

# KENYA SEA TURTLE CONSERVATION COMMITTEE

## SEA TURTLE EDUCATION AND AWARENESS CAMPAIGN MANUAL



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*KESCOM*

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*“ the changes in our life must come from the impossibility to live otherwise than according to the demands of our conscience...”* – Leo Tolstoy (1828-1910).

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***Turtles have been around for over 150 million years, but in just under 100 years, they are struggling to survive due to man's activities***

## **Introduction**

Sea turtles are some of the most mysterious and time-honored creatures on earth. Kenya Sea Turtle Conservation Committee (KESCOM) through its education and awareness initiative is helping to conserve sea turtles, which currently face insurmountable threats. It is encouraging that as humans we have the ability, given education to know how our actions affect the world around us and to change our behavior accordingly.

By use of participatory rural appraisal (PRA) tools KESCOM is tapping on the peoples will to participate in the conservation of the mysterious time-honored but now endangered sea turtle. In the process the communities living close to sea turtle habitats get to learn about sea turtles, threats to sea turtles and how they can be involved in the conservation efforts and take personal responsibility of their actions.

As a way of encouraging everybody to take personal interest in sea turtle conservation. KESCOM invites you to take a step of commitment by becoming a member (see the form at the back of this manual). This will give you an opportunity to work with turtle experts and be involved in turtle conservation activities with confidence.

This is the first edition of the education manual to be produced by KESCOM. Being the first edition of its kind, we encourage you to take note of any ideas you may have about how we can improve its usefulness. An evaluation form is found at the back of the manual. Please complete and return it to us with your ideas.

## **Turtle Conservation in Kenya**

The Kenya Sea Turtle Conservation Committee (KESCOM) was established in 1993 out of a necessity to address the plight of marine turtles in Kenya and represents a national integrated approach contributing towards global efforts in turtle conservation. This followed increased incidents of turtle mortality mainly occasioned by fishing activities and reportedly declining populations within the Western Indian Ocean region and the world as a whole. The committee sought to specifically address the problems of illegal poaching of turtle eggs and meat and a burgeoning list of threats posed by the growth of the tourism industry. Initial efforts to implement conservation and management objectives were limited to the Mombasa area (especially the area around the Mombasa Marine National Park and Reserve) with the support of the Kenya Wildlife Service and Baobab Trust.

Over time, through increased support and cooperation of government institutions and NGOs as well individuals, KESCOM has to date established nine community based Turtle Conservation Groups (TCGs) along the Kenyan Coast. The activities of TCGs involve collection of turtle data and information at the ground level and engaging local communities in the conservation process through education and awareness programs, beach patrols and surveillance-to protect turtle nests and nesting females, tagging of sea turtles, and fishermen-turtle-release programs. They also participate in beach clean-up events. The groups include (from south to north-coast); Bodo Turtle Conservation Group, Funzi Turtle Club, Boabab Trust, Kilifi Community Conservation Group, Watamu Turtle Watch, Robinson Island Turtle Conservation Project, Kipini Community Conservation Group, Lamu Marine Conservation Project and WWF-Kiunga. Their activities cover 31% of the entire Kenyan Coast.

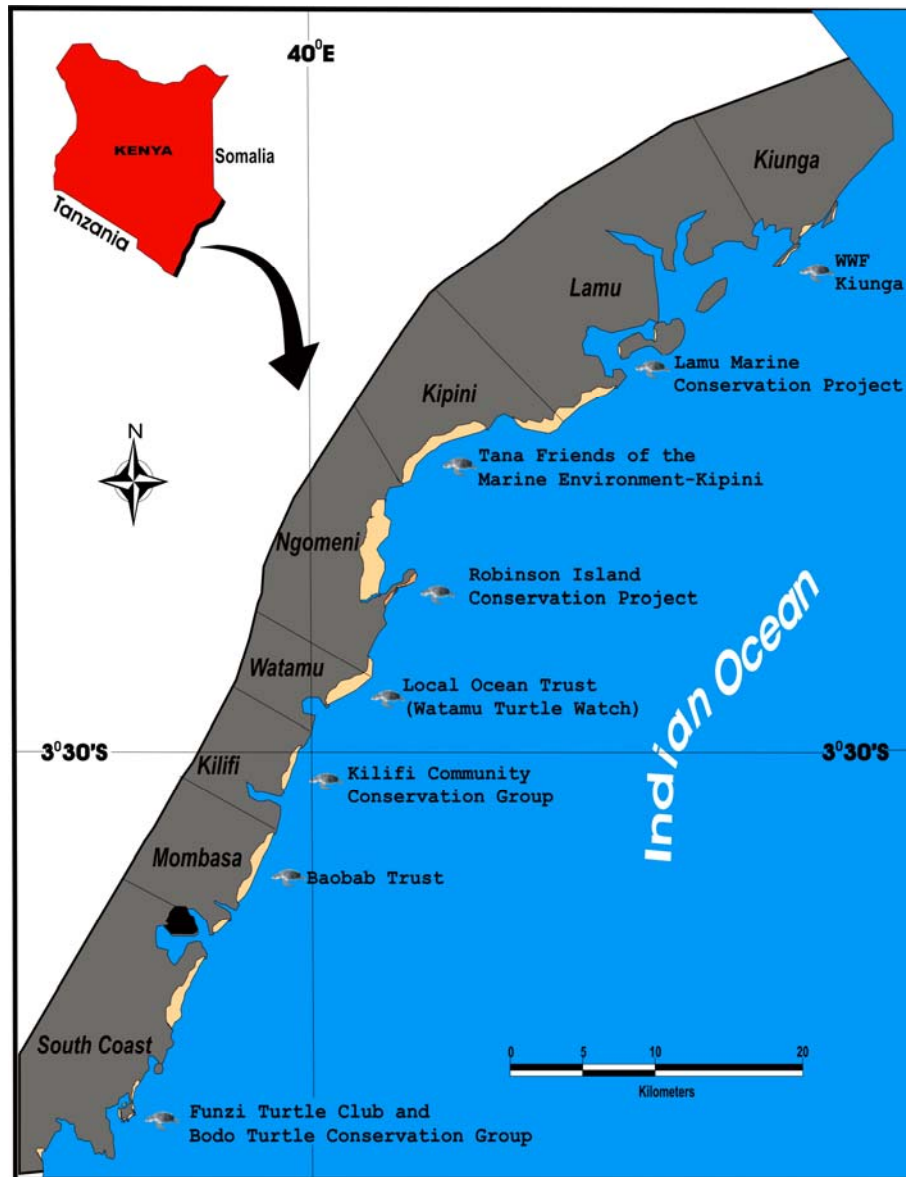


Figure 1. Map of the Kenyan Coast Showing the distribution of the Spatial extent of KESCOM TCG based activities.

The data and information collected by TCGs is then forwarded to a national database managed by KESCOM.

Between 1997 and 2000 Turtle Conservation Groups in Kenya reported a total of 695 nests (laid within their areas of coverage) containing a total of 64,877 eggs and released a total of 51,217 hatchlings back to sea. For the same period 171 dead turtles were reported to KESCOM with about 85% of mortality cases occasioned by poaching and slaughtering of turtles and fishing activities (mainly trawling and entrapment in set nets). This current status of sea turtle exploitation in Kenya spells a major challenge to conservation and management efforts especially given that a large percentage of mortalities are human caused and mitigation measures partly involve major socio-cultural as well as socio-economic shifts. The lack of adequate financial and human resources continues to considerably slow the pace of conservation action.

Among KESCOM's plan of action is to strengthen its institutional partnerships and stakeholder involvement in conservation. In addition there are plans to support TCGs to identify potential sources of alternative livelihoods and increase our spatial coverage to 75% of the Kenyan coast within the next five years through engagement of stakeholders in the tourism industry, local communities and donors. Eventually KESCOM intends to shift actual conservation and management responsibilities to the local people through a gradual process and play more of a coordinating role.

Based on the work of experts, conservationists and members in an effort to address the threats facing sea turtles, KESCOM has become a well respected entity that works tirelessly on behalf of sea turtles by updating its members, students and the general public about its activities and the issues affecting sea turtles and their habitat through the media. Through this initiative, KESCOM is reaching the public with accurate and timely information that will help them become well informed about sea turtle's plight.

Being highly migratory not to mention the growing population of coastal residents who are involved in turtle hunting and egg poaching, sea turtle populations risk being wiped out from the face of the earth in a very short time. KESCOM envisions a corporative effort where the local communities can participate in protecting important foraging, mating and nesting areas for sea turtles. This manual is the outcome of the experiences of education and awareness campaign carried out by KESCOM. It is hoped that the manual will be applicable to different conditions in all the nine TCGS and even beyond.



# Section 1

## **What are Sea turtles?**

Sea turtles are large, air breathing reptiles that inhabit the tropical and subtropical seas throughout the world. Their streamlined bodies and large flippers make them remarkably adapted to life at the sea. However, sea turtles maintain close ties to land, as females must come ashore to nest in the sand.

Research on marine turtles has uncovered many facts about these ancient creatures. Most of the research has been focused on nesting females and hatchlings emerging from the nest, largely because they are the easiest to find and study. Thousands of sea turtles have been tagged to help collect information about their growth rates, reproductive cycles and migration patterns and routes.

## **Turtles and humans**

Sea turtles have for long fascinated people and have featured prominently in the mythology and folklore of many cultures (ccc, 1999). Unfortunately, the spiritual significance of sea turtles has not saved them from being exploited both for food and profit. This is evidenced by the fact that sea turtles once roamed the earth's oceans, but now only a fraction remains.

## **General Description**

Each species of sea turtles looks and behaves distinctly, but they do have several common characteristics. Their shell consists of the upper part (carapace) and the lower part (plastron). Hard scale (scutes) covers all but the Leatherback Turtle. The number and the arrangement of the scutes can be used to identify the turtle species. They do not have teeth but their jaws have modified "beaks" suited to their particular diet. They do not have visible ears but have eardrums covered by the skin. They hear well at low frequencies and their sense of smell is excellent. Their vision under water is good but out of water they are nearsighted.

## **Reproduction**

Only females come ashore to nest; males rarely return ashore. Most females return to nest on the beach where they were born (natal beach). Most females nest at least twice during a mating season. A female will not nest in consecutive years, typically it will skip one or two years before returning.



**Plate 1: Plate showing green turtle during mating**

### **Growth and development**

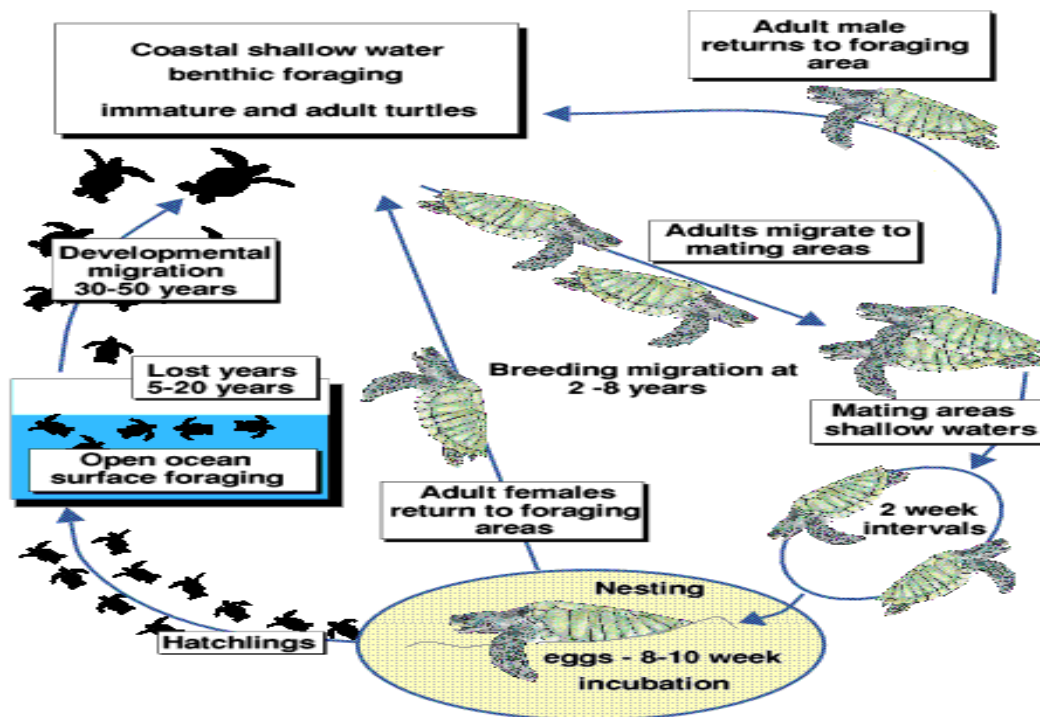
Hatchlings spend their earliest, most vulnerable years floating around the sea in giant beds of seaweeds where they only eat and grow.



**Plate 2: Plate showing turtle hatchlings in sea weeds**

Once they reach a dinner-plate size, they appear at feeding grounds in near shore waters. They grow slowly and take between 15-50 years to reach reproductive maturity depending on species. Some species can live for over 100 years. Sea turtles are therefore long lived, slow growing species and live in multiple habitats during their course of development. Their shared and complicated life cycle is composed of a series of stages. The sea turtle generalized life cycle can be depicted as below

## Life Cycle



**Generalised life cycle of sea turtles**

**Figure 2: Figure showing a generalized life cycle of sea turtles (Source: Frazier 2004)**

## Status

The earliest known sea turtle fossils are about 150 million years old. In groups too numerous to count, they once navigated throughout the world's oceans. Over the past hundred years however, demand for turtle meat, egg, oil and shells has reduced their numbers. Destruction of feeding and nesting habitats and pollution of the oceans are all taking a serious toll on the remaining sea turtles. Many breeding populations have been wiped out. In the near future, all the turtle population will become extinct unless action is taken, and fast.

### ***Extinct? So what if turtle become extinct***

*Turtles become extinct when the last living individual of its species dies, causing it to vanish from the earth's surface forever. Extinction is a natural part of the evolutionary process. This process has been taking place for many years. Dinosaurs are a good example. Many other species that succumbed to extinction just like dinosaurs disappeared due to sudden geological or climate changes.*

*Today, species are going into extinction due to abrupt changes brought about by man. Habitat destruction, overexploitation and pollution are just but a few causative factors. The rate at which the decline is taking place is so alarming that the life diversity is compromised. This may make life on earth vulnerable as well due to the natural symbiotic relationships between different species of fauna and flora. It is possible that the extinction of sea turtles will make human life very difficult. If humans can learn from past mistakes now and begin changing their behavior, there is time to save turtles. In the process, we will be securing our survival on this planet.*

### Difference between the species

Each sea turtle has a common name and a scientific name. The scientific name identifies both the genus and species, while the common name typically describes the characteristics of the turtle's body.

The Loggerhead Turtle gets its name from its exceptionally large head. The Hawksbill Turtle gets its name because its narrow head and large beak makes it look like a hawk. The Leatherback Turtle is the only sea turtle without a hard shell. It is named Leatherback Turtle because its shell is made up of a layer of thin, tough, rubbery skin that looks like leather. Other turtles are named after colors on their bodies. The Green Turtle is named so because of the green color of the fat under its shell. Kemp's Ridley Turtle is named after the first scientist to study it i.e. Richard Kemp. The Olive Ridley Turtle on the other hand gets its name from its shell which is olive green

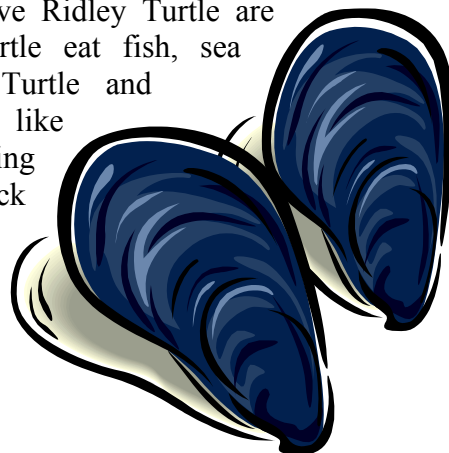
**Table: 1. Table showing names of different sea turtle species**

Common English Name	Swahili Name	Scientific Name
Green Turtle	Kasa wa Kawaida	<i>Chelonia mydas</i>
Hawksbill Turtle	N'gamba	<i>Eretmochelys imbricata</i>
Olive Ridley Turtle	Kigange or Kigamba	<i>Lepidochelys olivacea</i>
Loggerhead Turtle	Kasa duvi or Kasa mtumbi	<i>Caretta caratta</i>
Leatherback Turtle	Kasa ilazi or Kasa ngozi or Kasa noa or Kasa tasa	<i>Dermochelys coriacea</i>

### Diet

During the course of their growth, sea turtles shift habitats and therefore their diet. Different species of sea turtles eat different types of food depending on the morphology of their mouths and jaws. Different turtles have their mouths and jaws specially formed to help them eat different types of food. The Hawksbill Turtle has a narrow head and jaws shaped like a beak. This allows the Hawksbill Turtle to get food from the coral reefs. As a result, their diet consists of sponges, anemones, squid and shrimp.

Loggerheads Turtle are primarily carnivores and feed mostly on shellfish that live on the bottom of the ocean. They eat horseshoe crabs, clams, mussels, and other vertebrates. Kemp's Ridley Turtle and Olive Ridley Turtle are also carnivores. They together with Loggerheads Turtle eat fish, sea urchins, squid and jellyfish. Unlike Loggerheads Turtle and Ridleys, the Leatherback Turtle has delicate scissor like jaws. Their jaws would be damaged by anything other than a diet of soft-bodied animals. Leatherback Turtle thus feed almost exclusively on jellyfish.



**Plate 3: Plate showing shellfish**

The diet of Green Turtles change significantly during their lives. The young turtles eat a variety of food including worms, young crustaceans, insects, grasses and algae. When they reach 8-10 inches in length their diet changes. Adult Green Turtles are strictly herbivores. They mostly eat sea grass and algae. Their jaws are finely serrated which aids them in tearing vegetation.



*Plate 4: Plate showing Sea grass*

### **Species Found in Kenya**

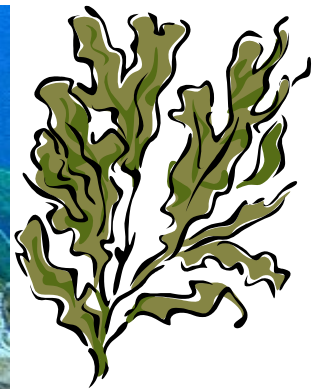
Seven species have been identified in the world. These are the Green Turtle, Hawksbill Turtle, Olive Ridley Turtle, Loggerhead Turtle, Leatherback Turtle, Kemp's Ridley Turtle and the **Australian Flat back** Turtle. Five out of these have been found to either forage in Kenyan waters or nest on Kenyan beaches. The Green Turtle (kasa wa kawaida) *Chelonia mydas*, Olive Ridley Turtle (kigange) *Lepidochelys olivacea* and Hawksbill Turtle (Kasa ng'amba) *Eretmochelys imbricata* are documented to nest on Kenyan beaches while the Loggerhead Turtle (Kasa duvi or Kasa mtumbi) *Caretta caretta* and Leatherback Turtle (Kasa ngozi or Kasa tasa) *Dermochelys coriacea* use the Kenyan waters as feeding grounds.

### **Species Identification**

Sea turtles can be separated into hard-shelled and leathery shelled. Sea turtles can be distinguished from each other by the scales on top of the snout, called prefrontal and **scutes** on the carapace, skull/head, number of claws and the kind of diet. For a more advanced identification use of the jaws, rhamphotheca, infra marginals and the pteregoid process and the skull mainly if the skeleton is found by beach side and could be used to identify some species

**Green Turtle** (kasa wa kawaida) *Chelonia mydas*

Green Turtle is the most widely distributed species of the sea turtles and highly nests on Kenyan beaches.



*Plate 5: Plate showing Green Turtle and sea grass*

**Distinguishing features**

- Green Turtle has one pair of prefrontals and one pair of claws
- The carapace is smooth with four pairs of lateral scutes.
- The carapace is smooth with color changing with age. Plastron is white in hatchlings.
- First costal does not touch the nuchal
- The Green Turtle is an herbivore found mainly in sea grass beds of coastal waters

**Hawksbill Turtle** (Kasa ng'amba) *Eretmochelys imbricata*

**Distinguishing features**

- Has a narrow head ending in a pointed beak. Head length is twice as the width
- Overlapping scutes more pronounced with age.
- Has two pairs of prefrontals that are not elongate.
- One nuchal notch with usually two smaller ones on each side.
- Has two claws on each limb.
- Jaw is V- shaped
- Has four costals. First costal does not touch the nuchal
- Spongivore; feeds on sponges, soft corals, shell fish mollusks



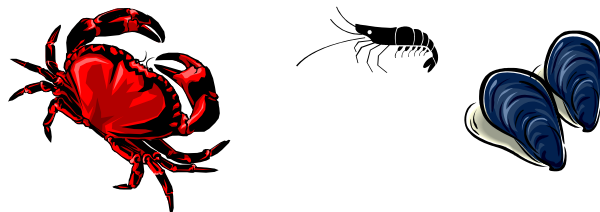
**Plate 8: Plate showing Hawksbill Turtle swimming**

**Olive Ridley Turtle** (kigange) *Lepidochelys olivacea*

Olive Ridley is found in tropical pacific, Atlantic and Indian oceans. And is the smallest of the seven sea turtle species.

**Distinguishing features**

- Has a slightly hooked beak with a short snout.
- Has two pairs of prefrontals
- First nuchal is not in contact with first costal/lateral scutes
- Has two claws on each limb
- Has a circular carapace mainly doomed shaped from the front.
- Costals are six or more
- It is carnivorous feeding on crabs prawns, shell fish, and sea squids
- Olive Ridley Turtle prefers shallow protected waters.



**Plate 7: Plate showing an Olive Ridley Turtle, shellfish, shrimp and crab**

**Loggerhead Turtle** (Kasa duvi or Kasa mtumbi) *Caretta Caretta*

Loggerhead Turtle is found in tropical and sub tropical extending to south pacific.

**Distinguishing features:**

- Massive head on thick neck
- Bill distinctly hooked
- Two pairs of prefrontals
- Five pairs of costal; first costals small with rarely 4 pairs of costals.
- Nuchal scute is in contact with first lateral/coastal
- Each limb has two claws outmost recessed until invisible in old age.
- Hatchlings plastron is creamy to brown while in adults is creamy to tan
  
- Completely carnivorous; shell fish, crabs, sea urchins
- Found mainly in coral reefs and sheltered bays

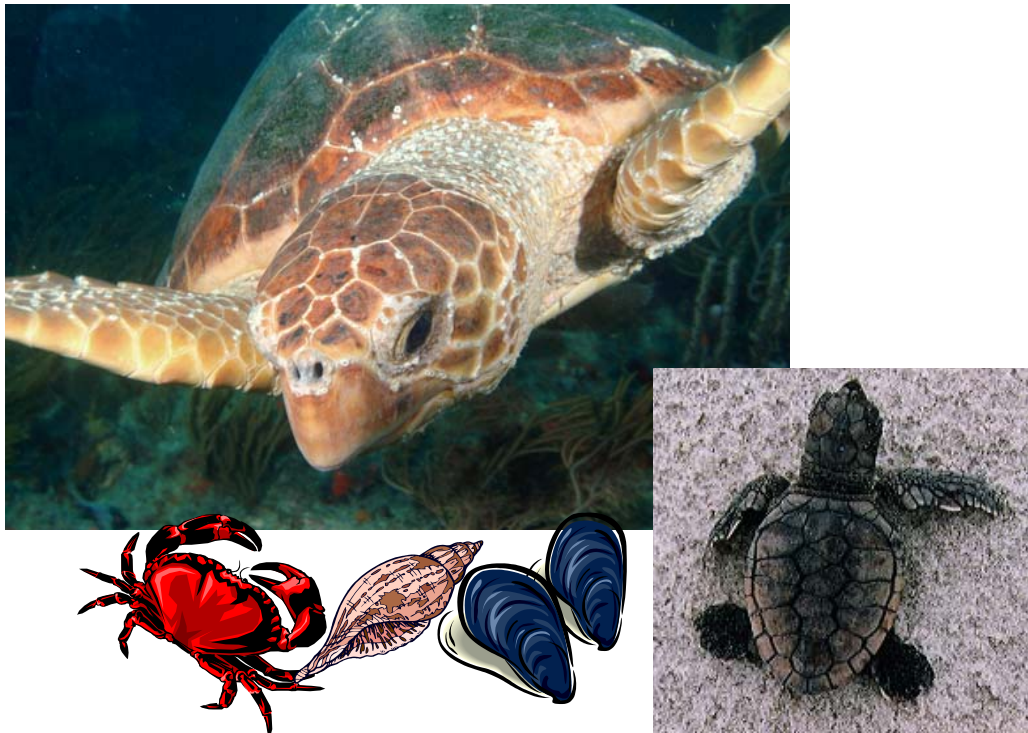
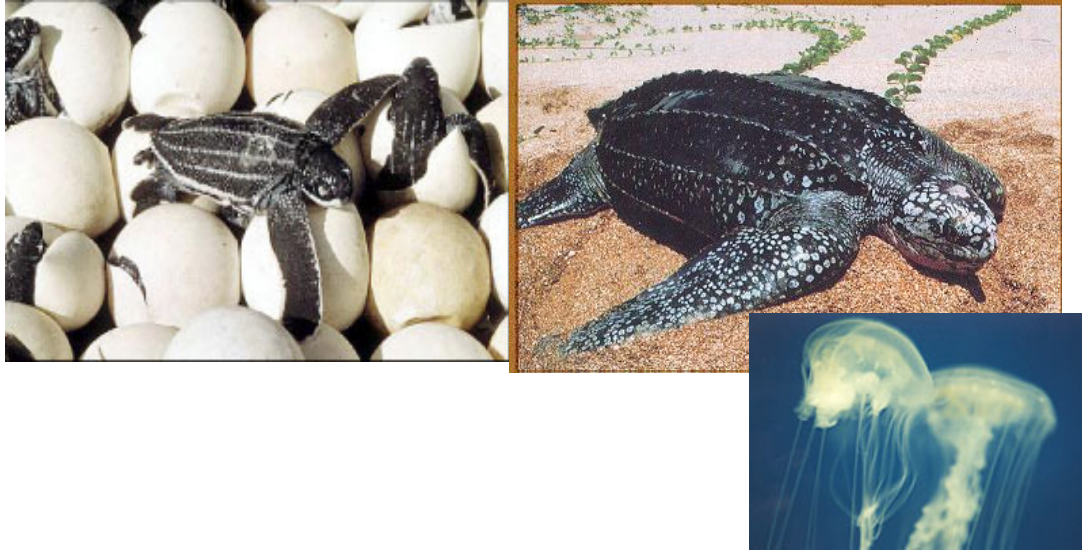


Plate 6: Plate showing an adult Loggerhead Turtle a hatchling a crab and shellfish

**Leatherback Turtle** (Kasa ngozi) *Dermochelys coriacea*

- Largest sea turtle species.
- Has leathery shell with five dorsal ridges along the length of carapace, two ridges form the margins.
- A notch occurs on each side of the upper jaw.
- Limbs lack claws.
- No scutes and scales.
- Leaves a neotonoastaic life feeding mainly on jellyfish.



**Plate9: Plate showing Leatherback hatchlings emerging from eggs an adult Leatherback Turtle and jellyfish**

### **Behavior Patterns**

Sea turtles are extremely solitary creatures that remain submerged for most of the time they are at sea. They rarely interact with one another outside courtship and mating. Ridelys however come together in massive groups during “arribadas”.



**Plate 10: Plate showing Olive Ridley Turtles during “arribada”**

It is important to note that even if large numbers of sea turtles come together during migration or on feeding grounds there is very little behavior change among individuals.

### **Daily Activities**

Turtles are known to feed and rest on and off during a typical day. During nesting, Loggerheads follow regular patterns between the nesting beach and offshore reefs and other rocky structures. Mating and feeding takes place at these offshore areas. When it is not a nesting season, sea turtles may migrate hundreds or even thousands of kilometers.

Sea turtles can sleep at the surface while in deep water or at the bottom wedged under rocks in near shore waters. Green Turtles have been seen sleeping under ledges in reefs and rocks.



**Plate 11: Plate showing Green Turtle sleeping under ledges in reefs and rocks**

Hatchlings typically sleep floating on the surface, with their front flippers folded back over the top of their backs.

### **Courtship and mating**

Courtship and mating occurs during a period just before the female turtle crawls out of the water to nest for the first time. After this only females come ashore to nest. During courtship, females may court females by nuzzling her head or by gently biting the back of her neck or rear flippers. If the female does not flee, the male attaches himself to the back of the female's shell by gripping her top shell with claws in his front flippers. He then folds his long tail under her shell to copulate.

Copulation can take place either on the surface or under water. A female may mate with many males just prior to nesting season and store the sperms for several months. When she finally lays her eggs, they will have been fertilized by a variety of males. This keeps genetic diversity in the population high.



**Plate 12: Plate showing Turtles during mating**

### **Nesting, Incubation and Emergence**

Most females return to the same beach every time they are ready to nest. Nesting occurs mostly at night. Sometimes the females crawl out of the ocean but do not nest for some reasons. This is called a false crawl. Females may nest only once or up to ten times during a particular nesting season depending on the species.

### **Constructing the nest**

The female turtle crawls to a dry beach and flings away loose sand with her flippers. She then constructs a body pit by digging with her front flippers and rotating her body. After this she digs an eggs cavity using her cupped rear flippers as shovels. This done, she begins to lay eggs two or three at a time. The average size of a clutch may be between 80 – 150 eggs depending on species.



### Plate 13: Plate showing a turtle nesting

A turtle crying ?!!!!

Nesting turtles appear to shed tears. These are salty secretions produced continuously and not just during nesting. In this way, turtles rid their bodies of excess salts through glands located near the eyes.

Sea turtles may abort nesting if harassed or feel there is danger. Consequently, it is important that turtles are not disturbed during nesting. Once the eggs are in the chamber, the turtle use her rear flippers to push sand over the top of the eggs cavity. She then packs the sand down over the top and using her front flippers refill the body pit and disguise the nest. After the nest is thoroughly concealed, the female crawls back to the sea to rest before nesting again later that season or before beginning her migration to her feeding ground. *She never returns to tend her nest.*

#### **Incubation**

This takes place at on average between 52 to 60 days. The temperature of the sand however governs the speed at which the embryos develop. The hotter the sand surrounding the nest, the faster the embryo development. Cooler sands produce more males, with warmer sand producing a higher ratio of females.

#### **Emergence from nest**

The hatchlings use a sharp temporary tooth called “caruncle” which is the extension of the upper jaw that falls off soon after birth to emerge from the egg. Group effort is employed during the process of digging out of the nest and can take several days. Hatchlings usually emerge from their nest at night or during rainstorm when temperatures are low. They normally erupt from the nest cavity as a group and dash towards the sea.



Plate 14: Plate showing hatchlings emerging from a nest and dashing into the sea

If they don't make it to the sea, some die out of dehydration in the sun and others are caught by the many predators – crabs, birds, etc. Once in the water, they swim several miles offshore where they are caught in currents and seaweeds that carry them for several years. There are many threats to hatchlings in the open ocean. Sharks and big fish all eat hatchlings. They may die after accidentally eating tar balls or plastic garbage. The threats are so numerous that only one out of 1000 survive to adulthood. Several methods are used to learn about the migratory patterns of turtles, their reproductive behavior etc. They include tags and satellite telemetry.

### **Threats to sea turtle survival**

Depending on the species, sea turtles take between 10 to 50 years to develop from eggs to sexual maturity. Their natural survival rate (without human interference ) is estimated at 1:1000. This is due to a host of threats they face at each stage of their lifecycle. Natural threats to eggs include predators like raccoons and mongoose. Crabs and ants raid eggs and hatchlings still in the nest. Once they emerge they encounter crabs, birds and other predators. In adulthood they encounter sharks. To counter these threats, sea turtles have developed a strategy of laying a large number of eggs and having a long reproductive life such that by the time they reach adulthood, they have fewer natural predators. This strategy enabled them to survive for more than 100 million years.

However, over-exploitation and unplanned development in under 100 years have pushed them to the brink of extinction. All sea turtle species are now on the IUCN red list while the 5 species found in Kenya are listed as either critically endangered or endangered.

### **Human Caused Threats**

Many coastal communities still harvest turtles for their meat, eggs, oil and shells. Although this is illegal, enforcement of the legislation is lax making poaching rampant.



**Plate 15: Plate showing Green Turtle poached at Tawandani beach near Kipini**

The harvested turtles are either consumed by the poachers or sold. Consumers of turtle meat and oil believe that they increase male vitality and treat asthma respectively.

### **Commercial fishing**

Thousands of turtles become entangled in fishermen's set nets and trawler nets and drown. Gill nets, trawl nets, drift nets, set gillnets, purse seines and shark nets are known to entangle and drown many turtles. Turtle Excluder Devices (TEDs) are used to help release turtles caught in trawl nets. The use of TEDs therefore will help a great deal to mitigate trawl net related turtle mortalities.

### **Ingestion of debris and plastic**

Thousands of sea turtles die by eating or becoming entangled in non-degradable debris each year. These debris include plastic papers, packing bands, balloons, pellets, bottles and tar balls among others. Plastics thrown over board or dumped near beaches and swept into the waters are eaten by turtles and becomes lethal. Leatherbacks for example cannot distinguish between a floating jellyfish and a floating plastic bag.

Other threats include artificial lighting, coastal armoring, beach nourishment and pollution. Due to an increase in tourist activities, artificial structures keep coming up near turtle nesting beaches every day. These structures not only interfere with turtle nesting beaches but the lights emanating therefrom disorient nesting turtles and hatchlings thereby exposing them to the danger of being killed. Fibropapillomas, a turtle complication is believed to be caused by pollution. Common sources of pollution are oil spills, runoff of chemicals, fertilizers, petroleum and human effluent.

### **National laws (Legislation).**

Sea turtles are recognized as flagship species for environmental destruction as all the threats to sea turtles encompass the general threats to our marine environmental. It is from this understanding that the national as well and international legislation were put in place to protect the hapless sea turtle.

### **What regulations protect sea turtles in Kenya?**

Three levels of regulations are used in protecting sea turtles.

#### **National laws**

- **Fisheries Act Cap 378 (1989), section 51 of laws of Kenya**
- Declares maritime zones of Kenya as marine mammals and sea turtle sanctuary
- Prohibits killing, chasing, harassing any marine mammal or turtle stressing whether dead or alive or stranded on land.
- Taking any marine mammal or turtle whether dead or a live or opulence including shell, egg, meat or any part of the sea turtle.
- The law adds that where any marine mammal or turtle is caught or taken unavoidably during fishing, such marine mammal or turtle, whether dead or a live, be released immediately into the waters.
- Any person contravening this regulation shall be guilty of an offence and liable to a fine not exceeding Ksh. 20,000 or imprisonment for 2 years or both.

**2. Wildlife conservation and management Act cap 376 (1985), section 42** of the laws of Kenya provides that any person caught in possession of live, dead or part of a dead sea turtle without special permission from KWS be liable to a fine not exceeding Ksh. 10,000 or imprisonment for a period not exceeding 3 years or both.

### **3. Regional Treaties/ international conventions**

1. Sodwana declaration 1995
  - Deals with research, publicize and advocate for responsible management and conservation
2. The African Convention on the conservation of Natural resources of O. A. U (1968).
  - Takes measures conservation, utilization of natural resources
3. Convention on Conservation of Migratory Species of wild Animals. (The Bonn Convention of 1979)
  - Takes care of migratory species
4. Law of the Sea convention 1982. Gives party nations sovereignty in territorial and EEZ and pollutions
5. The Convention of International Trade in Endangered Species (CITES) Regulates trade in endangered plant and animal species. The sea turtle is listed in appendix I which discourages trade in threatened or endangered species.
6. Convention on Biological Diversity 1992. Monitoring of species, elements of biological diversity.
7. The World Conservation Union (IUCN). Conservation of threatened species and species recovery.

Long-term protection of sea turtles means enlisting the support of all stakeholders right from the local community members, research organizations and individuals at all levels. It also calls for a reduction in reliance on “money to conserve” syndrome. A wildlife conservation ethic that can withstand gaps in government regulations must be fostered at all levels of the stakeholder spectrum.

It is apparent that a higher percentage of the numerous threats facing sea turtles are human caused. Although it is an uphill task to completely eliminate un conducive human habit, the habit can be changed through persistent education and awareness campaigns about the importance of sea turtles in the general life of man and the reason for their conservation.

Sea turtle meat and oil have for instance been used as food, medicine and for ornamental reasons for a long time. However, recently they have become important in the education of conservation, scientific research and tourism. More importantly, sea turtles have a role to play in the ecology of the complex marine and coastal ecosystems they inhabit and upon which human populations depend. Sea turtles also stabilize the ecosystem by playing a role in the complex food web. The Hawksbill Turtle and Loggerhead Turtle for instance feed on sea urchins, which without check can explode in numbers and damage seagrass ecosystems. Hawksbill Turtles are also rare predators of toxic sponges creating gaps for the settlement of reef building species and foraging access for fish that cannot penetrate the sponges’ armor. The Green Turtle maintains healthy sea grass beds, which are important spooning grounds for young fish. A part from these, sea turtles play an important role in by transferring energy values from foraging areas to breeding areas for other species which predate sea turtles eggs and hatchlings.

Therefore by exposing sea turtles to a myriad of human engineered threats, we stand to lose sea turtles as a resource for potential future direct sustainable exploitation not to mention

benign use such as tourism but also as a linkpin that helps maintain a healthy and functioning marine ecosystem upon which people depend. We also stand to incur the tragedy of losing aesthetic value of these most mysterious marine life that has survived all odds for over 150 million years. Everyone is under obligation to play whatever role they can to ensure their survival.

### **What Can You Do To Help?**

A big difference can be made through personal actions. For a start, this is what you can do:

- ◆ Do not poach turtle eggs
- ◆ Do not handle the eggs or introduce any foreign objects in to the nest. You can introduce bacteria or injure the eggs.
- ◆ Do not destroy turtle feeding (sea grass beds, coral reefs and mangroves) and nesting habitats through pollution and development.
- ◆ Do not kill turtles whether caught in fishing nets or nesting on the beach.
- ◆ Do not harass nesting females by shining light in to the eyes of a turtle.
- ◆ Do not at any time be in possession of turtle opulence.

You must remember that you share the ocean and beaches with other species and that your actions can have impacts on these species and their habitats. As an informed citizen, you have the power to influence the outcome of these issues by educating others and making them aware. Take personal responsibility of your action by reducing the amount of plastic garbage and avoid dumping of flotsams in the ocean or on the beach. Most important, avoid not only being in possession of but dealing in or utilizing turtle meat, eggs, oil or shells. In fact, report anyone seen doing this to the nearest Kenya Wildlife Service, Fisheries office, or the KESCOM. By so doing, you will help save the sea turtle. Turtle conservation requires the support of all stakeholders and should never be individualized. This is the essence of this guide.



# Section 2

## **Education and Awareness Activities**

The essence of section 1 is to equip any one carrying out education and awareness with the necessary knowledge so that they can be able to talk about issues candidly and with confidence. The section 2 is meant to provide guidelines on how one can utilize the information in section one to carry out education and awareness.

Before embarking on carrying out education and awareness, it is important for one to know the objectives of the exercise. With respect to the conservation of turtles the main objectives of carrying out education and awareness campaigns are to:

Create awareness among school children, local communities, staff and hotel visitors about turtles, threats afflicting them and what everybody can contribute to reverse the declining trend of sea turtle populations. This can be done through

- ◆ Advocating for an environmentally friendly fishery and avoid the use of destructive fishing gears including gill nets, drift nets, set gillnets and shark nets.
- ◆ Enforcing use of TEDs
- ◆ Protecting turtle foraging and nesting grounds
- ◆ Reducing the amount of plastic garbage in the sea
- ◆ Regulating artificial lighting, beach armoring, beach nourishment and limiting the impact of people on the beach
- ◆ Increasing public awareness and community participation in sea turtle conservation
- ◆ Discouraging illegal trade in turtle opulence

At the end of the exercise the audience should be able to answer any question relating to sea turtles and if called upon, be in a position to replicate the same information to others.

This manual was prepared from the understanding that education and awareness program is critical in enhancing change of peoples' attitude thereby giving rise to a collaborative conservation and management regime. It also enlightens the different target groups on the value and rate of exploitation of their own natural heritage. Information in this manual can be used to carry out education and awareness to primary school students, secondary school students, the local communities including fishermen, organized groups like the women groups and youth groups as well hotel staff and guests.

Before the educator carries out an effective awareness program, it will be important for them to carry out an appraisal of the target group. The contents of each education and awareness

activity can be adjusted in line with the audience's educational background, social ties, general guiding norms and linguistic ties. This information may include but not limited to the following important topics.

**(a) Sea turtle biology and ecology:**

- ♣ General introduction of sea turtles and species found in the world.
- ♣ Sea turtle species found in Kenya both foraging and nesting.
- ♣ Brief notes on species identification; foraging habitat and characteristics and identification of the body features including lateral scutes / costal scutes, prefrontal scutes, size of head, shape of carapace and the general size of the turtle.
- ♣ Reproductive behavior:- life cycle, age at first maturity, mating, developmental biology including nesting behavior.

**(a) Threats to sea turtles:**

- ◆ Poaching
- ◆ Predation by wild animals
- ◆ Fishing activities like gillnets/trawling
- ◆ Artificial lighting
- ◆ Destruction of natural nesting beaches through beach pollution and development.

**(b) Legislation for conservation and management of sea turtles**

- ♣ Fisheries Act cap 378 (1989)
- ♣ Wildlife management and amendment Act cap 376 (1985)
- ♣ Regional treaties and international conventions

It is worth noting that different types of target groups will require different approaches and methodologies to enhance effectiveness and achievement of the desired results. In carrying out education and awareness campaign, the educator can use one or any of the following tools:

- ♣ Verbal communication and lecture method
- ♣ Use of education tools like posters, brochures, stickers, hand outs, models, chalk and chalk board, banners, mural boards etc
- ♣ Use of visual aids like LCD, TV/ video, slides, overhead projectors etc

At any one point, while carrying out education and awareness campaign, remember the following basic principles,

- ♣ Make sure that you make the exercise interactive
- ♣ Be brief and straight to the point
- ♣ Use commendable cues
- ♣ Be audible but not noisy
- ♣ Address target groups directly
- ♣ Maintain good conduct and professional ethics through out the session
- ♣ Evaluate the understanding capacity of the target group(s)
- ♣ If possible give hand outs for reference

Below are practical activities which can be modified and applied to different categories of audience.

### <Activity No.1>

#### □ Story telling

- ◆ Using the descriptions of different species of sea turtles, allow the students to draw a relatively accurate picture of each type of sea turtle, then compare with accurate pictures in this manual. Create a mythological story about sea turtles. For a long time, sea turtles have played a part in the mythology of many cultures. Mythological stories are often used by many cultures to answer life's complex questions. In a native American tribe for example, it is believed that life started on the back of a giant sea turtle. The educator and the class can thus create their own mythological story about sea turtles. In the process, they should try as much as possible to incorporate some of the facts contained in this manual for example: sea turtle sheds tears, travel all around the world's oceans but still come back on the beach where they were hatched to nest, threats to their survival and the role sea turtles are playing now in teaching humans about how we are treating the earth.
- ◆ Make the class to write a composition or essay about sea turtles conservation. The students should discuss the role different stakeholders must play to protect sea turtles including different countries considering that sea turtles are highly migratory.
- ◆ **What would a Sea Turtle say to people?** Have students imagine they are a sea turtle that has been asked to give a speech to the students, fishermen, local community and to the leaders of country. As a sea turtle, what would you want these people to know?

### <Activity No.2>

#### □ Resource mapping and solution

Explain to the community that you want to learn from them and them from each other. To do this, let community members describe their resource and social potentialities. If possible, the community members should be divided into the men, women, and the youth. The social and resource map should be done in a large, open place. In each sub group, let someone draw the boundaries of their village. Within the boundaries, let the group name different turtle habitats, i.e. nesting beach, foraging ground and migration routes. As the mapping goes on, the educator can ask probing questions like which turtle species commonly nests in the area, who frequently uses these areas and for what reasons. After this, a volunteer from each group can be requested to present the mapping results to the community members.

The map gives the educator and community members a better understanding of the situation in the community as it shows the main characteristics of the resources therein.

After drawing a resource map the community can be led to recall and estimate turtle populations per species as far as they can remember in the past. This process can be done for consecutive years until the present. The community should also be asked to provide information about utilization of turtle products and major threats during each period in time. This process (historical profile) is a good reminder of the status of the resource over time. Discuss in detail the most important negative trends in history and their implications in the

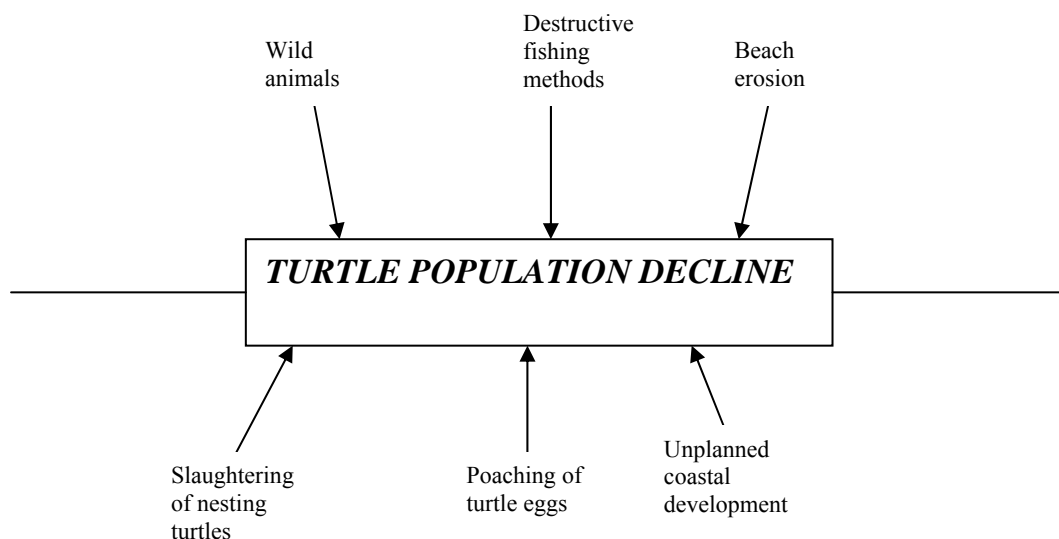
current situation. The educator should always remember that the communities have a wealth of experience and knowledge which can be harnessed to have positive implications in resource management.

This information can be combined with a 24-hour gender calendar. The main objective is to bring out a discussion on gender issues of division of labor, decision-making and how these relate to the present resource status. This process can be done as follows:

1. Divide the participants into groups according to age and gender
2. Ask the groups to brainstorm the different activities they do during a typical day
3. Request the participants to put down the activities in a diagram, using symbols for the benefit of illiterate members.
4. Present and discuss the diagrams, bringing out comparisons and contrasts between men's and women's work.
5. Clarify information about each activity and reasons why it is carried out.

At this point the educator will be in a good position to understand the reasons for the present resource status. This information can then be diagrammatically presented for all to see using a problem analysis flow diagram. This diagram shows a selected "main" problem in the center of the diagram and draws links from the different causes of the problem through to the effects that this has. This tool will be important if the community can identify solutions for each aspect of the diagram. It is also the starting point of community discovery of their actions impacts on resources and action to change the situation.

The problem analysis diagram is designed to provide detailed information about a selected priority problem, and to trace its causes and effect relationship. It also allows the educator to explore possibilities of identifying potential solutions to the problem.



1. Write down the selected core problem at the center of the sheet.
2. Ask for problem causes and effects and note them down around the core problem
3. Identify solutions and mark them down too.

This information can be presented in the visioning matrix presented below. A visioning matrix is a recap of the results of the previous discourse between the educator and community members and examines trends (past, present and future) as well as the impact of activities on resource status. The visioning matrix serves to enable every members of

the community to see at a glance information of importance. Note that the most important end result is to identifying solutions which the community may have control over.

### Visioning Matrix

Problem	Past situation (30-50 years ago)	Present situation	Probable future situation if nothing is done (10 years to come)	Preferred situation	What do we do to achieve the preferred situation?
Turtle slaughtering for meat and oil					
Poaching of turtle eggs					
Wild animals					
Coastal development					
Beach erosion					
Destructive fishing methods					

Some questions can then be posed to the audience to community members to gauge their attitude for example

- ◆ If you were scuba diving or snorkeling and saw a sea turtle, what would you do?
- ◆ If you saw a nesting turtle at night, what would you do?
- ◆ If you cannot afford to buy food, is it OK to take an adult sea turtle for food?
- ◆ If you come across a sea turtle nest, would you take the eggs from the nest and eat or sell them if you really needed food or money?
- ◆ What would you do if you came across a tank full of used motor oil having been washed ashore and you really need a tank but not the oil?

### <Activity No.3 >

#### □ Sea Turtle Quiz

First, hand out the quiz to the students and give them 3 minutes to solve it. After that give them answers and discuss other related issues. In case there are no handouts, give the quiz verbally. As you give the question one by one, do confirm the answer. Be careful to make the discussion interactive and participatory.

***\*Please tick “true” or “false”.***

1. There are seventy species of sea turtles in the world, five of them are found in Kenya.  
□ ( ) True / ( ) False
2. Hawksbill Turtle is most widely distributed in Kenya, constituting over 90% of reported nesting activity.  
□ ( ) True / ( ) False
3. Turtles have been on the earth for over 150 million years since before the time of the dinosaurs.  
□ ( ) True / ( ) False
4. Sea turtles migrate thousands of miles, moving between nesting and feeding grounds, for example from Kenya coast to South African Coast.  
□ ( ) True / ( ) False
5. Female sea turtles may take 2-3 years to reach sexual maturity.  
□ ( ) True / ( ) False
6. The average size of a clutch may be between 20- 30 eggs depending on species.  
□ ( ) True / ( ) False

7. The tears that flow from a females' eyes when she is nesting on the beach are because of pains.  
 ( ) True / ( ) False
8. Incubation takes place on average between 7- 10 days.  
 ( ) True / ( ) False
9. The sex of turtle hatchlings is determined by the characteristic of the sand.  
 ( ) True / ( ) False
10. One of the most threats to sea turtle in Kenya is coastal development and tourism.  
 ( ) True / ( ) False

Answers

1.False, 2.False, 3.True, 4.True,5 False,6.False,7.False,8.False,9 False,10.True.

### <Activity No.4 >

#### Sea Turtle Ecosystem Web

This activity is designed to be fun, hand-on way for students to learn about ecosystems and food webs. Each student represents a different component of the web, and explains to the others how he or she is related to the other components. This activity should take place after the discussion or lesson on sea turtles. The teacher may have to help the students decide how certain components are related.

<Materials> Paper, Drawing materials, Ball of String, Tape

<Procedure>

Each child will be randomly assigned as an animal or thing, listed below, that interacts with sea turtles. The students will make signs to show, either by drawing or words, what animal or thing they represent. They can tape it to themselves so that everyone else will know what they are. One person will have to represent the sea turtle(possibly the teacher should take this role). The "sea turtle" should stand in the center of the room. You will need to spread out around the room for this activity. One at a time, each student should explain to everyone else how they are connected to the sea turtle. For example, if one student is assigned to represent a ghost crab, he/she will explain that ghost crabs are connected to sea turtles because the crabs eat sea turtle eggs. The student will take a piece of string, hand one to the "sea turtle", and hold the other end. The next student might be assigned as shorebird. The student will explain that shorebirds eat sea turtle hatchlings, but they also might eat ghost crabs. The "shorebird" student should have a piece of string connecting him/her to the "sea turtle" but also a string to the "ghost crab" student. Some students will have several connections to other students, and some will have just the one to the "sea turtle". Students will learn about the interconnectedness of species and how changes in the habitat affect all the different parts of ecosystem.

<Roles for the students>

- |                            |  |                                 |
|----------------------------|--|---------------------------------|
| ▪ Ghost crabs              | ▪ Fish                                     | ▪ Frigate birds                 |
| ▪ Coati                    | ▪ Sharks                                   | ▪ Hawks                         |
| ▪ Raccoon                  | ▪ Orca whales                              | ▪ Vultures                      |
| ▪ Sea bulls                | ▪ Sea                                      |                                 |
| ▪ birds(pelagic)           | ▪ Sea grasses                              | ▪ Air                           |
| ▪ Bacteria                 | ▪ Clams                                    | ▪ Shrimp boats                  |
| ▪ Cleaner fish             | ▪ Tunicates(Tube worms)                    | ▪ Driftnets                     |
| ▪ Algae                    | ▪ Crustaceans                              | ▪ Poachers                      |
| ▪ Barnacles                | ▪ Ocean pollution (including plastic bags) | ▪ Hotels (on the nesting beach) |
| ▪ Micro animal in the sand | ▪ Sand                                     | ▪ Biologists                    |
| ▪ Jellyfish                |  |                                 |
| ▪ Sponges                  |  |                                 |

## <Activity No.5 >

### Sea Turtle Nest of Eggs Activity

There are many factors which influence how many sea turtle eggs survive to be adult turtles. The ratio is about 1:1000. Approximately one sea turtle egg survives to adulthood for every thousand laid in nests on the beach. There are many natural predators of sea turtle eggs which have evolved with sea turtles. These predators depend on sea turtle eggs as a source of food, as do the local communities of humans that harvest some to the sea turtle eggs. There are also several threats to the sea turtle eggs that lower the 1:1000 ratio, so that even fewer sea turtles survive. They include pollution, shrimp nets, development on nesting beaches (and the light pollution from them) and poachers.

<Materials> Paper, Drawing materials, Scissors

<Procedure>

For simplicity, this activity has been modified so that there are only 100 eggs to start with, leaving one at the end, Each student should draw 3 or 4 eggs (depending on the numbers of students) so that you end up with a total number of 100 eggs. The students can cut out the shapes of eggs, and draw the egg on one side, and a hatchling on the other side. All of the eggs should be placed in a pile on the floor to represent a sea turtle nest. Each student should take turns “taking” some of the eggs, based on how many each predator/threat is assigned. The numbers here are general and do not represent actual percentages taken by each predator or threat.

The teacher should not tell the students how many eggs will be left, but once there is only one egg, a discussion should ensure about natural sustainability and predators. What if all the eggs hatched and reached maturity (too many sea turtles and a strong food web)? What if there were no sea turtles left (what of the animals that rely on them for food and what of the animals the sea turtles eat)? The students should also understand there are still other, less sustainable threats to sea turtles even after the sea turtles survive to adulthood.

Number of students	Threat/Predator	Number of eggs taken by each student
4	Coati (relative of raccoons)	3
4	Ghost Crab	3
2	Raccoon	4
1	Coyote	2
6	Bacteria	4
2	Domestic dogs	6
2	Domestic pigs	6
2	Humans	5
1	Hurricanes (storms)	1

Threats to hatchlings (you can turn all the remaining eggs over at this point):

1	Ghost crab	1
1	Night heron	1
1	Shorebird	1
1	Black vulture	1
1	Sea gull	1
1	Lights on the beach	1

## <Activity No.6>

### □ Sea Turtle Webbing Activity

This activity, also known as semantic mapping, is great either as a group discussion or as part of a creative writing activity. It is a brain storming session that allows the students to share their knowledge of a subject, reinforces the information they already have and helps build vocabulary. It can be modified for any age group or type of class.

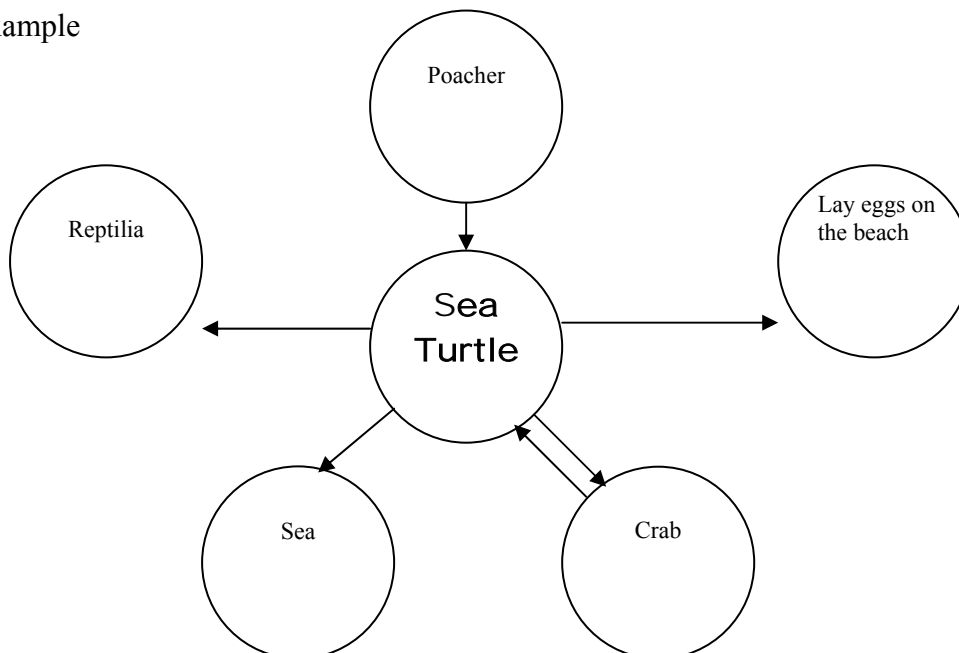
#### <Procedure>

Start by writing the words “sea turtle” on the board. Draw a circle around the words. Ask the student to think of things that are in some way “connected” to sea turtles. Write each new idea in another circle connected by a spoke to sea turtle circle. Some of the circles may be connected to each other as well. The teacher may want to pose prompting questions such as:

- What do sea turtles eat, and what animals eat sea turtles? Are any of those animals related to each other in some way?
- Where do sea turtles live?
- In which family do sea turtle belong?
- Do sea turtles have any enemies?
- How do sea turtles reproduce?

This could be followed by a creative writing activity built on the ideas generated.

For Example



## <Activity No.7>

### Sea Turtle Word Puzzle

To discover the secret message, fill in the definitions below and transfer the letters to the spaces in the grid with the corresponding number. All of the clues are based on sea turtles or threats to sea turtles. We have given you the first letter of each word.

1. Sea turtles have been on earth for at least as long as these other prehistoric reptiles.  
→ D \_\_\_\_\_
2. The process of change through time that has made sea turtles the way they are today.  
→ E \_\_\_\_\_
3. The habitat where sea turtles and all the other creatures interact and live in.  
→ E \_\_\_\_\_
4. The sea turtle species with the most beautiful shell.  
→ H \_\_\_\_\_
5. The largest sea turtle species.  
→ L \_\_\_\_\_
6. One of the sea turtle species that has a nesting behavior called “Arribada”  
→ O \_\_\_\_\_ R \_\_\_\_\_
7. Animals, like sea turtles, that live in natural habitats.  
→ W \_\_\_\_\_
8. The natural world around us.  
→ E \_\_\_\_\_
9. Release sea turtles hatchlings at \_\_\_\_\_ to help them make it safely to the sea.  
→ N \_\_\_\_\_
10. This kind of bird like to catch and eat young sea turtle hatchlings.  
→ V \_\_\_\_\_
11. These boats catch, and accidentally drown, sea turtles in their nets.  
→ S \_\_\_\_\_ T \_\_\_\_\_
12. Using resources faster than they can be naturally reproduced (like poaching sea turtle eggs) is considered \_\_\_\_\_.  
→ U \_\_\_\_\_
13. Non biodegradable garbage in the sea (like floating balloons which can look like jellyfish to sea turtles and can block their intestines when eaten).  
→ P \_\_\_\_\_
14. These fish devices are left to float out in the open ocean, and can kill sea turtles as well as other wildlife.  
→ D \_\_\_\_\_
15. What happens to endangered animals if they are not protected?  
→ E \_\_\_\_\_
16. Abbreviation of devices used in trawl nets to help release sea turtles  
→ T \_\_\_\_\_

### Answers:

- |                 |                |                   |
|-----------------|----------------|-------------------|
| 1. Dinosaurs    | 7. Wildlife    | 12. Unsustainable |
| 2. Evolution    | 8. Environment | 13. Pollution     |
| 3. Ecosystem    | 9. Night       | 14. Driftnets     |
| 4. Hawksbill    | 10. Vultures   | 15. Extinction    |
| 5. Leatherback  | 11. 11. Shrimp | 16. TEDs          |
| 6. Olive Ridley | Trawlers       |                   |

## <Activity No.8 >

### □ *Rubber Band Activity*

Objective: To demonstrate the problems sea turtles face from entanglement in plastics and discarded fishing nets.

Materials: Rubber bands

Activity: Ask for volunteers and fasten the rubber band on their thumb and first finger

Tell students that this is supposed to simulate a turtle with its flipper caught in a plastic bag, entangled in fishing net or in discarded plastic waste.

Ask students to remove the rubber band. Remember, if you are a turtle, your “finger” bones are fused inside your flippers, so you can’t use your fingers individually.

You can’t use your other hand; turtles don’t have hands or fingers!!!

Have other students try the same exercise for some time before ending activity.

Discussion: Discuss the dangers of plastic and discarded nets or fishing lines to sea turtles. Discuss ways that you can keep plastics out of the ocean, alternatives to plastic and ways to reduce impact.

## <Activity No.9 >

### □ *Pay it Forward*

Objective: To increase awareness of conservation issues and encourage students to spread the word and help to educate others about how to contribute to the solution of environmental problems.

Activities: Challenge students to make a change in their lives that will help reduce pollution, or help to contribute to reducing or solving an environmental issue. Have students encourage others to make similar changes in their lives. Give students the assignment of making one change in their consumer habits, such as an increase in recycling efforts, a decrease in consumption in their daily lives or a contribution in some way towards a conservation issue. As part of their assignment, students are required to educate at least 3 other people about their issue, and ask those 3 people to make a small change. In order to reach the most people, ask everyone to keep spreading the word, and have each person tell three other people.

Show the class how quickly this will reach large numbers of people by calling 3 people to the front of the class, then having them pick 3 people, who pick 3 more, etc.

## <Activity No.10 >

### □ *Do Something*

Objective: To increase awareness of conservation issues and inspire students to implement small changes towards solving broader conservation problems.

Activities: Have a class discussion on conservation issues. Have students pick an issue and research details on the web, in magazines, texts and/or newspapers. Have students write a report on the chosen topic, including a proposal for solving the problem. Students should be

encouraged to engage in positive, community-based solutions and to share their ideas and knowledge with others.

Students can be given an assignment to spend one month or one term implementing changes in their lives and in their communities.

At the end of the assignment, students should report to the class (or school) what they have learned about their chosen topic, the efforts they made to change or help the situation and how successful they think they have been.

### <Activity No.11 >

#### Sea Turtle Fact

For each term on the right, write in the correct numbers of the description on the left

- |  |     |                |
|--|-----|----------------|
| 1. This turtle gets its name from its exceptionally large head         | { } | Hawksbill      |
| 2. This turtle is the only one without a hard shell                    | { } | Carapace       |
| 3. This turtle is named for the green color of the fat under its shell | { } | Leatherback    |
| 4. People kill this turtle to get its shell for jewelry                | { } | Natal beach    |
| 5. This is the upper part of the sea turtle's shell                    | { } | Turtle killing |
| 6. Most turtles return to nest on the beach where they were hatched    | { } | Green turtle   |
| 7. This human activity threatens the survival of sea turtles           | { } | Loggerhead     |

Answers

1. Loggerhead, 2. Leatherback, 3. Green turtle, 4. Hawksbill, 5. Carapace, 6. Natal beach, 7. Turtle killing

### <Activity No.12 >

#### Word Search

Stretch your mind with this simple crossword puzzle by identifying the words shown below

A	M	A	R	I	N	E	Q	C	N	O	D	Y	N	R	E	E	F
B	N	S	K	R	A	H	S	J	A	L	Z	G	O	Y	E	C	D
A	Y	E	V	P	C	P	Q	W	Q	A	X	N	I	L	X	O	U
R	Q	V	M	Y	P	U	B	I	E	B	W	W	T	G	M	S	G
C	T	A	I	O	L	J	E	F	A	S	U	R	A	Q	B	Y	O
T	K	W	L	S	N	W	A	R	P	P	U	U	V	K	V	S	N
S	J	C	I	L	H	E	C	K	Y	T	R	D	R	I	F	T	G
O	U	X	Y	A	H	U	H	Z	A	M	V	X	E	O	S	E	U
H	T	Z	L	O	K	S	E	A	W	E	E	D	S	L	H	M	G
G	R	E	A	F	J	H	S	I	F	T	Y	I	N	U	A	Y	O
N	I	H	P	L	O	D	G	E	S	P	P	O	O	X	R	F	N
I	Z	C	X	V	N	M	J	E	D	F	A	W	C	A	M	H	G
L	X	S	N	M	L	F	S	Y	K	I	R	W	E	M	J	U	N
W	C	U	K	X	Y	L	T	Y	M	K	T	X	C	T	U	O	L
A	B	I	O	D	I	V	E	R	S	I	T	Y	G	T	U	L	P
R	M	P	F	R	D	C	B	H	W	Z	X	C	F	R	E	D	X
T	E	C	O	L	O	G	Y	J	S	E	V	O	R	G	N	A	M

☞ Marine, beaches, reef, mangroves, prawns, tides, anemone, waves, dugong, dolphin, trawling, shell, whale, eel, seaweed, turtle, fish, trap, sharks, ecosystem, ghost crab, conservation, ecology, biodiversity.

*\*Please tear or copy this evaluation page and return it to Kenya Sea Turtle Conservation Committee, P.O Box 82144, Mombasa, Kenya*

**Education and Awareness Campaign Evaluation Form**

What is your impression toward the information, pictures and the drawings presented in this manual ?

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What is your general impression of the education and awareness manual ?

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Do you have any suggestion about improving the education and awareness campaign manual?

{ } yes { } no

If yes, what are they ?

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Thank you for helping us to continue improving this manual

# KESCOM

## The Kenya Sea Turtle Conservation Committee

P.O. Box 82144, Mombasa, Kenya

Tel: 041-312744/5

E-mail: kescoms@yahoo.com

### Membership Registration Form

Name:.....

Organization:.....

Address:.....

Tel:.....

E-mail:.....

Interest:.....

.....

.....

I wish to be registered as a member of KESCOM.

Signature.....

Date.....

Date

Month

Year

Enclosed here is a money order/cheque/cash of Ksh. (please tick the appropriate box below)

- |                          |              |             |
|--------------------------|--------------|-------------|
| <input type="checkbox"/> | Student      | Ksh. 50     |
| <input type="checkbox"/> | Individuals  | Ksh. 200    |
| <input type="checkbox"/> | Organization | Ksh. 500    |
| <input type="checkbox"/> | Corporate    | Ksh. 2,000  |
| <input type="checkbox"/> | Life member  | Ksh. 10,000 |

Receipt No. \_\_\_\_\_

Thank you for supporting sea turtle conservation. Please send this form back to KESCOM.

<For official use only>

**Comments:**

## **Definition of terms**

Arribadas – Spanish for “arrival”, used to refer to the mass, synchronized emergence of nesting sea turtles.

Artificial lighting – Light created by human-made sources, such as lamp posts and torch lights.

Beach nourishment – The addition of sand to a beach by human beings to replace sand lost through erosion.

Caruncle- A temporary sharp egg-tooth on hatchlings used to tear open the egg shell.

Clutch – A nest of eggs.

Convention on International Trade in Endangered Species (CITES) –Agreement to control the international trade of endangered and threatened species.

Ecosystem – A system made up of biological communities as well as physical and chemical environment.

Extinct – When the last living individual of a species dies, causing the species to no longer exist.

Fibropapillomas- A disease that causes the growth of cauliflower- like tumors on sea turtles and other animals.

Habitat – A place where a plant or animal naturally lives.

Incubation – A process during which eggs develop into hatchlings.

Natal Beach – The beach where a sea turtle was born.

Nest – The structure made for laying and incubating eggs.

Plastron – The lower or ventral portion of a turtle’s shell.

Poach – Hunt illegally.

Spongivore – Feeding on sponges.

Scutes – The hard scales covering a turtle’s shell.

Satellite Telemetry – Technology that that uses radio transmitter to transmit signals to satellites orbiting the earth.

Turtle Excluder Device (TED) – A device attached to a shrimp net to allow sea turtles and other large organisms to escape from a net while allowing shrimp to be caught.