



**UNIVERSITI PUTRA MALAYSIA**

***ROLE OF INDIGENOUS KNOWLEDGE AND PRACTICES AMONG THE  
BAJAU AND DUSUN COMMUNITIES TOWARDS BIODIVERSITY  
CONSERVATION IN KOTA BELUD, SABAH, MALAYSIA***

**ANIS AMALINA BINTI ADAM**

**FEM 2022 2**



**ROLE OF INDIGENOUS KNOWLEDGE AND PRACTICES AMONG THE  
BAJAU AND DUSUN COMMUNITIES TOWARDS BIODIVERSITY  
CONSERVATION IN KOTA BELUD, SABAH, MALAYSIA**

By

**ANIS AMALINA BINTI ADAM**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra  
Malaysia, in Fulfilment of the Requirements for the Degree of Master of  
Science**

**August 2021**

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



COPYRIGHT UPM

## DEDICATION

*This thesis is dedicated to Natives of Sabah, whose indigenous knowledge is invaluable, regardless of scientific merits. May you remain steadfast in upholding your cultural identities and persist in protecting your governance and lands.*



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**ROLE OF INDIGENOUS KNOWLEDGE AND PRACTICES AMONG THE BAJAU AND DUSUN COMMUNITIES TOWARDS BIODIVERSITY CONSERVATION IN KOTA BELUD, SABAH, MALAYSIA**

By

**ANIS AMALINA BINTI ADAM**

**August 2021**

**Chair : Normala bte Othman, PhD**  
**Faculty : Human Ecology**

Indigenous knowledge of Bajau and Dusun people was developed from centuries of interacting, experimenting and adapting to the natural environment. Such knowledge was created as they historically inhabited biologically rich areas and ultimately dictated the way Bajau and Dusun people utilised the natural resources around them. Indigenous knowledge of Bajau and Dusun people is holistic and dynamic, emphasising the balance of physical and supernatural realms. Reflecting this concept to biodiversity conservation, indigenous knowledge of Bajau and Dusun people could be found in traditional medicine, river management, traditional hunting, and traditional farming. Thus, the unique knowledge of Bajau and Dusun people in various practices makes it important to study in the context of biodiversity conservation. This qualitative study applied case study approach to delve into the perspectives and experiences of Bajau and Dusun people regarding their indigenous knowledge system. The data in this study was collected through interviews, focus group discussion, and observation. Kota Belud in Sabah was selected as the study site and informants were chosen using purposive and snowball sampling techniques. The informants in this study were Dusuns and Bajaus, the two main ethnics in Kota Belud. Fieldworks for data collection involved 11 informants (n=11) all together. The data was analysed thematically with the aid of NVivo 8. The main findings in this study yielded three major themes reflecting the objectives. The first theme deals with indigenous knowledge and practices of Bajau and Dusun people in traditional farming, traditional hunting, river management, and traditional medicine. The second theme presents the initiatives of Bajau and Dusun people in transferring indigenous knowledge to their communities. The third theme touches on the documentation of indigenous knowledge of Bajau and Dusun people. Lastly, the findings of this study provide some implications to the body of knowledge by delivering discussions on the role of indigenous knowledge of Bajau and Dusun communities in biodiversity conservation. In practical, this study helps the government to strengthen the existing policies and create programmes pertaining to biodiversity conservation. This study also demonstrates significant implication from

the perspectives of Bajau and Dusun communities with regards to indigenous knowledge documentation.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PERANAN PENGETAHUAN DAN AMALAN PERIBUMI DALAM KALANGAN MASYARAKAT BAJAU DAN DUSUN TERHADAP PEMULIHARAAN BIODIVERSITI DI KOTA BELUD, SABAH, MALAYSIA**

Oleh

**ANIS AMALINA BINTI ADAM**

Ogos 2021

**Pengerusi** : Normala bte Othman, PhD  
**Fakulti** : Ekologi Manusia

Pengetahuan peribumi masyarakat Bajau dan Dusun dikembangkan dengan berhubung, memerhati dan menyesuaikan diri dengan alam semulajadi. Pengetahuan tersebut dibentuk kerana masyarakat peribumi pada dahulu kala menetap di kawasan yang tinggi kepelbagaian biologinya dan seterusnya pengetahuan tersebut menentukan cara hidup mereka. Pengetahuan peribumi masyarakat Bajau dan Dusun bersifat holistik dan dinamik, dengan menekankan keseimbangan antara alam fizikal dan alam ghaib. Dalam menghubungkaitkan pengetahuan peribumi dalam pemuliharaan biodiversiti, pengetahuan peribumi masyarakat Bajau dan Dusun dapat dilihat dalam amalan perubatan tradisional, pengurusan sungai, pemburuan tradisional, dan pertanian tradisional. Oleh yang demikian, pengetahuan unik masyarakat Bajau dan Dusun dalam pelbagai amalan menjadikan kajian ini penting untuk dilakukan dalam konteks pemuliharaan biosivertiti. Kajian kualitatif ini menggunakan pendekatan kajian kes dalam menyingkap perspektif dan pengalaman masyarakat peribumi berkaitan sistem pengetahuan mereka. Data kajian ini dikumpul melalui temubual, perbincangan berfokus, dan pemerhatian. Daerah Kota Belud di Sabah dipilih sebagai kawasan kajian dan informan pula disaring menggunakan persampelan bertujuan dan persampelan bola salji. Informan kajian ini terdiri daripada suku kaum Bajau dan Dusun yang merupakan dua suku kaum utama di Kota Belud. Kerja lapangan melibatkan informan seramai 11 orang (n=11). Selanjutnya, data yang diperolehi dianalisis secara tematik dengan bantuan perisian komputer untuk analisis data kualitatif iaitu *Nvivo 8*. Dapatan utama kajian ini menghasilkan tiga tema besar berpandukan kepada objektif utama kajian. Tema pertama menyentuh pengetahuan peribumi dan amalan masyarakat Bajau dan Dusun dalam pertanian tradisional, pemburuan tradisional, pengurusan sungai, dan pertanian tradisional. Tema kedua pula menggambarkan mengenai inisiatif masyarakat Bajau dan Dusun dalam memindahkan pengetahuan peribumi dalam kalangan mereka. Manakala tema ketiga pula membincangkan mengenai dokumentasi pengetahuan peribumi masyarakat Bajau dan Dusun. Akhir sekali, dapatan kajian memberikan implikasi

kepada badan pengetahuan dengan memberikan perbincangan mengenai peranan pengetahuan peribumi masyarakat Bajau dan Dusun dalam pemuliharaan biodiversiti. Secara praktikal, dapatakan kajian ini memberikan maklumat kepada pihak kerajaan untuk mengukuhkan dasar-dasar yang sedia ada dan merancang program berkaitan usaha pemuliharaan biodiversiti. Kajian ini juga turut memperlihatkan implikasi yang significant dari perspektif masyarakat Bajau dan Dusun dalam dokumentasi pengetahuan peribumi.





## ACKNOWLEDGEMENTS

All praises to Allah the Almighty for endowing me with ability, perseverance and sanity to complete this thesis. *Alhamdulillah 'ala kulli haal.*

I would like to express my deepest appreciation to my supervisory committee, Dr. Normala Othman and Associate Professor Dr. Adlina Abd. Halim for guiding and assisting me in completing this thesis. Their endless support, professional expertise, and constructive criticism kept me constantly engaged with my research throughout the three years of this journey at UPM. A debt of gratitude to Dr. Normala Othman for appointing me as a Graduate Research Assistant in which sparked my interest in the field of Cultural Anthropology and essentially gained new knowledge and experience as a novice researcher. I would also like to express my appreciation to Dr. Zatul Himmah Adnan, who I many times consulted for inspirations and suggestions.

A note of gratitude also goes to every individual involved in my fieldworks in Kota Belud, Sabah; those at Kota Belud Native Court for their assistance and my informants for consenting to engage in my research. Having them providing help and support as well as sharing their experience make this journey a valuable one.

I am indeed deeply thankful for the support given by the Universiti Putra Malaysia and Faculty of Human Ecology for the sponsorship of a research grant under Putra Grant Inisiatif Putra Siswazah (IPS).

My special thanks to my small family, especially *Ma* and *Abah*, Anizan Musa and Adam Zakaria for their love, encouragement, support, and prayer. To my loved one, thank you. Lastly, to anyone who directly and indirectly involved in completion of this thesis, I thank you.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

**Amna binti Haji Md Noor, PhD**

Senior Lecturer  
Faculty of Human Ecology  
Universiti Putra Malaysia  
(Chairman)

**Normala bte Othman, PhD**

Senior Lecturer  
Faculty of Human Ecology  
Universiti Putra Malaysia  
(Member)

**Adlina binti Haji Ab. Halim, PhD**

Associate Professor  
Faculty of Human Ecology  
Universiti Putra Malaysia  
(Member)

---

**ZALILAH MOHD SHARIFF, PhD**

Professor and Dean  
School of Graduate Studies  
Universiti Putra Malaysia

Date: 9 March 2022

## Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Name and Matric No.: Anis Amalina Adam

## Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: \_\_\_\_\_  
Name of Chairman  
of Supervisory  
Committee: Dr. Normala Othman

Signature: \_\_\_\_\_  
Name of Member of  
Supervisory  
Committee: Assoc. Prof. Dr. Adlina Ab. Halim

## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	i
<b>ABSTRAK</b>	iii
<b>ACKNOWLEDGEMENTS</b>	v
<b>APPROVAL</b>	vii
<b>DECLARATION</b>	viii
<b>LIST OF TABLES</b>	xi
<b>LIST OF FIGURES</b>	
<b>CHAPTER</b>	
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Study background	1
1.2 Problem statement	6
1.3 Research questions	9
1.4 Research objectives	9
1.5 Definition of terminology	9
1.5.1 Indigenous peoples	9
1.5.2 Indigenous knowledge	10
1.5.3 Biodiversity	10
1.5.4 Conservation	11
1.5.5 Culture	11
1.6 Theoretical framework	11
1.6.1 Cultural Ecology theory	12
1.7 Conceptual framework	14
1.8 Significance of study	15
1.9 Scope of study	15
1.10 Conclusion	16
<b>2 LITERATURE REVIEW</b>	<b>17</b>
2.1 Background of Sabah	17
2.2 Indigenous peoples in Sabah	23
2.3 Dusun people and their culture	26
2.4 Bajau people and their culture	27
2.5 Indigenous knowledge	29
2.5.1 Defining indigenous knowledge	29
2.5.2 Criteria of indigenous knowledge	33
2.6 Indigenous knowledge and biodiversity conservation	36
2.6.1 Traditional farming	38
2.6.2 Traditional hunting and wildlife management	40
2.6.3 Traditional medicine	41
2.6.4 Traditional river management	43
2.7 Indigenous knowledge documentation	45
2.8 Conclusion	46

<b>3</b>	<b>METHODOLOGY</b>	47
3.1	Introduction	47
3.2	Qualitative research as methodology	47
3.2.1	Case study approach	48
3.2.2	Data collection	48
3.2.3.1	Interview	48
3.2.3.2	Focus group discussion	49
3.2.3.3	Observation	49
3.3	Location	49
3.4	Sampling	51
3.5	Informant profile	51
3.6	Research instrument	54
3.7	Fieldwork	54
3.8	Ethical consideration	57
3.9	Data analysis and interpretation	57
3.9.1	Data management	57
3.9.2	Transcription	58
3.9.3	Interview transcript analysis	58
3.10	Validity and reliability	59
3.10.1	Validity	59
3.10.1.1	Triangulation	59
3.10.1.2	Member check	60
3.10.1.3	Researcher as instrument	60
3.10.1.4	Researcher's lens or reflexivity	60
3.10.1.5	Peer review	61
3.10.2	Reliability	61
3.10.2.1	Audit trail	61
3.11	Fieldwork limitations	61
3.12	Conclusion	62
<b>4</b>	<b>FINDINGS AND DISCUSSION</b>	63
4.1	Introduction	63
4.2	Indigenous and practices of Bajau and Dusun people towards biodiversity conservation in Kota Belud, Sabah	63
4.2.1	Indigenous knowledge and practices in traditional medicine	64
4.2.1.1	Classification of traditional medicine	64
4.2.1.2	Traditional medicine using shamans	64
4.2.1.3	Traditional medicine using plants	66
4.2.1.4	Implication to biodiversity conservation	69
4.2.2	Indigenous knowledge and practices in tagal system	70

	4.2.2.1	Establishing a tagal site	70
	4.2.2.2	Tagal as an ecotourism site	73
	4.2.2.3	Implication to biodiversity conservation	74
4.2.3		Indigenous knowledge and practices in traditional farming	75
	4.2.3.1	Shifting to modern agriculture	76
	4.2.3.2	Traditional farming	77
	4.2.3.3	Implication to biodiversity conservation	80
4.2.4		Indigenous knowledge and practices in traditional hunting	80
	4.2.4.1	Taboos in wildlife hunting	81
	4.2.4.2	Traditional hunting tools	82
	4.2.4.3	Types of animals hunted	83
	4.2.4.4	Implication to biodiversity conservation	84
	4.2.5	Summary of findings	85
4.3		Indigenous knowledge transfer of Bajau and Dusun people in Kota Belud, Sabah	87
	4.3.1	Approaches of knowledge transfer among Bajau and Dusun people	87
	4.3.1.1	Collaboration with relevant parties	87
	4.3.1.2	Establishment of cultural sites	89
	4.3.1.3	Implementation of customary law	89
	4.3.1.4	Social events	90
	4.3.1.5	Symbolic representations of indigenous practices in the modern practices	91
	4.3.1.6	Parental role	92
4.3.2		Challenges in indigenous knowledge transfer among Bajau and Dusun people in Kota Belud, Sabah	92
	4.3.2.1	Change of indigenous livelihood practices	93
	4.3.2.2	Change of religious beliefs	94
	4.3.2.3	Contact with dominant, non-indigenous groups	94
	4.3.2.4	Economic development pressure	96
	4.3.2.5	Loss of indigenous organisation	97

	4.3.2.6	Unsustainable use of natural resources by local communities	97
	4.3.3	Summary of findings	99
4.4		Indigenous knowledge documentation of Bajau and Dusun people	101
	4.4.1	Perception on the loss of indigenous knowledge	101
	4.4.2	Acceptance of indigenous knowledge documentation	102
	4.4.3	Challenges in indigenous knowledge documentation	104
	4.4.3.1	Biopiracy	105
	4.4.3.2	Lack of support from authority	106
	4.4.3.3	Lack of initiatives in documentation Bajau and Dusun people	106
	4.4.4	Meanings of indigenous knowledge from the perspectives of Bajau and Dusun people	107
	4.4.4.1	Maintains soil health	107
	4.4.4.2	A source of livelihood	108
	4.4.4.3	Safeguards natural resources	109
	4.4.5	Summary of findings	110
4.5		Reflection to cultural ecology theory	112
4.6		Conclusion	113
<b>5</b>		<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>114</b>
	5.1	Introduction	114
	5.2	Summary	114
	5.3	Implication	116
	5.3.1	Theoretical implications	116
	5.3.2	Practical implications	117
	5.4	Recommendations	118
	5.4.1	Recommendations for Bajau and Dusun people to enhance indigenous knowledge	118
	5.4.2	Recommendations for future research to enhance indigenous knowledge	119
		<b>REFERENCES</b>	<b>121</b>
		<b>APPENDICES</b>	<b>142</b>
		<b>BIODATA OF STUDENT</b>	<b>196</b>
		<b>LIST OF PUBLICATIONS</b>	<b>197</b>



## LIST OF TABLES

<b>Table</b>		<b>Page</b>
2.5.1(a)	Various terms of indigenous knowledge with working definitions	31
2.5.1(b)	Forms of indigenous knowledge and their examples	32
3.3	Population of Kota Belud based on 2010 consensus	50
3.5	Informant profile	53
3.7	Dates of data collection sessions	56

## LIST OF FIGURES

Figure		Page
1.1	A model representing the worldview of indigenous peoples in general. The chart demonstrate the interconnection of God, people and nature as the basis of their life	3
1.6.1	Cultural ecology theory	13
1.7	Conceptual framework	14
2.6	Applicability of indigenous knowledge in conservation biology or ecology	37
4.2	Indigenous knowledge and practices of Bajau and Dusun people towards biodiversity conservation in Kota Belud, Sabah	86
4.3	Indigenous knowledge transfer of Bajau and Dusun people in Kota Belud, Sabah	100
4.4	Indigenous knowledge documentation of Bajau and Dusun people in Kota Belud, Sabah	111

## CHAPTER 1

### INTRODUCTION

This chapter presents the study background, problem statement, research questions, research objectives, definition of terminology, theoretical and conceptual frameworks, significance, scopes and limitations pertaining to indigenous knowledge and biodiversity conservation.

#### 1.1 Study background

In the peak of secular scientific knowledge, where breaking discoveries are being produced, indigenous knowledge is getting more and more attention from academics, policy makers and developers. The literatures on indigenous knowledge and indigenous peoples have been debated, discussed and rewritten through major fields such as Anthropology, History and Conservation Biology (Paulina & Johnson, 2016). The indigenous knowledge system has been in existence hundreds of years ago; however its emergence in academia can be dated back in the early 1950s.

According to Berkes (2008) ethnobiologists and ethnoecologists mainly concentrated their work on species identification and classification and the knowledge and understanding of indigenous peoples on the ecological processes and the interactions in the environment. Special focus is given to conservation of biodiversity as cultural approaches are being integrated in achieving its goals. Other aspects that are being studied in indigenous knowledge include learning systems; local organisations, controls, and enforcement; local classification and quantification; and human health (Grenier, 1998).

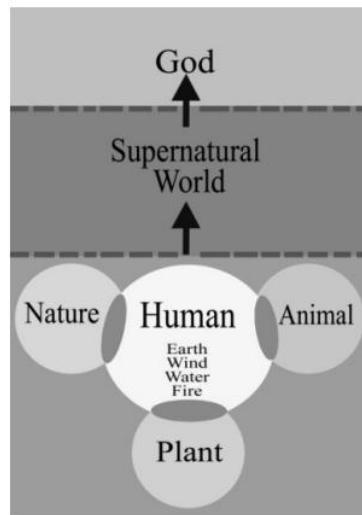
As Purcell (1998) mentions, indigenous knowledge has been signified as a “methodology, social science perspective as well philosophical and ideological positions.” Despite it remains problematic to conceptualise the term “indigenous”, it is worthy to note it has become a rather significant resource in many cultural and socioeconomic paradigms. More importantly, the importance of indigenous knowledge and indigenous peoples are now being given international recognitions by non-governmental organisations - United Nations Environmental Programme through its Convention of Biological Diversity 1992 and International Labour Organisation through its Indigenous and Tribal Peoples Convention 1989 – initially aim for recognising, protecting and developing of indigenous peoples, their rights and knowledge. The International Day of the World’s Indigenous Peoples was established by United Nations General Assembly in December 1994 and it is commemorated on August 9 annually.

Globally, indigenous peoples constitute approximately five percent of the world's total population, inhabiting various geographical locations of Americas, Africa, Asia and the Pacific. Population-wise, indigenous peoples are considered minorities, but their indigenous knowledge emerges to be relatively significant specifically in biodiversity conservation. According to (Stevenson, 1996), indigenous peoples have made important contributions in maintaining the biodiversity and ecosystems within their territories through two directions. Firstly, they carry out ways of life in their lands which the natural base and biodiversity are left intact. Indigenous peoples develop certain systems in utilising and managing the natural resources, essentially reflecting their intimate knowledge of their lands, local geography and ecosystems. More importantly, indigenous peoples place spirituality highly in their lives and it is manifested in their respect and care for nature. Secondly, indigenous peoples have managed to achieve and preserve the ecological safety and unity by fighting intruders who wish to economically exploit the lands and natural resources. Stevenson (1996) again emphasises biological diversity has been maintained and secured with the success of blocking settlement from outsiders in their land for the sole purpose of land commercialisation, urban development and modernisation.

This study is trying to bring out the relationship of knowledge systems of Sabah's indigenous peoples embedded in their culture to biodiversity conservation. Ingold (2002) states that the culture is the fundamental tenet in ecological anthropology which has become the mediator in the relations between humans and their environments. He further remarked that culture also serves as the human mode of adaptation and is a system of symbol. Hence, it is fair to see how culture is interpreted in anthropology. Sutton and Anderson (2014) define culture as "learnt and shared behaviour within social groups and it is the fundamental element that sets human apart from other animals." From the view of sociology, a culture can be distinguished between non-material and material culture. Beliefs, courtship, intellectual traditions, music, dancing, and any other oral traditions are grouped as non-material culture. The latter includes any possession or touchable objects belonging to a certain society such as equipment used in daily life, artefacts, art forms and technology (Wahab et al., 2012).

The culture of indigenous peoples is significantly influenced by worldview that is "the culturally structured set of assumptions (including values and commitments/allegiances) underlying how a people perceive and respond to reality" (Kraft, 1999, p. 385). In some simple words, a worldview could be understood as the deep-level culture in which indigenous peoples base their life. According to Vidal (2008), worldview is a personal and historical point of view that is made up of philosophical basis such as model of reality as a whole, model of the past, model of the future, theory of value, theory of actions, and theory of knowledge. Depending on social settings, worldviews vary across all groups of society. Similar to other indigenous groups, the worldviews of Dusun and Bajau people are substantially influenced by the past of their ancestor. Essentially, they conduct themselves in accordance to the norms and values inherited from their ancestors. According to Halina Sandera (2013) worldviews of indigenous peoples demonstrate that the universe is divided into natural (material and physical) and supernatural (immaterial and spiritual). The commonalities of Dusun and Bajau primal worldviews, which highly emphasise the belief of supernatural beings. Both Dusun and Bajau people

fundamentally believe that man and animals are not the only creatures inhabiting this world but all kinds of spiritual beings that live in close proximity to them and can be found scattering in various natural landscapes including the river, mountains, bushes and sea. In the view of Dusun and Bajau people, they perceive that existence of these spiritual beings is directly linked to their lives by strongly influencing their fate and fortune towards their events of life such as yield of crops, success in hunting, as well as sickness and death (Figure 1).



**Figure 1.1: A model representing the worldview of indigenous peoples in general. The chart demonstrates the interconnection of God, people and nature as the basis of their life**

(Source: Shafiia et al., 2016).

According to Halina Sandera (2013), the traditional worldview of Bajau encircles animism and Hinduism demonstrated in certain rituals such as *payung jomo matai* (umbrella of the dead) and reincarnation. Now, with the advent of Islamic teaching, it has greatly coloured and transformed how Bajau perceive their world. In a work of (Yap, 1985), the worldview of Bajau is heavily influenced by the jinn, *bantu syaitan* (ghost and devils), and souls of the dead. Both Sainatul Nornis (2012) and Halina Sandera (2013) demonstrate that the worldview of Bajau can be divided into several levels known as *Latallah*, *roh*, *langit*, and *bumi*. Bajau people manifest their worldview in various aspects of their life such as in the events of birth, death and marriage.

*Latallah* or God resides at the very top level, believed by the Bajau people to be the most powerful creator on earth and the entire universe. The term *Latallah* is adapted from the word Allah Taala. In the view of Bajau people, *Latallah* does not rely on humans or other creatures and has the mighty power to bestow His blessings or punishments according to the behaviours of human. Bajau people also believe that all the dead souls will eventually return to *Latallah*.

*Roh* at the second level is occupied by the good and bad spirits known as *embo'-embo'* and *meron*. *Embo'-embo'* refers to the spirits of family members who have deceased long time ago. Among Bajau people, *embo'-embo'* are highly regarded and respected, as they are believed to control the actions of and watch over their living descendants on earth. Meanwhile, *meron* is the opposite of *embo'-embo'*. *Meron* refers to bad spirits that are capable of threatening the peace, health and harmony of Bajau people. *Meron* is also believed to bring upon various misfortune, suffering and calamities such as sickness, diseases, accident, and event death (Halina Sandera, 2013). At this particular level, knowing the existence of good and bad spirits, Bajau people adapt themselves to respect the nature as it is occupied by the unseen creatures. This is to maintain the harmony among humans, supernatural beings, and nature. Hence, various taboos and rituals are introduced especially in cultivating lands for farming, cutting trees, and harvesting forest products.

*Langit* refers to the intermediary space occupied by the spirits of the dead who have yet to reach the level *roh*. The Bajau people believe that the spirits would remain at this level for 100 days and depend on the conduct on the living relatives in this world. Therefore, throughout the period, it is believed that the spirits must be given the necessities including food, clothing or adornment through rituals like *duang*, *mayang pinang*, and *bangkai-bangkaian* (Halina Sandera, 2013). If these requirements are not met, misfortune would befall upon the family members. It is also believed that the spirits of the dead would appear in their dreams.

The next of level is *bumi* (the world) that is occupied by man. Halina Sandera (2013) highlights that this level is divided into the real world and the supernatural world. The real world is reserved by humans and physical objects while the supernatural world is inhabited by spiritual creatures. At this level, the Bajau people emphasise maintaining the value of harmony and peace among them and their nature.

As for Dusun people, their worldview is based on the concept of divine virtues of peace, harmony and balance that involves various dimensions such as the seen, unseen, hot, and cold. In a balance or neutral nature, the universe is said to be *osogit* or cold. However, the balance could be disturbed by the misconducts and sinful deeds of humans and those further inflict *ahasu* or spiritual heat to the perpetrator (Pugh-Kitingan, 2016). In more severe cases, *ahasu* may also inflict the wider family clan and community causing grave calamities such as failure of crops and hunting, famine, and epidemics of diseases (Pugh-Kitingan, 2014). Moreover, their worldview is not only about man-and-god relationship, but it includes various dimensions such as *adat* and legal institutions, educational institutions, family institutions, economic institutions, political institutions, environmental care as well as health care institutions.

The Dusun people are monotheists and acknowledge the existence of a supreme being or omnipotent deity known as Kiningan and Mumsumundok. The pair who also have human attributes are believed to be the creator of the world and everything in it including man, animals and various features of the natural and physical landscape (Rutter, 1922; Yap, 1985). In essence, The Dusun worldview involves the universe,

*Minamangun* (the creator), *osundu* (benevolent celestial spirits), *rogon* (demons and malevolent spirits), *bambarayon* (rice souls), and *tulun* (human beings).

In the traditional worldview of Dusun people, the universe is perceived to exist as seven-tiered, upper middle and under worlds. *Pogun* refers to the middle world of human beings, *Karaganan* refers to the underworld of evils, and *Sawat* or *Hibabou* is the upper world of deities. Minamangun means the Creator that refers to Kinaringan and his wife, Mumsumundok. According to Yap (1985), Kinaringan and Mumsumundok created man of different physiques and complexion from earth with a portion of *Bisagit* or the Spirit of Smallpox. Furthermore, it is also believed that Kinaringan and Mumsumundok sacrifice their daughter, Ponumpuan by cutting up her body into parts, which made all kinds of food. Her blood gives form to rice, her head to a coconut, her fingers to bananas, her ears to the sirih-vine, her feet to Indian corn, her throat to sugar-cane, and her knees to yam. Meanwhile, it is also believed that animals originate from her torso.

*Osundu* refers to benevolent celestial beings who inhabit the upper world of *Sawat*. There are seven different *osundu* occupying each tier to *Sawat* namely *Aso Sundu*, *Rumandawi*, *Pinoubou*, *Monungaran*, *Mongontonu*, *Mogohungung*, and *Humingkubang*. The Dusun people perceive that *osundu* is the mediatory realm for *bobohian* (priestesses) to reach Kinaringan and Mumsumundok (Pugh-Kitingan, 2016).

Meanwhile, *rogon* is the evil spirits of the underworld who scatter the human world, causing misfortune and disposing calamities. The evil spirits are said to attack human, livestock and crops leading to loss of livelihood as well as spread of diseases and death. *Rogon* is believed to occupy various topographies in Dusun villages such as river streams, strange-looking rocks and certain areas of forest. In order to get rid of *rogon*, the Dusun people usually perform a ritual by sacrificing animals (Pugh-Kitingan, 2016).

The Dusun people who are known as the paddy farmers believe in rice souls called *bambarayon*. Each family unit is believed to own their own *bambarayon* that looks after their crop. Unlike *osundu* and *rogon*, *bambarayon* is viewed as *sunduwana* or soul. The Dusun people manifest this belief in paddy farming that *bambarayon* is embodied in every paddy grain (Low, 2012; Pugh-Kitingan, 2016). According to Yap (1985), *bambarayon* consists of seven categories of rice-souls, each carries different role. *Ohinopot* helps guard the supply of paddy in the store, *Sambilod* looks after the damaged rice and sees that the amount does not increase, *Gontolobon* gives rice piled up in boulders, *Momiaud* gives paddy as abundant as spring water, *Sompidot* gives full grain in the ear, and lastly *Kabang* makes the rice swell in the cooking pot.

Meanwhile, *tulun* in the Dusun worldview refers to man. Dusun people perceive that man *tulun* is made up of one body, *sunduwana* (soul) and seven *rusod* (spirits). The seven *rusod* is said to contain at different parts of the body such knees, hips, elbows, shoulders, and chest. Upon death, the *rusod* returns to Minamangun (the Creator) in

Nabalu'. Based on this belief, Dusun people hold firm on the proper burial for *rusod* to properly leave a man's body or else it would turn into *tambiriuo* or ghost.

## 1.2 Problem statement

This study is founded on the premise that indigenous knowledge is important in conservation of biodiversity as promulgated in Convention on Biological Diversity (United Nations, 1992). The Bajau and Dusun people in Kota Belud possess extensive and holistic knowledge in natural resources management particularly in their respective traditional landscapes. Their experimentation and experience with their surrounding allow them to innovate their own knowledge in the local practices and systems (Lasimbang, 2003; Tongkul, 2002). For example, both Bajau and Dusun people are known as farming-oriented community, working on paddy plantation in both lowland and upland areas (Low, 2012; Saidatul Nornis, 2012b). Bajau and Dusun were also known for their knowledge in utilizing various medicinal plants (Fadzilah, 2018; Fadzilah et al., 2018; Julius Kulip, 2014) in their traditional health system. Therefore, this uniqueness of this study establishes the interconnectedness of indigenous knowledge of Bajau and Dusun people thriving on the natural resources around them with the emphasis of harmony of both living and non-living things. In the context of this study, the worldview of Bajau and Dusun people postulates that the universe is made up of physical and spiritual realms (Halina Sandera, 2013; Pugh-Kitingan, 2016). The God-people-nature relationship among Bajau people is demonstrated by their worldview comprises of several levels known as Latallah (God), good and evil spirits, earth. Bajau people perceive that Latallah is the most powerful creator on earth and the entire universe. The good and evil spirits tell Bajau people who occupy the earth, that they need to maintain the harmonious relationship among humans, supernatural beings, and nature. Disobedience would eventually inflict misery and misfortune to them (Halina Sandera, 2013; Yap, 1985). Meanwhile, among Dusun people, the God-people-nature relationship involves Minamangun (God), benevolent celestial spirits, malevolent spirits, and human beings. Minamangun as the Creator refers to Kinarangan and Mumsumundok who created man of different physiques and complexion. The benevolent celestial spirits were believed as mediatory realm for priestesses to reach Minamangun. The malevolent spirits are thought to cause misfortune and dispose calamities upon humans by destroying the livelihood stock and crops. Rituals of sacrificing animals are performed to appease and ward off these evil spirits (On & Pugh-Kitingan, 2015; Pugh-Kitingan, 2015; Yap, 1985). It is the fundamental belief of Bajau and Dusun people that existence of humans coexist with animals, plants and all kinds of spiritual beings scattering in various natural landscapes. Furthermore, both humans and spiritual beings must live in harmony to not invoke the wrath of God that bestows them with fortune (Halina Sandera, 2013; Pugh-Kitingan, 2016). Hence, for thousands of years, these indigenous Bajau and Dusun communities thrive sustainably in nature and biodiversity territories.

The first issue of this study concerns with indigenous knowledge and practices. Since the introduction of Convention on Biological Diversity in 1992, indigenous knowledge is becoming an international commitment especially by those countries populated by indigenous peoples. Appreciation and recognition towards indigenous knowledge



expand as more studies are being carried out in this field. The importance of indigenous knowledge is stressed upon the dependence of indigenous peoples on natural resources for their livelihood including hunting, fishing, gathering, and making arts (Langton & Rhea, 2005). Wilder et al. (2016) emphasise that indigenous knowledge now is appearing to be more significant as biodiversity is degenerating rapidly and conventional biodiversity management does not function effectively. With regards of this, indigenous peoples in Sabah have four aspects of indigenous knowledge and practices inextricably linked to biodiversity conservation which are hunting, farming, using of medicinal plants, and river management (Tongkul, 2002). The practice of traditional farming by indigenous peoples are shown to mitigate the impacts of forest degradation based on a case study in Gana-Lingkabau Forest Reserve in Sabah (Hardawat et al., 2020). Meanwhile, Jurry and Harifah (2012) demonstrate that indigenous river management conserves the population of freshwater fish resources and promotes sustainable practices. However, as landscape and livelihood changes occur inevitably (Kulip, 2003; Kulip et al., 2000; Sayok & Teucher, 2018; Ibrahim et al., 2020), the fate of indigenous knowledge remains a question. Sayok and Teucher (2018) attribute the rampant loss of indigenous knowledge to palm oil plantation, in which discouraged indigenous peoples practice their traditional livelihood. Due to this, there is an issue of discontinuation of indigenous knowledge practices among indigenous peoples in Kota Belud, Sabah (Tongkul et al., 2012) and the repercussion imposes peril to their cultural identity. Therefore, the situation above motivates this study to be carried out, to see whether indigenous knowledge and practices are being continued at present days among Bajau and Dusun people in Kota Belud, Sabah.

The second issue concerns with approaches of indigenous knowledge transfer. Epistemologically speaking, indigenous knowledge and western secular knowledge are two distinctive groups of knowledge system. Indigenous knowledge has been intergenerationally passed down mainly through oral traditions and symbolic means (Hills, 2004; Ohmagari & Berkes, 1997). Indigenous knowledge is learnt through hands-on activities, observations, and social interactions among parents, community members, and peers (Taylor & Thoth, 2011). In the context of Sabah, the customary law or *adat* plays a fundamental part in indigenous knowledge transfer. *Adat*, transferred orally and through observations, essentially dictates all social behaviours within an indigenous community (Desmond & Norjieta Julita, 2018). More interestingly, as *adat* is informal and unwritten, it is adhered by most people. Hence, this further demonstrates the importance of oral traditions and symbolic means to indigenous peoples in Sabah. In light of this, relying on contemporary educational institutions to revive indigenous knowledge appears rather ambitious and most likely will encounter with a myriad of obstacles as supported by Battiste (2002, p.4) that “indigenous knowledge has been systematically excluded from contemporary educational institutions”. Following this, the responsibility to transfer indigenous knowledge lies on the shoulder of indigenous peoples. This is in line with Wotherspoon (2015) that emphasises the community members with social, cultural and economic resources to continue reviving the learning activities and take initiatives to provide skills and competencies to anyone who needs them. Therefore, this thesis argues that indigenous knowledge and practices ought to be upheld and reinvigorated through collective actions by indigenous peoples themselves. An effective environment to transfer indigenous knowledge and practices should be connected with cultural, linguistic, and biological diversity associated with their identity,

sustainability and survival (Rosnon & Chinnasamy, 2016). Following that, this study sees the significance to explore how indigenous peoples in Kota Belud, Sabah transfer the indigenous knowledge in their community.

The third issue pertains to indigenous knowledge documentation. Sobrevila (2008) pinpoints that preservation of indigenous knowledge is an integral component in biodiversity management model. One way of knowledge preservation is through knowledge documentation. Indigenous knowledge documentation may bring positive impacts towards indigenous peoples as it serves the purpose of documentation and makes it available to those with good intentions (Ngulube, 2002; Sithole, 2007). This effort is also critical to the capacity of future indigenous generation to have the access to their heritage. Indigenous knowledge is a complete set of knowledge, thus documentation can serve as a valuable and insightful database on how the indigenous peoples interact with their surrounding that is constantly changing. It has been established that economic, political, and cultural changes on a national and global scale rapidly transform the natural environment (Kardooni et al., 2014; Tang & Gavin, 2016). To elaborate further, dependence of indigenous peoples on natural resources is what creates indigenous knowledge. Over the years, indigenous peoples gradually relinquish the practices; hence, it escalates the loss of indigenous knowledge. This calls for an attention to identify and document indigenous knowledge as indigenous peoples are highly vulnerable to those changes. Failure to execute this initiative may not only jeopardise biodiversity but also their identity and culture (Lambin et al., 2019). On contrary of this, indigenous knowledge of biodiversity and resource use has yet to be systematically documented in Sabah (Kodoh et al., 2017; Tongkul et al., 2012). Hence, this study is significant to fill the gap by exploring the acceptance of indigenous peoples on the idea of knowledge documentation.

There is still another noticeable gap that demands to be filled. Many researches related to indigenous knowledge related to biodiversity conservation have been extensively studied by the Western countries in the Amazon, Africa, and Australia. In the context of Sabah, the studies of indigenous knowledge focus on mainly on the ethnobotany and traditional health medicine (Kulip, 2003; Kulip et al., 2010; Kulip et al., 2005), the *tagal* system (Er et al., 2012; Wong et al., 2009). Indigenous knowledge in biodiversity conservation has a wide scope. Hence, in order to contribute to previous literature, this study focuses on different components of indigenous knowledge in biodiversity conservation namely skills and practices, indigenous knowledge transfer and indigenous knowledge documentation.

### **1.3 Research questions**

Based on the discussion over the research problem above, the following questions are developed:

- a) What are the indigenous knowledge and practices of Bajau and Dusun communities towards biodiversity conservation in Kota Belud, Sabah?
- b) How do Bajau and Dusun communities transfer indigenous knowledge to their communities in Kota Belud, Sabah?
- c) How would Bajau and Dusun communities accept the idea of indigenous knowledge documentation in Kota Belud, Sabah?

### **1.4 Research objectives**

#### **Main research objective**

The main objective of this research is to examine the role of indigenous knowledge in biodiversity conservation in Sabah.

#### **Specific objectives**

- a) To examine the indigenous knowledge and practices of Bajau and Dusun communities towards biodiversity conservation in Kota Belud, Sabah
- b) To explore the approaches of indigenous knowledge transfer among Bajau and Dusun communities indigenous communities in Kota Belud, Sabah
- c) To investigate the acceptance of Bajau and Dusun communities on documentation of indigenous knowledge in Kota Belud, Sabah

### **1.5 Definition of terminology**

#### **1.5.1 Indigenous peoples**

United Nations Working Group on the Rights of Indigenous Peoples opted out to let the issues unresolved as they could not agree on a formal definition. The author has chosen two definitions from Toledo (2001) and Sabah Interpretation (Definition of Native) Ordinance No.2 1952. According to Toledo (1999), indigenous peoples are best described by applying the following criteria: a) descendants of the original inhabitants of a territory which has been overcome by conquest, b) ecosystem peoples, such as shifting or permanent cultivators, herders, hunters and gatherers, fishers and/or handicraft makers, who adopt a multi-use strategy of appropriation of nature; c) practice a small-scale, labour-intensive forms of rural production which

produce little surplus and has low energy needs; d) do not have a centralised political institution, organise their life at community-level, and make decisions on a consensus basis; e) share a common language, religion, moral values, beliefs, clothing and identifying characteristics as well as a relationship to a particular territory; f) have a different world-view, consisting of a custodial and non-materialist attitude to land and natural resources based on a symbolic, interchange with the natural universe; g) subjugated by a dominant culture and society; and h) consist of individuals who subjectively consider themselves to be indigenous. In this study, indigenous peoples refer to those who live in Kota Belud, selected through purposive sampling.

### **1.5.2 Indigenous knowledge**

The United Nations Convention on Biological Diversity (1992) defines indigenous knowledge as “the knowledge, innovations and practices of Indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry”. In this study, indigenous knowledge refers to traditional skills, cultures, practices, and knowledge of indigenous peoples in Sabah of plants, animals as well as land and ecosystem management. The indigenous knowledge is expressed in unwritten form and commonly transferred orally through folk stories, songs and rituals specific to a particular ethnic group.

### **1.5.3 Biodiversity**

The term generally brings a connotation about the variety of life at all biological levels. It is a blend of the phrase of biological diversity, a neologism which was coined in 1985 by Walter G. Rosen and was popularised by Edward O. Wilson in later years (Maclaurin & Sterelny, 2008). The United Nations Convention of Biological Diversity (1992) defines biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”. While DeLong (1996) describes biodiversity as “an attribute of an area and specifically refers to the variety within and among living organisms, assemblages of living organisms, biotic communities, and biotic processes, whether naturally occurring or modified by humans. Biodiversity can be measured in terms of genetic diversity and the identity and number of different types of species, assemblages of species, biotic communities, and biotic processes, and the amount (e.g, biomass, cover, rate) and structure of each. It can be observed and measured at any spatial scale ranging from microsites and habitat patches to the entire biosphere”. Biodiversity in this study refers to biological resources available to

indigenous peoples in Kota Belud, Sabah. The natural resources such as forests, lands, and rivers in which the indigenous peoples thrive in for their socioeconomic and cultural needs such as hunting, farming, fishing, and traditional healing.

#### **1.5.4 Conservation**

IUCN International Union for Conservation of Nature (1980) conceptualise conservation as a process involving many sectors (e.g. forestry, wildlife, agriculture, fisheries) with the emphasis of sustainable utilisation and management. A working paper by International IUCN called World Conservation Strategy published in 1980 defines conservation as the management of human of the biosphere so that it may yields the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. Meanwhile, a broader definition is provided by Hambler (2004) that “ conservation is the protection of wildlife from irreversible harm”. In this context, wildlife refers to non-domesticated species, animals, plant population and microorganisms. In this study, conservation is the efforts executed by the indigenous peoples in Kota Belud to protect and conserve the natural environment.

#### **1.5.5 Culture**

Culture could be generally understood as human phenomena that manifests all ways of life (arts, belief, customs) and passed down from generation to generation. Tylor (1871, preface) proposes that culture is “complex whole which includes knowledge, belief, art, law, morals, custom and any other capabilities and habits acquired by man as a member of society. Kroeber and Kluckhohn (1952, p. 86) defines culture as “patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values. Culture, as a complex concept consists of various attributes that it is learnt (depending on developed symbols), shared, symbolic, encompassing, integrated, and either adaptive and maladaptive (Kottak, 2015). In the context of this study, the discussion of culture refers to indigenous knowledge and practices of Bajau and Dusun people in Kota Belud, Sabah.

### **1.6 Theoretical framework**

In theory, a qualitative research develops through inductive means that allows a particular concept, theory, or hypothesis to be generated from the intensive and in-depth data gathering. The purpose of qualitative research is not to test a concept, hypothesis or theory; nevertheless this does not mean a theory cannot be placed in

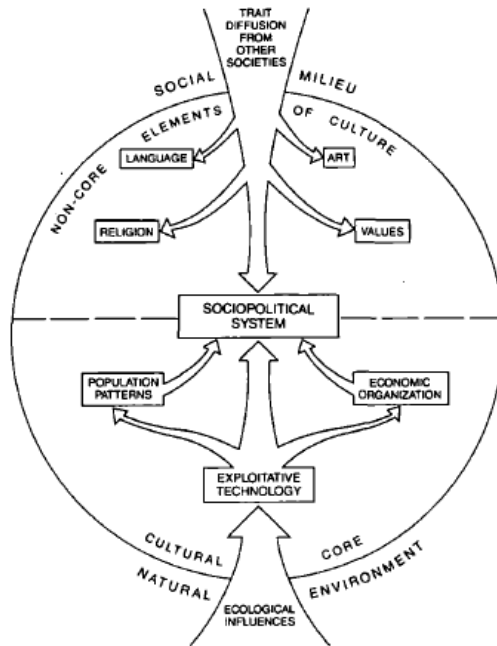
qualitative research. Theoretical framework can be considered as an orientation or a stance of the researcher holds while conducting his research (Othman, 2017). In this study, the main theory used is Weltanschauung theory and supported by theory of social ecology.

### 1.6.1 Cultural Ecology Theory

Cultural Ecology Theory is a theory founded by Julian H. Steward in 1955 in his book "Theory of Cultural Change: The Methodology of Multilinear Evolution". Steward defines the theory as "a heuristic device for understanding the effect of environment upon culture". In brief, this theory deals with the interaction of human, culture and environment.

The phrase "cultural ecology" consists of two base words; culture and ecology. Nevertheless, ecology was thought not to belong anywhere in the discipline of anthropology. Ecology, a concept derived from biology, deals with the relationship between living organisms and their environments (Gunn, 1980). Meanwhile, the concept of culture has been an integral part of anthropology. Culture is regarded as "a dynamic mix of symbols, beliefs, languages and practices that people create, not a fixed thing or entity governing humans" (Anderson & Gale, 1992, p. 3). Steward founded this theory as he identified the difficulty in using the cultural factor in ecological studies due to lack of clear objectives in biological use of ecology. Gunn (1980) provides some insightful appraisal of the emergence of this theory based the philosophical differences on culture. Environmental determinists propose that culture is "the mechanical actions of natural forces upon a purely selective humanity" while environmental possibilists argue culture "acts selectively, if not capriciously, upon their environment, exploiting some possibilities while ignoring others" (Sahlin, as cited in Gunn, 1980).

Steward addresses cultural ecology by drawing distinctions from other concepts of ecology and anthropology and demonstrating how cultural ecology can augment the existing approach to determine its adaptation of culture to environment. In the early development of this theory, Steward notices the methodological difficulties when cultural factor is integrated in ecological studies due to lack of clarity of the concept of ecology itself. At the same time, Steward argues that social ecology itself should be regarded as a subdiscipline as the analysis is insufficient of fair objectives of biology that it constantly applies ecology to explain the biological phenomena. Following that, Steward suggests social ecology to be an operational tool by proposing two objectives: understanding of the organic functions and genetic variations of man as a purely biological species and determination of how culture is affected by its adaptation to environment (Steward, 1955, p. 31).



**Figure 1.6.1: Cultural ecology theory**

(Source: Steward, 1955)

Based on Figure 2 above, Steward (1955, pp. 40-41) establishes cultural ecology as a method that consists of three parts: first the interrelationship of exploitative or productive technology must be analysed; second the behaviour patterns involved in the exploitation of a particular area by means of a particular technology must be analysed; and third procedure is to ascertain the extent to which the behaviour patterns entailed in exploiting the environment affect other aspects of culture.

However, Lapka et al. (2012) propose a contemporary approach of cultural ecology. The authors argue their approach is different of Steward's that stresses on adaptive function of culture. Lapka et al. (2012) claim their approach as a holistic and integrative attempt to study complexity of cultures as it engages a wider perspective of culturology. Besides, their focus in this approach is landscape ecology by proposing four constitutive principles of modern cultural ecology which are focus on the problems of present times, integrative approach which is aware of the pitfalls of inter- or transdisciplinary, cultural core of society-environment relationship; and dialogue between human and environment. Nevertheless, the authors' attempt in delivering a different approach of cultural ecology is still inspired by Steward's.

This study considers the criteria of cultural ecology theory as illustrated in Figure 1 to assist in deliberating the research focus. Following this theory, cultural ecology in essence emphasises on how a society adjusts and adapts to similar environments. It examines the mutual relationship between natural environment and culture, reflected by interdependence between environment, technology, and human behaviours. In this context of this study, the cultural core of indigenous peoples lies within their

indigenous knowledge system that includes technology, social structure, governance system, and resource use system. In the mutual relationship between man and environment, indigenous peoples are the keystone component in shaping their environment through the cultural core. Referring to this theory, indigenous peoples are able to both adapt their cultural core to ecological system, and ecological system to their social, cultural, and physical requirements. In the role of indigenous knowledge in biodiversity conservation, cultural core is reflected through the three key issues in this study, which are indigenous knowledge and practices, knowledge transfer, and knowledge documentation. Hence, this study considers the man-nature interactions as a fundamental connection underlying biodiversity conservation.

### 1.7 Conceptual framework

A conceptual framework in a qualitative research serves to illustrate the main idea in this study. This framework also works to guide the researcher to achieve the proposed objectives. The present conceptual framework as shown in Figure 1 is devised after reviewing the literature review pertaining indigenous knowledge and biodiversity conservation. Based on a thorough review of literature, the management of biodiversity conservation has evolved from a conventional to a more holistic way. This is done through implementation of indigenous knowledge. The scope of indigenous knowledge is too broad as the knowledge system covers every aspect of life. In this study, the role of indigenous knowledge in biodiversity conservation is investigated through three components; the skills and practices, the mechanisms of knowledge transfer, and the acceptance of indigenous peoples on knowledge documentation. Thus, the research conceptual framework is summarised in Figure 3 below.

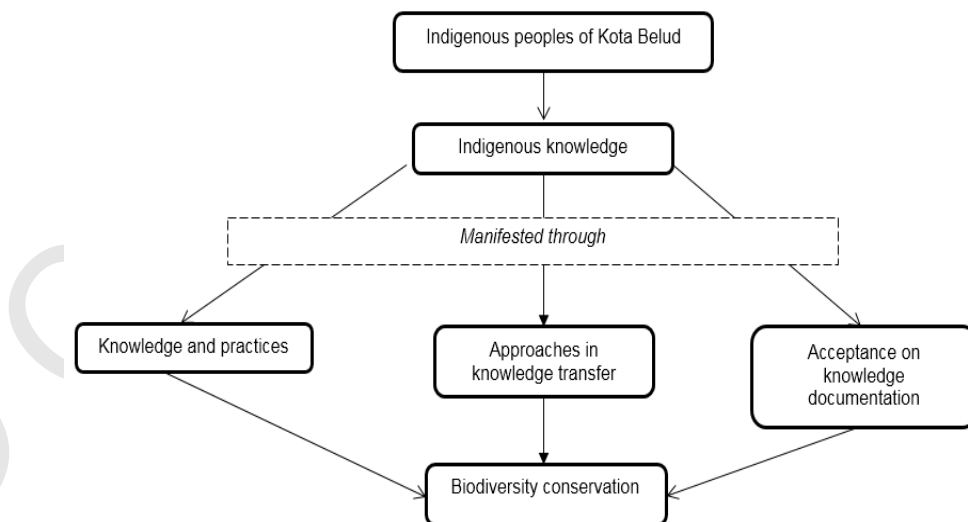


Figure 1.7: Conceptual framework



## 1.8 Significance of study

The study of indigenous knowledge in biodiversity conservation informs the interlinkages between culture and nature. In fact, it has been established that the diversity itself involves both the living forms and the worldviews and cosmologies that give meanings to life. Moreover, nature and culture evolve on many levels that span values, beliefs, and norms to practices, knowledge, and languages. In the sense of belonging of this study to the people, it offers another dimension to the realm of biodiversity conservation from the perspective of indigenous knowledge of Bajau and Dusun people in Kota Belud, Sabah. It provides insights how manifestation of indigenous knowledge of Bajau and Dusun people through culture, wisdom and beliefs shapes the environment and resource use. The interdisciplinary position between anthropology (culture and indigenous knowledge) and biodiversity conservation is able to reach a holistic understanding on interactions of humans and environment. The findings of the study will contribute to the general literature by informing the changes of indigenous practices, the modes of transfer of indigenous and the documentation of indigenous knowledge among Bajau and Dusun people in Kota Belud, Sabah. In essence, the findings of this study will redound to various stakeholders in biodiversity conservation such as the Bajau and Dusun communities, policy makers and non-governmental organisations that share the common grounds.

## 1.9 Scope of the study

Indigenous knowledge stands as one body of knowledge. It encompasses variety of aspects including language, naming and classification systems, resource use and practices, belief and spirituality, and worldview. The primary focus of this study was on the practices that pertain to biodiversity conservation – traditional hunting, traditional farming, *tagal system*, and traditional medicine. This study involved informants of two main ethnic groups in Kota Belud in Sabah – Bajau and Dusun. All informants chosen were elderly individuals as they were perceived to hold more knowledge and experiences.

This study focused on the knowledge systems of indigenous peoples in Sabah. The informants in this study comprise of Bajau and Dusun ethnics located in Kota Belud Sabah. Kota Belud was chosen as study site for its various ethnic groups' composition and from the background study, the indigenous knowledge is still being practiced in some parts of the locations.

This study required information how the practices in traditional hunting, traditional farming, water management, and traditional medicine can help in biodiversity conservation and the principle behind each practice. In concluding the implication of indigenous knowledge towards biodiversity conservation, three main aspects will be investigated: i) the indigenous practices in agriculture, medicine, natural resource

management (hunting, fishing), and culture; ii) the approaches of knowledge transfer; and iii) the acceptance of knowledge documentation among indigenous peoples.

In collecting the primary data, this study fully employed interpretive paradigm through qualitative method. The data collection strategies used were focus group discussion (FGD), interviews and observation to answer the proposed research questions. The informants chosen must comply the inclusion and exclusion criteria regulated by the researcher to ensure the validity, reliability and soundness of data.

### **1.10 Conclusion**

Indigenous knowledge can be a tool in biodiversity conservation efforts. This can be achieved through means of knowledge documentation and knowledge integration among the indigenous peoples. The participation of indigenous peoples in environment can improve their livelihood and simultaneously uplift their status as marginalised community. In general, this chapter reveals the background of the study pertaining to the concept of indigenous knowledge and the need to execute this study. The next chapter will discuss on the literatures from various sources including textbooks, journal articles, and reports based on relevant themes

## REFERENCES

- Abbasi, A. A., Khan, M. A., Ahmad, M., & Zafar, M. (2012). *Medicinal Plant Biodiversity of Lesser Himalayas-Pakistan*. Springer-Verlag.
- Abbot, R. (2014). *Documenting Traditional Medical Knowledge*. World Intellectual Property Organization.
- Adu-Gyamfi, Y. (2011). Indigenous beliefs and practices in ecosystem conservation: Response of the church. *Scriptura*, 107, 145–155.
- Agrawal, A. (1995). Dismantling the Divide between Indigenous and Scientific Knowledge. *Development and Change*, 26(3), 413–439.
- Agrisino, M. V. (2007). *Doing ethnographic and observational research*. Sage.
- Allen, R., & Haris, H. (2005). Introduction. In R. Allen, P. Parkes, & A. Bicker (Eds.), *Indigenous Environmental Knowledge and its Transformations: Critical Anthropological Perspectives* (pp. 4–5). Harwood Academic Publishers.
- Altieri, M. (1999). The ecological role of biodiversity in agroecosystems. *Agric. Ecosyst. Environ.*, 99, 28–36. <https://doi.org/dx.doi.org/10.1016/s0167-8809>
- Altman, J. C. (1987). *Hunter-gatherers today: an Aboriginal economy in north Australia*. Australia Institute of Aboriginal Studies.
- Anderson, K., & Gale, F. (1992). Introduction. In K. Anderson & F. Gale (Eds.), *Inventing Places: Studies in Cultural Geography* (pp. 1–14). Longman.
- Anis Amalina, A., Normala, O., & Adlina, A. H. (2021). Pendekatan dan cabaran dalam pemindahan pengetahuan peribumi dari perspektif masyarakat Dusun dan Bajau di Kota Belud, Sabah. In M. F. Ahmad Faathin, Z. Muhammad Hafeez, A. Zaharul, & M. N. Mohd Sabri (Eds.), *Prosiding Seminar Antarabangsa Kenegaraan dan Ketamadunan (ISOGOC) III: Mengembalikan Roh Ketamadunan* (pp. 563–582). Universiti Putra Malaysia.
- Anthons, C. (2010). The role of traditional knowledge and access to genetic resources in biodiversity conservation in Southeast Asia. *Biodiversity and Conservation*, 19(4), 1189–1204.
- Antweiler, C. (1998). Local Knowledge and Local Knowing: An anthropological analysis of contested “cultural products” in the context of development. *Anthropos*, 93, 469–494.
- Anywar, G., Kakudidi, E., Byamukama, R., Mukonzo, J., Schubert, A., & Oryem-Origa, H. (2020). Indigenous traditional knowledge of medicinal plants used by herbalists in treating opportunistic infections among people living with HIV/AIDS in Uganda. *Journal of Ethnopharmacology*, 246, 112205. <https://doi.org/https://doi.org/10.1016/j.jep.2019.112205>
- Aweto, A. O. (2013). *Shifting Cultivation and Secondary Succession in the Tropics*.

CABI.

- Ayaa, D. D., & Waswa, F. (2016). Role of indigenous knowledge systems in the conservation of the bio-physical environment among the Teso community in Busia County-Kenya. *Afr. J. Environ. Sci. Technol.*, 10(12), 467–475. <https://doi.org/10.5897/AJEST2016.2182>
- Aziz, M. A., Adnan, M., Khan, A. H., Shahat, A. A., Al-Said, M. S., & Ullah, R. (2018). Traditional uses of medicinal plants practiced by the indigenous communities at Mohmand Agency, FATA, Pakistan. *Journal of Ethnobiology and Ethnomedicine*, 14(1), 2. <https://doi.org/10.1186/s13002-017-0204-5>
- Badaruddin, M. I., Soon, S., Lee, L., Sahibil, Z., & Tarmizi, M. S. H. A. (2019). Bird as a subject in wood carving motifs: an observation on bajau traditional weapons. *Borneo Research Journal*, 13, 115–138.
- Battiste, M. (2002). *Indigenous knowledge and pedagogy in First Nations education*.
- Béné, C., Arthur, R., Norbury, H., Allison, E. H., Beveridge, M., Bush, S., Campling, L., Leschen, W., Little, D., & Squires, D. (2016). Contribution of fisheries and aquaculture to food security and poverty reduction: assessing the current evidence. *World Development*, 79, 177–196.
- Benjamin, G. (2016). Indigenous peoples: Indigeneity, indigeneity or indigenism? In *Routledge Handbook of Asian Law* (pp. 376–391). Routledge.
- Bennet, E. L., & Robinson, J. G. (2000). *Hunting Wildlife in Tropical Forest: Implications for Biodiversity and Forest Peoples* (No. 76).
- Benton, T. G., Vickery, A. A., & Wilson, J. D. (2003). Farmland biodiversity: is habitat heterogeneity the key? *Trends Ecol. Evol.*, 18, 182–188.
- Berkes, F. (1993). Traditional Ecological Knowledge in Perspective. In J. T. Inglis (Ed.), *Traditional Ecological Knowledge: Concepts and Cases* (pp. 1–10). Canadian Museum of Nature.
- Berkes, F., & Folke, C. (1993). A system perspective on the interrelations between natural, human-made and cultural capital. *Ecological Economics*, 5(1), 1–8.
- Berkes, Fikret. (2008). *Sacred Ecology* (Second). Routledge.
- Besi, E. E., Nikong, D., Esa, M. I. M., Mus, A. A., Nelson, H. V., Mohamad, N. N., Ombokou, R., Rusdi, N. A., David, D., & Aziz, Z. A. (2021). A Species Checklist of Wild Orchids in Selected Sites in Kadamaian, Kota Belud, Sabah. *Journal of Tropical Biology & Conservation (JTBC)*, 18, 131–147.
- Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member Checking: A Tool to Enhance Trustworthiness or Merely a Nod to Validation. *Qualitative Health Method*, 26(13), 1802–1811. <https://doi.org/10.1177/1049732316654870>
- Borrelli, N., & Davis, P. (2012). How culture shapes nature: Reflection on ecomuseum

practices. *Nature and Culture*, 7(1), 31–47.  
<https://doi.org/10.3167/nc.2012.070103>

- Boyd, R., & Richerson, P. (1985). *Culture and the Evolutionary Process*. University of Chicago Press.
- Briggs, J., Sharp, J., Yacoub, H., Hamed, N., & Roe, A. (2007). Environmental knowledge production: evidence from the Beddoin communities in Southern Egypt. *Journal of International Development*, 19, 239–251.
- Brink, H. I. L. (1993). Validity and reliability in qualitative research. *Curationis*, 16(2), 35–38.
- Brondizio, E., Adams, R. T., & Fiorini, S. (2017). History and scope of environmental anthropology. In H. Kopnina & E. Shoreman-Ouiment (Eds.), *Routledge Handbook of Environmental Anthropology* (pp. 10–30). Routledge.
- Brush, S. B. (2005). Protecting traditional agricultural knowledge. *Journal of Law & Policy*, 17(January), 59. <https://doi.org/10.1016/j.agry.2004.07.005>
- Caracciolo, C., & Keizer, J. (2011). A framework for knowledge sharing and interoperability in agricultural research for development. In D. Lukose, A. R. Ahmad, & A. Suliman (Eds.), *Knowledge Technology*. Springer. [https://doi.org/10.1007/978-3-642-32826-8\\_2](https://doi.org/10.1007/978-3-642-32826-8_2)
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, 41(5), 545–547. <https://doi.org/10.1188/14.ONF.545-547>
- Charnley, S., Carothers, C., Satterfield, T., Levine, A., Poe, M. R., Norman, K., Donatuto, J., Breslow, S. J., Mascia, M. B., Levin, P. S., Basurto, X., Hicks, C. C., García-Quijano, C., & St. Martin, K. (2017). Evaluating the best available social science for natural resource management decision-making. *Environmental Science and Policy*, 73(January), 80–88. <https://doi.org/10.1016/j.envsci.2017.04.002>
- Chiron, F., Charge, R., Julliard, R., Jiguet, F., & Muratet, A. (2014). Pesticide doses, landscape structure and their relative effects on farmland birds. *Agriculture, Ecosystems & Environment*, 185, 153–160.
- Christanty, L. (1986). Shifting Cultivation and Tropical Soils: Patterns, Problems, and Possible Improvements. In G. G. Marten (Ed.), *Traditional Agriculture in Southeast Asia: A Human Ecology Perspective* (pp. 226–240). Westview Press.
- Chuan, C. N. K. (2017). The Application of Citizen Science Approach in an Ichthyofaunal Survey at Tagal Sites in Upper Moyog River, Sabah, East Malaysia. *Journal of Tropical Biology and Conservation*, 14, 37–53.
- Chunhabunyatip, P., Sasaki, N., Grünbühel, C., Kuwornu, J. K. M., & Tsusaka, T. (2018). Influence of Indigenous Spiritual Beliefs on Natural Resource Management and Ecological Conservation in Thailand. *Sustainability*, 10(2842), 1–18. <https://doi.org/10.3390/su10082842>

- Cinner, J. E., & Aswani, S. (2007). Integrating customary management into marine conservation. *Biological Conservation*, 140(3–4), 201–216.
- Cisneros-Montemayor, A. M., Pauly, D., Weatherdon, L. V., & Ota, Y. (2016). A global estimate of seafood consumption by coastal indigenous peoples. *PloS One*, 11(12), e0166681.
- Clarkson, L., & Morrissette, V. (1992). Our responsibility to the seventh generation: Indigenous peoples and sustainable development. *International Institute for Sustainable Development*.
- Colding, J., & Folke, C. (2000). The taboo system: lessons about informal institutions for nature management. *The Georgetown International Environmental Review*.
- Colfer, C. J. P., Peluso, N., & Chin, S. C. (1997). *Beyond Slash and Burn: Lessons from the Kenyah on Management of Borneo's Rain Forests*. New York Botanical Garden.
- Conklin, H. C. (1957). *Hanunoo Agriculture*.
- Conklin, S. D. (2011). The Iranun and Their Neighbours in Kota Belud. In J. U. H. Chin & K. J. Smith (Eds.), *The Iranun of Sabah: Language and Culture of an Endangered Minority in Sabah* (pp. 73–79). Pelanduk Publication (M) Sdn Bhd.
- Constant, N. L., & Tshisikhawe, M. P. (2018). Hierarchies of knowledge: ethnobotanical knowledge, practices and beliefs of the Vhavenda in South Africa for biodiversity conservation. *Journal of Ethnobiology and Ethnomedicine*, 14(56), 1–28. <https://doi.org/10.1186/s13002-018-0255-2>
- Convention on Biological Diversity. (2013). *Indicators relevant for traditional knowledge and customary sustainable use*.
- Creswell, J.W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. SAGE Publication, Inc.
- Creswell, John W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods*. SAGE Publication Ltd.
- Creswell, John W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (4th ed.). Sage.
- Curnoe, D., Datan, I., Goh, H. M., & Sauffi, M. S. (2019). Femur associated with the Deep Skull from the West Mouth of the Niah Caves (Sarawak, Malaysia). *Journal of Human Evolution*, 127, 133–148. <https://doi.org/10.1016/j.jhevol.2018.12.008>
- da Silva Policarpo Brito, I., Borges, A. K. M., de Faria Lopes, S., Dias, T. L. P., & Alves, R. R. N. (2019). Environmental influence on the choice of medicinal animals: a case study from northeastern Brazil. *Journal of Ethnobiology and Ethnomedicine*, 15(1), 55. <https://doi.org/10.1186/s13002-019-0337-9>
- Dalal, A. K. (2017). Indigenous Healing: Search for the Universals. *Psychology and*

- Darmadi, H. (2018). Sumpit (Blowgun) as Traditional Weapons with Dayak High Protection. *Journal of Education, Teaching and Learning*, 3(1), 113–120.
- Davis, P. (2011). *Ecomuseums: A sense of place*. Continuum International Publishing Group.
- De-Paula, M. J., & Pezzuti, J. C. B. (2017). Hunting and monitoring: Community-based research in Xerente Indigenous Land, Brazilian Cerrado. *Human Ecology Review*, 23(1), 23–44.
- DeLong, D. C. J. (1996). Defining Biodiversity. *Wildlife Society Bulletin*, 24(4), 738–749. <https://doi.org/10.2307/3783168>
- Desmond, D. F., & Norjietta Julita, T. (2018). Pengetahuan Lokal dalam Pertanian Masyarakat Kadazandusun di Sabah. *Malaysian Journal of Social Sciences and Humanities*, 3(3), 122–130.
- Dobbs, R. J., Davies, C. L., Walker, M. L., Pettit, N. E., Pusey, B. J., & Close, P. G. (2016). Collaborative research partnerships inform monitoring and management of aquatic ecosystems by Indigenous rangers. *Reviews in Fish Biology and Fisheries*, 26(4), 711–725. <https://doi.org/https://doi.org/10.1007/s11160-015-9401-2>
- Doran, J., & Parkin, T. (1994). Defining and assessing soil quality. In D. C. Coleman, D. F. Bezdicsek, & B. A. E. Stewart (Eds.), *Defining Soil Quality for a Sustainable Environment* (pp. 3–21). Soil Science Society of America.
- Doubleday, N. C. (1990). Finding Common Ground: Natural Law and Collective Wisdom. *Traditional Ecological Knowledge: Concepts and Cases*, 41–53. <http://library.umac.mo/ebooks/b10756577b.pdf>
- Drew, J. A. (2005). Use of Traditional Ecological Knowledge in Marine Conservation. *Society for Conservation Biology*, 19(4), 1286–1293.
- Dwyer, A. (2006). Ethics and practicalities of cooperative fieldwork and analysis. In J. Gippert, N. Himmelmann, & U. Mosel (Eds.), *Essentials of language documentation* (pp. 31–66). Mouton de Gruyter.
- Efferth, T., Banerjee, M., Paul, N. W., Abdelfatah, S., Arend, J., Elhassan, G., Hamdoun, S., Hamm, R., Hong, C., Kadioglu, O., Naß, J., Ochwangi, D., Ooko, E., Ozenver, N., Saeed, M. E. E., Schneider, M., Seo, E. J., Wu, C. F., Yan, G., ... Alexie, G. (2016). Biopiracy of natural products and good biorespecting practice. *Phytomedicine*, 23, 166–173.
- Endicott, K. (1976). The hunting methods of the batek negritos of Malaysia. *Canberra Anthropology*, 2(2), 7–22. <https://doi.org/10.1080/03149097909508624>
- Ens, E. J., Cooke, P., Nadjamerrek, R., Namundja, S., Garlingarr, V., & Yibarbuk, D. (2010). Combining Aboriginal and non-aboriginal knowledge to assess and

manage feral water buffalo impacts on perennial freshwater springs of the Aboriginal-owned Arnhem Plateau, Australia. *Environ Manage*, 45, 751–758. <https://doi.org/https://doi.org/10.1007/s00267-010-9452-z>

- Er, A. C., Selvadurai, S., Lyndon, N., Sheau, T. C., Adam, J. H., & Mohd Fuad, M. J. (2012). The evolvement of tagal on ecotourism and environmental conservation: a case study in Kampong Luanti Baru, Sabah. *Advances in Natural and Applied Sciences*, 6(1), 61–65.
- Eriksen, C. (2007). Why do they burn the “bush”? Fire, rural livelihoods, and conservation in Zambia. *The Geographical Journal*, 173(3), 242–256.
- Fadzilah, A.-K. (2018). Plants used for traditional postpartum care by Sama-bajau in Kota Belud, Sabah, Malaysian Borneo. *3rd International Conference on Tropical Biology*.
- Fadzilah, A.-K., Abu, B. M. F., Maryati, M., & Atiqah, N. N. (2018). Utilization of natural resources: Preliminary study on ethnopharmacological application of ‘ulam’ or traditional vegetables among Sama-Bajau of Kampung Menunggu, Kota Belud, Sabah. *AIP Conference Proceedings*, 2016(1), 20029.
- Fang, W.-T., Hu, H.-W., & Lee, C.-S. (2014). Atayal’s identification of sustainability: traditional ecological knowledge and indigenous science of a hunting culture. *Sustain Sci*, 11(1), 33–43.
- Finn, M., & Jackson, S. (2011). Protecting indigenous values in water management: a challenge to conventional environmental flow assessments. *Ecosystems*, 14(8), 1232–1248.
- Fisher, K., & Parsons, M. (2020). River Co-governance and Co-management in Aotearoa New Zealand: Enabling Indigenous Ways of Knowing and Being. *Transnational Environmental Law*, 9(3), 455–480. <https://doi.org/10.1017/S204710252000028X>
- Foo, Jurry. (2019). Managing the Environment of Development in Malaysia - The Tagal System from the Perspective of the Local Community. *International Journal of Society, Development and Environment in the Developing World*, 3(3), 52–60.
- Foo, Jurry. (2011). Sistem tagal dalam industri pelancongan: Manfaat kepada komuniti. *Geografia*, 7(1), 14–25.
- Food and Agriculture Organization. (2010). *Inland fisheries resource enhancement and conservation in Asia*. RAP Publication.
- Fox, C. A., Reo, N. J., Turner, D. A., Cook, J., Dituri, F., Fessell, B., Jenkins, J., Johnson, A., Rakena, T. M., & Riley, C. (2017). “The river is us; the river is in our veins”: re-defining river restoration in three Indigenous communities. *Sustainability Science*, 12(4), 521–533.
- Frecska, E., Bokor, P., & Winkelman, M. (2016). The therapeutic potentials of ayahuasca: Possible effects against various diseases of civilization. In *Frontiers*



*in Pharmacology* (Vol. 7, Issue MAR). <https://doi.org/10.3389/fphar.2016.00035>

Gadgil, M., Berkes, F., & Folke, C. (1993). for Knowledge Indigenous Conservation. *Ambio*, 22(2–3), 151–156. [https://doi.org/10.5363/tits.6.3\\_37](https://doi.org/10.5363/tits.6.3_37)

Garavelli, A. C., Gorgoglione, M., Scozzi, B. (2002). Managing knowledge transfer by knowledge technologies. *Technovation*, 22(5), 269–279. [https://doi.org/10.1016/s0166-4972\(01\)00009-8](https://doi.org/10.1016/s0166-4972(01)00009-8)

Glenn, A. (2009). Five Dimensions of Collaboration: Toward a Critical Theory of Coordination and Interoperability in Language Documentation. *Language Documentation & Conservation*, 3(2), 149–160.

Godoy, R., Reyes-Garcia, V., Byron, E., Leonard, W. R., & Vadez, V. (2005). The Effect of Market Economies on the Well-Being of Indigenous Peoples and on Their Use of Renewable Natural Resources. *Annu. Rev. Anthropol*, 34, 121–138. <https://doi.org/10.1146/annurev.anthro.34.081804.120412>

Grenier, L. (1998). *Working with Indigenous Knowledge: A Guide for Researchers*. International Development Research Centre.

Groenfeldt, D. (1991). Building on tradition: Indigenous irrigation knowledge and sustainable development in Asia. *Agriculture and Human Values*, 8(1), 114–120.

Guerrero, I., Morales, M. B., Onate, J. J., Bengtsson, J., Berendse, F., Clement, L. W., Dennis, C., Eggers, S., Emmerson, M., Fischer, C., Flohre, A., Geiger, F., Hawro, V., Inchausti, P., Kalamess, A., Kinks, R., Liira, J., Melendez, J., Part, T., ... Weisser, W. W. (2011). Taxonomic and functional diversity of farmland bird communities across Europe: effects of biogeography and agricultural intensification. *Biodivers. Conserv.*, 20, 3663–3681.

Gunn, M. C. (1980). Cultural ecology: A brief overview. *Nebraska Anthropologist*, 5, 19–27.

Gupta, A. K. (2000). Shifting Cultivation and Conservation of Biological Diversity in Tripura, Northeast India. *Human Ecology*, 28(4), 605–629.

Hafijah, S., & Azmi, A. (2017). Kedudukan dan Keberadaan Masyarakat Orang Asli Bajau Laut dalam Sejarah Pendudukan Jepun di Sabah, 1942-45: Satu Tinjauan Awal. *Persidangan Nasional Sejarah Dan Sejarahwan Malaysia 2017 Memperkasa Sejarah Nasional Dalam Melestarikan Pembangunan Negara*, 137–148.

Halim, A. A., Jawan, J. A., Ismail, S. R., Othman, N., & Ibrahim, N. N. (2012). Indigenous Knowledge and Biodiversity Conservation in Sabah, Malaysia. *International Journal of Social Science and Humanity*, 2(2), 159–163. <https://doi.org/10.7763/IJSSH.2012.V2.88>

Halina Sandera, M. Y. (2013). Cosmology and World-View among the Bajau: The Supernatural Beliefs and Cultural Evolution. *Mediterranean Journal of Social Sciences*, 4(9), 184–194. <https://doi.org/10.5901/mjss.2013.v4n9p184>

- Hambler, C. (2004). *Conservation*. Cambridge University Press.
- Hames, R. B. (1991). Wildlife conservation in tribal societies. In M. L. Oldfield & J. B. Alcorn (Eds.), *Biodiversity: Culture, conservation and ecodevelopment* (pp. 172–199). Westview.
- Hardawati, Y., Florina, R., Jurry, F., & Martin, R. A. (2020). Kesan amalan sistem pertanian tradisional dan peranan orang asal dalam mengurangkan degradasi hutan: Kajian di Hutan Simpan Gana-Lingkabau, Kota Marudu, Sabah. *Journal of Borneo Social Transformation Studies*, 6(1), 123–147.
- Harrison, T., & Harrison, B. (1971). *The Pre-History of Sabah* (Sabah Soci). Sabah Society.
- Hatton, J. (1881). “*The New Ceylon.*”: *Being a Sketch of British North Borneo, Or Sabah. From Official and Other Exclusive Sources of Information*. Chapman and Hall.
- Hay, J. (2009). Learning indigenous knowledge system. In L. Cooper & S. Walters (Eds.), *Learning/work: Turning work and lifelong learning inside out* (pp. 194–207). HSRC Press.
- Heard, G., Birrell, B., & Khoo, S. (2009). Inter-marriage between indigenous and non-indigenous Australians. *People and Place*, 17(1), 1–14.
- Hens, L. (2006). Indigenous knowledge and biodiversity conservation and management in Ghana. *Journal of Human Ecology*, 20(1), 21–30. <http://www.krepublishers.com/02-Journals/JHE/JHE-20-0-000-000-2006-Web/JHE-20-1-000-000-2006-Abstract-PDF/JHE-20-1-021-030-2006-1561-Hens-Luc/JHE-20-1-021-030-2006-1561-Hens-Luc-Text.pdf>
- Hewlett, B. S., & Cavalli-Sforza, L. L. (1986). Cultural Transmission among Aka Pygmies. *American Anthropologist*, 88(4), 922–934. <https://doi.org/10.1525/aa.1986.88.4.02a00100>
- Hills, F. W. (2004). Passing on Traditional Knowledge. *Indigenous Knowledge Conference Proceedings*.
- Hood Salleh. (2004). *Dunia Peribumi dan alam sekitar: Langkah Ke Hadapan*.
- Hulktrantz, A. (1985). The shaman and the medicine-man. *Soc. Sci. Med*, 20(5), 511–515.
- Humphries, P. (2007). Historical Indigenous use of aquatic resources in Australia's Murray-Darling Basin, and its implications for river management. *Ecological Management & Restoration*, 8(2), 106–113.
- IBP. (2013). *Norway Country Study Guide Volume 1 Strategic Information and Developments*. Int'l Business Publications. <https://books.google.com.ua/books?id=17Mc6Pi73cYC>
- Ibrahim, A. L., Jonhlee, E. B., & Lintangah, W. (2020). *Landscape and livelihood*

*changes in Sabah: Development in Kampung Mangkawagu*. Landscape and Livelihood Changes in Sabah: Development in Kampung Mangkawagu; CIFOR. <https://doi.org/10.17528/cifor/007610>

Ingold, T. (2002). Culture and the perception of the environment. In E. Croll & D. Parkin (Eds.), *Culture, Environment and Development* (pp. 39–56). Routledge.

IUCN. (1980). *World Conservation Strategy*.

IUCN. (2004). *Review and Analysis of Secondary Information on the Processes and Procedures for the Documentation of Traditional Knowledge in Nepal*.

Jabatan Perangkaan Malaysia, D. (2010). *Jumlah Penduduk Mengikut Kumpulan Etnik, Kawasan Pihak Berkuasa Tempatan dan Negeri, Malaysia 2010*. Jabatan Perangkaan Malaysia.

Jasni, R. M. (1965). *Sejarah Sabah*. Saudara Sinaran Berhad.

Jeliazkov, A., Mimet, A., Charge, R., Juguet, F., Devitor, V., & Chiron, F. (2016). Impacts of agricultural intensification on bird communities: New insights from a multi-level and multi-facet approach of biodiversity. *Agriculture, Ecosystems & Environment*, 216, 9–22.

Jewell, C. (2017). *Protecting traditional knowledge: a grassroots perspective*. WIPO Magazine. [https://www.wipo.int/wipo\\_magazine/en/2017/01/article\\_0004.html](https://www.wipo.int/wipo_magazine/en/2017/01/article_0004.html)

Julia, L., Mohd Sabrie, S., Wong, W. W. W., & Gumpil, J. (2016). *Sabah's Roles and Contributions towards Fulfilling the Nation's Strategies in Achieving 100% SSL in Rice Production*. <http://www.iipm.com.my/wp-content/uploads/2016/05/PN.-JULIA-HJ.-LAMDIN.pdf>

Jung, C. G. (1964). *Man and his Symbols*. J.G. Ferguson Publishing.

Jurry, F., & Harifah, M. N. (2012). Respons masyarakat tempatan terhadap pelaksanaan sistem Tagal. *Geografia*, 8(2), 30–37.

Kalland, A. (2005). Indigenous Knowledge: Prospects and Limitations. In R. Ellen, P. Parkes, & A. Bicker (Eds.), *Indigenous Environmental Knowledge and its Transformations: Critical Anthropological Perspectives* (pp. 316–327). Harwood Academic Publishers.

Kardooni, R., Fatimah, K., Siti Rohani, Y., & Siti Hajar, Y. (2014). Traditional knowledge of orang asli on forests in peninsular Malaysia. *Indian Journal of Traditional Knowledge*, 13(2), 283–291.

Ken, D. W. T. (2015). The name of Sabah and the sustaining of a new identity in a new nation. *Archipel. Études Interdisciplinaires Sur Le Monde Insulindien*, 89, 161–178.

Khadijah Ab Rahim, S. A., & Nurhasan, R. (2016). *Status of Sea Urchin Resources in the East Coast of Borneo*.

- Kingsbury, B. (1988). "Indigenous Peoples" in international law: A constructivist approach to the Asian controversy. *The American Journal of International Law*, 92(3), 414–457.
- Koch, T. (2006). Establishing rigor in Qualitative Research: the decision trail. *Journal of Advanced Nursing*, 53(1), 91–103.
- Kodoh, J., Moijol, A. D., Lintangah, W., Gisiu, F., Maid, M., & Liew, K. C. (2017). Traditional knowledge on the use of medicinal plants among the ethnic communities in Kudat, Sabah, Malaysia. *International Journal of Agriculture, Forestry and Plantation*, 5, 79–85.
- Koenig, M. E. D. (2003). Knowledge management, user education and librarianship. *Engineering, Computer Science*, 52(1), 10–17. <https://doi.org/10.1108/00242530310456979>
- Kolshus, K., Matras, F., Treinen, S., & Elstraeten, A. Van der. (2014). *How to organize a knowledge share fair*. Food and Agriculture Organization of the United States. <http://www.fao.org/3/a-aq228e.pdf>
- Kottak, C. P. (2015). *Cultural anthropology: Appreciating cultural diversity*. McGraw-Hill Education.
- Kraft, C. H. (1999). Culture, worldview and contextualization. *Perspectives on the World Christian Movement*, 3, 384–391.
- Kraisame, S. (2018). Language endangerment and community empowerment: Experience from community training in the Moken language documentation and preservation. *Kasetsart Journal of Social Sciences*, 39(2), 244–253. <https://doi.org/https://doi.org/10.1016/j.kjss.2017.05.002>
- Kroeber, A. L., & Kluckhohn, C. (1952). Culture: A critical review of concepts and definitions. *Papers. Peabody Museum of Archaeology & Ethnology, Harvard University*.
- Kuchikura, Y. (1988). Efficiency and focus of blowpipe hunting among Semaq Beri Hunter-Gatherers of Peninsular Malaysia. *Human Ecology*, 16(3), 271–305. <https://doi.org/10.1007/BF00888448>
- Kulip, J. (2003). An ethnobotanical survey of medicinal and other useful plants of Muruts in Sabah, Malaysia. *Telopea*, 10(1), 81–98.
- Kulip, J., Indu, J. P., & Mison, R. (2005). Ethnobotanical survey of medicinal plants in the village of Kaingaran in Sabah, Malaysia. *Journal of Tropical Biology and Conservation*, 1, 71–77.
- Kulip, J., Lam, N. F., Nurhuda, M., Julius, A., Mohd. Said, I., Gisil, J., Joseph, J. A., & Tukin, W. F. T. (2010). Medicinal plants in Maliau Basin, Sabah, Malaysia. *Journal of Tropical Biology and Conservation*, 6, 21–33.
- Kulip, Julius. (2014). The Ethnobotany of Dusun People in Tikolod Village, Tambunan District, Sabah, Malaysia. *Reinwardtia*, 14(1), 101–121.

- Kulip, Julius. (2016). A Study on the Traditional Beliefs and Practices on the Agricultural Land, Forest Resources, River Resources and Conservation by the Dusun People in Tambunan District, Sabah, Malaysia. *Traditional Knowledge for Ecosystem Services in ASEAN Countries - Folk Culture: Proverbs, Old Sayings and Community Rules*, 44–59.
- Kulip, Julius, Majawat, G., & Kulik, J. (2000). Medicinal and other useful plants of the Lundayeh community of Sipitang, Sabah, Malaysia. *Journal of Tropical Forest Science*, 12(4), 810–816.
- Kurup, P. (2011). Ayurveda. In RR Chaudhury UR (Ed.), *Traditional Medicine in Asia* (pp. 3–16). World Health Organization, SEARO Regional Publications.
- Lambin, R., Wahab, N. A., Choo, G. S., Mustapha, R., Abdullah, R., & Sharif, R. M. (2019). Transmission and Documentation of Orang Asli Indigenous Knowledge in 'Green Technology' for Sustainable Development in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 9(5), 195–213. <https://doi.org/10.6007/ijarbss/v9-i5/5850>
- Langton, M., & Rhea, Z. M. (2005). Traditional indigenous biodiversity-related knowledge. *Australian Academic and Research Libraries*, 36(2), 45–69. <https://doi.org/10.1080/00048623.2005.10721248>
- Lapka, M., Vavra, J., & Sokolickova, Z. (2012). Cultural ecology: Contemporary understanding of the relationship between humans and the environment. *Journal of Landscape Ecology*, 5(2), 12–24.
- Lasimbang, J. (2003). *Indigenous Knowledge and Biodiversity in Asia: Malaysia*.
- Lasimbang, Jannie, Nicholas, C., & Erni, C. (2008). Country Profile: Malaysia. In C. Erni (Ed.), *The Concept of Indigenous Peoples in Asia: A Resource Book* (pp. 403–409). International Work Group for Indigenous Affairs & Asia Indigenous Peoples Pact Foundation.
- Laugrand, F. (2012). The Transition to Christianity and Modernity among Indigenous Peoples. *Reviews in Anthropology*, 41(1), 1–22. <https://doi.org/10.1080/00938157.2012.644996>
- LeCompte, M. D., & Goetz, J. P. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research*, 52(1), 31–60.
- LeCompte, M. D., & Schensul, J. J. (2010). *Designing & Conducting Ethnographic Research: An Introduction* (Second). AltaMira Press.
- Lee, Y. L. (1965). *North Borneo (Sabah): a study in settlement geography*. Eastern Universities.
- Lenzerini, F. (2011). Intangible Cultural Heritage: The Living Culture of Peoples. *European Journal of International Law*, 22(1), 101–120. <https://doi.org/10.1093/ejil/chr006>
- Leung, L. (2015). Validity, reliability, and generability in qualitative research. *J Family*

- Lewis, H. T. (1993). Traditional Ecological Knowledge - Some Definitions. *Traditional Ecological Knowledge: Wisdom for Sustainable Development*, 8–12.
- Lichtenstein, A. H., Berger, A., & Cheng, M. J. (2017). Definitions of healing and healing interventions across different cultures. *Annals of Palliative Medicine*, 6(3), 248–252.
- Lim, H. F., Haron, N., Yusof, N., Baharuddin, I. N., Mustapha, N. M., Tan, A. L., Zaidi, N. H., Jamaludin, F., & Mohtar, M. (2015). Documenting Traditional Forest-Related Knowledge of Medicinal Plants in Malaysia: A Comprehensive Approach. *J. Trop. Resour. Sustain. Sci*, 3, 77–85.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. SAGE Publication.
- Liu, Z., & Lee, Y. (2015). A method for development of ecomuseums in Taiwan. *Sustainability*, 7, 13249–13269. <https://doi.org/10.3390/su71013249>
- Loke, V. P. W., Lim, T., & Campos-Arceiz, A. (2020). Hunting practices of the Jahai indigenous community in northern peninsular Malaysia. *Global Ecology and Conservation*, 21, 1–11.
- London, A. J. (2007). Biorespecting and biopiracy in Latin America: The Case of Maca in Peru. *Nebraska Anthropologist*, 32, 63–71.
- Low, K. O. (2012). Belief in bambarayon (paddy spirits) among the Kadazandusun of North Borneo. *Borneo Research Journal*, 6, 75–101.
- Luz, A. C., Guèze, M., Paneque-Galvez, J., Pino, J., Macia, M. J., Orta-Martinez, M., & Reyes-Garcia, V. (2015). How does cultural change affect indigenous peoples' hunting activity? An empirical study among the Tsiman' in the Bolivian Amazon. *Conservation and Society*, 13(4), 382–394.
- Lwoga, E., Ngulube, P., & Stilwell, C. (2016). Indigenous Knowledge Management Practices in Indigenous Organizations in South Africa and Tanzania. *Handbook of Research on Social, Cultural, and Educational Considerations of Indigenous Knowledge in Developing Countries*, 65(November), 181. <https://doi.org/10.4018/978-1-5225-0838-0.ch010>
- Lwoga, E. T., Ngulube, P., & Stilwell, C. (2016). Indigenous knowledge management practices in indigenous organizations in South Africa and Tanzania. In P. Ngulube (Ed.), *Handbook of Research on Social, Cultural, and Educational Considerations of Indigenous Knowledge in Developing Countries*. IGI Global.
- Maclaurin, J., & Sterelny, K. (2008). *Biodiversity*. The University of Chicago Press.
- Maden, K., Kongren, R., & Limbu, T. M. (2009). *Documentation of Indigenous Knowledge, Skills, and Practices of Kirata Nationalities with Special Focus on Biological Resources*. [www.digitalthimalaya.com/collections/rarebooks/](http://www.digitalthimalaya.com/collections/rarebooks/)
- Makbul, N. S., & Wong, A. (2016). The Diversity of Birds in Kota Belud Bird Sanctuary,

Sabah. *Journal of Tropical Biology & Conservation (JTBC)*.

Makihara, D., Mtasiwa, B., Kembo, J., Bazirake, B., Morimoto, Y., Maundu, P., Kariuku, P., & Wakhu, P. (2006). *Concept and process of "Community Empowerment and Networking Program."*

Marinsah, S. A., & Ramli, M. A. (2017). Amalan tradisi magombo'dalam masyarakat Bajau di Semporna Sabah: Analisis dari perspektif sosiobudaya dan perspektif hukum Islam. *Borneo Research Journal*, 11, 72–86.

Marovic, Z., & Machinga, M. M. (2017). African shamanic knowledge and transpersonal psychology: spirits and healing in dialogue. *The Journal of Transpersonal Psychology*, 49(1), 31–44.

Marshall, N. T. (1998). *Searching for a cure: conservation of medicinal wildlife resources in east and southern Africa*. Traffic International.

Mason, R., & Omar, A. (2003). The Bumiputera policy: Dynamics and dilemmas. *Kajian Malaysia*, 21(1), 1–12.

Mason, T., Ismail, N., & Ayob, R. (2015). Documentation and Mapping of local knowledge in Malaysia. *Australian Journal of Basic and Applied Sciences*, 9(7), 168–171.

Maxwell, A. R. (1981). The Origin of the Name "Sabah." *Sabah Society Journal*, 7(Part 2), 82.

Maxwell, J. A. (2013). *Qualitative Research Design: An Interactive Approach* (3rd Editio). SAGE Publication.

McDade, T., Reyes-Garcia, V., W., L., Tanner, S., & Huanca, T. (2007). Maternal ethnobotanical knowledge is associated with multiple measures of child health in the Bolivian Amazon. *Proceedings of the National Academy of Sciences of the United States of America*, 104(15), 6134–6139.

MCMC. (2015). *Population by States and Ethnic Group*.

Melin, G. (2000). Pragmatism and self-organization: Research collaboration on the individual level. *Research Policy*, 29, 31–40.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to to design and implementation*. Josey-Bass.

Mertz, O., Wadley, R. L., Nielsen, U., Bruun, T. B., Colfer, C. J. P., de Neergaard, A., Jepsen, M. R., Martinussen, T., Zhao, Q., Noweg, G. T., & Magid, J. (2008). A fresh look at shifting cultivation: Fallow length an uncertain indicator of productivity. *Agricultural Systems*, 96(1–3), 75–84. <https://doi.org/10.1016/J.AGSY.2007.06.002>

Milne, D., & Howard, W. (2000). Rethinking the role of diagnosis in Navajo religious healing. *Medical Anthropology Quarterly*, 14(4), 543–570.

- Mugabe, J. (1999). Intellectual Property Protection and Traditional Knowledge: An Exploration in International Policy Discourse. *Intellectual Property and Human Rights*, 97–122.
- Namdeo, A. G. (2018). Chapter 20 - Cultivation of Medicinal and Aromatic Plants. In S. C. Mandal, V. Mandal, & T. B. T.-N. P. and D. D. Konishi (Eds.), *Natural Products and Drug Discovery: An Integrated Approach* (pp. 525–553). Elsevier. <https://doi.org/https://doi.org/10.1016/B978-0-08-102081-4.00020-4>
- Natiemoa-Baidu, Y. (1995). *Indigenous vs. Introduced Biodiversity Conservation Strategies: The Case of Protected Area Systems in Ghana (African Biodiversity Series 1)*. Biodiversity Support Programme.
- National Policy on Biological Diversity. (1998). *National Policy on Biological Diversity*. Ministry of Science, Technology and The Environment.
- National Policy on the Environment. (2002). *National Policy on the Environment*. Ministry of Science, Technology and The Environment.
- Ngulube, P. (2002). Managing and preserving indigenous knowledge in the knowledge management era: challenges and opportunities for information professionals. *Information Development*, 18(2), 95–100.
- Nguofo, R., Yongyeh, N. K., Obioha, E. E., Bobo, K. S., Jimoh, S. O., & Waltert, M. (2014). Social norms and cultural services - community belief system and use of wildlife products in the northern periphery of the Korup National Park, South-West Cameroon. *Change Adaptation Socioecol. Syst*, 1, 26–34. <https://doi.org/10.2478/cass-2014-0003>
- Nguyen, T. H., & Ross, A. (2017). Barriers and Opportunities for the Involvement of Indigenous Knowledge in Water Resources Management in the Gam River Basin in North-East Vietnam. *Water Alternatives*, 10(1).
- Nicolas, A. R., & Cabarogias, A. S. (2015). Indigenous Knowledge and Sustainable Pest Management in Rice Farming Communities of Southeastern Luzon, Philippines. *International Journal on Advance Science Engineering Information Technology*, 5(6), 440–443.
- Niezen, R. (2003). *The origins of indigenism*. University of California Press.
- Nordin, R., Hassan, K. H., & Zainol, Z. A. (2012). Traditional knowledge documentation: Preventing or promoting biopiracy. *Pertanika Journal of Social Science and Humanities*, 20(SPEC. ISS.), 11–22.
- Nornis, M. S. (1999). *Bahasa dan Alam Pemikiran Masyarakat Bajau*. Universiti Malaysia Sabah.
- Noss, A. J. (1997). Challenges to nature conservation with community development in central African forests. *Oryx*, 31(3), 180–188.
- Nur Zaimah, U., Restiweela, S., Rossazana, A., & Farhana, I. (2018). Tagang System Development: The Impacts and Perception of Local Communities in Terbat



Mawang Village, Sarawak, Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 8(12), 1203–1222. <https://doi.org/10.6007/IJARBSS/v8-i12/192>

O'Neill, A. R., Badola, H. K., Dhyani, P. P., & Rana, S. K. (2017). Integrating ethnobiological knowledge into biodiversity conservation in the Eastern Himalayas. *Journal of Ethnobiology and Ethnomedicine*, 13(21), 1–14. <https://doi.org/10.1186/s13002-017-0148-9>

Ohmagari, K., & Berkes, F. (1997). Transmission of Indigenous Knowledge and Bush Skills among the Western James Bay Cree Women of Subarctic Canada. *Human Ecology*, 25(2), 197–222.

Olekao, S. K. (2017). *The role of traditional ecological knowledge in management of dryland ecosystems among Maasai pastoralists in Kiteto District, Tanzania*. Sokoine University of Agriculture.

Olsen, C. S. (1998). The trade in medicinal and aromatic plants from Central Nepal to Northern India. *Economic Botany*, 52(3), 279–292.

Omari, R., Bellingrath-Kimura, S., Sarkodee-Addo, E., Oikawa, Y., & Fujii, Y. (2018). Exploring Farmers' Indigenous Knowledge of Soil Quality and Fertility Management Practices in Selected Farming Communities of the Guinea Savannah Agro-Ecological Zone of Ghana. *Sustainability*, 10(1034), 1–16.

Omari, R., Sarkodee-Addo, E., Fujii, Y., Oikawa, Y., & Bellingrath-Kimura, S. (2017). Impact of Fertilization Type on Soil Microbial Biomass and Nutrient Availability in Two Agroecological Zones of Ghana. *Agronomy*, 7(3), 55.

On, L. K., & Pugh-Kitingan, J. (2015). The impact of christianity on traditional agricultural practices and beliefs among the kimaragang of sabah: A preliminary study. *Asian Ethnology*, 74(2), 401–424. <https://doi.org/10.18874/ae.74.2.08>

Oppenheimer, S., Richards, M., & Macaulay, V. (2000). Austronesian homeland in Island Southeast Asia: a genetic perspective. *Borneo 2000. Proceedings of the Sixth Borneo Research Council Research Conference*, 72–91.

Othman, L. (2017). *Penyelidikan Kualitatif: Pengenalan kepada Teori dan Metode* (U. P. S. Idris (ed.)).

Oviedo, G., Jeanrenaud, S., & Otegui, M. (2005). *Protecting Sacred Natural Sites of Indigenous and Traditional Peoples: an IUCN Perspective*. [https://www.iucn.org/sites/dev/files/import/downloads/sp\\_protecting\\_sacred\\_natural\\_sites\\_indigenous.pdf](https://www.iucn.org/sites/dev/files/import/downloads/sp_protecting_sacred_natural_sites_indigenous.pdf)

Pangayan, V. B., & Sha, A. S. H. (2021). Ethnic minorities in borneo: the kimaragang people. *Gendang Alam*, 11(1), 245–256.

Parajuli, D. R., & Das, T. (2013). Indigenous Knowledge And Biodiversity: Interconnectedness For Sustainable. *International Journal of Scientific and Technology Research*, 2(8), 220–224.

- Patel, S. K., Singh, A., & Singh, G. S. (2019). Food production through traditional agriculture: an urgent need to improve soil health by sustaining soil microbial diversity. *International Journal of Current Microbiology and Applied Sciences*, 8(1), 183–196.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. SAGE Publication.
- Patton, M. Q. (2015). *Qualitative Evaluation and Research Methods*. Sage.
- Patzel, N. (2010). Occurrence, function and meaning of symbols in agriculture. In I. Darnhofer & M. Grötzer (Eds.), *Building Sustainable rural Futures: The Added Value of Systems Approaches in Times of Change and Uncertainty. 9th European IFSA Symposium* (pp. 1234–1236). BOKU - University of Natural Resources and Applied Sciences.
- Paulina, R., & Johnson, M. (2016). Indigenous Knowledge Within Academia: Exploring the Tensions that Exist between Indigenous, Decolonizing, and Nehiyawak Methodologies. *Totem: The University of Western Ontario of Anthropology*, 24(1), 20.
- Pindah, C., Bebit, M. A. A., & Amin, H. (2015). Thematic Analysis as a Basis in Giving Meanings to Myths of Nunuk Ragang and Huminodun Folktales of Kadazandusun Tribe in Sabah. In S. Zainal Abidin, R. Legino, H. Md Noor, V. V. Vermol, R. Anwar, & M. F. Kamaruzaman (Eds.), *Proceedings of the 2nd International Colloquium of Art and Design Education Research (i-CADER 2015)* (pp. 577–580). Springer.
- Polfus, J. L., Simmons, D., Neyelle, M., Bayha, W., Andrew, F., Andrew, L., Merkle, B. G., Rice, K., & Manseau, M. (2017). Creative convergence: exploring biocultural diversity through art. *Ecology and Society*, 22(2).
- Posey, D. A. (2003). Kayapó Ethnoecology and Culture. In *Kayapó Ethnoecology and Culture*. <https://doi.org/10.4324/9780203220191>
- Pugh-Kitingan, J. (2014). Balancing the human and spiritual worlds: Rituals, music, and dance among Dusunic societies in Sabah. *Yearbook for Traditional Music*, 46(2014), 170–190.
- Pugh-Kitingan, J. (2015). Cultural and Religious Diversity in Sabah and Relationships with Surrounding Areas. In I. Tokoro, H. Tomizawa, T. G. Daigaku, & A. A. G. B. Kenkyūjo (Eds.), *Islam and Cultural Diversity in Southeast Asia* (pp. 269–294). Research Institute for Languages and Cultures of Asia and Africa (ILCAA).
- Pugh-Kitingan, J. (2016). *Kadazandusun*. Institut Terjemahan & Buku Malaysia Berhad.
- Purcell, T. W. (1998). Indigenous knowledge and applied anthropology : Questions of definition and di ... *Human Organization*, 57(3), 258–272. <https://doi.org/10.17730/humo.57.3.qg0427ht23111694>
- Rahman, M. H. (2013). A Study on Exploration of Ethnobotanical Knowledge of Rural

Community in Bangladesh: Basis for Biodiversity Conservation. *ISRN Biodiversity*, 2013, 1–11. <https://doi.org/http://dx.doi.org/10.1155/2013/369138>

Rankoana, S. A. (2015). The Use of Indigenous Knowledge in Subsistence Farming: Implications for Sustainable Agricultural Production in Dikgale Community in Limpopo Province, South Africa. In H. Jordaan & Manfred Max Bergman (Eds.), *Towards a Sustainable Agriculture: Farming Practices and Water Use* (pp. 63–72). MDPI.

Regis, P., & Lasimbang, A. (n.d.). *Introduction to Integration of Indigenous Culture into Non-Formal Education Programmes in Sabah*.

Renddan, B., & Azi, Y. A. (2020). Shifting the Dimensionality of Language: Evidence from Bilingual Bajau Sama Kota Belud in Malaysia. *Advances in Language and Literary Studies*, 11(6), 12–24.

Reo, N. J., & Whyte, K. P. (2012). Hunting and Morality as Elements of Traditional Ecological Knowledge. *Human Ecology*, 40(1), 15–27.

Reyes-García, V., Guèze, M., Luz, A. C., Paneque-Gálvez, J., Macía, M. J., Orta-Martínez, M., Pino, J., & Rubio-Campillo, X. (2014). Evidence of traditional knowledge loss among a contemporary indigenous society. *Evolution and Human Behavior*, 34(4), 249–257. <https://doi.org/10.1016/j.evolhumbehav.2013.03.002>

Robinson, J. G., & Redford, K. H. (1994). Measuring the sustainability of tropical forests. *Oryx*, 28(4), 249–256.

Roseman-Halsband, J. L., Carson, C., Torres, E., Strong, J., Thomas, S., Filemyr, A., Gonzales, T., & Vetter, R. (2019). Indigenous Medicine. *Alternative and Complementary Therapies*, 25(6), 292–303.

Rosnon, M. R. (2016). Indigenous Education Policy in Malaysia: a Discussion of Normalization in Schooling. *Journal of Education and Social Sciences*, 4, 25–32.

Rutter, O. (1922). *British North Borneo An Account of its History, Resources and Native Tribes*. Dalcassian Publishing Company.

Rutter, O. (1929). *The Pagans of North Borneo*. Oxford University Press.

SaBC, & GDF. (2010). *Biodiversity Information Management and Traditional Knowledge in Sabah*.

Saidatul Nornis, H. M. (2012a). Pandang Dunia dan Kosmologi Bajau. In H. M. Saidatul Nornis (Ed.), *Bajau Pantai Barat* (pp. 183–213). ITBM-UMS.

Saidatul Nornis, H. M. (2012b). Sistem Ekonomi Tradisi. In H. M. Saidatul Nornis (Ed.), *Bajau Pantai Barat* (pp. 89–108). Institut Terjemahan & Buku Malaysia.

Sandor, J. A., & Furbee, L. (1996). Indigenous knowledge in classification of soil in the Andes of Southern Peru. *Soil Sci Soc Am J*, 60, 1502–1512.

- Saugestad, S. (2001). *The inconvenient indigenous: remote area development in Botswana, donor assistance and the first people of the Kalahari*. Nordic Africa Institute.
- Sayok, A. K., & Teucher, U. (2018). Loss of Food Plants Knowledge and Identity among Indigenous Peoples in Akademia Baru Journal of Advanced Research in Loss of Food Plants Knowledge and Identity among Indigenous Peoples in Malaysia. *Journal of Advanced Research in Social and Behavioural Sciences*, June.
- SEDIA. (2008). *Sabah Development Corridor*. [http://www.sedia.com.my/SDC\\_Blueprint/Blueprint\\_BM/BAB3.pdf](http://www.sedia.com.my/SDC_Blueprint/Blueprint_BM/BAB3.pdf)
- Senanayake, S. G. J. N. (2006). Indigenous Knowledge As a Key To Sustainable. *The Journal of Agricultural Sciences*, 2(1), 87–94.
- Shafiia, A. H., Ishakb, S., Hassanc, H., Ghouse, M., & Beguma, M. (2016). Babalian and community rituals of Dusun Tatana Ethnic in Sabah, Malaysia: A preliminary study. *International Soft Science Conference*.
- Simons, H. (2009). *Case study research in practice*. SAGE publications.
- Singh, R. (2000). *The Making of Sabah, 1865-1941: The Dynamics of Indigenous Society*. University of Malaya Press.
- Sithole, J. (2007). The challenges faced by African libraries and information centres in documenting and preserving indigenous knowledge. *IFLA Journal*, 33(2), 117–123.
- Siti Aidah, L. (2007). *Perubahan sosio-ekonomi dan pentadbiran masyarakat peribumi Sabah (1881-1963)*. Penerbit Universiti Malaysia Sabah.
- Smith, M. K. (2006). Beyond the curriculum: Fostering associational life in schools. In Z. Bekerman, N. C. Burbules, & D. Silberman-Kelelr (Eds.), *Learning in Places: The informal education reader* (pp. 9–34). Peter Lang.
- Sobrevila, C. (2008). *The Role of Indigenous Peoples in Biodiversity Conservation; The Natural but Often Forgotten Partners*. 102.
- Staal, F. J. (1923). The Dusuns of North Borneo. Their Social Life. *Anthropos*, H. 4./6, 958–977.
- Stevenson, M. G. (1996). Indigenous knowledge in environmental assessment. *Artic*, 49(3), 278–291. <https://doi.org/10.2307/40512004>
- Steward, J. (1955). *Theory-of-Culture-Change-Julian-Steward.pdf*.
- Steward, J. H. (1955). *Theory of Culture Change*. University of Illinois.
- Struthers, R., Eschiti, V. S., & Patchell, B. (2004). Traditional indigenous healing: Part 1. *Complementary Therapies in Nursing Midwifery*, 10, 141–149.

- Sutton, M. O., & Anderson, E. N. (2014). *Introduction to Cultural Ecology*. AltaMira Press.
- Tagle, Y. R. (n.d.). *The Protection of Indigenous Knowledge Related to Biodiversity: The Role of Database*. [https://www.sylff.org/wp-content/uploads/2009/03/sylff\\_p131-146.pdf](https://www.sylff.org/wp-content/uploads/2009/03/sylff_p131-146.pdf)
- Tanalgo, K. C. (2017). Wildlife Hunting by Indigenous People in a Philippine Protected Area: A Perspective from Mt. Apo National Park, Mindanao Island. *Journal of Threatened Taxa*, 9(6), 10307–10313.
- Tang, R., & Gavin, M. C. (2016). A Classification of Threats to Traditional Ecological Knowledge and Conservation Responses. *Conservation and Society*, 14(1), 57–70.
- Taylor, M. J., & Thoth, C. A. (2011). *Cultural Transmission BT - Encyclopedia of Child Behavior and Development* (S. Goldstein & J. A. Naglieri (eds.)); pp. 448–451. Springer US. [https://doi.org/10.1007/978-0-387-79061-9\\_755](https://doi.org/10.1007/978-0-387-79061-9_755)
- Thagard, P. (1997). Collaborative knowledge. *Noûs*, 31(2), 242–261.
- Toledo, V. (2001). Indigenous Peoples and Biodiversity. In *Encyclopedia of Biodiversity* (Vol. 3). <https://doi.org/10.1016/B978-0-12-384719-5.00299-9>
- Tongkul, F. (2002). *Traditional Systems of Indigenous Peoples of Sabah, Malaysia*. PACOS Trust.
- Tongkul, F., Lasimbang, C., Lasimbang, A., & Chin Jr, P. (2012). Traditional knowledge and SFM: experience from Malaysia. *Unasylva* 240, 64(1), 41–49.
- Torri, M. C., & Herrmann, T. M. (2011). Spiritual Beliefs and Ecological Traditions in Indigenous Communities in India: Enhancing Community-Based Biodiversity Conservation. *Nature and Culture*, 6(2), 168–191. <https://doi.org/10.3167/nc.2011.060204>
- Tucker, B. (2013). Cultural Ecology. In *Theory in Social and Cultural Anthropology: An Encyclopedia* (Vol. 1, pp. 142–147). SAGE.
- Tyler, M. E. (1993). Spiritual stewardship in aboriginal resource management systems. *Environments*, 22(1), 1–7.
- Tylor, E. B. (1871). *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Language, Art, and Customs*. Cambridge University Press.
- United Nations. (1992). Convention on biological diversity. *Diversity*, 30. <https://doi.org/10.1146/annurev.ento.48.091801.112645>
- United Nations. (2006). *Conserving Cultural and Biological Diversity: The Role of Sacred Natural Sites and Cultural Landscapes*. UNESCO.
- United Nations Development Program, & International Recovery Platform. (2010).

Guidance Note on Recovery.  
[https://www.undp.org/content/dam/india/docs/guidance\\_note\\_on\\_recovery\\_livelihood.pdf](https://www.undp.org/content/dam/india/docs/guidance_note_on_recovery_livelihood.pdf)

- Usher, P. J. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, 53(2), 183–197.
- Vadez, V., Reyes-García, V., Godoy, R., Byron, E., & Apaza, L. (2004). Does integration to the market homogenize agriculture? Evidence from Tsimane' Amerindians. *Hum. Ecol.*, 32(5), 635–646.
- Vasco, C., & Sirén, A. (2019). Determinants of Wild Fish Consumption in Indigenous Communities in the Ecuadorian Amazon. *Society & Natural Resources*, 32(1), 21–33.
- Veira, M. A. R. de M., Muhlen, E. M. von, & Shepard, G. H. (2015). Participatory Monitoring and Management of Subsistence Hunting in the Piagaçu-Purus Reserve, Brazil. *Conservation and Society*, 13(3), 254–264.
- Vidal, C. (2008). Wat is een wereldbeeld? (What is a worldview?). In H. Van Belle & J. Van der Veken (Eds.), *Nieuwheid denken. De wetenschappen en het creatieve aspect van de werkelijkheid* (Issue September). Acco. [https://learn.liberty.edu/webapps/blackboard/content/listContent.jsp?course\\_id=\\_549088\\_1&content\\_id=\\_34711706\\_1](https://learn.liberty.edu/webapps/blackboard/content/listContent.jsp?course_id=_549088_1&content_id=_34711706_1)
- Wahab, E. O., Odunsi, S. O., & Ajiboye, O. E. (2012). Causes and Consequences of Rapid Erosion of Cultural Values in a Traditional African Society. *Journal of Anthropology*.
- Wan Arfah, H., & Ramy, B. (2003). *An introduction to the Malaysian legal system*. Fajar Bakti.
- Warren, D. M. (1996). Indigenous knowledge, biodiversity conservation and development. *Sustainable Development in Third World Countries: Applied and Theoretical Perspectives*, September, 81–8. <http://books.google.com/books?hl=en&lr=&id=o5fliqIKFzsC&oi=fnd&pg=PA81&dq=%22Knowledge+and%22+%22Among+the+influential+documents+now+published+are+those+by+Abramovitz+for+the%22+%22these+publications+focus+on+the+immediate+and+long-term+negative+biologica>
- Watters, R. F. (1971). *Shifting Cultivation in Latin America*.
- Werner, K., Dickson, G., & Hyde, K. F. (2015). Learning and knowledge transfer processes in a mega-events context: The case of the 2011 Rugby World Cup. *Tourism Management*, 48, 174–187. <https://doi.org/http://dx.doi.org/10.1016/j.tourman.2014.11.003>
- Wilder, B. T., O'Meara, C., Monti, L., & Nabhan, G. P. (2016). The Importance of Indigenous Knowledge in Curbing the Loss of Language and Biodiversity. *BioScience*, 66(6), 499–509. <https://doi.org/10.1093/biosci/biw026>
- Williams, E., Guenther, J., & Arnott, A. (2011). *Traditional healing: A review of*

*literature* (No. 2; Working Paper Series 2: Evaluation and Policy).  
[http://www.covaluator.net/docs/S2.2\\_traditional\\_healing\\_lit\\_review.pdf](http://www.covaluator.net/docs/S2.2_traditional_healing_lit_review.pdf)

Wilson, N. J. (2014). Indigenous water governance: Insights from the hydrosocial relations of the Koyukon Athabascan village of Ruby, Alaska. *Geoforum*, 57, 1–11. <https://doi.org/https://doi.org/10.1016/j.geoforum.2014.08.005>

WIPO. (2017). *Documenting Traditional Knowledge – A Toolkit*. World Intellectual Property Organization.  
[https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_1049.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1049.pdf)

Witt, K., Ross, H., Shaw, S., Jones, N., Rissik, D., & Pinner, B. (2019). How do local people value rural waterways? A study in the upper catchments of South East Queensland's rivers. *Society & Natural Resources*, 32(6), 638–656.

Wong, D. (2009). Wooley and the codification of native customs in Sabah. *New Zealand Journal of Asian Studies*, 11(1), 87–105.

Wong, J. Z., Etoh, S., & Sujang, A. B. (2009). *Towards sustainable community-based fishery resources management: the Tagal system of Sabah, Malaysia*.

Wotherspoon, T. (2015). Formal and Informal Indigenous Education. In W. Jacob, S. Cheng, & M. Porter (Eds.), *Indigenous Education*. Springer.  
[https://doi.org/10.1007/978-94-017-9355-1\\_4](https://doi.org/10.1007/978-94-017-9355-1_4)

Yap, B. L. (1985). The Traditional World-views of the Indigenous Peoples of Sabah. In M. T. Osman (Ed.), *Malaysian World-view* (pp. 76–130). Institute of Southeast Asian Studies.

Yin, R. K. (2003). *Case study research: Design and methods* (Vol. 5). SAGE Publication, Inc.