

# Participatory Restoration of Mangrove Forests: 5-year Activity of U To Village, Myanmar



Ramsar Center Japan



In collaboration with  
the Myanmar Forest Association

## Introduction

“A small fishing village in the south-eastern part of Myanmar is having problems catching fish due to the decline of mangrove forests. I was wondering if RCJ could help us to restore the mangrove forests to their former glory”.

It was in the spring of 2016 that the Ramsar Center Japan (RCJ), an environmental NGO working in Japan and Asia for 30 years, received a consultation from Mr. Htun Paw Oo of the Myanmar Forest Association (MFA), an NGO based in Yangon. This is a story about the village of U To (population 500), located by the U To stream in the Ayeyarwady (Irrawaddy) region of southern Myanmar.

Mangrove forests in the coastal area of tropical and subtropical region are not only an important habitat for fish, shrimp, crabs, and shellfish, but also a source of high-quality timber and charcoal. They perform a variety of roles, such as purifying water and protecting the country from

storm surges and tsunamis. Although the Myanmar government prohibits the uncontrolled logging of mangrove forests, the mangrove forests of the U To stream are not protected public forests. As a result, the catch of fish and crabs decreased, and the villagers who depend on their livelihood on fishing became desperate.

Mr. Htun Paw Oo said, “MFA would like to help the villagers restore the mangrove forests by themselves and recover the abundant fishing grounds”.

MFA is an NGO consisting of former senior foresters of the Forest Department who have extensive experience and skills in management of mangrove forests. It was looking for funding to proceed the project.

In collaboration with MFA as a partner, RCJ decided to apply for a grant from the Toyota Environmental Activity Grant Program of Toyota Motor Corporation, which supports NGO activities.

We were fortunate to get the grant for the “Sustainable Life Forest Conservation and Livelihood support through Community Based Activities at U To Village, Rakhine Coast, Myanmar” (activity period 2017-18), and the “Sustainable Management of the Mangrove Forest in U To Village, Myanmar, as well as Share Their Experiences to Nearby Villages, and Conduct Environmental Awareness Activities for Young Generations” (2020-21).

We have been working with the people of U To village for five years. Now, healthy mangrove forests are recovering in the watershed of the U To stream, and shellfish, crabs, and fish are coming back to the area.

How did the village of U To regain its mangrove forests and rich ecosystem? This is a record of those five years.

## Visiting U To Village

In January 2017, the RCJ group visited U To village for the first time. The group consisted of project leader, Mr. Tamotsu Kameyama, Ms. Reiko Nakamura, Mr. Kimihiko Maekawa, and Dr. Bishnu Bhandari (Nepal) with MFA members, Mr. Htun Paw Oo and Mr. Myo Lwin. We left Yangon, the former capital of Myanmar, at 8:00 a.m. and drove westward for about six hours, crossing several rivers in the delta region of Ayeyarwady, and driving all the way to the Rakhine coast facing the Bay of Bengal. On the way, in Pathein, the capital of the Ayeyarwady region, we paid a courtesy call to Mr. Tin Maung Than, the Director of the Ayeyarwady Region of the Myanmar Forestry Department, to report on the activities in U To village and ask for the cooperation of the department.

We arrived at U To a little after 3:00 pm. At the community center in the village, we met with the village leaders and villagers for the first time.

From what we could see, the area around U To village seemed to be covered with abundant mangrove forests. However, according to the villagers, the mangrove forests used to be quite dense up until around 1990, but afterwards, they started being cut down for fuel and charcoal production, and year by year their devastation has been progressing.

The villager’s complaints are “The fish that used to be caught as soon as we put our nets in the river are no longer easy to catch”, “The crabs are fewer and smaller”, “The seawater flows deep into the

river and gets into the wells, making the water undrinkable,” and “We wonder if this is because the mangrove forests are no longer as thick as they used to be”.

Since two years ago, some villagers stopped selling mangrove seeds, which they used to collect and sell, and have started growing seedlings in their own nursery. However, as the mangrove forests around the village are not designated as protected public forests, there is no way to stop them cutting down by persons from outside the village. The mangroves are an essential source of energy for daily cooking in and around U To, where electricity and gas are not available.

The comments from the villagers were: “We want the mangrove forests to be restored somehow, and have them be protected” and “If we have dense mangrove forests, we can attract tourists as an eco-tourism spot”.

After the meeting, we went to see the mangroves forests in the area. As we traveled up the river by boat and entered the tributaries, we found empty spaces here and there with only the stumps of cut trees left. The mangrove forests in the village looked rich at first glance, but in fact they were degraded forests.



First meeting with U To villagers in January 2017



This vacant lot used to be a mangrove forest



A young fisherman showed us the fish he had caught that day

## What is U To Village?

U To village, named after the U To stream (24 km long), is one of the newly settled villages at the coastal area of the Bay of Bengal in western Myanmar. It is said that the beginning of the village was in 1980 when the four settlers started to live at the mouth of the U To stream, a tributary of the Chaung Thar stream.

The brackish water area of the estuary, where seawater from the ocean and freshwater from the river mix, is a rich fishing ground where fish from both the ocean and the river can be caught. As U To village is located on the main road leading to Pathein, the capital of Ayeyarwady region, due to the convenience of transportation, the number of settlers has gradually increased, and the village is now home to 500 people and 120 households.

The village has an administrator, one male and one female leader, several elders, and 10 household heads (group leader for every 10 households), who hold a community meeting monthly to decide on various matters. There is one elementary school with 130 children attending.

Chaung Thar Beach, a natural, long sandy beach which has been developed as a tourist resort since 1992, is located on the

Rakhine coast facing the Bay of Bengal, not far from U To village. The road connecting Pathein and Chaung Thar Beach has been improved, hotels are lined up, and the beach is crowded with tourists from all over Myanmar. As a result, it has become an important consumption area for fish, crabs, and shellfish caught in U To village.

With the completion of the current new bridge in 2016, Chaung Thar Beach can now be reached in about 10 minutes by car from the village. There is high potential for the development of ecotourism consisting of tourists visiting Chaung Thar Beach, taking advantage of the rich mangrove forests and biodiversity of U To village.



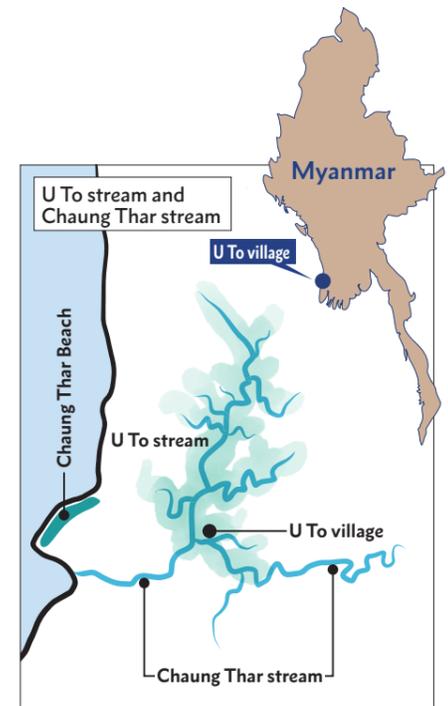
Main street of the village. Stilt houses line along the U To stream.



The road in front of the entrance of elementary school, which leads to Chaung Thar Beach



Chaung Thar Beach in the off-season. Horses carrying tourists walking leisurely along the sandy beach



## Nature of Myanmar

The Republic of the Union of Myanmar (formerly Burma) is located on the western side of the Indochina Peninsula in Southeast Asia. It is a long country whose land runs north to south with an area of 680,000 km<sup>2</sup>. It shares a northwestern border with Bangladesh and India, a northeastern border with China, a southeastern border with Laos and Thailand, and its southwestern coast faces the Bay of Bengal and the Andaman Sea in the Indian Ocean. It is a multi-ethnic country with about 55 million people, 70% of whom are Burmese, and it includes 135 other ethnic groups such as the Karen, Rakhine, and Mon tribes.

Nearly 50% of the country is covered by forests, and four major rivers, the Ayeyarwady, Salween, Chindwin, and Sittaung, flow through the country from the northern highlands to the south. Among them, the Ayeyarwady River (2,200 km long), which is a principal river of Myanmar, is formed by the confluence of the Nmai and Mali rivers, rise in northern Myanmar border with Tibet Plateau, branches out in many directions, forming a vast delta in the basin, and a large mangrove forest has developed in the estuary.

The estuaries of the Chaung Thar stream and U To stream, which flow

out of the western hills and into the Bay of Bengal from the Rakhine coast, also have fertile mud flats, and mangrove forests have formed in the area.

Because economic development has lagged behind that of other countries in the Indochina peninsula, the area has preserved an unspoiled nature rich in biodiversity and is said to be the last unexplored region in Asia, with habitats for endangered waterfowl confirmed and new species of monkeys discovered. However, with the rapid economic development in recent years, there are concerns that this biodiversity hotspot may be affected in various ways.

## Start of villagers' activities

In February 2017, the people of U To village started their activity to revive the mangrove forests. First, they organized a Village Development Group (VDG) consisting of six members, including representatives of the village elders and leaders, to serve as the core for promoting the activities. A fundamental socio-economic survey was first conducted for all households in the village to understand the basic situation of the target area for the project activities.

By June, it was decided to build a nursery for mangrove seedlings on a plot of vacant land to the east of the village. The land was cleared of obstacles, then banks and fences were built around it. 5,000 one-year-old seedlings were purchased and transplanted into the nursery. At the same time, 16,000 propagules (seeds of mangroves) harvested by the villagers from the surrounding mangrove forests were planted one by one in pots and placed in the nursery to be nurtured and cared for.

The villagers decided to build a wooden boardwalk with a handrail around the seedling facility, as well as a covered hut to avoid the hot summer sun.

They set aside 200 hectares of mangrove forest around the village as a voluntary conservation area. To publicize this decision, the villagers put up 70 signboards calling for mangrove conservation.

In July, a tree-planting ceremony was held as a demonstration of awareness-raising. T-shirts with the logo, steamed sticky

rice, and vegetable tempura were delivered to 80 participants as refreshment. In December, a wooden signboard calling for the conservation of mangroves was erected near the village. In the year of 2017, about 5,000 mangroves were planted.

Activity by the villagers continued into 2018. In January, 3,000 new young seedlings were purchased and started to grow in the nursery. Villagers continued to harvest propagules from the surrounding mangrove forests. They cut undergrowth of shrubs and weeds in the conservation area and planted 500 seedlings from propagules since the previous year.

In May and June, after the rainy season began, villagers planted 10,000 young trees that had been purchased and 9,600 seedlings that had grown from propagules in the planned reforestation areas, in order to fill in the gaps created by the degradation of the mangrove forest.

It was also confirmed that 90% of the seedlings planted in 2017 have been successfully grown. In the two years from 2017 to 2018, more than 20,000 young trees and 70,000 seedlings from propagules were planted in total in 5 hectares.

In November 2018, during a trip to the Ayeyarwady region, Minister U Ohn Win of the Ministry of Natural Resources and Environmental Conservation (MONREC) of the Government of Myanmar visited the U To village and observed the plantation activities. The Minister's visit greatly cheered up the people of U To village.



Planting seedlings of *Rhizophora mucronata* with bamboo poles erected six feet apart



Blue signs indicate conservation areas, and red signs say "Please help us to conserve the mangroves"



Rows of seedlings being carefully nurtured at the village nursery

## Second Visiting U To Village



The trip members at Natyenan, the largest plantation area of the project



Walking on the mud flats towards the plantation area

In October 2018, RCJ members revisited U To Village. Mr. Tamotsu Kameyama, Ms. Reiko Nakamura, and Dr. Bishnu Bhandari were joined by 4 new participants: Mr. Toshihiko Hayashi, Prof. Shimpei Iwasaki, Mr. Yuma Sato, and Dr. Sansanee Choowaew (Thailand).

Mr. Myo Lwin of MFA accompanied us again as our guide and interpreter.

There were several changes in U To village after a year and a half. First, the mangroves, which were planted and nurtured by the villagers, are growing well, and the number of bare open spaces has visibly decreased. Second, thanks to the support of a Japanese company, a generator was installed to provide electricity to the village from 6:00 pm to 10:00 pm. In addition, a deep well was dug with the help of a monk's donation, which solved the drinking water problem of the people who had been suffering from saltwater intrusion.

In what was a vacant lot when we visit-

ed the village in 2017, a wooden nursery and boardwalk had been built. A wooden staircase connects the main road overlooking the village to the nursery, so that people visiting the village can easily stroll along the boardwalk through the mangrove forest. The design was based on the expectation of future ecotourism development.

The second day, guided by Mr. Soe Myint, a MFA staff member, we took a boat ride up the U To stream to a mangrove plantation area. After about an hour of boating, we arrived at Natyenan, the area's largest plantation. We got off the boat, trudged over the mud flats while just barely keeping our balance as our boots sank into the mud, and were able to confirm that the seedlings planted last year were growing well.

On this day, we also visited five other tree planting sites and planted commemorative trees at each site.

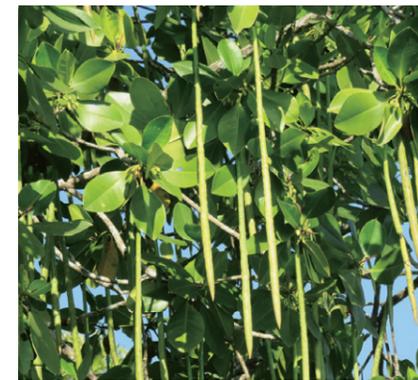
## Mangroves of U To Village

Mangrove is a general term for evergreen trees that grow in brackish water areas where seawater and freshwater mix, such as estuaries in coastal areas of tropical and subtropical regions. The northern limit of mangrove forests is the southern part of Japan.

It is said that there are about 50 to 70 species of mangrove plants, and they are also called mangrove forests because they often grow densely together to form a forest zone. While land plants usually die when immersed in salty seawater, mangrove plants grow only in the brackish water of the intertidal zone, which is affected by the tides, and have the unique property of being able to survive even if they are submerged in the sea for several hours a day.

Because they grow on soft mud flats, they have unique characteristics such as prop roots that form octopus-like roots to prevent them from falling over, aerial roots (respiratory roots) that emerge from the surface of the water to breathe, and some of them have a mechanism to discharge salt from the underside of their leaves.

The total area of mangrove forests in the world is said to be about 15 million hectares. This is only about 0.4% of the total forest area of the earth, but it is decreasing significantly year by year for various reasons.



Many propagules hanging from a mangrove, *Rhizophora mucronata*



A mangrove, *Rhizophora mucronata* standing firmly on its supporting roots



The mangrove forests around the village have grown denser and taller

For example, many of the mangrove forests in Southeast Asia have been transformed into shrimp farms and developed into rice paddies. Many mangroves have been cut down to make charcoal, a high quality material that has strong firepower and is long-lasting.

Myanmar has the fourth largest area of mangrove forests in Asia, but in recent years its mangrove forests have been declining due to the development of forest products and conversion to agricultural land. Especially in the delta region of Ayeyarwady, the deterioration of mangrove forests is progressing because of logging for fuel in large urban areas.

However, the mangrove forests that develop on the border between the sea and the land have a variety of invaluable functions. They provide a habitat for benthic animals such as shrimps, crabs and shellfish, a place for fish to spawn and raise their young, protect the land from storm surges, tidal waves and tsunamis, and purify eutrophic wastewater from the land. They also act as sinks for CO<sub>2</sub>, which is a major factor in climate change.

In addition to preserving the remaining mangrove forests, activities to restore and regenerate mangrove forests that have deteriorated or disappeared are required.

The most common mangrove plants found in U To village are *Rhizophora mucronata*, *Rhizophora apiculata*, *Ceriops decandra*, *Kandelia candel*, and *Bruguiera gymnorhiza*.

Initially, there were said to be 12 species of mangroves in and around the village. In October 2020, a field survey by the Patheingyi District Forest Department identi-



Insert propagules of *Bruguiera gymnorhiza* into pots containing soil to grow seedlings

fied 22 true mangrove species and 6 associate mangrove species, some of which are listed as "Least Concern" and "Endangered" in the IUCN Red Data Book. There are still some good conditioned mangrove forests left in U To village.

The mangrove plants, which are common in U To village, produce propagules that germinate and begin to mature when the seeds are still on the tree. When they are mature enough, they fall away from the parent tree, and their pointy ends stick in the mud and quickly take root and grow leaves.

The villagers of U To can either plant the propagules directly as they collect them, or they can replant them in pots and grow them in a nursery before planting.

## Mud Crabs: Benefits of Mangroves



A mud crab caught in the mud of mangrove forests at U To village



Training in Bangsrakao Village (Thailand) where crab hatching facilities are located on the sea



The trainer showed us the technique of scrubbing the eggs of a mother crab with a brush

One of the main sources of income for the fisherman in U To village is the fishing of mud crabs, which live in the muddy mud flats of the mangroves.

However, in recent years, as the mangrove forests have deteriorated, the crabs have become smaller and fewer have been caught.

In May 2017, MFA invited an expert to train villagers in crab fattening. Crab fattening is a method of temporarily raising small crabs in a live-box to make them bigger before selling them to the market. In addition to generating income by selling the crabs at a higher price, crab fattening also helps protect the crabs by reducing the pressure on natural crab resources.

Twelve villagers participated in the training. Immediately, they built a flat pot pond (9m x 9m) as taught in the training, put 400 small crabs in this pond, and started feeding them.

In December 2017, RCJ also conducted a "crab training" trip to Thailand, a neighboring country where the crab aquaculture activities are popular.

Seven people participated in the program, including Ms. Tin Tin Mya and Mr. Zaw Lin Tun, representatives of the villag-

ers, Mr. Myo Lwin and Mr. Soe Myint from MFA, Mr. Tamotsu Kameyama, Mr. Kimihiko Maekawa, and Mr. Durga Prasad Dash (India) from RCJ.

Under the coordination of Dr. Sansanee Chooaew of Mahidol University and her students, the group visited several sites of "Crab Bank" and "Soft-shell Crab Farming", techniques which are actively conducted in Thailand.

The "Crab Bank" is a community-based resource management method where humans assist and facilitate the spawning and larval release of egg-holding female crabs in order to prevent the depletion of crab resources.

Unfortunately, the attempt at crab fattening in U To village was abandoned due to an accident in which all the crabs released into the pond disappeared. The crab bank and softshell crab farming that we learned about in Thailand will take some time to materialize in U To village, as



Mayor Sathit of the Bangsrakao Village (Thailand) and all participants

there are several issues to be addressed.

Nevertheless, the international training was a great stimulus for the project to think about the future sustainability of the village.

## Clam Fattening

The people of U To village also focused on the mangrove clams that can be found in the surrounding area. There are several kinds of mangrove clams submerged in the mud flats of the mangrove forests at a depth of 3 to 6 cm. They are delicious and sell at high prices. Hundreds of mangrove clams per day can be collected from the mud. The villagers also tried to fatten and grow the mangrove clams in order to sell them at even higher prices.

In October 2017, they built an enclosure near the village's mangrove nursery and started fattening mangrove clams. There is no need to feed them because the plankton in the seawater that comes up the U To stream at high tide is a natural food source for the clams. It is a natural cycle method of fattening.



He showed us the different types of mangrove clams

washes over their feet at high tide two times a day. We were told that since the clams are raised right under their houses, it helps prevent theft.



He began the mangrove clam fattening under the floor of his stilt house

## Expectations for Ecotourism

Ecotourism development based on the rich biodiversity of the village was also discussed. Since U To village is located near Chaung Thar Beach, one of the most famous resorts on the Rakhine coast of Myanmar, there seems to be a big potential for the development of mangrove cruises and nature watching on the U To stream targeted to the tourists to the resort.

In October 2018, the first eco-tour training was held with invited experts, and 20 people participated. The wooden boardwalk around the mangrove nursery and the covered resting hut were set up on the advice of the expert with an eye to the possibility of starting eco-tours in the future.

During the second phase of activities in 2020-21, it was planned to send a delega-

tion from U To village to observe advanced community-based ecotourism site in other regions.

This plan could not be carried out due to the outbreak of COVID-19, but in early June 2021, two members of the MFA visited Kyaik Ta Lei village near Yangon where ecotourism is practiced.

In late June 2021, MFA organized a training workshop with an expert in U To village to handover the results of the inspection to the villagers. Twenty-six people participated in the workshop.

In the village, construction of a toilet



The railing boardwalk, covered hut and the nursery, seen from the road

and septic tank for future eco-tourists was carried out.



Construction of the foundation of a toilet and septic tank in June 2021



Future goal is to use boats like this for ecotourism



The one and only grocery store in the village

## Towards a Certification of the Community Forestry

The mangrove seedling cultivation and planting have been continued by the villagers in 2020 and 2021. So far, more than 120,000 mangrove seedlings and propagules have been planted in the 5 years since 2017. Thanks to the rich mangrove forests being regenerated, fishes are gradually returning to the U To stream. The catch of crabs and other benthic animals have also increased, and the fishing in U To village is coming back to life.

Seeing the success of the project in U To village, the residents of Tha Zin village, located a little further south along the Rakhine coast, wanted to start mangrove restoration as well. After sharing the experiences of U To village, Tha Zin village made a plan to plant 15,000 mangrove seedlings on 5 ha as the first step.

Another good move was to start working towards "Community Forestry" certification of 650 ha of mangrove forest in the U To stream basin. The mangrove forests of the U To stream are not designated as a protected public forest, so no matter how much the people of U To village stress the importance of conservation there are no

legal restrictions on logging or stopping the conversion to paddy fields.

It was the MFA that advised aiming for the certification as a Community Forestry for which local residents are responsible for the management, conservation, and use of forests.

It is a method of forest resource management in which local residents participate in the management of the forest, and the profits from the management are distributed to the residents. It is also known as "social forestry".

It was first introduced in Nepal in the mid-1970s, and spread to the Philippines, India, Thailand, and China, but was not introduced to Myanmar until the mid-1990s.

In order to work the management method effectively, there must be a community and residents who depend on the forest for their livelihood on a daily basis, who are familiar with its characteristics, and who will take the initiative to use it sustainably in the future.

In Myanmar, which has a long history of forest management by the government, participatory forest management is a rath-

er unique new concept.

As of 2010, the area of Community Forestry in Myanmar is about 0.1% of the total forest area. Currently, only a limited area has been certified, and the certification process is quite strict. In the village of U To, once the current application for "protected public forest" has been approved, the next step will be to apply for "community forestry".

Following the MFA's advice, the villagers formed a forest user group and started preparing a management plan for the surrounding 650 ha of land.

According to subsequent news, the village has applied to the Ayeyarwady Region of the Government's Forestry Department to be designated as an "Official Protected Forest," a prerequisite for Community Forestry certification. Once the current application has been approved, the next step will be to apply for Community Forestry.

## The Future of U To Village: As a Gatekeeper of the Natural Environment

Efforts to restore mangrove forests and sustainable livelihoods of U To village were forcibly stalled due to COVID-19, which became a worldwide pandemic from the end of 2019. Severe activity restrictions prevented RCJ members from visiting Myanmar, and also prevented MFA staff in Yangon from visiting on-site. The number of visitors to Chaung Thar Beach has declined, and sales of crabs and mangrove clams caught in U To village have also been poor.

The villagers are continuing to grow mangrove seedlings, plant saplings, and repair broken wooden boardwalk, using whatever resources they have. Some of the seedlings will be provided to Tha Zin village, which is about to embark on a new mangrove restoration project.

Coordination with the government for Community Forestry certification is also underway. It may take some time, but we believe that the day will come when the people of U To village will take responsibility for the management and conservation of the mangrove forests in the basin of U To stream.

In December 2021, MFA published a booklet for young people to raise awareness on the value of mangroves and the importance of those conservation in Myanmar language.

The U To village is located at the mouth of the U To stream, and there are no other villages in the river basin, which is about 24 km upstream from the village. The upriver tropical forest area in southern Patheingyi District is home to 100 Asian el-

ephants and a variety of other wildlife. It can be said that the U To village and its residents play irreplaceable and important roles as gatekeepers of the rich mangroves and natural environment of the U To stream.

The situation of the global environment is becoming increasingly serious. The question is, what form of natural environment can we pass on to our children and grandchildren, while overcoming the COVID-19 pandemic and other social changes?

We are looking forward to the day when we can visit Myanmar, go to U To village with the MFA people, meet the villagers again, and take the next step in our future cooperative activities.



### Participatory Restoration of Mangrove Forests: 5-year Activity of U To Village, Myanmar

Published on 31 March 2022 © Ramsar Center Japan (RCJ)

Published by Ramsar Center Japan (RCJ)

c/o Maple Tours, Room 101, 2-3-1 Meguro, Meguro-ku, Tokyo 153-0063, Japan

Tel/Fax: +81-3-3792-5513 URL: <http://ramsar-cj.site/>

In collaboration with the Myanmar Forest Association (MFA)

Editing & Writing: Tamotsu Kameyama, Reiko Nakamura, Taketo Kitamoto

English Language Adviser: James McGill

Design: Ayano Abe

Photography: Myanmar Forest Association (MFA), Tamotsu Kameyama, Reiko Nakamura

Printing: Towa Inc., Japan