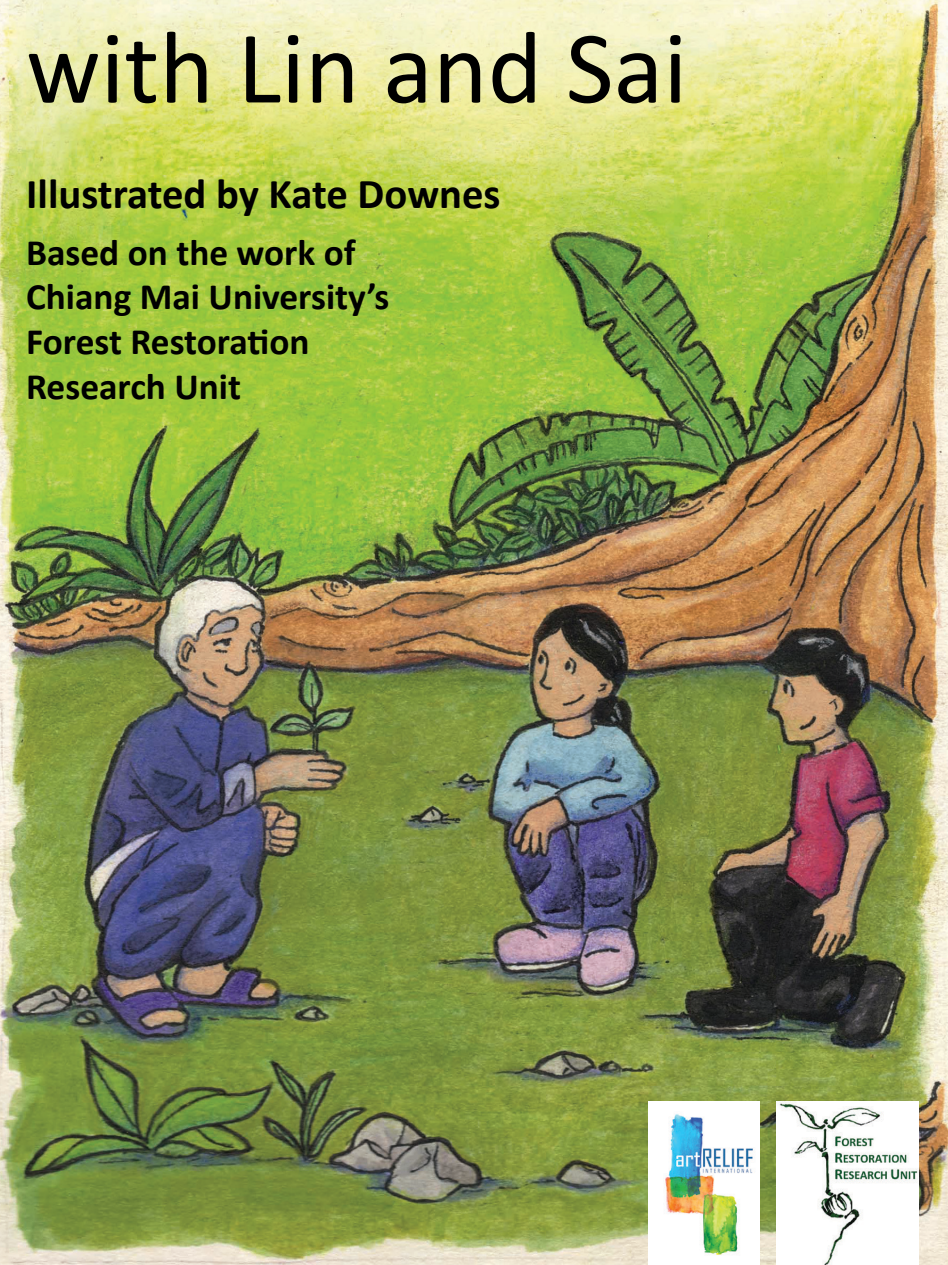


# Grow a Forest with Lin and Sai

Illustrated by Kate Downes

Based on the work of  
Chiang Mai University's  
Forest Restoration  
Research Unit



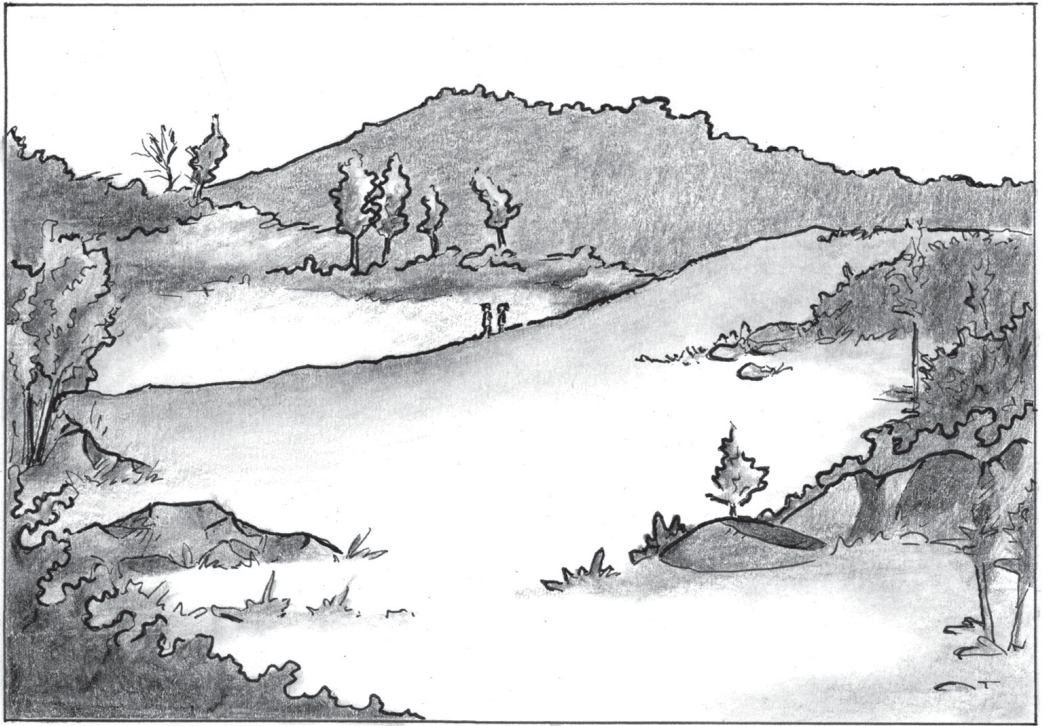


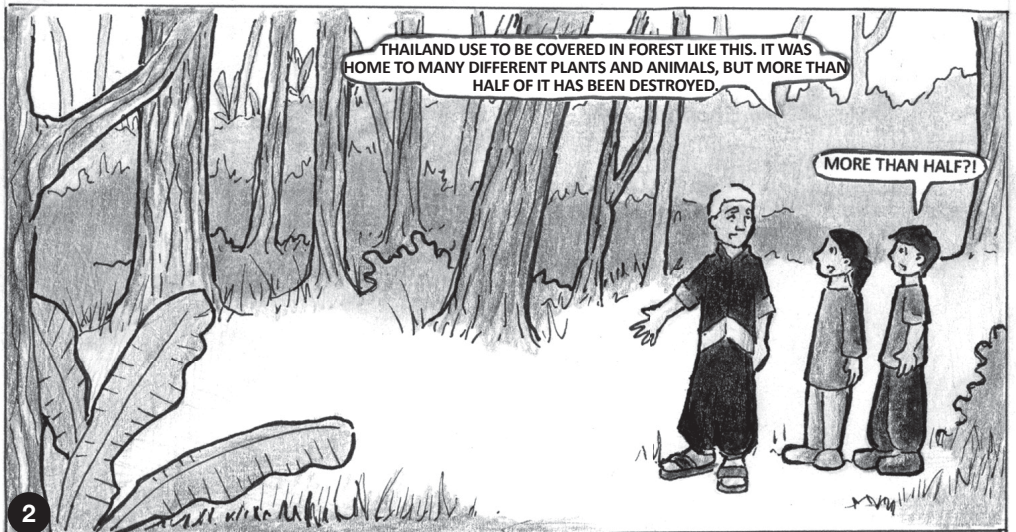
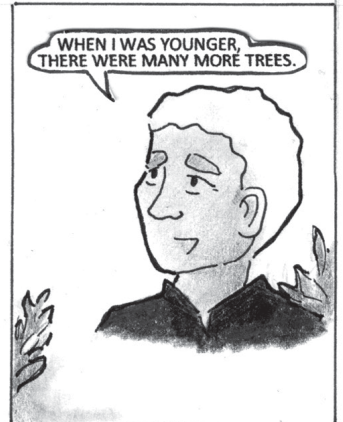
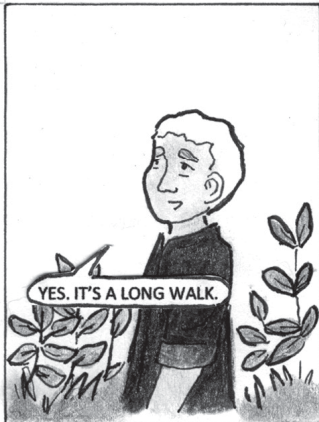
## About the artist

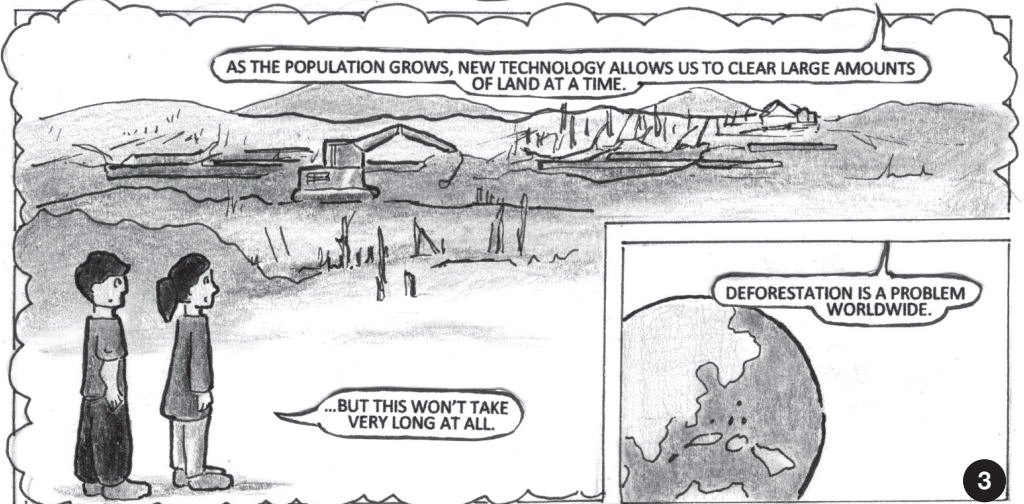
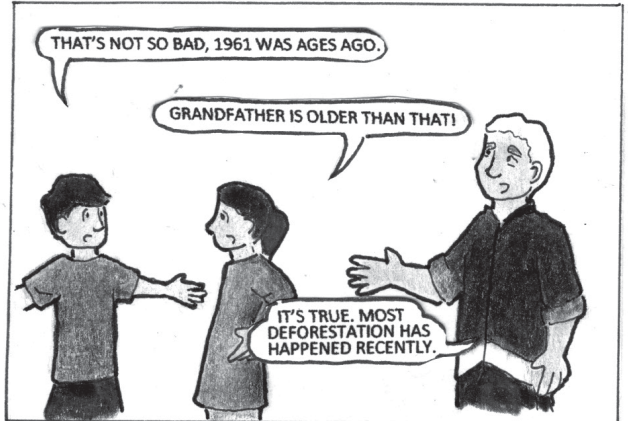
Kate Downes is a freelance illustrator, living and working in London. She became involved with producing this cartoon book, whilst working with Art Relief International, early in 2013. She found a note at the ARI office from a brainstorming session with one of ARI's partner organizations, FORRU-CMU, suggesting a comic book for children and decided to run with it. Forest restoration is something very close to her heart and she has loved being able to contribute to FORRU'S work.

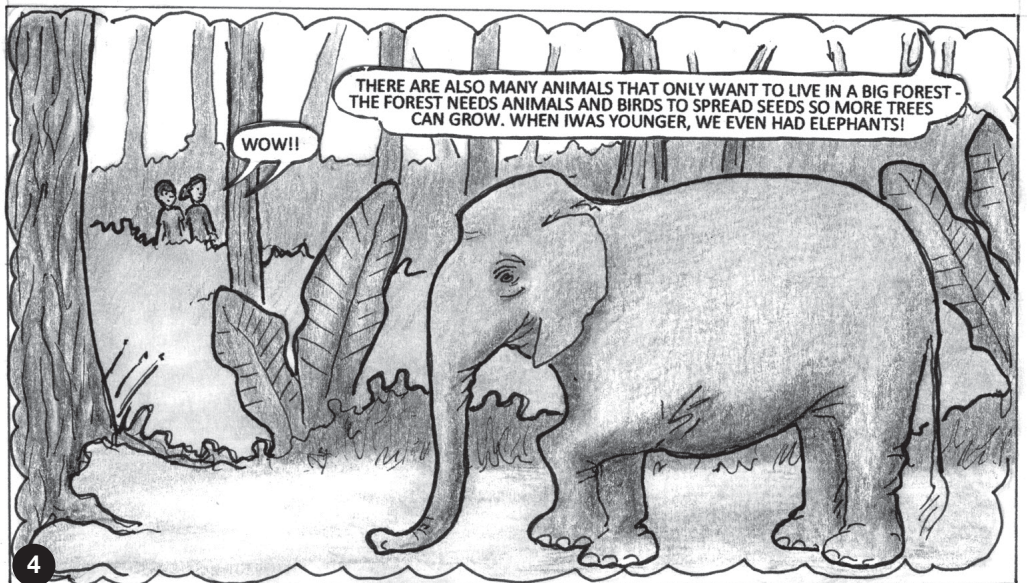
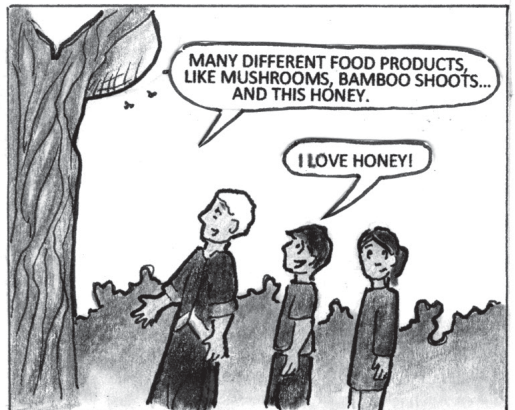
Almost all the subject material for this comic was sourced from FORRU's handbook - "How to Plant a Forest", with additional information from the FORRU team, to whom Kate feels forever indebted for both the time they spent showing her the sites and nursery and their very patient answers to her technical questions.

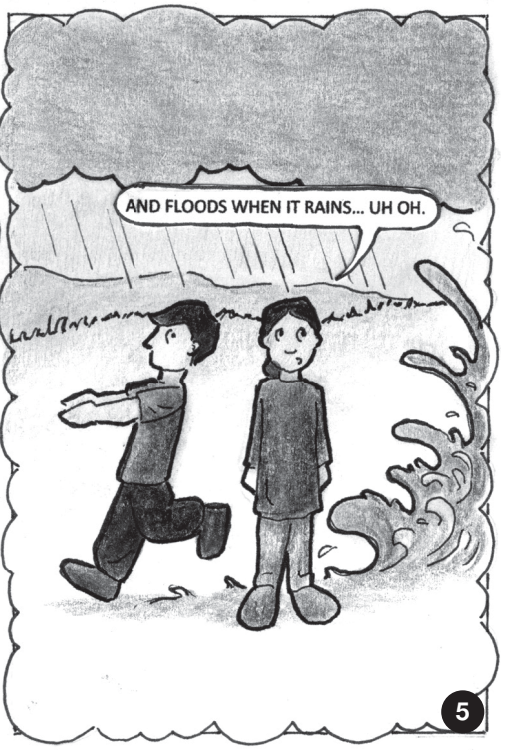
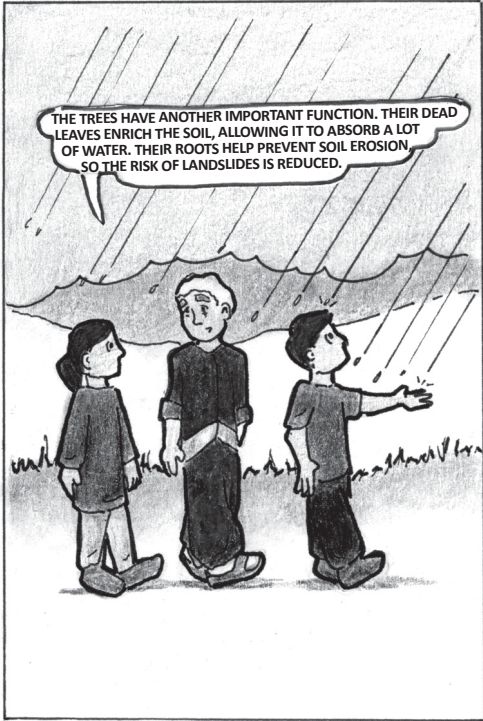
[peppermint.illustration@gmail.com](mailto:peppermint.illustration@gmail.com)

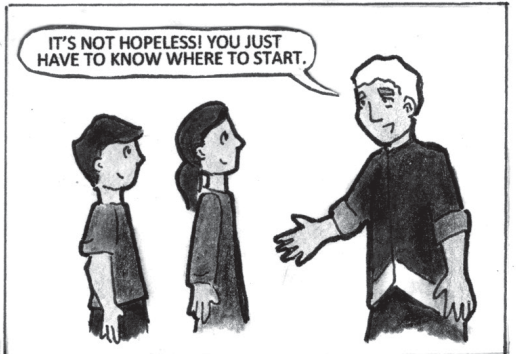
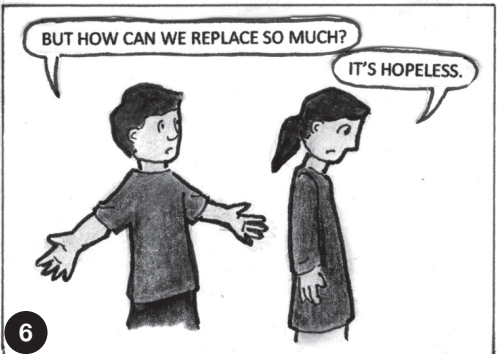
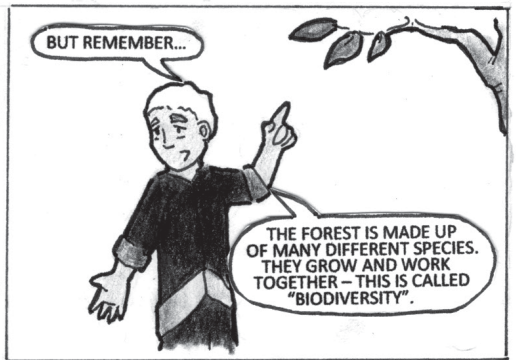
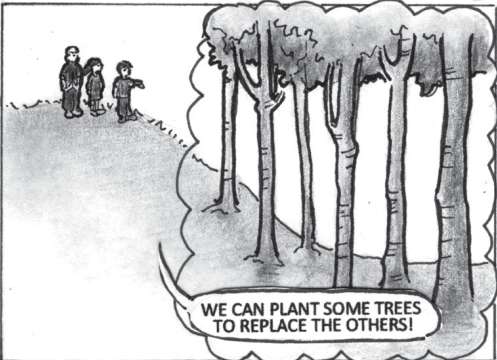
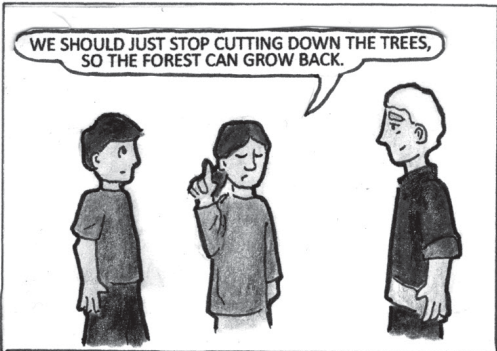
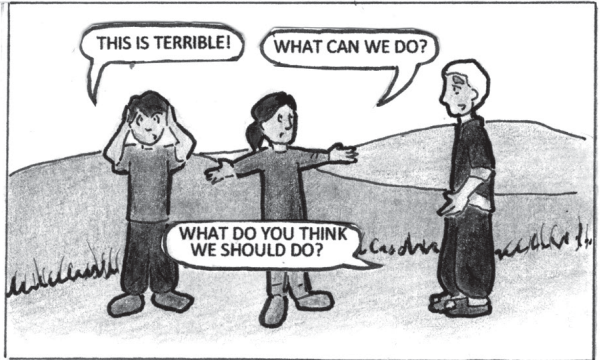
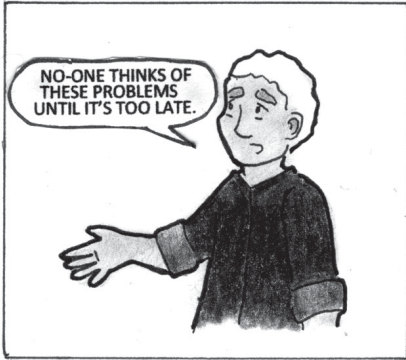




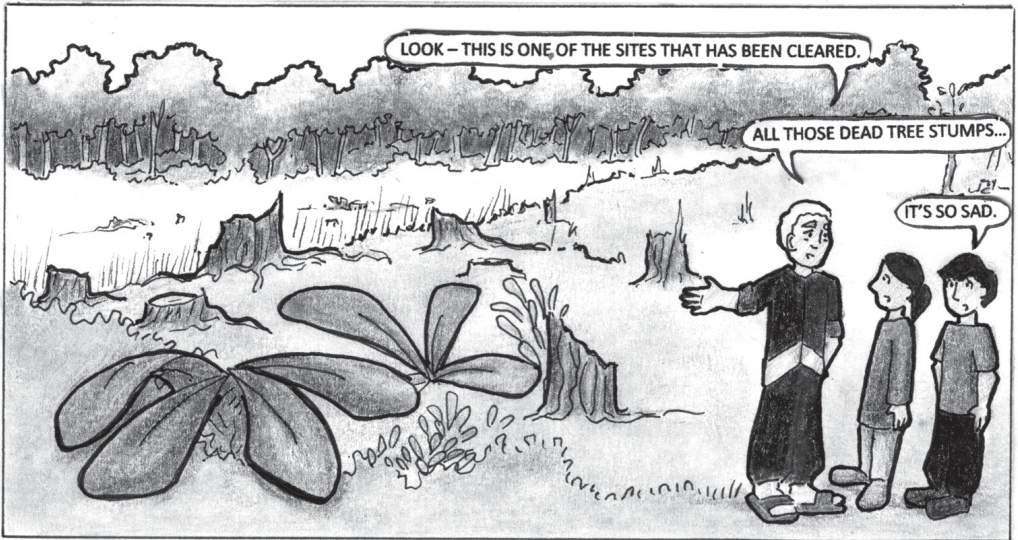












LOOK - THIS IS ONE OF THE SITES THAT HAS BEEN CLEARED.

ALL THOSE DEAD TREE STUMPS...

IT'S SO SAD.



NOT ALL DEAD!! LOOK OVER HERE -

IT'S ALIVE!



YES, IT'S STARTED TO SPROUT AGAIN.  
YOU SEE, THE FOREST WILL ALWAYS WANT TO GROW BACK.



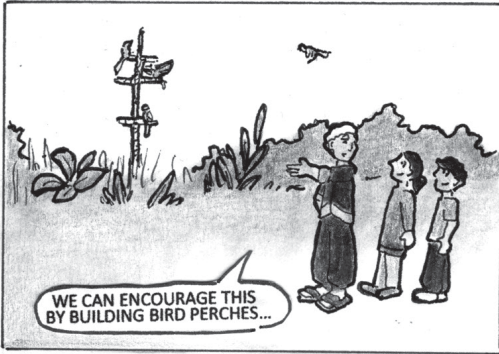
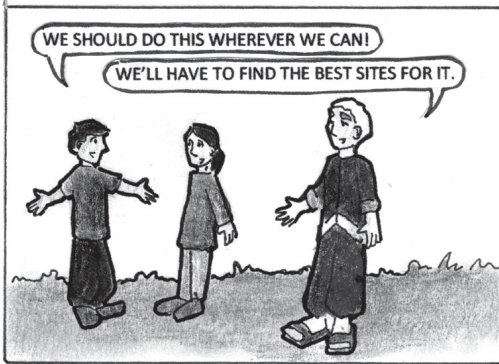
AND LOOK - A SAPLING HAS GROWN!

I'M GOING TO CLEAR AWAY THE WEEDS.

WELL, YOU'VE GOT THE RIGHT IDEA!



WHEN WE HELP THE FOREST GROW LIKE THIS,  
WE CALL IT ASSISTED NATURAL REGENERATION - "ANR".





WHAT ELSE CAN WE DO?

WELL, HOW ABOUT OUR PLAN OF PLANTING TREES? DON'T GIVE UP ON THAT JUST YET!



WHAT ARE THEY DOING OVER THERE?

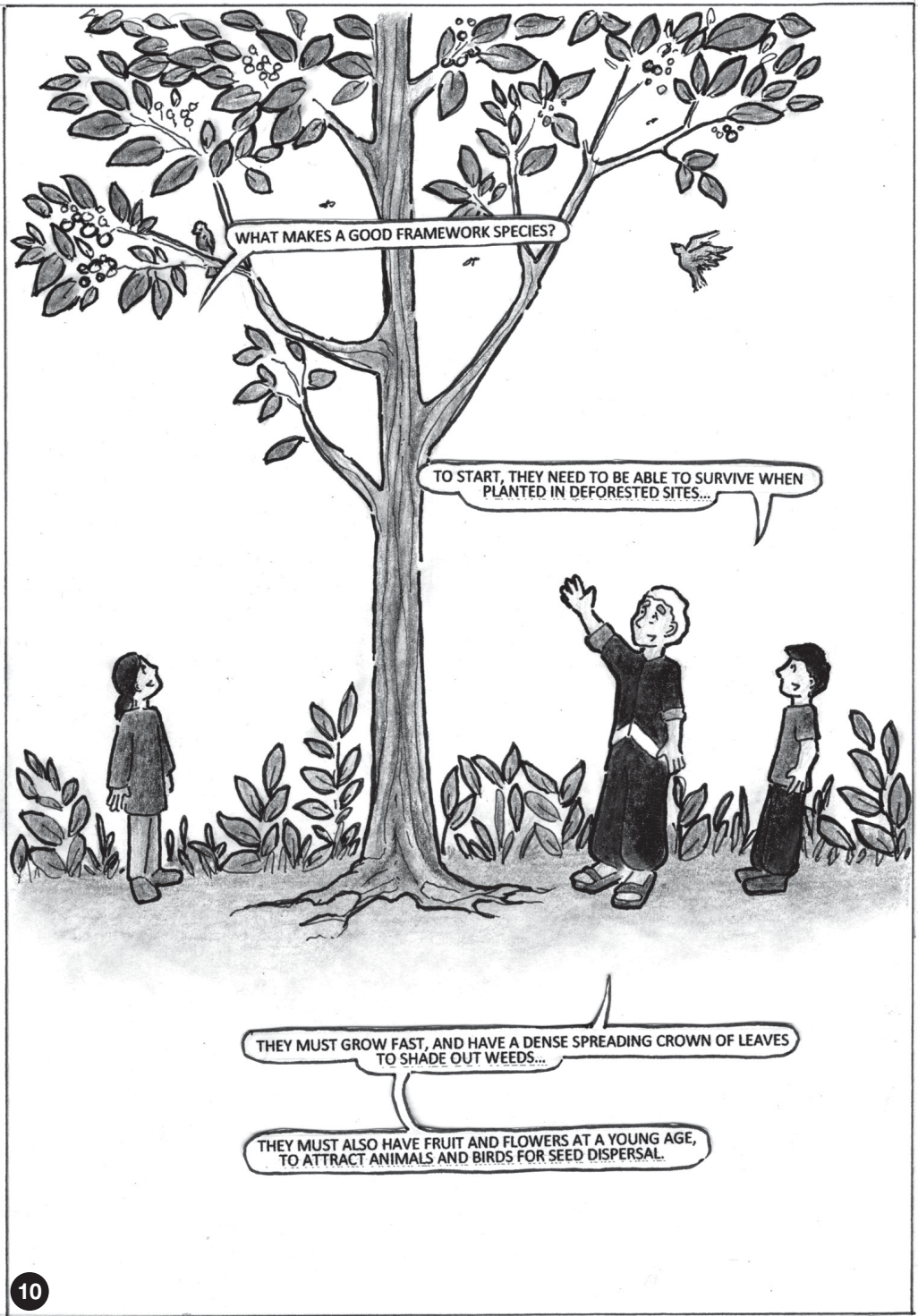
THEY'RE COLLECTING SEEDS FROM THE TREES.



YOU SEE, WHILE WE CAN'T RESTORE EVERYTHING AT ONCE, WE CAN WORK OUT WHICH TREES WOULD BE THE BEST TO START WITH.



THESE TREES WILL CREATE A FRAMEWORK FOR THE RESTORATION OF THE FOREST – SO WE CALL THEM FRAMEWORK SPECIES.

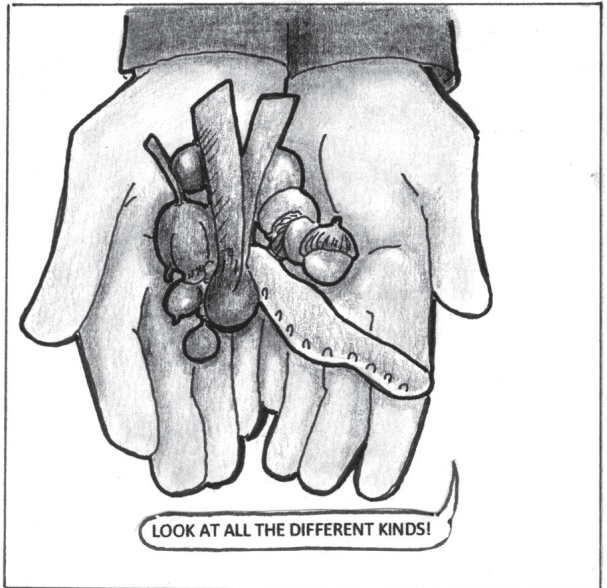


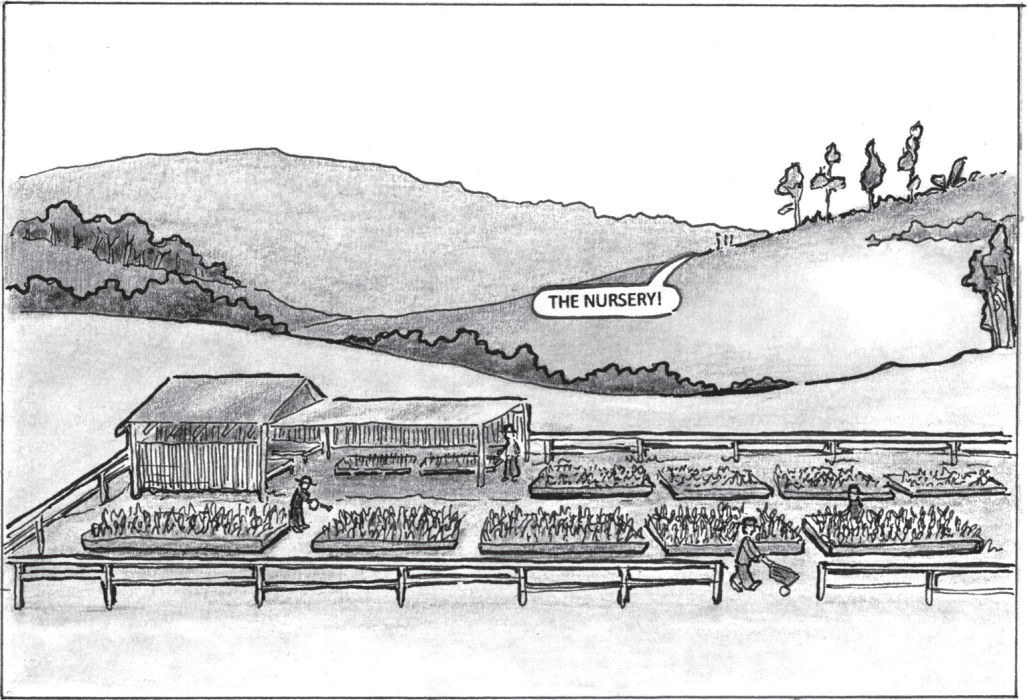
WHAT MAKES A GOOD FRAMEWORK SPECIES?

TO START, THEY NEED TO BE ABLE TO SURVIVE WHEN PLANTED IN DEFORESTED SITES...

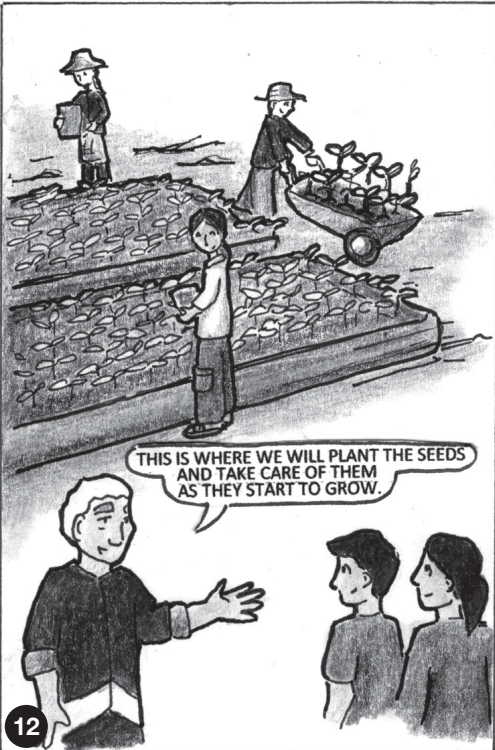
THEY MUST GROW FAST, AND HAVE A DENSE SPREADING CROWN OF LEAVES TO SHADE OUT WEEDS...

THEY MUST ALSO HAVE FRUIT AND FLOWERS AT A YOUNG AGE, TO ATTRACT ANIMALS AND BIRDS FOR SEED DISPERSAL.





THE NURSERY!



THIS IS WHERE WE WILL PLANT THE SEEDS AND TAKE CARE OF THEM AS THEY START TO GROW.



LIN, SAI, THIS IS MALI.

WOULD YOU LIKE TO SEE THE NURSERY?

YES PLEASE!

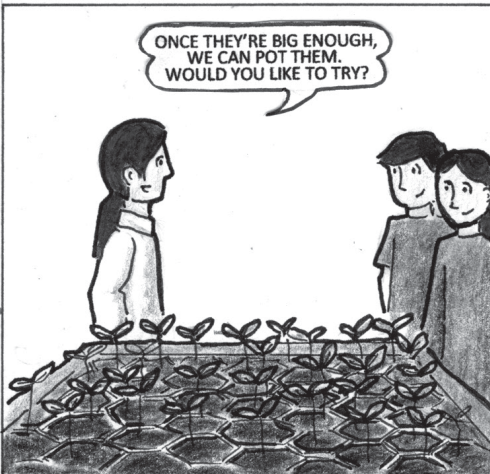
CAN WE EAT FIRST?



WE PLANT THE SEEDS IN THESE TRAYS.



THESE ONES HAVE STARTED TO GROW!



ONCE THEY'RE BIG ENOUGH, WE CAN POT THEM. WOULD YOU LIKE TO TRY?



HERE YOU GO.

WHAT KIND OF SOIL WILL WE USE?



IT'S A MIX OF HALF FOREST SOIL, HALF PEANUT HUSK.

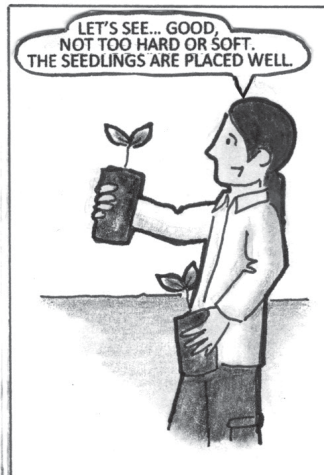
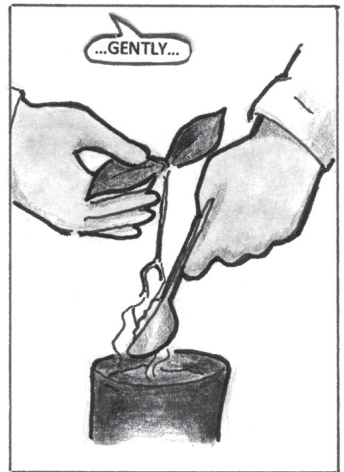
I LOVE PEANUTS!



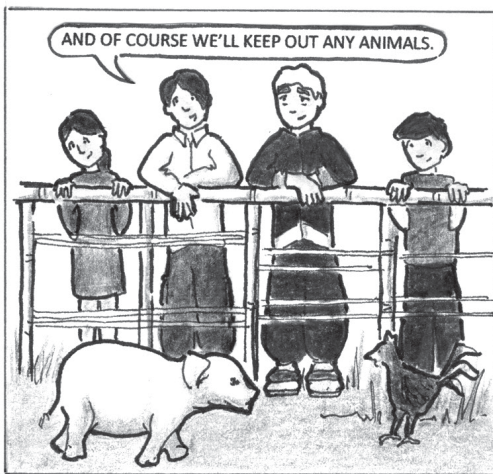
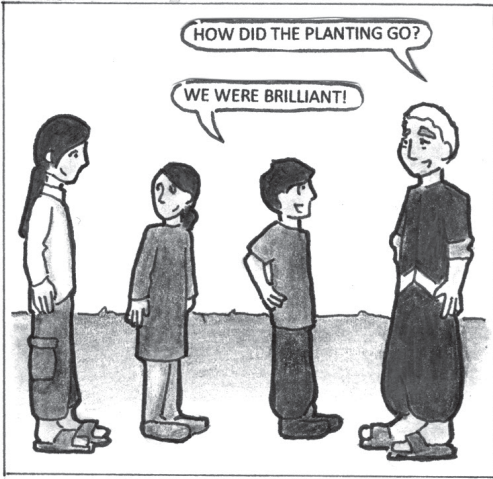
YOU ALSO USE RICE OR COCONUT HUSK.

I LIKE RICE AND COCONUT TOO!

SAI, PLEASE DON'T EAT THE SOIL.

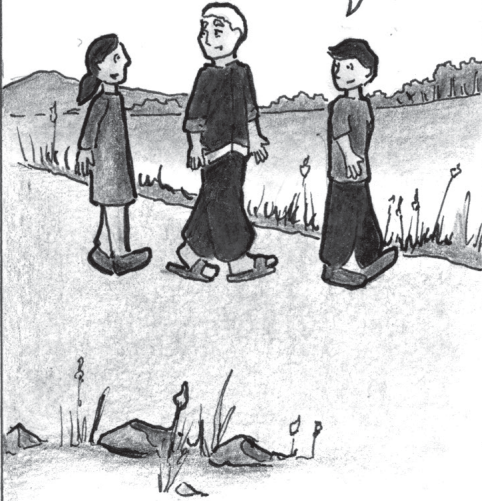






WHEN WILL THE NEW TREES BE PLANTED?

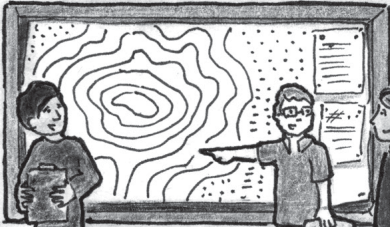
THE VILLAGES MUST WORK TOGETHER WITH LOCAL AUTHORITIES AND THE FORESTRY DEPARTMENT TO DECIDE ON THE SITES.



IT'S ALSO IMPORTANT THAT WE GET PERMISSION TO USE THE LAND - SO WE MUST START PLANNING AT LEAST A YEAR IN ADVANCE.

A WHOLE YEAR?!

CAN I GET A SNACK WHILE WE WAIT?

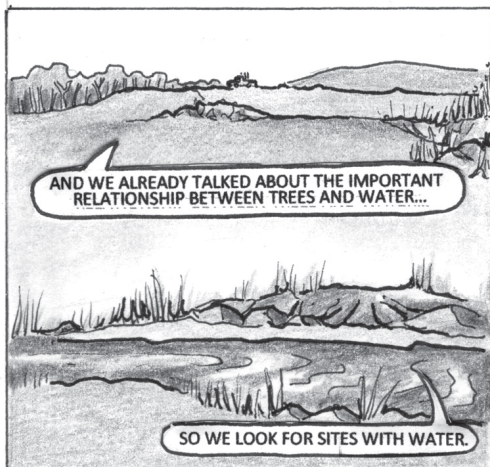
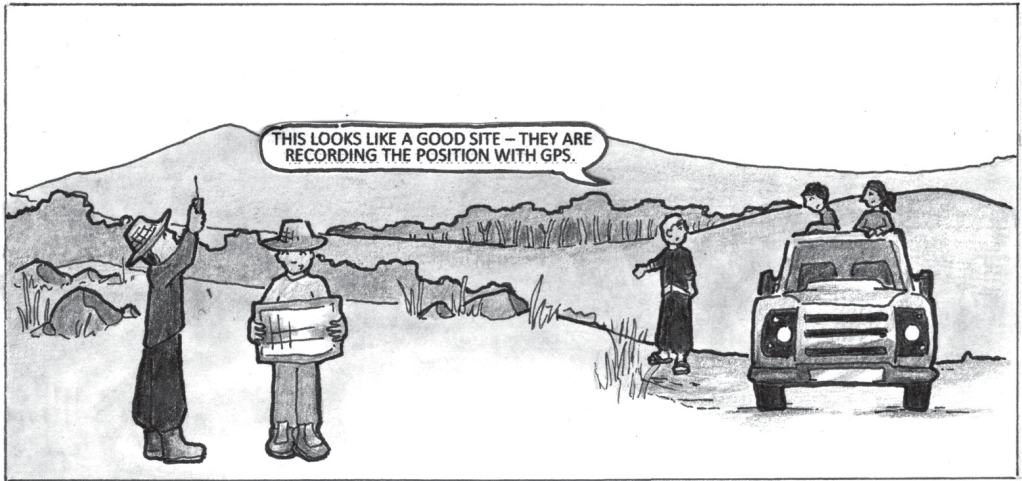


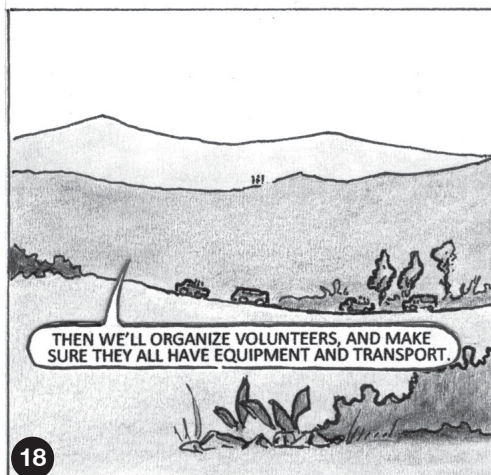
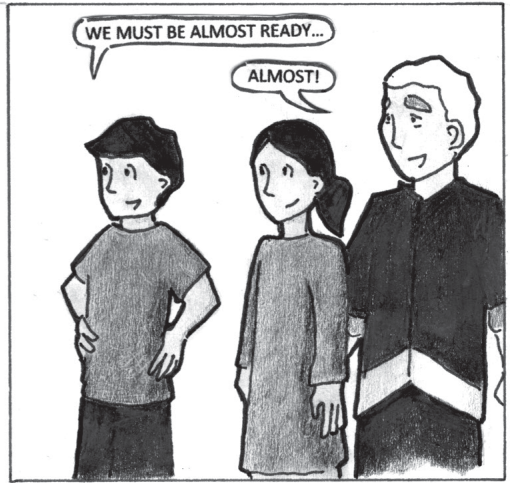
WELL, IT'S A VERY BIG PROJECT - THE FOREST IS IMPORTANT, AND WE MUST PLAN EVERYTHING OUT.

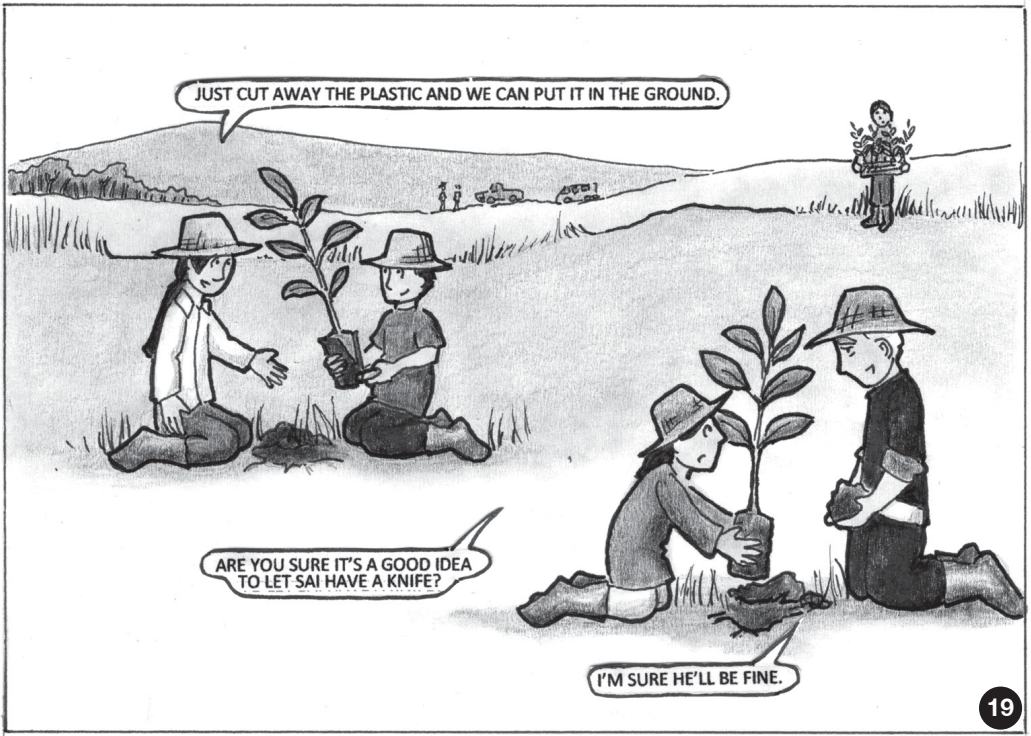
SHALL WE GO LOOK AT A POTENTIAL SITE?

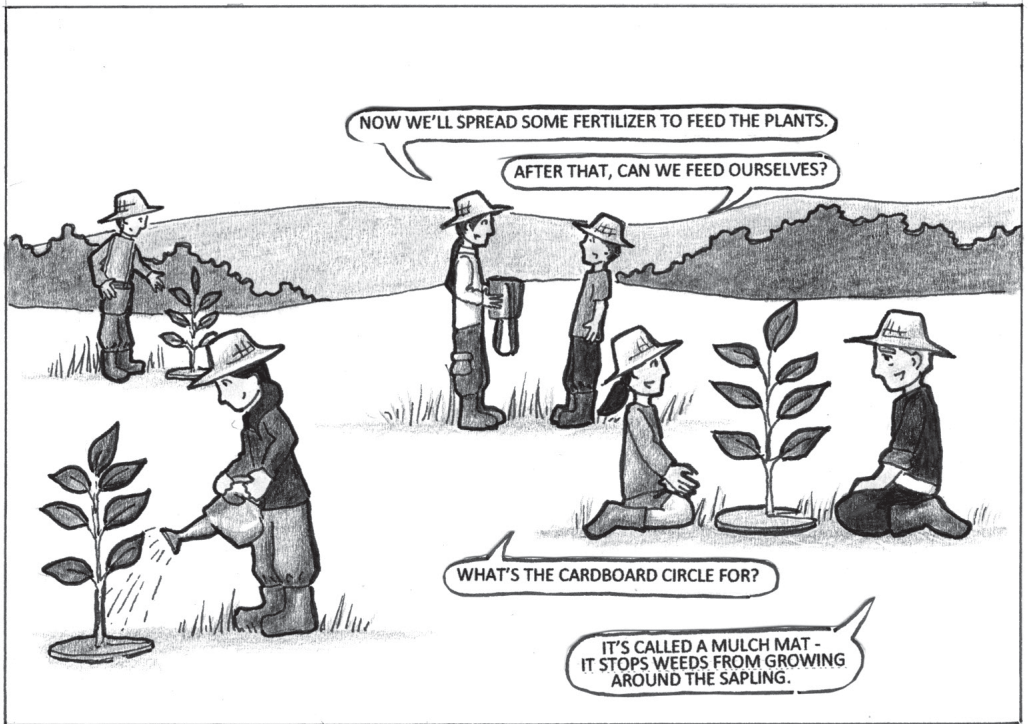
YES PLEASE!









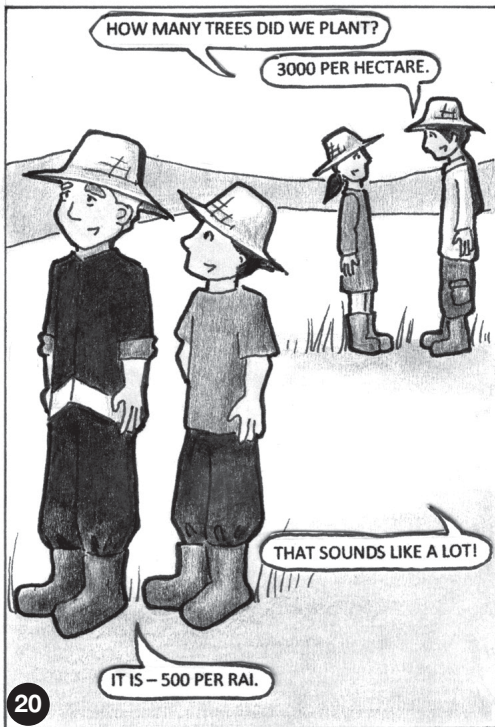


NOW WE'LL SPREAD SOME FERTILIZER TO FEED THE PLANTS.

AFTER THAT, CAN WE FEED OURSELVES?

WHAT'S THE CARDBOARD CIRCLE FOR?

IT'S CALLED A MULCH MAT - IT STOPS WEEDS FROM GROWING AROUND THE SAPLING.



HOW MANY TREES DID WE PLANT?

3000 PER HECTARE.

THAT SOUNDS LIKE A LOT!

IT IS - 500 PER RAI.



WE PLANT A LOT SO THEY WILL SHADE OUT ANY WEEDS AS SOON AS POSSIBLE...

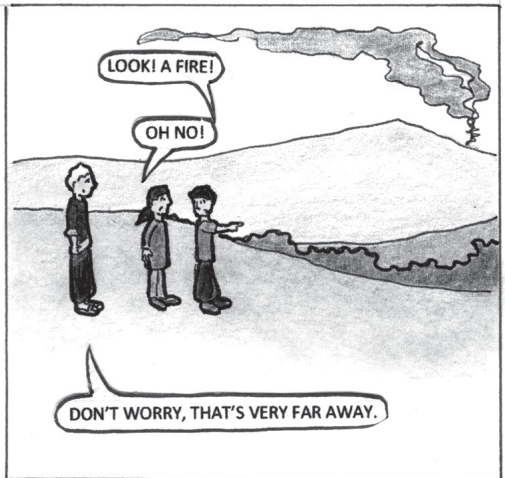
BUT MORE THAN THAT AND THEY'D BE TOO CROWDED.





WAIT, GRANDFATHER! LOOK!

WHAT'S THE MATTER?



LOOK! A FIRE!

OH NO!

DON'T WORRY, THAT'S VERY FAR AWAY.



BUT ONE COULD HAPPEN CLOSER!

WHAT ABOUT THE TREES?

WELL, IT IS A PROBLEM...



BUT THERE ARE STEPS WE CAN TAKE TO PREVENT IT. TO START, WE CAN ORGANIZE TEAMS TO WATCH OUT AND WARN US LIKE YOU DID, SAI.



IF IT'S SLOW AND SMALL, THE FIRE CAN BE CONTROLLED WITH HAND TOOLS.



IF IT'S BIGGER, WE CAN CALL IN FIREFIGHTERS TO HELP.

OOOH...





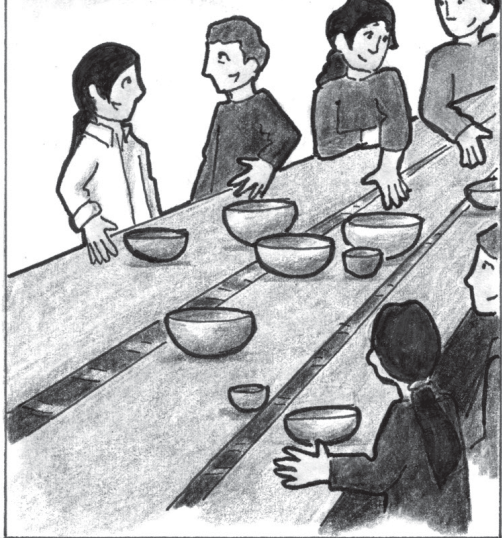


WE CAN PAY HOMAGE TO THE HOLY TREE AND THANK THE SPIRITS AFTER A FIRE-FREE DRY SEASON.



AND BECAUSE EVERYONE WORKS TOGETHER, IT'S IMPORTANT TO CELEBRATE TOGETHER.

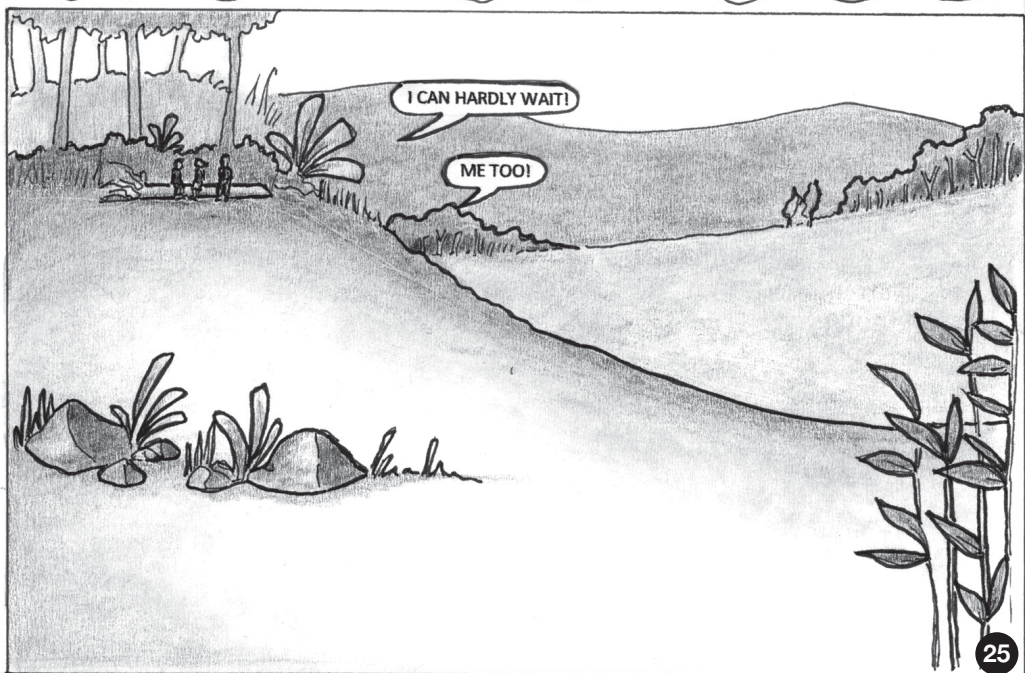
FOOD! FINALLY!

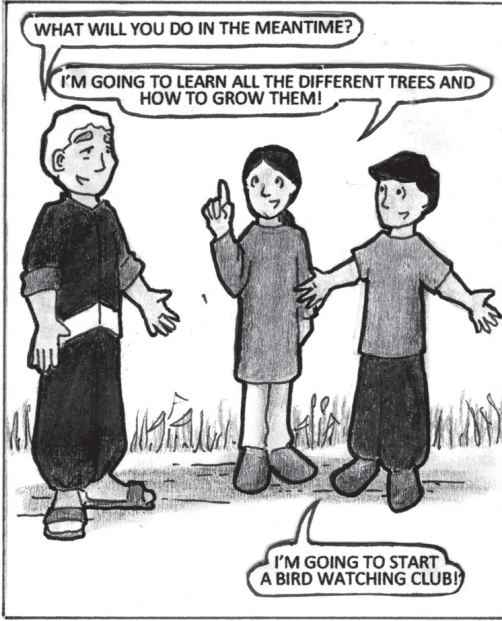


WHEN WILL THE TREES BECOME A FOREST? SOON?

IT WILL BE A LONG TIME. FORESTS TAKE AGES AND AGES TO GROW.

TRUE... BUT WITH OUR FAST-GROWING TREES AND ALL THE EXTRA WORK, WE WILL SEE RESULTS SOONER THAN YOU MAY THINK... IN A MATTER OF YEARS.





# The Forest Restoration Research Unit Chiang Mai University (FORRU-CMU)



**FORRU-CMU** is a team of ecologists and research students in Chiang Mai University's Science Faculty, N. Thailand, who develop new ways to restore tropical forest ecosystems for biodiversity conservation and environmental protection. Our unit also has an education team, which provides technical training to a wide range of organizations.

We carry out research on the reproductive ecology of native forest trees and their propagation in nurseries. Field trials are then used to test the performance of each tree species and monitor biodiversity recovery and carbon storage in restored forest plots.

FORRU-CMU actively engages with local people to integrate forest restoration and biodiversity conservation into the needs of communities. If local people have appropriate technical support and are directly involved from the start, they develop a sense of project stewardship and actively participate in caring for and monitoring restored sites, reducing the likelihood of subsequent deforestation.

We have established satellite units in Kanchanaburi and Krabi Provinces and we also work with forest authorities in Laos, China, The Philippines, Indonesia and Cambodia to develop techniques, suitable for the distinctive ecosystems and socio-political conditions in each of those countries. We work with community groups and schools, international conservation organizations, government agencies and the private sector. CMU provides FORRU with a small grant, as well as office space and logistical support, but most of our funding comes from research grants and donations.

# Ban Mae Sa Mai

The characters in this comic are based on real people - the villagers of Ban Mae Sa Mae, about an hour's drive north from Chiang Mai, where FORRU-CMU set up its first experimental restoration plots.

The village is the largest Hmong hill tribe community in northern Thailand, with 190 households and a total population of more than 1,800. It was originally founded at 1,300 m elevation, but was moved a few kilometres down the valley, after deforestation caused the village water supply to dry up. This event left the villagers with a strong sense of the link between deforestation and loss of water sources.

In 1981, the village lands were included in Doi Suthep-Pui National Park, which meant that the villagers faced a legal threat of eviction. To avoid this, some of the villagers decided to show that they could be responsible custodians of the environment. They formed the Ban Mae Sa Mai Natural Resources Conservation Group and built a community-wide consensus to replant abandoned fields with forest trees.

Meanwhile, FORRU-CMU approached the national park authority to find a suitable location to test the framework species method of forest restoration. The national park authority recommended the watershed above Ban Mae Sa Mai and the villagers agreed to accept the project so they could improve their efforts to restore

the forest. This partnership provided FORRU - CMU with a source of indigenous knowledge, an opportunity to test the practicability of the unit's research outputs and local labour to help with tree planting and monitoring.



FORRU-CMU funded a village tree nursery and trained villagers in tree propagation methods. The unit also employs one family in the village to collect seeds and grow the trees. The nursery now produces about 25,000 trees per year, most of which have been planted above the village in mid-June, every year since 1996.

The village committee organizes fire prevention. Fire breaks are cut in mid-January and fire prevention teams man a fire lookout station, until the rains start in April. The villagers hold a ceremony at the start of the fire season to pray for successful fire prevention. FORRU-CMU pays for labour to cut the fire breaks and provides meals for the fire prevention teams. FORRU-CMU also employs villagers to weed around the planted trees and apply fertilizer. This combination of payments and voluntary inputs has helped to build a sense of local stewardship of the forest restoration plots and gradually increased support for the work at the community level.

So now, the formerly bare watershed above the village supports a patchwork of restored forest plots, from recently planted, to 17 years old. The villagers have a more secure water source, a supply of forest products and they enjoy a positive reputation as conservers of the national park.

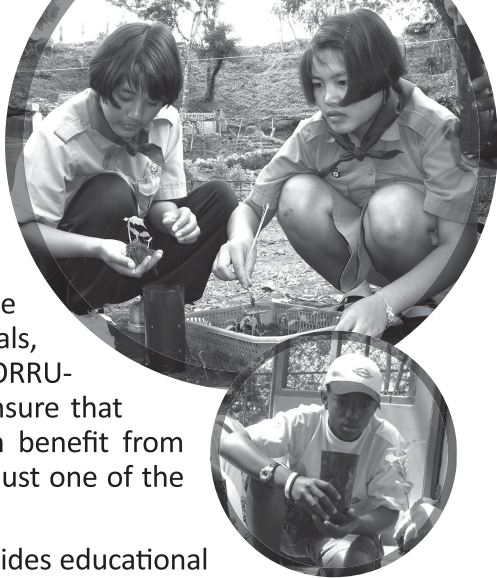


# FORRU's Education Program

Research serves no purpose, if the results remain only on the pages of journals, gathering dust in libraries. Therefore, FORRU-CMU runs an education program to ensure that all those involved in forest restoration benefit from the unit's research. This comic book is just one of the program's products.

**Schools Program :** FORRU-CMU provides educational events for both local and international schools. Our staff sometimes provide in-school events, but more usually, school groups visit FORRU's nurseries or field sites on Doi Suthep. Activities in the nursery include learning about fruits and seeds, treating seeds for germination, potting up seedlings and learning how to care for them in the nursery. From our nursery, near Wat Prathat Doi Suthep, there's an easy, guided, forest walk to learn about forest ecology and visit the largest tree on the mountain. Programs are adapted to the ages of the children and are run in Thai or English, as needed.

**Training for professionals :** We also run training workshops of 1-5 days for government officials, NGO's, international agencies and university students. Our standard 3-day program includes a day in the classroom to learn restoration concepts and species selection, a day in the nursery on tree propagation techniques and a day at Ban Mae Sa Mai for a discussion with the village committee about socio-economic aspects of restoration and to study field plot establishment, monitoring and biodiversity recovery. FORRU-CMU can tailor workshops for specific needs, so please feel free to contact us at [apivit.chansai@gmail.com](mailto:apivit.chansai@gmail.com) if you are interested.





**“Restoring Tropical Forests: A Practical Guide” by Stephen Elliott, David Blakesley and Kate Hardwick.**

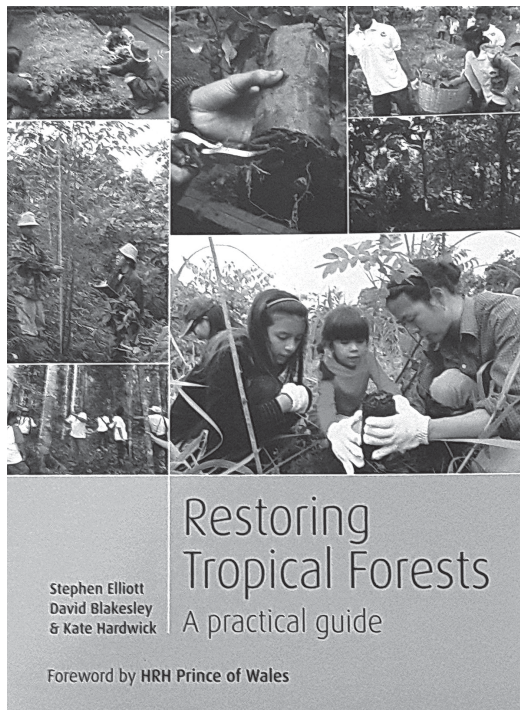
**Kew Publishing, with foreword by HRH Prince of Wales**

If you want more details about the art and science of forest restoration, we’ve just finished this comprehensive guide.

“Restoring Tropical Forests” provides a step-by-step account of how to recover forest

ecosystems, wherever they have been degraded or destroyed. Based on concepts and techniques, developed at FORRU - CMU since 1994, the book covers every aspect of forest restoration, from site selection, engaging local communities, fund-raising and formulating project plans, to planting trees and monitoring progress. It also explains how to carry out research to refine restoration methods and adapt them to local ecological and socio-economic conditions.

This book is an invaluable resource for anyone interested in restoring tropical forests, including practitioners, researchers, students and policy makers and an essential read for those involved growing forests to store carbon. The printed book can be ordered through the Kew website ([www.kewbooks.com/asps/ShowDetails.asp?id=1035](http://www.kewbooks.com/asps/ShowDetails.asp?id=1035)) or viewed for free through our website ([www.forru.org/en/content.php?mid=78](http://www.forru.org/en/content.php?mid=78)).



# How to Contact FORRU-CMU

Offices of the Forest Restoration Research Unit are located in the Herbarium Building of Chiang Mai University's Biology Department.

## Postal Address:-

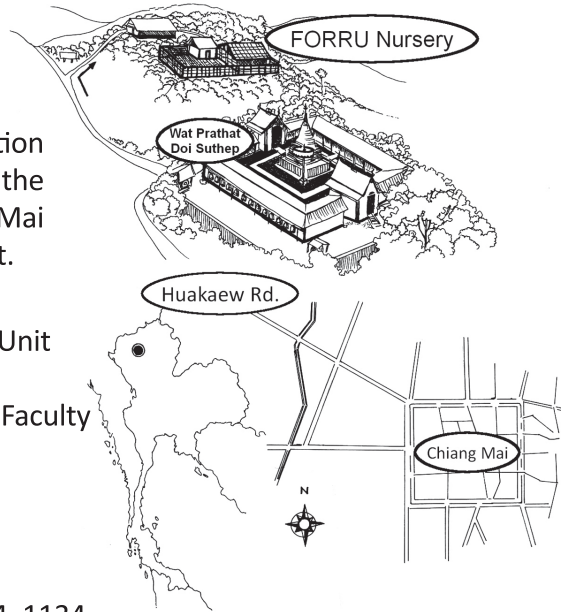
Forest Restoration Research Unit  
c/o Dr. Stephen Elliott  
Biology Department Science Faculty  
Chiang Mai University  
Huaykaew Rd, Chiang Mai  
Thailand 50200

## Tel :-

053 943346 or 3348 ext 1114, 1134  
081 531 0894

## Email:-

stephen\_elliott1@yahoo.com (for general enquiries in English)  
s.suwan@gmail.com (for general enquiries in Thai)  
somrattanamon@gmail.com (for education enquiries)  
apivit.chansai@gmail.com (for education enquiries)



## Our website for books and other archived information:-

[www.forru.org](http://www.forru.org)

## Our Facebook page for current activities:-

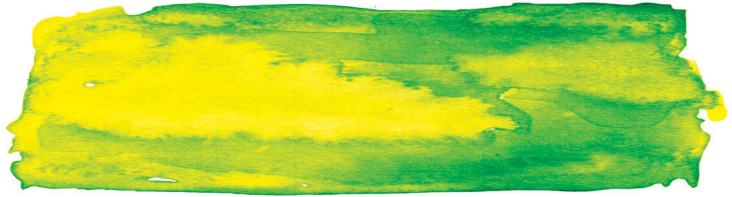
[www.facebook.com/forestrestorationresearchunit](http://www.facebook.com/forestrestorationresearchunit)

## Our YouTube Channel:-

[www.youtube.com/user/FORRUCMU](http://www.youtube.com/user/FORRUCMU)

**artRELIEF**  
INTERNATIONAL

info@artrelief.net  
www.artrelief.net



The mission of Art Relief International is to promote awareness of significant social issues and inspire change, while cultivating creativity among struggling social groups. ARI offers individuals and groups something rare: an accepting and therapeutic atmosphere that not only fosters an appreciation for art, but provides an outlet to cope with the difficulties of everyday life.



ARI uses all forms of art, from painting and drawing to dance and drama. We encourage self-exploration as a means to heal, have fun, and restore the mind, body, and soul.



Art Relief International's workshops are planned and implemented entirely by volunteers. These wonderful people come from all over the world to live and work in Chiang Mai, Thailand.



Please see our blog, [art-relief.blogspot.com](http://art-relief.blogspot.com), to keep up with our workshops and get inspired to create. You can also follow us on facebook ([www.facebook.com/artreliefinternational](http://www.facebook.com/artreliefinternational)) and instagram ([@artreliefinternational](https://www.instagram.com/artreliefinternational)) to see the work that we do and get an insight into the volunteer experience.

# A Few Words from Our Sponsor

When it is very hot, do you like to go and sit under the shade of a tree and listen to the leaves rustling in the breeze? It is cool and if you look up you can see the patterns of the leaves as they move against the sky. Trees are very important to us, not just because they give us shade. They provide wood for our houses and furniture, and fuel for cooking food. They ensure that soil is not washed away by heavy rains and they look beautiful.



But that is not all. They produce oxygen which we must breathe, if we are to stay alive. They also capture carbon dioxide. Did you know that most scientists believe that the climate of the world is rapidly changing, because there is too much carbon dioxide in the atmosphere?

In my lifetime we have cut down so many trees that we have seriously reduced the ability of forests to capture carbon dioxide and provide us with oxygen. It is very important that we replace the forests we have destroyed so that they can continue to give us wood, oxygen, capture carbon dioxide and be beautiful. But just planting trees is not enough. Forests are complex ecosystems, with many species of trees, plants, insects, fungi, animals and birds. Their lives are interlinked and they often depend on each other. For example, animals often eat the fruits of the trees and by doing so transport the seeds to other parts of the forest.

Dr Stephen Elliott and his team at the Forest Restoration Research Unit at Chiang Mai University have developed effective and sustainable ways of restoring complex forest ecosystems and the wildlife they support. Based on their work, Kate Downes has produced this wonderful book for children that explains how forests may be restored to their former glory and I am delighted to be able to support its publication.

I hope that you enjoy it and that it motivates you to do something that will preserve our forests, so everyone can sit in the shade of a tree and enjoy breathing the oxygen it produces.