

EARTHWATCH Climate and Landscape Change in Borneo's Rainforests

アースウォッチ「ボルネオの雨林と気候変動」体験報告

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1. Introduction

I happened to learn about EARTHWATCH two years ago when I was at an airport in India. A science teacher told me the story of an EARTHWATCH project she did in Africa and the importance of the environment. It interested me a lot. A year later Rikuzentakata, a city of Iwate prefecture where I grew up, was devastated by the earthquake and tsunami on March 11, 2011. The disaster made me change my view of the environment and make up my mind to do something about it.

2. Overview of the Expedition

a. Expedition Date

July 25, 2012 – August 3, 2012

b. Research Location

Malua Forest Reserve and Danum Valley Conservation Area, Sabah, Malaysia

c. Assignments for Volunteers of Team 2

To work with scientists in experimental areas within forest fragments and degraded forest focusing on:

- Assessing survival and growth
- Measuring dipterocarp seedlings (height, diameter)
- Counting leaves of the seedlings
- Measuring the amount of sunlight available for photosynthesis with PAR meter
- Measuring forest overstory density with Spherical Densiometer

d. EARTHWATCH Scientists and Field Staff

Dr. Glen Reynolds, Director of Royal Society SEARRP and EARTHWATCH Lead Scientist

Prof. Rory P.D. Walsh, Research Coordinator of SEARRP

Dzaeman Dzulkipli, Researcher from the University of Zurich

Yeong Kok Loong [a.k.a. Benny], Researcher from the University of Malaysia, Sabah

Philip Ulok, Senior Manager of the Sabah Biodiversity Experiment

e. Volunteer Members of Team 2

Frederick Chapel, United States / Brooke McReynolds, Australia

Ryan Zimmer, United States / Yeh-Chia Chen, Taiwan / Yi-Wen Wu, Taiwan

Hidefumi Suzuki, Japan / Junichi Suzuki, Japan / Sayuri Okabe, Japan

Kenichi Matsuda, Japan / Ryo Sasaki, Japan

3. About the EARTHWATCH Project

a. Overall Goal

To maintain rainforest biodiversity, ecosystem functioning and conservation value in the face of climate and land use change

b. Four Main Objectives of Research

Objective 1: To establish the regeneration status and restoration requirements of degraded and fragmented forest and how restoration can best be achieved

Objective 2: To assess biodiversity and vegetation structure in pristine and degraded rainforest, forest under active restoration and in rainforest fragments

Objective 3: To assess the ability of degraded and fragmented forest to maintain ecosystem functioning (focusing on decomposition)

Objective 4: To establish the susceptibility to erosion and soil moisture status of forest fragments, degraded/restored rainforest and plantations

c. About the Research Area

Borneo is the third largest island in the world and has exceptionally rich biodiversity in its tropical rainforests. However, over the decades, these lowland forests have been under serious threat from human activities such as intensive industrial-scale logging and conversion to huge agricultural plantations.

Danum Valley Conservation Area covering almost 450 square kilometers is one of the largest and most important areas of protected primary lowland rainforest managed by Yayasan Sabah and the Danum Vally Management Committee (Class I - Protection Forest Reserves). The Danum Valley Field Centre, one of the leading tropical forest research centers in Southeast Asia, is located on the eastern border of DVCA.

Malua Forest Reserve is classified as a secondary lowland forest and one of the most important areas of contiguous forest remaining in Borneo (Class II - Commercial Forest Reserves). Currently, the site is under conservation management by the Malua BioBank Forest Restoration Project and has been set up within a large-scale forest rehabilitation area covering five square kilometers of logged forest (also known as Sabah Biodiversity Experiment). Malua Base Camp, where we were based, is located about 63 kilometers north of Danum by road.

4. Team 2 Ten-day Schedule and Daily Schedule

a. Team 2 Ten-day Schedule

| Day (Date) | Day Activity | Evening Activity |
|----------------------|--|--|
| Day 1 (25/Jul/12) | Rendezvous at a hotel in Kota Kinabalu Health and safety briefing by Mr. Simon Transfer from KK to Danum Valley | Introductory lecture on EARTHWATCH Project by Dr. Glen Self-introductions |
| Day 2 (26/Jul/12) | Short trek in the primary forest and in-forest lecture by Dr. Glen Transfer from Danum Valley to Malua | Orientation Health and safety briefing by Dzaeman |
| Day 3 (27/Jul/12) | Field work with Dzaeman Lab work | Lecture on Vani's study by Benny |
| Day 4 (28/Jul/12) | Field work with Dzaeman Lab work | Lecture on Dzaeman's study by himself |
| Day 5 (29/Jul/12) | Field work with Benny | Lecture on Benny's study by himself |
| Day 6 (30/Jul/12) | Field work with Dzaeman Lab work | Night drive |
| Day 7 (31/Jul/12) | Excursion to Borneo Rainforest Lodge (Danum Valley) | |
| Day 8 (1/Aug/12) | Field work and in-forest lecture by Benny | Lecture on Dr. Rory's overall research by himself |
| Day 9 (2/Aug/12) | Lab work Wrap-up session with Dr. Glen | Farewell party |
| Day 10 (3/Aug/12) | Visit to oil-palm plantation and lecture by Dr. Glen Transfer from Malua to KK End of expedition | |

b. Daily Schedule

| Time | Activity |
|-------------|--|
| 6:30~7:00 | Wake up with natural symphony |
| 7:00~8:00 | Breakfast and preparation for field work |
| 8:00~8:30 | Warm-up exercise and depart to field site |
| 8:30~12:00 | Field work |
| 12:00~13:00 | Lunch |
| 13:00~15:30 | Field work and drive back to camp site or lab work |
| 15:30~16:00 | Do laundry and take a shower |
| 16:00~19:00 | Afternoon tea and recreational activities |
| 19:00~20:00 | Dinner |
| 20:00~21:30 | Lecture by EARTHWATCH scientist or field staff |
| 21:30~22:00 | Prepare for bed |
| 22:00 | Lights out |

5. Research Activities for Each Objective

Objective 1 (studied and organized by Dzaeman and Benny)

Objective 2 (studied and organized by Benny)

Objective 3 (studied and organized by Benny)

In this research, the volunteer activities including measuring survival and growth (height, diameter, etc.) of dipterocarp seedlings allowed for assessment of its regeneration and diversity in degraded forest.



Measuring the height of the seedling



Measuring the diameter of the seedling



Counting the leaves



Measuring forest overstory density with Densiometer



Measuring the amount of sunlight available for photosynthesis with PAR meter

Objective 4 (studied and organized by Vani)

In this research, soil moisture levels to assess could be found through weighing leaves.



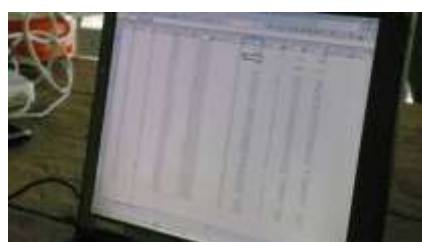
Separating into leaves, sticks and small pieces



Weighing leaves



Weighing sticks(wood)



Recording the data

6. Excursion to Borneo Rainforest Lodge

a. What is Borneo Rainforest Lodge?

Located in the Danum Valley Conservation Area, the Borneo Rainforest Lodge is a basic and international-standard lodge surrounded with a primary rainforest jungle. We did not stay there, but had an incredibly unique jungle experience.



b. Activities at the BRL

The main activities at the BRL include jungle walks, bird-watching, a canopy walkway and night safaris. We enjoyed the following:



The BRL trail map



Canopy walkway, 107m long and 27m high!



Nature trail near the lodge



Fairy Falls, pool and natural Dr. Fish!



Birds and wildlife spotting



Certified for donating blood to leeches!



Certification

7. Life at Malua

Staying at Malua gave us unforgettable and fantastic days. Terima Kashi!



Hostels and shower rooms



Bed and mosquito net



Outdoor lecture site



Inspiring evening lectures by scientists every night



Dining room



Authentic Malay dish
All you can eat!



Swimming in the river
Found fish and a soft-shelled turtle!↗



Soft-shelled turtle
Called "suppon" in Japanese!



[Front] Clothesline
[Back] Badminton and volleyball
courts we played on everyday



Field staffs' lodge! Cozy!

8. Biodiversity at Danum Valley and Malua

Borneo has exceptionally diverse rainforest, which includes over 15,000 species of flowering plant, more than 220 species of mammal, 420 species of bird, more than 250 reptiles, almost 150 amphibians, over 400 species of freshwater fish and many tens of thousands of insects and other invertebrates.



Orangutan eating in the tree
(=“person of the forest” in Malay)



Black and yellow broadbill



Lizard
(Many varieties of lizard at Malua)



Calanthe orchid



Tongkat ali fruits!



Leech “Nice to see you again!”



Strangler fig tree



Dipterocarp trees



Centipede that bit me sleeping in bed!



Pitcher plant



Mengaris

9. After the Project

a. Climate Change

Rainforests not only in Borneo but around the world play a critically important role in many ways in our everyday lives on the planet. They provide a home to a large number of the world's plants and animal species and protect against flooding and erosion. Even more, they help stabilize the world's climate. They absorb carbon dioxide, a greenhouse gas, from the atmosphere and produce oxygen. When rainforests are cut down and burned, the carbon in the wood and leaves disappears into the atmosphere. This contributes to climate change. In turn, climate change threatens rainforests by contributing to droughts. The rainforests in Borneo have experienced severe droughts in recent decades. I truly did not know what was happening around the world before this trip.

b. Deforestation

Rainforests have been destroyed in Borneo over the past decades. I was able to witness part of the situation i.e. degraded and fragmented forests and conversion to agricultural land use such as palm oil plantations. On the other hand, I also learned a lot about conservation projects like Malua Bio Bank, INIKEA and more. In addition to them, some forests have been certified to Forest Stewardship Council (FSC) standards and now some palm oil plantations are being assessed for certification to the Roundtable on Sustainable Palm Oil principles (RSPO). Above all, I had the good fortune to meet scientists and researchers struggling and tackling the problem in the rainforest to make a difference. They inspired me.

c. Diversity ~Interculture, not just multicultural or monoculture~

One of the most amazing things was getting a chance to see the richness of diversity. I got quite excited by the unique and complex dynamics of biodiversity. Moreover, I noticed that the biodiversity was necessary for the rainforest because it was the best balanced relationship as a system. They help and support each other and work together until now. I need to learn and understand more about the system. Now we live and work in a cross-cultural environment and many foreign and different ideas, philosophies, and worldviews encounter each other all the time. In that sense, with each difference, it could be more important for us to support each other more interculturally, build sustainable relationships and live together on this planet.

10. Improving my experience in my field

a. Learning More

I learned a lot through this expedition. Learning new things causes us to proceed to have questions, compare the information to our current knowledge or experience, and connect it with related ideas. So, for example, if my students learn about the rainforest layers in Borneo, they can look at the forests surrounding them using what they learned and ask questions about their differences. Also, it will be possible for them to notice the connection between their life in Japan and the fact of what has been happening in Borneo. Therefore, they can think more about themselves and the world.

b. Thinking Globally, Acting Locally, Sustainably and...

Fortunately I gained a lot from the project. At the same time, sadly, I saw the destruction of the rainforest in Borneo. What did I see and think about the environment? And what did I do for it? I was shocked. Then I started thinking about it and taking action little by little on a daily basis. That includes sharing my experience with my students, teachers and friends, and rethinking my life. Everyone must change their way of thinking. We all have new things to be aware of. There are many things we can do for the environment. Living on the planet gives us a lot of responsibilities.

11. Acknowledgements

I would like to thank the Kao Corporation, which has given me their support and vision. This opportunity I could have in Borneo would not have been possible without them.

A very special thanks is also due to EARTHWATCH JAPAN staff, EARTHWATCH Borneo's Rainforests Project staff, especially Dr. Glen, Benny, Dzaeman and the Malua boys and moms, and Team 2 members, Fred, Brooke, Ryan, Yeh-Chia, Yi-Wen, Suzuki sensei, Jun kun, Sayuri sensei and Ken sensei. Terima Kashi!

Finally, I would like to acknowledge Ms. Nagahama for encouraging me to get involved in the expedition.

