

SAFARI'S Encounter with Coastal and Marine hazards



One warm Sunday afternoon, Safari, his mother, father and little sister Zawadi were resting in the shade outside their home in the small village of Kilima near Shimba Hills. It was early January just before the schools were to reopen. Safari passed his final primary exams very well and was now waiting for a letter of admission to secondary school. The family was very happy and busy discussing Safari's secondary school options, when Mr. Kombo, his primary school teacher and family friend, came to visit.

"Welcome, Mr. Kombo, how are you?" Safari's father asked.

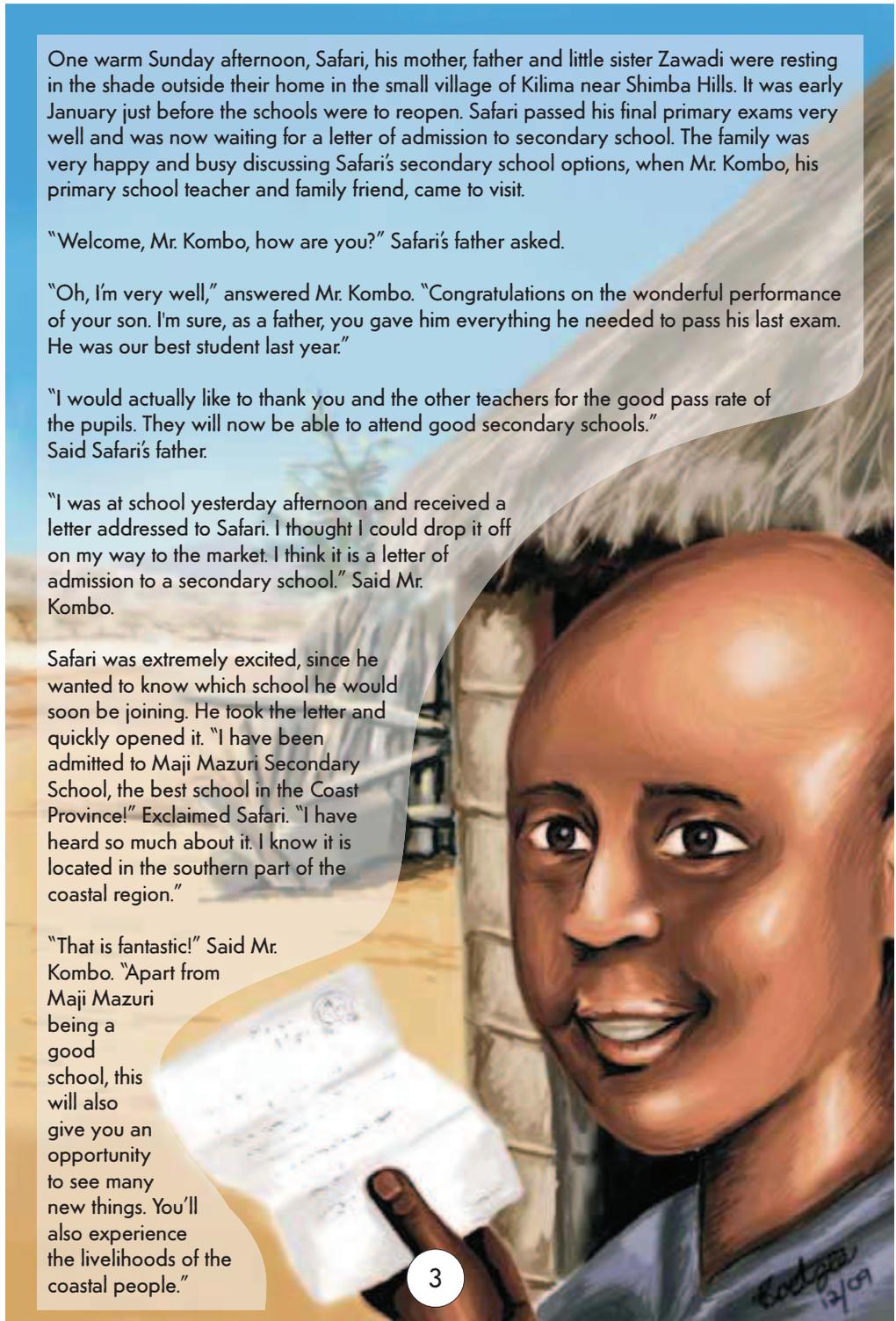
"Oh, I'm very well," answered Mr. Kombo. "Congratulations on the wonderful performance of your son. I'm sure, as a father, you gave him everything he needed to pass his last exam. He was our best student last year."

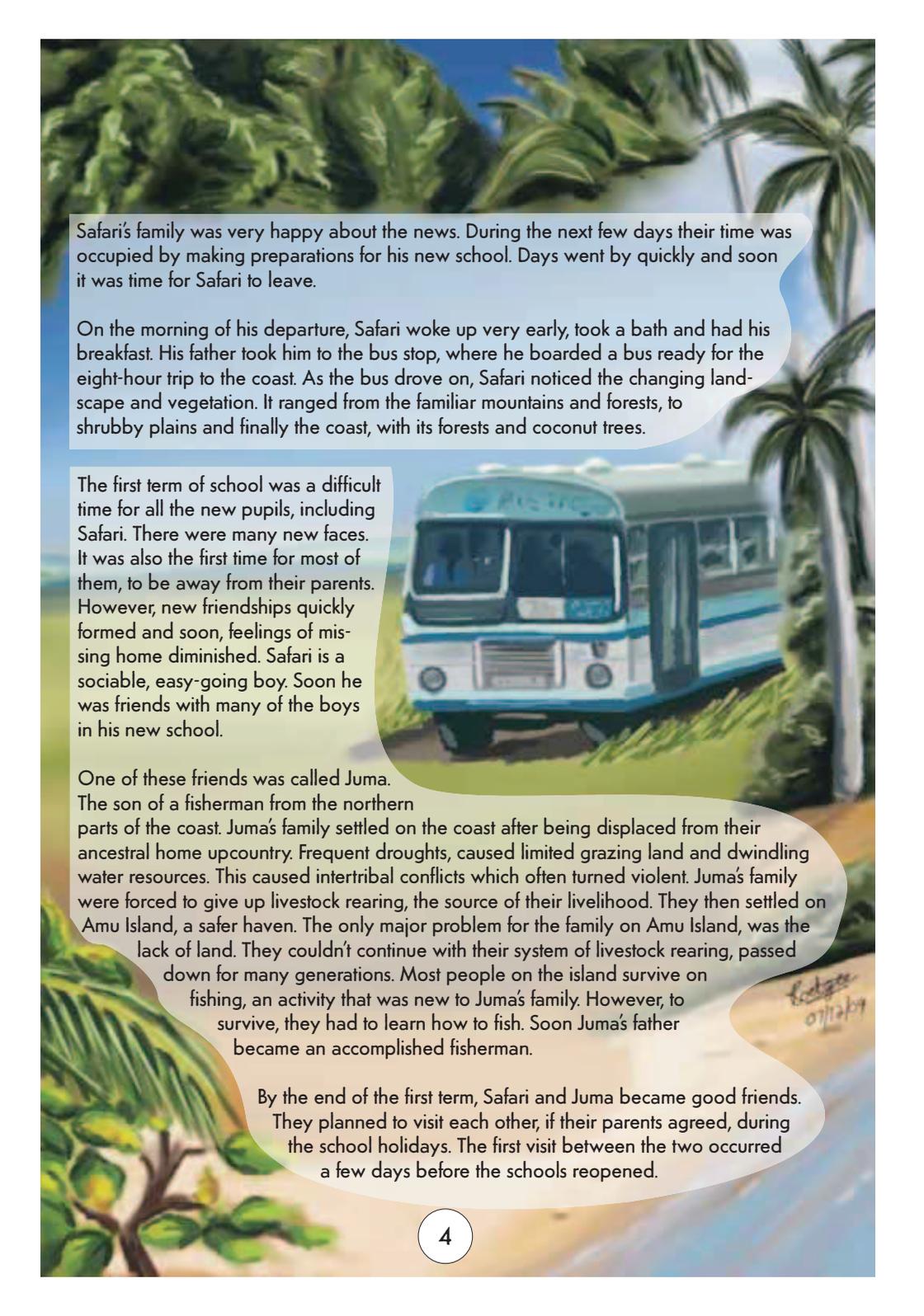
"I would actually like to thank you and the other teachers for the good pass rate of the pupils. They will now be able to attend good secondary schools." Said Safari's father.

"I was at school yesterday afternoon and received a letter addressed to Safari. I thought I could drop it off on my way to the market. I think it is a letter of admission to a secondary school." Said Mr. Kombo.

Safari was extremely excited, since he wanted to know which school he would soon be joining. He took the letter and quickly opened it. "I have been admitted to Maji Mazuri Secondary School, the best school in the Coast Province!" Exclaimed Safari. "I have heard so much about it. I know it is located in the southern part of the coastal region."

"That is fantastic!" Said Mr. Kombo. "Apart from Maji Mazuri being a good school, this will also give you an opportunity to see many new things. You'll also experience the livelihoods of the coastal people."





Safari's family was very happy about the news. During the next few days their time was occupied by making preparations for his new school. Days went by quickly and soon it was time for Safari to leave.

On the morning of his departure, Safari woke up very early, took a bath and had his breakfast. His father took him to the bus stop, where he boarded a bus ready for the eight-hour trip to the coast. As the bus drove on, Safari noticed the changing landscape and vegetation. It ranged from the familiar mountains and forests, to shrubby plains and finally the coast, with its forests and coconut trees.

The first term of school was a difficult time for all the new pupils, including Safari. There were many new faces. It was also the first time for most of them, to be away from their parents. However, new friendships quickly formed and soon, feelings of missing home diminished. Safari is a sociable, easy-going boy. Soon he was friends with many of the boys in his new school.

One of these friends was called Juma. The son of a fisherman from the northern parts of the coast. Juma's family settled on the coast after being displaced from their ancestral home upcountry. Frequent droughts, caused limited grazing land and dwindling water resources. This caused intertribal conflicts which often turned violent. Juma's family were forced to give up livestock rearing, the source of their livelihood. They then settled on Amu Island, a safer haven. The only major problem for the family on Amu Island, was the lack of land. They couldn't continue with their system of livestock rearing, passed down for many generations. Most people on the island survive on fishing, an activity that was new to Juma's family. However, to survive, they had to learn how to fish. Soon Juma's father became an accomplished fisherman.

By the end of the first term, Safari and Juma became good friends. They planned to visit each other, if their parents agreed, during the school holidays. The first visit between the two occurred a few days before the schools reopened.

Safari visited Juma's home in Amu. One evening at dinnertime, Safari asked Juma's father: "We heard about the Tsunami affecting the coast a few months ago, was Amu affected and how?"

Juma's father exclaimed: "My son, don't remind me of that day! I have never seen something like that in my life! I happened to be in my boat close to the shore. Suddenly, the water retracted, and I found myself on dry land! It was scary. We caught no fish that day. Even the most experienced fishermen were scared. We abandoned our boats and ran home. Within two hours, mountains of waves started to hit the coast. The fishermen lost most of their fishing boats. Parts of our mangroves are still under water. A lot of properties in the low-lying areas were also destroyed. Luckily very few lives were lost, because our coast guards were able to warn most people, to move away from the beaches and low lying coastal areas."

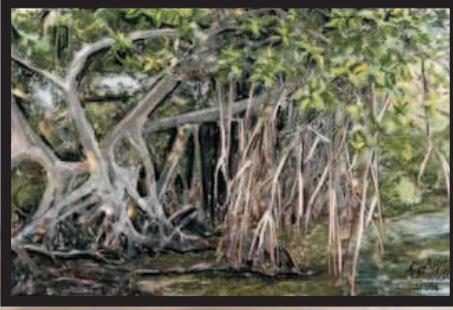
"Did the Tsunami affect all parts of the coast equally?" Safari enquired.



26TH DECEMBER 2004

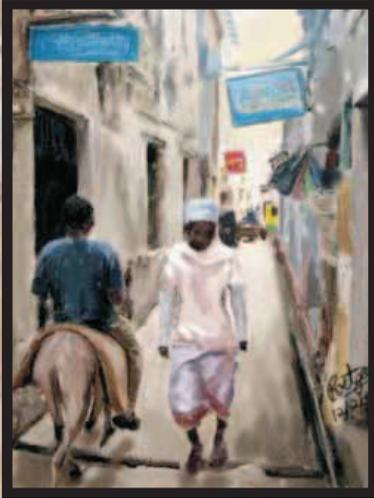
IMPACT OF TSUNAMI





Mangrove forests, a natural barrier against storms and ocean surges.

"No." Juma's father answered. "Some parts of the coast are highlands, while others have good protection from waves and natural hazards, in the form of mangrove forests. You probably also noticed the narrow, winding streets in our town. These streets quickly channel the wind across town and thereby reduce pressure and potential damage. Mangroves along the coastline, on the other side of the Island, also greatly protect us from waves and surges from the ocean." He said. "Some parts of the coast face problems with this natural barrier. A fast-growing local population, led to the destruction of mangroves and other natural systems in these parts. These systems, used to protect the people from strong waves and other coastal and marine natural hazards."



Narrow winding streets prevent damage from wind and storms.

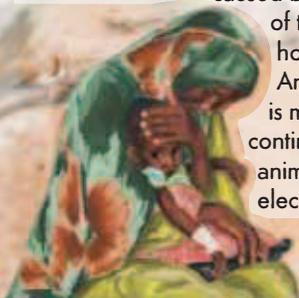


Drought, a natural hazard, which could easily become a disaster.

"But what are natural hazards?" Safari asked.

"Natural hazards, are the dangers we are exposed to by our immediate environment, as we go about our daily lives. It can interfere with the normal functioning of communities or even threaten our activities or lives, if we don't know how to protect ourselves from it. These hazards are caused by nature. There is not much we can do to stop it recurring. The extent of the damage done by these natural hazards will therefore depend on how a community is able to withstand and cope with its impacts."

Answered Juma's father. "Drought, is an example of a natural hazard. It is most persistent in this area, due to unreliable rainfall. It sometimes continues for several years, like in 1999-2001. People lost most of their animals as a result of no drinking water. There was also no electricity available, both for industries and homes.





Drought relief

The industries were forced to close down and many people lost their jobs as a result. This caused a serious disaster in our village.” He added.

“And what is a disaster?” asked Juma.

“A disaster is an event where these natural hazards pose danger, loss, injury, or other adverse consequences to the community. They then can’t manage on their own.” Answered Juma’s father. “During that particular drought, we mainly survived on food relief from the government and other well wishers. In fact, the devastation can still be seen around the village.” Juma’s father continued to explain.

The waves of a Tsunami can reach over 9 meters in height.

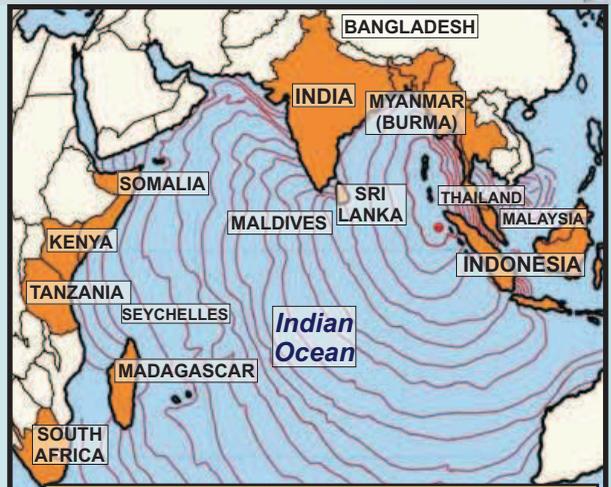
Key:

-  Path of the waves of the 26 Dec. 2004-Tsunami
-  Countries affected by the 26 Dec. 2004-Tsunami

“This is very interesting, but, now I’m even more confused about natural disasters! I know drought is caused by lack of rains, while floods are the result of excessive rains. How does nature then cause a Tsunami?” Safari asked.

Juma’s father explained. “A Tsunami, is a series of huge waves that occur after an under ocean disturbance, such as an earthquake or volcanic eruption. The word Tsunami, is from

the Japanese word, meaning “harbour wave.” These waves travel in a circular direction from the area of disturbance. It’s much like the ripples that form after throwing a pebble into water. In the open ocean, the waves may travel as fast as 700 kilometers per hour. As the waves approach the shallow waters along a coast, they can sometimes grow to more than 9 meters in height! These huge waves then smash into the shore and cause a lot of destruction.”



A map showing the center of the earthquake and the path, the concentric waves of the Tsunami follow.

Juma's father added. "The warning signs of a possible Tsunami are, a strong earthquake, lasting 20 seconds or more and a noticeable rapid fall in coastal waters, exposing normally submerged areas. Temporary rises in sea level, even though it's not a high tide, is another sign. Don't be tempted to explore. Rather, run inland to the high grounds."

Safari and Juma spent the next few days visiting various parts of the village. They saw farms with plantations of cassava as well as mixed planting of millet and maize. These crops are drought resistant, since they need very little water to survive. They also saw indigenous food storage systems and many other local systems used for drought management. However, Safari could not see any rain gauges or meteorological instruments for drought monitoring and prediction.



Cassava

Maize

Millet

During his stay, Safari noticed that Juma's father only allowed them, to go out to sea in the mornings. This puzzled Safari, until one day he asked, "Why do we only go sailing in the mornings?"

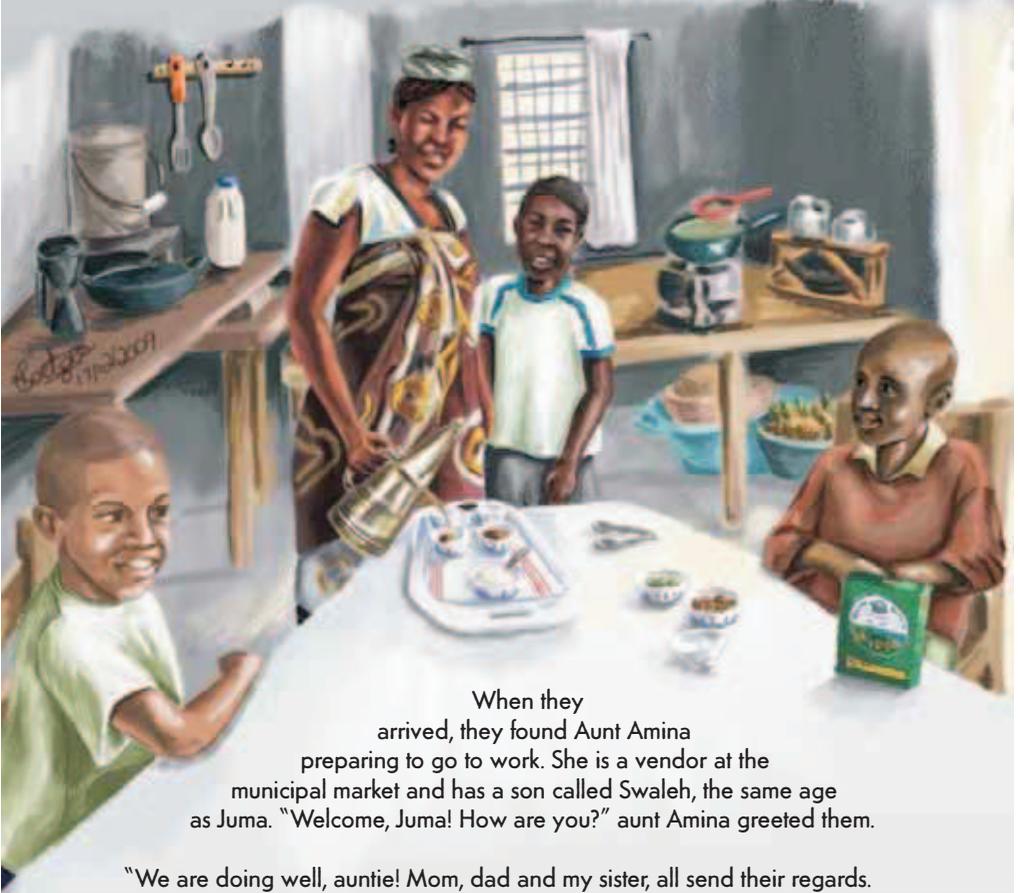
"That is a very good question, my son." Juma's father said. "In the morning, the ocean is very calm, due to little or no wind. In this conditions, the risk of boats overturning, are small and so it is safe to go out to sea. However, in the late afternoon, these conditions change. The winds and ocean currents start picking up, the sea gets rough and boats are easily overturned. Many people have lost their lives this way, venturing into the ocean. On our coast, the waves are the strongest during the months of June and July, due to strong low level monsoons and the Somali Ocean current."

"What causes the changing conditions in wind and ocean currents?" asked Safari.

Juma's father explained. "The earth is heated by the sun, but land and water masses heat and cool in different ways. The result is a difference in temperature of land and water. With temperature differences, pressure differences occur and cause wind. Wind always blows from areas of high pressure to areas of low pressure."

He continued, "In our region it is the hottest in the afternoon. This is when we expect the highest pressure differences and also strong winds and rough ocean. Seasons also affect wind and ocean currents."

At the end of the holidays, they decided to visit Juma's aunt, on their way back to school. Her name is Amina, and she lives in Kwanza, a town located about 150 kilometres from Amu. It is very close to the ocean and well known for tourism. It lies in the delta of the river Hela. The town is prone to floods, and sections facing the river and sea, is protected by stone walls. On the opposite bank of the river, a thick natural mangrove forest grows.



When they arrived, they found Aunt Amina preparing to go to work. She is a vendor at the municipal market and has a son called Swaleh, the same age as Juma. "Welcome, Juma! How are you?" aunt Amina greeted them.

"We are doing well, auntie! Mom, dad and my sister, all send their regards. This is Safari, my friend from school, who came to visit us during the holidays!" Juma responded. Aunt Amina and Swaleh, then invited them into the house and gave them some tea. Before Aunt Amina left for the market, she warned the boys. "Do not to go to the river! Although Swaleh loves fishing and swimming, the river levels are too high at the moment and it is dangerous to go down there. You could easily be swept away by the floods!"

"Floods?" Juma exclaimed. "We didn't see any rains, why then is the river flooding, auntie?"



Aunt Amina said, while pointing at the far away hills upstream. "We may not have rains here in town now, but, look at those clouds upstream! When prolonged rain persists upstream, the excessive water causes the river to break its banks. The nearby areas will then be flooded. We call this flash floods and it is very destructive. It had caught many people unaware in the past and caused a lot of deaths in the village, due to drowning."

Juma looked curious and said, "Uncle Shabir told once told me, floods occurred in their town as well!"

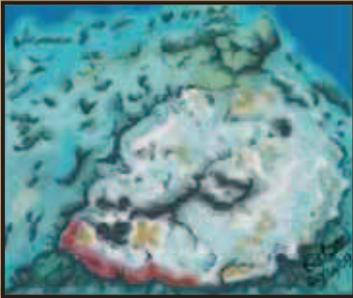
Aunt Amina replied. "Yes, floods can occur anywhere, also in towns and cities! Blocked or inadequate drainage systems contribute significantly to flooding. Roads, buildings and other infrastructure in urban centres are then damaged." She then told the boys about the floods of 1997 and 1998. "These floods were caused by the El Niño phenomenon. Household items, property, livestock and poultry were lost. Many people lost their lives or were displaced from their homes and family. Education was also disrupted, while roads and telephone lines were destroyed. Some people used makeshift boats as means of transport! Others dug holes to drain the excess water."



Arial view of a flooded area



Healthy coral reef



Dead (bleached) coral reef

She further added. "When floods occur, rivers carry large amounts of topsoil from the interior. The soil accumulates in the river mouths, which then changes the course of the rivers. This erosion is caused by excessive agricultural practices and the destruction of mangroves. This silt covers our living coral reefs and destroys it."

Aunt Amina further explained. "In the coastal region, floods are also caused by storm surges and waves from the ocean, when large amounts of water, are washed inland. However, here, we have built a stone wall, to protect us. Our mangrove forests, and a good urban flood management policy, protect us as well. In many cases, malaria, typhoid fever and other vector borne disease outbreaks are common during floods."

When Aunt Amina left for the market, the three boys obeyed her and spent the day playing and helping with household chores. They did not go to the river.

The following morning, Juma told his aunt that they intended to visit his uncle Shabir on their journey back to school. He further told her that they would ask permission from their parents, to come and visit again over the December holidays. Because December is usually relatively dry, they could then maybe go out with Swaleh to swim in the river.

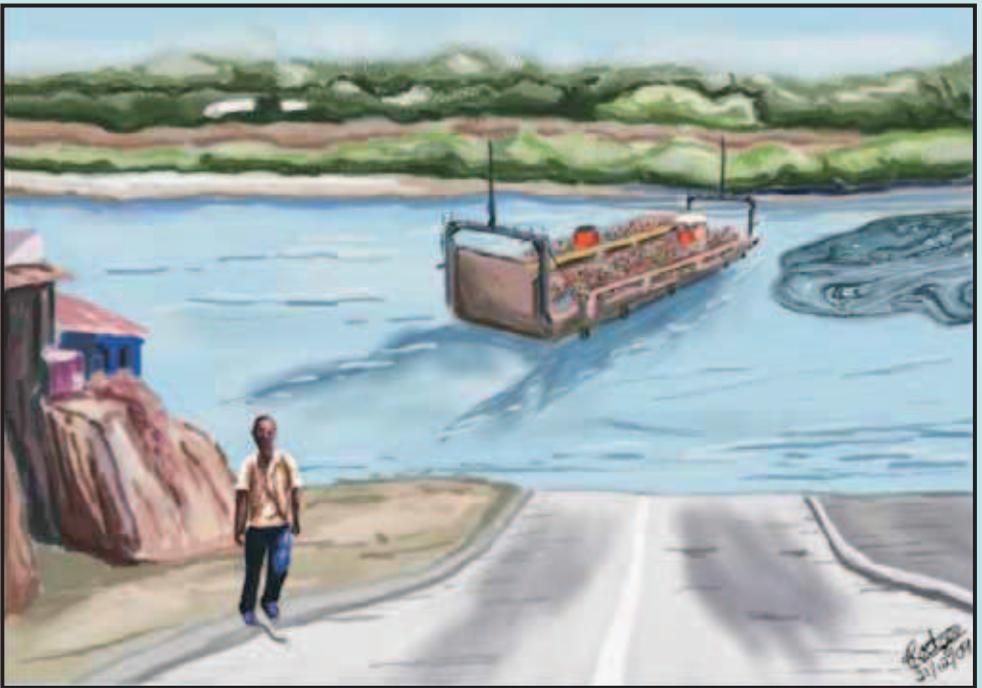
Uncle Shabir lives in Langa City, the main port of the country. No sooner had they arrived early that evening, than they heard a fire siren sound close by. Safari, Juma and his uncle rushed out. They saw some neighbours' houses engulfed in flames, as screams of help rent the air.



A few minutes later, the fire brigade and an ambulance arrived at the scene. As the firefighters started to extinguish the fire, the ambulance crew tended to the injured. It took four hours to extinguish the fire. Afterwards, people gathered in groups, to discuss the cause the fire.

After they returned home, Safari asked Juma's uncle, "I saw you talk to some of the people whose homes were burnt down. Did they say what caused the fire?"

Uncle Shabir replied: "The fire was due to an explosion, as a child about your age, was trying to light a stove. The fire then rapidly spread through the neighbourhood, because the houses are built close together. Most of them are built from wood and have makuti-thatched roofs. Due to the dry and hot conditions, the wood and makuti easily caught fire. It is unfortunate that two children died in the inferno. This is not the first fire incident this year. Some years ago, a whole dormitory at the Bombolulu Girls High School burnt down. Many innocent children died. At the time it was said that the fire was due to an electrical fault. Afterwards, rumours were, that some of the students were playing with the sockets. Who knows?"



After the long journey from Kwanza and the stress that they went through during the fire, Safari and Juma were so tired, that they went to bed immediately.

The following morning, uncle Shabir woke them up early. They had to catch the ferry to cross the sea channel, then board the only bus, that travels directly from town to school. After breakfast, uncle Shabir escorted the boys to the ferry. As the ferry crossed the channel, Safari noticed black patches and some dead fish floating on the water. He asked, while pointing at the spot, "What is wrong with the water over there?"



Uncle Shabir replied: "This is due to the spilling of crude oil by big ships further out at sea. The spilled oil is then brought to the shore by the currents and appears as black patches on the water's surface. Apart from this, some people and industries dump their used oil and raw sewage into the rivers and ocean."

"I cannot believe what I'm seeing! Can't somebody do something about this?" Safari wondered out loud.

The sad result of an oil spill.

Uncle Shabir replied: "The government, through their special team, the National Environmental Management Authority (NEMA) address these problems. People expect them to do this, though, it is each and every person's own duty to keep the environment clean and to conserve natural resources. I saw you littering this morning after breakfast in our shamba (farm), by throwing some plastic bags on the ground. Plastic is not biodegradable. This means that it cannot be decomposed by nature. Therefore, there is no difference between you and these people. You are all polluters!"

Safari and Juma felt very ashamed and pledged to stop littering.

As they came close to docking, the ferry stopped abruptly, and this scared the young boys. Uncle Shabir exclaimed: "Ferry accidents have claimed many lives in this town. For example the Mtongwe ferry disaster in 1994. It happened because of overloading and mechanical problems. Some people survived by clinging to the buoys in the water. Most of those who were good swimmers also survived. It is good to be able to swim and the two of you should learn how to at school. I also think the Ferry Services should have some rescue vessels." Uncle Shabir said, as the ferry started moving again.



It's a good idea to learn how to swim!



The ferry however docked with no problems and they disembarked safely. They took a "Boda Boda" (bicycle taxi) to drive them to the bus stop. It was the first time Safari rode on a Boda Boda. He was very frightened, because the driver was riding the bicycle recklessly.

They arrived at school and started the new term with eager. During their free time and on weekends, they would play and share their stories. They did their best at school and time seemed to fly. Soon, they were on their way back for the December holidays.

They were excited, especially when they remembered that they were to spend the first few days of their holiday with Aunt Amina and Swaleh. The two boys arrived in Kwanza just a few days before Christmas, to the excitement of Juma's aunt.

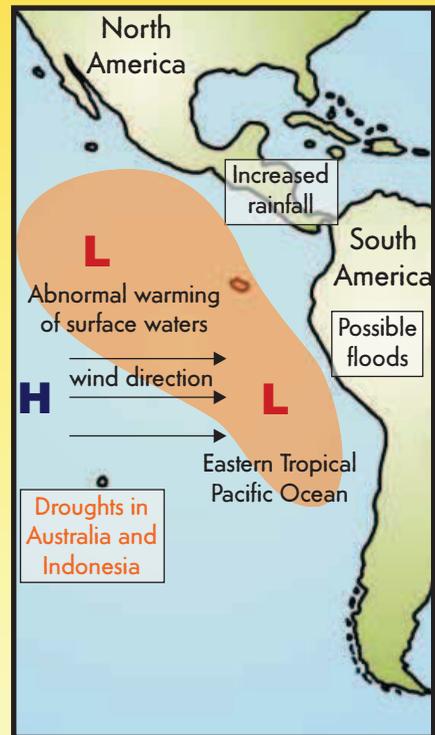
"I see you have kept your promise about the December holidays," Juma's aunt said. "This time the river level is low and you should be able to go swimming. December is generally our dry season," she further said.

"We are then quite lucky this time!" said Swaleh.

"That is true, but not all our Decembers are dry." Aunt Amina said. "Do you remember the El Niño floods of 1997/98 we discussed last time? The rains, extended from the usual October to November, into December through to February. During that season, floods became more severe during the traditionally dry months of December to February." She continued.

"We've talked about El Niño last time, but what is it exactly?" asked Safari.

"Let me try to explain." Said Aunt Amina. "I remember a weather man on TV saying that El Niño, is the abnormal warming of the surface waters, of the Eastern Tropical Pacific Ocean. This warming causes air to rise and creates a low pressure system in this region. Wind always blows from a high to low pressure system. This cause atmospheric wind motions that are often referred to as Southern Oscillation (SO). When the reverse occurs, it is abnormally cold in the Eastern Tropical Pacific Ocean region. It is then called, La Niña. El Niño, La Niña and SO are often collectively referred to by climate scientists as El Niño / Southern Oscillation (ENSO). ENSO has been linked to worldwide climate extremes including floods and droughts." Aunt Amina further explained, "In fact, the name El Niño, means "The Boy" in Spanish and originated from the South American fishermen, who referred to the Christ Child. The phenomenon often peaks at around Christmas time, when Christians celebrate the birth of Jesus Christ." Aunt Amina concluded.



Eastern Tropical Pacific Ocean during El Niño

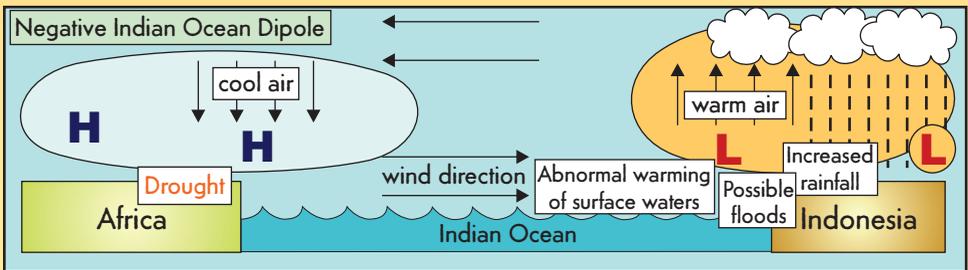
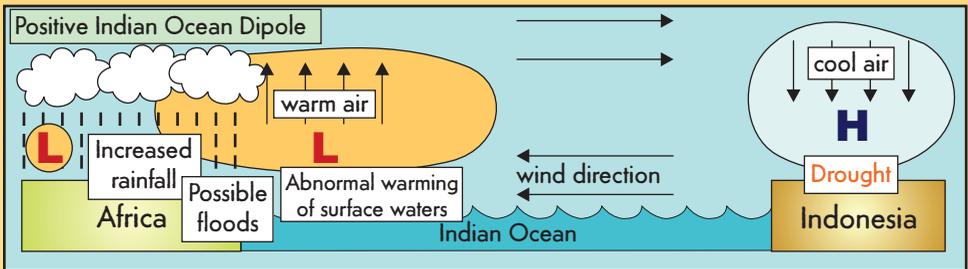
"Do this abnormal warming and cooling only occur in the Pacific Ocean, auntie?" asked Juma.

"No, Juma, climate scientists say there are similar occurrences in the tropical regions of the Atlantic and Indian oceans as well. In fact, within the Western and Eastern Indian Ocean, there are sometimes warming or cooling systems similar to the Pacific El Niño / La Niña. It is called the Indian Ocean Dipole," clarified aunt Amina.

"But how can weather over the ocean affect our weather on land?" Asked Safari.

"When I was in school, the teacher told us, that the warming or cooling of oceans, can affect the normal flow of the trade winds and ocean currents. The monsoons are affected, and then lead to droughts and floods. This is what caused the extreme rainfall and floods in 1997." Explained aunt Amina.

"Oh, now I remember, those December holidays were extremely wet!" exclaimed Swaleh.



Indian Ocean region during El Niño

The boys then ran out to play, and for the next four days had a wonderful time. The next day, Safari and Juma went back to Amu. From there, Safari went back to spend the rest of the holiday with his family upcountry.

Safari felt sick a few days before the schools reopened. This forced him, to only return to school a week later. As the bus neared the coastal lowlands and neighbourhood near their school, Safari noticed something strange. Most of the houses, trees and the major structures were flat on the ground. There seemed to be no life. Safari also saw some of their school's distinct roofing material scattered kilometres away from school.

There was water everywhere, and even the usual tarmac road to school was looking like a river. The driver found it increasingly difficult to drive through the water. Soon, they reached a police roadblock. There, they were instructed to turn back, drive to the high ground and then go to a tented camp near the market.

When Safari reached the camp, he saw people and animals clustered around the tents. There were children crying, people, young and old, looking very exhausted and traumatised. Although there was water everywhere, there was no clean water to drink. There were no working toilets, and everything looked a mess.

Juma and some of his other friends ran to meet him in hope that he brought some food and water from home. Safari noticed that several of them were injured and wore bandages.



Juma then sadly told Safari, "Something terrible had happened here last night! It was raining heavy when we went to sleep. Later we were woken by the howling of strong winds. The roofs of the dormitories and classes were blown off. We still do not even know where some students and teachers, including our headmaster, are!"

"I saw some of the materials from our school's roofs kilometres away." Safari said.



Juma said, "It must have been blown there by the storm. In fact, I'm surprised that I'm not injured, because I saw things flying everywhere! You can be thankful that you were not here!"

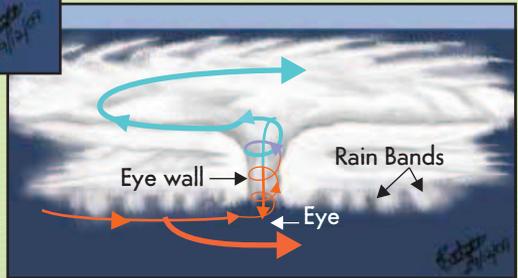
The Geography teacher, who was standing nearby, started to speak to them and said, "What passed through here last night, is known as a tropical cyclone. They originate in the Indian Ocean and rarely reach our coast. I have never seen one in my life, but my dad said one passed through here when he was young."

"A tropical cyclone! What is that, Sir?" Safari asked.

"Cyclones are strong, rotating winds, that normally form over warm ocean waters, far away from our shores. They travel over the ocean and cause large waves, severe storm surges and heavy rainfall, to hit our coast." The teacher said. "The government is now erecting a wall along the ocean shore to protect us from future waves. I wonder whether this is a permanent solution to the problem. I would think that protecting the existing mangrove trees and planting new ones, would rather be a lasting solution. Mangrove forests are known to be effective barriers for cyclones and storm surges in many parts of the world." The teacher added. He also told the students that tropical cyclones have an indirect impact. Moisture is attracted by the cyclone from areas that are supposed to be wet. Those areas then experience drought. "This is what happened, during what was supposed to be, the long rainfall season, (March – May) of 1984. A cyclone named "Kamisy", pulled moisture to Southern Africa in April of that year, subsequently causing one of the worst droughts that has ever been observed in Eastern Africa."



A Tropical Cyclone



Planting of new Mangrove trees.

"Sir, while visiting the coastal area, I have noticed, that it is prone to several natural hazards. For example, I saw how the people of Amu deal with drought. How do the communities around here deal with natural hazards?" asked Safari.

"My boy, I lived here for more than 40 years now. I've learned to live in peace with nature, because nobody can stop these natural hazards from occurring. Our ancestors seemed to have had the answers, to predict and handle natural hazards. I think that they were very wise. They learnt through experience to build their houses on high ground."

"They also made use of indigenous early warning systems. For example, when they noticed a flood, the people living upstream would warn those living downstream by beating drums to a certain rhythm. They also blew on horns to attract attention to the impending disaster. Droughts, floods and storms were predicted by looking at animal behaviour, plants and certain climatological clues." The teacher told Safari.

"Juma told me, some of the elderly people in Amu told them about caves and flood routes, used by evil spirits! I can't remember the story exactly, but I think it was about saving lives during disasters." Safari interjected.

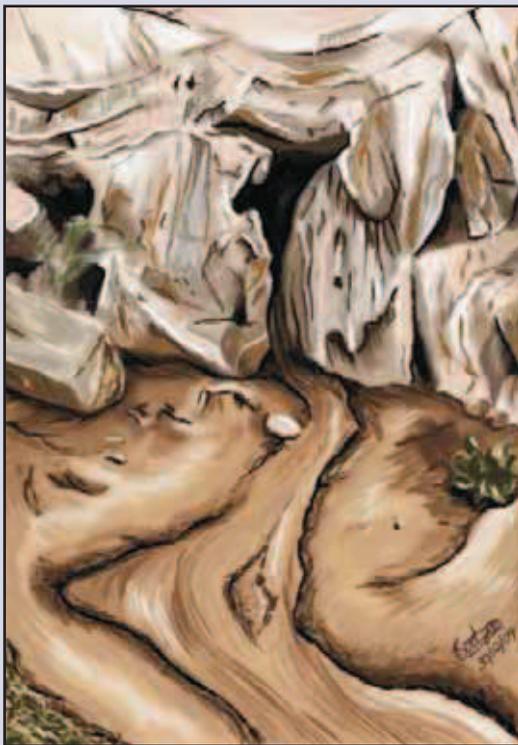
"Yes, correct! These old people must have been talking about the cleared drainage routes or channels used to drain flood water into caves. The water then drained through these caves into the ocean. To ensure these routes' conservation, people were told that evil spirits used them! It used to be an effective way to keep people away and most coastal populations used this method." The teacher answered. He continued, "People also gathered in advance to communicate a plan of action, for example, food storage and escape routes. After hazards and disasters occurred, they gathered again. They then planned the rehabilitation of the community and better strategies in coping with the next hazard or disaster."

"But, if these traditional methods are there, why don't we use it anymore?" Safari wondered out loudly.

"Traditional methods are only successful on a localised scale. They are generally ineffective to provide warning over large areas. Unfortunately, these days, people think of traditional early warning systems as superstitious, and only rely on modern warning methods. Modern information often reaches us late or disregarded by the community as unreliable," responded the teacher.

"But Sir, Juma told me that there were warnings over the radio about yesterday's tropical cyclone. Why did the people ignore the reports?" Safari asked.

"Terms like 'showers', 'scattered showers', 'well scattered', etc. confuse the people. Then they just don't listen. Even I, a Geography teacher, sometimes struggle to grasp these climate jargons and warning terms. The warnings need to be clear to everyone. People thought yesterday's warning was just a usual forecast and disregarded it!" said the teacher.

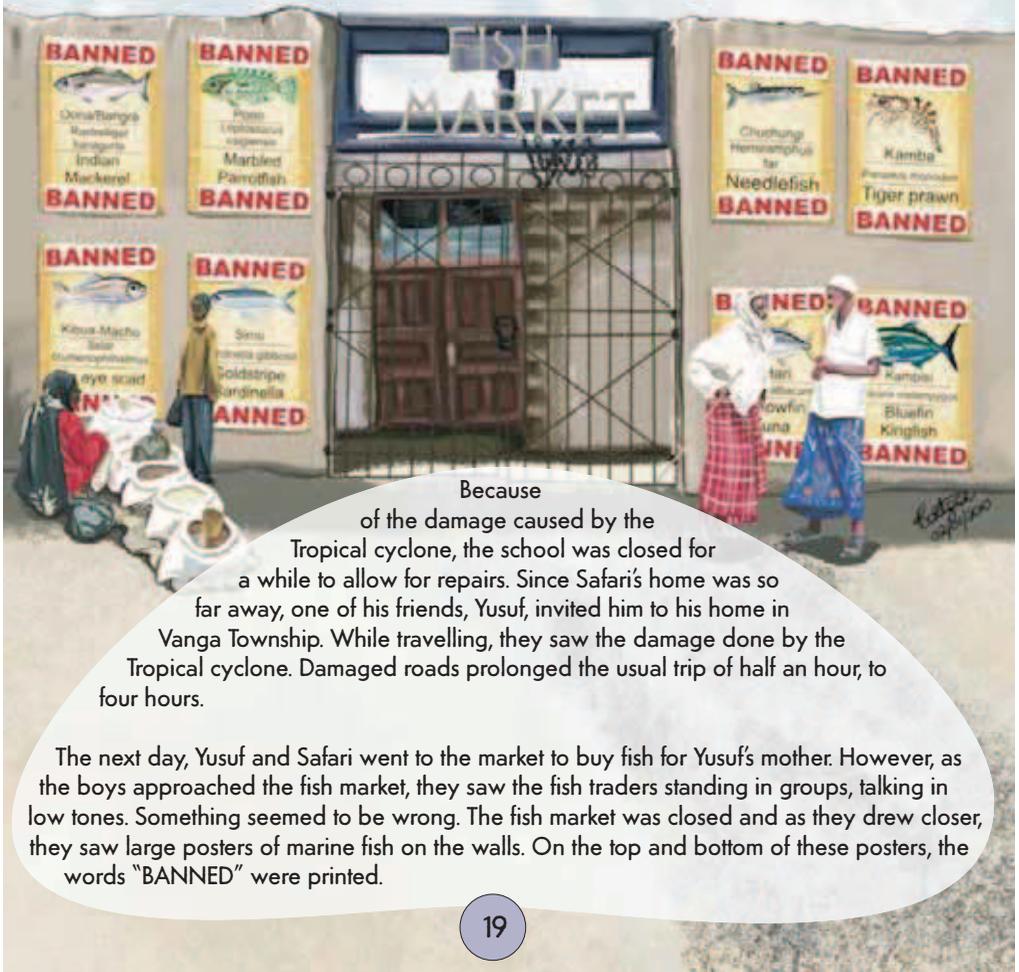


The use of channels and caves during floods, forms part of the traditional knowledge in early warning and prevention of disasters.

"That's why I want you to study hard and become a disaster reduction scientist. Then you can warn and help communities in our country reduce their vulnerability to local natural hazards. A new effort has been initiated by the United Nations, known as the International Strategy in Disaster Reduction (ISDR). I heard that they have an African office in Nairobi. The Meteorological Department headquarters are also located there. I will organise a class trip to these places during the coming term." The teacher concluded.

"I would really like to learn more! Then I can help people by predicting and warning them about floods, droughts, cyclones, Tsunami and other natural hazards." Said Safari.

"For now it would be a good idea to start watching the weather forecast on TV! The Meteorological Department release information about the weather on a daily, weekly and seasonal basis. They report through TV, radio, newspapers the Internet and e-mail. However, most of our people do not own TV's or radios, they hardly ever read the newspapers and know nothing about e-mails or the Internet!" explained the teacher.

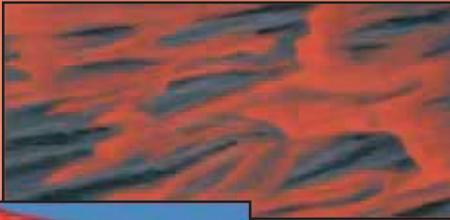


Because of the damage caused by the Tropical cyclone, the school was closed for a while to allow for repairs. Since Safari's home was so far away, one of his friends, Yusuf, invited him to his home in Vanga Township. While travelling, they saw the damage done by the Tropical cyclone. Damaged roads prolonged the usual trip of half an hour, to four hours.

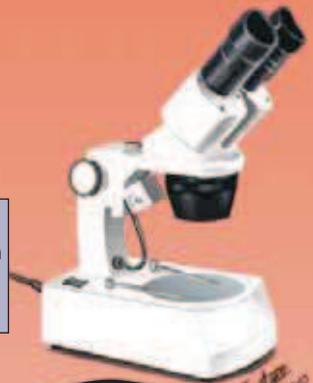
The next day, Yusuf and Safari went to the market to buy fish for Yusuf's mother. However, as the boys approached the fish market, they saw the fish traders standing in groups, talking in low tones. Something seemed to be wrong. The fish market was closed and as they drew closer, they saw large posters of marine fish on the walls. On the top and bottom of these posters, the words "BANNED" were printed.

They inquired from one of the traders, why the market was closed.

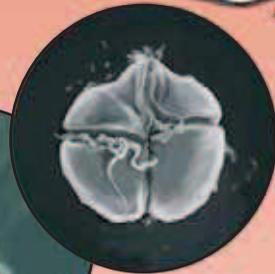
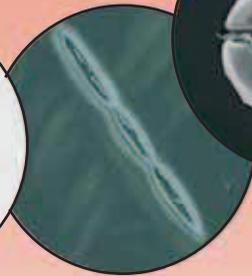
He said, "Two days ago, we saw red and brown patches on the ocean's surface. Soon thereafter, we saw increasing numbers of dead fish, sea turtles and birds on the beach. These red and brown patches are called 'red tide' and 'brown tide'. This is what poisoned and killed the marine life. Some people unknowingly ate the poisoned fish, and also became ill. They were hospitalized with nausea, abdominal pain, liver and breathing problems. Selling of fish and any other marine products has been banned by the government." The trader continued. "Government representatives informed us that these toxins are caused by Harmful Algal Blooms (HABs). HABs are caused by pollution, climate change and increased human impact on coastal zones. This is the reason why fishing, trading and eating of marine products are banned. All access to the beaches and the ocean, both for recreational and/or fishing, is prohibited until the Harmful Algal Blooms dissipate. The ban will be lifted as soon as the marine animal deaths cease and the water is clear."



Red discolouration of water during "Red Tide". A brown, yellow or green discolouration of salt- or fresh water is likely, but equally dangerous.



Harmful Algal Blooms cause death in marine and human life.



Microscopic view of some Harmful Algal Blooms.

The two boys then went back home and informed Yusuf's mother about the banning. After a week, Safari and Yusuf went back to school. Safari was happy with his newfound knowledge about the coastal region. He started to make plans for Juma and Yusuf to visit his family at their home up-country. The boys were inspired to study Disaster Risk Reduction. As experts, they would then ensure the safety of communities by predicting and managing marine and coastal zone hazards and disasters. Most of their questions on the subjects had been answered. Here are some of those questions, can you answer them?

Questions:

1.

What is a Tsunami?



2.

What are the causes of a Tsunami?



3.

What precautions should be applied, in case of a Tsunami warning?

4.

Why didn't the Tsunami affect all parts of the Coast equally?



5.

Why didn't the town where Juma lives, get so affected by the Tsunami?



6.

What is the difference between a natural hazard and a natural disaster?

7.

Why did Juma's father only allow the boys to go sailing in the mornings?

8.

What caused the fire in Langa City?



9.

Why did this fire spread so quickly?



10.

While crossing the channel on the ferry, what did Safari see on the surface of the ocean and how did it get there?



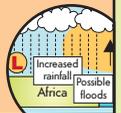
11.

Which part of Pacific Ocean abnormally warms or cools during El Niño or La Niña?



12.

Do this abnormal warming and cooling also occur in the Atlantic and Indian oceans?



13.

What are El Niño and La Niña events?

14.

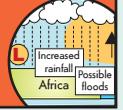
Why are people worldwide concerned about El Niño and La Niña?

15.

What is the Indian Ocean Dipole event?

16.

Are there any such events in other oceans of the world?



18.

What are some of the barriers that may protect people from the direct impact of tropical cyclones?



19.

What are some of the indirect impacts of tropical cyclones?



17.

What is a tropical cyclone?



21.

How did the people at the coast traditionally deal with floods?



22.

What traditional methods were used to warn people of pending floods?

20.

How did the people of Amu deal with droughts?



24.

Why is there still so much destruction from natural hazards and disasters, if there are both traditional and modern early warning systems available?

25.

What profession did the boys aspire to practice when they grow up and why did they want to work in this field?

23.

Are there any modern early warning services available?



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