

The background of the cover is a vibrant landscape photograph. At the top, a blue sky is filled with large, white, fluffy clouds. Below the sky, a range of dark, forested mountains stretches across the horizon. In the middle ground, a dense, green forest covers the slopes of the mountains. On the left side, a waterfall cascades over large, grey rocks. In the bottom right corner, a small village with colorful houses and a winding road is visible, partially obscured by a layer of white mist or low clouds that fills the lower portion of the image.

# BUNGO RANGE

**BIODIVERSITY AND COMMUNITY**

EDITORS

GABRIEL TONGA NOWEG

FAISAL ALI ANWARALI KHAN

JONGKAR GRINANG



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EDITORS

GABRIEL TONGA NOWEG  
FAISAL ALI ANWARALI KHAN  
JONGKAR GRINANG

SUPPORTING EDITORS

CINDY PETER  
RUNI SYLVESTER PUNGA  
ANDREW ALEK TUEN

UNIVERSITI MALAYSIA SARAWAK

# BUNGO RANGE

BIODIVERSITY AND COMMUNITY

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# FOREWORD

I am glad to note that this publication is another excellent milestone from Universiti Malaysia Sarawak through the Institute of Biodiversity and Environmental Conservation, in particular exploring and documenting the rich biodiversity and community in Sarawak. The biodiversity and environmental conservation is one of three niche areas of the university, which recognise the need to balance the biodiversity, habitats and human development. As such, the Research Innovation and Enterprise Centre, the university's centre responsible for research and innovation, has actively facilitated and supported research activities, and publications in various platforms available to scientific communities and the public.

I would like to thank staff of the Institute of Biodiversity and Environmental Conservation for continuously conducting good research and documenting crucial information that benefits many users including scientists across the region. It is well in line with the Institute's vision to become a leading center for research in tropical biodiversity and environmental conservation in Borneo and Southeast Asian region. I would like to congratulate the editors for their efforts in compiling and editing the data resulted from a multidisciplinary expedition in Bungo Range in December 2017 into a well indexed research book. I do believe that each article in this book serves its purpose as an important reference to academics, policy makers as well as public audiences. In particular, the findings would be a useful reference for the management plan of Bungo Range National Park that was gazetted on 26 February 2009.

To materialise the multidisciplinary expedition and the publication, the Institute had collaborated with various state agencies and local communities. Therefore, I am acknowledging their support and contribution (both financial and in-kind) to this project. They are Forest Department Sarawak, Sarawak Forestry Corporation,

Sarawak Biodiversity Centre, Sekolah Kebangsaan Tringgus, Pejabat Pendidikan Daerah Bau, Bau District Office, Bau District Council, Klinik Kesihatan Krokong, Bau District Police, Bau Fire and Rescue Station, Bau Hospital, and villagers from Tringgus settlement namely, Kg Bong, Kg Rotan and Kg Nguan. I hope similar collaborative efforts will be pursued in the near future to other protected areas in Sarawak.

To the authors, UNIMAS Publisher, and those who are involved in this publication, keep up with the good team spirit.

Finally, thank you for inviting me to pen my message in this great reading material.

**Prof. Dr. Wan Hashim bin Wan Ibrahim**  
**Deputy Vice Chancellor (Research and Innovation)**  
**Universiti Malaysia Sarawak**

# PREFACE

This publication marks another significant output of the collaborative works between Universiti Malaysia Sarawak and Forest Department Sarawak on biodiversity study and conservation in the State.

In this book, the findings of multidisciplinary expedition to Bungo Range in December 2017 were compiled into 24 chapters covering biodiversity, environment and community under the theme “Bungo Range - Biodiversity and Community”. The theme signifies the importance of the pristine mountainous forest of the Bungo Range that supports rich species of flora and fauna, and the uniqueness of community and their customs as well as cultures. The involvement of academics, researchers and the villagers in the expedition has enhanced the exchange of knowledge, skill, and experience among the stakeholders, which are reflected in this book. In particular, the participation of the villagers in the expedition had indirectly conveyed the message of the Forest Department Sarawak on the importance of conserving the forest of Bungo Range and preserving local cultures. Ironically, the Bungo Range is becoming a popular tourism destination due to the outstanding sceneries such as mountains, waterfalls, reservoir, and the cultures (e. g., the last ring ladies). Indeed, this book will serve as a useful reading material for researchers, scientists and non-government organization in their research endeavour.

We would like to congratulate the editors, authors and those who contributed to the production of this book. We wish similar outputs shall be achieved from future collaborative work between Universiti Malaysia Sarawak and Forest Department Sarawak. Specifically, we would like to thank the community leaders and heads of department in Bau District for their support throughout the project. Yang Berhormat Miro Simuh for his strong supports of the expedition and launching of the event on 5<sup>th</sup> December 2017.

We hope this book serves the needs of the audiences either as academic reference or reading material in leisure time. Happy Reading!

**Prof. Dr. Mohd Azlan Jayasilan**

Director  
Institute of Biodiversity and  
Environmental Conservation  
Universiti Malaysia Sarawak

**Datu Hamden Haji Mohammad**

Director  
Forest Department Sarawak

# INTRODUCTION

Sarawak government has voluntarily set aside more than 2.6 million hectares of lands and water bodies as conservation areas under the Heart of Borneo (HOB) Initiatives. The Sarawak's HOB area stretch from the north in Limbang Division to the south at Tanjung Datu that boundaries with Sabah, Brunei and Kalimantan, Indonesia. Of the total HOB area, approximately 441,000 hectares are totally protected area comprising national parks, wildlife sanctuaries and nature reserves. The southern part of the HOB contains 10 protected areas many of which are tourism hotspots such as Bako National Park, Kubah National Park, Gunung Gading National Park, Matang Wildlife Centre and Tanjung Datu National Park.

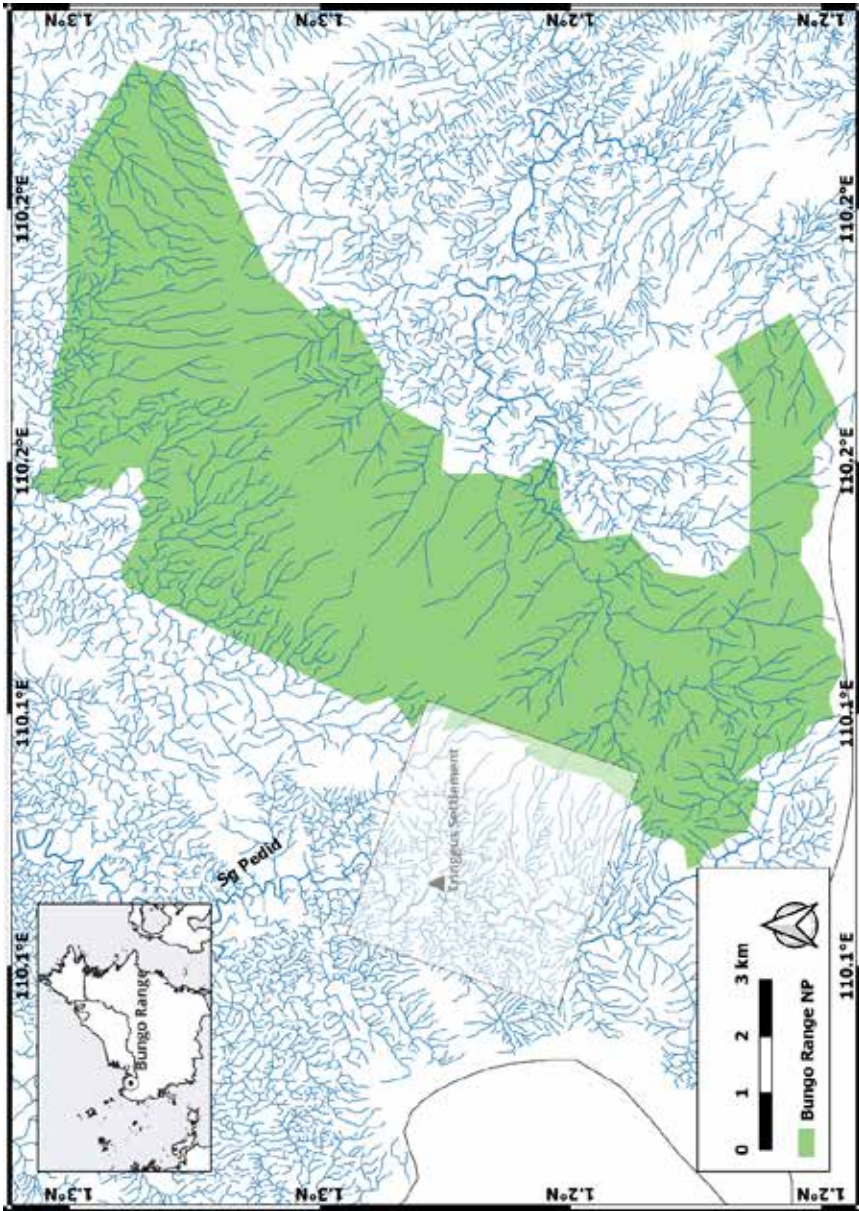
Bungo Range is located at 10° 16' latitude and 110° 9' longitude of the southern side of the HOB, about 500 meter above the sea level. The mountainous primary forest of the area was gazetted as Bungo Range National Park on 26<sup>th</sup> February 2009 covering 8,096 heactares (**Figure 1.1**). Bungo Range is an important water catchment area in the upstream of the Sarawak Kiri River and Sarawak Kanan River, where the Bengoh Dam is built to provide water supply for Kuching population. The southern end of the Bungo Range is the boundary of West Kalimantan, Indonesia.

In 2017, a multidisciplinary expedition to Bungo Range was conducted as one of the activities organized in conjunction with UNIMAS's Silver Jubilee Celebration. The Institute of Biodiversity and Environmental Conservation had led the expedition with the support of Forest Department Sarawak and other Institutes as well as Faculties within the university. The goal of the expedition was to increase the visibility of UNIMAS not just to the Tringgus community, but also to answer the call of the Sarawak government that wants to emphasise the implementation of Digital Biodiversity

in this state. The expedition was conducted for two weeks with the launching of the event held on 5<sup>th</sup> December 2017 at Tringgus settlement area.

Despite the earliest exploration in the area back to year 1880s, there is a lack of information pertaining to biodiversity and socio-economy, which are necessary to enhance biodiversity conservation, and boost local economic activities in the area. The expedition had produced substantial baseline data for the management of Bungo Range National Park, and highlight the area as a tourism destination, which eventually would benefit the local community in the area. The findings of the expedition are compiled herewith, comprising historical exploration in Bungo Range, water resource, aquatic biodiversity, floristics, mammals, birds, reptiles, amphibians, insects, and health and socio-economics of the locals. In summary, this book reported a total of 313 species of plants mainly orchids and zingers, and 298 species of wildlife among others are 105 birds, 39 mammals, 92 insects, 27 reptiles, 17 amphibians, and 59 aquatic lives. Additionally, the use of natural resources by local community in Tringgus is also presented in this book.

Because the expedition had only covered a small area of the southern section of the Bungo Range, gaps of information in this edition are expected, which suggest more explorations are needed in the near future. In this regard, the editors would like to acknowledge the contribution of the authors of each article in this edition. This edition may not stop here, and we wish to be working with you all again!



**Figure 1.1.** Map of Bungo Range National Park and the expedition area (shaded box).





# TAGANG SYSTEM ON PEDID RIVER

Eva Kristin Larry Sait, Wong Swee Kiong and Neilson Ilan Mersat

Composed of logged forest, secondary forest and protected primary forest, Bungo Range is part of the catchment area of Sarawak River. Tringgus is a Bidayuh settlement located on the western side of the Bungo Range in Bau. Tringgus consists of three villages: Tringgus Bong, Tringgus Rabak Rotan, and Tringgus Matan Nguan. On the eastern side of the Bungo range, on the other hand, dwell the Bidayuh of Padawan, who traditionally live in longhouses. The Bidayuh of Tringgus and Padawan speak a similar dialect of Biatah Bidayuh.

The people of Tringgus have relied on the forest for their various livelihood activities. They clear the land for paddy cultivation, collect wood as their building materials, hunt game for food and sport as well as gather wild fruits, vegetables and honey to supplement their diet. The forest is also the place for the villagers to secure raw materials such as rattan, bamboo, vines, and bark used to weave utility baskets (*kata*) and mats for drying paddy (*kasah*). As they are in close contact with the forests, the villagers in Tringgus are generally still rich in the indigenous knowledge of utilizing these resources as well as adopting their cultural practices related to the forest and nature. Sungai Pediaq (local pronunciation as Pidiea), which runs through the three villages of Tringgus is also an additional source of protein for the villagers, as it is still relatively clean and a suitable habitat for aquatic life such as freshwater fish, crab, prawn, river snails. The villagers also saw potential to develop the area for eco-tourism as it has maintained a relatively unpolluted river environment, besides having close proximity to Bungo Range National Park which becomes an attraction to visitors.

Sungai Pidiea is an important natural capital to the community. Aware of the importance of the river and the sustainability of its resources, the villagers of Tringgus, in collaboration with Inland Fisheries Division of the Department of Agriculture in Sarawak, have established a smart partnership for protection, conservation and management of river resources known as *Tagang* system in Sungai Pidiea. The *Tagang* system manages the harvesting of river resources by gazettelement of three zones i.e. red, yellow and green, in which villagers may or may not be allowed to fish. The village *Tagang* committee members worked together with the officers from the Agriculture Department to determine the zones for the *Tagang* system along 1.5 km stretch of Sungai Pediea. Each colour-coded zone of red, yellow or green, carries a specific meaning. The red zone is designated as a fish breeding ground which prohibits all fishing activities. The yellow zones are areas in which fish harvest is allowed about once in two years (*'buka Tagang'* or open season) or during special occasions upon approval from the *Tagang* committee, and green zones are areas in which fishing is permitted at any time to only members of the *Tagang*.

The *Tagang* system in Tringgus began operating in 2013 involving all three villages. It encompasses nine deep pools along designated stretch of Sungai Pidiea including Lubok San, Lubok Bong Satu, Lubok Bong Dua, Lubok Bakah, Lubok Sendang and Lubok Samban. Lubok Bong Satu, with a depth of three meters, being designated as breeding ground among the six pools in the Red Zone. *Lampam jawa* (*Barbonymus gonionotus*) and *Tengadak* (*Barbonymus schwanenfeldii*) are the main fish conserved in the area. In fact, a total of 30,000 fish fries were released initially during the officiating ceremony of the *Tagang* system in 2016. Besides this, *Semah* (*Tor* species) and *Juak* (*Hampala bimaculata*) can also be found in Sungai Pidiea as they are native species to the area. Among the species, the price of big-sized of *Semah* can fetch as high as RM200/kg

The villagers believe that there is a potential for ecotourism in Tringgus that are biodiversity- and cultural heritage-based. Development of homestays and recreational areas have been progressing well by adopting beautiful sceneries of the rivers and mountains as well utilizing of forest materials such as bamboo, rattan and wood to preserve the authenticity of living in a traditional Bidayuh village. An information center has also been built for the management of tourism activities and to display the tourism products. At the time of this study, the entrance fee was not imposed yet, but the committee members have planned to start with the fees upon the completion of important management facilities and services with the guidance of Sarawak Tourism Board. The villagers hope that the implementation of the *Tagang* system would contribute to the conservation of aquatic life in Pediea River while sustaining ecotourism activities in Tringgus.



**Figure 22.1.** Sungai Pidiea facing upstream with background view of the Bungo Range.



**Figure 22.2.** Three conservation zones of Tagang System designated along 1.5 km stretch of Sungai Pidiea.



**Figure 22.3.** Signage denoting the start of the restricted Red Zone in Sungai Pidiea from Lubok San to Lubok Bekah.



**Figure 22.4.** Homestays built by the river using forest materials.



**Figure 22.5.** A waterfall in Tringgus as an attraction to visitors.



**Figure 22.6.** A villager uses her indigenous knowledge to prepare rattan materials for basket weaving.



**Figure 22.7.** A work in progress of rattan basket.

# BUNGO RANGE

**BIODIVERSITY AND COMMUNITY**

This book highlights the significant findings from the Multidisciplinary Expedition in Bungo Range conducted on 5-10 December 2017. The expedition was organized by the Institute of Biodiversity and Environmental Conservation, UNIMAS with support from the Forest Department Sarawak. This volume is illustrated in 24 chapters covering the historical exploration of Bungo Range, a geological feature of the mountain, water resources, aquatic biodiversity, floristics, mammals, birds, reptiles, amphibians, insects, and health and socio-economics of the Tringgus community. It is reported herewith in the book that there are a total of 313 species of plants mainly orchids and zingers, and 298 species of wildlife, among them 105 birds, 39 mammals, 92 insects, 27 reptiles, 17 amphibians, and 59 aquatic lives. Additionally, the use of natural resources by the local community in Tringgus is also presented. This book can serve as a useful reference for the development and management of Bungo Range National Park, and the communities living surrounding the area.