

Incredible Paradise

The land of calm and chaos

A SMALL ENDEAVOUR FOR AWARENESS GENERATION



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MOSQUITOES EVERYWHERE

Mosquitoes won't just ruin a cookout or leave angry red welts on your skin after a blood meal; the little buzzers might also transmit serious diseases. They are "silent" feeders; their siphon-like mouthparts can quickly pierce human skin and feed on blood without causing any notice. There exist 3557 species under 113 genera in the world (404 species in 49 genera of mosquitoes in India) out of which 3, namely *Aedes*, *Anopheles* and *Culex* are widespread. Only the female mosquitoes transmit pathogens as it sustains on a blood diet, while the male plays a vital role in mating and species continuity.

Characteristics




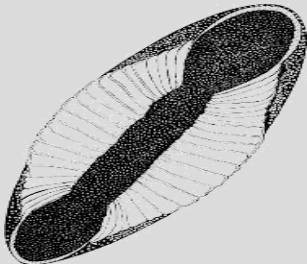

Genus- *Aedes*



Genus- *Anopheles*



Genus- *Culex*

| | | | |
|--------------------------------|--|--|---|
| Resting Position | Stays more or less parallel to the surface | Mosquitoes have a 45° angle | Stays parallel to the surface |
| Most Active | Aggressive day biter, Most active for approximately two hours after sunrise and several hours before sunset. | Most active at dawn and dusk, bites during the night. | Most active at dawn and dusk, bites during the night. |
| Wings Pattern | Have black and white bands | Discrete blacks of black and white scales | Narrow and dark wings |
| Sound | Makes very less sound | Characteristic buzzing sound | No sound |
| Shape of eggs |  <p>Spindle-shaped</p> |  <p>Boat-shaped</p> |  <p>Cigar-shaped</p> |
| Male-Female Distinction | The female is larger than the male with sparse, lesser hairs on antenna. Male is smaller and has dense hairs on antenna. | Compared to the male, female has a more needle-like proboscis, which they use for biting. Males have bushy, hairy antenna. | The male has a feathery antenna. Conversely, the female has especially plain antennae. |
| Diseases transmitted | Dengue, Chikungunya, Zika fever | Malaria | Elephantiasis (Filariasis), Japanese Encephalitis, West Nile Fever. |

Mosquito Borne Diseases are prevalent mainly in the wet summer (Monsoon) season which counts from June to September in India.

Some of the common diseases and their symptoms include-

- **Dengue**- High fever, headache, body aches, nausea, rash, etc.
- **Malaria**- Chills, headache, sweats, fatigue, recurring fever, nausea, etc.
- **Chikungunya**- Fever, joint pain, muscle pain, joint swelling, rash, etc.
- **Elephantiasis**- Main symptom include gross enlargement of arms, legs or genitalia.
- **Japanese Encephalitis**- Fever, headache, vomiting, movement disorders, seizures, etc.

Preventive Measures:

Include removal of mosquito breeding grounds, usage of mosquito repellants and killing agents. Some common, feasible methods are:

- Tight covering of water storage containers to prevent egg laying by mosquitoes.
- Use of larvicides or *Gambusia* fish (Mosquito fish) in larger stagnant water bodies.
- Plants like Basil (Tulsi), Marigold, Rosemary deters mosquitoes.
- Essential oils like lavender oil, tea tree oil, lemon oil, eucalyptus oil, peppermint oil, or clove oil deter mosquitoes.
- Regular usage of intact mosquito nets at home.
- Use of commercially available liquidators, candles or incense sticks. (Long term exposure can lead to headache, skin and eye-irritation, allergies and rashes, sore throat, nausea, dizziness)



Fig. Mosquito net



Fig. *Gambusia* fish

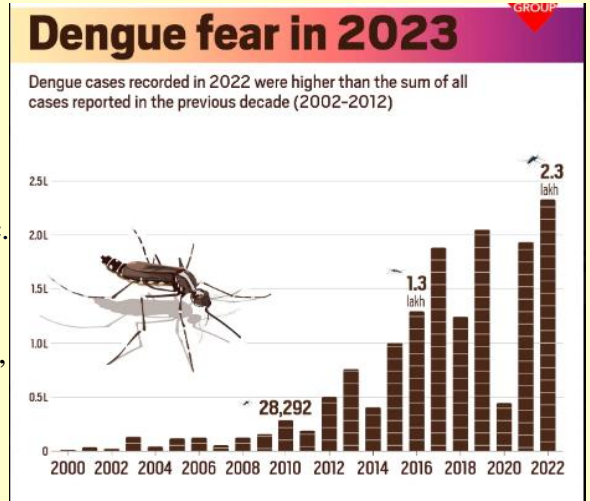





Fig. Recent statistical data on Dengue

SNAKES: LET'S BE CAREFUL

Venomous Snakes of Odisha

| | Name | Identifying Characters | Active status | Habitat | Symptoms | Anti venom |
|--|--|--|---|---|---|---|
|  | Monocellate Cobra (ଓଫି) <i>Naja Kaouthia</i> (Neurotoxic) | <ul style="list-style-type: none"> ◆ Broad head ◆ Shades of brown and black coloured uniformly ragged with yellowish cross bands ◆ An “eye”-shaped or “O” shaped hood is present. | Crepuscular | Agricultural fields, Rodent burrows, Dikes between two fields. | Drowsiness, Paralysis and severe pain during swelling. | Polyvalent antivenom |
|  | Common Indian Cobra (ଜୀଜ) <i>Naja naja</i> (Neurotoxic) | <ul style="list-style-type: none"> ◆ Broad head ◆ Spectacled marking on hood | Both diurnal and nocturnal | Dense and open forests, Agricultural lands, Rock terrain wetlands, Heavily populated urban areas. | Headache, blurred vision, respiratory failure and cardiac arrest. | Polyvalent anti-snake venom |
|  | King Cobra (ଅହିରାଜ) <i>Ophiophagus hannah</i> (Neurotoxic) | <ul style="list-style-type: none"> ◆ Grey or black body colour with white cross bands. ◆ Hood is long and narrow | Active at days for hunting, rarely seen at nights | Dense or open forests, Bamboo farm, Agricultural areas and dense mangrove swamps. | Puncture marks at the wound, Redness and swelling around bite, Laboured breathing and rapid heart rate. | NPAV (Neuro polyvalent anti-venom) |

| | | | | | | |
|--|---|---|---|---|--|---|
| | <p>Common Krait (କୈଟି) <i>Bungarus caeruleus</i> (Neurotoxic)</p> | <ul style="list-style-type: none"> Black, brownish-black body colour with thin white cross lines | <p>Sluggish during the day and active during night.</p> | <p>Generally found near termite mounds, brick piles, rat holes, and even inside house.</p> | <p>Abdominal pain, diarrhoea nausea and severe sweating.</p> | <p>Polyvalent anti-snake venom</p> |
| | <p>Russell's viper (ବେଙ୍ଗ ବୋଡ଼ା) <i>Daboia russelii</i> (Hemotoxic)</p> | <ul style="list-style-type: none"> Brown body with 3 longitudinal series of prominent, large brown or black oval spots. Top of the head usually has narrow white Δ shaped mark. | <p>Most active at night. During cold weather, it alters its behaviour and becomes more active during night.</p> | <p>Open, grassy or bushy areas, forests.</p> | <p>Pain at the bite site. Bleeding from gums and in the urine. Blood pressure drops and heart rate falls after 20 minutes.</p> | <p>Polyvalent antivenom</p> |
| | <p>Saw-Scaled Viper (ସୂଳିଆ ବୋଡ଼ା) <i>Echis carinatus</i> (Hemotoxic)</p> | <ul style="list-style-type: none"> Light, dark brown, with zigzag patterns on back. Top of head has usually distinct arrow-head mark. | <p>Nocturnal</p> | <p>Deserts, semi-deserts, rainforest, dry and moist deciduous forest, grasslands, and scrublands.</p> | <p>Localised Swelling and pain. Haemorrhage and coagulation defect.</p> | <p>Polyvalent antivenom</p> |
| | <p>Bamboo Pit Viper (ଡାଳୁଆ ବୋଡ଼ା) <i>Trimeresurus gramineus</i> (Hemotoxic)</p> | <ul style="list-style-type: none"> Yellow or olive brown with uneven pattern. Lip scales and underside are pale green colour. | <p>Nocturnal</p> | <p>Bamboo groves and forests, usually near streams.</p> | <p>Bruising of the skin. Immediate pain with rapid swelling. Troubles in breathing and changes in heart rate.</p> | <p>CroFab antivenom</p> |



Non-Venomous Snake of Odisha



Checked Keelback (ଧଣ୍ଡୁ ସାପ)
Xenocrophis piscator



Indian Rat Snake (ଛମଣା)
Ptyas mucosa



Striped Keelback (ମାଟିବିରାଡ଼ି)
Amphiesmas tolutum



Barred Wolf Snake (କଉଡ଼ିଆ ସାପ)
Lycodon striatus



Common Wolf Snake (କଉଡ଼ିଆ ସାପ)
Lycodon aulicus



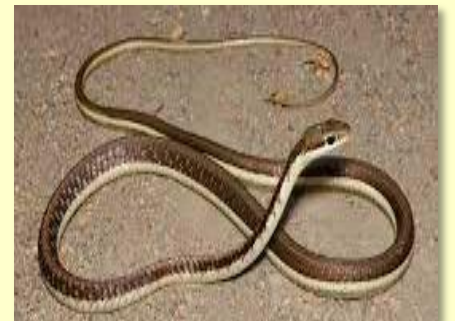
Banded Kukri (କୁକ୍ରି ସାପ)
Oligodon arnensis



Common Sand Boa (ବାଲି ବୋଆ)
Eryx conicus



Red Sand Boa (ବୋମୁଣ୍ଡିଆ)
Eryx johnii



Bronze Back Tree Snake (କାଣ୍ଡନାଳ ସାପ)
Dendrelaphis tristis



Green Keelback (ସବୁଜ ଧଣ୍ଡୁ)
Rhabdophis plumbicolor

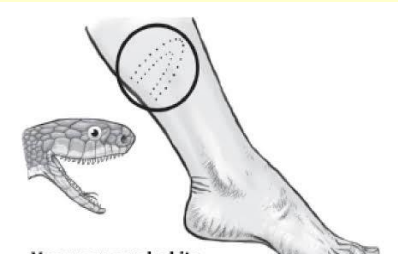





Brahminy Worm Snake (ତେଲି ସାପ)
Indotyphlops braminus



Indian Rock Python (ଅଜଗର)
Python molurus

Identifying non-venomous and venomous snakes:

| Characters | Non-Venomous | Venomous |
|---------------------------------|--|--|
| Head | Narrow, barely distinguishable from neck | Broad triangular |
| Pupils | Round pupils | Elliptical (vertical) pupils |
| Body | Relatively thin or narrow | Heavy or relatively fat in appearance |
| Tails | Tapers to a long, thin point | Blunt, usually ending in a modified scale, never tapers to a thin point |
| Teeth bite marks | Two fang marks with number of small teeth marks. | Two fang marks with or without marks of other teeth. |
| Pictorial representation |  |  |

| Do's  | Don't  |
|---|---|
| Reassure the victim | Apply a tourniquet |
| Immobilize the whole of the victim's body by laying him/her down in a comfortable and safe position | Apply ice, cut around the bite to suck the poison out |
| Get to the hospital immediately | Give the patient anything to drink or any other counter medication |
| Tell the doctor of any symptoms that manifest on the way to hospital | Take the patient to a tantric or a snake charmer for treatment |
| | Suck or cut the wound |



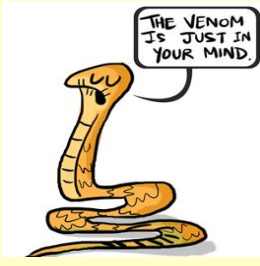
Prevention:

- Don't walk barefoot at late evening or at night.
- Always carry torch and flashlight at night.
- Do not lift logs, rocks or anything with bare-hand.
- Do not handle a freshly killed or injured snake.
- Don't get within the striking range of a snake while trying to identify it.
- Do not throw wet food near room/house as it attracts rats and in turn snakes.



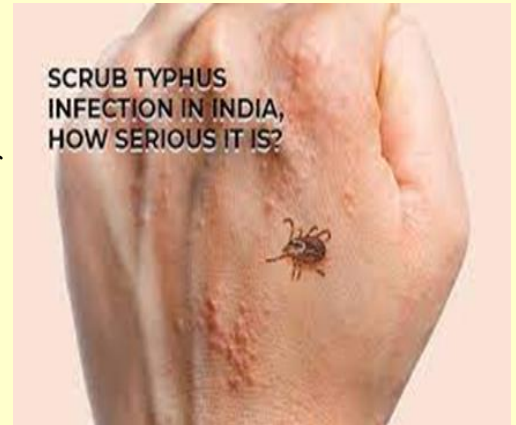
Fig. Wear gumboots to prevent snake bite

Reality in Myth

| MYTH ❌ | REALITY ✅ |
|---|--|
| <p>Snakes drink milk.</p>  | <p>Snakes are reptiles and cannot digest milk. They generally feed on rats, other snakes and frogs.</p>  |
| <p>Snakes sway to the charmer's flute.</p>  | <p>Snakes have no external ears and cannot hear sound. Snake charmers move their flutes around in circles, and snake just follow this movement.</p>  |
| <p>Snakes seek revenge.</p>  | <p>Snakes are not revengeful animals and do not remember humans who have harmed them.</p>  |
| <p>Snakes carry gemstone in their head.</p>  | <p>There is no gemstone in in any part of a snake's body.</p>  |
| <p>Rat snake has venom in their tails.</p>  | <p>Rat snake are non-venomous. When agitate, thrashing their tails about.</p>  |

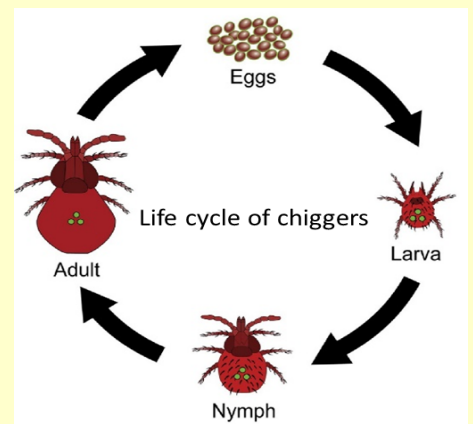
SCRUB TYPHUS

Scrub typhus or Bush typhus is a form of typhus caused by the intracellular parasite *Orientia tsutsugamushi*, a Gram-negative α -proteobacterium of the family Rickettsiaceae first isolated and identified in 1930 in Japan. It is spread to people through bites of infected **chiggers (larval mites)**. Most cases of scrub typhus occur in rural areas of Southeast Asia, Indonesia, China, Japan, India, and northern Australia. Anyone living in or travelling to areas where scrub typhus is found could get infected.



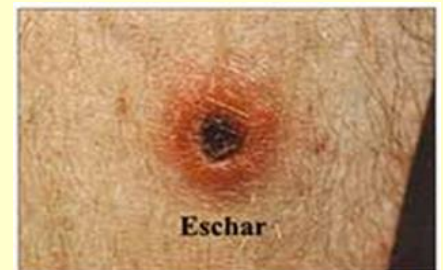
Causes

Scrub typhus is **transmitted** by two species of trombiculid mites ("chiggers", particularly *Leptotrombidium delicense* and *L. akamushi*), which are found in areas of heavy scrub vegetation. The mites feed on infected rodent hosts and subsequently transmit the parasite to other rodents and humans. The bite of this mite leaves a characteristic **black eschar** that is useful to the doctor for making the diagnosis.



Signs and Symptoms

- Fever and chills.
- Headache.
- Body aches and muscle pain.
- A dark, scab-like region at the site of the chigger bite (also known as **eschar**)
- Mental changes, ranging from confusion to coma.
- Enlarged lymph nodes.
- Rash.



Diagnosis and Testing

- Travelling history in medical records.
- Blood testing in case of visible symptoms.

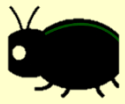
Treatment

- Quick administration of antibiotics like doxycycline can be used which are not age-restricted.






Prevention

- No vaccine is available to prevent scrub typhus.
- Avoid contact with infected chiggers.
- When travelling to areas where scrub typhus is common, avoid mite infested bushy, dense vegetation.





HARMFUL INSECTS AROUND US

| IMAGE TO IDENTIFY | NAME OF THE INSECT | HARMFUL EFFECT | PREVENTION/ TREATMENT |
|---|---|---|--|
|  | <p><i>Solenopsis invicta</i> (Red Ant)</p> | <p>Their sharp stings cause itchy swelling</p> | <p>Wear protective clothing and use insect repellent</p> |
|  | <p><i>Ropalidia marginata</i> (Indian Wasp)</p> | <p>Their stings cause allergy and anaphylaxis and swellings</p> | <p>Wash the area with soap, apply ice-pack on the site</p> |
|  | <p><i>Blatta orientalis</i> (Cockroach)</p> | <p>Transfer bacteria and viruses from their legs to food, dishes, and utensils, and they are known to spread dysentery, E. coli, Salmonella, and food poisoning</p> | <p>Keep food items covered, maintain good sanitation</p> |
|  | <p>Family Culicidae (Mosquitoes)</p> | <p>They transmit epidemics like Malaria, Dengue, Filariasis, etc.</p> | <p>Use insect repellents and mosquito net, wear long sleeve clothing</p> |
|  | <p><i>Musca domestica</i> (House Fly)</p> | <p>They transmit Typhoid, Dysentery, Cholera, etc.</p> | <p>Maintain good sanitation and keeping food items covered</p> |
|  | <p>Order Isoptera (Termites)</p> | <p>Termites damage furniture and property</p> | <p>Sun-dry the damaged items, use Gammoxene or kerosene to remove colonies</p> |
|  | <p><i>Vespa mandarinia</i> (Asian Giant Hornet)</p> | <p>Their stings are poisonous, cause anaphylactic shock and even cardiac arrest</p> | <p>Stay away from the nest. If bitten, apply ice-pack over affected area</p> |

| IMAGE TO IDENTIFY | NAME OF THE INSECT | HARMFUL EFFECT | PREVENTION/ TREATMENT |
|---|--|--|---|
|  | <i>Buprestis aurulenta</i> (Golden Jewel beetle) | They damage crop plants, ruin fabrics and furniture | Neem and pyrethrin based sprays control outbreaks |
|  | <i>Scolopendra gigantea</i> (Giant centipede) | Venom cause vomiting, dizziness and pulsating | Use boric acid or tea-tree oil on hiding spots |
|  | Order Ixodida (Indian Tick) | They infect humans and animals with pathogenic bacteria causing various diseases | Examine pets, vehicles, etc; permethrin insecticide to be used on goods |
|  | <i>Apis indica</i> (Honey bee) | Their sting causes painful swelling | Avoid contact with bee nests; use wet warm cloth to remove stings |
|  | Order Phthiraptera (Lice) | They cause itching of scalp and scratchy sores | Use of neem, tea-tree or lavender oils, avoid head-to-head contact |
|  | <i>Cimex lectularicus</i> (Bed bug) | They suck human blood, cause painful sores & anaphylaxis | Use of steam, insecticides, soap-based spray on infested furniture |
|  | <i>Locusta migratoria</i> (Locust) | They devastate crops which can lead to famine & starvation | Apply small concentrations of organo-phosphate pesticides or neem oil |



CROCODILES OF INDIA

Introduction

Crocodiles are fascinating reptiles that have inhabited the waterways and wetlands of India for millions of years. These ancient and formidable creatures have a rich history and play a crucial role in ecosystems. They show pronounced sexual dimorphism, with males growing much larger and more rapidly than females. They are polyphyodonts which means they replace their eighty teeth up to fifty times in their life span. They have very good night vision, and are mostly nocturnal hunters.

Types of crocodiles found in India

India is home to three species of crocodiles: the mugger crocodile, the saltwater crocodile, and the gharial. They belong to different families and have different habitats, sizes, and conservation statuses. Here's a comparison table among the three species of crocodiles found in India:

| Characteristic | Saltwater Crocodile (<i>Crocodylus porosus</i>) | Mugger Crocodile (<i>Crocodylus palustris</i>) | Gharial (<i>Gavialis gangeticus</i>) |
|--|--|---|--|
| Size | Largest living reptile; males can reach up to 23 feet (7 meters) or more | Smaller than saltwater crocodile; males typically reach 10-13 feet (3-4 meters) | Specialized long, slender snout; males reach 13-16 feet (4-5 meters) |
| Coloration | Pale greyish-green to dark green or brown; lighter underbelly | Brown to olive-green with dark bands; lighter underbelly | Light greyish-brown with dark spots; long, thin snout |
| Snout Shape | V-shaped snout, tapered and narrow | V-shaped snout, tapered and narrow | Extremely long, slender snout with numerous teeth |
| Behaviour | Aggressive, known to be more territorial and prone to attacking humans | Less aggressive compared to saltwater crocodile; generally, avoids humans unless provoked | Relatively passive, primarily fish-eaters; poses little threat to humans |
| Distribution in India | Coastal regions, especially in the Sundarbans, Andaman and Nicobar Islands, and the eastern coast | Widespread across the Indian subcontinent, including major rivers like the Ganges and Brahmaputra | Limited to specific rivers in northern India and Nepal |
| Diet | Opportunistic apex predators, feed on fish, birds, mammals, and occasionally large prey such as deer and water buffalo | Opportunistic feeders, primarily fish, but also consume birds and small mammals | Specialized fish-eaters, primarily feed on fish using their long, slender snouts |
| Conservation Status (IUCN Red List) | Vulnerable in some areas, populations have rebounded in recent years | Least Concern, stable populations in many regions | Critically Endangered, with small, declining populations |
| Cultural Significance | Revered and integrated into local cultures in some regions of Asia | Lesser cultural significance compared to saltwater crocodile | Sacred in Hindu mythology; used as a symbol of conservation efforts |



Saltwater Crocodile



Mugger Crocodile

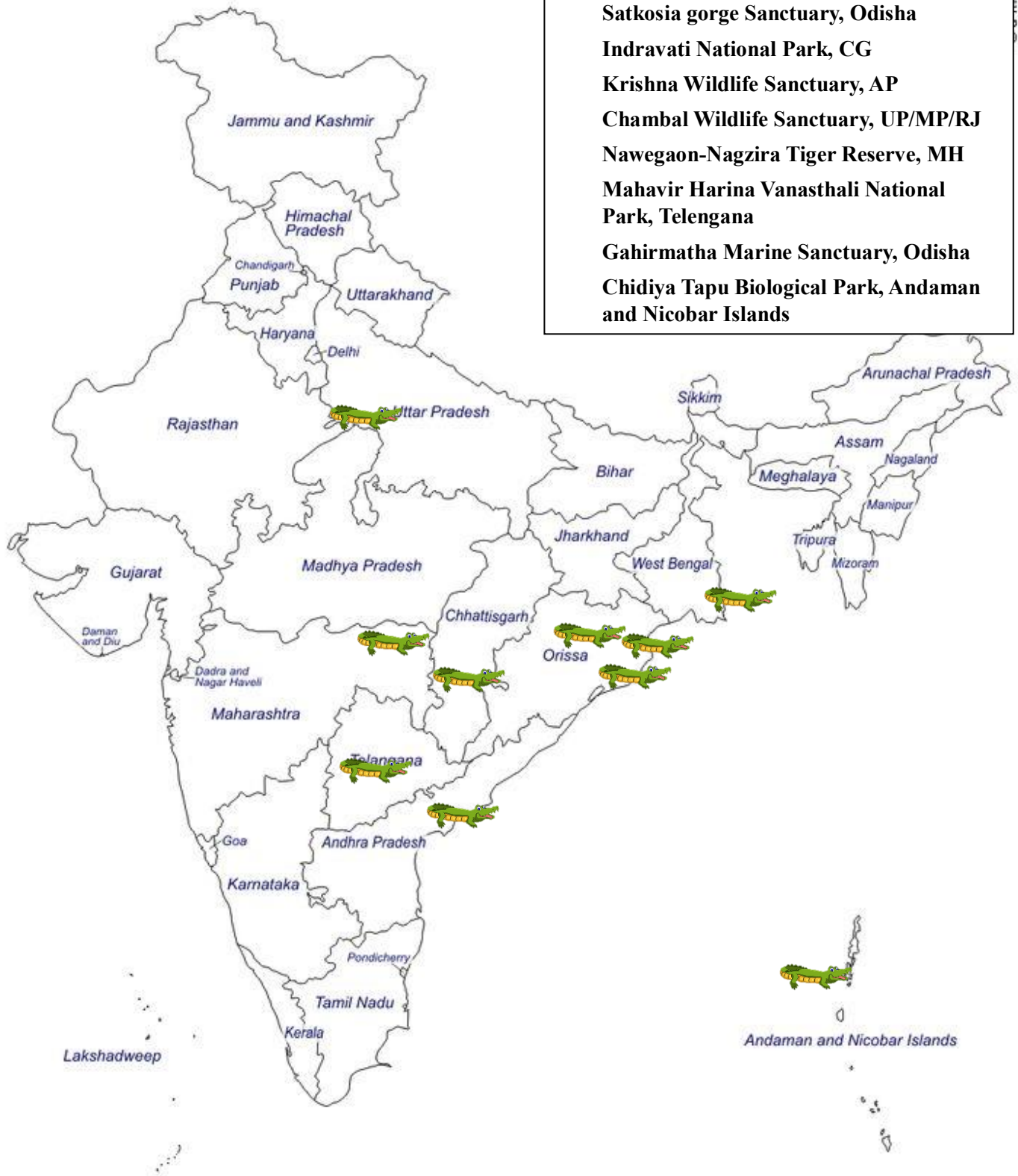


Gharial

Crocodile Conservation

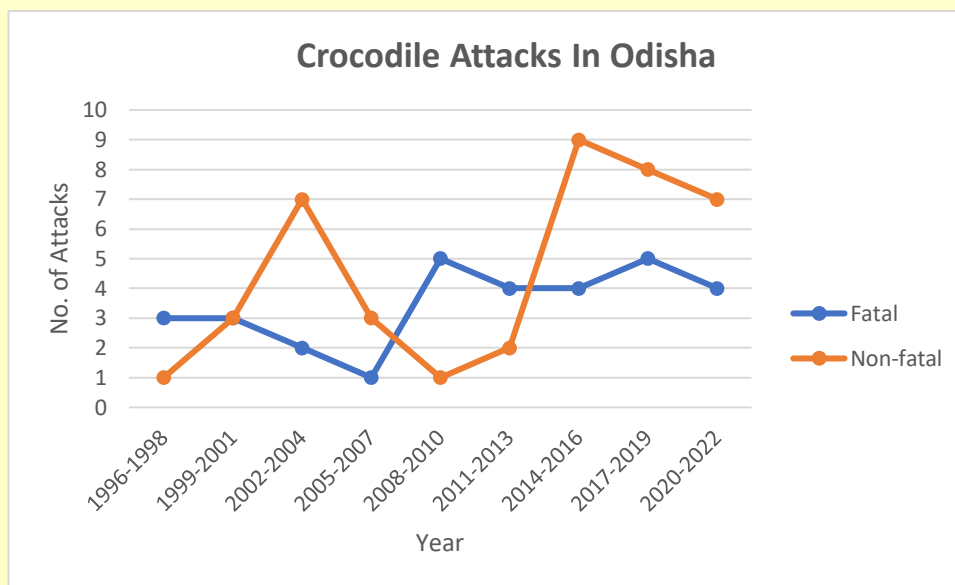
India boasts several crocodile reserves and sanctuaries dedicated for the conservation and protection of these magnificent reptiles. Here is a list of some prominent crocodile reserves and sanctuaries across the country:

Bhitarkanika Wildlife Sanctuary, Odisha
Sundarbans Reserve Forest, WB
Satkosia gorge Sanctuary, Odisha
Indravati National Park, CG
Krishna Wildlife Sanctuary, AP
Chambal Wildlife Sanctuary, UP/MP/RJ
Nawegaon-Nagzira Tiger Reserve, MH
Mahavir Harina Vanasthali National Park, Telangana
Gahirmatha Marine Sanctuary, Odisha
Chidiya Tapu Biological Park, Andaman and Nicobar Islands



Crocodile Related Death:

Crocodile-related incidents, including attacks on humans, are relatively rare in India. While these incidents do occur, they are often isolated and depend on various factors, including the behaviour of individual crocodiles, human activities near crocodile habitats, and the effectiveness of conservation and safety measures. Efforts have been made in India to reduce the risk of crocodile attacks and to promote coexistence between humans and crocodiles. These efforts include the establishment of protected areas, educational programs, and guidelines for residents and tourists in crocodile-prone regions. It is also important for individuals to exercise caution and follow safety guidelines when in or near water bodies inhabited by crocodiles to minimize the risk of incidents.



Conclusion:

Crocodiles are not only apex predators that help in maintaining balance in the aquatic ecosystems but also hold cultural significance in India, with some communities revering them and incorporating them into local traditions and mythology. The Indian Crocodile Conservation Project was launched in 1975 to protect and breed these crocodiles in captivity and release them into the wild. The project has been successful in increasing the population of these crocodiles in some areas, but there are still many challenges and threats to their survival. Some of these include habitat degradation, poaching, pollution, fishing nets, human-crocodile conflict, and climate change. Therefore, despite the occasional crocodile-human conflicts, it is important to raise awareness and educate people about the importance of these magnificent creatures and the need for their conservation and protection.





OLIVE RIDLEY SEA TURTLE -THE PRIDE OF ODISHA

Lepidochelys olivacea

Sea turtles, the most majestic of the turtle family and a “keystone species”, are large, long-lived, and ancient oceanic animals. Many stories in various world cultures feature tales of the world being built on the back of a sea turtle. Today, there are seven species of sea turtles in existence, and most are listed as at least vulnerable to extinction under the IUCN’s Red List.

Olive Ridley turtles are famous for their mass nesting behavior or *arribada*. They get their name from **olive green color of its heart shaped shell (carapace)**. These are the second smallest species of Sea turtles. Adult grows up to 2 feet and weighs between 35 to 55kg.



Fig. *Arribada* of Olive Ridley turtles at Gahirmatha.



Fig. Hatchlings emerging from an egg.

Males and females grow up to the same size, however, females have a slightly more rounded carapace. They remain in warmer water (26°C - 33°C) and in a salinity range between 19.5 - 36.4 psu. They are omnivorous with jelly fish, crustaceans, shrimps, seaweeds, etc. as preferred food.

Habitat and distribution

They are globally distributed in the tropical and warm temperate regions of the south Atlantic, Pacific and Indian oceans. Though mainly pelagic, they have been found to inhabit coastal areas including bays and estuaries. They migrate thousands of kilometers between pelagic feeding and coastal breeding grounds.

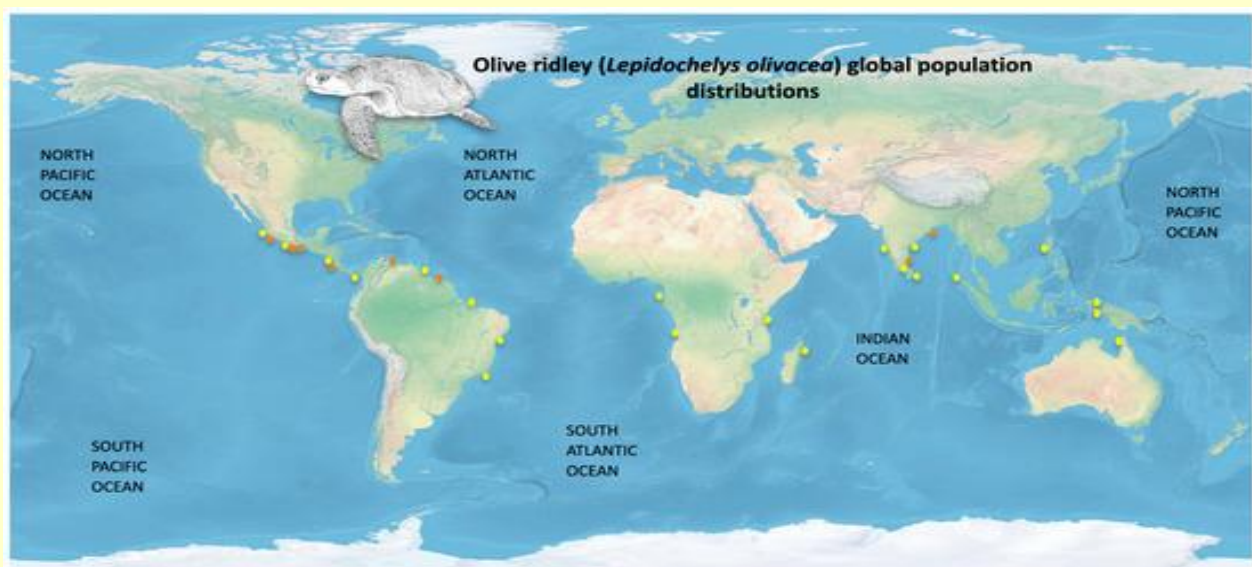


Fig. Olive Ridley Sea turtle (*L. olivacea*) distribution map: orange circles are major nesting grounds; yellow circles are minor nesting sites. (Source – Caceres-Farias et al., 2022).

Olive Ridley turtles arrive at Odisha's Rushikulya and Gahirmatha beaches for mass nesting

Three beaches along the Odisha coast such as Gahirmatha, Rushikulya river estuary and Devi River mouth, ORT arrive in thousands to lay eggs. Gahirmatha beach, in Kendrapara district, is known as the world's largest nesting ground for these turtles. Every year, sometime during February to May, something phenomenal occurs on the Rushikulya and Gahirmatha beaches.



Fig. Baby turtles begin their journey towards the sea

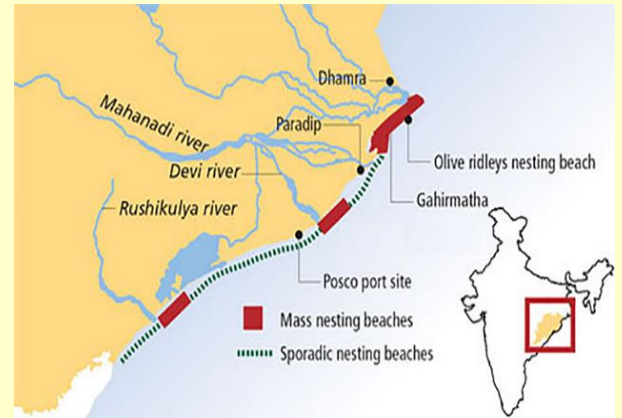


Fig. Different nesting sites in Odisha

Hundreds of thousands of turtles ascend on the beach, and lay their eggs. This is no ordinary social gathering – rather one of the most spectacular incidents on earth.

Olive Ridley turtles dig holes on the beach with their front flippers. Subsequently, they use their hind flippers to scoop out sand to create a cavity. They lay around 110 eggs at one go and cover them again with sand accurately. Before sunrise, the turtles return to its foraging ground, leaving behind the eggs, which would hatch after 45-65 days depending upon the prevailing temperature. The hatchlings are expected to emerge from the eggs in the month of April and May.

Less than one in a thousand hatchlings is believed to survive to adulthood.

The sex of a hatchling is determined by incubation (nest) temperature. Lower temperatures (less than 29°C) generate largely males, higher temperatures (above 31°C) females. The pivotal temperature (i.e., the temperature that produces equal numbers of males and females) varies among species and populations, but is usually around 28–32°C.

What are the threats faced by Olive Ridley turtles?

- **Human Activities:** Coastal development, fishing, and pollution along with destruction of their nesting habitats and accidental capture in fishing nets.
- **Predators:** Natural predators such as dogs, hyenas, and birds of prey that often feed on eggs or hatchlings.
- **Climate Change:** Rising temperatures and sea levels impact nesting habitats, making it difficult to lay eggs.
- **Light Pollution:** Artificial lights from nearby towns and industries can disorient hatchlings, causing them to move away from the sea and towards nearby villages.

Conservation

Certain populations of Olive Ridleys are federally listed as threatened and endangered, and the sea turtle is internationally listed as vulnerable. Threats include harvesting for skin and meat, accidental capture (particularly in shrimp trawl nets and nearshore gill nets), and marine pollution. Olive Ridleys are protected by national laws as well as international treaties and agreements.

Operation Olivia

In order to protect Olive Ridley as they congregate along the Odisha coast for breeding and nesting, an initiative was taken in the early 1980s by Indian Coast Guards.

Mandatory use of Turtle Excluder Devices {TEDs}

The Government of Odisha has made it mandatory for trawlers to use Turtle Excluder Devices (TED), a net specially designed with an exit cover to reduce accidental killing of sea turtles in India and elsewhere.

Tagging

The tagging of the endangered olive Ridley turtles using non- corrosive metal tags is done to enable their movements and the areas they visit.



Fig. An Olive Ridley turtle seen at the Rushikulya river mouth beach and laying eggs on their mass nesting time near to the Podampeta village in



Fig. Tagged Olive Ridley turtles entering the sea.





COOKING OILS: LET'S KNOW THEM

Edible oils, largely used for cooking, are mostly extracted from plants. They serve as fat-soluble transporters. They have several fatty acids, which can be grouped into 3 classes—saturated fatty acids (SFA) (which have 3 groups, short-chain, medium-chain, and long-chain SFA), monounsaturated fatty acid (MUFA), and polyunsaturated fatty acid (PUFA) (further subdivided into Linoleic acid (LA), Linolenic (LC or n6), alpha-linolenic (ALNA or n3) acid, and trans fatty acids (TFA)), which are produced by hydrogenation of vegetable oils (Vanaspati ghee). In addition, edible oils contain several antioxidants (like tocopherols, oryzanol, carotenes, tocotrienols, etc.), phytosterols, & micronutrients.

| Oil | Sources | MUFA/PUFA (in %) | Advantages | Disadvantages |
|---------------|--|--|---|--|
| Coconut Oil | <p>Copra (coconut flesh)</p> | MUFA: 5-10 PUFA(DB): 1-2.5 PUFA(TB): <2.5 | High level of Vitamin-A and antioxidants, High smoke point (suitable for frying) | Excess consumption increases cholesterol level |
| | <p>Sesame Seeds</p> | MUFA: 37-43 PUFA(DB): 43-48 PUFA(TB): <1 | Lowers blood sugar level | Causes weight gain if consumed excessively |
| Groundnut Oil | <p>Groundnut oil</p> | MUFA: 37-55 PUFA(DB): 25-39 PUFA(TB): <3 | Decreases LDL, Increases Vitamin E and antioxidant level | Allergic to certain people |
| | <p>Reddish pulp of oil palm fruit (<i>Elaeis guineensis</i>)</p> | MUFA: 37-41 PUFA(DB): 9-11 PUFA(TB): <0.15 | Increases Vitamin-E, Carotene and antioxidant, Reduces age related diseases | High in saturated fat |

| | | | | |
|------------------------------|---|---|---|--|
| <p>Sunflower Oil</p> |  <p>Sunflower seeds</p> | <p>MUFA: 16-27 PUFA(DB): 60-72 PUFA(TB): <2</p> | <p>Increases Vitamin-E, Improves overall immune response and nervous system</p> | <p>Increases blood sugar level, Allergic to certain people</p> |
| <p>Olive Oil</p> |  <p>Olive pulp</p> | <p>MUFA: 54-80 PUFA(DB): 5-21 PUFA(TB): <1.5</p> | <p>Improves conditions in diseases related to heart, skin, and hair.</p> | <p>Expensive, not suitable for frying due to low smoke point</p> |
| <p>Rice Bran Oil</p> |  <p>Rice bran</p> | <p>MUFA: 27-34 PUFA(DB): 48-55 PUFA(TB): 1.5</p> | <p>Reduces cholesterol level</p> | <p>Excess consumption causes stomach & skin issues</p> |
| <p>Soyabean Oil</p> |  <p>Soya bean</p> | <p>MUFA: 15-36 PUFA(DB): 43-56 PUFA(TB): <2-14</p> | <p>Reduces cholesterol level, Increases Vitamin-E & Omega- 3-fatty acid</p> | <p>Allergic to certain people</p> |
| <p>Canola Oil</p> |  <p>Canola Seed</p> | <p>MUFA: 60 PUFA (DB): 18-20 PUFA (TB): 10</p> | <p>Reduces plasma cholesterol level, Increase in antioxidant (tocopherol)</p> | <p>Easily spoilt</p> |
| <p>Cottonseed Oil</p> |  <p>Cottonseed</p> | <p>MUFA: 16-27 PUFA(DB): 43-54 PUFA(TB): < 0.3</p> | <p>Decreases LDL and Heart Diseases</p> | <p>Loss of appetite, causes infertility and reduced sperm count if unrefined oil is used</p> |

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|-----------------------------|---|--|---|--|
| <p>Cod-liver Oil</p> |  <p>Liver of Cod Fish</p> | <p>MUFA: 40-44 PUFA(DB): 10-12 PUFA(TB): 6-7</p> | <p>Provides Omega-3-fatty acid, Improves overall heart health</p> | <p>Expensive, can't be consumed by vegetarians</p> |
| <p>Mustard Oil</p> |  <p>Mustard Seeds</p> | <p>MUFA: 50-58 PUFA(DB): 10-12 PUFA(TB): <9</p> | <p>Improves blood circulation and digestion, Protects from cold & cough</p> | <p>Inflammation of lungs & gastrointestinal diseases if consumed excessively</p> |

**DB: Double bond; TB: Triple Bond*

Adult human body needs about 40 gm of fatty acids per day. Our normal food provides about half of this requirement, rest has to be taken from fatty food, primarily oil. Since a specific ratio of n-3 and n-6 fatty acids need to be maintained, we have to be cautious while choosing our food/oil. SFA increases the **blood cholesterol** level significantly. Cholesterol (essential for the synthesis of Vitamin D and some hormones, and the formation of cell membrane) is a combination of **HDL** (good cholesterol), **LDL**, **VLDL** (both bad cholesterol) and **triglycerides** (fulfils the energy needs of the body).

Animal cell cannot decompose cholesterol. Excess cholesterol is either excreted or converted to bile salt. If not, the excess LDL in blood vessels accumulate together and gets attached to the endothelial surface. The monocytes of blood are attracted to such places and converted to macrophages. The macrophages engulf the LDL and inflate it like a foam. Free-floating cholesterol in blood combine with such foams and form **plaques**, the size of which increases with time and the amount of free cholesterol available. The plaques affect the flow of blood in blood vessels. Some of the cells of the plaques break down with time and plaque formation occurs in blood. Such a condition is known as **atherosclerosis** which is more prevalent in industrial areas and in the lower part of the legs of 50+ years individuals. Development of such plaques in the principal vessels connecting the brain and heart leads to death.

The Best Edible oil



*According to Indian Council of Medical Research, 15 to 30% of our energy needs should come from fatty acids. Out of this, <10% should come from SFA, 6 to 10% from PUFA and rest from MUFA. According to FSSAI, a mixture of two or more oils types containing a balanced mixture of SFA, PUFA, MUFA and minor nutrients should be used in which the ratio of any oil must not be less than 20%. **Olive oil** is very good for cooking due to its high MUFA and low free fatty acid content. However, this is not possible for average families due to its excessive cost.*

- India consumes **23.5-24 million tonnes (mt) of cooking oil annually**, out of which 13.5-14 mt is imported and the balance 9.5-10 mt produced from domestically cultivated seed.
- **Sunflower** is the **fourth largest consumed oil (2-2.5 mt)**, behind **mustard (3-3.5 mt)**, **soyabean (4.5-5 mt)** and **palm (8-8.5 mt)**.



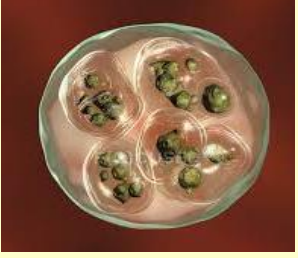



NEGLECTED TROPICAL DISEASES

Neglected tropical diseases (NTDs) are a diverse group of tropical infections that are common in low-income populations in developing regions of Africa, Asia, and the Americas. They are caused by a variety of pathogens (viruses, bacteria, protozoa, and parasitic-worms). There are 20 NTDs occur world-wide. Out of these 20 NTDs Rabies, Dengue, Chikungunya, Chromoblastomycosis, mycetoma, Buruli Ulcer, Leprosy, Trachoma, Yaws, Chagas disease, Echinococcosis, Leishmaniasis are prevalent.

| DISEASE NAME | CAUSATIVE AGENT | RESORVOIR | TRANSMISSION | SYMPTOMS | DIAGNOSIS | TREATMENT | PREVENTION |
|---|---------------------|------------------------------------|---------------------------|---|--|--------------|--|
|  <p>Rabies</p> | Rabies virus | Bat Racoon Fox Cat Dog | By saliva infected animal | Seizures, hallucinations, paralysis, fever, fatigue, wound burning, wound itching, numbness, vomiting, cough, muscle pain | Blood test, Skin biopsy, saliva test, cerebrospinal fluid test | No treatment | Vaccination |
|  <p>Dengue</p> | Dengue virus | <i>Aedes</i> mosquito | <i>Aedes</i> mosquito | Headache. Muscle, bone and joint pain, nausea, vomiting, pain behind eyes, swollen glands, rash, fatigue. | Blood test | No treatment | Keep surrounding clean, use mosquito repellent, traps, and nets. |

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|---|--|---|------------------------------|--|---|--|--|
|  <p>Chikungunya</p> | <p>Chikungunya virus</p> | <p><i>Aedes</i> mosquito</p> | <p><i>Aedes</i> mosquito</p> | <p>Headache, muscle pain, swelling in joints, rash, fatigue, nausea.</p> | <p>Blood test</p> | <p>No treatment</p> | <p>Keep surrounding clean, use mosquito repellent, traps, and nets.</p> |
|  <p>Mycetoma</p> | <p>Fungi (<i>madurella mycetomatis</i>)</p> | <p>Unknown</p> | <p>Unknown</p> | <p>Triad, painless firm skin lump, multiple weeping sinuses, grainy discharge.</p> | <p>Ultrasound, fine needle aspiration</p> | <p>Antifungal and antibiotics</p> | <p>Wearing closed toe shoes and clothing, cleaning and disinfecting of skin wounds in endemic areas, avoiding walking bare foot in the infected areas.</p> |
|  <p>Chromoblastomycosis</p> | <p>Conidia and mycella</p> | <p>Soil and decaying plant material</p> | <p>From infected surface</p> | <p>Ulcerating nodules on exposed body parts</p> | <p>By appearance, histology and culture.</p> | <p>Itraconazole, flucytosine and surgical excision</p> | <p>Maintain hygiene, keep surrounding clean,</p> |
|  <p>Buruli ulcer</p> | <p><i>Mycobacterium ulcerans</i></p> | <p>Unknown</p> | <p>Unknown</p> | <p>Nodules on the body, diffuse painless swelling of legs, arms and face</p> | <p>PCR, direct microscopy, histopathology</p> | <p>Antibiotics administration</p> | <p>Mosquito proofing of homes</p> |

| | | | | | | | |
|---|--|--------------------------------|---|---|---|--|--|
|  <p>Leprosy</p> | <p><i>Mycobacterium leprae</i></p> | <p>Human and armadillo</p> | <p>Through droplets of saliva and nasal fluid</p> | <p>Reddish skin patch, thickened and large peripheral nerve with loss of sensation.</p> | <p>By finding signs and symptoms</p> | <p>Dapsone, Rifampicin and Clofazimine.</p> | <p>Early diagnosis and treatment of people who are infected</p> |
|  <p>Chagas disease</p> | <p><i>Trypanosoma cruzi</i></p> | <p>Wild animals of America</p> | <p>By contact with faeces and urine of infected blood sucking triatomine bugs.</p> | <p>Skin lesion, purplish swelling of one eye.</p> | <p>Testing for parasite specific antibodies</p> | <p>Administration of benznidazole, nifurtimox</p> | <p>Avoid sleeping in a mud, thatch or adobe house</p> |
|  <p>Echinococcosis</p> | <p><i>Echinococcus granulosus</i> and <i>echinococcus multilocularis</i></p> | <p>Dog faeces</p> | <p>Consumption of contaminated food and water by faecal matter of an infected dog</p> | <p>One or more hydatid cysts in liver and lungs</p> | <p>Ultrasonography</p> | <p>Aspiration, injection, puncture, surgery, anti-infective drug treatment</p> | <p>Avoid contaminated food and water, wash your hands with soap and warm water after handling dogs</p> |
|  <p>Leishmaniasis</p> | <p>20 species of leishmania</p> | <p>Sand fly</p> | <p>Bites of infected female phlebotomine sandflies</p> | <p>Fever, weight loss, swelling of liver and spleen</p> | <p>Serological and parasitological test</p> | <p>Treatment requires an immunocompetent system</p> | <p>Use of insect repellent, avoid outdoor activities</p> |



GLOBAL WARMING AFFECTS OUR COMMON FUTURE

What is Global Warming?

Global warming is a gradual, long-term increase in the average temperature of Earth's atmosphere due to the greenhouse effect where gasses from various human activities, including the burning of fossil fuels, trap the heat from solar radiation.

Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1° Celsius, or about 2° Fahrenheit.

The result?

The planet that has **never been hotter than today**. Nine of the 10 warmest years since 1880 have occurred since 2005—and the 5 warmest years on record have all occurred since 2015.

Climatologists have concluded that we must limit global warming to 1.5° Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as **Climate Change**.

EFFECTS

- ✦ **Early melting of glaciers**, and severe droughts shall cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.
- ✦ **Rising sea levels** will lead to even more coastal flooding on the Eastern Seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.
- ✦ Forests, farms, and cities will face troublesome **new pests, heat waves, heavy downpours, and increased flooding**. All of these can damage or destroy agriculture and fisheries.
- ✦ **Disruption of habitats** such as coral reefs and alpine meadows could drive many plant and animal species to extinction.
- ✦ **Allergies, asthma, and infectious disease outbreaks** will become more common due to increased growth of pollen-producing ragweed, higher levels of air pollution, and the spread of conditions favourable to pathogens and mosquitoes.

➤ HOW TO REDUCE GLOBAL WARMING?

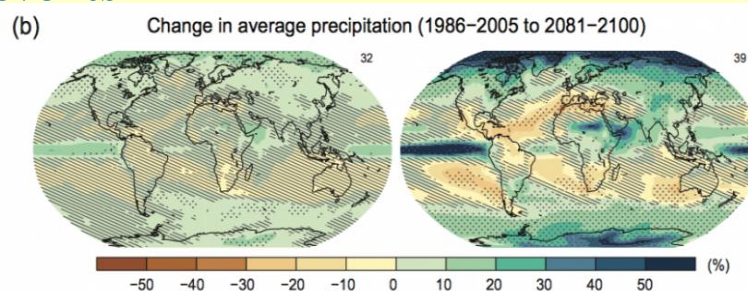


Future temperature changes

Increases in average global temperatures are expected to be within the range of 0.5°F to 8.6°F by 2100, with a likely increase of at least 2.7°F for all scenarios except the one representing the most aggressive mitigation of greenhouse gas emissions.

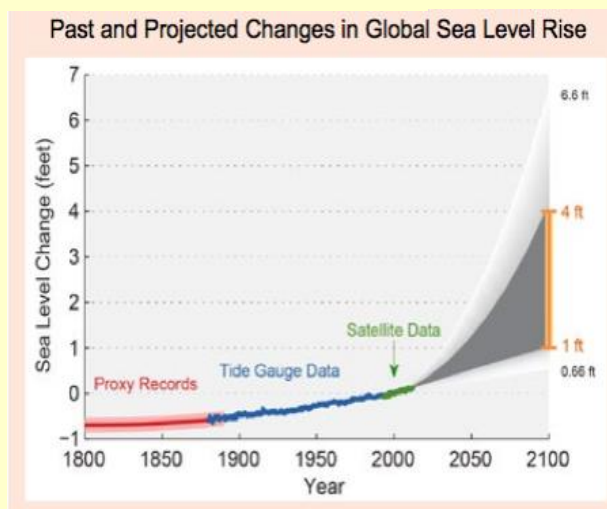
Future precipitation and storm events

Global average annual precipitation through the end of the century is expected to increase. This will be particularly pronounced in tropical and high-latitude regions, which are also expected to experience overall increases in precipitation.



Future changes in permafrost and increase in ocean level

- **Arctic sea ice** is already declining. The area of snow cover in the Northern Hemisphere has decreased since about 1970. Permafrost temperatures in Alaska and much of the Arctic have increased over the last century.
 - Warming temperatures contribute to sea level rise by: expanding ocean water; melting mountain glaciers and ice caps; and causing portions of the Greenland and Antarctic ice sheets to melt or flow into the ocean.
 - **The Gangotri glacier** in the Uttarakhand Himalayas, from where the Ganga River originates, retreated by 1,700m between 1935 and 2022, a study by **Wadia Institute of Himalayan Geology**, Dehradun has found, attributing it to reduced snowfall and more rain, apart from rising temperature in the upper reaches of the Himalayas. **Worryingly**, the study has also found that the rate of retreat is increasing.



Future ocean acidification

As ocean acidification increases, the availability of calcium carbonate will decline. Calcium carbonate is a key building block for the shells and skeletons of many marine organisms. If CO₂ concentrations continue to rise at their current rate, the combination of climate warming and ocean acidification could slow coral growth by nearly 50% by 2050.

EL NINO EFFECT AN ALARMING CONCERN:

What is El Niño?

- An El Niño event is typically declared when sea surface temperatures in the tropical eastern Pacific **rise to at least 0.5 degree Celsius above the long-term average**.
- It has two opposite states - El Niño and La Niña - both of which significantly alter global weather.
- These changes in the Pacific Ocean and its overlying atmosphere occur in a cycle known as El Niño-Southern Oscillation (**ENSO**).



Flooding In Prayagraj, On May 6, 2023, Due To La Nina Effect

Since 1981, monsoon rainfall over Central India — known as **the monsoon core zone**, where agriculture is largely rain-fed, is increasingly getting disassociated from the ENSO with **only 10% of droughts or excess rains** linked to ENSO fluctuations.



**NATIONAL ANIMAL OF INDIA
ROYAL BENGAL TIGER**

Panthera tigris



**NATIONAL BIRD OF INDIA
INDIAN PEACOCK**

Pavo cristatus



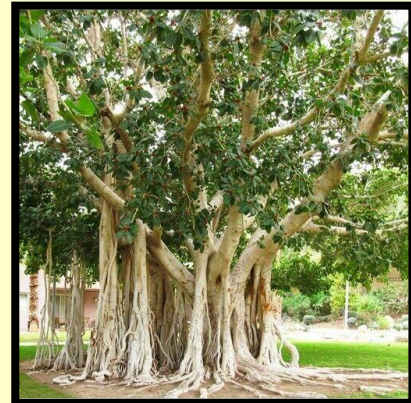
**NATIONAL FLOWER OF INDIA
LOTUS**

Nelumbo nucifera



**HERITAGE ANIMAL OF INDIA
INDIAN ELEPHANT**

Elephas maximus indicus



**NATIONAL TREE OF INDIA
BANYAN TREE**

Ficus benghalensis

State symbols of Odisha



**STATE BIRD OF ODISHA
THE INDIAN ROLLER**

Coracias benghalensis



**STATE ANIMAL OF ODISHA
SAMBAR DEER**

Rusa unicolor



**STATE FLOWER OF ODISHA
ASHOKA TREE**

Saraca asoca

(**Images are taken from various sources**)

