. It is just that the Bajau Islamic practice still mixes it with traditional beliefs.
	Loss of traditional beliefs	In this context, it is more about the influence of Islamic teachings, which state that Bajau teachings (Islam Sama) are deviant and shirks because of doubling upon God in Islamic teachings (Islam Bagai). The loss of beliefs is more reflected in the younger generation who study Islam outside their community (such as from universities or in recitation groups)
Change of environment and natural resources	A shift in physical location and environment	This can be seen in several locations used as important domains, such as graves or sacred locations, that have changed functions because dominant groups or other institutions have grasped those locations.
	Resource degradation	The rapid growth of the Bajau population forms competition and overexploitation of a specific resource, resulting in scarcity, such as octopus, grouper, mantis shrimp, and other high-economic value commodities.

Loss of traditional rights	Loss of traditional land and/or land tenure	Not applicable to Bajau communities.
	Loss of traditional land use	Not applicable to Bajau communities.
	Loss of access to traditional resources	Socio-cultural conflicts with the WNP and customary communities.
Loss of traditional institutions	Replacement of traditional resource governance	The formal village system has replaced all customary institutions.
	Loss of other aspects of traditional institutions	It is completely gone and needs to be reconstructed, and elders pass away without transferring their knowledge to younger generations.

From these six threats of TEK, the Bajau communities might fulfill almost all of the global TEK dynamics. What makes it different is the nature of the Bajau as a nomadic group with their marine-oriented life. The TEK threats mapping proposed by Tang (2012) excludes the representation of sea nomad groups in a comprehensive analysis. Meanwhile, the TEK threats reflected by the Bajau exemplify that the loss of pathways for TEK transmission and the loss of traditional institutions are the primary concern in the Wakatobi Bajau. The positionality of the Bajau communities is located in the MPA (refers to WNP) and surrounded by dominant customary communities, which causes various social relations to emerge and results in the degradation of TEK, either partially or wholly.

The absence of the normative regulatory function leads to a catastrophic loss of customary identity. In addition, the loss of Bajau traditional institutions has also accelerated the loss of TEK coexistent. Hence, this situation is impacted by the massive system change in the Bajau communities, which have to compete to become land communities for an economic goal. Their unpreparedness in a competition undoubtedly creates gaps and cultural shocks instead of adding to their cultural complexity.

Move on to the typology of underlying threats to Bajau TEK, and there are ten categories on how to underly threat of TEK which reflect Bajau as analyzed in Table 23.

Table 23. The typology of underlying threats to Bajau TEK

Underlying Threats	Threats	Reflection to Bajau
Government policy and legislation (policy and legislation that devalue and/or suppress indigenous groups and their cultures)	Loss of pathways of TEK transmission	There is no current local to national policy recognition of nomadic sea groups (the Bajau) in Indonesia; a draft law for the protection of indigenous peoples was promulgated in 2009 but has not been ratified until now.
	Change of traditional livelihood practices	
	Loss of traditional rights	
	Loss of traditional institutions	
Contact with other cultural groups (can be caused deliberately by nonindigenous groups or voluntarily by)	Loss of pathways of TEK transmission	This is a significant concern in landless people such as the Bajau; to obtain a residence permit, The Bajau must beg these customary groups, which often positions the Bajau as a powerless community; also, it became a political modal for the customary communities to overcontrol the Bajau.
	Loss of traditional religion and beliefs	
Influence of outside market (including the availability of modern goods, access to the market, and the possibility of engaging in trading activities)	Loss of pathways of TEK transmission	The market system run by land communities in the past was unfair trade through practicing a patron-client system for the Bajau people who did not have financial literacy, access, and knowledge of fair trade. The Bajau later adopted this knowledge; the current condition is that the Bajau are actors in the patron-client trade relations system and the fisheries trading mafia.
	Change of traditional livelihood practices	
Colonization (the establishment, maintenance, acquisition, and expansion of colonies in one territory by people from another territory)	Loss of pathways of TEK transmission	It was not detected in Bajau Wakatobi specifically, but this issue may be very relevant in a broader context of the Bajau situation because Indonesia was colonized by colonialism, which changed the cultural order. A history that appears was more to the separatism movement in Indonesia, namely the DI/TII movement, which acquired and intimidated the Bajau community (Mantigola Bajau) and led to the provocation of customary conflicts in Wakatobi with the Kaledupa people.
	Change of traditional livelihood practices	
	Loss of traditional religion and beliefs	
	Loss of traditional rights	
	Loss of traditional institutions	
Relocation (enforced or voluntarily)	Change of traditional livelihood practices	This situation is more relevant in several Bajau communities outside Wakatobi, and this relocation is due to personal needs, tourism, and regional development. The local relocation in Wakatobi is due to the customary community's limited spaces of Bajau Mola residence (Sara Mandati). This pattern will increase when rapid population growth and the need for residential land are also increased, and it is predicted that there will be relocation or
	Loss of traditional rights	
	Change of environment and natural resources	

		migration for new Bajau villages in Wakatobi in a few decades.
Marginalization by dominant societies (including social, economic, and political marginalization, which often leads to reduced self-esteem of the indigenous population)	Loss of pathways of TEK transmission	In the socio-cultural context of the dominant group, the ethnocentrism of development programs (infrastructures and human resources) in Wakatobi seems to marginalize the Bajau community, Free Prior Informed Consent (FPIC) and Bajau communal recognition do not exist.
War and military occupation	Loss of traditional rights	This situation happened at the beginning of the New Order of Indonesia, and all government sectors received intervention from the military. This task force restricted the Bajau people from practicing customary beliefs and customary governance because they were considered threatening and contrary to the government system
Indigenous population decline (including natural demographic decline or human-made incidents, such as genocide)	Loss of pathways of TEK transmission	Not applicable in Bajau communities
Migration (including indigenous emigration and nonindigenous immigration)	Loss of pathways of TEK transmission	The migration of Bajau communities to Wakatobi was due to better catches than their Bajau village, and it is because the marine environment was healthier for fishing
	Change in traditional livelihood practices	
	Changes in traditional religions	
	Loss of traditional rights	
Economic development pressure (sustained and concerted actions that promote the standard of living and economic health of a specific area, usually driven by the dominant market economy)	Change of traditional livelihood practices	Market access and economic pressures have made the mindset of the Bajau community now asset-oriented; the sea is used as a resource that can be exploited to get as much capital as possible, sometimes leading to overfishing and illegal or destructive fishing.

Table 23 analysis reveals nine causalities of TEK threats in the Wakatobi Bajau. One difference reflecting the Bajau is the increased population. This situation is predicted due to the high number of early marriages and a lack of understanding about family planning. Three to five families can inhabit each Bajau community house. Bajau people do not know the philosophy of family planning. According to Bajau, the more children, the more resources they might help parents go fishing. During adolescence transition, Bajau boys who are already skillful and have expertise in fishing will start to move away from their parent's homes and choose to live independently. Then, the Bajau girl

will stay home with domestic work until boys approach them. The trend that emerged in the last decade shows that the average age of marriage for Bajau people is between 13 to 19 years old. They now mostly practice elope marriage than the cultural wedding. The older generation of Bajau complained of this transition of young marriage age. Mentally immature adolescent age affects the quality of the Bajau generation in the future.

The identification data through the Wakatobi Government Regulation No. 1/2017 concerning prevention and quality improvement of slum areas and slum community settlement showed that the five villages in Bajau Mola are included in the slum settlement category 24 percent of the total number in Wakatobi Regency. This categorization point of view needs to be further validated with a socio-cultural perspective. However, compared to the increasing population trend, this phenomenon aligns with and portrays the complicated social problems in the Bajau community. Low school participation, poverty rates, health, and environmental problems, suffering economic systems, and even overfishing increase coexistence. Hence, this population trend has implications for structural social and other development issues.

Concerning the transmission of TEK, those problems are interconnected. Also, the younger generation's interest in TEK is declining, but the alternative search is absent. This issue becomes more problematic as usual when the informal cooperative system offers loans with immense interest without collateral in the Bajau village. This business is multiplying and has made the economic chain in Bajau more prominent. Formal banks also see this opportunity to give loans to the Bajau. Over the last five years, several major bank brands in Indonesia have also targeted the Bajau people. The large income of the Bajau but low financial literacy has become a business field for Banks. An inclusive financial model is needed to manage the Bajau saving and spending system in more appropriate ways.

4.7 Sustainable resource use and Bajau TEK

In co-management practiced by IPLC, TEK elements are required to develop a sustainable program (Houde, 2007; Moller et al., 2004). The role of TEK covers the

entire co-management process, from initiating to monitoring the program. This step intends to attract IPLC's sense of shared ownership in a co-management program. As a form of co-management, TEK has been developed in various fields such as agriculture, environmental, healthcare and ethnomedicine, biodiversity, traditional lifestyles, natural resources and genetic resources, and know-how of traditional architecture and construction technology (Tsosie, 2018). However, some challenges must be examined in this process, one of which is documenting and presenting TEK itself (Peters, 2003).

In order to see how the presence of the management system of Bajau TEK in Wakatobi, this study adopts the findings from Tang (2012), then is enriched by the localities of the Bajau communities. This adaptive framework helps see the potential for TEK development in good order as a general guideline when dealing with the Bajau communities in Wakatobi or similar cases in other Bajau communities. Furthermore, the differentiation of this TEK management system (Table 24) will be used to develop indicators in the final discussion chapter.

Table 24. The management system of future TEK in Bajau communities

Management system	Categories	Indicators	Challenges in the Bajau
Capacity building	Institutional development	Self- government	Loss of customary institution
		Self-organization	Social cohesion and internal conflict among Bajau
	Alliance and partnership development	Community alliance	Human resources, capability to manage the partnership, and political power
		Partnership with external parties	Human resources, capability to manage the partnership, and political power
	Customary communities financing	Financial schemes	Business as usual
		Economic inclusivity and literacy	High income but less saving management
	Mainstreaming gender	Men's and women's roles	Women control the economy and are fully responsible for kids and domestic works
Community-based TEK conservation activities	Traditional lifeways programmed	Institutional support for TEK's existence	Degradation of customary institutions leads to co-management failures
	Environmental conservation activities	Community-initiated environmental conservation programs	Top-down initiatives from WNP

		Participation in 'external' environmental conservation management	Top-down initiatives from NGOs and tourism sectors
	TEK commoditization	Ethnos- tourism or ecocultural tourism	Failure of cultural center or unsustainable tourism
		Bajau craft and products trading	Market exposures and unclear government supports
		TEK as a human resource	Rowing sport and the "Sarang" (captain) phenomenon
Education and awareness	Include TEK in a formal education	Teach Bajau languages in a formal education system	Not exist yet
		Include TEK in school curricula	Maritime junior high school
	Customary education	Teaching Bajau kids about their TEK awareness and understanding	Previous Bajau Matilak Informal School
	Bajau media as informal learning	Bajau sharing information and outreach	Many Bajau online platforms and documentary films about Bajau living in Wakatobi
		Informal learning	Mostly it was in the form of a workshop
Policy and legislative support	Political system and policy development	Political representative	Not exist yet
		Political literacy and awareness	Social cohesion and political 'identity' 'ecology.'
Research and documentation of TEK	TEK research and documentation	Dissemination and entrenchment	Business as usual
	TEK databases	Reference for local development	Business as usual
Intercultural relation	TEK acceptance	Relation to other customary communities	Not exist yet
	Migrant and nomad pattern	TEK as knowledge exchange	TEK transmission and transformation

Existing TEK systems of Bajau co-management could contribute to superior resource management in several ways. Even though many arrangements need to be considered in practice, this Bajau TEK arrangement is an exciting point. For the Bajau, TEK is domains and intellectual property rights transmitted across generations. The transactional need commodifies such knowledge as a form of community-based TEK conservation activities of Bajau communities.

Apart from being a scientific approach to sustainable resource management, the function of TEK can transform into a commodity from an outsider's lens. Appropriate

regional planning related to Bajau TEK must be more holistic than conventional management, integrating and coordinating different management functions locally. The more local and specific the enhancement and allocation, the more effective it is accomplished, and a highly-desirable avoidance of costs can result (Pinkerton, 1994). However, the government and the private sector sometimes misinterpret the factual TEK when it fails to serve their particular interests (Houde, 2007).

In discussing the arrangement management of the Bajau, their TEK accuses ecological desecrators, such as coral mining practices (Djohani, 1996). This practice gouges the dead hard coral concealed in the sand instead of living coral picked. Ecologically, the coral mining impacts the surrounding marine ecosystem where the mined reef flat failed to recover from the severe mining event, despite being un-mined for over 20 years (Caras & Pasternak, 2009). A more appropriate and in-depth study about the extent of the environmental impact assessment of this hard coral mining is required. It seems to happen because of the decrease in quality of life, socio-cultural pressures, and the supply-demand concept from non-Bajau. The destructive chain nonetheless exists and involves several actors who have power in the Wakatobi Regency.

Damaging coral reefs and overfishing near sacred sites for the Bajau communities have affected Bajau's belief system (Simonin, 2015). However, this traditional belief began to erode due to various factors. The lack of co-management from Bajau TEK as a form of community-based conservation, the loss of institutional legitimacy, the imposition of formal regulations, new market pressures, shifting behavior, and environmental change are crucial drivers for this phenomenon (Ruiz-Mallén & Corbera, 2013). There are complicated factors that must be explored deeply regarding the relationship between behavior changes of the Bajau and the socio-economic pressures that corner them. If it is extended to conservation issues, the positionality of the Bajau will be under threat because of their damaging practice.

Lastly, the co-management arrangement that can be highlighted from the Bajau is about integrating TEK with technology as a form of knowledge exchange. For instance, the TEK conservation about Cetaceans (C11), in particular whale sharks (*Dede*'), national

park authorities require data and management strategies for whale shark conservation, including behavior, local migration patterns, or potential threats to determine the predictability of whale shark appearances in their area. The Bajau TEK can cover those needs because they know whale sharks as a natural sign for pelagic fishing. The Bajau communities believe in protecting whale sharks because they are the mother of all fishes. Capable technologies can be incorporated with this Bajau TEK as a form of collaboration. The results of this collaboration can be a vital factor in assessing the potential for developing small-scale whale shark ecotourism initiatives (Stacey et al., 2012). Another example of TEK is Tuna (C10). Their knowledge about fishing grounds and migratory lanes of Tuna, especially Yellowfin Tuna (*Thunnus albacares*), is documented as the upwelling areas. Possibly, this TEK might be integrated with satellite mapping to increase the economic income of the Bajau in Wakatobi (Tadjuddah et al., 2012).

4.8 Conclusions

TEK for the Bajau community is a harmonious relationship between humans, spirit, and nature. The assignments of these three elements are related and cannot be separated from their traditional way of life as a society with sea-oriented culture. This TEK scope is predominantly practiced in marine ecosystems but can also be found in terrestrial ecosystems. Documentation and deep ecology understanding are needed to determine the existence of Bajau TEK, which is degraded over time. Massive determinants and multilayer actor influences cause it. To cope with this drawback, it is necessary to design a suitable mechanism for local matters to resource assessment based on the Bajau TEK management system.

Regarding the Bajau TEK research and development, these findings result in a systematic methodology for downscaling gaps, labeling, misleading identification, and data validation and shutting the tendency for the presence of separated TEKs. The complexity of Bajau TEK is detailed to identify the dimensions, justifications, manifestations, shortcomings, and nature of TEK itself. These understandings inclusively show the uniqueness of the Bajau because their historical background, intercultural relations, development exposures, domains and territories, and values are

different from other customary groups. Although this detail is still conceptualized in a qualitative setting, it has an ideal opportunity to be integrated with formal natural resource management.

The TEKs of the Bajau community have encountered many challenges that affect its sustainability and projections. Subjectivity Bajau people as migrants who live in dominant customary community areas are a prominent factor in the sustainability of TEK or leading to the cultural identity crisis of the Bajau people. This condition becomes more complex when intercultural relation is linked to the issue of '*Adat*', religion, and communal property regimes that the Wakatobi government legalized. Furthermore, the positionality of the Bajau Wakatobi people who live in the marine national park also influences the existence of their TEK. The implementation might be a scenario of TEK protection in the form of co-management or even the loss of TEK due to conservation targets and a local management system that is not yet cooperative with the Bajau communities.

The reconstruction of TEK in the management of coastal and small island resources is urgently needed, particularly by involving the Bajau community as the main resource users on the coast and sea of Wakatobi. The causality and multiscale transformation of TEK into sustainable resource management can be diminished or accelerated according to the need of the local management system in Wakatobi. Fortunately, Bajau TEK is adaptive and exchangeable to become a new practice.

CHAPTER V

THE CONTEMPORARY BAJAU TRADITIONAL ECOLOGICAL KNOWLEDGE AND THE IMPLICATION OF CO- MANAGEMENT

5.1 Introduction

The co-management systems in Indonesia have emerged over time while incorporating customary coastal communities. This concept evolves into a customary co-management system where customary coastal communities gradually include their traditional knowledge in the locally managed marine areas. Indonesia has unveiled several policies in recognizing and guiding customary coastal communities through province and local decrees initiatives. This form of formal management has been strengthened since there was a paradigm shift from centralized management to co-management in coastal and marine systems.

Coastal management and community practice have been regulated in Law No. 1/2014 regarding the management of coastal zone and small islands and the Minister of Marine Affairs and Fisheries Regulation No. 40/2014 regarding community participation and empowerment in the management of coastal areas and small islands. These legal acknowledgments served as the basis for Indonesia's commitment to target MPA based on conserved community areas (CCA), target effectiveness of marine protected areas, and other effective area-based conservation measures (OECM) such as the implementation of Aichi Target 11 on Convention on Biological Diversity (CBD) and Sustainable Development Goals 14.

In marine-based conservation areas, such as in Wakatobi Regency, this concept is more complex when a group of Bajau is inhabitants in WNP and they are surrounded by customary law communities that receive formal recognition from local governments. In Wakatobi Regency, two authorities manage marine and coastal areas, namely the Wakatobi Regency Government and the WNP Authority. The co-management that has been carried out sees the Bajau as the object of the program instead of as the subject or

a knowledgeable group worth collaborating with. Meanwhile, the Bajau as the main user of marine resources in Wakatobi Regency experiences various social, cultural, and economic problems caused by this overlapping management system.

5.2 Coastal Communities in Wakatobi

According to Law No. 1/2014, coastal communities in Indonesia are grouped into three categories: customary law communities or translated into Indonesian as *Masyarakat Hukum Adat* (MHA), traditional communities or *Masyarakat Tradisional*, and local communities or *Masyarakat Lokal*. The MHA is defined as the customary group that has historically inhabited coastal areas and small islands. MHA has a higher position than the other two groups in terms of legal protection. They have ties with ancestral domains on land and coastal areas, possess local knowledge and historical heritage objects, and can implement customary governance systems.

The existence of MHAs is well acknowledged because they enjoy a robust legal basis in their recognition and protection by the Regent's regulation. The customary rules of MHA in the management of marine and fishery resources emphasize being environmentally friendly and sustainable. According to the law, MHA communities have certain managed areas with clear boundaries both on land and water. Two other legal bases for the recognition and protection of MHA are enshrined in Minister of Home Affairs Regulation No. 52/2014 on Guidelines for the Recognition and Protection of Indigenous People and Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No.8/2018 on Procedures for Determining the Regional/Management Area of Customary Laws Communities in the Utilization of Space in Coastal Areas and Small Islands. Except for those legal schemes, the existence of customary law is not well recognized implicitly by national law due to the complexity resulting from the sociocultural diversity in Indonesia (Manullang, 2021).

Before becoming the Regency, Wakatobi was known as the Buton Islands, a prominent Islamic kingdom in Southeast Sulawesi in the 13th century. Several groups of these customary communities, formerly small kingdoms under the Buton Sultanate, have

remained until nowadays. This group received recognition for marine and land customary areas from the government of the Wakatobi Regency. There are four MHAs in Wakatobi, namely MHA Kadiye Liya (No. 40/2017), MHA Barata Kahedupa (No. 44/2018), MHA Kawati Tomia (No. 45/2018), and MHA Sara Sarano Wali (No. 29/2019). Meanwhile, five other customary communities are in the process of becoming formally recognized as MHAs, namely Sara Mandati, Sara Vance, Sara Kapota, Joe Palahidu, and Bonto Popalia (see Figure 29).

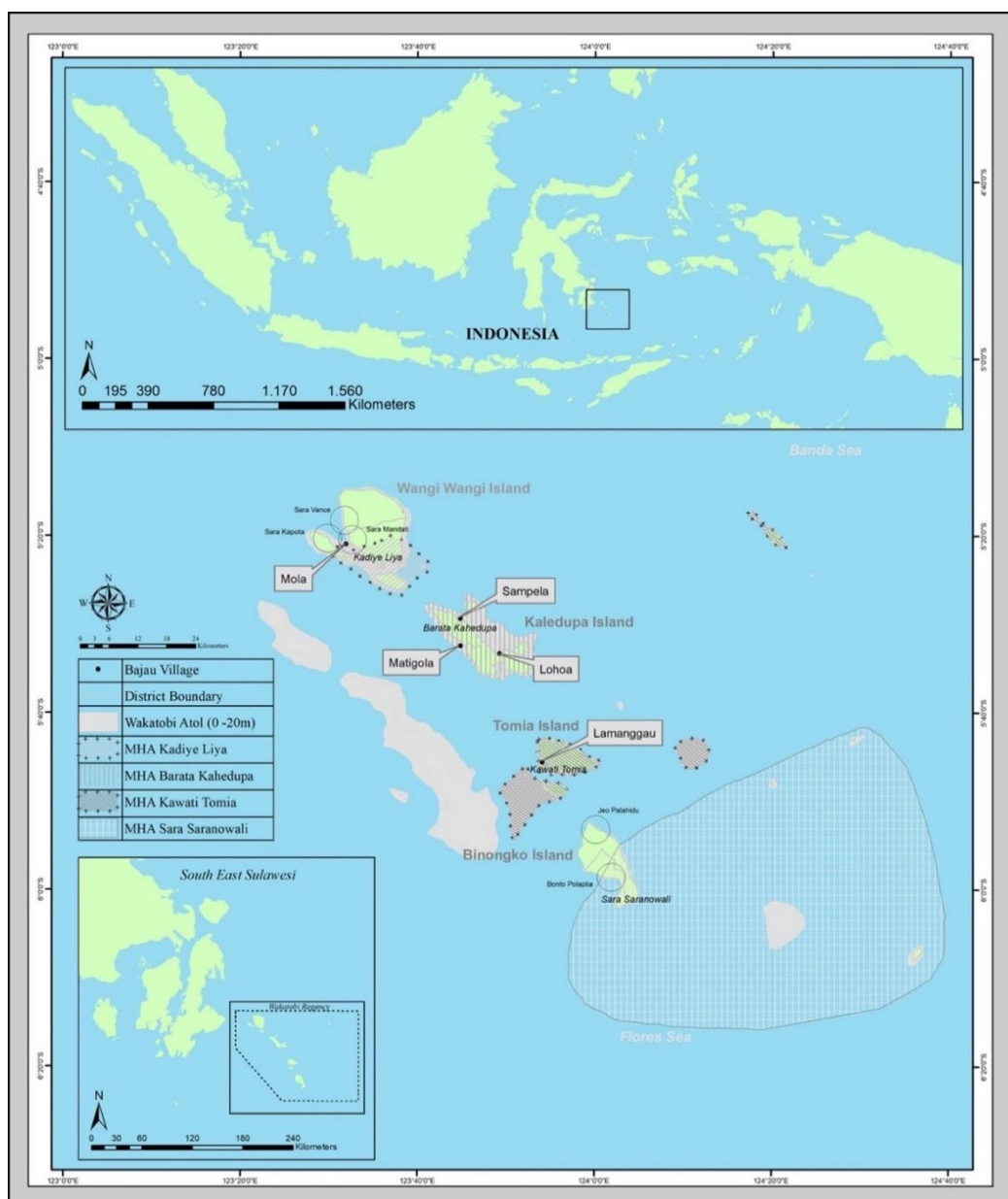


Figure 29. Map of Wakatobi coastal communities

However, a misconception about granting non-inclusive rights to coastal communities creates social competition and opportunities for conflict with other coastal-based communities, such as the Bajau community. The Bajau cannot fulfill the requirement to be MHA because they are thought to not have an ancestral domain on land. Also, their interpretation of territories and property rights is different from islander communities. Bajau communities have various cultural and socioeconomic unique practices that inform their views on local knowledge of environmental causality and spiritual belief systems (Clifton & Majors, 2012; Stacey et al., 2017). The definition used to differentiate coastal communities in Indonesia is not yet fully inclusive. The clarity of this status will certainly affect the process of sustainable fisheries management and intersectionality issues. Therefore, discretionary practice for common resources in the case of the Bajau living system as a coastal community remains the main object which must be straightened so that they may also enjoy communal property rights.

The implementation of a co-management system with former sea nomadic groups such as the Bajau requires multi-sectoral agreement and consideration. The main stakeholders are the Bajau group and the MHA in the vicinity of the Bajau village, the central government in the WNP Authority, the Wakatobi Regency Government, and non-government organizations at sub-national, national, and international levels. Spatial, temporal, and historical context must be considered when implementing co-management of coastal resources with the Bajau community. The failure to recognize Bajau's needs and to realize complex socio-political relations within the Bajau society and other coastal communities in Wakatobi may pose obstacles to developing a successful co-management system in Wakatobi.

5.3 Wakatobi marine national park

5.3.1 Management challenges

Several challenges exist in WNP in the management area and accessibility.

Overlapping areas

Wakatobi Regency as local administrator, WNP as Marine Protected Area (MPA) institution, and IPLCs as resource user and customary institution are sources of confusion in Wakatobi. However, the existence of a WNP that is congruent with the Wakatobi Regency and customary institutions is unique. It is also an exciting reference for the possibility of transforming the WNP management system.

Bathymetry

The contours of the sea depths in the WNP vary widely from shallow sea to deep-sea or 0 to 4,000 meters. The deep-sea contour in WNP causes management and supervision inefficiency because this deep-sea contour is challenging to manage with limited resources and technology.

Location of scattered islands

The Wakatobi archipelago consists of 39 islands, and it is scattered widely in Banda and Flores seas. There are several islands located farthest apart, separated from other small islands. The vast island scattering condition makes it difficult to manage because it takes time, effort, and cost to reach and secure the entire area of WNP.

Environmental degradation. The following issues related to environmental issues in the WNP as follows.

1. Environmental pollution allegedly comes from household waste and port activities in the form of oil spills.
2. Anthropogenic activities include dynamite and chemical fishing and coral and sand mining.
3. There are conflicts over fishers' use of natural resources who still depend on catching/taking marine products without any conservation efforts (restocking).
4. Fishing with purse seines (using FADs) and illegal fishing from outside Wakatobi create conflict with local communities. Local and traditional communities only use gill nets which catch less. Hence this phenomenon causes social jealousy and prejudice.
5. Coastal abrasion, because the geography of the Wangi-Wangi Sub-district is mostly open islands in the north, west, and east, there is a significant tendency

toward coastal abrasion. This coastal abrasion is due to the strong surges hitting the coast without any natural buffers, such as coral reefs, seagrasses, and mangroves that have been exploited.

The WNP authority is carrying out area management more dominant towards the protection and security of the area. So, their budget is absorbed for these activities. Increasing the function of the area as a life support system, in this case, the function of preservation and sustainable use has not been fully implemented.

The complexity of the management system in Wakatobi coastal and marine areas depicts the dynamic and diversity in Indonesia, which is a challenge and opportunity in a community-based management system. This challenge can evolve into a practical model or a bottleneck to a community. The worst scenario lessens the community identity, increases conflicts, and fails the management system. It might happen if the system is not engaged with a right-based approach and informed consent between groups or institutions.

The WNP management system is executed by multiple institutions, namely the WNP Authority, the Government of Wakatobi Regency, and customary coastal institutions. Nevertheless, the positionality of the Bajau people seem to be looked at as 'shadow' customary communities in Wakatobi. The historical background and the acknowledgment of the Wakatobi Regency (in 2003) existed after establishing the WNP (in 2002), so their area management is the same. Consequently, this complexity is predicted to persist if multilevel stakeholders lack adaptive management and commitment to an inclusive system.

The levels of public participation of multi actors in planning and decision-making processes are rudimentary problems in the WNP management system. The need for reflection and adjustment regarding adaptive management and paradigm shift of community-based area management are key attributes to determining a management model that fits the complexity of the Wakatobi situation. However, the current implementation shows the exclusive domain of the government under the WNP rather

than community participation, especially the Bajau. Both theoretical propositions of co-management and community participation fail to discuss the quality of organization interests explicitly. Also, the methods used left important attributes of effective public participation. These challenges are documented to be influenced by internal and external factors in Table 25.

Table 25. Challenges of Wakatobi National Park

Internal drivers	External drivers
The status of the WNP area that overlaps or has the same management space between various parties (local government, community, and other institutions)	The activity of fishers from outside Wakatobi operating within the WNP area
Waste management toward a clean and healthy environment has not been managed properly	Regional planning and development activities by the local government do not pay attention to aspects of sustainability, especially the environment
Illegal and destructive practices threaten natural resources and ecosystems, such as protected marine biota catching, illegal fishing, bomb fishing and chemical fishing, sea sand and coral mining, beach reclamation, and mangrove encroachment and settlements in coastal areas.	Marine debris from local people practicing disposal of garbage and ship waste directly into the sea
The positionality of WNP as open water areas/open access and national shipping lanes	Tourist activities that damage the environment do not match the local culture and exceed the carrying capacity
The ratio of officers to the area of the area is not comparable (human resources)	Global warming causes a decrease in biodiversity, coral bleaching, sea-level rise, climate change, and other global issues
The availability of transportation modes to/from and within the Wakatobi area is still lacking	

Table 25 presents the challenges of the WNP consisting of institutional arrangement, ecological protection, and social economy facet. These challenges will be used as a situated indicator in the transition of the management system in Wakatobi. As community representatives in this model, the Bajau community views these challenges are not having many differences in the implementation at the community level. It concludes that the developed model aligns with the current management considerations. This information and evidence from Bajau are used to build indicators of adaptive management according to community needs. Other indicators are built based on a review of various interviews with related stakeholders.

5.3.2 The Bajau and marine national park

As the primary marine resource users in WNP, the Bajau stated they have limited access to coastal and marine areas if they follow the WNP zonation system. Predominantly, the Bajau often questions their accessibility to the core, marine protection, and tourism zones. The determination of the WNP zonation system invites a dualism of partisanship which consists of pro-zoning and contra-zoning parties, especially regarding their fishing activities. The pro-zoning groups generally include the Bajau, who are well-educated and have good mutual relations with the WNP Authority. This group of people is not fully dependent on the fisheries sectors. Most of them work in formal sectors such as government or NGOs. The contra-zoning parties are a less educated group of Bajau, including the elders, women, and experienced fishers. They always speak about their real experience when fishing and are intimidated by WNP authorities. This group of people is in fear and tears when meeting with WNP authorities in person, and even they are doing the typical fishing work (Lynch & Turner, 2021). One apparent reason for Bajau's obedience is a supposed feeling of fear toward the threat posed by uniformed people's words, actions, and power. The presence of WNP officers who patrol and monitor the areas that are Bajau's usual fishing grounds becomes an intimidating act.

In addition, another dilemma for Bajau communities related to WNP authority is access to the tourism zone. This area is primarily located near Bajau's sedentary areas and primary fishing grounds. The determination of this tourism zone is an ecological conflict for the Bajau communities, such as Sampela Bajau with the tourist diving sites around Hoga Island, Lamanggau Bajau on Tolandono Island and Sawah Island, and Mola Bajau with tourism sites in Kapota Atoll which are spearfishing grounds for the Bajau there. The Bajau are frequently expelled by tourists and WNP authorities when fishing around tourism areas.

Presently, the Bajau do not give attention to or comply with this WNP zonation system. They still think of the marine area as their ancestral domains or freedom area and as life sources for generations. Economic pressure and the attitude of the Bajau towards WNP zonation have led to overfishing in specific zones. This condition is due to

overexploitation and even destructive fishing practices. This condition of environmental degradation has an adverse impact on the Bajau themselves, namely the decrease in income (Jeon, 2019). With the economic challenges, the Bajau have adapted to these capitalism-based socio-economic changes by adopting patron clients within their communities (Isiyana Wianti et al., 2012; M. Marlina et al., 2020).



Figure 30. Bajau spearfishing activities in Wakatobi Atoll (15 June 2021)

In coastal management, such a relationship between the Bajau people and the WNP Authority would not create a sustainable system and fulfill the integrated coastal zone management. From the perspective of the WNP authority, the Bajau are tough to regulate and do not perform marine conservation practices. The Bajau fishers were accused and labeled as the leading actor of destructive fishing in Wakatobi waters. In determining the zoning decision process, the WNP invited Bajau community leaders to represent their community in the latest zoning revision in 2007, when a participatory action plan was applied in this process. However, from the Bajau perspective, there was no involvement at the community level regarding this zoning. The Bajau representatives were not outspoken about the real problem in the field, and there has been no solution until now. The Bajau are increasingly indifferent to zoning and penalty

for violation, even though some of their people have been fined or even imprisoned for violating WNP's regulations.

The Bajau have increasingly been excluded from their fishing areas. The governments of Wakatobi Regency do not offer any development program for the Bajau community. The local governments have issued Regent Regulation No. 62/2020 concerning the practice of sustainable small-scale fisheries in the Wakatobi Regency. However, this regulation tries to mainstream small-scale fishers in Wakatobi and is not inclusive. The coastal communities that are becoming the main emphasis are MHA communities, and the Bajau, the main small-scale fishers in Wakatobi, are being ignored.

Regarding the marine areas, the Wakatobi government, through the Office of Marine and Fisheries, excludes a mandate on actual management. The task belongs to the Provincial level based on Law No.1/2014. The WNP Authority also has an additional mandate from the Ministry of Environment and Forestry of the Republic of Indonesia, which gives more complexity to Wakatobi marine and coastal management. The Bajau have experienced the impact of this overlapping management, especially conservation area target and community development priorities.

5.4 Institutional complexity

5.4.1 Stakeholders' interests and influence

Analyzing the results of interviews with various stakeholders provides a broader picture of the situation details above. Stakeholders provided a homogeneous view of the existence of the Bajau and LMMA in Wakatobi, which consist of government officers (28%), NGO staff (10%), customary institutions (17%), CSO officers (19%), academia (13%) and the private sector (13%). Table 26 lists stakeholders related to LMMA issues in the Wakatobi regency and their relationship to Bajau communities. This stakeholder mapping made clear that the views of the Bajau people were consistent with institutional support being provided. Institutions that have an important role include the WNP authority, the regency government, and customary communities. Other institutions showing interest based on their organization's mission and programs have also been included in Table 26 and Figure 31.

Table 26. Stakeholders related to coastal and marine areas management in Wakatobi and with Bajau communities

Institution	Actor	Abbreviation	Motivation	Working Scopes
Government	Wakatobi National Park Authority	WNP	Zonation Biodiversity and marine conservation Marine sustainable recourse Other Social-ecological Issues	Wakatobi
	Wakatobi Local Government	KAB	Sustainable Development	Wakatobi
	Provincial Government	PRV	Coastal and Small Islands Area Zonation Plan (RZWP3K) Fisheries facilitator	Wakatobi
	Department of Marine and Fishery of Wakatobi	DKP	Community Welfare Capture and aquaculture fisheries MHA and coastal customary communities	Wakatobi
	Regional Development Planning, Investment, Research, and Development Agency of Wakatobi	BPD	Coastal planning and development	Wakatobi
	Department of Tourism and Creative Economy of Wakatobi	DPR	Coastal and marine tourism	Wakatobi
	Environmental Agency of Wakatobi	DLH	Solid waste management Environmental health	Wakatobi
	Public works and Settlement Office of Wakatobi	DPU	Coastal facilities and construction	Wakatobi
	Water and Air Police Corps	ART	Security	Wakatobi
	Indonesian Navy	TNI	Security	Wakatobi
	Agrarian and Land Planning Office of Wakatobi	ATR	Agrarian Reforms Task Force for coastal and small island areas (vertical instruction from Ministry of Agrarian Affairs and Spatial Planning of the Republic Indonesia)	Wakatobi
Non-Government Organization	World Wide Fund for Nature	WWF	Community-based management	Binongko Kaledupa Wangi-wangi

	<i>Yayasan Konservasi Alam Nusantara</i> or The Nature Conservancy	YKN	Community-based management	Kaledupa Tomia
	Rare Indonesia	RAR	Community-based management	Wangi-wangi Kaledupa Binongko
	Sustour	STR	Community-based tourism	Kaledupa
	Operation of Wallacea	OPW	Research experience and collaboration	Kaledupa
Customary Institutions	MHA Kadiye Liya	MKL	Managed and accessed customary areas	Wangi-wangi
	MHA Barata Kahedupa	MBK	Managed and accessed customary areas	Kaledupa
	MHA Kawati Tomia	MKT	Managed and accessed customary areas	Tomia
	MHA Sara Sarano Wali	MSW	Managed and accessed customary areas	Binongko
	Sara Mandati	MSM	Managed and accessed customary areas	Wangi-wangi
	Sara Kapota	MSK	Managed and accessed customary areas	Wangi-wangi
	Sara Vance	MSV	Managed and accessed customary areas	Wangi-wangi
	Bonto Popalia	MBP	Managed and accessed customary areas	Binongko
	Joe Palihidu	MJP	Managed and accessed customary areas	Binongko
	Kekar Bajau	MKB	Bajau customary organization	Wakatobi
Community Social Organization	Komenangi	KMN	Island forum: Coastal issues in Wangi-wangi	Wangi-wangi
	Forkani	FKN	Island forum: Coastal issues in Kaledupa	Kaledupa
	Komunto	KMT	Island forum: Coastal issues in Tomia	Tomia
	Foneb	FNB	Island forum: Coastal issues in Binongko	Binongko
	Posaasa Liya	PSA	Small-scale fisheries in Liya	Wangi-wangi
	Lepa Mola	LPM	Bajau community-based tourism	Wangi-wangi
	Kamelia	KML	Environmental education	Wakatobi
	Padakawang Sama	PWS	Bajau conservation group	Kaledupa
	Conservation group Horuo Mantigola	CHM	Bajau conservation group	Kaledupa
	Padakauang Sama Mola	PDS	Bajau conservation group	Wangi-wangi

Academia	Halu Oleo University	HOU	Research, development, and policy	Wakatobi
	Wakatobi Community college for marine and fisheries	AKP	Research, development, and policy	Wakatobi
	Muhammadiyah Institute of Technology and Business of Wakatobi	IMB	Research, development, and policy	Wakatobi
	Visiting researchers	VTR	Conducting research to institutions need	Wakatobi
Private	Wakatobi Dive Resort	WDR	Tourism and cultural visit to Bajau Lamanggau	Tomia
	Tour operators	TOP	Tourism to all Bajau villages	Wakatobi
	Pulau Mas	PMS	Marine Product Distributors	Wangi-wangi Tomia
	Where there be dragons	WTD	Cultural Tourism in Bajau Sampela	Kaledupa
	Aruna Jaya Nusantara	ARN	Marine Product Distributors	Wangi-wangi

The Wakatobi Regency lacks good governance systems such as those active in urban areas in Indonesia. Residents work in silos, with no effort made to integrate their activities into coastal management by governments or other institutions. Institutional support should play an important role in community capacity-building and outreach in Wakatobi, addressing the protection of coastal customary communities, their empowerment, and cultural strengthening, meeting basic community needs and assisting with other socio-cultural issues. Figure 31 shows the relationship between institutions that exist in Wakatobi and their intersections with LMMAs in the Bajau communities.

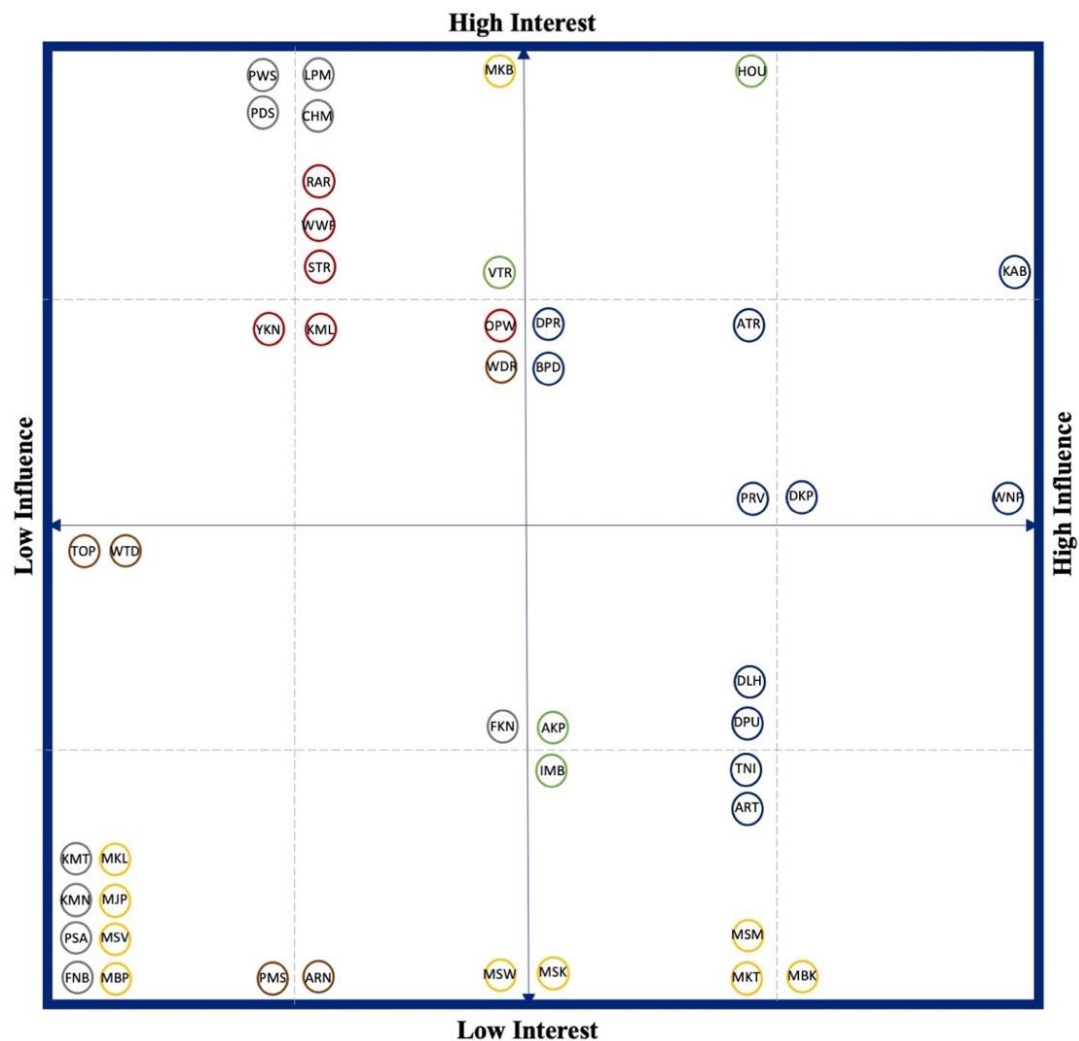


Figure 31. Stakeholder mapping of Institutional supports to Bajau LMMAs. Color grouping: government (blue), NGO (red), CSO (grey), customary institution (yellow), academia (green), and private (brown).

Government. The government of Wakatobi Regency has an influential role in many, if not all, of these relationships. There is no observable volition or capability to strengthen the Bajau LMMA concept. The research found that the Wakatobi development plan concentrates on customary law communities or MHAs whose recognition nomenclature is lawful. The Wakatobi government is powerless in zoning and managing marine areas. Law No. 23/2014 on local government stipulates that the maximum limit of the provincial sea area is 12 nautical miles, while the limit for district or city marine areas is a maximum of four nautical miles. This division of tasks in marine area management seems to be an excuse for the local government not to act on issues occurring in marine areas, coastal communities, and related social and ecological obstacles encountered by

sea-oriented people. The government offices of the Wakatobi Regency do not retain enough power to play a role in coastal management because they must follow instructions of regional development plans and the Regent's political agenda. The Wakatobi government did issue Regent's regulation No. 62/2020 on sustainable SSF, but it only focuses on involving MHAs, which is not inclusive of Bajau communities. Marine police and the Navy lack interest in strengthening Bajau LMMAs because their focus is on marine security and other protection issues.

The next issue regards the WNP authority that regulates MPAs and the biodiversity preservation agenda under the Ministry of Environment and Forestry of the Republic of Indonesia. The Wakatobi Regency, which consists of small islands and marine areas, is nationally regulated by a ministry that focuses primarily on forests and the environment but not specifically on marine habitats. However, the WNP authority has, as part of its agenda, a responsibility to protect marine ecology, which gives it oversight of the marine-oriented Bajau community. The mutual distrust between the WNP authorities and the Bajau community is readily apparent. The Bajau are presumed to be the main perpetrators of destructive fishing in Wakatobi, and indeed, this research discovered that illegal fishing methods such as bomb fishing and chemical poisoning are still practiced in all five Bajau communities in Wakatobi. However, it is practiced not only by the Bajau people but also by fishermen from the mainland and illegal fishers outside Wakatobi. Multi-cultural communities well manage the underground market chain. Unfortunately, there is no practical solution to this destructive fishing problem in Wakatobi. The intimidating approach by the WNP authority toward the Bajau does not educate them about the detriments of such destructive fishing methods – it only exacerbates their fear when going out to sea. Fortunately, this relationship has been improving since the WNP authority carried out a collaborative program for mangrove plantations in Kaledupa Island from October 2020 until today. The WNP authority appointed the Bajau villages of Sampela, Mantigola, and Lohoa as program implementors. Although it is still regarded as insufficient compensation, this mangrove plantation program has reconstructed the mindset, perspective, and attitude of the Bajau community toward the WNP authority.

Non-Government Organization. The main role of NGOs is to establish community-based development programs. As a result of NGO initiatives, Bajau people have greater access to the economic system, capacity building, knowledge co-creation processes, and networking opportunities. Nevertheless, as institutions that work under a strict mandate, the programs are led by institutional missions that leave the root causes of Bajau community problems unresolved. Initially, NGOs' missions were more about marine conservation and protection, but their efforts increasingly extended into issues of microeconomics, tourism, and protection of customary coastal communities. All NGO groups have displayed a commendable interest in the issue of Bajau LMMAs, toughening their community-based development and overtly supporting alternatives to mainstream development schemes. This includes strengthening customary institutions, which they understand as necessary for sustainable coastal resource development. According to NGOs, the current development plan of the Wakatobi regency does not target issues of substance but only those of importance to the regent. Hence, they argue that the Wakatobi government should prioritize the concept of Bajau LMMAs through formal recognition or localized agenda setting. NGOs would then align their institutional interests with such agendas. The challenge faced by NGOs is that the issues deemed necessary, and organizations' ethos do not always overlap. The Wakatobi government is not very accommodating of the coordinating center for NGOs and does not actively assist in aligning with other institutions' agendas for the coastal and marine development plans.

Customary Institution. Wakatobi is one of the regencies in Indonesia that has multifarious coastal community categories, such as MHA, customary communities, and local communities –yet sea-oriented groups such as the Bajau still fall outside of this categorization scheme. Land-based customary communities play prominent roles in Wakatobi because these customary communities have been inhabiting the land and waters of Wakatobi before the existence of the state system. Four customary communities have obtained legal rights to manage coastal areas and to practice customary institutions from the Wakatobi government: MKL, MBK, MKT, and MSW. Five more customary communities are preparing to be granted formal recognition as MHAs: MSM, MSV, MSK, MBP, and MJP. All of these customary communities have

no interest in Bajau LMMAs. They are still not considering the Bajau as one of the Wakatobi customary communities. In this context, cultural issues generate competition, conflict, marginalization, and dominance. The customary institutions of MBK, MKT, and MSM are very vocally opposed to accommodating the Bajau communities in their LMMA. In terms of power relations, these three customary communities have a more powerful role than the Bajau communities. One predictable cause of future conflict is the housing expansion area and the rapid population growth of the Bajau communities, especially in Mola and in relation to its MSM institution, Wangi-wangi Island. The need for settlement areas and the competition for common resources in the marine ecosystem and customary sacred areas will be increased by multiple.

Civil Society Organization. This institutional group is a strong contender when it comes to articulating customary issues of SSF in the Wakatobi regency. They utilize a grounded theory and take note of community-based initiatives that are rarely noticed by the government. They are capable of working with cooperation partners on projects and strengthening customary-based fisheries management and conservation practices with support from donors. The high influence groups are the fishing forums on each island (KMN, FKN, KMT, FNB). When it comes to small-scale fisheries and community-based practices, the programs initiated by CSOs are always the pledge programs in the Wakatobi regency. One of the CSOs that has many activities, donors, tidy management systems, and strong human resources is the FKN, or *Kahedupa Toudani* Forum. The FKN has the vision to strengthen community sovereignty in sustainable natural resource management based on local knowledge in Wakatobi. FKN used to coordinate some activities with Bajau Sampela on fishery data and management, but these are no longer being facilitated. In general, all CSOs have a low intention and interest in the Bajau LMMAs. This study identified two main reasons for this. The first is the limited human resources and the priority to work in customary communities on mainland Wakatobi. The inclusion of Bajau people as representatives in these CSOs was not observed. Secondly, more effort and time are needed to work with Bajau communities due to their unclear cultural identity in the Wakatobi government lens. The social dynamic of land-based customary communities is a complicated issue but is easier to manage than the Bajau community, which has even

more complex problems. Additionally, in the community-based management scheme, the communities targeted by donors are those that have communal rights and an institutional governance system in coastal and marine management. The institutional governance of Bajau communities has been degraded over time and does not have ancestral domains in the agrarian sense. As a high-interest group, there are several CSOs whose members are all Bajau people. These four CSOs (LPM, PWS, CHM, PDS) were created by outsider institutions in the form of program partners with a legal acknowledgment as a CSO, such as the mangrove conservation program with PWS and CHM which was formed by the WNP authority, the joint fisheries access management program with PDS as introduced by WWF and activated by RAR, and the Bajau cultural tourism development program with LPM as an accelerator, which was created by the Wakatobi government and supported by various community social responsibility programs.

Academia. Wakatobi has been the object of research for decades. Wakatobi exoticism has attracted many researchers from national and international institutions to learn from its abundant natural and cultural resources. One of the most popular research topics is the Bajau community. Research related to the Bajau way of life from a socio-cultural, economic, and environmental perspective has been widely published in internet databases. Nevertheless, Wakatobi had not referenced those research results to inform local development. In terms of Bajau LMMAs, academic institutions play an important role in researching and offering recommendations or policy briefs to decision-makers in the Wakatobi regency. Generally, this function has not worked well for Bajau LMMAs issue because of institutions' interests and priorities, the government supports, research experiences and funds, and other internal institutional issues. One of the main universities in Southeast Sulawesi Province is HOU. They actively encourage their lecturers and students to research Bajau issues across the province. HOU is the entrance for VTR researchers. This academic institution holds a position of high interest and influence. Through this institution, the strengthening of Bajau LMMAs is managed closely. HOU is the main promoter in this stakeholder mapping. Meanwhile, local Wakatobi universities such as AKP and IMB have no direct research and programs related to Bajau communities or coastal management issues at this time.

Private sector. There are two categories of this institution, namely fisheries businesses and tourism enterprises. The first group is buyers such as ARN and PMS, the core business of which is buying fishery products from Bajau communities. This group has no direct interest in Bajau LMMAs but influences the marketing chain and the economic system of the Bajau communities in Wakatobi. Moreover, another economic control group for the Bajau community is not included in this analysis, namely the fishing coordinators or buyers from Bajau. This informal sector engages in patron-client practices, which sometimes become illegal and overfishing actors in the market chain. In the tourism sector, TOP and WTD have interests but do not have power over Bajau LMMAs. This interest describes the need for socio-cultural and underwater tourism, such as scuba diving, free diving, and snorkeling. An organizer runs WTD from Bajau Sampela, partnering with an international agency. Their business core is providing an alternative mainstream travel and tourism opportunity for summer and gap year programs in developing countries. Their guests are foreigners from developed countries. WTD offers a living experience with a foster family in Bajau Sampela for a couple of weeks. The TOP business core offers cultural tourism opportunities such as sightseeing in Bajau villages. The largest enterprise in this group is WDR, a provider of hospitality services and a pioneer of the luxury eco-tourism concept that has been active in Wakatobi since 1993. This luxury resort provider company has sought permanent closure of marine areas to form a marine protected area along the seashore over one kilometer around the resort area for tourism purposes. Bajau Lamanggau neighbors WDR on the small island named Tolandono Island, next to the main island of Tomia. WDR provided compensation in the form of employment, electricity payments, and access to clean water to the surrounding communities on that island. The community is responsible for protecting that area from all activities because it is exclusively for WDR guests. The interest of WDR in the Bajau LMMAs is to get benefits from tourism.

5.4.2 Interrelation of the Bajau governance system

Systematic factors have accumulated in Bajau communities in Wakatobi over the past decades. Both internal and external factors have degraded their institutional

complexity, as have other emerging issues. The religion and existing culture of the Bajau expose them to instruments of hegemony and domination in their intercultural relations. The social constructions of outsiders are sometimes used to control Bajau's customary practices.

Internally, the Bajau governance system gradually becomes weak because the customary boundaries of symbolic legitimacy are blurred and reduced by various influences. Some institutions stigmatize the Bajau by referring to them as coast and marine area destroyers. They blame Bajau communities for gouging reef stones as piles for their houses, felling mangrove forests for firewood, bomb fishing, and using chemicals damaging coral reefs to capture fish. The government, through the WNP, has carried out many operations to reduce such activities by the Bajau people. Many cases of destructive fishing have been reported to the police, and some Bajau people have even been imprisoned. However, these practices persist and proliferate secretly. Bajau perpetrators of destructive fishing activities often express pride when leaving jails. Bajau communities often cannot afford to care about deterrent effects and fines.

The interrelation of governance systems between the Bajau and other customary institutions is clarified adequately by the LMMA concept. Both customary communities in the mainland and the Bajau people hold values and ideologies believed to be basic forces for the development of their culture. This is nothing new for the case of ethnicity in Indonesia as a maritime country featuring a high degree of multiculturalism and pluralism.

Nevertheless, Bajau communities are vulnerable to the influence of the dominant cultures around them, from dialects and languages to cultural ceremonies, dresses and costumes, and daily activities. This can be seen clearly in the Bajau community of Lamanggau on Tomia Island. Lamanggau has lost its cultural practices and fully follows Tomia's customary culture. This demonstrated the ease with which the Bajau can adopt other cultural lifeways as their new cultural expression by leaving their Bajau values behind. Another example is Lohoa on Kaledupa Island. The absence of elders, shamans, and customary healers forced them to invite others to fulfill the customary

activities and ceremonies from neighboring Bajau communities or even outsiders from mainland Kaledupa. This suggests that Bajau communities can also partially absorb the cultures of other customary communities based on their needs. In Sampela, on Kaledupa Island, another pattern of acculturation was observed. One of the elder figures is a community developer and an Islamic religious leader but is not originally Bajau. This situation impacts the purity of Bajau customary practices, which now barely exist. In Mantigola on the same island and in Mola on Wangi-wangi Island, the people have shown less interest in adopting the culture of land-based communities because many Bajau elders remain in these villages.

The Bajau in Wakatobi acknowledges themselves as Muslims (Baskara et al., 2014). All Islamic teachings are based on Sharia and Sunnah guidelines in the Koran. But Bajau communities still carry out their customary belief system as well. The Bajau people pay homage and merit to the sea spirit, and to respect the spirit of the sea, a sequence of offerings must be served. They also believe that every newborn baby has a twin sister or brother octopus in the sea that always follows them. These two logics are contradictory, and young Bajau who have studied the Islamic religion in university or boarding schools sometimes accuse Bajau elders of being apostates. These Bajau elders are assumed to worship jinn or a God other than Allah, which is disallowed by Islamic teachings. These young people often invite Islamic clerics to Bajau villages to teach Islam, and many members of the community often reject these Islamic forums.

Nonetheless, the absence of Bajau customary institutions to defend the Bajau epistemology or legislate in such instances has degraded the social cohesion of their internal governance system. Furthermore, the Indonesian educational system has not incorporated Bajau TEK, and Bajau adults are prevented from serving as teachers in their children's schools because they cannot acquire the needed certifications. This situation indirectly affects the understanding and skepticism of young Bajau people who are being exposed to formal learning and religious knowledge, often in the absence of adults from their culture. Such youth often disavow their customary systems and cultural heritage. If this situation persists, the Bajau cultural identity is going to be diminished, and their communal knowledge will evaporate entirely. The Bajau and their

culture may eventually be known only as exonyms and languages. Bajau TEK and LMMA practices could become an extinct cosmology.

For now, though, one of the most problematic aspects of Bajau culture is the demographic dividend, which has become a potent source of conflict for coastal resource management and other interculturalism institutions. The dense and rapidly increasing population demands wider access to housing and marine areas. From the perspective of non-Bajau customary institutions, this is a threat because the Bajau settlement has been extending overseas for a long time. From the government's perspective, this population size is becoming a hazard to the marine environment. Solid waste management in Bajau villages is already causing environmental problems. Bajau communities have failed to implement their local knowledge in this context due to the complexity of the Wakatobi waste management system (Ariando et al., 2022).

Unfortunately, these emerging issues have still not evolved as a local priority for development. The Wakatobi government agenda remains focused on developing the tourism sector, which will directly contribute to local government incomes. Economically speaking, the rapid population growth of the Bajau can be very lucrative and beneficial to people from the mainland who are positioned to serve the needs – or hold ransom, Bajau people, whose consumption and purchasing of goods and services will increase exponentially. Another institution that will benefit from the increasing Bajau population is political actors. Kinship with Bajau communities can be an effective strategy for getting endorsements and securing a position at the legislative or executive level.

5.4.3 Development initiatives and implementation

The government of Indonesia has been creating policies and programs related to strengthening customary institutions for coastal communities, acknowledging communal access rights to coastal and marine areas, and encouraging community-based management knowledge of fisheries and marine conservation. In the process of strengthening the tenure rights of coastal communities, Indonesia is one of the leading countries in the Asia Pacific region in terms of MHAs and LMMAs. This management

shift helps with monitoring and evaluating coastal resources because of the existence of customary institutions with TEK(s) (Berkes & Nayak, 2018). This concept is the main part of a model of ICZM (Christie et al., 2005), as future holistic approaches that interact with the science-policy interface, including the co-construction of knowledge, the strengthening of community participation, the reconstruction of decentralization, and the clarification of institutional interactions across the diversity of coastal stakeholders (Bremer & Glavovic, 2013; Wever et al., 2012).

This research documented three observed reasons why the concept of ICZM has not been implemented in Bajau communities. Firstly, a lack of appropriate information and participatory action research on Bajau livelihoods and cultural conditions in coastal and marine management complicates engagement. Next, no legal protection at the national or local level accommodates Bajau people and communities in their defense and acquisition of resources in Indonesia or allows for Bajau's self-determination. Lastly, local politics and intercultural relations on the mainland prioritize dominant customary communities in every development plan. The lack of Bajau politicians at any level of government underscores their minority status.

On 9 June 2022, the government of Indonesia, under the Ministry of Agrarian Affairs and Spatial Planning of the Republic of Indonesia, commenced awarding land certificates to Bajau communities in coastal areas and small islands through a program named the Agrarian Reform Task Force (GTRA). As an item near the pinnacle of the Group of Twenty (G20) Presidency of Indonesia agenda, the GTRA endorses a theme titled "actualizing inclusive and environmentally friendly economic recovery through agrarian reforms, synchronized spatial planning, and empowerment of people in small islands and coastal areas." The GTRA aims to give legal certainty to people's land rights and business licenses, asset reforms in the coastal, small island, and outermost small island areas, and access to avenues for reform of customary laws, traditions, and local communities in coastal and small island areas. The GTRA program categorizes Bajau communities as local communities according to Law No. 1/2014 concerning the management of coastal zones and small islands. This event was held in Wakatobi and targeted the Bajau in Mola Villages.

This manner of granting individual marine settlement permits to the Bajau raises many debates and impacts myriad political interests. Formal institutions in Wakatobi acknowledge that this initiative will protect Bajau communities from marine area conflicts such as settlement eviction and will also likely help with overpopulation problems and potential LMMA conflicts with other customary communities. This research argues that the formal recognition from the local government is an important step toward including the Bajau and addressing their problems before granting individual marine settlements. In terms of Bajau conflict resolution with other customary communities regarding LMMAs, this initiative does not consider the substance, cultural values, or ideology of Bajau culture. Institutional customaries are very strong in appropriating cultural wisdom and ancestral domains.

The GTRA initiative has the potential to create social, ecological, and cultural problems for the Bajau communities. The inappropriate categorization of Bajau communities as part of the local community category has compromised them and made unclear any vision of the future would end. On the other hand, the GTRA initiative will also initiate deliberations with the Wakatobi government to take more action and acknowledge their settlement areas in granting communal social protection.

The complexities in the internal body of Bajau and external institutional support show a need for the proper management of coastal resources. To strengthen Bajau customary systems into formal management systems, the concept of co-management can be taken up as a development alternative to aligning the needs of Bajau communities with institutional support. Prior to developing programs, assessment and identification of traditional ecological knowledge should be queried to inform baseline data. In the case of the Bajau, who do not have the customary formal institutions, program intervention through the village administrative system is a possible approach. Indonesian LMMAs use this concept in the eastern part of the country. Indonesian LMMAs target the smallest unit of society through village laws to strengthen institutions (Steenbergen, 2016). The community as one administrative village tends to be homogeneous, and the village government and traditional stakeholders can still handle issues of political

interest. Indeed, the key to the success of such co-management programs is community participation and a high sense of communal ownership.

5.5 Co-management program related to the Bajau in Wakatobi

Since the establishment of the WNP, the construction of luxury resorts and the joint program from NGOs in the Wakatobi marine areas have changed the coastal communities' social dynamics and conservation mindset, especially the Bajau. Outsiders entered the Bajau villages to provide social assistance, but there was a lack of informed consent and cultural consideration. Bajau people identify that they are "*one plate with the environment*." This term explains that the environment has become a basic need aligning for daily consumption and corporate environmental values in their daily activities.

Co-management is not a new practice in Bajau Wakatobi. The activities shown in Table 27 reveal the program implementation detail by various organizations.

Table 27. Co-management programs in Bajau Wakatobi from 2003 to 2021

Program	Main stakeholders	Period	Activities	Main issues	Challenges
<i>Tubba dikattuang</i>	<ul style="list-style-type: none"> The Operation of Wallacea (B) Bajau Sampela 	2007 to 2012	<ul style="list-style-type: none"> No-take zone area Research area Spawning ground 	<ul style="list-style-type: none"> Marine Conservation Education 	<ul style="list-style-type: none"> Management system in Sama Bahari Village Customary conflicts to local communities (Ambeua - MHA Barata Kahedupa)
Mangrove Labor Plantation (PKPM)	<ul style="list-style-type: none"> Wakatobi National Park Authority (A) Bajau Sampela Bajau Mantigola Bajau Lohoa 	<ul style="list-style-type: none"> October - December 2020 October – December 2021 	<ul style="list-style-type: none"> Mangrove plantation Mangrove conservation 	<ul style="list-style-type: none"> Coastal Conservation Economic 	<ul style="list-style-type: none"> The local politics of internal Bajau Planting Season

Fisheries Managed Access Area (PAAP)	<ul style="list-style-type: none"> • Wakatobi National Park Authority (A) • Rare Indonesia (B) • Bajau Mola 	2017 to present	Managed Access Area in Kapota's Atoll	Marine Conservation	<ul style="list-style-type: none"> • Community support • Leadership • Area surveillance • Customary conflicts to local communities (Sara Mandati and Sara Kapota)
Bajau Cultural Center	<ul style="list-style-type: none"> • Ministry of Education and Culture of the Republic of Indonesia (A) • PT Bank Mandiri (C) • British Council (C) • Bajau Mola 	2014 to 2015 (construction of Bajau Cultural center that is now left deserted)	<ul style="list-style-type: none"> • Bajau cultural center in Indonesia • Maritime history and knowledge • Tourism attraction 	<ul style="list-style-type: none"> • Heritage and culture • Tourism 	<ul style="list-style-type: none"> • Lack of community consultation in design • Community supports • Maintenance and local government support
Better Management Practice	<ul style="list-style-type: none"> • WWF Indonesia - SEASCAP (B) • Bajau Mola 	2015 to present	<ul style="list-style-type: none"> • Sustainable fishing system for groupers and Tunas • Small-scale fisheries economic initiatives • Cooperation management 	<ul style="list-style-type: none"> • Marine Conservation • Economic 	<ul style="list-style-type: none"> • Market exposure and institutional support • The fishing ground in Kapota's atoll because of illegal and destructive fishing • The market competition of Bajau Mola buyers
Tourism Protected Area	<ul style="list-style-type: none"> • Wakatobi Dive Resort (C) • Bajau Lamanggau 	2008 to present	No Take Zone area	<ul style="list-style-type: none"> • Tourism • Marine Conservation • Economic 	<ul style="list-style-type: none"> • Fishing activities by local fishers
Cultural Tourism Development	<ul style="list-style-type: none"> • Sustour (B) • Bajau Mantigola 	2021 to present	<ul style="list-style-type: none"> • Community-based tourism • Conservation of mangrove and reef 	<ul style="list-style-type: none"> • Tourism • Economic 	<ul style="list-style-type: none"> • Community participation • Local government support and commitment

Note: A= Government, B= NGO, C= Private sector, (source: Authors)

Table 23 shows activities leading to co-management in the Bajau communities carried out by the government, NGOs, and the private sector. The activities predominantly

target the issues of marine protected areas, conservations, and tourism. Also, the issues of strengthening economic values and cultural and environmental education are documented. There are three basic challenges seen in the process of implementing co-management of the Bajau community in Wakatobi.



Figure 32. MHA forum in Wakatobi (19 January 2021)

Firstly, the Bajau communities do not have management rights to the coastal and marine areas. *Masyarakat Hukum Adat* or MHAs, receive the strongest formal recognition in the coastal community definition in Indonesia. In Wakatobi, MHAs are endorsed by the local government for certain marine areas based on their customary laws spreading over four main islands. MHAs have communal rights to manage and decide which areas can be used in coastal co-management programs. MHAs have also claimed all of the Bajau villages in Wakatobi under their customary areas, although administratively, these are Bajau villages. It means that there is no space for the Bajau people in terms of coastal management because they are categorized as recent migrants to Wakatobi waters, although the Bajau have the national identity and are Wakatobi registered people. One of the reasons why Bajau's co-management of marine areas is not successful is because the target area was under the full control of the MHAs.

Secondly, there are internal issues within the Bajau communities themselves. The principal problems are weakened social cohesion and even distrust among the Bajau, especially in terms of family politics, competition for economic-based assets, limited skills in the formal management system, and the lack of community participation. It has partly resulted from a paradigm shift from nature as natural and spiritual capital to nature as financial capital. People's knowledge is a fundamental asset in a co-management system. Bajau's kin-based society makes them less capable of engaging in a cooperative system with outsiders. The Bajau's reluctance to collaborate with outsiders or what they call *Bagai* is linked to past grudges against islanders. Hence, the lack of openness of the Bajau towards outsiders may explain the current situation where the Bajau live in an exclusive marine-oriented life system. They maintain the group identity in a customary system but are not ready for effective self-organization. Social conflicts often erupt and may lead to failure of co-management in coastal and marine resources. Rapid global and regional changes make them more exposed to the modernized economic and political system, yet they have been forced into this change without time for gradual adjustment and considering the long-term impact and the culture they have adhered to so far.

The third challenge is the organization's interests, whether in the form of policy support from the local government or through specific programs by NGOs. The concept of co-management of coastal resources is catchy in development plans, especially for landless and neglected people such as Bajau communities in Wakatobi. Working with the Bajau communities requires much effort, especially being accepted initially. Therefore, development programs that were carried out seem to prefer the term co-management, even though the mission and activities were based on the agenda of the organizations. Co-management in this context thus lacks enforcement capacity, equitability, and political interests.

Since 2018, Wakatobi has been nominated as one of the main tourism destinations by the Ministry of Tourism and Creative Economy of the Republic of Indonesia. The development plan of the Wakatobi Regency is more to infrastructure rather than community-based tourism. Moreover, the designation of the marine area targeted for

tourism purposes disrupts the stability and sustainability of traditional Bajau fishing patterns. Tourism development related to the Bajau people must position them as a subject without leaving their maritime knowledge behind.

All co-management programs carried out with the Bajau in Wakatobi are based in coastal and mangrove estuaries areas such as Wakatobi's atoll are under customary ownership claim by other groups. For example, around 13 nautical miles from Wangi-wangi Island, Kapota Atoll is overclaimed by Sara Mandati, a customary group in Wangi-wangi Island as *Karang Koba*. Koba is a local tree name in Wangi-wangi Island. Legally, marine areas more than 12 nautical miles from shore cannot be designated as customary properties as stated in Law No.23/2014 about Regional Government because it belongs to provincial government authority. Another example is *Tubba Dikatutuang* or 'dearest reef' which was initiated by the Sampela Bajau, then faced customary conflicts with local communities (Ambeua - MHA Barata Kahedupa) in 2012. At that time, the Sampela Bajau were presumed to have no customary rights to marine areas around Hoga Island in particular to practice marine seasonal closure. The political situation and economic motive were also the backgrounds of this customary conflict.

Traditionally the Bajau had the philosophy of 'the sea is our land' and all seas are ancestral territories and common properties. Bajau ancestors interpreted the sea as their "mother of nature" or "the sea nurtures" or "*dilao' iru makang*", which humans are responsible for nurturing, and the sea gives the Bajau needs. In former times, Bajau communities do not have the term communal property. Nowadays, the Bajaus think that the term common property in marine resources refers to ownership under government controls. In terms of property rights regime and natural resources (Schlager & Ostrom, 1992), the property concept of the Bajau defines as access and withdrawal and management of communal property rights. The Bajaus only need the rights to enter defined physical property (assets), the rights to obtain the product of resources (catches), and the rights to regulate the internal use patterns and transform the resources by making improvements (resource management). Depending on the upcoming complexities and land-oriented life, it might be extended into the next level of property rights (exclusion and alienation).

Due to the government regulation on land ownership acknowledgment and claims based on actual land or territory, Bajau's understanding has shifted into the asset-based orientation. To get the acknowledgment, the Bajau must have an asset in their area. The common example for this case is the Bajau's constructing the reclamation land under their stilt house. They use the reef stones to pile up land in the water area. This practice began in the late 1970s and continues until now. In the former time, this pile of rocks served as small platforms to put their fishing equipment and land for boats and boat maintenance. This practice was associated with the hard work and diligence of the Bajau because they put a good effort into getting reef stones from the sea. However, as this practice creates assets similar to land-based communities, the Bajau compete to pile up the reef stone under their houses. Every Bajau village has permanent houses and reclaimed land in water areas (see Figure 33). Ironically, the Wakatobi government gave the land certificate to those reclamation houses in 2014, and the Bajau used this asset to access capital debts from the bank and other informal sources.



Figure 33. Reclamation of land from piling reef stones in the Mantigola Bajau (15 May 2021)

The Bajau, who do not have this kind of assets, have been marginalized by area-based development. This issue is also becoming a driver for cultural discrimination that has the potential to lead to socio-cultural conflicts between the Bajau and MHA communities in Wakatobi. All Bajau villages in Wakatobi have historical ties to

temporary shelter permits. Those informal permits were defined by MHAs to control the Bajau fully. From Bajau's perspective, these informal permits describe the mutuality and symbiosis of these two communities. The Bajau elders stated that the islanders benefit greatly from the Bajau, especially Wakatobi's economic development.

Meanwhile, MHAs felt that overpopulation in Bajau communities could threaten the stability of islander culture and lead to competition over land and marine natural resources. In addition, Bajau villages are considered by MHAs as a source of social problems due to low education levels, early marriage without family planning, and other social ills. The Wakatobi government realized some of these problems, and in 2022, they plan to construct multi-storey housing for the Bajau in Mola to solve housing problems and the land conflict of Sara Mandati. This top-down initiative and solution may have a negative impact on island society, culture, and ecology.

The government of the Wakatobi Regency is somewhat aware of these potential consequences. The Bajau began to be preoccupied with money and the ease of modernity. They become a business opportunity for land communities. The Wakatobi Regency, though a small island region in Indonesia, has rich assets in fisheries and tourism resources. The Bajau are the main actor in the Wakatobi fisheries system. Fish trading centers on each big island in Wakatobi are in the Bajau village. Regarding tourism activities, Bajau villages are more attractive to tourists than other villages, especially to foreign tourists. Tourism businesses in Wakatobi always put the program of visiting Bajau village in their tour in addition to exploring the amazing underwater world.



Figure 34. Densely populated village in the Bajau Mola (24 August 2021)

5.6 Deliberation of co-management in the Bajau lens

5.6.1 The key attributes to co-management

There are three key attributes that influence the co-management transition in Wakatobi as follows:

Institutional arrangements – are a rule, a code of conduct, and an organization facet that aims to monitor, regulate, and support a resource management system. The administrative system and institutional issues play an important role in managing environmental resources. Institutional arrangements are used as the rationale for an MPA rendezvous and the decision-making based on the level of autonomy and participation (Ban et al., 2017). Another need is to resolve a conflict between stakeholders in MPA (Cánovas-Molina & García-Frapolli, 2020). However, the overlapping systems in Wakatobi and other administrative issues are translated into 11 indicators, namely: (1) data and information, (2) human resources, (3) financing schemes, (4) visions and development plans, (5) marine zoning and territories, (6) interaction and institutional supports, and (7) congruence between rules and localities, (8) incentive and cooperation, (9) effective communication (10) mechanism for conflict resolution, and (11) graduated sanctions.

Ecological protection – is a form of protection, supervision, and awareness of environmental issues, both from the needs of institutions and local community practices, combined with global dynamics and trends for a conservation vision. Ecology and biodiversity protection has become the main targets in the MPA (Weeks et al., 2010). However, this protection is effective if managed by resource users themselves for detailed coastal and marine area coverage (O'Leary et al., 2018). The development of this ecological protection aims to connect a multistakeholder in a social-ecological system to protect species, territories, or the involvement of local knowledge. This extended concept of environmental protection must commence from institutional planning in a conservation program to monitoring and evaluation (Balbar & Metaxas, 2019; Cheok et al., 2019; Jones et al., 2013). To develop this attribute in the Wakatobi context, there are four indicators developed in this ecological protection, namely: (1) resource monitoring and surveillance, (2) conservation targets, (3) environmental education, and (4) traditional ecological knowledge.

Social and economic– is the relation and interaction of intersection issues in management from a social, economic, and cultural point of view to support the sustainability of a resource management system. Considering social issues in an MPA, management functions as social capital to bridge institutions and the local community (Plummer & Fennell, 2007). This interaction can provide spaces for knowledge and co-management that enable co-operation: accessing resources, bringing together different actors, building trust, resolving conflicts, and networking (Berkes, 2009a). In terms of ecosystem service needs, the involvement of the economic sector in MPA management contests a fundamental variable (Albers & Ashworth, 2022; Schratzberger et al., 2019; Sumaila & Charles, 2002). There are eight indicators used to identify social and economic factors in WNP, namely (1) community organization and champions, (2) community participation, (3) history and indigeneity, (4) religiosity, (5) small-medium enterprise, (6) tourism development, and (7) technology and research development.

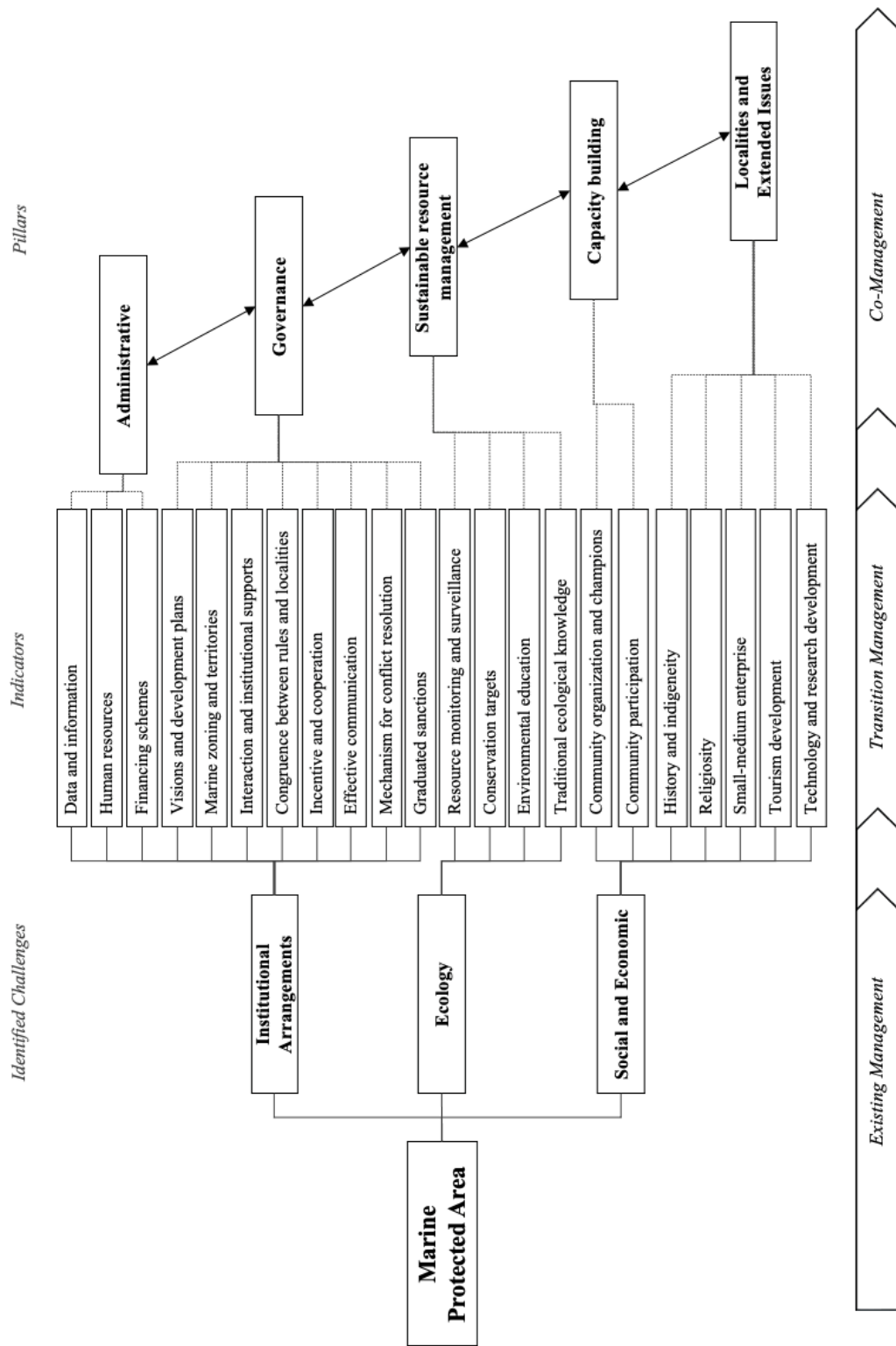


Figure 35. The situated model of co-management in WNP and its indicators

After mapping the institutional challenges found in Wakatobi and indicators built from thematic analysis from Bajau's point of view and related stakeholders, these attributes are grouped into five pillars in the deliberation co-management system in WNP areas (see Figure 35). These pillars reinforce variables of co-management in WNP. The connection between these pillars is perpendicular and complementary to each other.

[P1] *Administrative* – The functions of describing the necessity of documentation, human resources, and financing schemes for a marine national park.

[P2] *Governance* – The function of strengthening institutions and management in resolving complexities, social relations, participation, and other pillar functions in marine national parks.

[P3] *Sustainable resources management* – The function of protecting natural resources and ecosystem services toward good governance from the point of view of the socio-ecological systems, economic development, and institutional support.

[P4] *Capacity building* – The function of strengthening human resources and program partnership through the proliferation of understanding, collaboration, a sense of ownership, and other forms of participation to support the sustainability of the marine national park program.

[P5] *Localities and extended issues* – The function of considering emerging issues in accordance with local issues, intercultural relations, environmental threats and responses, and adaptive systems to align the marine national park management system with global needs and changes

5.6.2 Transition of co-management

A transformation from an ongoing system into a new one is a formidable management challenge. It takes a high commitment to be adopted all of the updated mechanisms. A rights-based approach and understanding to arrange the socio-economic aspects for resource users are the leading keys in inclusive management, particularly in MPA. Fishers and coastal communities are an affected and vulnerable in dealing with MPA authorities. Historical background and environmental threats experienced by them in a given place shape their vulnerability levels (Chen & Lopez-Carr, 2015). In the complex case of the WNP, there needs to be protracted negotiations and communication

development in multi-layered planning. Also, the extended complexity from peripheral roles of the Bajau communities in Wakatobi's coastal and marine common pool resources.

In the last two decades, the strategy of WNP management was concerned with destructive fishing activities, coral reefs, seagrass and mangrove conservation, economic diversification, and tourism development in Wakatobi (Elliott et al., 2001). Still, those concerns are not changed. Destructive activities [P2] such as coral mining, bomb fishing, and chemical fishing are one of the combated issues still being practiced. This practice is still found in all Bajau villages in Wakatobi up today. These problems cross with the Bajau community's livelihood and dilemmatic. However, the narrative emphasizing illegal and destructive fishing creates an adversarial scenario that favors certain more powerful institutions and corners disadvantaged Bajau communities (Helanda & Clifton, 2015). The bottleneck probably comes from the institutional mechanism or misleading graduated sanctions in existing management. Commitment to finding effective management alternatives is required for the complexity of Wakatobi prior to biodiversity collapse as a tragedy on the commons (Hardin, 1968; Ostrom, 2008).

The planning direction from the WNP and the Wakatobi Regency Government support a collaborative mechanism toward sustainable resources management (Sopari et al., 2014). In practice, management is overlapping, especially for coastal area developments and community livelihood. Towards the transformation of the WNP system into a collaborative goal, preparation, seizing opportunities, and building socio-ecological resilience are required (Per Olsson et al., 2004). It forms of adaptive management intended to evolve the knowledge transferred concept and practice of co-location. This transition system must consider the scope and likelihood at the planning stage for all future projects (Christie et al., 2014).

Consequently, transition and collaboration maintain an effective management system in Wakatobi, which must be urgently vivid. One of the key attributes is promoting the *Kemitraan Konservasi* or 'conservation partnership scheme', introduced as a new

management form in national parks under the Ministry of Environment and Forestry of the Republic of Indonesia in 2018 (Wiratno, 2018). This concept has been applied to Bajau communities around Kaledupa Island (Sampela, Mantigola, and Lohoa) in 2020-2021 through a mangrove plantation program (Setyaningrum et al., 2022) and area-based fisheries management in Bajau Mola in 2018. However, the implementation of this concept is still determined by several challenges in the administrative [P1] and governance [P2].

Zoning management is not following its designation in WNP [P2-P3]. It can be seen how the Bajau do not practically regulate this zonation system as enforcement and division of territory. The Bajau generation involved in the WNP initiation process was different from the current actors of Wakatobi marine resource users. Although, they are often arrested for entering and fishing in specific prohibited areas. However, there was no deterrent effect for the Bajau, and they still illegally practiced fishing activities in the core zone, tourism zone, or protected area zone. In addition, illegal fishers from outside Wakatobi also actively fish in the WNP area during specific periods. Also, the migration of Bajau communities from outside Wakatobi, mating with the Wakatobi Bajau, increased the Bajau population and resource users [P5]. To deal with this complexity, it is vital to have a policy and safeguard function that involves other integrated sectors.

Through approximately 1,390,000 hectares total (Wakatobi National Park, 2020), the WNP is the second largest marine national park and Indonesia's fourth largest national park. The biodiversity protection or loss of a large national park area is rooted in the situation of unmanageable resources and access to protect the area [P1, P2, P3, P4]. The core zone of WNP is located in the southernmost area, far from access to observation and administration resorts and customary community villages. There is no sufficiency and intensive supervision, which makes the effectiveness of biodiversity protection not optimal in WNP areas. Hence, it is necessary to evaluate the area, re-zonation, or a more profound reflection of WNP's achievements to match the capacity and institutional purposes.

Since the establishment of WNP, there has been no new participatory mapping for the socio-ecological system, which impacts the undeveloped mechanism in the management system. It is necessary to question which areas should be protected for biodiversity and what adaptive mechanism is more suitable for the community's needs. The involvements of experts, academics, and local institutions are essential for this mechanism. Adjusted global agenda to localities and right-based approaches should be essential in bridging the program and implementation in the WNP.

The effectiveness of managing marine reserves and MPAS is distinguishable because the institutions' roles are also different. Biodiversity conservation should focus on marine reserves, not MPAs (Costello & Ballantine, 2015) because MPAs are vulnerable to politicization and the complexity of institutional interests. The concept of marine reserves in the context of Wakatobi can be returned to the customary marine areas of the MHA or sacred areas of the Bajau communities in the locally managed marine areas scheme. However, this situation is uncaptured from the existing WNP management system.

The involvement of the human dimension in the management of national parks [P4-P5] is a conventional topic but still relevant today. Outdated management considers conservation issues only a need for foresters, ecologists, marine conservationists, or biologists. Nevertheless, those perceptions are not relevant to the current adaptive world. In the context of Wakatobi, the role of social scientists has not been seen to be foremost. Social science can facilitate conservation policies, encourage local knowledge, identify paradigm shifts, and deliberate more legitimate, salient, robust, and practical actions (Bennett et al., 2017; Charles & Wilson, 2008). The socio-cultural issues as human dimensions are not presumed as conservation matters. Ironically, it makes interdisciplinary works and management limited and not optimal because it is only executed from a monodisciplinary.

Integrating the human dimension in MPAs has become a global effort to co-produce knowledge and re-orient practical methods (Christie et al., 2017; Gray et al., 2017). The lack of social science approach impacts community participation, especially in the

Bajau communities. Positionality and reflectivity of Bajau can improve the human dimension in WNP associated with participation in zoning, social and environmental monitoring, local knowledge integration, and rulemaking. Moreover, the construction and absence of local human subjects in Wakatobi tourism branding as ‘the heart of coral reef triangle center’ shows weak social sustainability (Tam, 2019).

The peripheral role of Bajau in participation in WNP is also influenced by trust issues and their historical background [P5]. The social conflicts that cornered the Bajau during the DI/TII period by Kaledupa customary communities still left their prolonged trauma. It can also be seen in how islanders stereotype the Bajau community name with negative connotations, such as *Fadhu*, which means the lowest class society, such as enslaved people. This term is usually associated with a backward, foolish, and dirty group. Consequently, the Bajau cohesive social form is more exclusive due to discrimination. The Bajaus also have a negative connotation for non-Bajau people, namely *Bagai*, which means discredited outsiders. The gap between Bajau and non-Bajau portrays how WNP faces complexities in dealing with community participation. Mechanisms to conflict resolution, graduated sanctions, and customary law enforcement is critical attributes for the WNP in this transition management. Moreover, enhancing government accountability, flexibility in developing regulations relating to marine resource use, and greater participation of Bajau communities in decision-making offer some prospects for improved governance of the WNP (Clifton, 2013).

In addition, there needs to be interpersonal communication and an effective strategy [P2] to meet these needs in every decision-making and program-making involving the Bajau. Interpersonal communication reduces institutional barriers among stakeholder groups and the propensity of stakeholders, which ties in between participants with dissimilar knowledge and values (de Nooy, 2013). Crafting communications on environmental impacts and benefits for marine resource users in WNP is a current challenge. This communication style is still rigid and uses a military-based approach. To decrease this challenge, the WNP recruited conservation educators in 2020. Moreover, with the enormous scope, practical work, and diversity of the customary communities in Wakatobi, the WNP authority has not yet targeted Bajau as a red flag.

Another impact of this lack of interpersonal communication is paradigm shifts and attitudes of the Bajau regarding conservation or development programs in their villages. Their mindset sees these programs as a 'donation' rather than a customary communal need. With a greater degree of decision-making input and the opportunity to re-introduce cultural practices, a values-based paradigm (Augustine & Dearden, 2014) may contribute to the acceptability of MPAs and promote the expansion of conservation values to the Bajaus as a collaborative community. Conservation appeals should consider the Bajau psychographic characteristics when motivating local resources and related issues (Nelson et al., 2018).

5.6.3 The Bajau and contemporary management system

Prior to initiating co-management with IPLCs, the sovereignty over their resources and way of life should be respected rather than dictating resource management practices (Ban & Frid, 2018; Spak, 2005). If this need is not fulfilled, the co-management program impacts the metamorphosis of their traditions in many possible pathways. There are two considered factors to create collaborative works among those people (Prado et al., 2022), first is catalytic factors such as crises, threats, social mobilization, political identity, and emancipatory partnerships. The next factor is structural factors consisting of fulfilling basic needs and rights. These two factors are relevant to the condition of the Wakatobi Bajau concerning MPAs management, intercultural relations, and resource mobilization. Several institutions that run co-management programs had not assessed these factors. Instead of moving towards sustainable resource management, it now creates a paradigm shift, social conflict, or even marginalization for landless and maritime cultural-oriented groups like Bajau.

The involvement of TEK from the Bajau community must be the introductory consideration for WNP in bearing out co-management because they are the main resource users across the zonation. Bajau TEK comprehensively identifies a practice's classification, biodiversity, projection, spatial, spirit, and activity. Implemental TEK in MPA management has been practiced in various regions and positively correlates with management effectiveness and sustainability (Ferse et al., 2010; Glaser et al., 2010;

Mellado et al., 2014). Reflecting on Bajau in WNP, several studies showed the existence of Bajau TEK for conservation needs in WNP, such as Dugong marine mammals protection (Cullen-Unsworth et al., 2018), whale sharks (Stacey et al., 2012), mangroves (Setyaningrum et al., 2022), environmental health (Ariando et al., 2022), gender environment and development (Fatirahwahidah & Mansur, 2018; Lynch & Turner, 2021), ecotourism (Bahar & Fauzi, 2020; Kasmiati et al., 2016; Marlina et al., 2020), and nursery ground from sacred areas (Hasrawaty et al., 2017). Bridging the institutional issues to TEK as a co-management enables cooperation in accessing resources, bringing together different actors, building trust, resolving conflict, and networking (Berkes, 2009a).

Apart from being an adaptive mechanism in MPA management, for the Bajau lens, the co-management transitional need is noticed as a way to augment their communal recognition. However, this circumstance was strengthened by global concerns from the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) regarding the protection of indigenous peoples and their pursuit of self-determination and facilitating reconnection with country, culture, and language. Also, the practice of Bajau in marine resource utilization can be associated with the practice in the community conserved areas because of their distinction of rich the 'natural' and 'culture' values. Hence, the need to partner with WNP, which is then strengthened by TEK management, will make the positionality of the Bajau community, which used to be a 'peripheral community,' become a 'conservation-based community.' This need is also envisioned as a starting point for Bajau's self-determination and recognition from Wakatobi Regency. The exclusivity of MHAs and other dominant customary communities threatens the presence of the Bajau, who are still considered migrants. Even though administratively, the Bajau people are already registered as Wakatobi people. Their existence profits from the economic development of Wakatobi Regency through fisheries and trade sectors.

Furthermore, there is an opportunity for institutional support for WNP and Wakatobi Regency to transform their effective management. This institution is a cross stakeholder of Wakatobi in its institutional function to govern world biosphere reserves awarded.

Wakatobi received this award in July 2012 from the United Nations Educational and Cultural Organization (UNESCO) through the 24th session of the International Coordinating Council of the Man and the Biosphere program. Wakatobi was awarded as a biosphere reserve because it has high biodiversity and coral garden, diverse cultural practices, and high values of ecosystem services. The institutional members represent key persons from WNP, the Wakatobi government from several related agencies, NGOs, civil society organizations, academics, and private sectors, including representatives from the Bajau community. This institution can prospect co-management and accelerate Wakatobi's social, economic, and environmental functions. Unfortunately, the execution of the tasks of this biosphere reserve institution encounters obstacles regarding the governance system and the commitment of institutional representatives.

5.7 Socio-economic challenges and threats to TEK and co-management

The Bajau people have evolved in many directions due to their interaction with modern life. As a former nomad community, they now mobilize depending on the season and better catches. Thus, they would still need to find a temporary land or littoral area to habituate. Prior to migrating to a new place, the Bajau leader or *Punggawa* voluntarily sailed to explore or check a new proposed place. Then when the *Punggawa* finds a new place, the *Punggawa* will return to the group and invite their colony to migrate to that place. If the new place is considered to have a good income, the Bajau will settle in the area. To get a good acceptance, they ask the local communities for permission to stay around their coastal shore. Undoubtedly, some locals received good acceptance, but some expelled the Bajau. Once they got a permit, they set aside catches to a 'key person' or customary leader from settled communities in the land who guaranteed their social security. While a good relationship was strengthened, they bartered fishery products and forest or cultivation products with islanders.

This relationship gradually grew into a more complex situation. After the trade relationship, the Bajau continued to transmit their prestige knowledge about fishing techniques to land communities to get more acceptance. The Bajau practiced good interpersonal communication to maintain this relationship even though they got many

stereotyping and bad words. At that time, the Bajau ancestors withstood those displeasures, which then turned them into a way resilient. Time flies and those distresses are even going on now, but they have started to dare to speak up because the current generation is already in school. For the Bajau expectation, custodianship, interdependency, affection, and solidarity should appear as intercultural relations rather than marginalization.

Nowadays, Bajau people are quickly adopting the local language around them. This situation can be seen in Wakatobi, where the Bajau can speak the typical Buton Islands dialect. Towards the cultural survival of a minority, this second language is a basic life skill that the Bajau must possess. The process of language adaptation depends on the exposure level through various activities with land people. In contrast, not many land people can speak the Bajau language (*Baong Sama*). Then, after the socio-economic relations are well established, cultural relations will usually be followed. For example, currently, marrying arrangements, burial ceremonies, and other customary systems are influenced by Butonese culture.

The narrative above shows how being a Bajau community must have adaptive and flexible characteristics, so that dominant customary communities from various lines can tolerate them. This adaptability has shaped Bajau's social construction and attitudes that are seen today. On the one hand, high adaptability is useful for fast-moving cultural survival, resilience, livelihood, and management systems. Contradictory, adaptive management can accelerate the Bajau community's loss of identity, intergroup conflict, environmental degradation, and other development discourse issues. Their attachment to the formal system of government and geographical or administrative boundaries makes the knowledge-practice-belief system evaporate slowly. This study investigates the challenges of adaptive management of the Bajau community in the contemporary world. The issues discussed were the dominant issues captured during the observation in the Bajau village of Wakatobi.

5.7.1 Transformation of Bajau TEK

TEK is a fluid and dynamic practice in the Anthropocene. A TEK transformation can ensue according to the threats and forced adaptation from a community. The context of this transformation is closely linked to the knowledge exchange and management system of TEK manifestation from the Bajau. Adaptive management of the Bajau communities as part of TEK shows their essential role in framing this transformation, either positively or otherwise. On the one hand, The TEK transformations as an adaptive system imply a constant re-attunement of relations that engage humans and their environments (Fonseca-Cepeda et al., 2019). Besides, this transformation can also be a concern if resource users who practice TEK are excluded from a management system (Gomez-Baggethun et al., 2010).

Sea as dynamic space has changed to static with a more limited territory and space. The sea concept as a social, cultural, and ecological space has now completely turned into an economy and asset oriented. For the Bajau, this TEK transformation has occurred since the change in their sedentary patterns in the late 18th century (Liebner, 1996). Nevertheless, the relation between their TEK and wealth is inverse. Bajau TEK decreases, reflecting a move away from ethnos fishing practice with the advent of higher incomes (Cullen et al., 2007).

Indonesia's background as a country with a high cultural diversity substantially influences its natural resource management mechanism, such as in the Wakatobi Regency case. Inequality in recognizing and strengthening coastal communities in Indonesia (refers to MHA, traditional, and local community) leads the left-behind Bajau communities to be the fastest to transform their TEK. Several identified factors are the transformation factors of this TEK in the case of the Wakatobi Bajau, which are divided into three scales, as shown in Figure 36.

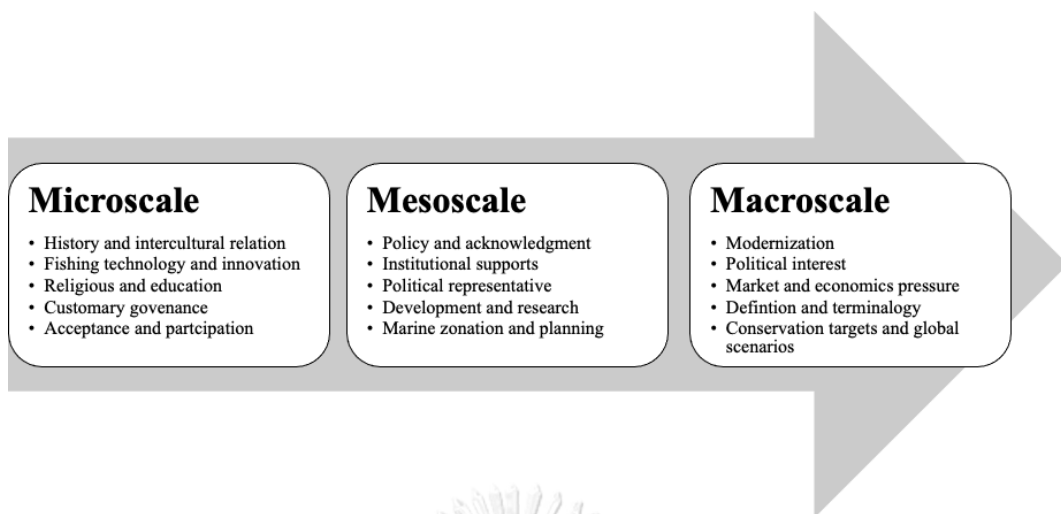


Figure 36. Factors of TEK transformation in the Bajau communities

This TEK transformation is a reciprocal relationship of interconnection between cultural and biological diversity at the microscale facets, then expanded to regional problems at the mesoscale and approximated with national and international efforts and targets at the macroscale. Previous research demonstrated that this TEK transformation was a form of knowledge impoverishment caused by globalization, modernization, and market integration (Aswani et al., 2018). However, this transformation is practically influenced by various connected relations and scales.

There are three selected examples to illustrate the transformation of TEK found in the Bajau community in Wakatobi. Firstly is the request for athletes in the rowing sport. The Bajau people, who spend almost all their time at sea, have an incomparable ability to row over mainstream people. Prior to being known as a sport, rowing a boat for the Bajau (TEK A3) was an essential skill similar to swimming or free diving. The Bajau rowing skills began to be exposed as a valuable resource and potential in water sports in the 1980s. Some of the Wakatobi Bajau have been experienced as Indonesian athletes at the SEA Games, Asian Games, and 1992 Summer Olympics. The demand for rowing athletes from the Bajau has increased over time. Young Bajau (men and women) who have good posture and talent are usually recruited to join rowing athletes by the 'middlemen.' These middlemen are former Bajau athletes and have connections to the

following official athletes' managers chain. This talent-recruiting demand is to seek athletes representing Wakatobi Regency or other regencies around Indonesia.

In each national competition, several delegates are well-trained Bajau people or Orang Laut from Indonesia. The need for rowing sport is a media platform for the Bajau community to become more well-known. Still, the phenomenon of intermediaries has become a talent business for continuously recruiting young Bajau athletes.

The second example is the *Sarang-Kalasi* phenomenon which represents the transformation of the Bajau TEK (F1, F2, F3). The *Sarang* is the captain of a fishing vessel (purse seine or trawl) with a capacity of approximately 50 to 200 gross tones and contains 10 to 20 crew members named *Kalasi*. The Bajau TEK in catching and identifying fishing grounds invite capital holders who run capture fisheries businesses, such as in Labuan (Sabah, Malaysia), Keke (Sabah, Malaysia), Miri (Sabah, Malaysia), Johor (Malaysia), Kijang (Riau Islands, Indonesia), and Saumlaki (Maluku, Indonesia). These business sectors recruit the Bajau men mainly from Wakatobi. Experienced Bajau people will be appointed as *Sarangs*. Then these *Sarangs* will invite their families and colleagues from their Bajau communities to become *Kalasi* or recommend them to become a *Sarang*. The *Sarangs* have a good income where their money will be delivered to their families in Wakatobi. The wives or kids of *Sarang* who stay in Wakatobi mostly live sufficiently and own many assets.

The *Sarang-Kalasi* phenomenon started in the late 1980s and indirectly led to the Bajau migration (*Sakai*). The pattern is where the Bajau work as *Sarang-Kalasi*, they intend to build a new Bajau village. It can be shown in Kijang, Riau Islands Province, where there are currently Bajau hamlets with the same name as the Bajau village in Wakatobi (Sampela and Lohoa). Most Bajau who migrated to Kijang are the Bajau from Sampela. Correspondingly with transboundary migration, such as to Malaysia, many Wakatobi Bajaus have changed their citizenship because they were settled and had a good income from maximizing their TEKs. The demand for *Sarang-Kalasi* is expected to grow constantly. However, this condition does not align with the readiness of the younger generation, who have insufficient TEKs.

The last selected example is the Bajau voyage looking for sea cucumbers at the Australian border (*Lama*). Their last stop before leaving Indonesia territory is Rote Island, Nusa Tenggara Province. The Wakatobi Bajau is one of the actors in this activity. The southernmost Bajau villages of Indonesia in East Nusa Tenggara Province originally migrated from Wakatobi Bajau villages, such as Tanjung Pasir (Rote Papela), Oenggai (Rote), Atapupu (Atambua), Sulamu (Kupang), and Pulau Kera (Kupang), which are estimated to have migrated periodically from the end of the 18th century until the post-Mantigola burned during DI/TII (1957). The Bajau's primary commodities to take from Australia are *Ballo* or *Teripang* (sea cucumbers) and *Kareo* (sharks). Since sharks have become protected species, they have left them behind. Presently, the Bajau seasonal migrate (A5) to East Nusa Tenggara Province, only looking for sea cucumbers within the Australian Fishing Zone (AFZ). They usually take sea cucumber in Pulau Beduk (Bedout Island), Masohor, Pulau Tengah and Menjerik (Rowley Shoals), Pulau Pasir (Ashmore Reef), Pulau Baru (Chartier Island Reef), and Pulau Dato (Scott Reef).

This reliable TEK fishing practice shows the unlimited Bajau sea territory in the former time crossing the national boundary. Although in 1974, a memorandum of understanding (MoU) Box as a subsequent agreement between Australia and Indonesia on the protection of traditional fishing communities, including the Bajau (Fox & Sen, 2002). In the implementation, it is still challenging due to still found the illegal practice of the Bajau in the AFZ (Stacey, 2007). If the Bajau are caught, they will be punished, imprisoned, and tried under Australian Laws. Another scenario was expelled from Australian water territory, or their boats will be burned.



Figure 37. The Papela Bajau boat was expelled and flagged by the Australian Navy (2 December 2022)

Crossing the AFZ later evolved into refugee smuggling from Central and West Asian countries that need asylum. This event started in the early 2000s until the end of 2015. Australia became its destination due to its ratification of the 1951 refugee convention. However, these illegal immigrants preferred sea crossings using traditional boats through Indonesian waters because it is cheaper and faster without long administrative processes. The Wakatobi Bajau communities were one of the actors in this chain of illegal immigrants. The task of the Bajau was to pick up illegal immigrants at specific meeting points such as in the Thousand Islands and Tidung Island (Jakarta), Lampung (Krakatau), Surabaya, Makassar, Cilacap, Banyuwangi, and several small towns in the southern part of the island of Java. Then they smuggled these immigrants to the Australian border: Pulau Pasir (Ashmore Reef) or Christmas Island.

A capital owner from Bajau in Wakatobi is involved in the refugee smuggling business. They recruit Bajau people as boat crews to send asylum seekers. The Bajau earned well

paid on a one-way trip refugee smuggling. They had to be ready for a consequence, such as being arrested by the Australian Navy and jailed for months before being deported to Indonesia. According to former boat crews, they got good treats from the Australian Government. Their life days in prison were fully serviced in terms of food and health; after leaving the prison, they would get amounts of cash. However, they were highly vulnerable because several incidents happened to the Bajau who sailed this boat. Many cases of boats sinking or sub-tropical storms hitting were documented, which happened to the Bajau without any update about their missing families. The boats carried were usually traditional fishing boats with 30-50 people. The condition of this boat was usually almost broken and old because the capital owner realized that when they touched down at the Australian border, this old boat would be burned, so there was no need for a new one.

The refugee boat crew and people smuggling phenomenon describes the Bajau TEK transformation used for illegal objectives. Tracing back to the Bajau motivation involved in this practice, high incomes tempt them. Factors such as economic drivers and manifestations and capitalization in shipping and fishing in the maritime zone (Missbach, 2016; Sholihah, 2018) are faced by the Bajau and other coastal communities in Indonesia that take part in these illegal practices.

All examples of the transformation of TEK are still indirectly related to the lifeways and nomadic orientation of the Bajau people in the past. Their courage and expertise in all things sea make them superior in all marine projection. The sea stores everything the Bajau needs, such as food, services, transportation, healing, and even the safest place for them. Their high curiosity and adaptive capacity have turned the Bajau human resource into a commodity. Once non-Bajau outsiders or institutions know about TEK, the impact of commercialization will arise. It concludes that TEK transformation is adjustable in this current global dynamic.

TEK has been eroding gradually because of its relevance to the current world. Of all the indicators and selected evidence related to TEK transformation, education is the principal tool to accompany the existence of this degraded TEK regime. Although this

is a paradigm shift and takes a long commitment, education towards revitalizing TEK keeps re-appropriating the intangible cultural heritage (Ianni et al., 2015). At least, the transmission from education still preserves their cultural identity and TEK. Educational institutions have a significant function in this TEK transmission to increase the participation of the younger generation as a catalyst for change (Feinstein, 2016). However, if done not in good order, it can trigger generational changes in the setting (from natural to school setting) and in the strategies (from experimental to conceptual learning) for those TEKs (Cristancho & Vining, 2009).

5.7.2 Mobility of the Bajau in the 21st century

The former Bajau were known as one of the groups spending their lives in boat houses (*Soppe*) and nomadic, following seasonal patterns. The appearance of the Bajau people who migrated to the Wakatobi islands was estimated around the 1850s (Stacey, 2007). Their migration purpose was to find a fishing ground with abundant marine resources. When the Bajau feel that the area has good fishery products, they will build temporary stilt houses (*Babaroh*) to store goods, fishery products, and shelter during the high storm surge. The Bajau settled pattern began with constructing temporary and malleable stilt houses. This pattern was then continued by constructing permanent stilt houses and materializing into a floating village on the sea. In the context of Wakatobi, the proliferation of this village was followed by the Bajau's marine reclamation initiatives around their stilt house, piling it with hard coral. Over time, the piles of rocks between these houses are connected so that new land reclamation is formed.

Bajau nomadism is a form of a tendency to move a group across the seas and islands because of specific motifs and patterns that later become a culture. This nomadism then expands the reciprocal exploitation of marine resources and completes a pattern of spatially and temporally discontinuous economic opportunities. Nomads are synonymous with 'mobility' and 'migration,' either seasonally inhabited by the sedentary or new fringe regions (Rowton, 1974). Sea nomadic life has solid ecological connections to other shared resources. In a broader context, nomadic peoples have a strong sense of belonging to their group, combined with a developed notion of possession and/or dominion over a territory (Moretti, 2012). These nomadic

communities depend on various natural resources and carve out intricate ecological niches for survival (Bokil, 2002). In the island areas, migration is used as a laboratory to describe the mobility of a complex community system, lying on various social and temporal scales or forced and voluntary efforts (King, 2009).

Due to marine ownership of specific areas being granted to those customary communities, for the Bajau, the sea is a domain that separates them from the settler community on the land. Their existence as migrant groups is disputed and threatens the property and ancestral domains of the dominant customary communities. This dilemma continually raises contemporary issues of strengthening the rights of customary communities in coastal areas and small islands of Indonesia, such as MHA term. The former marine nomadic groups collided with territory determination regarding communal property or recognized customary communities or marine national parks. For instance, the cases include marine national park zonation and MHA-managed marine areas in Wakatobi.

Rather than juxtaposing the contemporary with a past condition, the existence of marine and land nomadism in Indonesia is not well accommodated in development regimes. Consequently, this regime accelerated the disappearance of the practice of nomadic people in Indonesia. For land communities, the remains are shifting cultivation in various regions in Indonesia. Even this, they often face land tenure and dispute issues with other dominant communities, the private sector, or even the government. The coercion of sedentary in the colonial period, which continued during the New Order era in Indonesia, propelled the loss of nomadic practices. Their hunting and gathering practice are also diluted. The Bajau people inhabited the coastal area, and nomadic practices are no longer visible today. Even in Southeast Asian waters, 'sea nomadism' is now a misnomer as a sedentary existence has become the norm in the 21st century (Andaya, 2019). In Wakatobi, the migratory pattern was transformed into seasonal migration from September to December to the atoll.

This study identifies three justifications for Bajau mobility. The first is a 'long-term migration' term, the concept of the former nomadic style of the Bajau, which moves in

a big group to find a new settlement or resources. This term instance is the former voyage of Bajau migration from South Sulawesi to Wakatobi. This migratory style is motivated by cultural activity, freedom, and nature to explore and occupy new areas for their new civilization and livelihood. Next is 'local migration' caused by forced adaptation, distress, intergroup conflicts, and other human security issues. Its evidence can be seen in the migration that forced the Bajau community to scatter into several villages after the *Gerombolan* conflict (DI/TII movement) in Mantigola, Kaledupa Island. However, in the local migration concept, the Bajau people have two options: (1) to survive and return to their village after conditions are safe, or (2) to practice 'long-term migration' to find a new place. Some Bajau in Wakatobi also practices the second option, which fully migrates to new places outside Wakatobi areas during DI/TII conflict. The last one is 'seasonal migration,' as part of local migration, which is practiced for economic reasons in certain seasons.

Since the former nomadic practice or long-term migration was not glimpsed in the 21st century, the most widely practiced mobility of the Bajau is seasonal migration to atoll areas during the calm season. Atoll (*Sapak*) for the Bajau community is an open-access domain. The Bajau employ their TEK on seasonal migration, especially the cultural beliefs to their sacred areas in Wakatobi atoll. Their understanding of mobility conceptualization describes enormous TEK for examining, determining, and deliberating their cultural identity. In addition, mobility contemplation sometimes empirically clarifies property rights, territory, and intercultural relations.

The concept of seasonal migration justifies the word 'profession' at sea areas. The homogeneity of the Bajau people in the past as traditional small-scale fishers who depended entirely on the sea caused them to become unfamiliar with the term common profession classified by islanders. For them, the justification of 'profession' is only found when working on the mainland. The term "*Mamia*" which means looking for a living, is used by the Bajau to state their work diversification. The meaning of living for the Bajau is all activities in the sea. The full term is "*Mamia ka dilao*" or looking for a living at sea, divided into four terms (see Table 28). By examining more

profoundly and using time variables, the term seasonal migration is closest to *Pongka'*, while the long-term migration is more closely related to *Lama* or *Sakai*.

Table 28. Profession term of the Bajau

Activity	Boat	Duration	Description
Lilibu	Sailboat, Boat Bodi TS engine, <i>Katinting</i> , or <i>lepa</i> .	One-day trip (<i>babangi</i>)	Activities to earn a living or marine products around the village or in a relatively close area.
Pongka'	Soppe', Boat Body TS engine	More than one day Weeks Months	Seasonal migration to earn a living or marine products to <i>Sapak</i> and other faraway areas require overstay at seas, such as boats or <i>Babaroh</i> .
Lama'	Big sailboat or <i>Lambo</i>	Months Years	Migration activities include long-distance sailing both domestically and abroad to becoming fishermen, transporting goods, and finding new places for livelihood, but not settling for long-term.
Sakai	Lambo (perahu) or ferry and big vessels	Years	Long-term migration which aims to settle in a new place as a second village for economic reasons, but they still connect to their main Bajau village

Those kinds of seasonal migration are the last nomadic lifestyle of Bajau in Wakatobi. Presently, the Bajau commodifies this seasonal migration activity as forced by various economic motives. Thus, the sedentary life diminishes Bajau's mobility and disassembles its maritime livelihood system and culture. Also, their mobility has been limited since they are sedentary and encountering marine transboundary issues. As the most vigorous activity of Bajau seasonal migration, the *Pongka'* can be scrutinized using a sustainability perspective, as revealed in Figure 38 below.

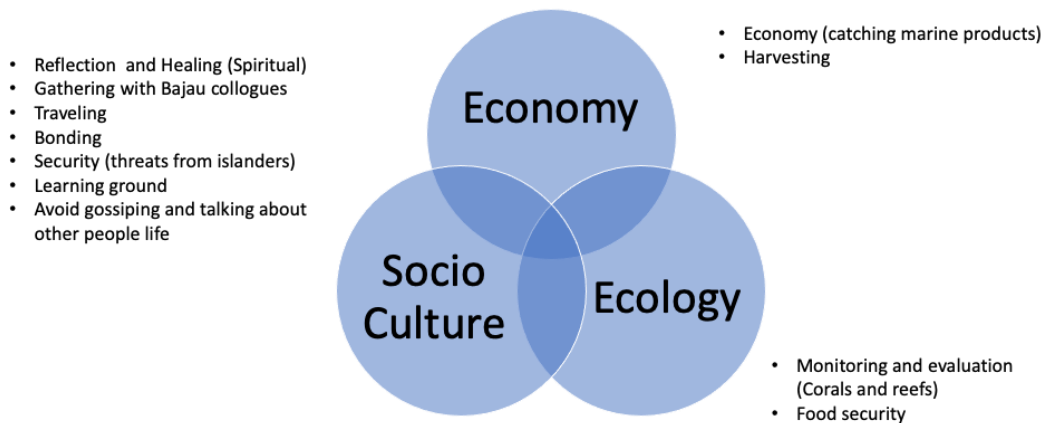


Figure 38. Sustainability perspective of *Pongka'* seasonal migration

The *Pongka'* activities usually involve nuclear families, but now *Pongka'* in Wakatobi was substitutable through fishing in *Sapak* and staying in Babaroh during a calm season. In the early 2000s, the Bajau community in Wakatobi still carried their children to *Sapak*, and some even delivered a birth during *Pongka'* activity. However, local government and WNP authority forbid the Bajau from taking their children to the sea. They should leave the kids in the village for safety and health reason. They also should study at formal school. Another reason to leave kids in the village is that the children need to study at formal schools and access health care for infants and sick Bajau.



Figure 39. Lilibu with Lepa boat (10 October 2021)



Figure 40. Katinting boat (23 January 2021)



Figure 41. Pongka' to Wakatobi atoll and overnight at Bodi boat (31 March 2021)



Figure 42. Bodi boat situation during Pongka' (30 March 2021)



Figure 43. Pongka' to Wakatobi atoll and overnight at stilt house (1 April 2021)



Figure 44. Babaroh in Kaledupa atoll (15 April 2021)



Figure 45. Lambo in Wakatobi from the Mola Bajau (2 April 2022)

Another mobility observed in this study is the activities of several Bajau communities from Wakatobi migrating (*Lama'*) to Papela Hamlet, Landolusi Village, East Rote sub-district, Rote Ndao Regency, East Nusa Tenggara Province. The Bajau Wakatobi name this place as Pepela. This area's specific name is Tanjung Pasir, whose residents migrated from Bajau to Wakatobi, especially Mola and Mantigola. Tanjung Pasir means cape of the sand island because this place used to be an unoccupied sand cape. The first Bajau Wakatobi migration was presumed in the early 1920s, along with the entry of Islam into the area from Bugis and Binongko folks (Stacey, 2007). Then, the following phase was during Sulawesi's DI/TII movement. This study observed that the Wakatobi Bajau seasonal migration occurred from March to June, and the second period was from September to December. Their purpose in migrating is to take sea cucumbers (*Balok*) from AFZ. This illegal fishing activity is always held out every year.



Figure 46. Bajau Village in Tanjung Pasir, Papela (1 Dec 2021)

During the Coronavirus disease (Covid-19) pandemic, the Bajau underwent massive migration because the sea border between Indonesia and Australia was still closed. This situation benefited the Bajau people due to free access to take Balok from Australia's exclusive economic zone (EEZ). Before the pandemic, the Bajau who did illegal to those marine areas were often arrested, their boats burned, tried, and imprisoned in Australia. However, during Covid-19, until this fieldwork was finished (December 2021), there were no arrests for the Bajau entering the AFZ. They were expelled from the border, or their boats were only sunk if they came in groups.

The activities of transboundary issues have been discussed since 1974 through the MoU Box. It refers to a rectangular tract of marine waters within Australia's EEZ in the Timor Sea. Particularly for the Bajau community in Wakatobi, their representatives have signed the Wakatobi Fisher Commitment for Illegal Unregulated and Unreported fishing (IUU) and illegal activities for crossing the national border on 20 August 2019, in Mola, Wangi-wangi Island. However, the Bajau community in Wakatobi has not

fully obeyed this commitment. The older generations of Bajau communities in Wakatobi typically have sailed experience to AFZ. This experience was always acknowledged as pride for Bajau men because of their courage to such a distant sailing.



Figure 47. Women are cleaning the sea cucumbers or Tripang (Balok) from the Australian Fishing Zone in Papela Bajau village (2 December 2021)



Figure 48. A group of the Lamanggau Bajau is preparing to visit Papela for fishing in the Australian Fishing Zone (5 June 2021)



Figure 49. Bodi boat for sailing to the Australian Fishing Zone (1 December 2021)

5.7.3 Destructive and illegal activities as intergenerational cultural dissonance

The plight of cultural degradation of Bajau communities in Wakatobi is analogous to destructive fishing practices. As a result of these unacceptable practices, Bajau has frequently received poor stereotyping from various social institutions around them as a group with no grasp of protecting the environment (Madlan et al., 2014). The accusation of the Bajau being discourteous to nature is an iceberg phenomenon. These issues are consequences and accumulated complex social, ecological, and economic stress from internal Bajau and external factors. The long journey with generations in nurturing the environment and upholding human-nature philosophy was spoiled because of these destructive activity regimes of the contemporary Bajau.

Adopting destructive fishing is a form of TEK degradation and poor knowledge absorption. Today's destructive fishing practices do not originate within the Bajau community. The foremost gate of this practice adopted by the Bajau is because of a fisheries market chain led by the local oligarchs which entangle Bajau communities. This antagonistic influence reached outside but was welcomed by the Bajau due to their vulnerable cultural identity and autonomy. Additionally, the temptation to earn money quickly and easily without much effort motivated the Bajau to accomplish destructive fishing.

The supply chain of these practices involves several actors and capital holders in Wakatobi. Due to the Bajau acting as the first executor and implementor, they bitterly received accusations of destroying nature. However, the other fruitful actors are covered silently. This political ecology and power regime in Wakatobi appears stagnant and unsolvable. There are seven factors documented in destructive fishing practices in Wakatobi as follows (1) the Bajau losing their TEK and customary institutions, (2) a robust patron-client system, (3) overlapping WNP management authority, (4) illegal and destructive fishing activities from outside Wakatobi, (5) chemical material suppliers for destructive activities, (6) market system for illegal fisheries catches, and (7) low law enforcement and graduated sanctions.

Dynamite fishing

Dynamite fishing was known in Bajau communities as a remnant of the pre-Independence Day of Indonesia. According to the Bajau, it was first discovered in around 1939, when the Japanese Allies forced the Bajau to fish using dynamites and homemade bombs. The Bajau were taught to assemble and use dynamites. Consequently, this practice was protracted even after Indonesia's independence and the second world war. The Bajau dashed to find remnants of dynamite from Japanese allies. Then, they practiced their skills to do bomb fishing using homemade dynamites. High curiosity and willingness from the Bajau elders regarding dynamite fishing were inherited by generation until the government of Indonesia stated this practice was prohibited.

In Wakatobi, the practice of homemade fish dynamites was served in the 1980s. Bajau migrants from Malaysia brought this method to Wakatobi, later adopted by other Bajau communities. Raw materials for making fishing bomb can be ordered through illicit transactions with several providers in Wangi-wangi and Kaledupa Island. The main component that is difficult to find is 'urea fertilizer' or ammonium chlorate. Others are their daily necessities such as glass bottles (335 ml or 620ml), kerosene, detonator from wooden lighters, cotton wicks, rubber from used sandals, and other small items. The capital spent by the Bajau to make one homemade bomb is around IDR 75,000. This fishing bomb action (*Ngabong*) is conducted at low tide and is usually conducted at sunrise or sunset. This preference time aims to deceive the WNP authority that infrequently patrolled around that time. In each Bajau village in Wakatobi, the victims of this homemade fishing dynamite can be spotted where some of them might lose their organs, such as arms, legs, or facial defects, and some even passed away.

In a broader context, the dominant practice of dynamite fishing is carried out by people outside Wakatobi. The homemade bombs used had a larger capacity than the traditional communities (such as the Bajau), using jerrycans ten liters or bigger (*Ngabong Kabel*). The detonating system is a cable sensor and Accu batteries instead of cotton wicks. From 2008 to 2012, the WNP authority experienced several ceasefires with these fishing bombers. There was even an incident where the fish bomber threw the bomb at

WNP officers. The documented data from WNP regarding bombers and illegal fishing from outside Wakatobi was dominated by fishermen from Kendari and Saponda (Southeast Sulawesi Province) or Banggai (Central Sulawesi Province). Some of the crew members who carried out bomb fishing were the Bajau people.

Fish poisoning

The ancestors of the Bajau community were unaware of poisoning fish in the past, whether made from natural ingredients such as leguminous plants from the derris genus (*Tuba*) or even chemical ingredients. Mainland people predominantly do tuba practice because the parts of the plant (fruits and roots) are used as the primary material for that natural poison. Tuba is a wild plant growing on land, not on the coast. Due to its living location on community plantations and owned by islanders, the Bajau people in Wakatobi cannot access that plant freely. The practice of *Tuba* carried out by land communities is still found during this research, especially during the morning low tide periods.

The use of chemical fishing, made from potassium cyanide, is deemed to have entered Wakatobi islands around 1993 but was widespread in 2015. Similar to dynamite fishing, chemical fishing was introduced by the Bajau people who migrated (*Sakai* or *Lama'*) from Wakatobi. Then, when they came back, they bought and practiced it in their village. It is evidenced that the Bajau migration out of their villages, apart from gaining economic benefits, also sometimes has a negative effect on the modification of fishing gear and unsustainable fishing methods.

Furthermore, there are three ways to use this potassium cyanide. The first is to mix it with water in a one potassium cyanide crystal ratio for 190 milliliters (usually using a floor cleaning bottle). Then this mixed liquid is sprayed on the coral where the fish hide (*Nyuppu*) so that the fish will get poisoned and easily caught with barehand. The second way is to powder the potassium cyanide crystals, mix them with fish pieces and sprinkle them into the waters (*Ngarasong*). Fish that consume the poisoned fish pieces will die and float to the sea surface. The last method is almost the same as *Ngarasong*, but the fish pieces are put in a plastic bag and given a stone weight. The plastic bag with stone

weights is lowered to the seabed for about 5-10 meters in the target area and firmly pulled until the bag is torn and pieces of poisoned fish bait are scattered out (*Ngantong*). Fish in the target area will eat the bait poisoned pieces, die, and float to the sea surface.

The following practice regarding chemical poisoning is the use of insecticides. One of the famous brands is Dangke 40WP, or Bajau people know it by the term *Ngadangke*. Initially, Dangke 40 WP is a white contact and stomach poison systemic insecticide in the form of a powder that can be suspended (wetable powder) to control pests on shallots, soybeans, chilies, long beans, cocoa, tomatoes, green beans, cabbage, and Palm oil. The Dangke 40WP is used as an alternative to potassium cyanide because it is cheaper. The way to use it is the same as potassium cyanide, but the Dangke 40WP cannot be mixed with water like *Nyuppu* practices.

The supply chain for chemical poisoning raw materials follows the trend of the market system. For example, as the primary material for bombs, urea fertilizer is obtained from agricultural shops or purchased directly from cities on the mainland of Sulawesi. While the Bajau previously obtained potassium cyanide by ordering it from a retail gold seller at the Wangi-wangi traditional market. The general public who are unfamiliar with the seller will not be able to buy them because codes and principles of trust have been advanced in this illegal chain. However, the chain of ordering illegal goods since early 2020 has adopted information, communication, and technology. The Bajau communities can now order urea fertilizer, potassium cyanide, or insecticide fertilizers such as Dangke 40WP online with direct delivery to their drop seller. Their motivation to order these things online is lower prices, faster and low risk. Indeed, it is intensified by smartphone and technology adoption.

Various age groups carry out the practice of chemical poison. However, what is interesting is the use of potassium cyanide and insecticides, mostly carried out by young people aged 15-25 years. Not only teenage boys but also girls. Sometimes they intentionally create a group for these illegal fishing activities with a clear division of work for each member. Their motivation for doing these practices is to earn money quickly, which does not require much energy. Only with these chemicals and basic

freediving skills do they effortlessly get money from these illegal fishing activities. They earn money to buy necessities such as cellular data packages, smartphones, clothes, or cosmetic needs. When arrested, they will be prosecuted with Article 1 Paragraph 1 of Emergency Law No. 12/1951 on explosives and Article 122 of Law No. 22/2019 on sustainable agricultural systems. This group of Bajau is frightened of prisoning and fearful of the living karma of the sea spirit, but they still practice it.

Illegal activities

Besides the detrimental practices to the marine environment, illegal activities, including shark-fin trading, sea turtle consumption, compressor fishing, coral and sand mining, and mangrove cutting for firewood, still exist in the 20 years birthday of WNP. Those activities are prohibited in Indonesia according to various fisheries and environmental laws. The primary reference for illegal fishing activities is Article 84 Paragraph 1 in conjunction with Article 8 Paragraph 1 Law No. 45/2009 about Fisheries, with a penalty of six years in prison and a fine of IDR 1.2 billion (approximately USD 8,183). In addition, the law regulates the protection of endangered and protected animals such as sharks and sea turtles in Article 7 of the Fisheries Law, Government Regulation No. 7/1999, and Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. P.20/Menlhk/Setjen/Kum.1/6/2018 concerning protecting plant and animal species. This illegal practice is well observed in all of the Bajau villages in the Wakatobi Regency.

In trading shark fins, immense trade occurred around the 1970s to 1980s due to the world market demand for Chinese food being high during that period. This practice is reinforced by the massive voyage of the Bajau into AFZ to catch sharks simultaneously. Sharks (*Kareo*) for the Bajau are meaningful animals in the ocean ecosystem. Especially the whale shark (*Dedek*) is considered the mother of fish and helps the Bajau catch pelagic fish. The Bajau do not consume whale sharks or whales because they are believed that they are sometimes incarnations of the sea spirit.

Furthermore, consuming sea turtles (*Bokok*) has been known by the Bajau for generations. They consume sea turtles on big Islamic days or events (for example, EID

Day and circumcision traditional ceremony) and welcome guests. Sea turtles are also used for traditional events such as *Maduai Bokok*, where the sea turtles will be slaughtered as offerings and given to sea spirits. Nevertheless, the sea turtle is a sacred animal for the Bajau communities if they kill them outside of particular needs. Sea turtles must be slaughtered according to Islamic teachings. It is taboo to slaughter sea turtles in the middle of the sea or on a boat. The procession must hold in the village or on the mainland. The present Bajau cannot smile or speak harshly during the slaughtering ceremony. The slaughterer must be an experienced person or an elder in the Bajau village. Mistakes in slaughtering or torturing turtles at sea will obtain the *Panyala* or life karma.

The initiative to unravel the destructive fishing in Wakatobi is flawed and problematic. The programs and policies carried out by the WNP authority have not accommodated the habits of local communities in reducing destructive and illegal fishing (Said, 2013). The institutional complexity facet, social cohesion, and ideological shifting are the background for this problem. The TEK of the Bajau community has conservation values initially but is not being addressed and appropriately involved. The maturation of information technology and the issue of globalization will increasingly affect Bajau in various ways. There is a need for documentation and development of TEK-based programs and a long-term commitment to co-management transition in resolving this complexity. If it is not addressed immediately, the cultural dissonance will continue to hit the Bajau future generations and increase other development challenges.



(a) bomb fishing



(b) shark fins

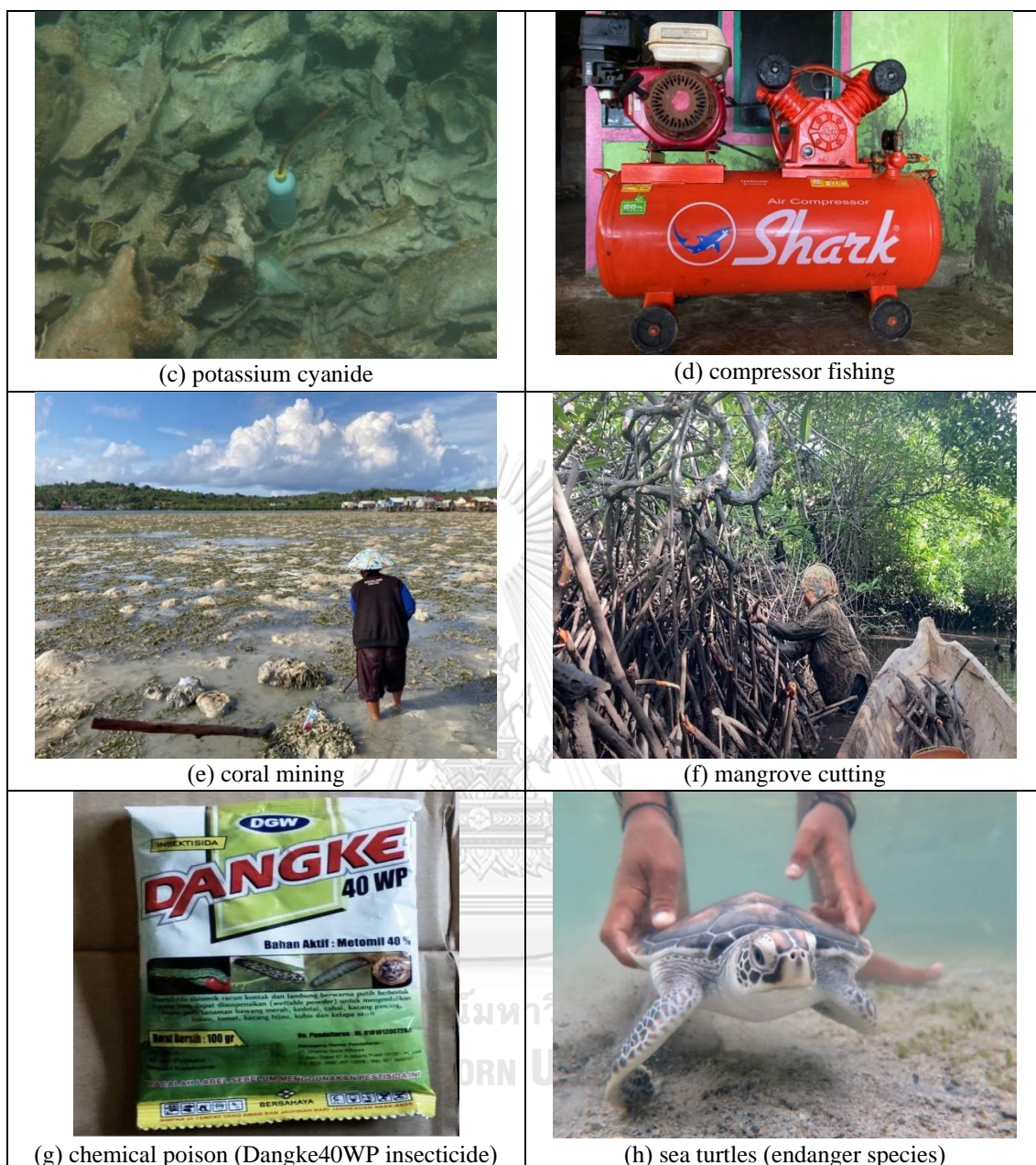


Figure 50. Destructive and illegal fishing activities of Bajau communities in Wakatobi

5.7.4 Bajau toward land-based community

The apprehension regarding the positionality of the Bajau people in contesting as customary communities are becoming a desirable debate in Indonesia. Since the Bajau are no longer nomadic life, the alternative development to provide land access to such land-based communities is apprehended. Whether from the government or administrative village initiatives, the development direction in Bajau communities has evolved toward a land-based community. Implemental, this projection does not align

with the eagerness of the Bajau internally, the acceptance of the dominant community, and the warranty of development by the local government.

Prior to transforming into a land-based community, the Bajau initially triggered demands to obtain land certificates in their village areas, both on the water and coast. The contemporary Bajau house style was gradually changed into the mixed style of permanently settled houses or stilt houses style from Butones cultures. Their demands to legitimate their reclamation land later than were welcomed by the Wakatobi government in 2014 until now in the form of 'land certificates'. The reclaimed land from coral piling under their stilt house can now access capital loans from the informal or formal sectors. Their financial inclusion concept has transformed because they might asset marine resources. The Wakatobi case is distinguishable because the Bajau communities live in the MHA areas and WNP zonation. At some points in Indonesia, the land disputes from sea nomads are included in crucial issues in conflict resolution, such as the Bajau in Kera Island, East Nusa Tenggara Province (Sastrawati & Bakar, 2021), the Bajau in the Gulf of Tomini, Gorontalo (Obie et al., 2015), Orang Laut in Bertam Island, Riau Islands Province (Rahmawati, 2014) or Chao Lay communities in Andaman coast, Thailand (Arunotai, 2017).

From a local initiative context, simplifying the Bajau community issues is the principle of the current emerging challenges. This simplification generalizes Bajau as a common coastal community that does not have customary domains on the land. However, it also mainstreams the Bajau community in all development engagements without consenting and prioritizing their TEK. Related stakeholders regulating the Bajau community need an adequate understanding of their history and equity efforts. This case is evident in Wakatobi, where the dominant customary groups govern decision-making. Although not overtly, there seems to be a tendency to raise the issue of cultural hegemony. Under the pretext of strengthening the MHA issues, which was then linked to sustainable SSF by leaving the Bajau behind.

In the mobility and island cultures approach, land and sea are two elements that cannot be separated or contradicted (Kelman & Stojanov, 2020). It is pronounced from the

current situation of the Bajau that even though the label says they are sea people, their lives also depend on the land. Disclosure of land and sea relations for the Bajau can be shown in their need for access to grave areas. The Bajau people are devout Muslims who need land to bury their dead families. Nevertheless, the contemporary Bajau people have to fight independently to access the burial ground. For this grave area issue, the Bajau always pleads to 'Adat' leaders through village leader forums or to political figures every general election period. The location of Bajau's ancestral graves has been converted into a special tourism land zone, as is the case on Hoga Island. In contrast to the clean water source issues, instead of being helped to get public facilities, the Bajau people become objects of water privatization by the capital holders. Their access to clean water from the government only enters the Bajau Mola village on the side of the main road.



Figure 51. Cemetery area for The Mola Bajau in Otawe Island (1 September 2021)



Figure 52. Women of the Sampela Bajau buy freshwater in Sampoabatu Market Kaledupa (20 November 2020)

In addition to sedentary change, the dilemma in the cultural transformation of the Bajau people to become land communities cannot be separated from other intersectional issues. This cultural transformation tension from the Bajau hybrid identity makes their identity narratives potentially problematic. Acculturation, exposure to capitalism, the educational system, and colonial history entangled are supporters of cultural transformation for the Bajau community in Wakatobi. This change targets the ideology and identity of the Bajau community, which directs multiple interpretations of their ecological and social challenges. This multi-interpretation and ambiguity later became a 'cherry-picking culture' as the fallacy of incomplete socio-cultural evidence. The role of institutions in designing development programs for the Bajau community is limited to the implied superficial issues. So, the Bajau customary institution cannot tackle this cherry-picking culture in Wakatobi.

Some Bajau people in Mantigola have agreements with Kaledupa islanders to oversee their nearshore field (*Koko*) on the west coast of Kaledupa island. The Bajau are permitted to plant cassava and other tubers by the landowner without paying rent. In the Bajau Lohoa village, they opened new land in the rock islands hidden behind the mangrove forest. In the beginning, they just took the lime rocks for the house's foundation or piled stone under their stilt houses. However, over time, because they found a layer of good soil under the lime rock, they planted it with tubers, bananas, and coconuts. They usually visit this land in the rainy season or replant it with other plants. However, this practice is predicted to create customary conflicts in the future. All areas on the island of Kaledupa are retained in the customary area and property by MHA Barata Kehedupa. This new field of the Lohoa Bajau is named Limbo Kiwolu by MHA Barata Kahedupa.

The identity of hunter and gatherer of the Bajau has slowly turned into an exploiter and trader. There is no lessening in their hunting and gathering practices because their basic skill was tied to it. The former Bajau positioned its main livelihood on the sea resources, and now they expanded to land resources. This phenomenon aligns with the manifestation of Bajau TEK regarding the diversification in knowledge exchange and adaptive management. The Bajau have the potential to become cultivators because of their maritime culture, including sea and land. However, the sea portion is way more significant. For comparative information, a similar situation is also found in *Chao Lay* and Moken in Thailand, where they practice local knowledge to grow wild rice and other plants and vegetables for daily consumption (Arunotai, 2006). Another example is in *Suku Akit*, as part of *Orang Suku Laut*, in Bengkalis Island, Riau Province, who turned their livelihood into a palm oil farmer (Juniyanti et al., 2020). However, several land-granting systems initiatives have failed due to management and planning factors that have not matured (Susilowati, 2017; Zacot et al., 2008).

If examined based on the history of the origin of the four oral versions of the Bajau story, according to Liebner (1996), the Bajau community originally came from the mainland community of the Islamic sultanate, which later transformed into a marine community due to various motives, scenarios, and threats. Through this history, the

presumption about Bajau TEK has similarities with other sea nomad groups because all these sea nomads are thought to have maritime culture and the same historical ties as stated by Sopher (1965). In this context, TEK is the remaining tool to demonstrate the relationship of sea nomads with land in various evidence (Arunotai, 2006; Chou, 2003; Zacot et al., 2008). As documented by several studies, the narrative about maritime nomadic cultures consistently differentiates and separates sea nomads from mainland culture or memorable phenomena. These rigid identity narratives contrast sharply to the contemporary realities of sea people identities articulated in Moken, Thailand (Robinson & Drozdowski, 2015).

Compared with contemporary research on the Bajau regarding evolutionary Genealogy (Ilardo et al., 2018) and genomic origin and dispersal (Kusuma et al., 2017), the Bajau community is distinguishable from the mainland community as a form of body adaptation and prolonged survival. These studies likely support Darwin and Wallace's theory of evolution by natural selection in 1858. The term natural selection constructs the genealogy evolution of the Bajau people, who used to be land people, into a unique sea community spread in various marine areas. Debatably, it is too amateur, and less evidence to connect those prominent theories through a multidisciplinary lens. Further study and analysis must be addressed.

Moreover, if this justification is projected into acknowledgment and recognition in Indonesia, a group like Bajau should get the same protection as other customary groups because the Bajaus are also tied to land culture. The detail as follows: the Bajau cultivated their basic needs on the land, some sacred sites of Bajau were located on coastal land, and the TEK was portrayed in forests. Bajau's extended culture from the sea to the land is one considered point that makes it different.

5.7.5 Tourism development

Tourism is one of the development issues most proximate to the Bajau community today. The adventurous scenery around the Bajau village and the distinctive culture becomes a big attraction for the economic growth of the Bajau community and local government. On the other hand, tourism development can dilute the Bajau TEK if it is

not designed sustainably. Some practices even place the Bajau community as an object rather than a subject. The practice of displaying and informing the primitiveness of the Bajau for the tourism industry is still discovered ethnocentrically. Regarding cultural display, infrastructure building is also normative in ethnocentric ways. This concern is compounded by the idea of developing coastal areas and small islands in Indonesia based on coastal tourism, underwater tourism, or cultural tourism, such as in the Wakatobi archipelago. Bajau villages offer all the mainstay destinations of small island tourism, such as community culture, beaches, underwater, mangrove forest, culinary, and other tourist attractions.

Wakatobi was nominated as one of the ten 'New Bali' destinations by the Ministry of Tourism and Creative Economy of the Republic of Indonesia in 2016. To support the ambition of the Wakatobi Regency, all development programs are linked to the tourism sector. The goal is to lift economic growth and livelihood diversification from the tourism sectors. The 'New Bali' concept is projected to be a breakthrough in the tourism sector in Indonesia, and the program is prepared to welcome tourists with the new adaptive and sustainable system (Ramadhana & Kusumaha, 2022). However, the glorification of tourism in Wakatobi is not in line with the socio-ecological development and sustainability of indigenous peoples, especially the Bajau. As a result, top-down concepts dominate development in Wakatobi, such as initiating the construction of flats for the Bajau community to reduce overpopulation problems and environmental hygiene.

In Wakatobi, apart from seaweed cultivation, tourism is an 'alternative' for the livelihood diversification of Bajau communities (Stacey et al., 2018). Seaweed cultivation has begun to be abandoned by the Bajau community due to unstable prices and the availability of seeds. The seaweed cultivators are mostly MHA Kadiye Liya and MHA Barata Kahedupa (Darawa village), later adopted by the Bajau community. Of the five Bajau villages, only the Bajau Sampela and Lohoa communities still have alternatives to find seaweed cultivation. The potency of seaweed cultivation has not been fully witnessed as an alternative economic opportunity for the Wakatobi. This left issue often gets objections from seaweed cultivators in Wakatobi regarding Fairtrade,

seed, product innovation, and better management practices (Paena & Rangka, 2012; Zaid, 2020).

Meanwhile, the tourism sector is growing because all tour operators in Wakatobi 'sell' cultural trips to all Bajau villages. However, these tourism opportunities for the Bajau are only limited to those with the capital, skills, sufficient education, networking, communication skills, and undoubted support from other institutions. In addition, examples such as inappropriate tourist clothing that come to Bajau villages may not necessarily align with their cultural belief systems or be detrimental to other livelihood strategies (Stacey et al., 2012). The issue of inappropriate tourist clothing is not only a tourism issue in Bajau village. The Wakatobi government does not yet have rules that explain guidelines for how to dress tourists when traveling in Wakatobi. Islam and customary norms have guided the tourist clothing rules.



Figure 53. The Lohoa Bajau and seaweed farming (20 February 2021)

The tourism industry in the Bajau village is not a new issue because the various regions with sea people in Indonesia do something similar. In Wakatobi, the objectification of Bajau village as a tourist destination began in 2005 until now. Then presently it becomes big business for tourism business sectors. One of the observable phenomena

is taking pictures of the Bajau people and used as personal branding for visitors. Their caption on social media often misled information and sold the 'Bajau sadness' living condition according to visitor views. They take pictures of Bajau kids without consent, and sometimes, they ask the Bajau kids to 'staged act' for their video or image settings. Also, some dive operators in Wakatobi commercialize the Bajau man as a 'staged free diver.' Sometimes, this profession is acted by 'land people' who pretend to be Bajau and get photoshoots underwater. This practice is widely found in dive operators on Tomia Island.

Operation Wallacea on Hoga Island near Bajau Sampela village does much socio-cultural research. Many researchers from abroad write about their distinctive lives and cultural tourism opportunities. Apart from sightseeing villages, attractive tourism such as canoeing, traditional fishing, dolphin watching, stargazing, snorkeling, and free or scuba diving can also be developed for the Bajau community in Wakatobi, especially in Mola Bajau and Sampela Bajau. The same thing is also ongoing and developed in Mantigola Bajau through the assistance of an international NGO focusing on ST. The tourism sector from the creative economy, such as crafts, is also an excellent opportunity for the contemporary Bajau in Wakatobi. A souvenir gallery in Bajau Mola sells processed products and crafts for the Bajau community. In the Bajau Sampela village, *Cerumeng* craftsmen (Bajau traditional goggles) and various pandanus crafts.

The Bajau Museum in Wakatobi, known as the 'Bajo Traditional House' or 'Heritage House,' was built in 2014-2015. The purpose of its development was as a cultural center that stores both tangible and intangible customary things (boats, flags, dress, songs, and others) for the Bajau and its intergroup relation. It was initiated as a sharing budget from the Ministry of Education and Culture of the Republic of Indonesia, Bank Mandiri, and the British Council. The building is now in disrepair before opening as a functional museum. Several cases were observed in this fallen project, namely: (1) conflict of interests and political situation, (2) the narrative of Bajau identity, (3) Bajau community participation and involvement, (4) intercultural conflicts, and (5) financial support and budgeting.

The Bajau people in Wakatobi do not have specific custom buildings or other heritage objects. The living museum concept is argued as more beneficial for the Bajau, namely in the form of shared ownership as a center for daily activities such as the function of a traditional meeting hall, performance arts, or common space for other customary activities. This concept, in Bajau terms, is called *Passipupukang* (common sharing place). The philosophy of *Passipupukang* is not about the construction of buildings or infrastructure but is a more common space for gathering. The extension concept of *Passipupukang* might serve as a bridge for cultural attractions for the Bajau community and an interpretation of cultural transformation in adopting vernacular architecture.

The juxtaposition of tourism development with TEK is commensurate. The concept of ecotourism that relies on TEK has been widely developed and proven effective and potential (Butler & Menzies., 2007; Chao & Hsu, 2011; Prasetyo et al., 2019). The manifestation and justification of TEK can be a tool to develop ST and CBT in Wakatobi. An example related to maritime knowledge is dolphin watching. Apart from being a tourism potential, the Bajau can become paid custodians of these species in the WNP as co-management of protected animal conservation issues. The WNP and Wakatobi Regency, which favor emphatic interests in tourism sectors over the voices and needs of local people such as the Bajau, are likely to result in less equitable and effective governance of MPAs, thus affecting its long-term social-ecological resilience (King et al., 2022). Even for Bajau, this government initiative to be overexposed to tourism will impact the objectification of their group and new narrative identity.

Among the obvious negative impacts of tourism development in Bajau Wakatobi is an increase in the mindset of begging tourists and donors. The Bajau elders feel that tourism development has made many Bajau people, especially young people, more interested in being tourism actors than working at the sea. These young Bajau associate the Bajau who still go to sea with menial jobs. Tourism conditions targeting the Bajau community have not been significant as an alternative or main livelihood. Only some people get direct benefits from current tourism development in Wakatobi. The Wakatobi tourism development concept still does not include livelihood diversification for the Bajau. There has been no consolidated TEK involvement in tourism

development in Wakatobi, both cultural and sustainable tourism. In particular, during the Covid-19 pandemic, Wakatobi should focus on recovering its tourism sector and incorporating principles of equitable resilience from local communities to recover from the pandemic (King et al., 2022).

5.7.6 Climate change adaptation

IPLCs are vulnerable to climate change, although much evidence explains that they are resilient because of TEK (Ford et al., 2020; Smith & Sharp, 2012). The relationship between TEK and climate change is reciprocal, but the multiplier of other determinants causes this relationship to be a dilemma. One of the determinant factors in adapting to climate change is the existence of customary institutions and the support of other institutions such as the government, NGOs, CSOs, and academics. In addition to ecological calamities, climate change also impacts IPLCs' social, cultural, and economic life. The capability of IPLCs to cope with the threat of the climate crisis is activated by their autonomous adaptation (Pecl et al., 2019; Pisor et al., 2022). Various United Nations forums have discussed the adaptation of IPLCs, especially the United Nations Framework Convention on Climate Change (UNFCCC) (IPCC, 2014).

For groups living on land, the issue of climate change is close to the transition of forest functions or water resources which causes various problems on development issues. Not much different from the IPLCs or IPs who live on the coast and small islands, the issues that can be seen are rising temperatures, sea surface conditions that impact marine life and livelihoods, and hydrometeorological disasters make fishermen unable to go to sea. Indonesia recognized the IPs as "*Masyarakat Adat*," or customary communities. The definition of IPs was not acknowledged as forced by Soeharto's regimes which articulated that discoursing the IPs, tribal or native, was prohibited (Murray Li, 2000). Also, most of Indonesia's customary communities are not native people or IPs. One of the customary communities is sea nomads. Groups of sea nomads who depend on marine resources are certainly affected in various ways by climate change (Ariando & Limjirakan, 2019; Nakano, 2020; Sinapoy & Djalante, 2020).

Under observations in Wakatobi, the climate change impacts found on the Bajau community are:

Table 29. Climate change impacts on Bajau in Wakatobi

Earth system	Variable*	Impacted to Bajau**
Atmospheric	Air temperature	Air temperature is increased
	Wind speed and direction	The occurrence of sea storms " <i>Sisiapu</i> " is increasing and mainly occurs at night. The shift in seasonal wind patterns makes them difficult to predict the pattern, and it decreases the adequate time for fishing
	Precipitation	The rainy and dry seasons are erratic. Each year sometimes the rainy season is longer (refers to La Nina), and sometimes the dry season is more extended (refers to El-Nino)
Oceanic	Sea surface temperature	The water temperature used to be cold in the West season but not anymore. Certain types of fish and shellfish do not come again in season or come sooner/slower. Some areas of the seagrass meadow and coral reef (bleaching) have turned to sand.
	Sea level	The height of the stilt house must be higher because, at certain times, the high tide accompanied by a storm will wash away their house. The Lamanggau Bajau experienced the most impact; in the past, behind the village, there was a sand meadow at low tides, but now it does not appear anymore. However, some argued that it was also caused by the sand mining on the other side of Tolandono Island, Sawah Island, and Lentea Island by the islanders. Ndaa Island and Tutubu islands had longer foreland, but now they are getting shorter.
Terrestrial	Water use	There are no springs on the mainland, so they must buy water from islanders.
	Land cover (including vegetation type)	The Bajau communities signify several types of trees and grass as signs of seasonal changes. Such grass types grow along the island coasts, but this grass is rare to find.

*Variable was selected based on the related context to the Bajau in Wakatobi. For the full variable, see Bojinski et al. (2014)

**Interpretations were documented by qualitative setting through open questions for comparing the current situation versus 30 years ago

Climate change has physical and socio-economic impacts on the Bajau communities. Despite those described in Table 29, the cultural transformation from nomadic to

sedentary communities impacted their adaptive capacity to climate change. In a negative sense, sedentarization for the Bajau represents the loss of the traditional nomadic lifestyle (Gaynor, 2007), contributes to the disappearance of maritime cultures (Stacey et al., 2017), and increases exposure to ecological threats (Clifton, 2014) due to climate change. In the common challenge, unpredictable weather and seasonal patterns and increasing extreme climate events affect the Bajau's access and fishing space. These deleterious consequences of climate change are related to their economic stability and livelihood diversification.

Regarding the food system transformation of the Bajau, climate change exacerbates food availability due to altering marine environmental conditions. In particular, water temperature with the potential loss of coral and seagrass affects food diversification (Stacey et al., 2017). Metamorphoses in land-based consumption patterns transpired in the Bajau community. On the one hand, this adds to the food diversification of the Bajau community for vitamins and minerals from agriculture and forest products. For example, the consumption of red meat, which used to be obtained from fish and other marine biotas, has now changed to follow the land community from livestock. Nevertheless, on the other hand, consumption patterns change leverage an unfair economic system and group dependencies on islanders. For example, the Bajau children consume junk food even more than other village children (Nuraini, 2016) or sugar food and beverage needs.

The transformation of the Bajau livelihood impacts consumption patterns and dependence on new food sources like land people in the Wakatobi archipelago. This food transformation grew middlemen who traded agriculture, forest products, and other necessities for the Bajau. The impact of this pattern includes affinal bonds, patronage, food substance addiction, or even a tendency for conflicts in Bajau communities. In the broader local context, these impacts have entailed Bajau's socio-economic reliance on outsiders (*Bagai*). This chain persists in varying according to the prevailing determinants and propels the Bajau into a 'new system' and trade-off.

Changes in dietary patterns are also influenced by food availability from local marine resources. Still, due to climate change, their preferences and alternative are more limited. The Bajau do not have access to food diversification non-marine products because they do not have land for cultivating or gathering. The Bajau must have sufficient economic capital to meet their dietary needs from food sources on land. This is not a single factor because many other determining facets add to this complexity. In linkage to climate change adaptation, food security, and health issues, the Bajau community in Wakatobi, especially in Mola, experiences diseases related to consumption patterns and nutrition fulfillment, such as obesity, stunting, diabetes, and hypertension (Ariando et al., 2022). Apart from dietary patterns, Bajau elders believe this situation is related to the sacredness of the sea or life karma for those with diseases. The forgiveness ceremony (*Tulak Bala*) through offerings to the sea spirit is needed on this occasion.

Furthermore, these food and health issues have a lower significance than the problem of the loss of marine resources and the economic system of the Bajau communities. The need to reevaluate the former local food systems substantially over promoting localized new agri-food systems (Lugo-Morin, 2020). The Wakatobi government should harness the Bajau resilience through its autonomy to adapt to climate change. The planetary health framework and TEK manifestation are necessary for such development alternatives and intersectional mechanisms in climate change threats (Paula, 2018; Redvers, 2018). The Bajau lives, and resilience to climate change always change through voluntary or forced adaptation. Still, development policies and programs in Wakatobi are not adaptive enough to capture their needs and roles.

Bajau people have a keen observation of the sea and attentiveness or sense of precaution to disaster. Their first selection to mitigate natural disasters starts with determining the sedentary area and village. This TEK explains how the selected Bajau village must have the most diminutive natural disaster risk. The assessment process for a potential Bajau village was initially carried out by the “*Punggawa*” responsible for discovering a new place. Various customary ceremonies were taken before plugging the first boat mooring pole (*Sambuah*). This disaster response facet is indirectly mentioned in the oral tradition

of the Bajau community: (1) *Pantun*, (2) *Iligo*, and (3) *Iko-Iko* (Muslim et al., 2020; Nuraini, 2012). The Moken sea nomad communities also practiced this TEK on Andaman Coast, Thailand, regarding the oral tradition about Tsunamis and their precaution (Arunotai, 2008).

The adaptation efforts of the Bajau communities have enabled them to survive in the contemporary world through various TEK trade-off mechanisms. TEK is a practical tool that helps Bajau communities adapt to climate risks, promote socio-ecological resilience, uphold community empowerment, and strengthen sustainable resource management. Despite their continuous adaptation efforts to alternative fishing methods and housing architectures, the Bajau herald that the forthcoming sea-level rise will exceed the limit of Bajau houses built above the sea.

Moreover, the coping strategy of Bajau communities with climate stress and variability can be tackled by capitalizing on their internal modalities (Maruf et al., 2021). The need to synergize Bajau's adaptability in the form of TEK is very substantial. A need for juxtaposing the adaptation efforts through TEK with other disciplines is a must. Technology adoption, infrastructure development, altering settlement areas, network and mobilization of family members, and diversification of livelihoods must be considered a community-based adaptation to climate change (Sinapoy & Djalante, 2020).

5.8 Conclusions

The Bajau, a marine nomadic community, has low involvement in coastal development and conservation programs. This situation is not only caused by inadequate participation and management capacity but also because the engagement process does not protect the Bajau communities and does not acknowledge their communal rights. Some programs did involve the Bajau communities but did not pay attention to the basic needs of the Bajau or the crucial issues within the communities or between coastal communities. Therefore, co-management programs primarily represented organizational interest. In the context of coastal management in Wakatobi, there is a huge potential to involve Bajau as marine guards and CCA actors. However, the

ethnocentric view of policymakers and negative labeling weakened the Bajau cultural positionality as a group. In addition, the pressure on conservation area targets carried out by WNP has diminished the fishing group cooperation and cultural beliefs that facilitate conservation for people like the Bajau.

Internally, the Bajau themselves see the complexity of social dynamics that mutually intersect. There are research opportunities about the Bajau that the government must complete regarding the fulfillment of basic needs, the distribution of actors and brokers, public interest, perception and participation, human resource development, and infrastructure development, as well as traditional institutions and regulations that have the potential to be strengthened. The WNP also needs to conduct participatory mapping and create a more effective form of communication with Bajau communities. A community-based conservation approach by strengthening TEK can be a bridge in synchronizing sustainable co-management programs.

The transition of MPA management to a co-management system requires much consideration. Collaboration multisector and the identification of institutional challenges must be mapped out at the commencement. In the case of WNP, the complex terms of institutions, intercultural relations, and the involvement of the human dimension in the management system occur constantly. The institutional challenge consists of coastal and marine area management between the WNP authority and Wakatobi local government (related agencies). Although they are both governmental agencies, these institutions work under different silos of ministries. In Indonesia, marine national parks are managed by the Ministry of Environment and Forestry. This situation is relatively problematic because coastal and marine areas are usually organized by the Ministry of Marine Affairs and Fisheries. The management of marine national park areas is distinguishable from forest national park areas, especially human resources, which can manage an MPA. The existence of MHA with a customary institution compounds this complexity because they hold the legality to manage coastal areas based on their customary system.

Co-management is not a panacea but tends to be more effective because of a sense of shared ownership and bottom-up practices. There are no static preconditions for co-management of MPAs or ICCAs. However, there must be a contextual consideration, right based approach, and the use of TEK as the main reference. In social, economic challenges and threats of co-management and TEK, several contemporary factors such as the transformation of TEK, mobility concept, destructive fishing, land-oriented mindset and development plan, tourism initiatives, and climate change were observed as extended issues of the Bajau in Wakatobi related to sustainable resource use in coastal and marine areas.



CHAPTER VI

A MODEL FOR THE INTEGRATION OF BAJAU TEK IN THE CO-MANAGEMENT OF COASTAL AND MARINE RESOURCES

6.1 Introduction

A co-management shares power and sustainability between the community, government, or private sector. The IPLCs are one of the actors nowadays engaged in co-management practice. Initially, many kinds of community-based programs and co-management were developed in protected areas to succeed in management. However, co-management practice can be adapted over time into multi-sector adaptive programs. This co-management usually targets the participation of IPLCs in administrating their territories and the biodiversity contained therein (Vierros et al., 2020). The key to the success of co-management practices is knowledge partnership and social learning through joint problem solving and reflection, sharing experiences and ideas (Berkes, 2009a).

In coastal areas and small islands, co-management practices can be designed in a more specific scope, such as strengthening Customary Marine Tenure (CMT) practices (Adhuri, 2013), acknowledging traditional institutions in sustainable fisheries resource management (Adrianto et al., 2021), protecting cultural heritage areas (Grey & Kuokkanen, 2019), implementing CBT (Marlina et al., 2020), and other development programs. This adaptive co-management (ACM) program connects humans and ecology in sustainable resource management institutions (Carlsson & Berkes, 2005; Castro & Nielsen, 2001). Linkages of social and ecological systems need to deal with the relevant attributes of the ecosystem, resource users and technology, TEK, property rights, and institutions (Berkes & Folke, 1998).

In practice, co-management has many criticisms and obstacles, especially in shareholder engagement, participation, and long-term commitment. According to Castro and Nielsen (2001), co-management regimes create conflicts through a lack of participation. However, if not implemented, this situation will have a prolonged impact

on livelihoods, quality of life, and resource competition. Another option is self-management from community groups, which requires the proper acknowledgment and employment of TEK as a legitimate knowledge system (Casson, 2015). Apart from resource management, this co-management practice can strengthen the identity of IPLC and TEK in today's various development challenges (Herse et al., 2020).

Furthermore, the practice of co-management aimed at the Bajau community will be more complex, and firstly it is because the Bajau are considered not to have an 'ancestral domain'. Narratively they are former marine nomads. Second is the mismatch between the Bajau community's understanding of the sea and the land-settled community because the sea for the Bajau is the living space, economy, spirit, and center of all customary activities. The third is that The Bajau could not define the boundaries of the resource they fished because they are primarily an underprivileged community living in other customary group areas or MPAs. The fourth is because the Bajaus have been crushed by economic competition and cultural transformation. Indeed, it is essential to systematically incorporate evaluation into the adaptive co-management process and recognize the challenge for resource agencies and researchers to shift from a conventional to a complex adaptive system perspective (Plummer & Armitage, 2007).

This study maps the complexity of the Bajau community with a co-management regime in the form of LMMA. Because this issue is massive and diverse, TEK practice is the primary basis for investigating the situated model for Bajau co-management. TEK is thought to be able to represent assets and background to see the potential for co-management development, especially in LMMA issues. An integrated model is needed to justify the co-management implementation to the Bajau, TEK existence, and other emerging issues. This model adopts the previous model in Indonesia, which is used to strengthen traditional identity, Right Based Fisheries Management (RBFM), and natural resources management in coastal areas and small islands. They are the ILMMA and MHA recognition mechanisms. These two models have similarities in identification and implementation but have never been applied to the sea nomads in Indonesia, especially the Bajau.

6.2 The Bajau and Locally managed marine areas

LMMA can be applied to strengthen IPLCs in communal rights and access to natural resources and uses. The practice of LMMA in the Asia Pacific Regions is one form of evidence in contesting Hardin (1968) concept of ‘the tragedy of the commons’, Hardin argues that natural resources without ownership or common property and free access tend to be overexploited. The nature of resource users is to maximize personal profits without thinking about the ominous consequences that the environment and future generations will suffer. Then, this theory was criticized by Ruddle and Akimichi (1984), who provided evidence that the sea tenurial in some traditional communities is a collective property and is used according to their common needs. It is also supported by Adhuri (2013) that Hardin's theory was unpliable and impartiality the concept and practice of *Sasi* and *Petuanan Laut* in eastern Indonesia. This concept was familiarized as CMT and later developed into various co-management practices such as LMMA or even MHA model.

In practice, the CMT has been transformed into the LMMA as a pragmatic co-management approach in Asia Pacific archipelagic countries. LMMA in Indonesia (ILMMA) has been running since 2002 under the ILMMA organization. ILMMA's goal was to empower coastal communities to manage their marine areas. ILMMA reaches 300 communities across Papua, Maluku, and North Maluku Provinces. Under local management and village decrees, the ILMMA has been working with 60 no-take zones with 760,800 hectares of coral reef, seagrass, mangroves, and coastline (retrieved from the ILMMA Network website on 15 May 2022).

Since 2017, the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia has executed a program to strengthen coastal communities in Indonesia following Law No.1/2014 concerning the management of coastal zone and small islands. They have been working on more than 30 initiatives for recognizing MHA and local communities (this initiative later is named the MHA model by this research). The procedural MHA recognition follows the Deputy General of Marine Spatial Management Decree No. 14/2018 on Facilitation Technical Guidelines for MHA Management Area Establishment. The MHA model concept is precise with LMMA, but the approach is

more based on RBFM, which is strengthened in the legal product of the Regent's Regulation. The MHA model has several national legal references. The following comparison between ILMMA and MHA models is depicted in Table 30 below for further legal basis details.

Table 30. Comparison of MHA and ILMMA model in coastal and marine management

Parameters	MHA Model	ILMMA
Law enforcement	Regent decrees (one law)	Village regulation (two laws)
Content of law recognition	<ul style="list-style-type: none"> • Rights and participations • Types of biota/area whose use is regulated in customary territories • Community development • Institutional • Prohibition, penalty, and sanction • Map 	<ul style="list-style-type: none"> • Natural Resource Participatory Mapping • Potential natural resources • Natural resource management • Types of biota/area whose use is regulated in customary territories • Protection and management of Natural Resources • Community-based management • Prohibitions and Sanctions • Recognition of customary Institution • Livelihood • Map
Post recognition	Assistant for fisherman	Community development and empowerment
Local knowledge	Recognized Customary marine tenure, territories, and Local Knowledge	Recognized Customary marine tenure, territories and Local Knowledge
Targeted communities	MHA (customary communities)	Coastal Communities
Funding	Government (Regency and National) or partnered with NGOs	Global Network and community support
Co-managing practice	State and community	NGOs and community

The two models' development and community empowerment settings are technically different, notably acknowledgment and lawfulness. The discrepancies are explained in Table 31.

Table 31. The development stage of MHA and ILMMA

Steps	MHA Model	ILMMA
Identifications	Accomplished by third-party assistance (academics or NGOs) and accompanied by the local government agencies and the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia.	Conducted by the community accompanied by the ILMMA facilitator
Participatory Mapping	Led by academics and local government agencies	Led by the ILMMA facilitator and local champions
Facilitating Forum with Related Stakeholders	Led by local government and national government and deliberated by key persons from customary communities	Led directly by the customary and village leaders and accompanied by the LMMA facilitators
Acknowledgment	After facilitating and profiling the targeted customary community, then the local government (Regency) prepares a legal document (Regent Decree) and secures it in the RZWP3K initiative map	After facilitating the customary and village forums, the documents prepared by the community are then created as legal documents by the LMMA facilitator in the form of Village decrees
Community Development and Empowerment	Learning and capacity building Fishing equipment Cultural development (music instruments, clothes, etc.)	Learning and Capacity Building Monitoring and Data Collection Diversified Livelihoods Environmental Education

These two models are also different from the legal references, as shown in Table 32 below.

Table 32. The legal references of MHA and ILMMA

Regulation	MHA Model	ILMMA
Law	<ol style="list-style-type: none"> 1. The 1945 Constitution of the Republic of Indonesia, Article 18 section 6, Article 18B section 2, and Article 28I 2. Law No. 5/1990 on Conservation of Natural resources and their ecosystems (State Gazette of the Republic of Indonesia Number 49 year 1990; Supplement to State Gazette of the Republic of Indonesia Number 3419) 3. Law No. 6/1996 on Indonesian Waters (State Gazette of the Republic of Indonesia Number 49 year 1996; Supplement to State Gazette of the Republic of Indonesia Number 3467) 4. Law No. 31/2004 on Fisheries (State Gazette of the Republic of Indonesia 	<ol style="list-style-type: none"> 1. The 1945 Constitution of the Republic of Indonesia, Article 4 section 1 and Article 33 section 3 2. Law No. 5/1990 on Conservation of Natural resources and their ecosystems (State Gazette of the Republic of Indonesia Number 49 year 1990; Supplement to State Gazette of the Republic of Indonesia Number 3419) 3. Law No. 24/1992 on Spatial Planning (State Gazette of the Republic of Indonesia Number 4501 year 1992) 4. Law No. 6/1996 on Indonesian Waters (State Gazette of the Republic of Indonesia Number 49 year 1996; Supplement to State Gazette of the Republic of Indonesia Number 3647)

	<p>Number 118 year 2004; Supplement to State Gazette of the Republic of Indonesia Number 4433) as amended by the Law No. 45/2009 regarding Fisheries (State Gazette of the Republic of Indonesia Number 154 year 2009; Supplement to State Gazette of the Republic of Indonesia Number 5037)</p> <p>5. Law No. 27/2007 on Management of Coastal Zone and Small Islands (State Gazette of the Republic of Indonesia Number 84 year 2007; Supplement to State Gazette of the Republic of Indonesia Number 4739) as amended by the Law No. 1/2014 on Amendment to Law No. 27/2007 on Management of Coastal Zone and Small Islands (State Gazette of the Republic of Indonesia Number 2 year 2014; Supplement to State Gazette of the Republic of Indonesia Number 5490)</p> <p>6. Law No. 32/2009 on Environmental Protection and Management (State Gazette of the Republic of Indonesia Number 140 year 2009; Supplement to State Gazette of the Republic of Indonesia Number 5059)</p> <p>7. Law No. 12/2011 on Legislation Making (State Gazette of the Republic of Indonesia Number 812 year 2011; Supplement to State Gazette of the Republic of Indonesia Number 5059)</p> <p>8. Law No. 6/2014 on Village (State Gazette of the Republic of Indonesia Number 7 year 2014; Supplement to State Gazette of the Republic of Indonesia Number 5495)</p> <p>9. Law No. 23/2014 on Local Government (State Gazette of the Republic of Indonesia Number 244 year 2014; Supplement to State Gazette of the Republic of Indonesia Number 5587) as amended by the Law No. 9/2015 on Second Amendment of Law No. 23/2014 on Local Government (State Gazette of the Republic of Indonesia Number 58 year 2015; Supplement to State Gazette of the Republic of Indonesia Number 5679)</p> <p>10. Law No. 32/2014 on Marine Affairs (State Gazette of the Republic of Indonesia Number 294 year 2014; Supplement to State Gazette of the</p>	<p>5. Law No. 23/1997 on Environmental Management Law (State Gazette of the Republic of Indonesia Number 60 year 1999; Supplement to State Gazette of the Republic of Indonesia Number 3839)</p> <p>6. Law No. 22/1999 on Regional Government (State Gazette of the Republic of Indonesia Number 60 year 1999; Supplement to State Gazette of the Republic of Indonesia Number 3839)</p> <p>7. Law No. 31/2004 on Fisheries (State Gazette of the Republic of Indonesia Number 118 year 2004; Supplement to State Gazette of the Republic of Indonesia Number 4433) as amended by the Law No. 45/2009 regarding Fisheries (State Gazette of the Republic of Indonesia Number 154 year 2009; Supplement to State Gazette of the Republic of Indonesia Number 5037)</p> <p>8. Law No. 32/2004 on Regional Administration (State Gazette of the Republic of Indonesia Number 125 year 2004; Supplement to State Gazette of the Republic of Indonesia Number 4437)</p> <p>9. Law No. 6/2014 on Village (State Gazette of the Republic of Indonesia Number 7 year 2014; Supplement to State Gazette of the Republic of Indonesia Number 5495)</p> <p>10. Law No. 27/2007 on Management of Coastal Zone and Small Islands (State Gazette of the Republic of Indonesia Number 84 year 2007; Supplement to State Gazette of the Republic of Indonesia Number 4739) as amended by the Law No. 1/2014 on Amendment to Law No. 27/2007 on Management of Coastal Zone and Small Islands (State Gazette of the Republic of Indonesia Number 2 year 2014; Supplement to State Gazette of the Republic of Indonesia Number 5490)</p>
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	Republic of Indonesia Number 5603)	
Other national regulations	<ol style="list-style-type: none"> 1. Government Regulation of the Republic of Indonesia No. 7/1999 on Preserving Flora and Fauna Species (State Gazette of the Republic of Indonesia Number 14 year 1999; Supplement to State Gazette of the Republic of Indonesia Number 3803) 2. Government Regulation of the Republic of Indonesia No. 60/2007 on Conservation of Fish Resources (State Gazette of the Republic of Indonesia Number 134 year 1999; Supplement to State Gazette of the Republic of Indonesia Number 4779) 3. Government Regulation No. 62/2010 on Utilization of the Outermost Small Islands (State Gazette of the Republic of Indonesia Number 101 year 2010; Supplement to State Gazette of the Republic of Indonesia Number 5151) 4. Government Regulation No. 28/2011 on Management of Nature Reserve Areas and Nature Conservation Areas (State Gazette of the Republic of Indonesia Number 56 year 2011; Supplement to State Gazette of the Republic of Indonesia Number 5217) as amended by the Government Regulation No. 108/2015 on Amendment to Government Regulation No. 28/2011 on Management of Nature Reserve Areas and Nature Conservation Areas (State Gazette of the Republic of Indonesia Number 330 year 2015; Supplement to State Gazette of the Republic of Indonesia Number 5798) 	<ol style="list-style-type: none"> 1. Government Regulation No. 72/2005 on Village (State Gazette of the Republic of Indonesia Number 158 year 2005; Supplement to State Gazette of the Republic of Indonesia Number 4857) 2. Presidential Decree No. 32/1990 on Protected Area 3. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Decree No. KEP 10/Men/2002 on General Guidelines for Integrated Coastal Management Planning 4. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Decree No. KEP 34/Men/2002 on General Guidelines for Coastal and Small Islands Spatial Planning 5. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Decree No. 38/MEN/2004 on Guideline on Coral Reef Management

	<ol style="list-style-type: none"> 5. Presidential regulation No. 121/2012 on Rehabilitation of Coastal Areas and Small Islands (State Gazette of the Republic of Indonesia Number 266 year 2012) 6. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. PER.17/MEN/2008 on Conservation Areas in the Coastal Area and Small Islands 7. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. PER.20/MEN/2008 on Utilization of Small Islands and Surrounding Waters 8. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. PER.02/MEN/2009 on Procedures for Marine Conservation Area Establishments 9. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. PER.04/MEN/2010 on Procedures for the Use of Fishes and Fishes Genetics 10. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No. PER.30/MEN/2010 on Management and Zonation Plan of Marine Protected Areas 11. Minister of Home Affairs Regulation No. 52/2014 on Guidelines for the Recognition and Protection of Indigenous People (Bulletin Gazette Number 951 year 2014) 12. Ministry of Forestry Ministerial Regulation No P.85/menhut-II/2014 on Procedures for Cooperation in Nature Reserve Areas and Nature Conservation Areas (Bulletin Gazette Number 1446 year 2014) as amended by the Minister of Forestry Regulation No. P.44/Menlhk/Setjen/kum.1/6/2017 on Amendment to Minister of Forestry Regulation No. P.85/menhut-II/2014 (Bulletin Gazette Number 1012 year 2017) 13. Ministry of Forestry Ministerial Regulation No P.34/Menlhk/Setjen/kum.1/5/2017 on Recognition and Protection of Local 	
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

	<p>Wisdom in Environmental Resource Management (Bulletin Gazette Number 801 year 2017)</p> <p>14. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Regulation No.8/2018 on Procedures for Determining the Regional/Management Area of Customary Laws Communities in the Utilization of Space in Coastal Areas and Small Islands (Bulletin Gazette Number 330 year 2018)</p> <p>15. Ministry of Marine Affairs and Fisheries of the Republic of Indonesia Ministerial Decree No, 38/MEN/2004 on Guideline on Coral Reef Management</p>	
Provincial and Local regulations	<ol style="list-style-type: none"> 1. Regency establishment 2. Sub-district establishment 3. Local government institutional structures 	<ol style="list-style-type: none"> 1. Customary communities

Furthermore, due to the nomenclature in Law No.1/2014, which states the classification of coastal communities in Indonesia, the MHA model cannot be applied to the Bajau groups due to the complex 'ancestral domain' understanding. This policy recognition does not cover the Bajau in identity and practice. It will take a long time to revise a state regulation and nomenclature to include sea nomad communities. Another form that can be developed is the situated model done by the Lingga Regency Government, Riau Islands Province, at Regency Decree No. 44/2020 on the Empowerment of the Lingga Regency Orang Laut Community.

In terms of guideline recognition and output of legal products of the ILMMA model, there are several contained chapters as the institutional arrangement and administrative necessity (see Figure 54).

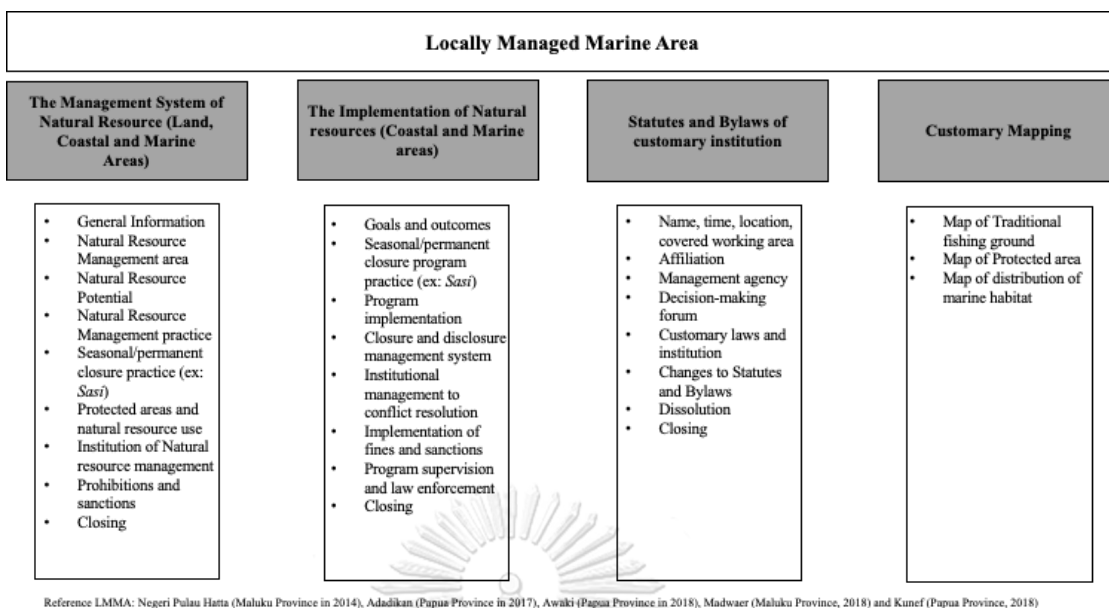


Figure 54. The contained information in LMMA village regulations

After juxtaposing the MHA and LMMA model based on qualitative data gathering at the LMMA site in Hatta Island, Banda Neira, Central Maluku Regency, Maluku Province, and four MHAs in Wakatobi Regency, Southeast Sulawesi Province, key attributes are found in implementing development initiatives with coastal communities (see Figure 55).

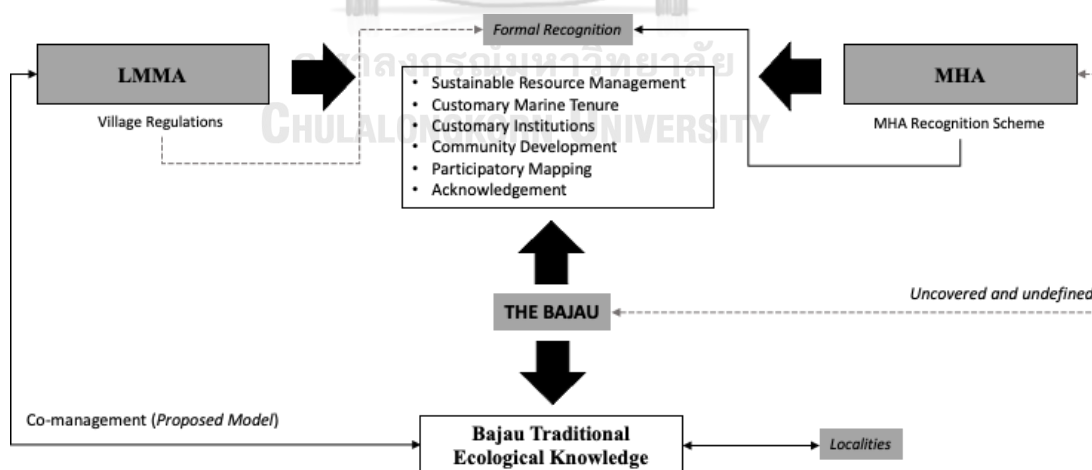


Figure 55. Manifestation of LMMA, MHA, and the Bajau

This key attribute is obtained from the SWOT analysis of the two models. The later Bajau LMMA model interface is likewise built using these key attribute management

as scrutinized in Table 33. Some key attributes are directly incorporated because they are relevant to the Bajau, while others are irrelevant such as the CMT acquaintance.

Table 33. Key attribute management of LMMA and MHA models

Key Attributes Management	Reflection On Bajau Communities
Sustainable Resource Management	This practice is associated with TEK documentation: indicators, manifestations, justifications, and underlying threats.
Customary Institution	The customary institutions of the Bajau community have been replaced with a village administration system, so efforts are needed to reconstruct customary institutions in sustainable natural resource management.
Customary Marine Tenure	As landless, the Bajau do not have a tenurial understanding (the Wakatobi case), but the marine typology in the Bajau community's view is use and access rights.
Participatory Mapping	It is possible to apply for the Bajau regarding territories, sacred areas, or other important practices that can be developed into co-management and LMMA.
Community Development	Similar to the developed model by LMMA and MHA, the program's sustainability in community development is very much needed in various development challenges.
Acknowledgment	In this context, recognition from the village level, as implemented by LMMA, has the potential to be developed in the Bajau community. This practice has been developed in the form of " <i>Tubba Dikatutuang</i> " in the Bajau Sampela village.



Figure 56. Site of LMMA in Hatta Island, Central Maluku Regency, Maluku Province (21 March 2021)



Figure 57. MHA Barata Kehedupa area in Darawa Island, Wakatobi Regency, Southeast Sulawesi Province (22 September 2021)

The Bajau community practices in protected marine area management in Wakatobi are proximate to the ILMMA concept. This vision and implementation depend on the institution supporting the program. The first is the Fisheries Managed Access Area (PAAP) by *Padakauwang Sama-* fisher forum (the Mola Bajau), WNP Authority, RARE Indonesia, Wakatobi Government, Sara Kapota, and Sara Mandati. The location is on Kapota Atoll under customary areas Sara Mandati. However, this concept tends to be top-down and cumbersome. According to the narrative of the Bajau community in Mola villages, PAAP is rigid and only beneficial for a specific community group of the Mola Bajau. For instance, the distance is more than 13 nautical miles from the village, the supervision in that protected area does not work well, and the outreach program to the Bajau Mola community do not well disseminate.

The second is the *Tubba Dikatutuang* program, earlier known as an initiative by the Bajau Sampela community, Operation Wallacea, CSO Bajo Matilak, and the WNP authority. The development concept of *Tubba Dikatutuang* is similar to ILMMA. Operation Wallacea provided compensation for the Sampela Bajau, but due to several internal and external challenges, *Tubba Dikatutuang* only lasted until 2012. The legal output was also a village decree.

The LMMA practice existed before the co-management regime of customary communities (MHA) in Wakatobi was recognized. The Bajaus were disclosed to the MPA co-management concept before the MHA model was implemented in Wakatobi (starting with MHA Kadiye Liya 2017). *Tubba Dikatutuang* was promoted as MPA in 2007 with a length of about one kilometer in front of Hoga Island (see Figure 58). In early 2010 the concept of *Tubba Dikatutuang* was adopted and extended in several customary communities in Wakatobi, such as the fish banks initiative in Kulati Village on Tomia Island, *Kaombo* (Permanent closure) in Wali Village on Binongko Island, and *Sasi Gurita* (Seasonal closure of octopus fishing) in Darawa Village on Kaledupa Islands. Nevertheless, all co-management practices were enforced after *Tubba Dikatutuang* received MHA model recognition. MHA Kawati Tomia has Kulati Village, MHA Sara Saranowali has Wali Village, and MHA Barata Kahedupa has Derawa Village.

Managing coastal and marine areas in Wakatobi has historically been owned by nine customary communities. Due to the granting of communal rights to MHA in Wakatobi, these co-management practices seem to be prestigious among MHA. However, this phenomenon cannot be separated from the support of institutions in each stage of strengthening and protecting MHA. Such as MHA Kadiye Liya, which local and national governments initiated, MHA Barata Kahedupa and MHA Kawati Tomia, which The Nature Conservancy accompanied, and MHA Sara Saranowali assisted by WWF-Indonesia. MHA as a product is influenced by the prestige and pride of each partner institution. Not only MHA, *Tubba Dikatutuang* of the Bajau Sampela Community assisted by Operation Wallacea or PAAP of the Bajau Mola community accompanied by Rare Indonesia has also met the phenomenon of institutional interest. Including an ongoing co-management program for CBT endeavors in Bajau Mantigola village with Sustour.



Figure 58. Location of *Tubba Dikatutuang* in Bajau Sampela Village

The ontology of *Tubba Dikatutuang* or translated as ‘dearest reef’ is the area used for the release of fish species that are considered not of sufficient size to be fished. Unlike the spawning ground or nursery ground, the *Tubba Dikatutuang* area is devoted to a place to stop before bearing fish, restocking fish species, nurturing other sea creatures, or simply throwing out the leftover lunch meals for fish feed. In addition, *Tubba Dikatutuang* is also associated with the *Sangal* ceremony (*Duata Sangal*). This cultural practice is regarded as a restoring term in offering and establishing a spiritual connection with sea spirits. This *Sangal* has two functions, and the first is the highest traditional healing ceremony by the Bajau community. The second function is the cultural ceremony to offer sea spirits during windstorm season and catch declines. The aim is to get the Bajau sustenance in the following season and adapt to disasters. There will be a ceremony part in these two *Sangal* rituals to release several types of biotas, such as sea turtles and fish, in the *Tubba Dikatutuang* area.

During the *Sangal* ceremony, the Bajau are prohibited from going to sea for several days. In the *Sangal* ritual ceremony, there will be advice from the Bajau customary leader not to over-catch marine products. They believe that sustenance has already been arranged for each Bajau, depending on how they maintain their relation to the sea. As

an intermediary for their relationship with God (Islamic teach), the *Sangal* ritual provides communal offerings for their twin sisters and brothers in the sea. In this *Sangal* ritual, *Iko-iko* (oral tradition) is also descanted, which directly conveys to all the Bajau that "the sea is mother nature."

Furthermore, to limit the scope and visibility of the Bajau community in Wakatobi, this study argues that *Tubba Dikatutuang* is the closest concept to LMMA and is prospective in protecting customary practices, marine access rights, and other co-management elements. The area consists of a sacred area around their village for traditional healing ceremonies and a sacred area in the atoll area (see Figure 61). To find areas that have the potential to become another *Tubba Dikatutuang*, this study identifies several fishing grounds and sacred areas that are identified as still having historical values, culture, and another dimension of TEK. Practically, the *Tubba Dikatutuang* areas of the Bajau are not widely recognized by the younger generation, but they can be reconstructed by studying TEK and other practices through appropriate participatory action research. This study identified several areas still recognized by the Bajau community today.

6.3 Developing indicators for the Bajau LMMA

The LMMA practice of *Tubba Dikatutuang* has been created and has great potential in future co-management practices. The justification from the ILMMA institution can be adopted as adaptive co-management in the Bajau community. Without learning-by-doing, co-management does not acquire the ability to address emerging challenges (Berkes, 2009a). It was apparent that previous experience by the Bajau was needed to accommodate the changing circumstances of a co-management system. According to LMMA networks, several core principles contribute to the improvement of LMMA in various domains, which was advantageous for developing the Bajau LMMA model. It consists of agreed core values, community engagement, community empowerment, community-based adaptive management (CBAM), and ongoing communication and skill development. Then, more details it was presented in Figure 59.

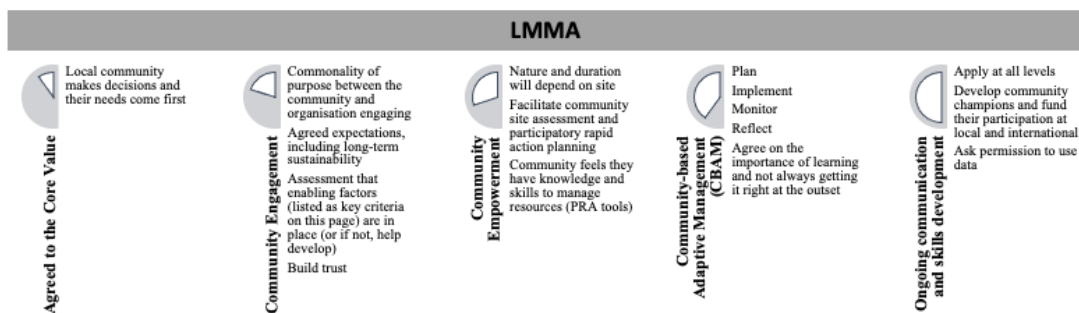


Figure 59. Core Principle of LMMA

Figure 59 shows that the strength of LMMA practice lies in community involvement and clear outcomes of community development in the initiation, implementation, and supervision stage. The key attribute management from Table 34 can be reflected in the Bajau community. The CMT key attribute for the sea nomadic community is more proximate to the term of use and access rights.

The implementation of Tubba Dikatuang at the Sampela Bajau is to face the challenges of legitimacy, management system, and intercultural relations. To connect it with Bajau LMMA in Wakatobi, Tubba Dikatuang is identified as the entrance model to be advanced. The field data in this study found that several determinant indicators affect the sustainability of the Bajau LMMA in Wakatobi. The indicators are as follows.

Use rights. As a sea-oriented culture group, the Bajau people do not have a concept of marine property. Since they see sea areas are open access that can be explored to their needs. Even in some areas, they use littoral areas to attach them with sea spirits for the cultural ceremony. Regardless, the sea as open access has now turned into a 'made' communal property regime to get formal recognition. The Bajaus now have to understand the essence of common property rights in sea allocation. For the Bajau people, the contemporary use rights paradigm might be considered an initial point as a substitute indicator for CMT in LMMA practice. Therefore, use rights are a system of property relations of the Bajau, which has a socially recognized priority in accessing particular resources such as spiriting, gathering, hunting, and fishing areas.

Intercultural sensitivity. The Bajau people as migrant groups have different exposure and acculturation because it depends on the dominant communities' sovereignty and power relations. This relation will shape the autonomy of the Bajau in carrying out their customs and livelihoods. Intercultural sensitivity is defined as the relationship between the Bajau community and the surrounding groups regarding issues of their acceptance, indigeneity, and respectfulness for the dominant culture.

Economic development. The Bajau people exposed to the capitalist economic system have paradigm-shifted as the settled land communities. The Bajau transform and augment their living standards by exploiting marine resources excessively. Economic development as an indicator in the LMMA is intended to justify the need for livelihood diversification from the sea area due to their primary source of income. The initiation of development alternatives and economic options as rudimentary to community development is a point that must be considered in addition to social and environmental issues in the LMMA model.

Institutional Supports. The existence of the Bajau community as a minority group and migrants into the area of customary communities causes their views and development narrative to be still marginalized. It is not only a program but also a policy that has not covered Bajau's identity from the national to the local level. Institutional support means how outsiders treat the Bajau community by supporting all forms of development that involve the Bajau community's consent.

To support the proposed indicators in the Bajau LMMA, several key indicators from previous research related to the Bajau, co-management, and MPA are integrated and matched with the local context. The concept of the social well-being approach addresses values in SSF for the Sama-Bajau used by Stacey et al. (2018) and Weeratunge et al. (2014) regarding resource use, autonomy, and economic development. Those indicators are pertinent to contemporary Bajau in Wakatobi Regency. In addition, in the form of co-management development, the justification made by Carlsson and Berkes (2005) regarding images of co-management was also adopted in the development of this model. Plummer and Armitage (2007) also explain

the evaluation of ACM in the resilience-based framework, which includes processes, livelihoods, and ecological systems. Hence, the final indicator development of the key indicators of the Bajau LMMA is as follows.

Table 34. Development of Bajau LMMA Model (Extended Indicators)

Indicator	Key Indicators
Use Rights	Resource use and access (fishing ground, grave, water sources) Resource competition Spatial mobility Knowledge transmission
Intercultural sensitivity	Superior customary communities Conflict and relation ties Autonomy and Identity Kinship and Religiosity
Economic development	Patronage system Inequality Destructive and illegal fishing TEK commoditization
Institutional Supports	Power distribution and interest Local politics and agency Ethnocentrism and relativism in development Land-based perspectives

6.4 Integrating Model to adaptive co-management

After developing the indicators, the LMMA model was constructed according to the localities of the Bajau community in Wakatobi. As an adaptive model, this model can be incorporated in developing co-management programs, strengthening TEK and the traditional identity of the Bajau community in sustainable resource management. The Bajau community in Kaledupa (Sampela, Lohoa, and Mantigola) have tremendous potential in developing this LMMA model. It reasons that the nature of the people and the ecology around their village are still attractive. In addition, the relationship between Bajau in Kaledupa Islands and MHA Barata Kahedupa is approachable.

Meanwhile, for the Bajau in Mola village, there needs to be more emphasis on intercultural sensitivity and government plans because it is close to the capital city of the Wakatobi regency and ties to Sara Mandati in Wangi-wangi Island. Also, the Bajau in Lamanggau is similar needs to the Mola Bajau. Nevertheless, the emphasis should be on the use rights. All areas around Tomia Island and atoll have been included as

management areas of MHA Kawati Tomia and private businesses. The model from indicator development for the Bajau context is illustrated in Figure 60.

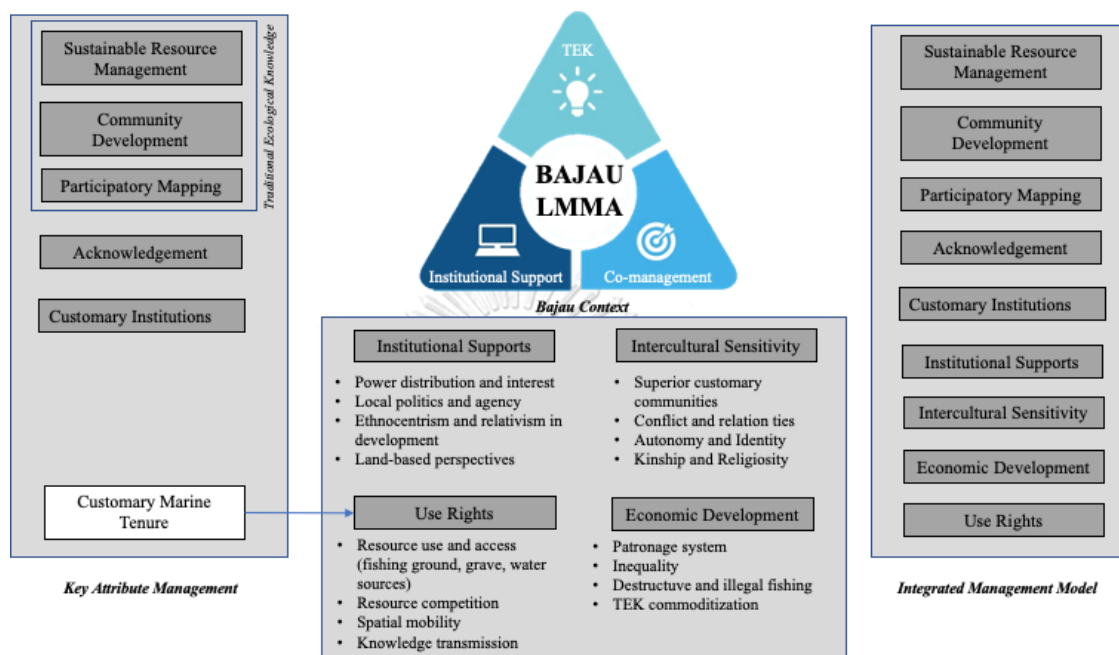


Figure 60. Integrated LMMA Model into Bajau context

Furthermore, a broader step is needed to bridge the Bajau community model into ACM and be ready to adopt it into practical programs. The goal of the bridging step is to persuade authorities that there are benefits to allowing local communities more power over their destiny and push for the inclusion of different, diverse perspectives on development on the political agenda (Sillitoe & Marzano, 2009). The ideal vision of co-management as a power-sharing arrangement between a coherent State and a single community presupposes the existence of a forum for collaborative decision-making (Carlsson & Berkes, 2005).

The ACM used in this bridging model has been mentioned in Chapter V, but the point of view is the management system by the WNP authority. Armitage et al. (2009) identified the core elements of ACM as (1) institutions, incentives, and governance, (2) learning through complexity, (3) power asymmetries, and (4) assessment: monitoring, indicators, and outcomes. The phases of communicative action, self-organization (strategic action), and joint or collaborative (instrumental) action influence the success of an ACM (Berkes, 2010; Per Olsson et al., 2004; Prabhu et al., 2008).

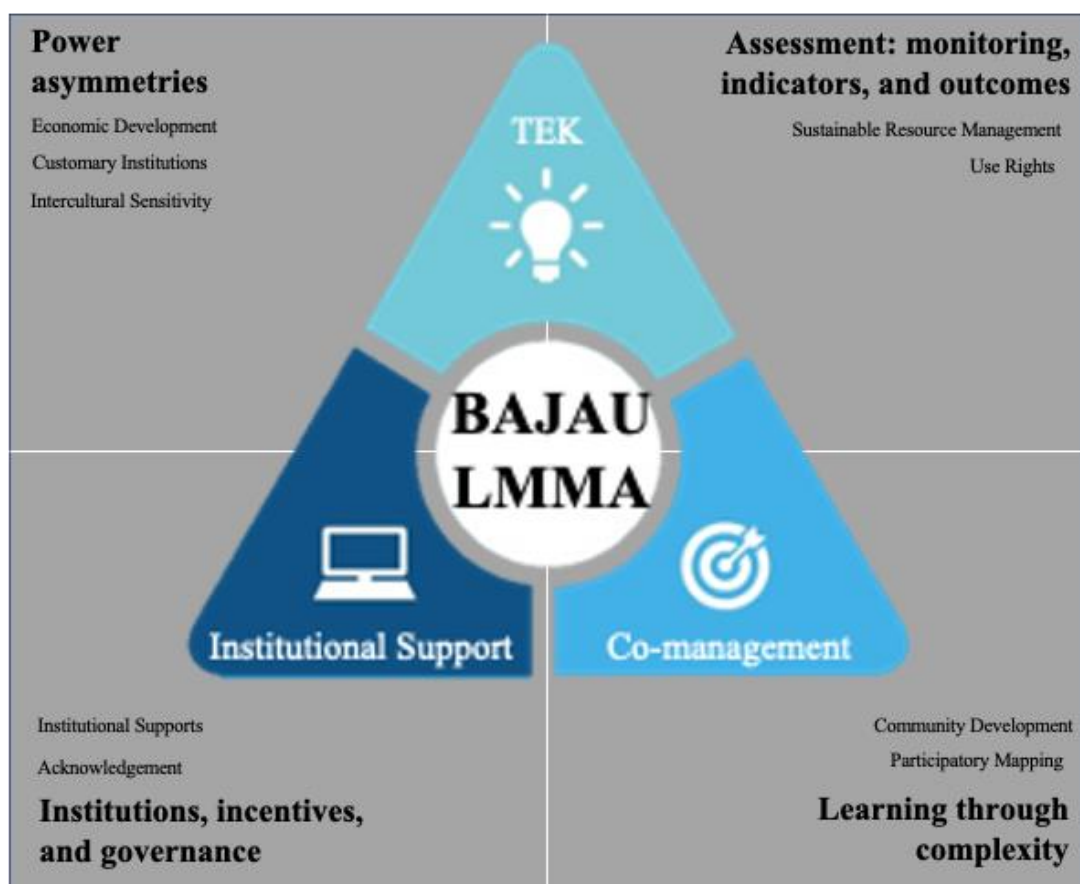


Figure 61. Adaptive Management and Bajau LMMA model
Adopted from Armitage et al. (2009)

The Figure above represents the concept of core elements of ACM combined with the Bajau LMMA Model. This grouping is based on the suitability of the framework built by Armitage et al. (2009) with management indicators in the sustainability of Bajau LMMA. The four core elements cover the intersectionality of Bajau TEK, co-management practices, and institutional supports (according to research questions).

Furthermore, to describe the ACM that has been built in the subsequent discussion, this study finds the steps that must be taken in implementing this model to become an ACM program that can be run by the local government, especially in Wakatobi Regency. In general, this stage has similarities with ILMMA and MHA. The elements used at each step have been validated according to the needs of Bajau in Wakatobi. In the last section, the point of 'sustainability' is added to the regime for the 2030 agenda. Sustainability extends the LMMA Network's core principle, namely community development. In addition, the sustainability challenges in implementing the SDGs have become the primary reference for shareholders.

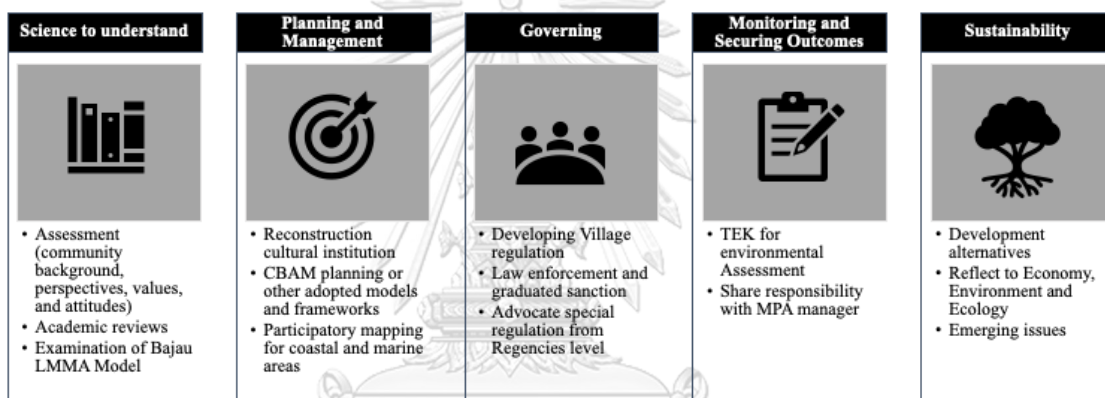


Figure 62. Bajau LMMA model implementation steps

6.5 Cultural sensitivity in the implementation of the model in Wakatobi

Disputes might occur because of the consequences in co-management regimes with minimal local engagement in decision-making (Castro & Nielsen, 2001). In addition, the process of these institutions is linked to knowledge development and social learning, both of which can benefit from strengthening adaptive capacity and decreasing vulnerability to IPLCs (Berkes & Armitage, 2010). This model can be a space for innovation governance in development programs for the Bajau community, especially in protected areas or Bajau sacred areas around WNP (See Figure 63).



Figure 63. Sacred areas mapping of the Bajau in WNP zonation

Cultural sensitivity enriches the quality and usefulness of research that deals with IPLCs (Burnette et al., 2014). In this context, developing the LMMA model will be implemented in the Bajau community in Wakatobi. In more detail, Figure 63 shows the overlaid map among the zonation of WNP, MHA, and sacred areas of the Bajau. Some of the Bajau sacred areas overlap with the MHA areas and tourism areas of the WNP zonation. Implementationally, the concept of Bajau sacred areas has two sides that are sensitive to coastal communities in Wakatobi.

The first sensitivity issue is how to develop these sacred areas into LMMAs in the WNP and MHA areas. This study argues that the approach that can be used is to re-evaluate the zoning by considering the division of the area with the concept of TEK and LMMA Bajau. Although practically not as easy, incorporating the model such as *Tubba Dikatuang* or other terms of Bajau LMMA requires adequate facilitation techniques and appropriate local government commitment in the deliberation process. This approach aligns with the ICZM, which must deal with the complexity of multiple decision-makers and stakeholders in the coastal area (Gumbira & Harsanto, 2019), and also SSF Voluntary Guidelines (FAO, 2015), which include a rights approach and in the designation of CCA territories. In addition, WNP has a 'conservation partnership' concept, which can provide an opportunity for the Bajau community to strengthen TEK practices in the form of co-management. This concept is still questionable; however, it needs more adjustments.

Next is the issue of cultural sensitivity between the Bajau and land communities (MHA and other customary communities). Before implementing this Bajau LMMA model, it is necessary to investigate the relationship between islanders and the Bajau historically, from the time of the arrival of the Bajau to the contemporary challenges, including how to reduce the gap in ownership and access to marine areas between these two groups. When the historical investigation was completed, it was continued with a discussion of the customary forum to clarify and justify the Bajau positionality in Wakatobi. The clearness of this forum will provide an optimistic hope on how the Bajau can access their basic rights as recognized customary communities by lawful from other customary communities in Wakatobi.

The last discussion concerns Bajau's social cohesion and customary leadership's acceptance of this LMMA model. Although this model was implemented using a community rights-based approach, conceptually, the idea for this model came from non-Bajau parties (researcher). Understanding and sharing perceptions are necessary for introducing the Bajau LMMA model. Community awareness and participation are substantial to localizing this model as a necessity for the Bajau community in Wakatobi. Along the process, there is needed to strengthen the foundation of the program plans and the customary institutions that will be fully involved in implementing this model. For instance, participatory mapping and validation of sacred areas intersect with the territories of all MHA customary areas, such as the community-protected areas at MHA Sara Saranowali known as “*Kaombo*”. *Kaombo* is also known as a sacred area by the Bajau community.

6.6 Recommendation for future policy direction

The discrepancy in understanding between policymakers and the situation on the ground is a big gap in a development program in Indonesia. For example, in the fisheries sector and coastal communities, the imposition of the concept of land development in the marine and fisheries sector is the causality of the missed agenda of protecting customary communities. Customary communities are constantly accused of being exploitative, destroying the environment, and being the object of criminalization. As a result, coastal customary communities are no longer the main development actors in their respective ancestral domains.

Furthermore, sustainable resource management of coastal areas and small islands requires integrated planning in the face of increasing environmental pressures. It requires suitability, carrying capacity, and adaptive models in various uses of coastal areas. This area in Indonesia is dominated by SSF, which includes customary and local communities. Even groups that depend entirely on the sea for their life and living space, such as the Bajau, reside in a water body or shore. In its implementation, the usage of coastal areas and small islands based on adaptation and mitigation must consider the resilience of coastal and marine ecosystems, climate change pressures, anthropogenic activities, and the quality of life and protection of customary communities inclusively.

This study has several recommendations for shareholders who work with the Bajau community, especially local government, WNP authority, and academics.

6.6.1 Bajau community

As a customary group who know the sea as an open-access area and orient their lives to marine resources, the Bajau are vulnerable to achieving sustainable fisheries. Rights-based development programs and other human security issues in the Bajau community are still being ignored. Also, the Bajau fishery system is complex, fluid, and fluctuating, constantly reinventing itself in changing circumstances (Marcus & Fischer, 1986; Stacey, 1999). Then, they nowadays need to engage with co-management regimes. The five leading issues of the various climactic problems described in this research discussion are presented below.

Table 35. The key problems in the Bajau communities in Wakatobi

Problems	Key development issues	Shareholders
Cultural Identity	<ul style="list-style-type: none"> • Implying Free prior and informed consent (FPIC) in all development plan • Strengthening and reconstructing Bajau customary institutions • Justifying the Bajau positionality in the development of coastal customary communities in Wakatobi • Sustaining the cultural pluralism in Wakatobi 	Government WNP Authority Academia
Intellectual property and rights	<ul style="list-style-type: none"> • Registering the intellectual property of the Bajau • Increasing the educational awareness of culture and TEK • Dealing with human security and basic need rights 	Government Academia
Capacity building	<ul style="list-style-type: none"> • Increasing conservation awareness and TEK synergy • Creating leadership program: youth engagement and local champions • Arranging better management practices in sustainable resource management and fair-trade system in fisheries business • Optimizing Village Fund for human resource development 	Government WNP Authority NGOs/CSOs Academia
Livelihood diversification	<ul style="list-style-type: none"> • Encouraging the Bajau in marine tourism and skill scuba divers • Providing updated technology and innovation aquaculture • Encouraging school participation (formal and informal) 	Government Private sectors NGOs/CSOs Academia
Communal Spaces	<ul style="list-style-type: none"> • Mapping of management and access areas • Clarifying land access for water sources, graves and seasonal cultivation • Securing the living spaces (land, territory nomads, marine), fishing ground, and sacred areas 	Government WNP Authority Academia

	<ul style="list-style-type: none"> • Reintroducing the marine tenure system to minimize land-based tenure bias perspectives 	
--	--------------------------------------------------------------------------------------------------------------------------------------------	--

6.6.2 Local Government

There are several recommendations to the Government of Wakatobi Regency based on the scope of this research.

1. Inventory of coastal customary communities (history, assets, TEK) and focus on advocacy and identification of policies that have the potential to threaten the sovereignty of customary communities (particularly the Bajau)
2. Facilitate an inter-customary forum with apparent legitimacy to strengthen the position of the Bajau access rights and the adulation of the MHA customary system.
3. Assess more information regarding the fulfillment of basic needs, the distribution of actors and brokers, public interest, perception and participation, human resource development, and infrastructure development for the Bajau.
4. Increase the TEK development and ACM practice towards community-based tourism and other development plans in Bajau villages.
5. Identify regulations that cause problems in fishing grounds, IUU threats, and TEK practices with WNP authority, private sectors, and neighbor regencies.
6. Re-evaluate fisheries assistance programs that are mostly not well-targeted due to power distribution and collusion practices.
7. Increase the number of local facilitators for assisting coastal communities in Wakatobi because of its diverse characteristics and geographical settings.
8. Adopt voluntary guidelines for securing sustainable SSF in the context of food security and poverty eradication (FAO, 2015) as guidelines for rights-based community development in coastal and small island areas.

6.6.3 Wakatobi National Park

In MPA management, there are several recommendations for WNP authority according to the following research discussion.

1. Conduct participatory mapping and create a more effective form of communication with Bajau communities.

2. Incorporate TEK and the human dimension in the concept of zoning management and supervision.
3. Develop a community-based conservation approach by strengthening TEK and synchronizing sustainable co-management programs.
4. Facilitate participatory mapping for the Bajau sacred areas, which have prospects in a marine co-management system, biodiversity, and other conservation targets (such as traditional healers or shamanism).
5. Evaluate the appropriate marine spatial planning of several sacred areas as a tool for surveillance, monitoring, and evaluating the prospective program.
6. Postulate the observation of learning and knowledge transfer between WNP and the community through informal forums with customary communities.

6.6.4 Timeframe for policy recommendation

In order to help the policymakers and related organizations working on the Bajau in Wakatobi, the recommendations of this study are divided into three terms: short, medium, and long, as follows.

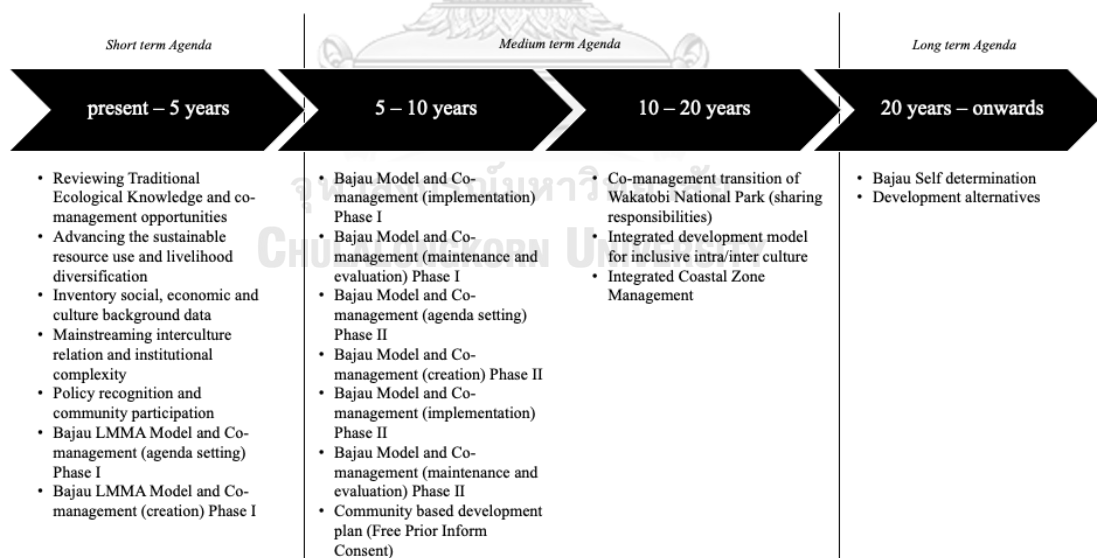


Figure 64. Policy recommendation timeline

6.6.5 Further research

Although this research has applied an interdisciplinary approach, several other issues have not been addressed holistically. There has been no systematic approach to cultural

constructionism of Bajau TEK and conservation initiative effectiveness. Hence, this gap must be addressed by creating systematized protocols of initial evaluation that include several aspects and causality of TEKs from sea nomads such as the Bajau. The socio-cultural data from this research must be corroborated with data from other disciplines such as marine biology, communication, economics, politics, and laws.

The developed model in this study is still in the early stage. This model needs to be testified further and materialized according to localities in areas that have similar challenges. There remain important inquiries about the impacts of manifestations, intergroup history, and trade-offs on the multidimensional maritime cultures of the Bajau. More rigorous research on the social and cultural transformation of the Bajau and its impacts on the MPA and relations to other customary communities are valuable for further documentation. Future research can also map the sacred area of the Bajau community based on the polygon area for conservation measurement needs and the TEK justification in each of these sacred areas. The subsequent research might focus on policy bridging from sacred areas and related Bajau TEK documentation as co-management in MPA. The last recommendation is about the opportunity for research institutions in Wakatobi or Southeast Sulawesi to activate the 'Bajau Research Center' since the majority of Bajau's research history in Indonesia is located in Wakatobi.

6.6 Final Reflections

The information conveyed from the ethnographic research by Stacey (1999) from 1994 to 1995 is very useful in the foundational milestones of Bajau culture in Wakatobi. Its narrative regarding the Bajau in Wakatobi has changed tremendously. Within two decades, the cultural dispatch of the Bajau community has headed according to mainstream development in Wakatobi. Information about customary practices is still observable, but details about community background, migration, and values are distorted due to the intercultural complexities in Wakatobi and untransmitted information by generations from the Bajau themselves.

The everyday phenomenon in Wakatobi places the rudimentary expertise of the Bajau as a separated congregation from island culture. The culmination of the Bajau voyages has now transformed into a society that has begun to lose its customary identity due to several factors. This research provides a new rosiness for adaptive ethnographic methods and interdisciplinary issues towards Bajau in the contemporary world.

The current Bajau communities in Wakatobi are highly dependent on SSF for income, food, and other livelihood activities. However, the Bajau report that their catches decreased over time. Hence, these declining catches denoted a need for local management in more suitable forms. The adverse livelihood impacts are caused by a lack of enforcement and community awareness of the ontology of marine.

Meanwhile, Wakatobi government programs addressed tourism development as their priority. They accelerate infrastructure development but dismiss community awareness (refer to the Bajau). Predictably, the poor community design processes and top-down instructions and implementation will impede the triumph of program goals.

Co-management offers a more holistic approach to marine conservation and community development challenges than the existing externally and locally driven policies and practices, which were not aligned. It is not only for Bajau communities but also for the MHA. However, weak local capacities and disjointed legislation present two key barriers to establishing a co-management regime in Wakatobi. There is a need to address grassroots barriers and opportunities before planning programs in broader steps.

REFERENCES

- Abelshausen, B., Vanwing, T., & Jacquet, W. (2015). Participatory integrated coastal zone management in Vietnam: Theory versus practice case study: Thua Thien Hue province. *Journal of Marine and Island Cultures*, 4(1), 42-53. <https://doi.org/10.1016/j.imic.2015.06.004>
- Abidin, A. Z. (1971). Notes on the Lontara' as Historical Sources. In C. U. P. S. A. P. P. a. Cornell & A. N. University (Eds.), (pp. 15). Cornel.
- Abrahamsson, E., & Schagatay, E. (2014). A Living Based on Breath - Hold Diving in the Bajau Laut. *Human Evolution*, 29(1-3), 13.
- Acciaioli, G., Brunt, H., & Clifton, J. (2017). Foreigners Everywhere, Nationals Nowhere: Exclusion, Irregularity, and Invisibility of Stateless Bajau Laut in Eastern Sabah, Malaysia. *Journal of Immigrant & Refugee Studies*, 15(3), 232-249. <https://doi.org/10.1080/15562948.2017.1319526>
- Acheson, J. M. (2015). Private Land and Common Oceans. *Current Anthropology*, 56(1), 28-55. <https://doi.org/10.1086/679482>
- Adade Williams, P., Sikutshwa, L., & Shackleton, S. (2020). Acknowledging Indigenous and Local Knowledge to Facilitate Collaboration in Landscape Approaches—Lessons from a Systematic Review. *Land*, 9(9). <https://doi.org/10.3390/land9090331>
- Adger, W. N., Pulhin, J. M., Barnett, J., Dabelko, G. D., Hovelsrud, G. K., Levy, M., Oswald Spring, U., & Vogel, C. H. (2014). Human Security. In C. B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, L.L. White (Ed.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 755-791). Cambridge University Press.
- Adhuri, D. S. (2013). *Selling the Sea, Fishing for Power A study of conflict over marine tenure in Kei Islands, Eastern Indonesia*. ANU E Press. <https://press-files.anu.edu.au/downloads/press/p223581/pdf/book.pdf>
- Adhuri, D. S. (2018). The State and Empowerment of Indonesian Maritime Culture: The Case of Traditional Marine Resource Management. *Journal of Ocean and Culture*, 1(12), 18-34. <https://doi.org/10.33522/joc.2018.1.18>
- Adimu, H. E., Boer, M., Yulianda, F., & Damar, A. (2017). The role of stakeholders in marine conservation areas in Wakatobi National Park, Indonesia. *AAFL Bioflux*, 10(6), 1483-1491.
- Adri, & Anwar, H. (2019). Iko-Iko sebagai media pembelajaran dalam lingkungan masyarakat Bajo di Desa Bokori Kecamatan Soropia Kabupaten Konawe. *Jurnal Penelitian Pendidikan Sejarah*, 4(1), 1-12. <https://doi.org/10.36709/jpps.v4i1.7323>
- Adrianto, L., Amin, M. A. A., Solihin, A., & Hartoto, D. I. (2021). *Konstruksi Lokal Pengelolaan Sumberdaya Perikanan di Indonesia* (L. Adrianto, Ed.). IPB Press.
- Ahmad Wani, K., & Ariana, L. (2018). Impact of climate change on indigenous people and adaptive capacity of Bajo Tribe, Indonesia. *Environmental Claims Journal*, 30(4), 302-313. <https://doi.org/10.1080/10406026.2018.1504380>

- Aikenhead, G. S., & Ogawa, M. (2007). Indigenous knowledge and science revisited. *Cultural Studies of Science Education*, 2(3), 539-620. <https://doi.org/10.1007/s11422-007-9067-8>
- Albers, H. J., & Ashworth, M. F. (2022). Economics of marine protected areas: assessing the literature for marine protected area network expansions. *Annual Review of Resource Economics*, 14(1). <https://doi.org/10.1146/annurev-resource-111820-024652>
- Altheide, D. L. (1987). Reflections: Ethnographic content analysis. *Qualitative sociology*, 10(1), 65-77.
- AM, H. M. (2019). Emerging trends in the generation, transmission and protection of Traditional Knowledge. *Indigenous Policy Journal*, 30(1), 1-15.
- Andaya, B. W. (2019). Recording the past of “peoples without history”: Southeast Asia’s sea nomads. *Asian Review*, 32(1), 5-33.
- Antweiler, C. (1998). Local Knowledge and Local Knowing: An Anthropological Analysis of Contested "Cultural Products" in the Context of Development. *Anthropos*, 469-494. <https://www.jstor.org/stable/40464844>
- Ariando, W. (2018). *Traditional Ecological Knowledge of Indigenous Peoples on Climate Change Adaptation: A Case Study of Sea Nomads “Orang Suku Laut”, Lingga Regency, Riau Islands Province, Indonesia* [Chulalongkorn University]. Bangkok, Thailand.
- Ariando, W., & Limjirakan, S. (2019). Traditional Ecological Knowledge of Indonesian Sea Nomads “Orang Suku Laut” on Climate Change Adaptation. *Natural Resource Management 5th EnvironmentAsia International Conference*, Chiang Mai, Thailand.
- Ariando, W., Sumolang, K. C., & Arumsari, I. (2022). Planetary health: a grassroots experience of Indonesian sea nomads in solid waste management in Bajau Mola Raya, Wakatobi Regency, Southeast Sulawesi. 3rd International Conference on Social Determinants of Health, Jakarta.
- Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., Diduck, A. P., Doubleday, N. C., Johnson, D. S., Marschke, M., McConney, P., Pinkerton, E. W., & Wollenberg, E. K. (2009). Adaptive co-management for social–ecological complexity. *Frontiers in Ecology and the Environment*, 7(2), 95-102. <https://doi.org/10.1890/070089>
- Arunotai, N. (2006). Moken Traditional Knowledge: An Unrecognised form of Natural Resources Management and Conservation. *International Social Science Journal*, 58(187), 139-150. <https://doi.org/10.1111/j.1468-2451.2006.00599.x>
- Arunotai, N. (2008). Saved by an Old Legend and a Keen Observation: The Case of Moken Sea Nomads in Thailand. In *Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region*. UN/ISDR Asia Pacific.
- Arunotai, N. (2017). ”Hopeless at Sea, Landless on Shore”: Contextualising The Sea Nomads’ Dilemma in Thailand. In A. Gingrich & G. Hazod (Eds.), *AAS Working Papers in Social Anthropology* (Vol. 31, pp. 1-27). Österreichische Akademie der Wissenschaften. <https://doi.org/10.1553/wpsa31>
- Arunotai, N., Wongbusarakum, S., & Elias, D. (2007). *Bridging the Gap between the Rights and Needs of Indigenous Communities and the Management of Protected*

- Areas: Case Studies from Thailand* (C. Haddad, S. Usher, & L. Hargreaves, Eds.). UNESCO.
- Asteria, D., Alvernia, P., Kholila, B. N., Husein, S. I., & Asrofani, F. W. (2022). Forest conservation by the indigenous Baduy community in the form of customary law. *Journal of Cultural Heritage Management and Sustainable Development*. <https://doi.org/10.1108/jchmsd-12-2020-0171>
- Astomo, P., & Asrullah, A. (2019). Legal Protection for The Indigenous Law Communities and Their Traditional Rights Based on the Verdict of the Constitutional Court. *PADJADJARAN Jurnal Ilmu Hukum (Journal of Law)*, 06(01), 90-108. <https://doi.org/10.22304/pjih.v6n1.a5>
- Aswani, S., Lemahieu, A., & Sauer, W. H. H. (2018). Global trends of local ecological knowledge and future implications. *PLoS One*, 13(4), e0195440. <https://doi.org/10.1371/journal.pone.0195440>
- Audefroy, J. F., & Sánchez, B. N. C. (2017). Integrating local knowledge for climate change adaptation in Yucatán, Mexico. *International Journal of Sustainable Built Environment*, 6(1), 228-237. <https://doi.org/10.1016/j.ijbe.2017.03.007>
- Augustine, S., & Dearden, P. (2014). Changing paradigms in marine and coastal conservation: A case study of clam gardens in the Southern Gulf Islands, Canada. *The Canadian Geographer / Le Géographe canadien*, 58(3), 305-314. <https://doi.org/10.1111/cag.12084>
- Awori, K., Vetere, F., & Smith, W. (2015). *Transnationalism, Indigenous Knowledge and Technology* Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15,
- Bahar, A., & Fauzi, A. (2020, 5 – 6 June 2020). *Coral reefs ecotourism sustainability assessment based on the integration of government-private-local community in Hoga Island, Wakatobi Regency* The 3rd International Symposium Marine and Fisheries (ISMF), South Sulawesi, Indonesia.
- Bailey, C., & Zerner, C. (1992). Community-based fisheries management institutions in Indonesia. *Mast: Maritime Anthropological Studies*, 1(1), 17.
- Balbar, A. C., & Metaxas, A. (2019). The current application of ecological connectivity in the design of marine protected areas. *Global Ecology and Conservation*, 17. <https://doi.org/10.1016/j.gecco.2019.e00569>
- Balehegn, M., Balehey, S., Fu, C., & Liang, W. (2019). Indigenous weather and climate forecasting knowledge among Afar pastoralists of north eastern Ethiopia: Role in adaptation to weather and climate variability. *Pastoralism*, 9(1). <https://doi.org/10.1186/s13570-019-0143-y>
- Ban, N. C., Davies, T. E., Aguilera, S. E., Brooks, C., Cox, M., Epstein, G., Evans, L. S., Maxwell, S. M., & Nenadovic, M. (2017). Social and ecological effectiveness of large marine protected areas. *Global Environmental Change*, 43, 82-91. <https://doi.org/10.1016/j.gloenvcha.2017.01.003>
- Ban, N. C., & Frid, A. (2018). Indigenous peoples' rights and marine protected areas. *Marine Policy*, 87, 180-185. <https://doi.org/10.1016/j.marpol.2017.10.020>
- Barrera-Bassols, N., & Toledo, V. M. (2005). Ethnoecology of the Yucatec Maya: Symbolism, Knowledge and Management of Natural Resources. *Journal of Latin American Geography*, 4(1), 9-41.

- Baskara, B., Abdullah, I., & Suryo, D. (2014). The construction and contestation of Islamic identity of the Bajo people in Wakatobi Islands, South East Sulawesi, Indonesia. *Humaniora*, 26(1), 32-42.
- Bennett, N. J., Katz, L., Yadao-Evans, W., Ahmadi, G. N., Atkinson, S., Ban, N. C., Dawson, N. M., de Vos, A., Fitzpatrick, J., Gill, D., Imirizaldu, M., Lewis, N., Mangubhai, S., Meth, L., Muhl, E.-K., Obura, D., Spalding, A. K., Villagomez, A., Wagner, D., . . . Wilhelm, A. (2021). Advancing Social Equity in and Through Marine Conservation. *Frontiers in Marine Science*, 8(711538), 1-13. <https://doi.org/10.3389/fmars.2021.711538>
- Bennett, N. J., Roth, R., Klain, S. C., Chan, K., Christie, P., Clark, D. A., Cullman, G., Curran, D., Durbin, T. J., Epstein, G., Greenberg, A., Nelson, M. P., Sandlos, J., Stedman, R., Teel, T. L., Thomas, R., Veríssimo, D., & Wyborn, C. (2017). Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation*, 205, 93-108. <https://doi.org/10.1016/j.biocon.2016.10.006>
- Berdej, S., & Armitage, D. (2016). Bridging for Better Conservation Fit in Indonesia's Coastal-Marine Systems. *Frontiers in Marine Science*, 3. <https://doi.org/10.3389/fmars.2016.00101>
- Berkes, F. (1993). *Traditional Ecological Knowledge: Concepts and Cases* (J. T. Inglis, Ed.). International Program on Traditional Ecological Knowledge and International Development Research Centre. <http://library.umac.mo/ebooks/b10756577a.pdf>
- Berkes, F. (1994). Co-management: bridging the two solitudes. *Northern perspectives*, 22(2), 18-20.
- Berkes, F. (2009a). Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, 90(5), 1692-1702. <https://doi.org/10.1016/j.jenvman.20>
- Berkes, F. (2009b). Indigenous Ways of Knowing and the Study of Environmental Change. *Journal of the Royal Society of New Zealand*, 39(4), 151-156. <https://doi.org/10.1080/03014220909510568>
- Berkes, F. (2010). Devolution of environment and resources governance: trends and future. *Environmental Conservation*, 37(4), 489-500. <https://doi.org/10.1017/s037689291000072x>
- Berkes, F. (2012). *Sacred Ecology* (3 ed.). Routledge.
- Berkes, F. (2015). *Coasts for People: Interdisciplinary Approaches to Coastal and Marine Resource Management* (Vol. 1). Routledge. <https://doi.org/10.4324/9781315771038>
- Berkes, F., & Armitage, D. (2010). Co-management institutions, knowledge, and learning: Adapting to change in the Arctic. *Études/Inuit/Studies*, 34(1), 109-131. <https://doi.org/10.7202/045407ar>
- Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of Traditional Ecological Knowledge as Adaptive Management. *Ecological Applications*, 10(5), 1251-1262. [https://doi.org/10.1890/1051-0761\(2000\)010\[1251:ROTEKA\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2)
- Berkes, F., & Folke, C. (1998). Linking Social and Ecological Systems for Resilience and Sustainability. In *Linking social and ecological systems: management practices and social mechanisms for building resilience* (Vol. 52, pp. 4-23).

- Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences
- Berkes, F., Folke, C., & Gadgil, M. (1995). Traditional Ecological Knowledge, Biodiversity, Resilience and Sustainability. In C. A. Perrings, K. G. Mäler, C. Folke, C. S. Holling, & B. O. Jansson (Eds.), *Biodiversity Conservation* (pp. 281-299). Springer. https://doi.org/10.1007/978-94-011-0277-3_15
- Berkes, F., & Nayak, P. K. (2018). Role of communities in fisheries management: “one would first need to imagine it”. *Maritime Studies*, 17(3), 241-251. <https://doi.org/10.1007/s40152-018-0120-x>
- Berry, J. W. (2008). Globalisation and acculturation. *International Journal of Intercultural Relations*, 32(4), 328-336. <https://doi.org/10.1016/j.ijintrel.2008.04.001>
- Bethel, M. B., Brien, L. F., Esposito, M. M., Miller, C. T., Buras, H. S., Laska, S. B., Philippe, R., Peterson, K. J., & Parsons Richards, C. (2014). Sci-TEK: A GIS-Based Multidisciplinary Method for Incorporating Traditional Ecological Knowledge into Louisiana's Coastal Restoration Decision-Making Processes. *Journal of Coastal Research*, 297, 1081-1099. <https://doi.org/10.2112/jcoastres-d-13-00214.1>
- Bikku. (2022). Colonial Impact on Pastoral Nomads and Caravan Traders in India: The Raika and the Banjara. In M. C. Behera (Ed.), *Tribe, Space and Mobilisation* (pp. 243–259). Springer. https://doi.org/10.1007/978-981-19-0059-4_13
- Bishop-Williams, K. E., Sargeant, J. M., Berrang-Ford, L., Edge, V. L., Cunsolo, A., & Harper, S. L. (2017). A protocol for a systematic literature review: comparing the impact of seasonal and meteorological parameters on acute respiratory infections in Indigenous and non-Indigenous peoples. *Syst Rev*, 6(1), 19. <https://doi.org/10.1186/s13643-016-0399-x>
- Bohensky, E. L., & Maru, Y. (2011). Indigenous Knowledge, Science, and Resilience: What Have We Learned from a Decade of International Literature on "Integration"? *Ecology and Society*, 16(4). <https://doi.org/10.5751/es-04342-160406>
- Bohorquez, J. J., Dvarskas, A., & Pikitch, E. K. (2019). Categorizing global MPAs: A cluster analysis approach. *Marine Policy*, 108. <https://doi.org/10.1016/j.marpol.2019.103663>
- Bojinski, S., Verstraete, M., Peterson, T. C., Richter, C., Simmons, A., & Zemp, M. (2014). The concept of essential climate variables in support of climate research, applications, and policy. *Bulletin of the American Meteorological Society*, 95(9), 1431-1443. <https://doi.org/10.1175/bams-d-13-00047.1>
- Bokil, M. (2002). Facing exclusion: The nomadic communities in Western India. *Indian Journal of Social Work*, 63(1), 33-45.
- Boli, P., Yulianda, F., Damar, A., Sudharma, D., & Kinseng, R. (2014). Benefits of Sasi for Conservation of Marine Resources in Raja Ampat, Papua. *Jurnal Manajemen Hutan Tropika (Journal of Tropical Forest Management)*, 20(2), 131-139. <https://doi.org/10.7226/jtfm.20.2.131>
- Bottema, M. J. M., & Bush, S. R. (2012). The durability of private sector-led marine conservation: A case study of two entrepreneurial marine protected areas in Indonesia. *Ocean & Coastal Management*, 61, 38-48. <https://doi.org/10.1016/j.ocecoaman.2012.01.004>

- Bremer, S., & Glavovic, B. (2013). Mobilizing knowledge for coastal governance re-framing the science policy interface for integrated coastal management. *Coastal Management*, 41(1), 39-56. <https://doi.org/10.1080/08920753.2012.749751>
- Briggs, J., & Sharp, J. (2004). Indigenous knowledges and development: a postcolonial caution. *Third world quarterly*, 25(4), 661-676.
- Brosi, B. J., Balick, M. J., Wolkow, R., Lee, R., Kostka, M., Raynor, W., Gallen, R., Raynor, A., Raynor, P., & Lee Ling, D. (2007). Cultural erosion and biodiversity: canoe-making knowledge in Pohnpei, Micronesia. *Conserv Biol*, 21(3), 875-879. <https://doi.org/10.1111/j.1523-1739.2007.00654.x>
- Brosius, J. P., & Hitchne, S. L. (2010). Cultural diversity and conservation. *International Social Science Journal*, 54(173), 11.
- Bryman, A. (2012). *Social Research Methods*. Oxford University Press Inc.
- Bubandt, N. (2005). On the Genealogy of Sasi. In T. Otto & P. Pedersen (Eds.), *Tradition and Agency : Tracing Cultural Continuity and Invention* (pp. 193-232). Aarhus Universitetsforlag. https://pure.au.dk/portal/files/12750360/genealogy_of_sasi_bubandt_2005_.pdf
- Burger, J. (2011). Valuation of environmental quality and eco-cultural attributes in Northwestern Idaho: Native Americans are more concerned than Caucasians. *Environ Res*, 111(1), 136-142. <https://doi.org/10.1016/j.envres.2010.09.013>
- Burnette, C. E., Sanders, S., Butcher, H. K., & Rand, J. T. (2014). A toolkit for ethical and culturally sensitive research: An application with Indigenous Communities. *Ethics and Social Welfare*, 8(4), 364-382. <https://doi.org/10.1080/17496535.2014.885987>
- Burton, R. J. F., & Riley, M. (2018). Traditional Ecological Knowledge from the internet? The Case of Hay Meadows in Europe. *Land Use Policy*, 70, 334-346. <https://doi.org/10.1016/j.landusepol.2017.10.014>
- Butler, C. F., & Menzies., C. R. (2007). Traditional ecological knowledge and indigenous tourism. In R. Butler & T. Hinch (Eds.), *Tourism and Indigenous Peoples: Issues and implications* (pp. 15-27). Elsevier.
- Cabral, R. B., Halpern, B. S., Lester, S. E., White, C., Gaines, S. D., & Costello, C. (2019). Designing MPAs for food security in open-access fisheries. *Sci Rep*, 9(1), 8033. <https://doi.org/10.1038/s41598-019-44406-w>
- Cánovas-Molina, A., & García-Frapolli, E. (2020). Untangling worldwide conflicts in marine protected areas: Five lessons from the five continents. *Marine Policy*, 121. <https://doi.org/10.1016/j.marpol.2020.104185>
- Caras, T., & Pasternak, Z. (2009). Long-term environmental impact of coral mining at the Wakatobi marine park, Indonesia. *Ocean & Coastal Management*, 52(10), 539-544. <https://doi.org/10.1016/j.ocecoaman.2009.08.006>
- Carlsson, L., & Berkes, F. (2005). Co-management: concepts and methodological implications. *Journal of Environmental Management*, 75(1), 65-76. <https://doi.org/10.1016/j.jenvman.2004.11.008>
- Casimirri, G. (2003). *Problems with integrating traditional ecological knowledge into contemporary resource management* XII World Forestry Congress, Quebec City. https://www.fao.org/3/XII/0887-A3.htm#P24_2299
- Casson, S. A. (2015). Socially-just and scientifically-sound: Re-examining co-management of protected areas. *IK: Other Ways of Knowing*, 1(2), 32-64. <https://doi.org/10.18113/P8ik159746>

- Castro, A. P., & Nielsen, E. (2001). Indigenous people and co-management: implications for conflict management. *Environmental Science and Policy*, 4(4-5), 229–239. [https://doi.org/10.1016/S1462-9011\(01\)00022-3](https://doi.org/10.1016/S1462-9011(01)00022-3)
- Chao, C.-L., & Hsu, P.-H. (2011). Learning about the development of eco-tourism in the context of the Smangus tribe's traditional ecological knowledge. *GeoJournal of Tourism and Geosites*, 7(1), 7-21.
- Charles, A., & Wilson, L. (2008). Human dimensions of marine protected areas. *ICES Journal of Marine Science*, 66(1), 6-15. <https://doi.org/10.1093/icesjms/fsn182>
- Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis* (1 ed.). Sage Publications.
- Chen, C., & Lopez-Carr, D. (2015). The importance of place: Unraveling the vulnerability of fisherman livelihoods to the impact of marine protected areas. *Applied Geography*, 59, 88-97. <https://doi.org/10.1016/j.apgeog.2014.10.015>
- Cheok, J., Weeks, R., & Pressey, R. L. (2019). Identifying the strengths and weaknesses of conservation planning at different scales: the Coral Triangle as a case study. *Ecology and Society*, 24(4). <https://doi.org/10.5751/es-10919-240424>
- Chou, C. (1997). Contesting the Tenure of Territoriality: the Orang Suku Laut. *Bijdragen tot de Taal-, Land- en Volkenkunde*, 153(4), 605-629.
- Chou, C. (2003). *Indonesian Sea Nomads Money Magic and Fear of the Orang Suku Laut*. RoutledgeCurzon, an imprint of Taylor & Francis.
- Christie, N., Smyth, K., Barnes, R., & Elliott, M. (2014). Co-location of activities and designations: A means of solving or creating problems in marine spatial planning? *Marine Policy*, 43, 254-261. <https://doi.org/10.1016/j.marpol.2013.06.002>
- Christie, P. (2011). Creating space for interdisciplinary marine and coastal research: five dilemmas and suggested resolutions. *Environmental Conservation*, 38(2), 172-186. <https://doi.org/10.1017/s0376892911000129>
- Christie, P., Bennett, N. J., Gray, N. J., 'Aulani Wilhelm, T., Lewis, N. a., Parks, J., Ban, N. C., Gruby, R. L., Gordon, L., Day, J., Tai, S., & Friedlander, A. M. (2017). Why people matter in ocean governance: Incorporating human dimensions into large-scale marine protected areas. *Marine Policy*, 84, 273-284. <https://doi.org/10.1016/j.marpol.2017.08.002>
- Christie, P., Lowry, K., White, A. T., Oracion, E. G., Sievanen, L., Pomeroy, R. S., Pollnac, R. B., Patlis, J. M., & Eisma, R.-L. V. (2005). Key findings from a multidisciplinary examination of integrated coastal management process sustainability. *Ocean & Coastal Management*, 48(3-6), 468-483. <https://doi.org/10.1016/j.ocecoaman.2005.04.006>
- Chunhabunyatip, P., Sasaki, N., Grünbühel, C., Kuwornu, J., & Tsusaka, T. (2018). Influence of Indigenous Spiritual Beliefs on Natural Resource Management and Ecological Conservation in Thailand. *Sustainability*, 10(8). <https://doi.org/10.3390/su10082842>
- Cinner, J. E., Basurto, X., Fidelman, P., Kuange, J., Lahari, R., & Mukminin, A. (2012). Institutional designs of customary fisheries management arrangements in Indonesia, Papua New Guinea, and Mexico. *Marine Policy*, 36(1), 278-285. <https://doi.org/10.1016/j.marpol.2011.06.005>
- Clifton, J. (2003). Prospects for co-management in Indonesia's marine protected areas. *Marine Policy*, 27(5), 389-395. [https://doi.org/10.1016/s0308-597x\(03\)00026-5](https://doi.org/10.1016/s0308-597x(03)00026-5)

- Clifton, J. (2009). Achieving congruence between conservation and community: the Bajau ethnic group and marine management within the Wakatobi and south-east Asia. In J. Clifton, R. K. F. Unsworth, & D. J. Smith (Eds.), *Marine resource dependence and natural resource use patterns in the Wakatobi* (pp. 244). Nova Science Publishers Inc.
- Clifton, J. (2013). Refocusing conservation through a cultural lens: improving governance in the Wakatobi National Park, Indonesia. *Marine Policy*, *41*, 80-86. <https://doi.org/10.1016/j.marpol.2012.12.015>
- Clifton, J. (2014). Maritime ecocultures: Bajau communities of eastern Indonesia. In S. Böhm, Z. P. Bharucha, & J. Pretty (Eds.), *Ecocultures: Blueprints for Sustainable Communities* (pp. 27-43). Routledge.
- Clifton, J., & Majors, C. (2012). Culture, Conservation, and Conflict: Perspectives on Marine Protection Among the Bajau of Southeast Asia. *Society and Natural Resources*, *25*(7), 716-725. <https://doi.org/10.1080/08941920.2011.618487>
- Clifton, J., & Unsworth, R. K. F. (2010). Introduction. In J. Clifton, R. K. F. Unsworth, & D. J. Smith (Eds.), *Marine Research and Conservation in the Coral Triangle: the Wakatobi National Park* (pp. 9-17). Nova Science Publishers Inc.
- Corbett, J. (2009). *Good Practices in Participatory Mapping*. The International Fund for Agricultural Development (IFAD). https://www.ifad.org/documents/38714170/39144386/PM_web.pdf/7c1eda69-8205-4c31-8912-3c25d6f90055
- Corntassel, J. (2008). Toward Sustainable Self-Determination- Rethinking the Contemporary Indigenous-Rights Discourse. *Alternatives*(33), 28.
- Costello, C., & Ovando, D. (2019). Status, institutions, and prospects for global capture fisheries. *Annual Review of Environment and Resources*, *44*(1), 177-200. <https://doi.org/10.1146/annurev-environ-101718-033310>
- Costello, M. J., & Ballantine, B. (2015). Biodiversity conservation should focus on no-take Marine Reserves: 94% of Marine Protected Areas allow fishing. *Trends in Ecology and Evolution*, *30*(9), 507-509. <https://doi.org/10.1016/j.tree.2015.06.011>
- Crawford, I. (1969). *Late prehistoric changes in Aboriginal cultures in Kimberley, Western Australia* [University College London]. London.
- Cristancho, S., & Vining, J. (2009). Perceived Intergenerational Differences in the Transmission of Traditional Ecological Knowledge (TEK) in Two Indigenous Groups from Colombia and Guatemala. *Culture & Psychology*, *15*(2), 229-254. <https://doi.org/10.1177/1354067x09102892>
- Cullen-Unsworth, L. C., Jones, B. L., Seary, R., Newman, R., & Unsworth, R. K. F. (2018). Reasons for seagrass optimism: Local ecological knowledge confirms presence of dugongs. *Marine Pollution Bulletin*, *134*, 118-122. <https://doi.org/10.1016/j.marpolbul.2017.11.007>
- Cullen, L. C., Pretty, J., Smith, D., & Pilgrim, S. E. (2007). Links between local ecological knowledge and wealth in indigenous communities of Indonesia: implications for conservation of marine resources. *The International Journal of Interdisciplinary Social Sciences*, *2*(1), 289-299.
- Das, A., Gujre, N., Devi, R. J., & Mitra, S. (2021). A review on traditional ecological knowledge and Its role in natural resources management: North East India, a

- cultural paradise. *Environmental Management*, 1-22.
<https://doi.org/10.1007/s00267-021-01554-y>
- Dawson, A., Toombs, E., & Mushquash, C. (2017). Indigenous Research Methods: A Systematic Review. *International Indigenous Policy Journal*, 8(02).
<https://doi.org/10.18584/iipj.2017.8.2.5>
- Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D., Stolton, S., Wells, S., & Wenzel, L. (2019). *Guidelines for applying the IUCN protected area management categories to marine protected areas* (Second ed.). IUCN.
- de Nooy, W. (2013). Communication in natural resource management: agreement between and disagreement within stakeholder groups. *Ecology and Society*, 18(2). <https://doi.org/10.5751/es-05648-180244>
- Djohani, R. H. (1996). The Bajau: future marine park managers in Indonesia. In R. Bryant & M. Parnwell (Eds.), *Environmental Change in Southeast Asia: People, Politics and Sustainable Development* (pp. 260-267). Routledge.
- Do Khac, A. L. (2018). The Political sea: conservation policies, state power, and symbolic violence - the case of the Bajau in the Wakatobi Marine National Park. *Explorations* 14.
- Drew, J. A. (2005). Use of Traditional Ecological Knowledge in Marine Conservation. *Conservation Biology*, 19(4), 1286-1293. <https://doi.org/10.1111/j.1523-1739.2005.00158.x>
- Early-Capistran, M. M., Solana-Arellano, E., Abreu-Grobois, F. A., Narchi, N. E., Garibay-Melo, G., Seminoff, J. A., Koch, V., & Saenz-Arroyo, A. (2020). Quantifying local ecological knowledge to model historical abundance of long-lived, heavily-exploited fauna. *PeerJ*, 8(9494), 1-34.
<https://doi.org/10.7717/peerj.9494>
- Ebhuoma, E. E., & Simatele, D. M. (2017). ‘We know our Terrain’: indigenous knowledge preferred to scientific systems of weather forecasting in the Delta State of Nigeria. *Climate and Development*, 11(2), 112-123.
<https://doi.org/10.1080/17565529.2017.1374239>
- Ellen, R. (2018). Nuaulu Ritual Regulation of Resources, SASI and Forest Conservation in Eastern Indonesia. *South East Asia Research*, 24(1), 5-22.
<https://doi.org/10.5367/sear.2016.0290>
- Elliott, G., Mitchell, B., Wiltshire, B., Manan, I. A., & Wismer, S. (2001). Community participation in marine protected area management Wakatobi National Park Sulawesi Indonesia. *Coastal Management*, 29(4), 22.
<https://doi.org/10.1080/089207501750475118>
- Essed, P. (2010). Multi-identifications and Transformations: Reaching Beyond Racial and Ethnic Reductionisms. *Social Identities*, 7(4), 493-509.
<https://doi.org/10.1080/13504630120107665>
- Estradivari, Agung, M. F., Adhuri, D. S., Ferse, S. C. A., Sualia, I., Andradi-Brown, D. A., Campbell, S. J., Iqbal, M., Jonas, H. D., Lazuardi, M. E., Nanlohy, H., Pakiding, F., Pusparini, N. K. S., Ramadhana, H. C., Ruchimat, T., Santiadji, I. W. V., Timisela, N. R., Veverka, L., & Ahmadia, G. N. (2022). Marine conservation beyond MPAs: Towards the recognition of other effective area-based conservation measures (OECMs) in Indonesia. *Marine Policy*, 137.
<https://doi.org/10.1016/j.marpol.2021.104939>

- Fabinyi, M., Knudsen, M., & Segi, S. (2010). Social Complexity, Ethnography and Coastal Resource Management in the Philippines. *Coastal Management*, 38(6), 617-632. <https://doi.org/10.1080/08920753.2010.523412>
- Fache, E., & Breckwoldt, A. (2018). Small-scale managed marine areas over time: Developments and challenges in a local Fijian reef fishery. *Journal of Environmental Management*, 220, 253-265. <https://doi.org/10.1016/j.jenvman.2018.05.029>
- Falzon, M.-A. (2016). *Multi-sited ethnography: Theory, praxis and locality in contemporary research* (M.-A. Falzon, Ed.). Routledge.
- FAO. (2015). *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication*. FAO. <http://www.fao.org/3/a-i4356en.pdf>
- Fatihwahidah, & Mansur, M. (2018). *Role of Bajo women in Wakatobi Island IOP Conference Series: Earth and Environmental Science*,
- Feinstein, B. C. (2016). Learning and transformation in the context of Hawaiian traditional ecological knowledge. *Adult Education Quarterly*, 54(2), 105-120. <https://doi.org/10.1177/0741713603260275>
- Fernandez-Llamazares, A., Diaz-Reviriego, I., Luz, A. C., Cabeza, M., Pyhala, A., & Reyes-Garcia, V. (2015). Rapid ecosystem change challenges the adaptive capacity of Local Environmental Knowledge. *Glob Environ Change*, 31, 272-284. <https://doi.org/10.1016/j.gloenvcha.2015.02.001>
- Ferse, S. C. A., Manez Costa, M., Manez, K. S., Adhuri, D. S., & Glaser, M. (2010). Allies, not aliens: increasing the role of local communities in marine protected area implementation. *Environmental Conservation*, 37(1), 23-34. <https://doi.org/10.1017/s0376892910000172>
- Fonseca-Cepeda, V., Idrobo, C. J., & Restrepo, S. (2019). The changing chagras: traditional ecological knowledge transformations in the Colombian Amazon. *Ecology and Society*, 24(1). <https://doi.org/10.5751/es-10416-240108>
- Ford, J. D., King, N., Galappaththi, E. K., Pearce, T., McDowell, G., & Harper, S. L. (2020). The Resilience of Indigenous Peoples to Environmental Change. *One Earth*, 2(6), 532-543. <https://doi.org/10.1016/j.oneear.2020.05.014>
- Ford, J. D., Vanderbilt, W., & Berrang-Ford, L. (2012). Authorship in IPCC AR5 and Its Implications for Content: Climate Change and Indigenous Populations in WGII. *Climate Change*, 113(2), 201-213. <https://doi.org/10.1007/s10584-011-0350-z>
- Fox, J. J., & Sen, S. (2002). *A Study of Socio-Economic Issues Facing Traditional Indonesian Fishers who Access The Mou Box, A Report for Environment Australia*. A. N. University.
- Francis, O. P., Kim, K., & Pant, P. (2019). Stakeholder assessment of coastal risks and mitigation strategies. *Ocean & Coastal Management*, 179(104844), 1-11. <https://doi.org/10.1016/j.ocecoaman.2019.104844>
- Frey, J. H., & Fontana, A. (1991). The group interview in social research. *The Social Science Journal*, 28(2), 13. [https://doi.org/10.1016/0362-3319\(91\)90003-M](https://doi.org/10.1016/0362-3319(91)90003-M)
- Galley, G., & Clifton, J. (2004). The Motivational and Demographic Characteristics of Research Ecotourists: Operation Wallacea Volunteers in Southeast Sulawesi, Indonesia. *Journal of Ecotourism*, 3(1), 69-82. <https://doi.org/10.1080/14724040408668150>

- Gaynor, J. L. (2007). Maritime ideologies and ethnic anomalies: Sea space and the structure of subalternity in the Southeast Asian littoral. In J. Bentley, R. Bridenthal, & K. Wigen (Eds.), *Seascapes: Maritime Histories, Littoral Cultures and Transoceanic Exchanges* (pp. 53-70). University of Hawai'i Press.
<https://doi.org/10.1515/9780824864248-005>
- Gaynor, J. L. (2016). *Intertidal History in Island Southeast Asia* (M. Kingra, T. Chaloeontiarana, C. Formichi, T. Loos, & K. McGowan, Eds.). Cornell University Press.
- Gervais, D. J. (2003). Spiritual but not intellectual - the protection of sacred intangible traditional knowledge. *Cardozo Journal of International and Comparative Law* 11(2), 467-496.
- Glaser, M., Baitoningsih, W., Ferse, S. C. A., Neil, M., & Deswandi, R. (2010). Whose sustainability? top-down participation and emergent rules in marine protected area management in Indonesia. *Marine Policy*, 34(6), 1215-1225.
<https://doi.org/10.1016/j.marpol.2010.04.006>
- Godwin, H., Carson, S., Kentatchime, F., Nana, E., Njabo, K., & Cole, B. (2018). Indigenous Peoples' Concerns About Loss of Forest Knowledge: Implications for Forest Management. *Conservation and Society*, 16(4).
<https://doi.org/10.4103/cs.cs.17.105>
- Gómez-Baggethun, E., Corbera, E., & Reyes-García, V. (2013). Traditional Ecological Knowledge and Global Environmental Change: Research findings and Policy Implications. *Ecology and Society*, 18(4), 1-8. <https://doi.org/10.5751/es-06288-180472>
- Gomez-Baggethun, E., Mingorria, S., Reyes-Garcia, V., Calvet, L., & Montes, C. (2010). Traditional ecological knowledge trends in the transition to a market economy: empirical study in the Donana natural areas. *Conserv Biol*, 24(3), 721-729. <https://doi.org/10.1111/j.1523-1739.2009.01401.x>
- Gomez-Baggethun, E., & Reyes-Garcia, V. (2013). Reinterpreting change in traditional ecological knowledge. *Human Ecology*, 41(4). <https://doi.org/10.1007/s10745-013-9577-9>
- Govan, H. (2009a). Achieving the potential of locally managed marine areas in the South Pacific. *SPC Traditional Marine Resource Management and Knowledge Information Bulletin*, 25, 10.
- Govan, H. (2009b). *Status and potential of locally-managed marine areas in the Pacific Island Region: meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs* <https://mpira.ub.uni-muenchen.de/23828/>
- Govan, H., Aalbersberg, W., Tawake, A., & Parks, J. E. (2008). *Locally-Managed Marine Areas: A guide to supporting Community-Based Adaptive Management* The Locally-Managed Marine Area Network. <http://www.reefresilience.org/wp-content/uploads/LMMA-Guide-2008.pdf>
- Gray, N. J., Bennett, N. J., Day, J. C., Gruby, R. L., Wilhelm, T. A., & Christie, P. (2017). Human dimensions of large-scale marine protected areas: advancing research and practice. *Coastal Management*, 45(6), 407-415.
<https://doi.org/10.1080/08920753.2017.1373448>

- Green, D., Billy, J., & Tapim, A. (2010). Indigenous Australians' Knowledge of Weather and Climate. *Climatic Change*, 100(2), 337-354. <https://doi.org/10.1007/s10584-010-9803-z>
- Grey, S., & Kuokkanen, R. (2019). Indigenous governance of cultural heritage: searching for alternatives to co-management. *International Journal of Heritage Studies*, 26(10), 919-941. <https://doi.org/10.1080/13527258.2019.1703202>
- Gumbira, G., & Harsanto, B. (2019). Decision support system for an eco-friendly integrated coastal zone management (ICZM) in Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, 9(4), 1177-1182.
- Hadiyanto, Wahyu Ananingsih, S., Sudarno, & Maryono. (2018). The development of sasi laut in the preservation of sea in Kei community. *E3S Web of Conferences*, 31. <https://doi.org/10.1051/e3sconf/20183109029>
- Halim, M. H. (2014). *Kajian Harmonisasi Pengelolaan Tujuh Taman Nasional Laut*. U. S. A. f. I. Development & (USAID).
- Hardin, G. (1968). The Tragedy of the Commons. *Science*, 162(3859), 1243-1248.
- Harell, A., & Stolle, D. (2011). Reconciling diversity and community? Defining social cohesion in diverse democracies. In M. Hooghe (Ed.), *Contemporary Theoretical Perspectives on the Study of Social Cohesion and Social Capital* (pp. 15-46). Royal Academy of Belgium
- Harkes, I., & Novaczek, I. (2002). Presence, performance, and institutional resilience of sasi, a traditional management institution in Central Maluku, Indonesia. *Ocean & Coastal Management*, 45(4-5), 24. [https://doi.org/10.1016/S0964-5691\(02\)00057-1](https://doi.org/10.1016/S0964-5691(02)00057-1)
- Harti, S. Y., Setyaningrum, A., Sagita, P., & Muhajirin. (2020). *Ekosistem Padang Lamun di Pulau Kaledupa* (Darman, Ed. Vol. 1). Balai Taman Nasional Wakatobi.
- Harvey, B. S. (1974). *Tradition, Islam, and rebellion: South Sulawesi 1950-1965* [Cornell University]. Cornell.
- Hasrawaty, E., Pigoselipi Anas, & Wisudo, S. H. (2017). The role of Bajonese local wisdom in supporting the management conservation area on Wakatobi Regency. *Jurnal Penyuluhan Perikanan dan Kelautan* 11(1), 25-34. <https://doi.org/10.33378/jppik.v11i1.83>
- Helanda, F. v., & Clifton, J. (2015). Whose threat counts? conservation narratives in the Wakatobi National Park, Indonesia. *Conservation and Society*, 13(2), 12. <https://doi.org/10.4103/0972-4923.164194>
- Hellier, A., Newton, A. C., & Gaona, S. O. (1999). Use of indigenous knowledge for rapidly assessing trends in biodiversity: a case study from Chiapas, Mexico. *Biodiversity and Conservation*, 8, 869-889.
- Hepburn, C. D., Jackson, A. M., Pritchard, D. W., Scott, N., Vanderburg, P. H., & Flack, B. (2019). Challenges to traditional management of connected ecosystems within a fractured regulatory landscape: A case study from southern New Zealand. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 29(9), 1535-1546. <https://doi.org/10.1002/aqc.3152>
- Hernandi, A., Abdulharis, R., Hendriatiningsih, S., & MeiLing, M. (2012, 6-10 May 2012). *An Institutional Analysis of Customary Marine Tenure in Maluku-Towards Implementation Marine Cadastre in Indonesia* FIG Working Week,

- Rome, Italy.
http://www.fig.net/resources/proceedings/fig_proceedings/fig2012/papers/ts01g/ts01g_hernandi_abdulharis_et_al_5797.pdf
- Herse, M. R., Lyver, P. O. B., Scott, N., McIntosh, A. R., Coats, S. C., Gormley, A. M., & Tylianakis, J. M. (2020). Engaging indigenous peoples and local communities in environmental management could alleviate scale mismatches in social–ecological systems. *BioScience*, 70(8), 699-707.
<https://doi.org/10.1093/biosci/biaa066>
- Hine, C. (2007). Multi-sited ethnography as a middle range methodology for contemporary STS. *Science, Technology, & Human Values*, 32(6), 652–671.
<https://doi.org/10.1177/016224390303598>
- Hoogervorst, T. G. (2012). Ethnicity and aquatic lifestyles: exploring Southeast Asia’s past and present seascapes. *Water History*, 4(3), 245-265.
<https://doi.org/10.1007/s12685-012-0060-0>
- Hoppers, C. A. O. (2005). *Culture, Indigenous Knowledge, and Development: The Role of the University* (C. A. O. Hoppers, Ed.). Centre for Education Policy Development.
<http://ahero.uwc.ac.za/index.php?module=cshe&action=downloadfile&fileid=23994111647093965583>
- Hornborg, S., van Putten, I., Novaglio, C., Fulton, E. A., Blanchard, J. L., Plagányi, É., Bulman, C., & Sainsbury, K. (2019). Ecosystem-based fisheries management requires broader performance indicators for the human dimension. *Marine Policy*, 108(103639), 1-8. <https://doi.org/10.1016/j.marpol.2019.103639>
- Houde, N. (2007). The six faces of traditional ecological knowledge: challenges and opportunities for Canadian co-management arrangements. *Ecology and Society*, 12(2), 34. <https://www.ecologyandsociety.org/vol12/iss2/art34/>
- Huntington, H. P. (2000). Using Traditional Ecological Knowledge in Science Methods and Applications. *Ecological Applications*, 10(5), 5.
[https://doi.org/10.1890/1051-0761\(2000\)010\[1270:UTEKIS\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2000)010[1270:UTEKIS]2.0.CO;2) (Wiley-Blackwell)
- Hussin, H. (2019). Buwas Kuning (yellow rice) and its symbolic functions among the Sama-Bajau of Malaysia. *SAGE Open*, 9(4), 1-13.
<https://doi.org/10.1177/2158244019885140>
- Ianni, E., Geneletti, D., & Ciolli, M. (2015). Revitalizing traditional ecological knowledge: a study in an Alpine rural community. *Environ Manage*, 56(1), 144-156. <https://doi.org/10.1007/s00267-015-0479-z>
- Ilardo, M. A., Moltke, I., Korneliussen, T. S., Cheng, J., Stern, A. J., Racimo, F., de Barros Damgaard, P., Sikora, M., Seguin-Orlando, A., Rasmussen, S., van den Munckhof, I. C. L., Ter Horst, R., Joosten, L. A. B., Netea, M. G., Salingkat, S., Nielsen, R., & Willerslev, E. (2018). Physiological and genetic adaptations to diving in sea nomads. *Cell*, 173(3), 569-580.
<https://doi.org/10.1016/j.cell.2018.03.054>
- Inamara, A., & Thomas, V. (2017). Pacific Climate Change Adaptation: The Use of Participatory Media to Promote Indigenous Knowledge. *Pacific Journalism Review*, 23(1), 20. <https://doi.org/10.24135/pjr.v23i1.210>
- IPCC. (2014). *Summary for Policy Makers, In: Climate Change 2014: Impact, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects.*

- Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (C. B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, & a. L. L. W. e. P.R. Mastrandrea, Eds.). Cambridge University Press.
- Isiyana Wianti, N., Hadi Dharmawan, A., & Kinseng, R. (2012). Local capitalism of Bajo [Kapitalisme Lokal Suku Bajo]. *Sodality: Jurnal Sosiologi Pedesaan*, 6(1), 35-56. <https://doi.org/10.22500/sodality.v6i1.5810>
- Ismail, I. E., & Ahmad, A. S. (2015). Spatial Arrangement of Coastal Sama-Bajau Houses Based on Adjacency Diagram. *International Journal of Built Environment and Sustainability*, 2(4), 284-291. <https://doi.org/10.11113/ijbes.v2.n4.96>
- Ismail, I. E., Ahmad, A. S. H., & Ibrahim, I. (2015). Influences of regional Sama-Bajau coastal dwellings: Social perspectives through identity molding. *International Journal of Culture and History*, 1(2), 115-121. <https://doi.org/10.18178/ijch.2015.1.2.022>
- Jentoft, S. (2000). Legitimacy and disappointment in fisheries management. *Marine Policy*, 24(2), 141-148.
- Jeon, K. (2019). The Life and Culture of the Bajau, Sea Gypsies: Focusing in Southeast Sulawesi. *Journal of Ocean and Culture* 2, 38-56.
- Joesoef, I. E. (2020). The Idea of customary law community representation in the regional representative council. *Unnes Law Journal*, 6(1), 119-142. <https://doi.org/10.15294/ulj.v5i2.26984>
- Jones, P. J. S., Qiu, W., & De Santo, E. M. (2013). Governing marine protected areas: social-ecological resilience through institutional diversity. *Marine Policy*, 41, 5-13. <https://doi.org/10.1016/j.marpol.2012.12.026>
- Jubilado, R. C. (2010). On cultural fluidity: the Sama-Bajau of the Sulu-Sulawesi Seas. *Kunapipi*, 32(1), 89-101.
- Juniyanti, L., Prasetyo, L. B., Aprianto, D. P., Purnomo, H., & Kartodihardjo, H. (2020). Land-use/land cover change and its causes in Bengkalis Island, Riau Province (from 1990-2019). *Journal of Natural Resources and Environmental Management*, 10(3), 419-435. <https://doi.org/10.29244/jpsl.10.3.419-435>
- Jupiter, S. D., Cohen, P. J., Weeks, R., Tawake, A., & Govan, H. (2014). Locally-managed marine areas: multiple objectives and diverse strategies. *Pacific Conservation Biology*, 20(2). <https://doi.org/10.1071/pc140165>
- Karlsson, M. (2019). Closing marine governance gaps? Sweden's marine spatial planning, the ecosystem approach to management and stakeholders' views. *Ocean & Coastal Management*, 179. <https://doi.org/10.1016/j.ocecoaman.2019.104833>
- Kasmiati, Dharmawan, A. H., & S.Bratakusumah, D. (2016). Ecotourism, livelihood system and decoupling sustainability in Wakatobi, Southeast Sulawesi. *Sodality: Jurnal Sosiologi Pedesaan*, 4(2), 158-164.
- Katikiro, R. E., Macusi, E. D., & Ashoka Deepananda, K. H. M. (2015). Challenges facing local communities in Tanzania in realising locally-managed marine areas. *Marine Policy*, 51, 220-229. <https://doi.org/10.1016/j.marpol.2014.08.004>
- Katili, A. S., Utina, R., Tamu, Y., & Nusantari, E. (2018). Management of coastal biodiversity based on social-cultural values in constructing conservation

- character education. *Biodiversitas Journal of Biological Diversity*, 19(5), 1763-1768. <https://doi.org/10.13057/biodiv/d190524>
- Kelman, I., & Stojanov, R. (2020). Islander migrations and the oceans: From hopes to fears? *Island Studies Journal*, 16(1), 23-42. <https://doi.org/10.24043/isj.120>
- King, C., Adhuri, D. S., & Clifton, J. (2022). Marine Reserves and Resilience in the Era of COVID-19. *Marine Policy*, 1-16. <https://doi.org/10.1016/j.marpol.2022.105093>
- King, R. (2009). Geography, islands and migration in an era of global mobility. *Island Studies Journal*, 4(1), 53-84.
- Kluger, L. C., Scotti, M., Vivar, I., & Wolff, M. (2019). Specialization of fishers leads to greater impact of external disturbance: Evidence from a social-ecological network modelling exercise for Sechura Bay, northern Peru. *Ocean & Coastal Management*, 179. <https://doi.org/10.1016/j.ocecoaman.2019.104861>
- Kodir, A., Ahmad, R., & Meiji, N. H. P. (2020). The Dynamics Access on Tourism Governance in Wakatobi National Park. *GeoJournal of Tourism and Geosites*, 32(4), 1376-1383. <https://doi.org/10.30892/gtg.32427-583>
- Kumar, K. (1989). *Conducting key informant interviews in developing countries*. Agency for International Development. https://www.participatorymethods.org/sites/participatorymethods.org/files/conducting%20key%20informant%20interviews_kumar.pdf
- Kusuma, P., Brucato, N., Cox, M. P., Letellier, T., Manan, A., Nuraini, C., Grange, P., Sudoyo, H., & Ricaut, F. X. (2017). The last sea nomads of the Indonesian archipelago: genomic origins and dispersal. *European Journal of Human Genetics*, 25(8), 1004-1010. <https://doi.org/10.1038/ejhg.2017.88>
- Lapian, A. B. (2009). *Orang Laut, Bajak Laut, Raja Laut: Sejarah Kawasan Laut Sulawesi Abad XIX*. Komunitas Bambu.
- Lauer, M., & Aswani, S. (2010). Indigenous Knowledge and Long-Term Ecological change: Detection, Interpretation, and Responses to Changing Ecological Conditions in Pacific Island Communities. *Environmental Management*, 45(5), 985-997. <https://doi.org/10.1007/s00267-010-9471-9>
- Leach, M., Mearns, R., & Scoones, I. (2012). Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management. In *Milestones and Turning Points in Development Thinking* (pp. 218-233). https://doi.org/10.1057/9781137271631_16
- Lefale, P. F. (2009). Ua 'afa le Aso Stormy Weather Today: Traditional Ecological Knowledge of Weather and Climate. The Samoa Experience. *Climatic Change*, 100(2), 317-335. <https://doi.org/10.1007/s10584-009-9722-z>
- Lenhart, L. (1997). Orang Suku Laut Ethnicity and Acculturation. *Bijdragen tot de taal-, land- en volkenkunde*, 153(4), 577-604. <https://doi.org/10.1163/22134379-90003916>
- Liebner, H. H. (1996). *Four Oral Versions of a Story about the Origin of the Bajo People of Southern Selayar* (P3MP - Proyek Pengkajian dan Pengembangan Masyarakat Pantai, YIIS UNHAS, Issue. <https://oxis.org/news/resources-3/bajo-origins.pdf>
- LMMA Network. (2020). *About the LMMA*. Retrieved February 14 from <https://Immanetwork.org/who-we-are/vision/>

- Loch, T. K., & Riechers, M. (2021). Integrating indigenous and local knowledge in management and research on coastal ecosystems in the Global South: A literature review. *Ocean & Coastal Management*, 212. <https://doi.org/10.1016/j.ocecoaman.2021.105821>
- Ludwig, D., & Macnaghten, P. (2019). Traditional ecological knowledge in innovation governance: a framework for responsible and just innovation. *Journal of Responsible Innovation*, 7(1), 26-44. <https://doi.org/10.1080/23299460.2019.1676686>
- Lugo-Morin, D. R. (2020). Indigenous communities and their food systems: a contribution to the current debate. *Journal of Ethnic Foods*, 7(1). <https://doi.org/10.1186/s42779-019-0043-1>
- Lynch, M., & Turner, S. (2021). Rocking the boat: intersectional resistance to marine conservation policies in Wakatobi National Park, Indonesia. *Gender, Place & Culture*, 1-23. <https://doi.org/10.1080/0966369x.2021.1971630>
- Madlan, L. B., Seok, C. B., Mutang, J. A., Baharudin, S. A., & Joo, H. C. (2014). The Prejudice of Bajau: From Own and Others Ethnic Perspective: A Preliminary Study in Sabah. *International Journal of Information and Education Technology*, 4(3), 244-248. <https://doi.org/10.7763/ijiet.2014.V4.406>
- Majid Cooke, F., & Johari, S. (2019). Positioning of Murut and Bajau identities in state forest reserves and marine parks in Sabah, East Malaysia. *Journal of Southeast Asian Studies*, 50(1), 129-149. <https://doi.org/10.1017/s0022463419000171>
- Manullang, S. O. (2021). Understanding the Sociology of Customary Law in the Reformation Era: Complexity and Diversity of Society in Indonesia. *Linguistics and Culture Review*, 5(S3), 16-26. <https://doi.org/10.37028/lingcure.v5nS3.1352>
- Marcus, G. E. (1995). Ethnography in/of the world system: The emergence of multi-sited ethnography. *Annual review of anthropology*, 24(1), 95-117.
- Marcus, G. E., & Fischer, M. M. J. (1986). *Anthropology as cultural critique: an experimental moment in the human sciences* (Vol. 1). The University of Chicago Press.
- Marlina, Sumarmi, & Astina, I. K. (2020). Sustainable Marine Ecotourism Management: A Case of Marine Resource Conservation Based on Local Wisdom of Bajo Mola Community in Wakatobi National Park. *GeoJournal of Tourism and Geosites*, 32(4), 1317-1323. <https://doi.org/10.30892/gtg.32419-575>
- Marlina, M., Sumarmi, S., Astina, I. K., & Susilo, S. (2020). Social-Economic Adaptation Strategies of Bajo Mola Fishers in Wakatobi National Park. *GeoJournal of Tourism and Geosites*, 34(1), 14-19. <https://doi.org/10.30892/gtg.34102-613>
- Marschke, M., & Nong, K. (2003). Adaptive co-management lessons from coastal Cambodia. *Canadian Journal of Development Studies*, 24(3), 369-383. <https://doi.org/10.1080/02255189.2003.9668927>
- Martin, J. F., Roy, E. D., Diemont, S. A. W., & Ferguson, B. G. (2010). Traditional Ecological Knowledge (TEK): Ideas, inspiration, and designs for ecological engineering. *Ecological Engineering*, 36(7), 839-849. <https://doi.org/10.1016/j.ecoleng.2010.04.001>
- Maruf, A., Wulandari, R., & Manan, A. (2021). The adaptive capacity of the Bajau fishermen in Terapung village, Buton Tengah Regency, Southeast Sulawesi

- towards the impacts of climate variability. International Webinar Community Development in Southeast Asia 2021 (IWCDSA2021), Malaysia.
- Maulidyna, A., Hartawan, B. S., Agustin, H. N., Irfan, A. N., Septiasari, A., Utina, R., & Setyawan, A. D. (2021). Review: The role of local belief and wisdom of the Bajo community in marine conservation efforts. *International Journal of Bonorowo Wetlands*, 11(1). <https://doi.org/10.13057/bonorowo/w110105>
- Mauro, F., & Hardison, P. D. (2000). Traditional Knowledge of Indigenous and Local Communities: International Debate and Policy Initiatives. *Ecological Applications*, 10(05), 1263-1269.
- Mazé, C., Coston-Guarini, J., Danto, A., Lambrechts, A., & Ragueneau, O. (2018). Dealing with impact. An interdisciplinary, multi-site ethnography of environmental impact assessment in the coastal zone. *Natures Sciences Sociétés*, 26(3), 328-337. <https://doi.org/10.1051/nss/2018050>
- Mazé, C., Dahou, T., Ragueneau, O., Danto, A., Mariat-Roy, E., Raimonet, M., & Weisbein, J. (2017). Knowledge and power in integrated coastal management. For a political anthropology of the sea combined with the sciences of the marine environment. *Comptes Rendus Geoscience*, 349(6-7), 359-368. <https://doi.org/10.1016/j.crte.2017.09.008>
- McCarter, J., Gavin, M. C., Baereleo, S., & Love, M. (2014). The challenges of maintaining indigenous ecological knowledge. *Ecology and Society*, 19(3). <https://doi.org/10.5751/es-06741-190339>
- McKenna, B., Myers, M. D., & Newman, M. (2017). Social media in qualitative research: Challenges and recommendations. *Information and Organization*, 27(2), 87-99. <https://doi.org/10.1016/j.infoandorg.2017.03.001>
- McKinnon, M. C., Cheng, S. H., Dupre, S., Edmond, J., Garside, R., Glew, L., Holland, M. B., Levine, E., Masuda, Y. J., Miller, D. C., Oliveira, I., Revenaz, J., Roe, D., Shamer, S., Wilkie, D., Wongbusarakum, S., & Woodhouse, E. (2016). What are the effects of nature conservation on human well-being? A systematic map of empirical evidence from developing countries. *Environmental Evidence*, 5(1). <https://doi.org/10.1186/s13750-016-0058-7>
- McLeod, E., Szuster, B., & Salm, R. (2009). Sasi and Marine Conservation in Raja Ampat, Indonesia. *Coastal Management*, 37(6), 656-676. <https://doi.org/10.1080/08920750903244143>
- McNeill, A., Clifton, J., & Harvey, E. S. (2018). Attitudes to a marine protected area are associated with perceived social impacts. *Marine Policy*, 94, 106-118. <https://doi.org/10.1016/j.marpol.2018.04.020>
- Mellado, T., Brochier, T., Timor, J., & Vitancurt, J. (2014). Use of local knowledge in marine protected area management. *Marine Policy*, 44, 390-396. <https://doi.org/10.1016/j.marpol.2013.10.004>
- Mentz, S. (2009). Toward a blue cultural studies: The sea, maritime culture, and early modern english literature. *Literature Compass*, 6(5), 997-1013. <https://doi.org/10.1111/j.1741-4113.2009.00655.x>
- Mills, M., Jupiter, S., Adams, V., Ban, N., & Pressey, B. (2011). *Can management actions within the Fiji Locally Managed Marine Area Network serve to meet Fiji's national goal to protect 30% of inshore marine areas by 2020?* Wildlife Conservation Society and ARC Centre of Excellence for Coral Reef Studies.

- <http://macbio-pacific.info/wp-content/uploads/2017/08/Can-Mgmt-Action-FLMMA-30-Inshore-Protection-2020-Millsetal.pdf>
- Missbach, A. (2016). Perilous waters: people smuggling, fishermen, and hyper-precarious livelihoods on Rote Island, Eastern Indonesia. *Pacific Affairs*, 89(4), 749-770. <https://doi.org/10.5509/2016894749>
- MMAF. (2020). *Pengelolaan Sumberdaya Laut, Pesisir dan Pulau-pulau Kecil Oleh Masyarakat Hukum Adat, Lokal, dan Tradisional*. Ministry of Marine Affairs and Fisheries.
- Moller, H., Berkes, F., Lyver, P. O. B., & Kislalioglu, M. (2004). Combining science and traditional ecological knowledge: monitoring populations for co-management. *Ecology and Society*, 9(3), 1-16.
- Moraes, O. (2018). *What factors constrain and enable the integration of blue carbon into the existing locally managed marine area (LMMA) network?* [The University of Melbourne]. Melbourne.
- Moretti, M. (2012). *International Law and Nomadic People*. Author House.
- Muchlis, F., Lubis, D. P., Kinseng, R. A., & Tasman, A. (2016). Sejarah marginalisasi Orang Rimba Bukit Dua Belas di era Orde Baru. *Paramita: Historical Studies Journal*, 26(2), 217-229. <https://doi.org/10.15294/paramita.v26i2.4972>
- Murray, F. (2007). *When Co-management Fails: A Review of Theory and Lessons Learned from Reservoir Fisheries in the Dry-Zone of Sri Lanka*
- Murray Li, T. (2000). Articulating Indigenous Identity in Indonesia: Resource Politics and the Tribal Slot. *Comparative Studies in Society and History*, 42(1), 149-179. <https://doi.org/10.1017/s0010417500002632>
- Muslim, A., Idham, I., & Subair, M. (2020, 8 – 10 October 2019). *Iko-Iko Siala Tangang (Tracing Moderatism of Religious Concept From the Oral Traditions of Bajau)* First International Conference on Religion and Education, Bintaro, Indonesia.
- Nadasdy, P. (1999). The Politics of TEK: Power and the "Integration" of Knowledge. *Arctic Anthropology*, 36(1-2), 18.
- Naess, L. O. (2013). The role of local knowledge in adaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, 4(2), 99-106. <https://doi.org/10.1002/wcc.204>
- Nagatsu, K. (2017). Maritime Diaspora and Creolization : Genealogy of the Sama-Bajau in Insular Southeast Asia. *Senri Ethnological Studies* 95, 11. <https://doi.org/10.15021/00008578>
- Nakano, M. (2020). Seasonal calendar by the Sama-Bajau people: Focusing on the wind calendar in Banggai Islands. *E3S Web of Conferences*, 211. <https://doi.org/10.1051/e3sconf/202021101007>
- Nakashima, D. J., Galloway McLean, K., Thulstrup, H. D., Ramos Castalino, A., & Rubis, J. T. (2012). *Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation* (D. McDonald, Ed.). United Nations Educational, Scientific and Cultural Organization 7, place de Fontenoy, 75352 Paris 07 SP, France, and the United Nations University – Traditional Knowledge Initiative, Ellengowan Drive, Darwin, NT 0909.
- Neis, B., Felt, L. F., Haedrich, R. L., & Schneider, D. C. (2016). An Interdisciplinary Method for Collecting and Integrating Fishers' Ecological Knowledge into Resource Management. In N. Dianne & O. Rosemary (Eds.), *Fishing Places*,

- Fishing People: Traditions and Issues in Canadian Small-Scale Fisheries* (pp. 217-238). University of Toronto Press.
<https://doi.org/doi:10.3138/9781442674936-013>
- Nelson, K. M., Schlüter, A., & Vance, C. (2018). Distributional preferences and donation behavior among marine resource users in Wakatobi, Indonesia. *Ocean and Coastal Management*, 162, 34-45.
<https://doi.org/10.1016/j.ocecoaman.2017.09.003>
- Nesheim, I., Dhillon, S. S., & Anne Stølen, K. (2006). What Happens to Traditional Knowledge and Use of Natural Resources When People Migrate? *Human Ecology*, 34(1), 99-131. <https://doi.org/10.1007/s10745-005-9004-y>
- Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches* (Seventh Edition ed.). Pearson.
- Newell, S. L., Nagabhatla, N., Doubleday, N. C., & Bloecker, A. (2019). The potential for locally managed marine area (LMMAs) as a participatory strategy for coastal and marine ecosystems - the global commons. *OIDA International Journal of Sustainable Development*, 12(4), 16.
- Nickols, K. J., White, J. W., Malone, D., Carr, M. H., Starr, R. M., Baskett, M. L., Hastings, A., & Botsford, L. W. (2019). Setting ecological expectations for adaptive management of marine protected areas. *Journal of Applied Ecology*, 56(10), 2376-2385. <https://doi.org/10.1111/1365-2664.13463>
- Nimmo, H. A. (1969). *The Structure of Bajau Society* [University of Hawaii]. Honolulu.
https://scholarspace.manoa.hawaii.edu/bitstream/10125/12072/uhm_phd_70195_11_r.pdf
- Noble, M. M., Harasti, D., Pittock, J., & Doran, B. (2019). Understanding the spatial diversity of social uses, dynamics, and conflicts in marine spatial planning. *Journal of Environmental Management*, 246, 929-940.
<https://doi.org/10.1016/j.jenvman.2019.06.048>
- Nolde, L. (2009). "Great is Our Relationship with the Sea" Charting the Maritime Realm of the Sama of Southeast Sulawesi, Indonesia. *Spring*, 9, 15-33.
- Novacek, I., Harkes, I. H. T., Sopacua, J., & Tatuhey, M. D. D. (2001). *An Institutional Analysis of Sasi Laut in Maluku, Indonesia* (J. Maychin, Ed.). International Center for Living Aquatic Resources Management (ICLARM) - The WorldFish Center.
https://www.researchgate.net/publication/23550908_An_institutional_analysis_of_SasiLaut_in_Maluku_Indonesia
- Nuraini, C. (2012). Indonesian Bajo History and Narratives: the Iko-Iko Epic Songs. In B. Abels, M. J. Grant, & A. Waczkat (Eds.), *Oceans of Sound: Sama Dilaut Performing Arts* (Vol. 3, pp. 141-166). Georg Olms Verlag.
- Nuraini, C. (2016). The intangible legacy of the Indonesian Bajo. *Wacana*, 17(1).
<https://doi.org/10.17510/wacana.v17i1.427>
- Nurdin, N. (2017). Research in online space: The use of social media for research setting. *Jurnal Sistem Informasi*, 13(1), 67-77.
<https://doi.org/10.21609/jsi.v13i1.513>
- Nyadzi, E., Werners, S. E., Biesbroek, R., & Ludwig, F. (2020). Techniques and skills of indigenous weather and seasonal climate forecast in Northern Ghana. *Climate and Development*, 13(6), 551-562.
<https://doi.org/10.1080/17565529.2020.1831429>

- O'Leary, B. C., Ban, N. C., Fernandez, M., Friedlander, A. M., Garcia-Borboroglu, P., Golbuu, Y., Guidetti, P., Harris, J. M., Hawkins, J. P., Langlois, T., McCauley, D. J., Pikitch, E. K., Richmond, R. H., & Roberts, C. M. (2018). Addressing criticisms of large-scale marine protected areas. *BioScience*, 68(5), 359-370. <https://doi.org/10.1093/biosci/biy021>
- O'Reilly, K. (2009). *Key Concepts in Ethnography* (1 ed.). SAGE Publications.
- Obie, M., Soetarto, E., Sumarti, T., & Saharuddin. (2015). Sejarah penguasaan sumber daya pesisir dan laut di Teluk Tomini. *Paramita: Historical Studies Journal*, 25(1), 73-87.
- Odote, C., Samoilys, M. A., Watson, R., Kamula, J., Amiyo, N., Omari, M., & Becha, H. (2015). *Legislative Guidelines for the establishment and operation of Locally Managed Marine Areas in Kenya*. C. O. R. a. D. I. O. C. E. Africa. <https://cordioea.net/wp-content/uploads/2015/07/Legislative-LMMA-Guidelines-FINAL-report-10-Jul-2015.pdf>
- Olsson, P., Folke, C., & Berkes, F. (2004). Adaptive comanagement for building resilience in social-ecological systems. *Environ Manage*, 34(1), 75-90. <https://doi.org/10.1007/s00267-003-0101-7>
- Olsson, P., Folke, C., & Hahn, T. (2004). Social-ecological transformation for ecosystem management: the development of adaptive co-management of a wetland landscape in southern Sweden. *Ecology and Society*, 9(4), 1-26.
- Ostrom, E. (1990). *Governing the Commons* (J. E. Alt & D. C. North, Eds. 1 ed.). Cambridge University Press. https://wtf.tw/ref/ostrom_1990.pdf
- Ostrom, E. (2008). The Challenge of Common-Pool Resources. *Environment: Science and Policy for Sustainable Development*, 50(4), 8-21. <https://doi.org/10.3200/envt.50.4.8-21>
- Paena, M., & Rangka, N. A. (2012). Potential and suitability of land seaweed farming (*Kappaphycus alvarezii*) water around the district of Wakatobi Southeast Sulawesi. *Jurnal Ilmiah Perikanan dan Kelautan*, 4(2), 151-169.
- Parsons, M., Fisher, K., & Crease, R. P. (2021). Environmental Justice and Indigenous Environmental Justice. In *Decolonising Blue Spaces in the Anthropocene* (pp. 39-73). https://doi.org/10.1007/978-3-030-61071-5_2
- Patankar, V. J. (2019). Attitude, perception and awareness of stakeholders towards the protected marine species in the Andaman Islands. *Ocean & Coastal Management*, 179(104830). <https://doi.org/10.1016/j.ocecoaman.2019.104830>
- Paula, N. D. (2018). What is planetary health? Addressing the environment-health nexus in Southeast Asia in the era of the Sustainable Development Goals: opportunities for International Relations scholars. *Revista Brasileira de Política Internacional*, 61(1). <https://doi.org/10.1590/0034-7329201800112>
- Pauli, N., Abbott, L. K., Negrete-Yankelevich, S., & Andrés, P. (2016). Farmers' knowledge and use of soil fauna in agriculture: a worldwide review. *Ecology and Society*, 21(3). <https://doi.org/10.5751/es-08597-210319>
- Pauwelussen, A., & Verschoor, G. M. (2017). Amphibious Encounters: Coral and People in Conservation Outreach in Indonesia. *Engaging Science, Technology, and Society*, 3, 292-314. <https://doi.org/10.17351/ests2017.59>
- Pecl, G. T., Ogier, E., Jennings, S., van Putten, I., Crawford, C., Fogarty, H., Frusher, S., Hobday, A. J., Keane, J., Lee, E., MacLeod, C., Mundy, C., Stuart-Smith, J., & Tracey, S. (2019). Autonomous adaptation to climate-driven change in marine

- biodiversity in a global marine hotspot. *Ambio*, 48(12), 1498-1515.
<https://doi.org/10.1007/s13280-019-01186-x>
- Pelling, M., O'Brien, K., & Matyas, D. (2014). Adaptation and transformation. *Climatic Change*, 133(1), 113-127. <https://doi.org/10.1007/s10584-014-1303-0>
- Peters, E. J. (2003). Views of traditional ecological knowledge in co-management bodies in Nunavik, Quebec. *Polar Record*, 39(1), 49-60.
<https://doi.org/10.1017/s0032247402002759>
- Pezzey, J. (1992). Sustainability: An Interdisciplinary Guide. *Environmental Values*, 1(4), 321-362. <https://doi.org/10.3197/096327192776680034>
- Pinkerton, E. (1994). Where do we go from here? The future of traditional ecological knowledge and resource management in native communities. In B. Sadler & P. Boothroyd (Eds.), *Traditional Ecological Knowledge and Environmental Impact Assessment* (pp. 51-60). Government of Canada.
- Pirri, M. D. (2019). *Spirituality, the connection to nature, and the role of shamanic rituals* (Publication Number 472319) Wageningen University]. Wageningen, Netherlands.
- Pisor, A. C., Basurto, X., Douglass, K. G., Mach, K. J., Ready, E., Tylianakis, J. M., Hazel, A., Kline, M. A., Kramer, K. L., Lansing, J. S., Moritz, M., Smaldino, P. E., Thornton, T. F., & Jones, J. H. (2022). Effective climate change adaptation means supporting community autonomy. *Nature Climate Change*, 12(3), 210-213. <https://doi.org/10.1038/s41558-022-01279-8>
- Plummer, R., & Armitage, D. (2007). A resilience-based framework for evaluating adaptive co-management: Linking ecology, economics and society in a complex world. *Ecological Economics*, 61(1), 62-74.
<https://doi.org/10.1016/j.ecolecon.2006.09.025>
- Plummer, R., & Fennell, D. (2007). Exploring co-management theory: prospects for sociobiology and reciprocal altruism. *Journal of Environmental Management*, 85(4), 944-955. <https://doi.org/10.1016/j.jenvman.2006.11.003>
- Plummer, R., & Fitzgibbon, J. (2004). Co-management of natural resources: a proposed framework. *Environmental Management*, 33(6), 876-885.
<https://doi.org/10.1007/s00267-003-3038-y>
- Pomeroy, R. S. (1995). Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. *Ocean & Coastal Management*, 27(3), 143-162.
- Poto, M. P., Kuhn, A., Tsiouvalas, A., Hodgson, K. K., Treffenfeldt, M. V., & M.Beitl, C. (2021). Knowledge Integration and Good Marine Governance: A Multidisciplinary Analysis and Critical Synopsis. *Human Ecology*.
<https://doi.org/10.1007/s10745-021-00289-y>
- Prabhu, R., McDougall, C., & Fisher, R. (2008). Adaptive collaborative management: A conceptual model. In R. Fisher, R. Prabhu, & C. McDougall (Eds.), *Adaptive collaborative management of community forests in Asia: Experiences from Nepal, Indonesia and the Philippines* (pp. 16-49). Cifor.
<https://doi.org/10.17528/cifor/002350>
- Prado, D. S., Seixas, C. S., & Trimble, M. (2022). Catalytic and structural factors behind advancements of co-management in protected areas: Contributions for its evaluation. *Journal of Environmental Management*, 311(114825), 1-9.
<https://doi.org/10.1016/j.jenvman.2022.114825>

- Prasetyo, N., Carr, A., & Filep, S. (2019). Indigenous knowledge in marine ecotourism development: The case of Sasi Laut, Misool, Indonesia. *Tourism Planning & Development*, 1-16. <https://doi.org/10.1080/21568316.2019.1604424>
- Purwaka, T. H., & Sunoto. (2001). *Coastal Resources Management in Indonesia: Legal and Institutional Aspects* (Institutional Issues and Perspectives in the Management of Fisheries and Coastal Resources in Southeast Asia, Issue. S. I. D. C. A. (Sida).
- Putri, F. R. D., Satria, A., & Saharuddin. (2020). Sasi Laut Folley and Dynamics of Community Based Management. *Journal of Natural Resources and Environmental Management*, 10(1), 13. <https://doi.org/10.29244/jpsl.10.1>
- Quimby, B., & Levine, A. (2018). Participation, Power, and Equity: Examining Three Key Social Dimensions of Fisheries Comanagement. *Sustainability*, 10(9), 1-20. <https://doi.org/10.3390/su10093324>
- Radcliffe, S. A. (2015). Development Alternatives. *Development and Change*, 46(4), 855-874. <https://doi.org/10.1111/dech.12179>
- Raharjo, A., Huda, N., Asy'ari T, A. H., Saefudin, Y., Bahrus Syakirin, M., & Sudrajat, T. (2018). Strengthening Indigenous Law to Make a Sustainable Development of the Coastal Area and Small Islands in Indonesia. *SHS Web of Conferences*, 54. <https://doi.org/10.1051/shsconf/20185404003>
- Rahman, H. M. T., Ville, A. S. S., Song, A. M., Po, J. Y. T., Berthet, E., Brammer, J. R., Brunet, N. D., Jayaprakash, L. G., Lowitt, K. N., Rastogi, A., Reed, G., & Hickey, G. M. (2017). A framework for analyzing institutional gaps in natural resource governance. *International Journal of the Commons*, 11(2), 823-853. <https://doi.org/10.18352/ijc.758>
- Rahmawati, A. (2014). Kehidupan Suku Laut di Batam: Sebuah fenomena kebijakan pembangunan di Pulau Bertam Kota Batam. *Share: Social Work Journal* 4(1), 1-12. <https://doi.org/10.24198/share.v4i1.12987>
- Ramadhana, G., & Kusumaha, A. H. G. (2022). The 10 new Bali project in Indonesia, real or gimmick. *Journal of Humanities and Social Studies*, 6(1), 30-34. <https://doi.org/10.33751/jhss.v6i1.4983>
- Rathgeber, B., & Kirana, P. W. (2018). *Wakatobi Guidebook: Guide to Discovering The World Marine Heritage of Southeastern Sulawesi*. FTKP Wakatobi. https://www.swisscontact.org/fileadmin/user_upload/HEAD_OFFICE/Documents/Innovationen/WISATA/Wakatobi/Wakatobi - Guide Book .pdf
- Raymond, C. M., Fazey, I., Reed, M. S., Stringer, L. C., Robinson, G. M., & Evely, A. C. (2010). Integrating local and scientific knowledge for environmental management. *Journal of Environmental Management*, 91(8), 1766-1777. <https://doi.org/10.1016/j.jenvman.2010.03.023>
- Redvers, N. (2018). The Value of Global Indigenous Knowledge in Planetary Health. *Challenges*, 9(2). <https://doi.org/10.3390/challe9020030>
- Reeves, S., Kuper, A., & Hodges, B. D. (2008). Qualitative research methodologies: ethnography. *BMJ: British Medical Journal*, 337(7668), 512-514. <https://doi.org/10.1136/bmj.a1O20>
- Reichel-Dolmatoff, G. (1976). Cosmology as ecological analysis: a view from the rain forest. *Man*, 11(3), 307-318.
- Rist, S., & Dahdouh-Guebas, F. (2006). Ethnoscience—A step towards the integration of scientific and indigenous forms of knowledge in the management of natural

- resources for the future. *Environment, Development and Sustainability*, 8(4), 467-493. <https://doi.org/10.1007/s10668-006-9050-7>
- Robinson, C. J., Maclean, K., Hill, R., Bock, E., & Rist, P. (2015). Participatory mapping to negotiate indigenous knowledge used to assess environmental risk. *Sustainability Science*, 11(1), 115-126. <https://doi.org/10.1007/s11625-015-0292-x>
- Robinson, D. F., & Drozdowski, D. (2015). Hybrid identities: juxtaposing multiple identities against the 'authentic' Moken. *Identities*, 23(5), 536-554. <https://doi.org/10.1080/1070289x.2015.1070730>
- Robinson, D. F., & Raven, M. (2019). Recognising Indigenous customary law of totemic plant species: Challenges and pathways. *The Geographical Journal*, 186(1), 31-44. <https://doi.org/10.1111/geoj.12320>
- Rocliffe, S., & Peabody, S. (2013). *Locally-managed marine areas- towards a global learning network*. https://bjyv3zhj902bwxa8106gk8x5-wpengine.netdna-ssl.com/wp-content/uploads/2015/09/WCC_LMMA_Workshop_0757_Report.pdf
- Rocliffe, S., Peabody, S., Samoilys, M., & Hawkins, J. P. (2014). Towards a network of locally managed marine areas (LMMAs) in the Western Indian Ocean. *PLoS One*, 9(7), e103000. <https://doi.org/10.1371/journal.pone.0103000>
- Rodríguez-Rodríguez, D., Merkohasanaj, M., & López, I. (2019). Social and economic sustainability of multiple-use marine protected areas in Spain: A mixed methods, multi-scale study. *Ocean & Coastal Management*, 171, 47-55. <https://doi.org/10.1016/j.ocecoaman.2019.01.013>
- Rojas, A., Nomedji, K., & West, C. T. (2021). Walking the Line: Conducting transect walks in Burkina Faso. *Practical Anthropology*, 43(1), 18-21. <https://doi.org/10.17730/0888-4552.43.1.18>
- Rowse, T. (2007). Family and nation: The Indigenous/non Indigenous relationship. In J. Jupp, J. Nieuwenhuysen, & E. Dawson (Eds.), *Social Cohesion in Australia* (pp. 90-102). Cambridge University Press. <https://doi.org/10.1017/CBO9780511481574>
- Rowton, M. (1974). Enclosed nomadism. *Journal of the Economic and Social History of the Orient*, 17(1), 1-30.
- Ruddle, K., & Akimichi, T. (1984). Introduction to Maritime Institutions in the Western Pacific. In K. Ruddle & T. Akimichi (Eds.), *Senri Ethnological Studies* (Vol. 17, pp. 1-19). National Museum of Ethnology.
- Ruiz-Mallén, I., & Corbera, E. (2013). Community-Based Conservation and Traditional Ecological Knowledge: Implications for Social-Ecological Resilience. *Ecology and Society*, 18(4). <https://doi.org/10.5751/es-05867-180412>
- Saat, G. (2003). The Identity and Social Mobility of Sama-Bajau. *Sari*, 21, 3-11. <https://core.ac.uk/download/pdf/11490343.pdf>
- Said, M. (2013). *Review of Case Law on The Handling of Fishing Using Explosives at Wakatobi National Park Area* [Hasanuddin University]. Makassar.
- Samson, C., & Pretty, J. (2006). Environmental and health benefits of hunting lifestyles and diets for the Innu of Labrador. *Food Policy*, 31(6), 528-553. <https://doi.org/10.1016/j.foodpol.2006.02.001>

- Santamaria, M. C. M. (2019). Cosmology and the Construction of Space in Three Sama-Bajau Rituals. *Borneo Research Journal*, 1(3), 26-41.
<https://doi.org/10.22452/brj.sp2019no1.3>
- Sastrawati, N., & Bakar, A. (2021). Dilema kewargaan kelompok minoritas: Studi kasus Suku Bajo di Nusa Tenggara Timur. *Jurnal Masyarakat dan Budaya*, 23(2), 177-193. <https://doi.org/10.14203/jmb.v23i2.1306>
- Sather, C. (1997). *The Bajau Laut: adaptation, history, and fate in a maritime fishing society of Southeast Sabah*. Oxford University Press.
- Sather, C. (2006). Sea Nomads and Rainforest Hunter-Gatherers: Foraging Adaptations in the Indo-Malaysian Archipelago In P. Bellwood, J. J. Fox, & D. Tryon (Eds.), *The Austronesians: Historical and Comparative Perspectives* (pp. 245-276). Australian National University E-Press.
- Schlager, E., & Ostrom, E. (1992). Property-rights regimes and natural resources: a conceptual analysis. *Land economics*, 68(3), 249-262.
- Schlosberg, D., & Carruthers, D. (2010). Indigenous Struggles, Environmental Justice, and Community Capabilities. *Global Environmental Politics*, 10(4), 12-35.
https://doi.org/10.1162/GLEP_a_00029
- Schnegg, M. (2018). Institutional multiplexity: social networks and community-based natural resource management. *Sustainability Science*, 13(4), 1017-1030.
<https://doi.org/10.1007/s11625-018-0549-2>
- Schratzberger, M., Neville, S., Painting, S., Weston, K., & Paltriguera, L. (2019). Ecological and Socio-Economic Effects of Highly Protected Marine Areas (HPMAs) in Temperate Waters. *Frontiers in Marine Science*, 6.
<https://doi.org/10.3389/fmars.2019.00749>
- Setyaningrum, A., Fasa, L., & Ariando, W. (2022). Mangrove plantation program in the lenses of Bajau in Kaledupa Island, Wakatobi Regency: community perceptions. The 9th Asian Academic Society International Conference, Bangkok.
- Setyaningrum, A., Harti, S. Y., & Sagita, P. (2020). *Mangrove di Pulau Kaledupa* (Darman, Ed. Vol. 1). Balai Taman Nasional Wakatobi.
- Shabanova, M. A. (2014). Voluntary and Forced Adaptation. *Sociological Research*, 37(6), 48-66. <https://doi.org/10.2753/sor1061-0154370648>
- Shepherd, S., & Terry, A. (2004). The role of indigenous communities in natural resource management: the Bajau of the Tukangbesi Archipelago, Indonesia. *Geography*, 89(3), 204-213. <https://doi.org/10.1080/00167487.2004.12094098>
- Sholihah, F. (2018). From shark fins to people smuggling: global capital of traditional fishing and shipping in the cross-border areas of the Timor Sea. *Patra Widya*, 19(1), 49-61.
- Siegelman, B., Haenn, N., & Basurto, X. (2019). "Lies build trust": Social capital, masculinity, and community-based resource management in a Mexican fishery. *World Development*, 123(104601).
<https://doi.org/10.1016/j.worlddev.2019.05.031>
- Sillitoe, P., & Marzano, M. (2009). Future of indigenous knowledge research in development. *Futures*, 41(1), 13-23.
<https://doi.org/10.1016/j.futures.2008.07.004>
- Simonin, P. W. (2015). From sea to spirit: Resilience conceptions in coastal communities of Kaledupa, Indonesia. *Resilience*, 3(3), 199-206.
<https://doi.org/10.1080/21693293.2015.1072312>

- Sinapoy, M. S., & Djalante, S. (2020). Protection of rights of community of Bajo Tribe from the impacts of climate change. In R. Djalante, J. Jupesta, & E. Aldrian (Eds.), *Climate Change Research, Policy and Actions in Indonesia* (pp. 173-199). Springer Climate. https://doi.org/10.1007/978-3-030-55536-8_9
- Singh, C. (2009). Pastoralism and the making of colonial modernity in Kulu, 1850–1952. *Nomadic Peoples*, 13(2), 65-83. <https://doi.org/10.3167/np.2009.130205>
- Singleton, S. (2000). Co-operation or capture? The paradox of co-management and community participation in natural resource management and environmental policy-making. *Environmental Politics*, 9(2), 1-21. <https://doi.org/10.1080/09644010008414522>
- Sirait, A. M., Fita Nafisa, D, R. A. O., & Jatmiko, R. S. (2015). Posisi dan reposisi kepercayaan lokal di Indonesia. *KURIOSITAS: Media Komunikasi Sosial dan Keagamaan*, 8(1), 25-38.
- Siry, H. Y. (2011). In search of appropriate approaches to coastal zone management in Indonesia. *Ocean & Coastal Management*, 54(6), 469-477. <https://doi.org/10.1016/j.ocecoaman.2011.03.009>
- Smith, H. A., & Sharp, K. (2012). Indigenous climate knowledges. *Wiley Interdisciplinary Reviews: Climate Change*, 3(5), 467-476. <https://doi.org/10.1002/wcc.185>
- Sopari, H., Oka, N. P., & Salman, D. (2014). A model of planning collaboration between Wakatobi National Park Authority and Wakatobi Regency Government in sustainable natural resource management. *Jurnal Sains & Teknologi*, 14(2), 189 – 198.
- Sopher, D. E. (1965). *The Sea Nomads A Study of the Maritime Boat People of Southeast Asia* (Christopher, Ed. Vol. 5). Memoirs of the National Museum.
- Spaeder, J. J., & Feit, H. A. (2005). Co-management and indigenous communities: Barriers and bridges to decentralized resource management: introduction. *Anthropologica*, 47(2), 147-154.
- Spak, S. (2005). The position of indigenous knowledge in canadian co-management organizations. *Anthropologica*, 47(2), 233-246.
- Stacey, N. (1999). *Boats to Burn: Bajo Fishing Activity in the Asutralian Fishing Zone* Northern Territory University]. Darwin, Australia.
- Stacey, N. (2007). *Boats to burn: Bajo fishing activity in the Australian fishing zone*. ANU E Press
- Stacey, N., Acciaioli, G., Clifton, J., & Steenbergen, D. J. (2017). Impacts of marine protected areas on livelihoods and food security of the Bajau as an indigenous migratory people in maritime Southeast Asia. In A. C. L. Westlund, S. M. Garcia & J. Sanders (Ed.), *Marine protected areas: Interactions with fishery livelihoods and food security* (pp. 113-126). <http://www.fao.org/3/a-i6742e.pdf>
- Stacey, N., Karam, J., Meekan, M., Pickering, S., & Nines, J. (2012). Prospects for whale shark conservation in Eastern Indonesia through Bajo traditional ecological knowledge and community-based monitoring. *Conservation and Society*, 10(1). <https://doi.org/10.4103/0972-4923.92197>
- Stacey, N., Steenbergen, D. J., Clifton, J., & Acciaioli, G. (2018). Understanding Social Wellbeing and Values of Small-Scale Fisheries amongst the Sama-Bajau of Archipelagic Southeast Asia. In *Social Wellbeing and the Values of Small-scale Fisheries* (pp. 97-123). https://doi.org/10.1007/978-3-319-60750-4_5

- Statistics Indonesia. (2016). *Statistics of Marine and Coastal Resources 2016* [Statistik Sumberdaya Laut dan Pesisir 2016]. BPS-Statistics Indonesia. <https://media.neliti.com/media/publications/48274-ID-statistik-sumber-daya-laut-dan-pesisir-2016.pdf>
- Statistics Indonesia. (2018). *Statistics of Marine and Coastal Resources 2018* [Statistik Sumber Daya Laut dan Pesisir 2018]. BPS-Statistics Indonesia. <https://www.bps.go.id/publication/download.html?nrbvfeve=OTNhMGZkODg4NWZIMmFjMTQyMDFINzFh&xzmn=aHR0cHM6Ly93d3cuYnBzLmdvLmlkL3B1YmxpY2F0aW9uLzIwMTgvMTIvMDcvOTNhMGZkODg4NWZIMmFjMTQyMDFINzFhL3N0YXRpc3Rpay1zdW1iZXItZGF5S1sYXV0LWRhbi1wZlNpc2lyLTIwMTguaHRtbA%3D%3D&twoadfnarfeauf=MjAyMC0wMi0wO SAwMjoyNjo0Mg%3D%3D>
- Statistics Indonesia. (2019). *Statistical Data of Wakatobi Regency* [Statistik Daerah Kabupaten Wakatobi 2019] (Vol. 1101002.7407). BPS Kabupaten Wakatobi.
- Steenbergen, D. J. (2016). Strategic customary village leadership in the context of marine conservation and development in Southeast Maluku, Indonesia. *Human Ecology*, 44, 311-327. <https://doi.org/10.1007/s10745-016-9829-6>
- Steenbergen, D. J., & Warren, C. (2018). Implementing strategies to overcome social-ecological traps: the role of community brokers and institutional bricolage in a locally managed marine area. *Ecology and Society*, 23(3), 1-12. <https://doi.org/10.5751/es-10256-230310>
- Stori, F. T., Peres, C. M., Turra, A., & Pressey, R. L. (2019). Traditional Ecological Knowledge Supports Ecosystem-Based Management in Disturbed Coastal Marine Social-Ecological Systems. *Frontiers in Marine Science*, 6(571), 1-22. <https://doi.org/10.3389/fmars.2019.00571>
- Stuckrad, K. v. (2002). Reenchanted nature: modern western shamanism and nineteenth-century thought. *Journal of the American Academy of Religion*, 70(4), 771-800. <https://doi.org/10.1093/jaar/70.4.771>
- Sugiyanta, Lazuardi, M. E., Hakim, M. R., Estradivari, Pusparini, N. K. S., Kusumadewi, N., Saputra, D., Bahar, A., Iqbal, M., & Fauzi., M. N. (2019). *Kajian Sosial dan Tata Kelola Sumber Daya Laut di Kawasan Taman Nasional Wakatobi, Indonesia*. WWF-Indonesia.
- Sumaila, U. R., & Charles, A. T. (2002). Economic models of marine protected areas: an introduction. *Natural Resource Modeling*, 15(3), 261-272.
- Susilowati, E. (2017). Etnis Maritim dan Permasalahannya. *Sabda: Jurnal Kajian Kebudayaan* 7(1), 1-18.
- Suyuti, N. (2004). *Bajo dan Bukan Bajo, Studi tentang Perubahan Makna Sama dan Bagai pada Masyarakat Bajo di Desa Sulaho Kecamatan Lasusua Kabupaten Kolaka Utara* (Publication Number KKB KK-2 Dis S 08/04Nas) Airlangga University]. Surabaya. <http://repository.unair.ac.id/id/eprint/32583>
- Syakur, A., Wibowo, J. T., Firmansyah, F., Azam, I., & Linkie, M. (2012). Ensuring local stakeholder support for marine conservation- establishing a locally-managed marine area network in Aceh. *Oryx*, 46(4), 9. <https://doi.org/10.1017/S0030605312000166>
- Tadjudah, M., Mustafa, A., Pangerang, U. K., & Yasidi, F. (2012). Application of satellite multi-sensor techniques to detect upwellings and potential fishing grounds in Wakatobi Marine National Park, Southeast Sulawesi, Indonesia.

- Aquatic Ecosystem Health & Management*, 15(3), 303-310.
<https://doi.org/10.1080/14634988.2012.709814>
- Tam, C.-L. (2019). Branding Wakatobi: marine development and legitimation by science. *Ecology and Society*, 24(3). <https://doi.org/10.5751/es-11095-240323>
- Tang, R. (2012). *An Analysis of Traditional Ecological Knowledge's Status And Its Conservation Options* (Publication Number 41338076) Victoria University of Wellington]. Wellington.
- Tang, R., & Gavin, M. (2016). A classification of threats to traditional ecological knowledge and conservation responses. *Conservation and Society*, 14(1). <https://doi.org/10.4103/0972-4923.182799>
- Techera, E. (2008). Customary Law and Community Based Conservation of marine areas in Fiji. In R. C. Hillerbrand & R. Karlsson (Eds.), *Beyond the Global Village: Environmental Challenges inspiring Global Citizenship* (Vol. 1, pp. 107-121). Inter-Disciplinary Press.
- Tennant, C. (1994). Indigenous Peoples, International Institutions, and the International Legal Literature from 1945-1993. *Human Rights Quarterly*, 16(1), 1-57. <https://www.jstor.org/stable/762410>
- Thornton, T. F., & Scheer, A. M. (2012). Collaborative Engagement of Local and Traditional Knowledge and Science in Marine Environments: A Review. *Ecology and Society*, 17(3). <https://doi.org/10.5751/es-04714-170308>
- Tien, H. V., & Nguyen, T. P. (2019). Marine algal species and marine protected area management: A case study in Phu Quoc, Kien Giang, Vietnam. *Ocean & Coastal Management*, 178(104816). <https://doi.org/10.1016/j.ocecoaman.2019.104816>
- Tilley, A., Hunnam, K. J., Mills, D. J., Steenbergen, D. J., Govan, H., Alonso-Poblacion, E., Roscher, M., Pereira, M., Rodrigues, P., Amador, T., Duarte, A., Gomes, M., & Cohen, P. J. (2019). Evaluating the Fit of Co-management for Small-Scale Fisheries Governance in Timor-Leste. *Frontiers in Marine Science*, 6(392), 1-17. <https://doi.org/10.3389/fmars.2019.00392>
- Tintoré, J., Medina, R., Gómez-Pujol, L., Orfila, A., & Vizoso, G. (2009). Integrated and interdisciplinary scientific approach to coastal management. *Ocean & Coastal Management*, 52(10), 493-505. <https://doi.org/10.1016/j.ocecoaman.2009.08.002>
- Tladi, D. (2019). An institutional framework for addressing marine genetic resources under the proposed treaty for marine biodiversity in areas beyond national jurisdiction. *International Environmental Agreements: Politics, Law and Economics*, 19(4-5), 485-495. <https://doi.org/10.1007/s10784-019-09449-4>
- Tomoya, A., & Dedi, A. (1996). Marine Resource Use in the Bajo of North Sulawesi and Maluku, Indonesia. *Senri Ethnological Studies*, 42, 105-119.
- Tsosie, R. (2018). Indigenous Peoples and “Cultural Sustainability”: The Role of Law and Traditional Knowledge. In M. K. Nelson & D. Shilling (Eds.), *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability* (Vol. 1, pp. 229-249). Cambridge University Press. <https://doi.org/10.1017/9781108552998>
- Tuda, A. O., & Machumu, M. E. (2019). Institutions and adaptive capacity for marine biodiversity conservation. *Environmental Science & Policy*, 100, 238-246. <https://doi.org/10.1016/j.envsci.2019.03.012>

- Tuhri, M., Maarif, S., & Simarmata, R. (2019). Adat, land, and religion: the politics of indigenous religions in Indonesia. *Al-Albab*, 9(2), 159-178. <https://doi.org/10.24260/alalbab.v9i2.1390>
- Turner, N. J., & Turner, K. L. (2008). "Where our women used to get the food": cumulative effects and loss of ethnobotanical knowledge and practice; case study from coastal British Columbia This paper was submitted for the Special Issue on Ethnobotany, inspired by the Ethnobotany Symposium organized by Alain Cugier, Montreal Botanical Garden, and held in Montreal at the 2006 annual meeting of the Canadian Botanical Association. *Botany*, 86(2), 103-115. <https://doi.org/10.1139/b07-020>
- Udu, S. (2017). Religious Values in Environmental Conservation of Traditional Society in Wakatobi Island. International Conference on Frontier of Science and Society, Makassar.
- Usher, P. J. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, 53(2), 183-193.
- Utina, R. (2017). Ecological intelligence of coastal community on biodiversity conservation (Case Study of Bajau Coastal Communities, Gorontalo). *Metamorfosa: Journal of Biological Sciences*, 4(1), 54-57.
- Venkatesan, A., Begay, D., Burgasser, A. J., Hawkins, I., Kimura, K. i., Maryboy, N., & Peticolas, L. (2019). Towards inclusive practices with indigenous knowledge. *Nature Astronomy*, 3(12), 1035-1037. <https://doi.org/10.1038/s41550-019-0953-2>
- Vierros, M. K., Harrison, A.-L., Sloat, M. R., Crespo, G. O., Moore, J. W., Dunn, D. C., Ota, Y., Cisneros-Montemayor, A. M., Shillinger, G. L., Watson, T. K., & Govan, H. (2020). Considering indigenous peoples and local communities in governance of the global ocean commons. *Marine Policy*, 119, 1-13. <https://doi.org/10.1016/j.marpol.2020.104039>
- von der Porten, S., Ota, Y., Cisneros-Montemayor, A., & Pictou, S. (2019). The role of indigenous resurgence in marine conservation. *Coastal Management*, 47(6), 527-547. <https://doi.org/10.1080/08920753.2019.1669099>
- Voorberg, W., & Van der Veer, R. (2020). Co-management as a successful strategy for marine conservation. *Journal of Marine Science and Engineering*, 8(7), 1-12. <https://doi.org/10.3390/jmse8070491>
- Wakatobi National Park. (2020). *Rencana Strategis (Renstra) Balai Taman Nasional Wakatobi Tahun 2020-2024* (A. G. Polii, H. Mulyono, Hastuty, J. P. P. S, Safarni, & Hendrawan, Eds.). Balai Taman Nasional Wakatobi.
- Walton, J., & Moody, D. C. (1984). The East Coast Bajau Languages. In J. K. King & J. W. King (Eds.), *Languages of Sabah : a survey report* (pp. 113-123). Pacific Linguistics: The Australian National University. <https://doi.org/10.15144/PL-C78.113>
- Warman, K. (2014). The Regulation Map on Recognition of the Rights of Masyarakat Hukum Adat [Peta Perundang-undangan tentang Pengakuan Hak Masyarakat Hukum Adat]. 48. Retrieved March 5, 2018, from http://procurement-notices.undp.org/view_file.cfm?doc_id=39284
- Warsito, B., Supriyono, A., Alamsyah, Muallimin, Sudarno, & Triadi Putranto, T. (2020). Pirates and the environment: Bajo tribe study in marine conservation. *E3S Web of Conferences*, 202. <https://doi.org/10.1051/e3sconf/202020207003>

- Watson, F. M., Hepburn, L. J., Cameron, T., Le Quesne, W. J. F., & Codling, E. A. (2019). Relative mobility determines the efficacy of MPAs in a two species mixed fishery with conflicting management objectives. *Fisheries Research*, 219(105334), 1-11. <https://doi.org/10.1016/j.fishres.2019.105334>
- Weeks, R., Aliño, P. M., Atkinson, S., Beldia, P., Binson, A., Campos, W. L., Djohani, R., Green, A. L., Hamilton, R., Horigue, V., Jumin, R., Kalim, K., Kasasiah, A., Kereseke, J., Klein, C., Laroya, L., Magupin, S., Masike, B., Mohan, C., . . . White, A. T. (2014). Developing Marine Protected Area Networks in the Coral Triangle: Good Practices for Expanding the Coral Triangle Marine Protected Area System. *Coastal Management*, 42(2), 183-205. <https://doi.org/10.1080/08920753.2014.877768>
- Weeks, R., Russ, G. R., Alcala, A. C., & White, A. T. (2010). Effectiveness of marine protected areas in the Philippines for biodiversity conservation. *Conservation Biology*, 24(2), 531-540. <https://doi.org/10.1111/j.1523-1739.2009.01340.x>
- Weeratunge, N., Béné, C., Siriwardane, R., Charles, A., Johnson, D., Allison, E. H., Nayak, P. K., & Badjeck, M.-C. (2014). Small-scale fisheries through the wellbeing lens. *Fish and Fisheries*, 15(2), 255-279. <https://doi.org/10.1111/faf.12016>
- Weiss, K., Hamann, M., & Marsh, H. (2013). Bridging Knowledges: Understanding and Applying Indigenous and Western Scientific Knowledge for Marine Wildlife Management. *Society & Natural Resources*, 26(3), 285-302. <https://doi.org/10.1080/08941920.2012.690065>
- Wever, L., Glaser, M., Gorris, P., & Ferrol-Schulte, D. (2012). Decentralization and participation in integrated coastal management: Policy lessons from Brazil and Indonesia. *Ocean & Coastal Management*, 66, 63-72. <https://doi.org/10.1016/j.ocecoaman.2012.05.001>
- WFP, W. F. P. (2009). Desk study: literature review and secondary data. In *Comprehensive Food Security & Vulnerability Analysis Guidelines* (First ed., pp. 48-62). World Food Program. https://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp203200.pdf
- White, A. T., Aliño, P. M., Cros, A., Fatan, N. A., Green, A. L., Teoh, S. J., Laroya, L., Peterson, N., Tan, S., Tighe, S., Venegas-Li, R. n., Walton, A., & Wen, W. (2014). Marine protected areas in the coral triangle progress issues and options. *Coastal Management*, 42(2), 87-106. <https://doi.org/10.1080/08920753.2014.878177>
- Whyte, K. P. (2013). On the Role of Traditional Ecological Knowledge as A Collaborative Concept: A Philosophical Study. *Ecological Processes*, 2(7), 12. <https://doi.org/10.1186/2192-1709-2-7>
- Wiadnya, D. G. R., Syafaat, R., Susilo, E., Setyohadi, D., Arifin, Z., & Wiryawan, B. (2011). Recent Development of Marine Protected Areas (MPAs) in Indonesia: Policies and Governance. *Journal of Applied Environmental and Biological Sciences*, 1(12), 6.
- Williams, T., & Hardison, P. (2013). Culture, Law, Risk and Governance: Contexts of Traditional Knowledge in Climate Change Adaptation. *Climatic Change*, 120(3), 531-544. <https://doi.org/10.1007/s10584-013-0850-0>

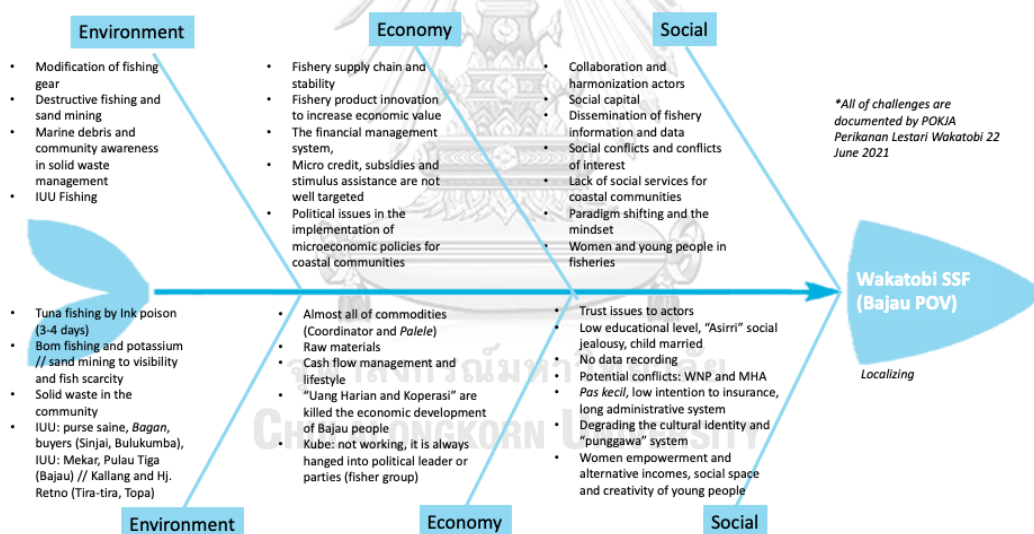
- Wiratno. (2018). *Ten Ways of Managing Conservation Areas in Indonesia* [Sepuluh Cara Baru Kelola Kawasan Konservasi di Indonesia: Membangun “Organisasi Pembelajar”] (B. Sya’bani, Ed.). Ministry of Environment and Forestry of The Republic of Indonesia.
http://ksdae.menlhk.go.id/assets/publikasi/10_Cara_Baru%20Kelola%20KK.pdf
- Wolff, M. (2015). From sea sharing to sea sparing – Is there a paradigm shift in ocean management? *Ocean and Coastal Management*, 116, 58-63.
<https://doi.org/10.1016/j.ocecoaman.2015.07.004>
- Xavier, L. Y., Jacobi, P. R., & Turra, A. (2018). On the advantages of working together: Social Learning and knowledge integration in the management of marine areas. *Marine Policy*, 88, 139-150. <https://doi.org/10.1016/j.marpol.2017.11.026>
- Yudistira, P. (2014). *Sang pelopor: peranan Dr. SH Koorders dalam sejarah perlindungan alam di Indonesia* (Wiratno, N. Hakim, & B. Sya’bani, Eds. II ed.). Direktorat Kawasan Konservasi dan Bina Hutan Lindung, Direktorat Jenderal Perlindungan Hutan dan Konservasi Alam, Kementerian Lingkungan Hidup dan Kehutanan.
- Zacot, F. o.-R., Muljono-Larue, F., & Pranoto, I. B. (2008). *Orang Bajo Suku Pengembara Laut: Pengalaman Seorang Antropolog* [Peuple nomade de la mer : les Badjos d'Indonésie]. Kepustakaan Populer Gramedia [and] Ecole française d'Extreme-Orien.
- Zaid, S. (2020). The product innovation of seaweed moringa chips: An antecedent to customer value and competitive advantage. *International Journal of Innovation, Creativity and Change*, 12(10), 275-285.

APPENDICES

Appendix 1. Wakatobi SSF profile

No	Sub District	total Area (Km2)	Capital	Island No	Number of Village	Population	Full fisherman	Main sideline Fisherman
1	Wangi-wangi	67.49	Wanci	5	20	28100	985	266
2	Wangi-wangi Selatan	123.55	Mandati	33	21	30824	1839	39
3	Kaledupa	35.18	Ambeua	31	16	11729	891	194
4	Kaledupa Selatan	56.08	Sandi	55	10	8051	554	6
5	Tomia	32.82	Waha	12	10	7908	576	8
6	Tomia Timur	46.02	Usuku	2	9	9169	335	26
7	Togo Binongko	43.85	Popalia	0	5	5545	163	5
8	Binongko	68.63	Rukuwa	4	9	10076	339	189
		473.62		142	100	111402	5682	733

Appendix 2. SSF challenges in Wakatobi Regency

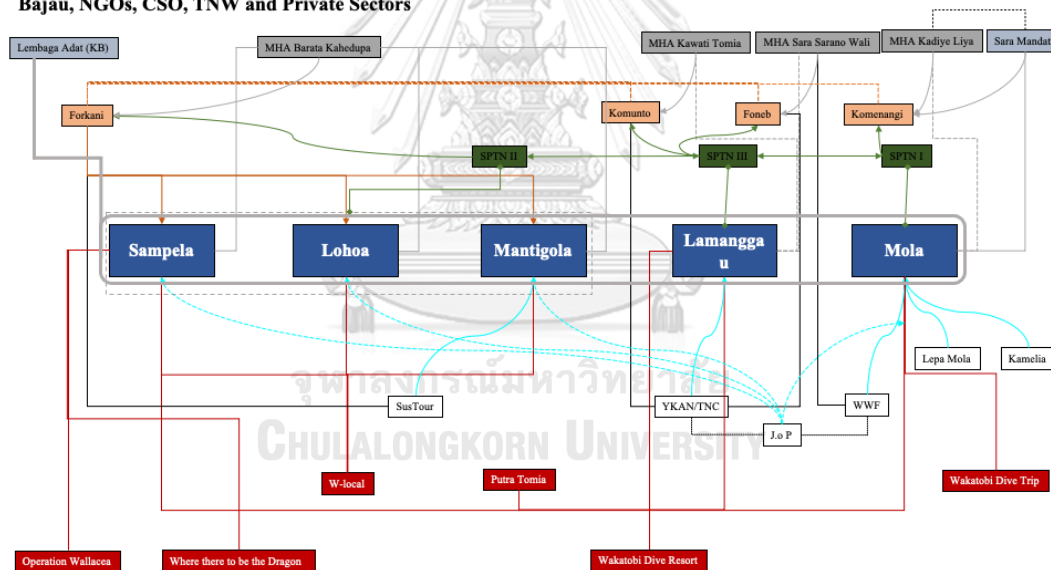


Appendix 3. Type of gears and fishing method of the Bajau in Wakatobi Regency

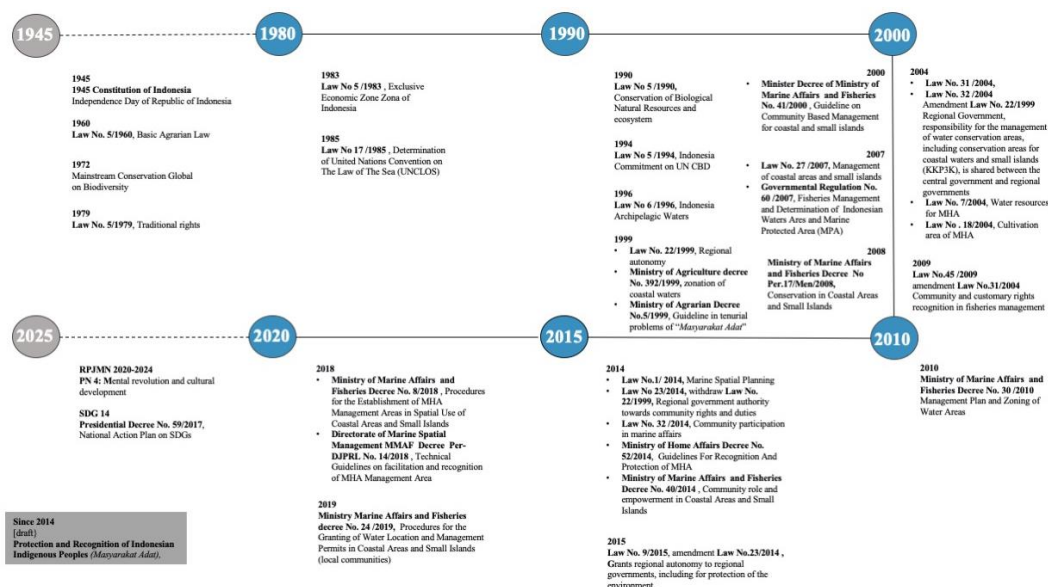
Sampela	Lohoa	Mantigola	Lamanggau	Mola
<ul style="list-style-type: none"> • Speargun (pana) • Spear fishing (sapah) • Fishing net (ringgi') • Seabasses fishing (misi dasar) • Fishing line (pisi boroh) • Kite fishing (labuyah) • Feather fishing (mancoh) • Ambai net (sori) • Octopus fishing (kain and umpan) • Squid fishing (misi kendok) • Grouper fishing (ngambor) • Fish aggregation (rumpong) • Manta shrimp trap (Pengko) • Bomb fishing • Potassium cyanide • Fish Poisson (chemical) 	<ul style="list-style-type: none"> • Speargun (pana) • Spear fishing (sapah) • Fishing net (ringgi') • Seabasses fishing (misi dasar) • Fishing line (pisi boroh) • Octopus fishing (kain and umpan) • Squid fishing (misi kendok) • Fish trap (bubu karamak) • Manta shrimp trap (Pengko) • Bomb fishing 	<ul style="list-style-type: none"> • Speargun (pana) • Spear fishing (sapah) • Fishing net (ringgi') • Seabasses fishing (misi dasar) • Fishing line (pisi boroh) • Kite fishing (labuyah) • Feather fishing (mancoh) • Ambai net (dasar) • Ambai net (sori) • Octopus fishing (kain and umpan) • Squid fishing (misi kendok) • Grouper fishing (ngambor) • Purse sein vessel • Fish aggregation (rumpong) • Manta shrimp trap (Pengko) • Bomb fishing • Potassium cyanide • Fish Poisson (chemical) • Compressor 	<ul style="list-style-type: none"> • Speargun (pana) • Spear fishing (sapah) • Fishing net (ringgi') • Seabasses fishing (misi dasar) • Fishing line (pisi boroh) • Kite fishing (labuyah) • Feather fishing (mancoh) • Octopus fishing (kain and umpan) • Squid fishing (misi kendok) • Grouper fishing (ngambor) • Fish aggregation (rumpong) • Potassium cyanide • Fish Poisson (chemical) • Compressor 	<ul style="list-style-type: none"> • Speargun (pana) • Spear fishing (sapah) • Fishing net (ringgi') • Seabasses fishing (misi dasar) • Fishing line (pisi boroh) • Kite fishing (labuyah) • Feather fishing (mancoh) • Ambai net (dasar) • Octopus fishing (kain and umpan) • Squid fishing (misi kendok) • Grouper fishing (ngambor) • Purse sein vessel • Fish aggregation (rumpong) • Manta shrimp trap (Pengko) • Bomb fishing • Potassium cyanide • Fish Poisson (chemical) • Compressor

Appendix 4. Stakeholder mapping

Bajau, NGOs, CSO, TNW and Private Sectors



Appendix 7. Indonesian policies related to the research



Appendix 8. LMMA in Indo Pacific

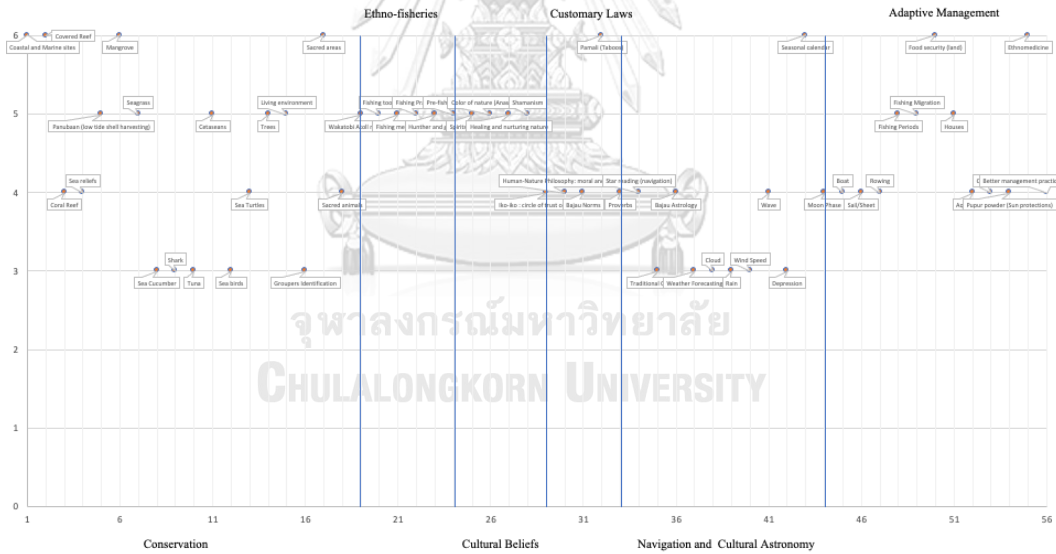
Country	Name
Cook Islands	Ra'ui site
Fiji	Tabu area, Traditional reserve, Community-protected area
French Polynesia	Rahui
Hawaii	Kapu Zone: Traditional MPA, Cultural Marine Conservation District
Kenya	Community Conservation Area: tengefu; hifadhi za kijamii, vilindi vya wenyeji
Indonesia	Sasizen: Community-based marine protected area: Sasi, Wehai, Kaombo, Kera-kera, Ombo, Ngam, Lubuk Larangan, Egek
Madagascar	Local Marine Resources Management
Malaysia	Community-based marine protected area
Myanmar	Collaborative Marine and Coastal Conservation
Marshall Islands	Mo
New Zealand	Rahui
Palau	Bau Zone
Papua New Guinea	Tabu Area: Customary Area
Philippines	Community based Marine Protected Area, marine sanctuary
Samoa	Sa
Solomon Islands	Tambu Zone, Community managed reserve, Community conservation area
Tanzania	Collaborative Fisheries Management Area
Tokelau	Lafu
Tuvalu	Tapu
Vanuatu	Tabu
Vietnam	People marine-managed area, village-managed reserve

Source: (Govan, 2009b; Rocliffe & Peabody, 2013; Rocliffe et al., 2014; Samoily et al., 2017) and unpublished document of MMAF (2020)

Appendix 9. TEK analysis

Classification	Biodiversity	Projection	Activities	Spatial	Spirit	Classification	Biodiversity	Projection	Activities	Spatial	Spirit
C1						B5					
C2						L1					
C3						L2					
C4						L3					
C5						L4					
C6						N1					
C7						N2					
C8						N3					
C9						N4					
C10						N5					
C11						N6					
C12						N7					
C13						N8					
C14						N9					
C15						N10					
C16						N11					
C17						A1					
C18						A2					
C19						A3					
F1						A4					
F2						A5					
F3						A6					
F4						A7					
F5						A8					
B1						A9					
B2						A10					
B3						A11					
B4						A12					

Note: the examination of Bajau practice as TEK classification



Appendix 10. Institutional SWOT analysis in Wakatobi for Bajau community issues

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Human resources • Coastal management (integrated TEK, science, and laws) • Biosphere reserve • Cultural values • Adaptive community • Cultural and sustainable tourism • Gender equality 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • Wealth management and assets oriented • Banking loans – chain • Limited free time (man) • Overexploitation natural resources • Customary institution • Cultural identity • Subsistence • Bajau data and research center (initiatives) • Action research with transdisciplinary solution oriented • Jealousy as social constructions • License, security and administrative • Territory, Orality, and Spirituality • Youth Participation • Monitoring and Evaluation System • Regulation
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • Championship and leadership • MHA as collaborative institution to Bajau • Land oriented people • Wakatobi National Park Authority • Institutional supports (FPIC) • Locally Managed Marine Areas and co-management • Important resources (BMP) • Village-Owned Enterprises (BUMDes) • Systematic chain and Theory of Change • Bajau development plan must consider Bajau's habit 	<p>THREATS</p> <ul style="list-style-type: none"> • Overpopulation • Destructive fishing • Environmental threats (garbage) • MHA conflicts (territories and natural resources) • Political interests and representatives • Stigmatization and social constructions

Appendix 11. Research documentations



Documentation 1. Foster Family during fieldwork in Wakatobi

Left-top: Sampela (La Sibly Family), Lest-bottom: Lohoa (Si Eda Family), Right-top: Mantigola (Si Nding Family), Right-middle: Mola (Si Limus Family), Right-bottom: Lamanggau (Si Aser Family)



Documentation 2. Key informant interview/related stakeholders (3 October 2021)



Documentation 3. Key informant interview/government (4 October 2021)



Documentation 4. Key informant interview/the Bajau (2 December 2020)



Documentation 5. Group interview preparation/the Bajau (24 September 2021)



Documentation 6. Informal discussion/the Bajau (3 April 2021)



Documentation 7. Participant observation/the Bajau (29 March 2021)



Documentation 8. Visual methodologies/the Bajau (28 December 2020)



Appendix 12. Research administrations



Environment, Development and Sustainability Program
Graduate School, Chulalongkorn University
254 Phayathai Road Pathumwan Bangkok 10330 Thailand

Ref. No. EDS.422/2020

28 August 2020


To Whom It May Concern

This is to certify that Mr. Wengki Ariando, Student's Identification No. 6288331420 is currently a doctoral student in Environment, Development, and Sustainability Program at the Graduate School, Chulalongkorn University for academic year 2020/2021. He had been successfully passed his dissertation proposal examination on the topic of *Developing A Model for The Integration of Bajau Traditional Ecological Knowledge in The Management of Locally Managed Marine Area: A Case Study of Wakatobi Regency, Indonesia* on 5 May 2020. He plans to take the data collection from October 2020 to September 2021.

This is for your information regarding his research plan and further appropriate actions.


Yours sincerely,

Assoc. Prof. Dawan Wiwattanadate, Ph.D.
Program Director



**KOMISI ETIK PENELITIAN KESEHATAN
FAKULTAS KEDOKTERAN
UNIVERSITAS MULAWARMAN**

Jl. Krayan Kampus Gunung Kelua Samarinda-KALTIM 75119
Telp: 0541 – 748581 / 748449 ; email : ppd@unmul.ac.id



**COMMISSION OF ETHICAL RESEARCH FOR HEALTH
MEDICAL FACULTY OF MULAWARMAN UNIVERSITY
Samarinda**


LETTER OF AGREEMENT FOR ETHICAL WORTHINESS
NO. 38/KEPK-FK/X/2020

PROVIDED ON RESEARCH :

**Developing a model of Traditional Ecological Knowledge in the Management of Locally
Managed Marine Area (LMMA) : A Case Study
of Wakatobi Regency**

Main researcher : Wengki Ariando / Chulalongkorn University

Samarinda, 9 October 2020




Director

Dr. dr. Nataniel Tandirogang, M.Si

Members :

Dr. dr. Nurul Hasanah, M.Kes, Dr. dr. Eva Rachmi, M.Kes, M.Pd.,Ked,
Dr. dr. Danial, M.Kes, Dr. drg. Sinaryani, M.Kes
Dr. Hadi Kuncoro, M.Farm. Apt, Prof. Dr. Drh. Gina Saptiani, M.Si

Document 2. Ethical clearance letter from Mulawarman University


KEMENTERIAN LINGKUNGAN HIDUP DAN KEHUTANAN
DIREKTORAT JENDERAL KONSERVASI SUMBER DAYA ALAM DAN EKOSISTEM
BALAI TAMAN NASIONAL WAKATOBI
 Alamat : Jalan Dayanu Ikhsanuddin No.71 Baubau - Sulawesi Tenggara Kode Pos 93724
 Telp./Fax. (0402) 2825652 ; eMail : info@wakatobinationalpark.com

SURAT IZIN MASUK KAWASAN KONSERVASI (SIMAKSI)
 Nomor : S.1279/IT.21/TU/PPK/09/2020

Dasar : 1. Peraturan Dirjen PHKA No. P.7/IV-SET/2011 tentang Tata Cara Masuk Kawasan Suaka Alam, Kawasan Pelestarian Alam, dan Taman Buru;
 2. Surat Direktur Program Universitas Chulalongkom tanggal 28 Agustus 2020 Tentang Permohonan Izin Penelitian.

Dengan ini memberikan izin masuk kawasan konservasi Kepada :

Nama : Wengki Ariando
 NIM : 6288331420
 Untuk : Melakukan penelitian dengan judul " Pembuatan Model Integrasi Kearifan Ekologi Lokal Masyarakat Bajau dalam Managemen Wilayah Pesisir Berbasis Adat : Studi Kasus Kabupaten Wakatobi, Propinsi Sulawesi Tenggara".
 Lokasi : Taman Nasional Wakatobi.
 Waktu : 1 Oktober 2020 s.d 30 September 2021

Dengan Ketentuan :

1. Sebelum memasuki lokasi kegiatan wajib melapor kepada Kepala Seksi Pengelolaan Taman Nasional terdekat;
2. Didampingi petugas dari Balai Taman Nasional Wakatobi dengan beban tanggung jawab dari Pemegang Simaksi ini;
3. Dalam proses pengambilan gambar (shooting) tidak diperkenankan memberikan perlakuan (makan, dll) kepada satwa liar yang menjadi obyek shooting dan atau perlakuan terhadap tumbuhan liar (pemotongan tumbuhan/bagian tumbuhan untuk kepentingan dekorasi-dekorasi buatan atau untuk kepentingan lainnya);
4. Tidak diperbolehkan membawa baik dalam keadaan hidup atau mati flora/fauna dari dan ke dalam kawasan Taman Nasional kecuali dengan ijin khusus;
5. Segala resiko yang terjadi dan timbul selama berada di lokasi sebagai akibat kegiatan yang dilaksanakan menjadi tanggung jawab Pemegang Simaksi ini;
6. Menyerahkan kepada Ditjen KSDAE Kementerian LHK C/q. Balai Taman Nasional Wakatobi, Pemerintah Daerah setempat selambat-lambatnya dalam jangka waktu 1 (satu) bulan setelah selesai melaksanakan kegiatan mengenai :
 - a. Copy laporan tertulis hasil kegiatan penelitian/pendidikan/penjelajahan/cinta alam/kegiatan jurnalistik, atau
 - b. Copy film/video/foto jadi untuk pembuatan film/video/pengambilan foto

// Komersialisasi ...

Document 3. Research permit from Wakatobi National Park



PEMERINTAH PROVINSI SULAWESI TENGGARA
BADAN PENELITIAN DAN PENGEMBANGAN
Jl. Mayjend S. Parman No. 44 Kendari 93121
 Website : balitbang_sulawesitenggara prov.go.id Email: badan.litbang.sultra01@gmail.com

Kendari, 31 Agustus 2020

Nomor : 070/1837/Balitbang/2020 Lampiran : - Perihal : <u>Izin Penelitian</u>	Kepada Yth. Bupati Wakatobi di - WANGI-WANGI
-------------------------------------------------------------------------------------	-------------------------------------------------------

Berdasarkan Surat Direktur Program Doctor environment and Sustainability Program Graduate School Thailand Nomor : EDS.420/2020 tanggal 28 Agustus 2020 perihal tersebut di atas, Mahasiswa di bawah ini :

Nama	: Wengki Ariando
NIM	: 6288331420
Prodi	: S3 Philosophy (Ph.D)
Pekerjaan	: Mahasiswa
Lokasi Penelitian	: Kabupaten Wakatobi

Bermaksud untuk Melakukan Penelitian/Pengambilan Data di Daerah/Kantor Saudara dalam rangka penyusunan KTI/Skripsi/Tesis/Disertasi, dengan judul :

"PEMBUATAN MODEL INTEGRASI KEARIFAN EKOLOGI LOKAL MASYARAKAT BAJAU DALAM MANAGEMEN WILAYAH PESISIR BERBASIS ADAT (Studi Kasus Kabupaten Wakatobi Provinsi Sulawesi Tenggara)"

Yang akan dilaksanakan dan tanggal : 31 Agustus 2020 sampai selesai.

Sehubungan dengan hal tersebut diatas, pada prinsipnya kami menyetujui kegiatan dimaksud dengan ketentuan :

1. Senantiasa menjaga keamanan dan ketertiban serta mentaati perundang-undanganyang berlaku.
2. Tidak mengadakan kegiatan lain yang bertentangan dengan rencana semula
3. Dalam setiap kegiatan dilapangan agar pihak Peneliti senantiasa koordinasi dengan pemerintah setempat.
4. Wajib menghormati Adat Istiadat yang berlaku di daerah setempat.
5. Menyerahkan 1 (satu) examplar copy hasil penelitian kepada Gubernur Sultra Cq Kepala Badan Penelitian dan Pengembangan Provinsi Sulawesi Tenggara
6. Surat izin akan dicabut kembali dan dinyatakan tidak berlaku apabila ternyata pemegang surat izin ini tidak mentaati ketentuan tersebut di atas.

Demikian Surat Izin Penelitian dibenkan untuk digunakan sebagaimana mestinya.

an GUBERNUR SULAWESI TENGGARA
 KEPALA BADAN PENELITIAN & PENGEMBANGAN
 PROV. SULAWESI TENGGARA



DR. BASUKANTO TODONG, MSP, MA
 Pembina Utama Muda, Gol. IV/c
 No. 19680720 199301 1 003

Tembusan

1. Gubernur Sulawesi Tenggara (sebagai laporan) di Kendari;
2. Direktur PPs Environment, Development and Sustainability, Graduate School, Chulalongkorn University Bangkok di Thailand;
3. Ketua Prodi S3 Philosophy (Ph.D) PPS Environment, Development and Sustainability Graduate School, Chulalongkorn University Bangkok di Thailand;
4. Kepala Balitbang Kab. Wakatobi di Wangi-Wangi;
5. Kepala Dinas Pariwisata Kab. Wakatobi di Wangi-Wangi;
6. Mahasiswa yang bersangkutan

Document 4. Research permit from Southeast Sulawesi Research Board (Balitbang)



PEMERINTAH KABUPATEN WAKATOBI
BADAN KESATUAN BANGSA DAN POLITIK
Jalan : La Ruku No. 8 Kel. Mandati III Wangi-Wangi Selatan
email : badan.kesbangpol.wktb@gmail.com

Wangi-Wangi, 27 Oktober 2020

Nomor : 070/19/KESBANGPOL/X/2020
Lampiran : -
Perihal : Izin Penelitian

Kepada
Yth. Sebagaimana Terlampir
di -
Tempat

Berdasarkan Surat Badan Penelitian dan Pengembangan Provinsi Sulawesi Tenggara Nomor: 070/1837/Balitbang/2020 tanggal 31 Oktober 2020 Perihal Izin Melaksanakan Penelitian, maka pada prinsipnya kami menyetujui memberikan izin Melaksanakan penelitian kepada :

Nama : Wengki Ariando
NIM : 6288331420
Prodi : S3 Philosophy (Ph.D)
Judul Skripsi : ***"Pembuatan Model Integrasi Kearifan Lokal Ekologi Lokal Masyarakat Bajau Dalam Manajemen Wilayah Pesisir Berbasis Adat (Studi Kasus Kabupaten Wakatobi Provinsi Sulawesi Tenggara"***

Lokasi Penelitian : Kab. Wakatobi.
Waktu Penelitian : Berlangsung mulai tanggal 27 Oktober 2020 sampai selesai.

Dengan ketentuan sebagai berikut :

1. tidak melakukan kegiatan lain selain penelitian dimaksud,
2. dalam setiap kegiatan senantiasa berkoordinasi dengan instansi terkait dan aparat keamanan demi suksesnya kegiatan penelitian,
3. senantiasa menjaga keamanan dan ketertiban serta mentaati peraturan perundang-undangan, agama dan adat istiadat yang berlaku,
4. setelah selesai melaksanakan penelitian agar menyampaikan laporan tertulis hasil penelitian (satu) Expl kepada Bupati Wakatobi u.p.

Demikian surat izin ini diberikan untuk digunakan sebagaimana mestinya.

a.n. Bupati Wakatobi
Kepala Badan Kesatuan Bangsa dan Politik
Kabupaten Wakatobi,


H. ADAM BAHTIAR, S.Pd
Perdana Muda, IV/c
NIP. 19661231 199403 1 092

Tembusan disampaikan Kepada :

1. Yth. Bupati Wakatobi (sebagai laporan) di Wangi-Wangi;
2. Yth. Wakil Bupati Wakatobi (sebagai laporan) di Wangi-Wangi;
3. Yth. Direktur PPs Environment, Development and Sustainability, Graduate School, Chulalongkorn University Bangkok di Thailand;
4. Yth. Ketua Prodi S3 Philosophy (Ph.D) PPs Environment, Development and Sustainability, Graduate School, Chulalongkorn University Bangkok di Thailand;
5. Yth. Kepala Dinas Pariwisata Kab. Wakatobi di Wangi-Wangi;
6. Yth. Camat Wangi-Wangi Selatan di Mandati;
7. Yth. Camat Kaledupa di Ambeua;
8. Yth. Camat Kaledupa Selatan di Langge;
9. Yth. Camat Tomia di Waha;
10. Mahasiswa Yang Bersangkutan;
11. Arsip.

Document 5. Research permit from Wakatobi Regency Research Board (Kesbangpol)

VITA

NAME	Wengki Ariando
DATE OF BIRTH	10 September 1991
PLACE OF BIRTH	Tiku
INSTITUTIONS ATTENDED	Bachelor of Science (B.Sc.) in Geophysics and Meteorology, IPB University, Indonesia
HOME ADDRESS	Master of Arts (M.A.) in Environment Development and Sustainability, Chulalongkorn University, Thailand Ujung Pasa Tiku, Kecamatan Tanjung Mutiara, Kabupaten Agam, Sumatera Barat, Indonesia 26473
AWARD RECEIVED	Scholarship Program for ASEAN and NON-ASEAN Countries 2019 for Doctoral Degree Program The 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund) Batch 46 (2/2020) for Research Funding Canada-ASEAN Scholarships and Educational Exchanges for Development (SEED) 2022 at Global Development Studies, Queen's University for Visiting Doctoral Researcher