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MARINE TURTLE CONSERVATION

By Frances Humber, Charlotte Moffat and Shawn Peabody

12

AUDIENCE: CONSERVATION FIELD AGENTS

INDIAN OCEAN COMMUNITY CONSERVATION HANDBOOKS

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Introduction

Marine turtles are found in warm and temperate seas around the world. Adults of most species are found in shallow, coastal waters, bays, lagoons, and estuaries and the open sea. Juveniles of some species may be found in bays and estuaries, as well as at sea.

Marine turtles are reptiles and belong to a group of animals which also includes snakes, lizards, and crocodiles. Marine turtles are split into two families; *Cheloniidae*, which are marine turtles with shells covered with scutes (horny plates), and *Dermochelyidae* with only one modern species, the leatherback turtle, which are covered with leathery skin. Turtles have inhabited the planet for over 150 million years, but there is a real possibility there may be very few in the near future unless radical protection measures are put in place today.

Species of turtle in the Western Indian Ocean and Madagascar

Five species of turtle are found in the waters around Madagascar: Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Loggerhead (*Caretta caretta*), Leatherback (*Dermochelys coriacea*), and Olive-Ridley (*Lepidochelys olivacea*). Greens, hawksbill and loggerheads are the most commonly found species in Malagasy waters. The species range from vulnerable to critically endangered according to the IUCN Red List of Threatened Species.

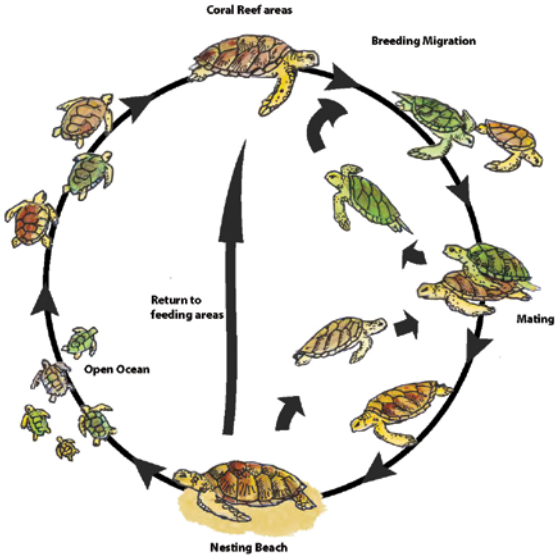
TURTLE SPECIES	COMMON NAME (FRENCH)	IUCN STATUS
Chelonia mydas	Green (Tortue Verte/Franche)	Endangered
Eretmochelys imbricata	Hawksbill (Tortue Imbriquée/Caret)	Critically Endangered
Caretta caretta	Loggerhead (Tortue Caouanne)	Endangered
Lepidochelys olivacea	Olive-Ridley (Tortue Olivâtre)	Vulnerable
Dermochelys coriacea	Leatherback (Tortue Luth)	Critically Endangered

Table 1. IUCN status of five species of marine turtle in the Western Indian Ocean. The IUCN Red List (www.iucnredlist.org) is a system for classifying species at high risk of global extinction through a number of criteria.

Life cycle

Once hatched from the egg, turtle hatchlings head out to the open sea to feed for a number of years until they reach sexual maturity. The length of time they spend out at sea varies from species to species, and this period is referred to as the 'lost years' as their precise movements are unknown.

Turtles take a long time to reach reproductive maturity. It can take between 10 and 50 years before a turtle will first breed, although this varies between species. Once mature, males and females travel to nesting areas and mate close to the shore, with females often returning to the same beach on which they hatched to lay their own eggs. Again, there are variations between species, but females lay on average 100 eggs per clutch (all laid at one time), and between one to ten clutches per breeding season, returning to lay clutches every few years. The long time it takes marine turtles to reach maturity combined with the many dangers faced by hatchlings and juveniles mean that as few as 1 in 1,000 eggs will become adult turtles.



Ecological importance of turtles

Turtles are important because they fulfill an important role within the marine ecosystem, by maintaining healthy seagrass beds and coral reefs, providing habitats (their carapaces) for other marine life, balancing marine food webs and facilitating nutrient cycling from water to land. When sea turtles graze on seagrass it leads to an increase in the seagrasses productivity and nutrient content. Without this grazing, seagrass beds can begin to decompose, as overgrown seagrass blades shade the plants underneath and reduce the flow of currents through the beds.

Some turtle species eat sponges which compete with corals for space to grow on reefs. By removing sponges from reefs, turtles allow coral species to grow, instead of sponges dominating.

Socioeconomic importance of turtles

Marine turtles have also provided an important source of food and protein to coastal communities for centuries, as well as providing a source of income. Marine turtles also form important components of many cultures worldwide and can hold great significance for the local population. As marine turtle populations have decreased, turtles have become a valuably eco-tourism attraction in many countries, and have become a flagship species to help protect oceans and coral reefs.

Threats to marine turtles

Collection of eggs

Many turtle nests are dug up by humans so they can eat or sell the eggs. Turtle eggs are a delicacy in many countries, and have traditionally been eaten for many years. Egg collection has passed sustainable limits in many countries as a result of the now decreased nesting turtle populations from overharvest of nests in the past.

Catching turtles for human consumption and illegal trade of turtle shell

Hunting of turtles for meat was widespread but with decreases in turtle populations and global conservation bans this has been reduced in many countries. However, many countries continue to fish for turtles, legally and illegally, often as part long-standing traditional fisheries.

All countries in the Western Indian Ocean (Comores, Kenya, Madagascar, Mauritius, Mozambique, Reunion, Seychelles, South Africa, Tanzania) are signed to IOSEA (Indian Ocean – South East Asia) Memorandum of Understanding. The IOSEA MoU is an intergovernmental agreement that aims to protect, conserve, replenish and recover marine turtles and their habitats of the Indian Ocean and South-East Asian region, working in partnership with other relevant actors and organisations.

Turtles are also hunted for their shells which can fetch high prices if traded. However if a country is a signatory of Convention on

International Trade in Endangered Species (CITES), international trade of turtle meat, shell and eggs is illegal. Because females come ashore to lay their eggs, whereas the male turtles tend to stay in the open ocean, the majority of turtles collected may be females, which will have an impact on the reproductive success of the species. All countries in the Western Indian Ocean are signatories of the CITES treaty.

Destruction of nests by animals

Dogs, crabs and birds are also known to dig up nests and eat turtle eggs. A large proportion of eggs laid are either eaten, or disturbed so that they do not develop into juveniles.

Fisheries bycatch

Turtles can easily get caught up in fishing nets targeting other species, which may cause injury and death by drowning. The fitting of Turtle Exclusion Devices (TED's) in shrimp nets, which has a trap door which allows the turtle to escape but keeps the fish in the net, is a positive step to reducing bycatch. Unfortunately TEDs are only compulsorily in some countries.

Pollution

Accidental and deliberate discard from fishers means that there are a huge number of nets and hooks floating in the oceans around the world. Many turtles may get hooked or caught on these, and will ultimately drown if they are unable to reach the surface to take their next breath.

Loss of nesting sites

Turtles return to the same beach to lay their eggs, on which they themselves hatched. Construction of buildings and development of tourist resorts on nesting beaches, can reducing the space for nesting, and also increase the likelihood of disturbance from humans.

Artificial lighting on nesting beaches

Turtles use light to direct themselves to and from the sea - the oceanic horizon at night is brighter than the land horizon as the sea reflects more moon and starlight. Artificial lights from villages and hotel developments may disorientate both adult turtles and hatchlings, meaning they are left exhausted before they have even reached the sea, and increasing the chance of predation.

Climate change

Climate change has the potential to be a great threat to the future of marine turtle populations. Not only will climate change have an impact on the environment in which they live, effecting coral reefs and seagrasses, but turtles have temperature-dependent sex determination. This means a change in temperature can lead to a change in the ratio of male to female turtle hatchlings.

Disease

Many types of diseases have been observed in marine turtles. Recent reports of a rise in the occurrence of fibropapillomas, a tumorous disease that can kill marine turtles, is believed to be caused by pollution.

Management options

There are many management options available to help protect marine turtle populations. Although taking of turtles and eggs in many countries is illegal, it often continues at some level within coastal communities. The management options below focus on reducing direct take of eggs and turtles and does not deal with industrial bycatch or pollution. The aim of any marine turtle programme should be to work as closely with the community as possible, especially if they have a long tradition of using marine turtles for food, money and culture. It is important to compliment any management activity with awareness-raising work with local populations.

Nesting beaches and nesting populations

Potential nesting beaches should be located, through interviews with the local population if currently unknown, and monitored. It is important to encourage the community to report any nests found and to establish a protocol for their protection. There are many different nest protection schemes around the world so it will be necessary to decide which method suits the area best.

Some questions to consider:

- Ideally, the nests should be left in-situ and protected. What is the greatest threat to the survival of the nest?
- Is there a local community close by that normally exploits turtle nests or nesting females?
- Can the community become actively involved in protecting the nesting population?
- Who might be able to contribute funding for beach protection (local hotels, tourism associations, local government, international groups)?

In-water (foraging) populations

If the in-water population is being heavily exploited, either through direct or artisanal bycatch, then you may decide to focus your efforts here. If fishing is legal or continues illegally, there are several potential management solutions that could be suggested to reduce the current numbers of turtles taken.

It is also important to note that any management strategy that attempts to control the turtle harvest may be difficult if the law states the fishery is illegal. This should not discourage local and regional efforts but it may be necessary to discuss your efforts with the Fisheries Department to prevent potential problems.

If legal exploitation is allowed, or you are working towards limiting the illegal take, there are several sound management principles that should be followed, or can be used to focus limiting illegal take, including:

- Protection of nesting females;
- Protection of all species and sexes during main nesting season;

- Protection of most endangered species exploited in the region, e.g. Hawksbills and Leatherbacks from the Western Indian Ocean;
- Introduction of maximum size limits (length of turtle) to ensure that mature individuals are protected from exploitation;
- Introduction of conservative quotas.

Other management options that could be utilised alongside these management principles could be:

- The introduction of reserve areas protected from turtle hunting all year round;
- Bans on certain fishing gears to target turtles.

It is also important that the harvest is monitored in order
to manage the fishery and establish trends over time.
Any monitoring programme should record the following:

- Number, species, size and sex (if possible) of turtles landed;
- Number of fishers (and therefore catch-per-unit-effort);
- Gear used;
- Location of landing site of turtle(s);
- Final destination of landed turtle (market, domestic use etc).

Conclusion

Marine turtles play an important role in the marine environment. They are also important for many coastal populations as a source of protein and cultural symbol. These animals are under growing threat from overexploitation, increased by-catch, and a changing environment. Cooperation between communities, governments, and non-governmental organisations is needed to sustainably manage the remaining populations and prevent the permanent loss of these creatures.

This handbook should assist conservation field agents to understand the biology of marine turtles, the threats facing them, and some basic management options. The attached comic is an educational tool for communities and students to encourage respect of these creatures and the rules that govern their exploitation. By depicting the community norm as one of non-acceptance of turtle exploitation, it is hoped that readers from communities where this is not the case, will be challenged to think differently about how their community views turtles.

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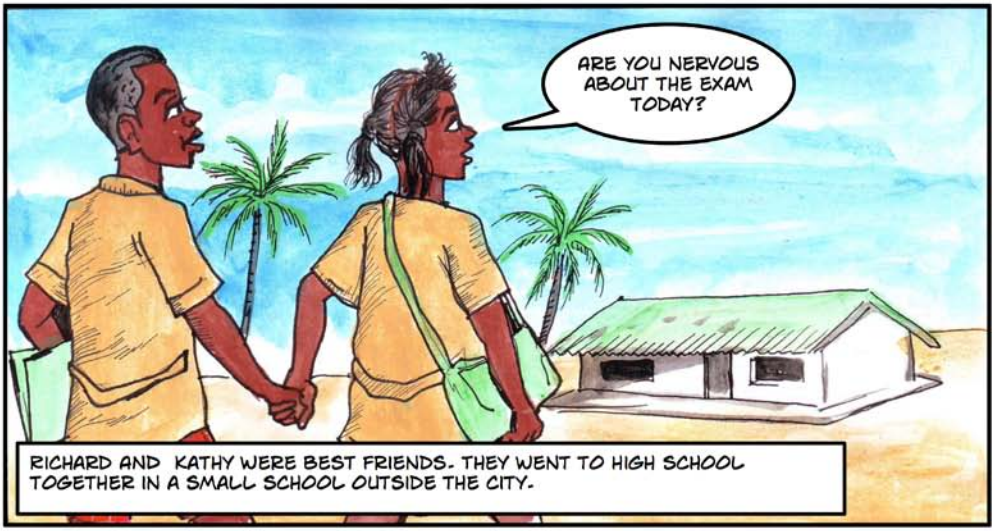
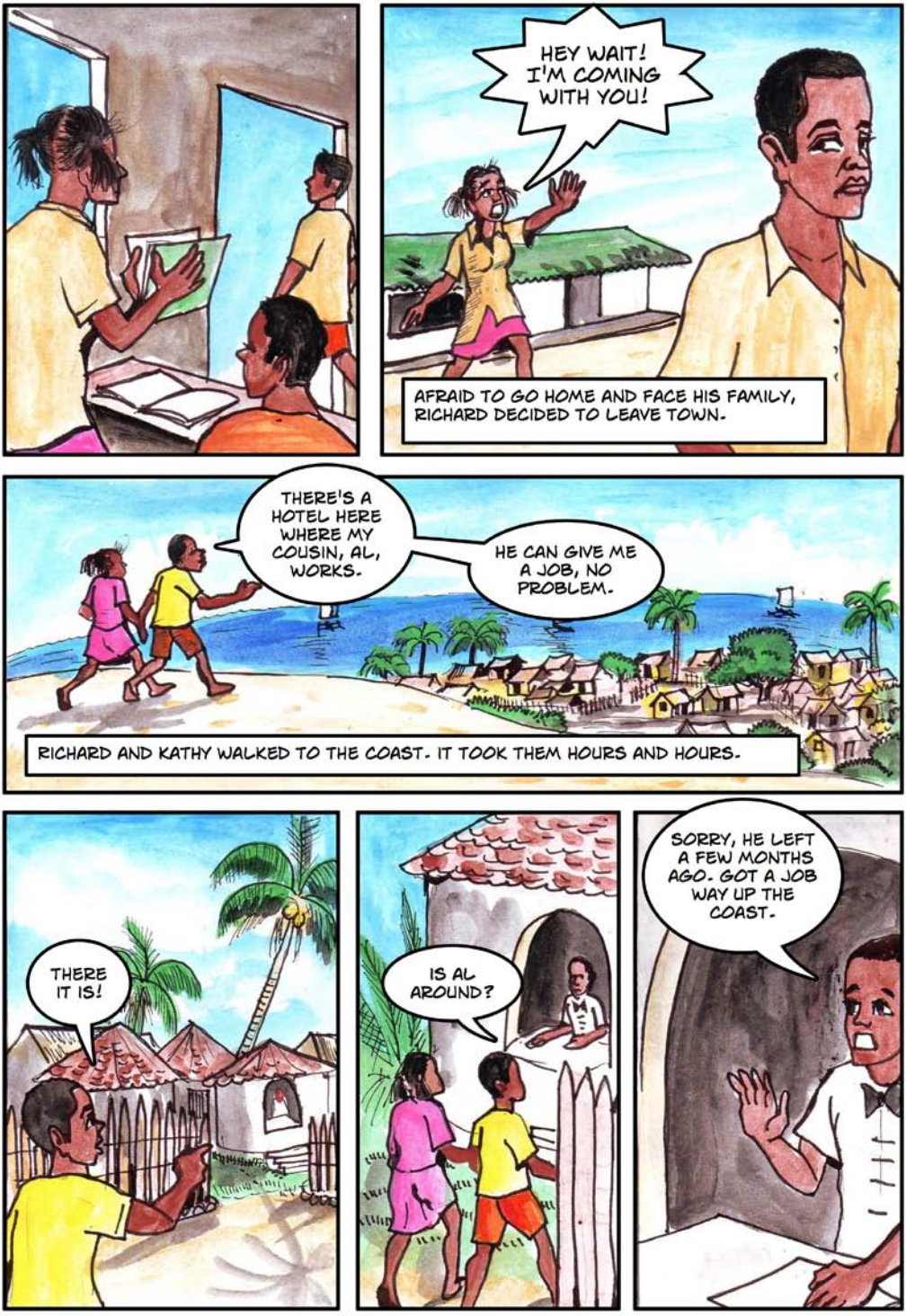
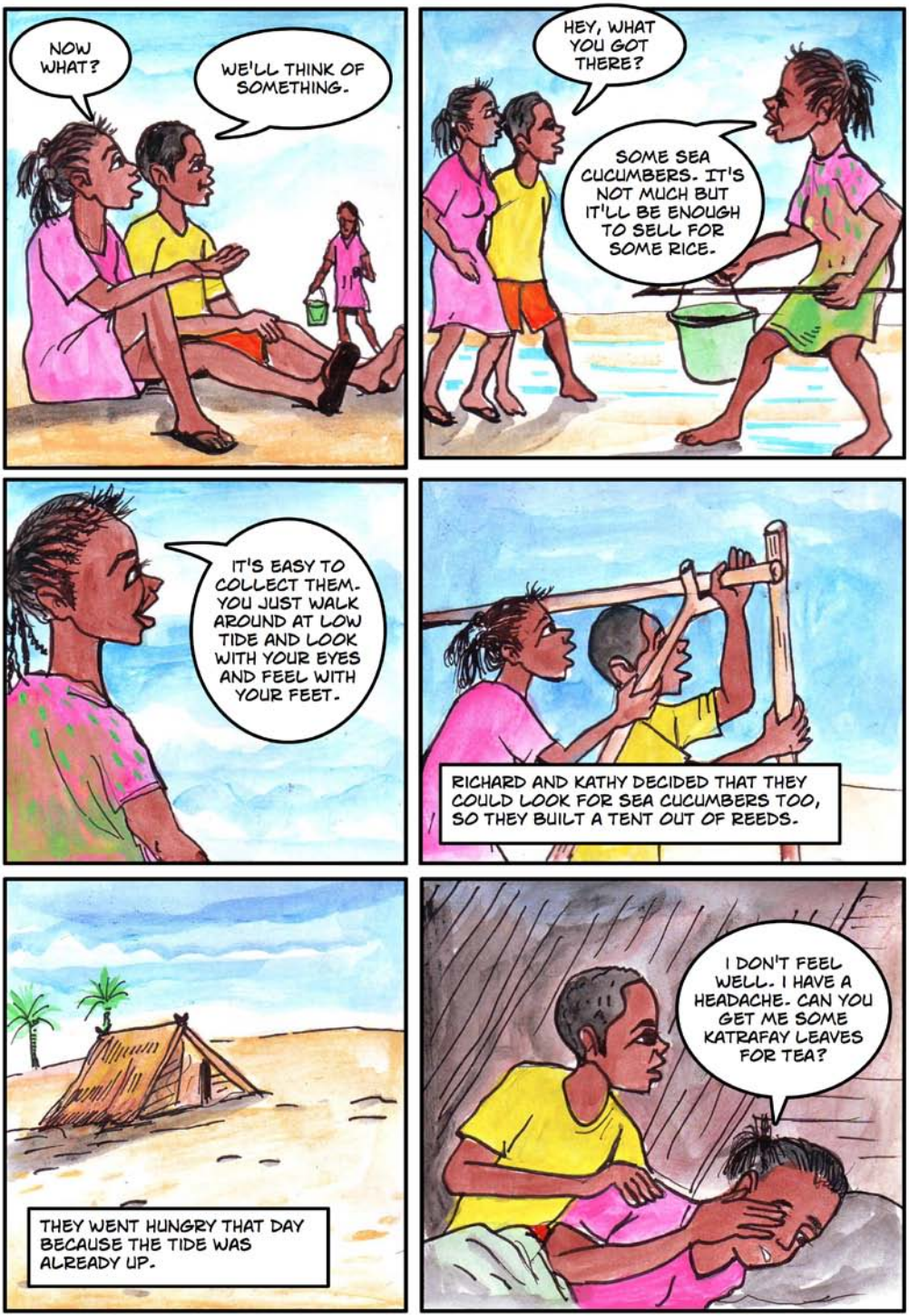

ARE YOU NERVOUS ABOUT THE EXAM TODAY?
RICHARD AND KATHY WERE BEST FRIENDS. THEY WENT TO HIGH SCHOOL TOGETHER IN A SMALL SCHOOL OUTSIDE THE CITY.


NO WAY, I'VE GOT A PLAN
I HOPE SO BECAUSE THE TEACHER SAID THIS IS YOUR LAST CHANCE.


WHAT IS THIS!


GET OUT OF MY CLASSROOM AND DON'T COME BACK!


HEY WAIT! I'M COMING WITH YOU!
AFRAID TO GO HOME AND FACE HIS FAMILY, RICHARD DECIDED TO LEAVE TOWN.
THERE'S A HOTEL HERE WHERE MY COUSIN, AL, WORKS.
HE CAN GIVE ME A JOB, NO PROBLEM.
RICHARD AND KATHY WALKED TO THE COAST. IT TOOK THEM HOURS AND HOURS.
THERE IT IS!
IS AL AROUND?
SORRY, HE LEFT A FEW MONTHS AGO. GOT A JOB WAY UP THE COAST.

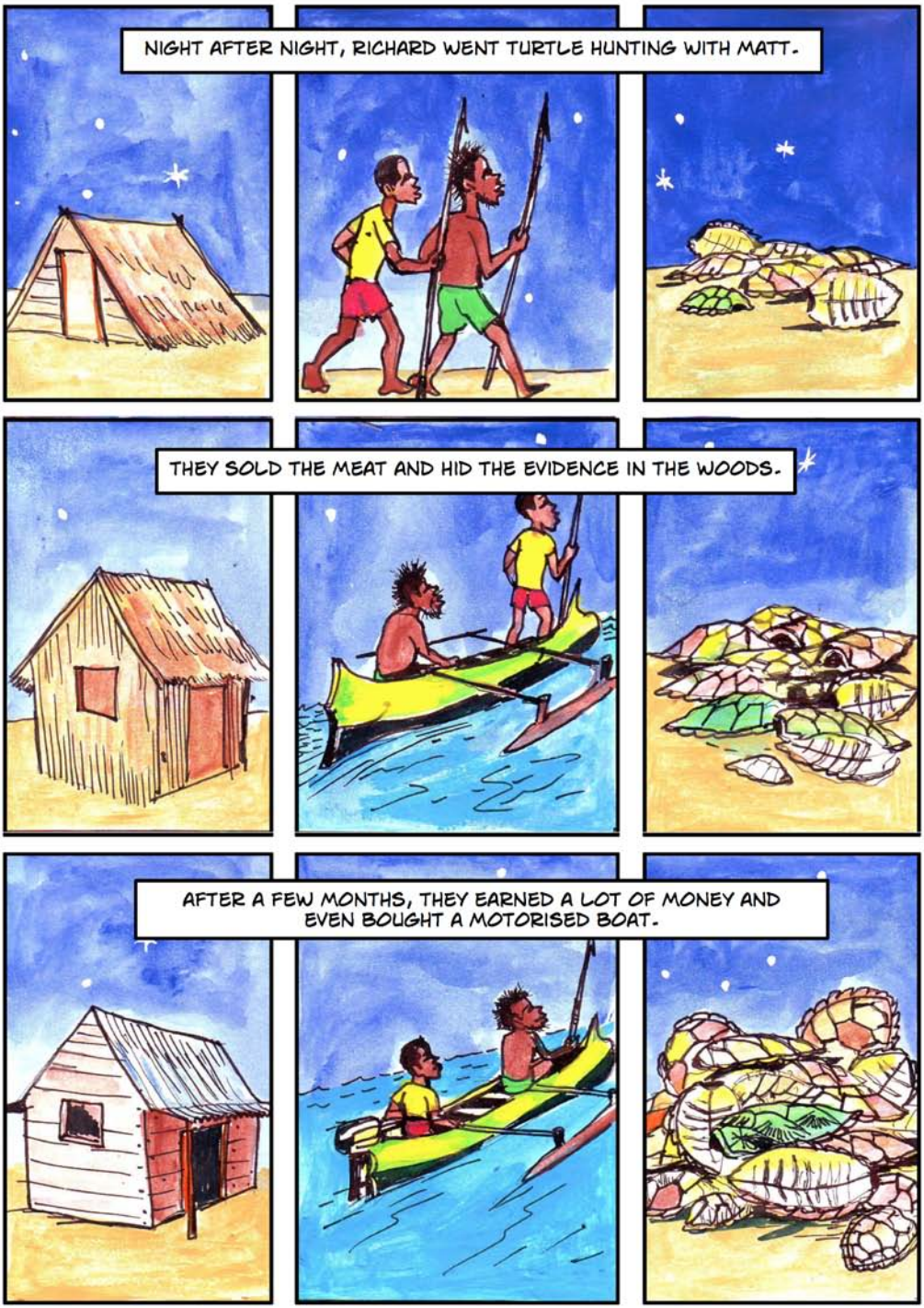

NOW WHAT?
WE'LL THINK OF SOMETHING.
HEY, WHAT YOU GOT THERE?
SOME SEA CUCUMBERS. IT'S NOT MUCH BUT IT'LL BE ENOUGH TO SELL FOR SOME RICE.
IT'S EASY TO COLLECT THEM. YOU JUST WALK AROUND AT LOW TIDE AND LOOK WITH YOUR EYES AND FEEL WITH YOUR FEET.
RICHARD AND KATHY DECIDED THAT THEY COULD LOOK FOR SEA CUCUMBERS TOO, SO THEY BUILT A TENT OUT OF REEDS.
THEY WENT HUNGRY THAT DAY BECAUSE THE TIDE WAS ALREADY UP.
I DON'T FEEL WELL. I HAVE A HEADACHE. CAN YOU GET ME SOME KATRAFAY LEAVES FOR TEA?


SHOULD BE SOME KATRAFAY IN HERE.
HEY, WHAT'S THAT?
WOW! THIS IS A LOT OF SHELLS. SOMEONE IS HIDING THESE HERE.
HEY! WHAT ARE YOU DOING HERE? I'M GOING TO HAVE TO KILL YOU!
HOLD ON MAN! I'M NOT GOING TO TELL ANYONE.

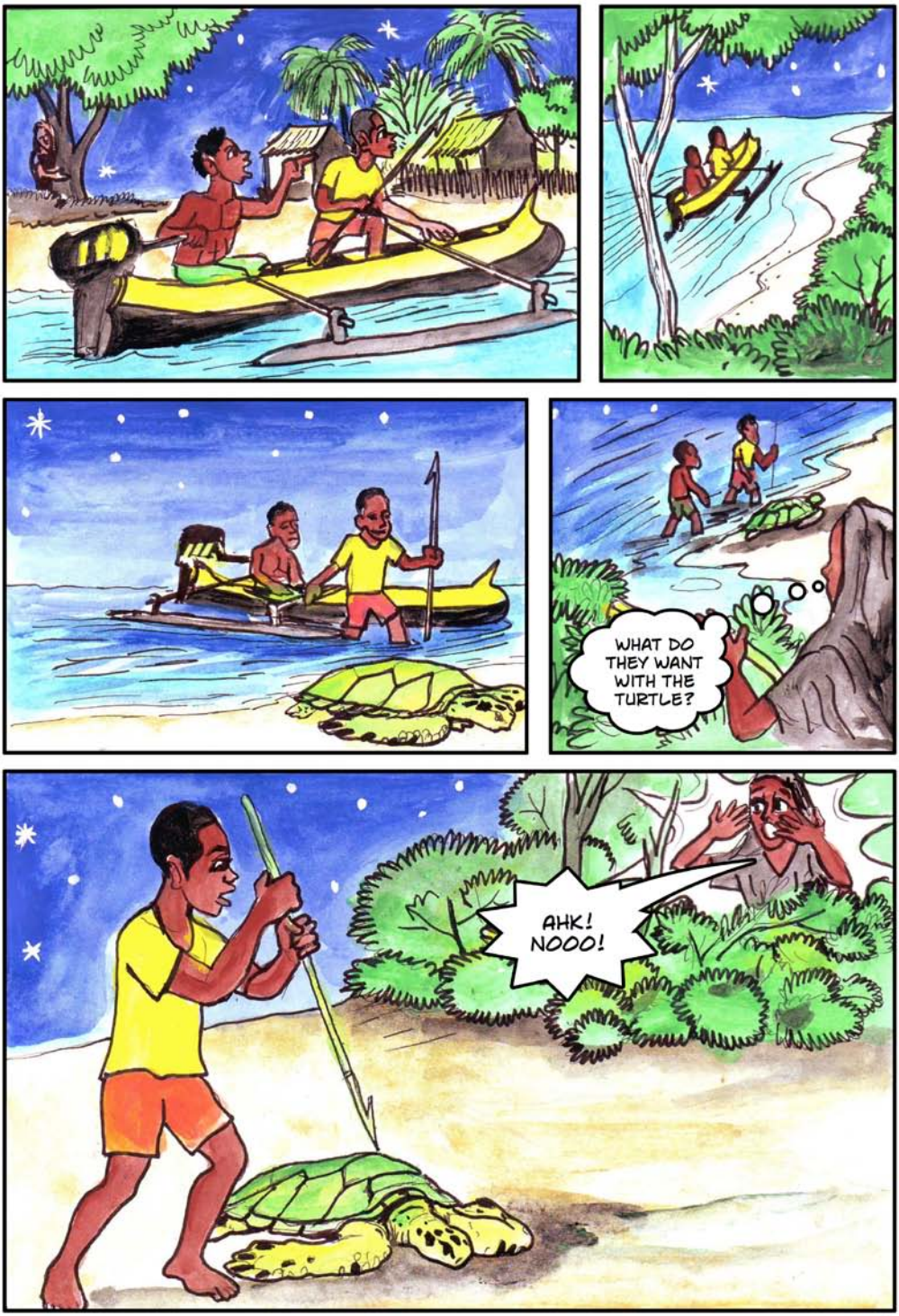

THEN YOU'LL COME WITH ME- NOW!
MY NAME'S MATT- YOU'LL BE MY PARTNER IN CRIME- WE'RE GONNA GET RICH-
I CAN'T SWIM, IF THAT MATTERS?
ME EITHER- DON'T WORRY, WE AREN'T GOING FISHING-
HAHA! FOUND ONE NESTING ON THE BEACH-
BONUS! EGGS!!!
KILL IT! BE QUICK AND LET'S GO-
HOLD ON- ISN'T THAT ILLEGAL?


OF COURSE IT'S ILLEGAL. WHO CARES? IT'S MONEY!
AND SINCE YOUR KILLING IT WITH ME, I KNOW YOU CAN'T GO TO THE POLICE.
BECAUSE YOU'RE GUILTY TOO!
LET'S GO. HURRY UP!


I GOT YOUR KATRAFAY AND I GOT SOME MONEY!
WOW!! WHERE DID YOU GET THIS MONEY?
I WENT BY THE HOTEL AND THEY GAVE ME A JOB AS A GUARDIAN
GOOD LUCK AT WORK MY DEAR!

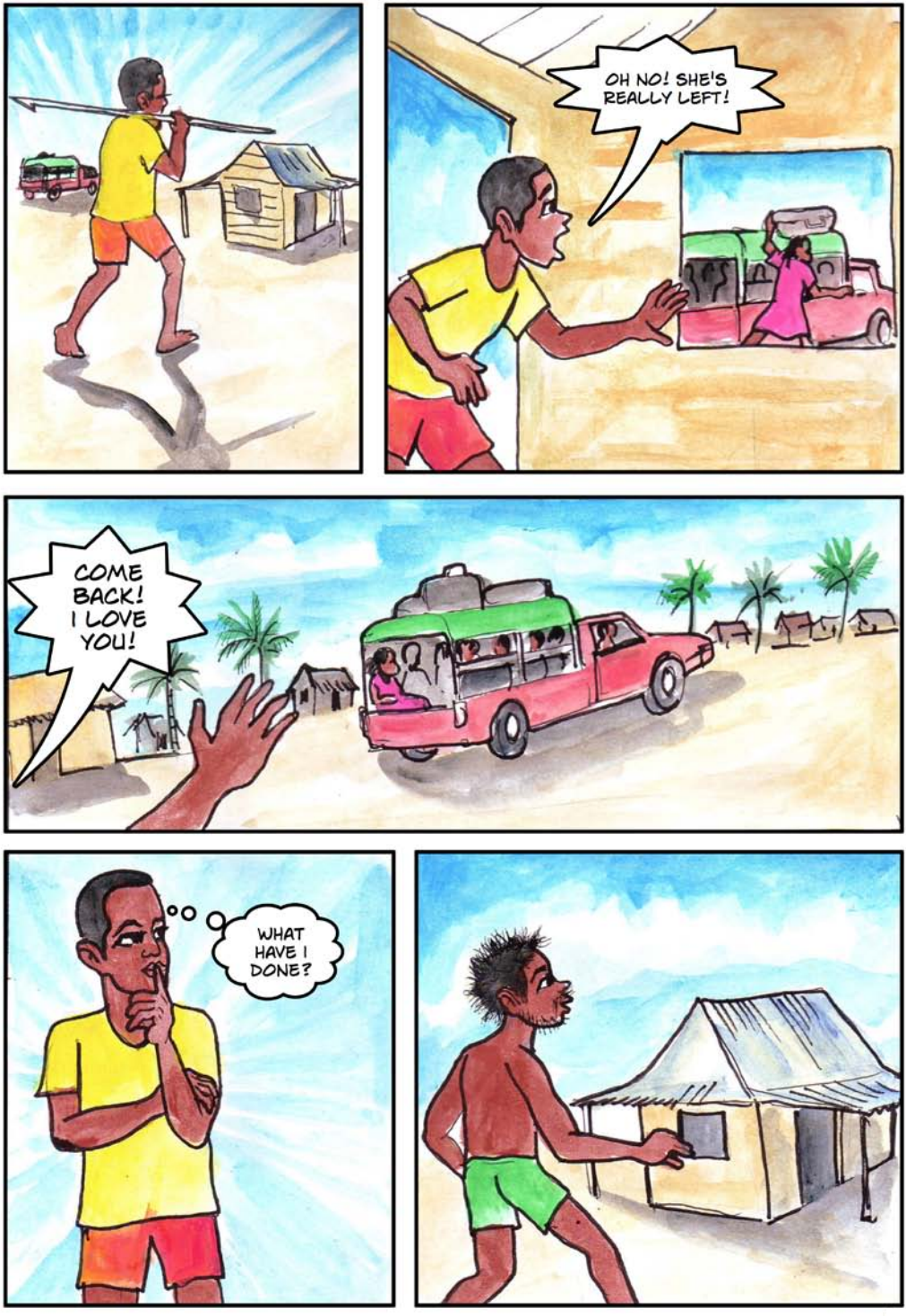

NIGHT AFTER NIGHT, RICHARD WENT TURTLE HUNTING WITH MATT.
THEY SOLD THE MEAT AND HID THE EVIDENCE IN THE WOODS.
AFTER A FEW MONTHS, THEY EARNED A LOT OF MONEY AND EVEN BOUGHT A MOTORISED BOAT.


OFF TO WORK AGAIN.
BUT KATHY GREW SUSPICIOUS OF ALL THE MONEY HE WAS BRINGING HOME.
GUARDIANS DON'T MAKE SO MUCH MONEY.
SOMETHING ELSE IS GOING ON.
WHO'S THAT?


WHAT DO THEY WANT WITH THE TURTLE?
AHK! NOOO!

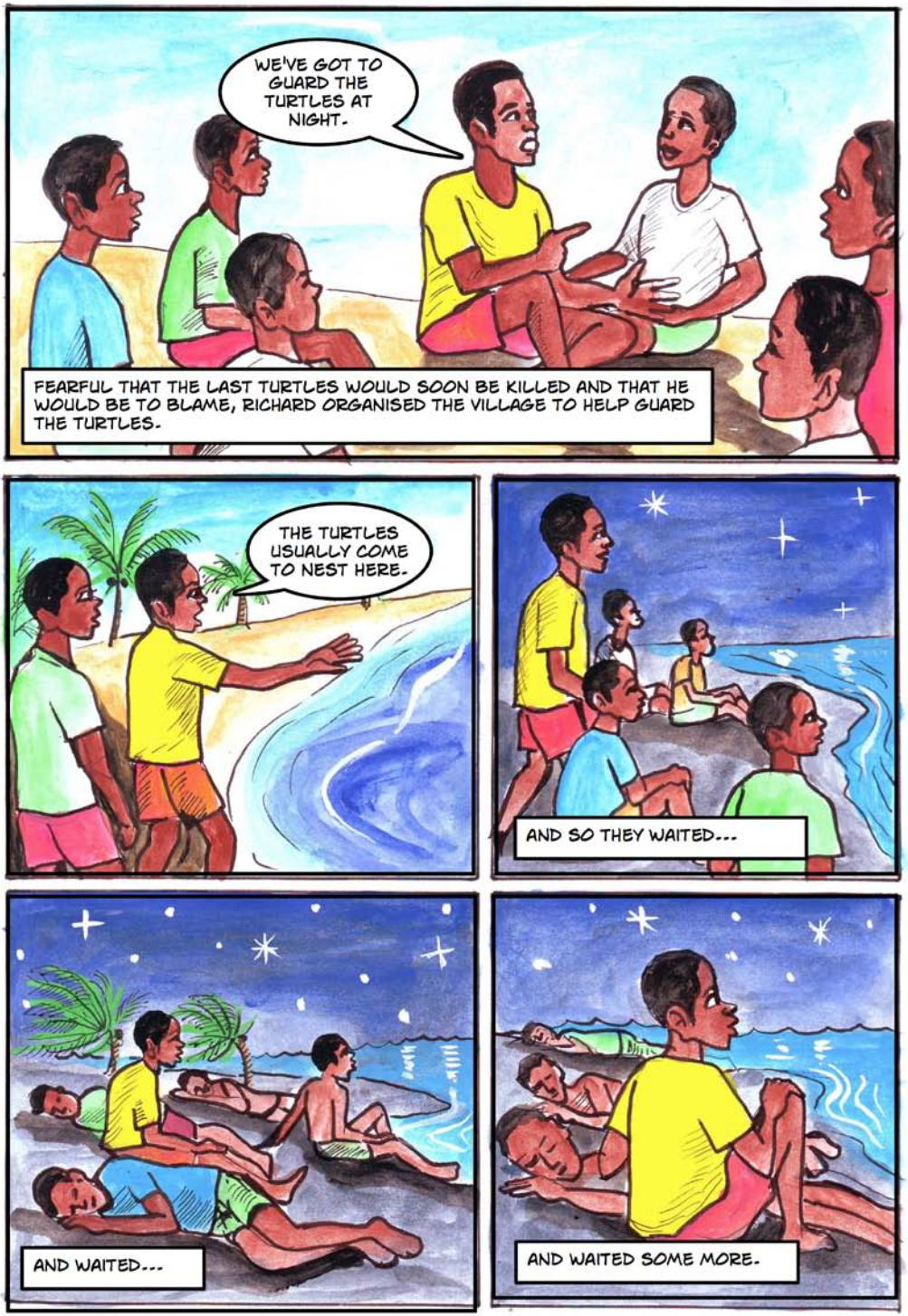

WE'VE BEEN FOLLOWED!
DIE!
WAIT! IT'S MY GIRL!
GET AWAY FROM ME!


THIS IS WHERE THE MONEY'S COME FROM!
DO YOU EVEN REALISE WHAT YOU'VE DONE? THESE ANIMALS ARE ENDANGERED.
THEY ARE A KEY PART OF THE MARINE ENVIRONMENT. WITHOUT THEM THE WHOLE ECOSYSTEM IS IN DANGER OF COLLAPSING.
AND YOU ARE DESTROYING THEM. YOU KILL THE SMALL ONES, THE BIG ONES, EVERYTHING. IT TAKES 25 YEARS FOR THEM TO MATURE TO ADULTS. YOU'LL KILL THEM ALL!
UMM. WE SHOULD PROBABLY KILL HER.
I'M GOING HOME. I DON'T WANT TO BE A PART OF THIS!
LET HER GO. SHE WON'T TELL ANYONE.


OH NO! SHE'S REALLY LEFT!
COME BACK! I LOVE YOU!
WHAT HAVE I DONE?

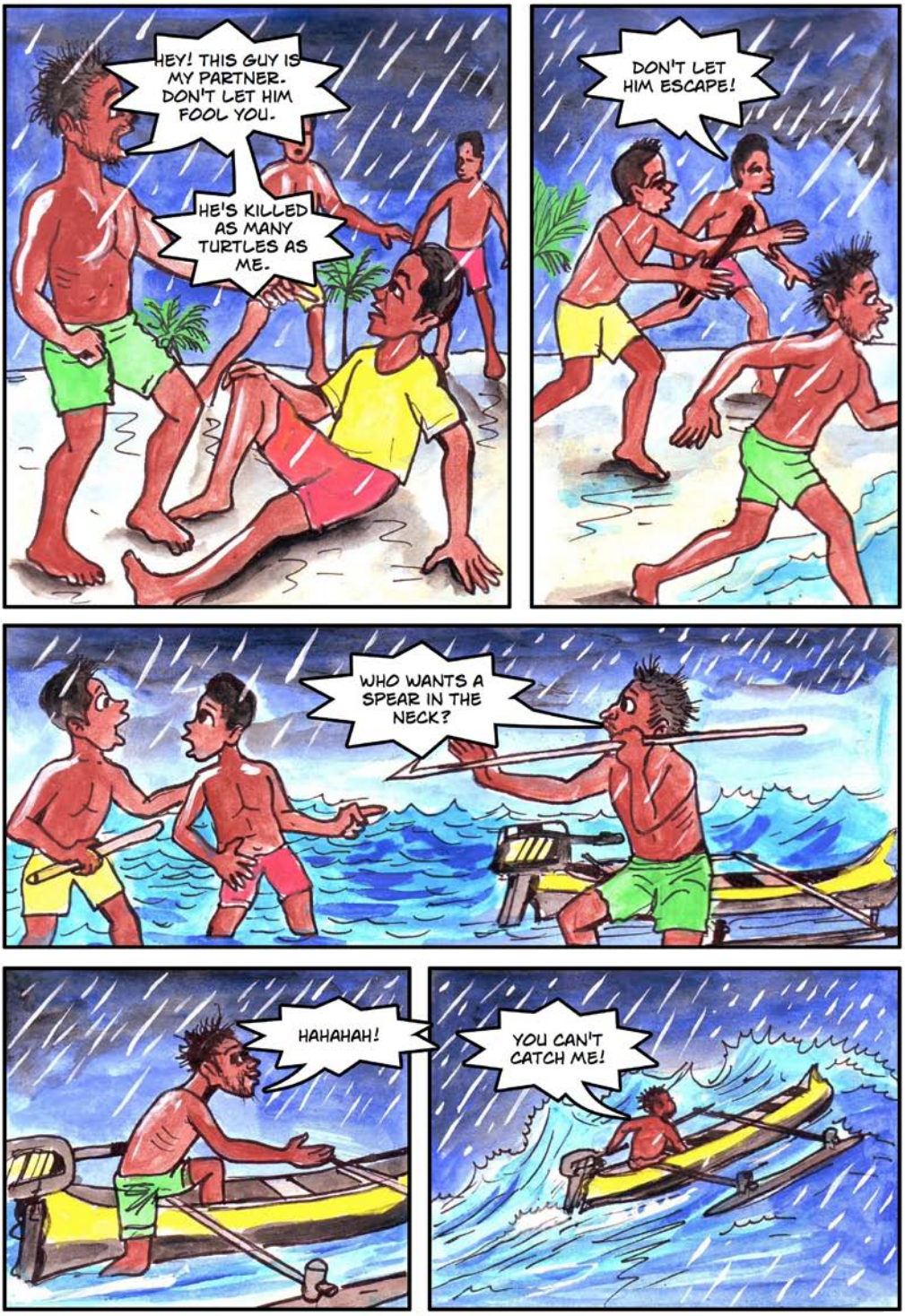

DON'T LET THAT GIRL GET TO YOU, MAN.
STOP!
HAVE YOU SEEN THESE?
SOMEONE ELSE FOUND THE SHELLS. THIS PAPER IS FROM LAST WEEK.
WANTED
Serial Turtle Poachers
Some other n o t interesting news goes here, it is too small to really read. Not interesting is this text says the guru. Don't try to read this stuff here.
600 TURTLE SHELLS FOUND
A gigantic pile of turtle shells was discovered last night in the forest by ifat. The turtle meat appeared to have removed for sale at the locl market. It is illegal to harvest urtle meat in this country


WHATEVER. I'M NOT SCARED.
WE'VE GOT TO STOP!
AND WHAT ABOUT WHAT KATHY SAID. THERE AREN'T MANY TURTLES LEFT.

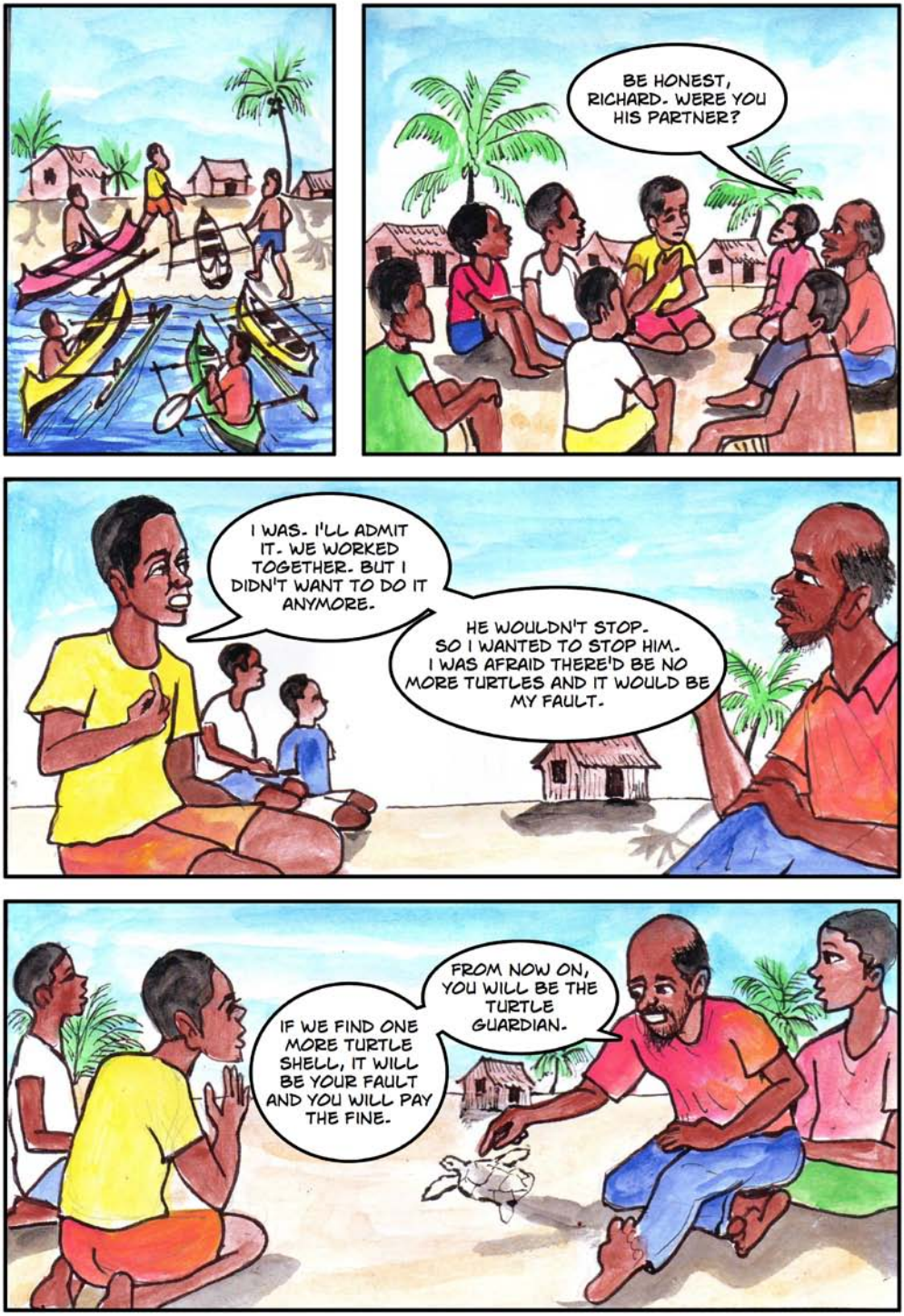

WE'VE GOT TO GUARD THE TURTLES AT NIGHT.
FEARFUL THAT THE LAST TURTLES WOULD SOON BE KILLED AND THAT HE WOULD BE TO BLAME, RICHARD ORGANISED THE VILLAGE TO HELP GUARD THE TURTLES.
THE TURTLES USUALLY COME TO NEST HERE.
AND SO THEY WAITED...
AND WAITED...
AND WAITED SOME MORE.


LET'S GO HOME. A STORM IS COMING.
HOLD ON! I HEAR SOMETHING!
IT'S HIM. I KNOW IT!
LET'S SPLIT UP ALONG THE COAST. HE'LL COME ASHORE SOMEWHERE NEAR HERE.


I TOLD YOU TO STOP AND YOU WOULDN'T.
I WON'T LET YOU KILL ALL THE TURTLES!
YOU FOOL. YOU CARE ABOUT THE TURTLES MORE THAN ME?
AND IF YOU STOP ME, I'LL KILL YOU.
I'LL DIE BEFORE I GIVE UP TURTLE HUNTING.


HEY! THIS GUY IS MY PARTNER. DON'T LET HIM FOOL YOU.
HE'S KILLED AS MANY TURTLES AS ME.
DON'T LET HIM ESCAPE!
WHO WANTS A SPEAR IN THE NECK?
HAHAHAH!
YOU CAN'T CATCH ME!


HERE'S THE BOAT.
THE NEXT DAY, THE VILLAGE WENT OUT TO LOOK FOR MATT.
HE'S OUT THERE SOMEWHERE.
HE'S GONE. MUST HAVE DROWNED.


BE HONEST, RICHARD. WERE YOU HIS PARTNER?
I WAS. I'LL ADMIT IT. WE WORKED TOGETHER. BUT I DIDN'T WANT TO DO IT ANYMORE.
HE WOULDN'T STOP. SO I WANTED TO STOP HIM. I WAS AFRAID THERE'D BE NO MORE TURTLES AND IT WOULD BE MY FAULT.
IF WE FIND ONE MORE TURTLE SHELL, IT WILL BE YOUR FAULT AND YOU WILL PAY THE FINE.
FROM NOW ON, YOU WILL BE THE TURTLE GUARDIAN.

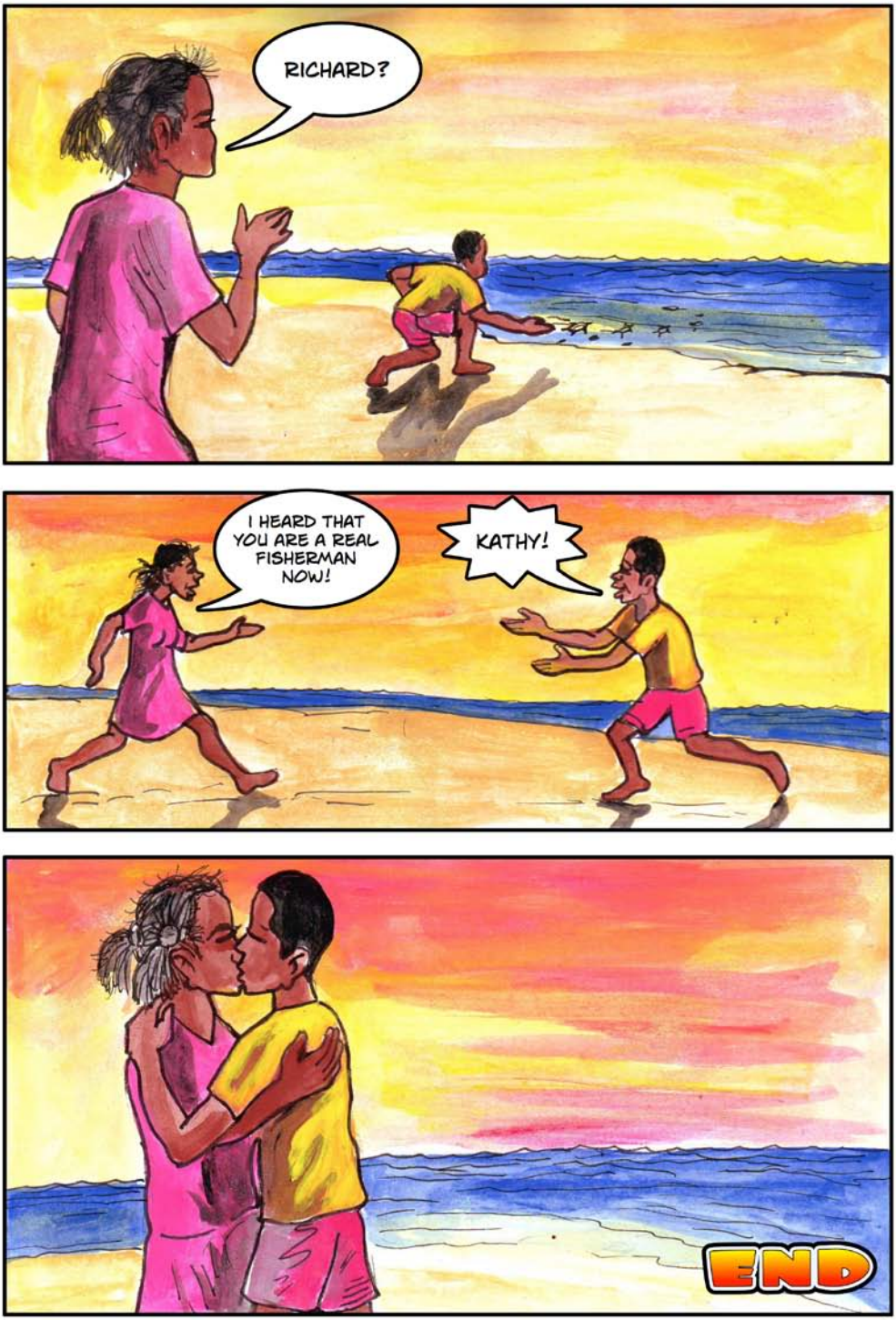

SEEING THAT RICHARD COULDN'T FISH OR SWIM...


THEY CHOSE SOMEONE TO TEACH HIM...


AND WITHIN A FEW WEEKS. HE COULD FISH AND SWIM LIKE THE OTHERS.


HE WROTE TO KATHY OFTEN.


BUT SHE NEVER WROTE BACK.
SO HE JUST KEPT ON GUARDING THE TURTLES AND HOPING.
LETTER FOR ME?
NOPE, SORRY.
GOOD LUCK TURTLES. I'LL SEE YOU LITTLE ONES IN 25 YEARS.
OTHER WAY, BUDDY.


RICHARD?
I HEARD THAT YOU ARE A REAL FISHERMAN NOW!
KATHY!
END

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