



ASSESSMENT OF ANIMAL WELFARE
& ENVIRONMENTAL IMPACT OF
**INDIAN FISHERIES
& AQUACULTURE**

PETA



AN INVESTIGATIVE REPORT BY PEOPLE FOR THE ETHICAL TREATMENT OF ANIMALS

INTRODUCTION



“The marine environment is facing challenges that, if not addressed immediately and effectively, will have profound implications for sustainable development.”

– Kofi Annan, former UN secretary general
World Environment Day, June 2004

“Fish are more intelligent than they appear. In many areas, such as memory, their cognitive powers match or exceed those of ‘higher’ vertebrates, including non-human primates.”

Culum Brown, biologist, University of Edinburgh



“According to the researchers, close encounters with nets in early life can educate the fish to swim away from an approaching trawler. . . . Emma Jones, a fish behaviouralist at the Marine Laboratory, said ... ‘And if you have one fish that is a particularly fast learner, the others will follow’.”

The Times (London), October 28, 2004

HIDDEN LIVES OF FISH

Dr Sylvia Earle, one of the world’s leading marine biologists, said, “I never eat anyone I know personally. I wouldn’t deliberately eat a grouper any more than I’d eat a cocker spaniel. They’re so good-natured, so curious. You know, fish are sensitive, they have personalities, they hurt when they’re wounded”.

While many people have never stopped to think about it, fish are smart, interesting animals with their own unique personalities – just like the dogs and cats we share our homes with. Did you know that fish can learn to avoid nets by watching other fish in their group and that they can recognise individual “shoal mates”? Some fish gather information by eavesdropping on others, and some – such as the South African fish who lays eggs on leaves in order to carry them to a safe place – even use tools.

Scientists are starting to learn more and more about our finned friends, and their discoveries are fascinating:

- A recent issue of the journal *Fish and Fisheries* cited more than 500 research papers on fish intelligence, proving that fish are smart, that they can use tools and that they have impressive long-term memories and sophisticated social structures. The introductory chapter said that fish are “steeped in social intelligence, pursuing Machiavellian strategies of manipulation, punishment and reconciliation ... exhibiting stable cultural traditions and cooperating to inspect predators and catch food”.
- Culum Brown, a University of Edinburgh biologist who has studied the evolution of cognition in fish, says, “Fish are more intelligent than they appear. In many areas, such as memory, their cognitive powers match or exceed those of ‘higher’ vertebrates, including non-human primates”. Their long-term memories help fish keep track of complex social relationships. Their spatial memories – “equal in all respects to any other vertebrate” – allow them to create cognitive maps that guide

them through their watery homes, using cues such as polarised light, sounds, smells and visual landmarks.

- Dr Phil Gee, a psychologist from the University of Plymouth, says that fish can tell what time of day it is. He trained fish to collect food by pressing a lever at specific times. He says, “[F]ish have a memory span of at least three months” and “are probably able to adapt to changes in their circumstances, like any other small animals and birds”.
- Dr Theresa Burt de Perara of Oxford University says, “We’re now finding that [fish] are very capable of learning and remembering, and possess a range of cognitive skills that would surprise many people”.
- A scientific review presented to the Australian Veterinary Association completely disproved the old myth that goldfish have three-second memories. The veterinarians instead found that goldfish have impressive memories and problem-solving abilities. One of the researchers said that after conducting the review, they wanted “to get the message out to vets to start looking more closely at fish and considering their welfare like they do other animals”.

DID YOU KNOW?

- Some fish talk to each other with squeaks, squeals and other low-frequency sounds that humans can only hear with special instruments.
- Some fish like to be touched and often gently rub against one another – like a cat weaving in and out of a person’s legs.
- Some fish tend well-kept gardens, encouraging the growth of tasty algae and weeding out the types they do not like.
- Like birds, many fish build nests, where they raise their babies. Others collect small rocks off the sea floor to make hiding places in which to rest.

FISH FEEL PAIN

While it may seem obvious that fish are able to feel pain, some people still think of fish as little more than swimming vegetables. In fact, when it comes to feeling pain, fish are equal to dogs, cats and all other animals. Dr Donald Broom explains, “The scientific literature is quite clear. Anatomically, physiologically and biologically, the pain system in fish is virtually the same as in birds and mammals”.

Neurobiologists have long recognised that fish have nervous systems that comprehend and respond to pain, just as all animals do. Indeed, scientists tell us that fish’s brains and nervous systems closely resemble our own. For example, fish (like “higher” vertebrates) have neurotransmitters such as endorphins that relieve suffering – of course, the only reason for a nervous system to produce painkillers is to relieve an animal’s pain. Claiming that fish do not suffer is as intellectually and scientifically unsound as arguing that the Earth is flat.

Scientists have created a detailed map of pain receptors in fish’s mouths and throughout their bodies. A team of researchers at the University of Guelph in Canada recently surveyed the scientific literature on fish pain and intelligence. They concluded that fish feel pain and that “the welfare of fish requires consideration”. Dr Lynne Sneddon, a scientist of fish biology in the UK, explains, “Really, it’s kind of a moral question. Is your angling more important than the pain to the fish?”

Scientists at Edinburgh University and the Roslin Institute in the UK report that in response to pain, fish also feel emotional stress and engage in “a ‘rocking’ motion strikingly similar to the kind of motion seen in stressed higher vertebrates like mammals”. The research team concluded that fish clearly experience both physical and psychological pain in the same way that mammals do. A study by scientists at the Queen’s University of Belfast proved that fish learn to avoid pain, just as other animals do. Rebecca Dunlop, one of the researchers, said, “This paper shows that pain avoidance in fish doesn’t seem to be a reflex response, rather one that is learned, remem-

bered and is changed according to different circumstances. Therefore, if fish can perceive pain, then angling cannot continue to be considered a non-cruel sport”.

As you would expect of intelligent and interesting individuals with memories and the capacity to learn, fish can also feel fear and anticipate physical pain. Researchers from universities around the world have published research showing that some fish use sound to communicate distress when nets are dipped into their tanks or when they are otherwise threatened. Researcher William Tavolga found that fish grunted when they received electric shocks. In fact, the fish began to grunt as soon as they saw the electrode, clearly anticipating the torment that Tavolga was inflicting on them.

According to Dr Michael Fox, DVM, PhD, “Even though fish don’t scream [audibly to humans] when they are in pain and anguish, their behavior should be evidence enough of their suffering when they are hooked or netted. They struggle, endeavoring to escape and, by so doing, demonstrate they have a will to survive”.

What happens to fish before they end up on your plate is nothing short of cruelty to animals.



ANIMAL WELFARE

Fish look so unlike humans, it is sometimes hard to imagine that they feel pain in the same way that we do, but scientists who study pain are in complete agreement that fish’s pain response is basically identical to that of mammals and birds. Fish also lead complex intellectual lives that rival those of dogs and some other mammals.

The fishing industry is completely foreign to most people, whose experience with fish is generally limited to purchasing their flesh from local markets. These intelligent, complex animals are slaughtered by the billions, and very little consideration is given to their suffering.

For people who oppose cruelty to animals, the fishing industry’s (as well as recreational fishers’) abuse of fish should be a key concern. In India, more than 68.69 lakh tonnes of fish were killed for food in one year spanning 2006-7. Because the law does not protect them from cruel treatment, fish are impaled, crushed, suffocated or sliced open and gutted, all while they are fully conscious.

The methods that fishers use to kill fish are shocking and horrifying.

Some countries have made improvements: The EU includes fish in its cruelty-to-animals statute, and Norway closed down one fish farm for cruelty to cod, but no Indian law offers any protection to fish.

Whether fish are raised on aqua farms, caught in the ocean by giant nets or “long-lines” or hooked at the end of a fishing line, there’s no doubt about it: eating fish supports cruelty to animals.

Fishing industries can be broken down into three main categories:

Commercial Fishers

Fish Farms (Aquaculture)

Industries That Cater to Recreational Fishers



COMMERCIAL FISHING

How Fish Get From the High Seas to the Fish Market

The way that fish are treated by the commercial fishing industry should make animal lovers everywhere give up fish flesh for good.

Today’s commercial fishers use advanced electronic equipment, satellite communications and massive ships the size of football fields to track fish. These enormous vessels can stay out at sea for as long as six months at a time, storing thousands of tonnes of fish onboard in massive freezer compartments.

Commercial fishing has become a big business, and the methods used to catch and kill the animals are as cruel as those used by factory farmers or slaughterhouse operators. In fact, such methods suggest that commercial fishers see their prey as no more sentient than rocks – and the horrible cruelty that they inflict on hundreds of billions of fish is completely unregulated.

Warming warning for oceans' treasures

Study says fishing grounds in Indian Ocean among those at greatest risk, some varieties of fish will disappear

Rajesh Sinha, New Delhi

Sea food will get dearer and some varieties may even disappear due to the changes taking place in the oceans under the impact of global warming, says a report released by United Nations Environment Programme (UNEP) on Friday.

The report, "In Dead Water", was launched at UNEP's Governing Council/Global Ministerial Environment Forum being held in Monaco. The report comes in the wake of findings issued last week by a team led by the National Centre for Ecological Analysis and Synthesis which said that over 40% of the world's oceans have been heavily impacted by humans and only 4% remain relatively unaffected.

The UNEP report says at particular risk are fishing grounds in Western Pacific, the Indian Ocean, the Persian Gulf, West Asia and the Caribbean. Over 90% of the world's temperate and tropical coasts will be heavily impacted by 2050. Marine areas at particular risk of increased pollution are Southeast and East Asia.

Calling climate change the latest threat to the world's dwindling fish stocks, the report says at least three quarters of the globe's key fishing grounds may become seriously impacted by changes in circulation of ocean currents as a result of the ocean's natural pumping systems fading and falling. These natural pumps, dotted at sites across the world including the Arctic and Mediterranean, bring nutrients to fisheries and keep them healthy by flushing out wastes and pollution.

Further, rising emissions cause higher sea surface temperatures and threaten to bleach and kill up to 80% of the globe's coral reefs which serve as major tourist attractions, natural sea defences and also nurseries for fish.

Calling it "a rapid response report", the UNEP said "In Dead Water" has for the first time mapped the multiple impacts of pollution; alien infestations; over-exploitation and climate change on the seas and oceans. "The worst concentration of cumulative impacts of climate change with existing pressures of over-harvest, bottom trawling, invasive species infestations, coastal development and pollution appear to be concentrated in 10-15% of the oceans,"

says the report. This 10-15% of the oceans is far higher than had previously been supposed and is "concurrent with today's most important fishing grounds" including the estimated 7.5% deemed to be the most economically valuable fishing areas of the world, it adds.

Achim Steiner, UN under-secretary general and UNEP executive director, said, "Climate change threatens coastal infrastructure, food and water supplies and the health of people across the world. It is clear from this report and others that it will add significantly to pressures on fish stocks. This is as much a development and economic issue as an environmental one. Millions of people including many in developing countries get their livelihood from fishing while 2.6 billion people get their protein from seafood," he said.

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Swimming in dead waters



■ **Half the world's** catch is caught along continental shelves in an area of less than 7.5% of the world's seas and oceans. An area of 10-15% of the world's seas and oceans cover most of the commercial fishing grounds

■ **At particular risk** are the Pacific, the Indian Ocean, Persian Gulf, West Asia, Caribbean ocean

■ **Increasing concentration** in the atmosphere are mirrored by increase in the marine environment

■ **Dead zones**, areas of dead water, are increasing

India's trawling trail

A 2006 study conducted by the Ocean Science and Technology Cell at the Cochin University of Science and Technology found that most resources in the sea had been exploited above optimum level, all thanks to indiscriminate trawling. The study was conducted along the coasts of Karnataka, Kerala and Andhra Pradesh. The study found that immense quantities of eggs and young ones of commercially important fish and shellfish are destroyed as a result of the practice of bottom trawling. Every year a considerable quantity of discards is thrown back into the sea by fishing trawlers, the study said. It found that the fishing pressure from trawlers along the Kerala and Karnataka coasts was very high. Moreover, the study concluded that the survival of crabs, stomatopods, echinoderms, gastropods and sea snakes was quite long among the discards while the post-fishery survival of fishes and shrimps was almost negligible.

On February 26, 2008, *DNA, Mumbai* reported on a study conducted by the Ocean Science and Technology Cell at the Cochin University of Science and Technology. The study found that most ocean fish populations had been exploited above optimum levels because of indiscriminate trawling. The study also found that immense quantities of eggs and the young of commercially important fish and shellfish were destroyed as a result of bottom trawling and that fishing pressure from trawlers along the Kerala and Karnataka coasts was very high.

Bottom trawling is among the most damaging and unsustainable fishing practices in India. It involves dragging huge, heavy nets along the sea floor. The large metal plates and rubber wheels that are attached to these nets move along the seabed and crush nearly everything in their path. Populations of deep-water life forms are profoundly affected by this practice, taking anywhere from decades to hundreds of years to recover – if they recover at all. Commercial fishing contributes to the destruction of mangroves. When fishers construct bund to control the flow of water, tidewater is blocked before it reaches the mangroves.

Even though the government bans fishing for a few months during the breeding season, fishers can easily get around this by taking fish from the deep sea, interrupting the fish's natural cycles and potentially causing extinctions.

Commercial fishers kill hundreds of billions of animals every year – far more than any other industry – and they've decimated our ocean ecosystems. In fact, 90 per cent of large fish populations have been exterminated in the past 50 years, and a report in the journal *Science* estimated that by the year 2048, our oceans will have been damaged beyond repair.

Lifeless oceans will encourage growth in the fish-farming industry, but the United Nations Food and Agriculture Organisation (UN FAO) is concerned that even fish farming will not be able to meet the demand for fish, as some species of farmed fish need to be fed approximately 2.5 kilograms of commercially caught fish to produce 400 grams of commercially raised fish flesh.



ANGLING

Imagine reaching for an apple on a tree and having your hand suddenly impaled by a metal hook that drags you – the whole weight of your body pulling on that one hand – out of the air and into an atmosphere in which you cannot breathe. This is what fish experience. Many people grow up fishing without ever considering the terror and suffering that fish endure when impaled by a hook and pulled out of the water when they are hooked for "sport".

Even when anglers put fish back in the water after torturing them, many of the fish die from their stress and injuries. A 2006 study conducted during and after a Wisconsin fishing tournament found that hundreds of fish who were caught and released had died within a few days.

LOCAL FISH MARKETS

Conditions are extremely poor in local fish markets across the country. The markets flout basic hygiene and sanitation norms. In one market, fish were slaughtered openly and their blood was strewn everywhere. Pieces of fish flesh could be seen lying on the floor – which was never cleaned. Flies were everywhere, risking contamination to the fish meat. Endangered species such as sharks and dolphins were sold openly. Because the merchants do



not fear the police or government authorities, they were more than happy to show us the many varieties of illegal fish that they were selling. Investigators discovered that shark meat was easily available at a price of 100 to 120 rupees per kilogram, and an entire shark could be purchased for just 2,000 rupees. Small guitar sharks were left alive in the shops to suffocate.

FISHING HURTS FISH ... AND OTHER ANIMALS TOO

“Bycatch” is a term used to describe any animal who is accidentally caught up in fishing gear. Bycatch can include non-targeted fish, birds, turtles and marine mammals. To encourage fishers to reduce the number of deaths of non-targeted animals, regulators in some parts of the world have made it illegal to land bycatch, and fishers

must throw the animals back, but they are often already dead or dying.

The amount of bycatch varies greatly from one fishery to the next. The UN FAO estimates that nearly 7 million tonnes of fish are discarded around the world by commercial fishers every year, which is equivalent to about 8 per cent of the global catch from marine fisheries. On top of this, there may be a much greater volume of bycatch that isn’t discarded. In some fisheries, the percentage is much higher and can be equal to 20 times the weight of the target catch.

Animals who are discarded by fishers often fall victim to swarming birds or slowly bleed to death in the water. Scientists recently found that nearly 1,000 marine mammals – dolphins, whales and porpoises – die each day after they are caught in fishing nets. By some estimates, shrimp trawlers discard as much as 85 per cent of their catch, making shrimp arguably the most environmentally

destructive animal flesh that a person can consume. Also, only 75 per cent of the fish caught are used for human consumption. The remainder are converted into fish meal and oil, which is primarily used to feed other animals, including other fish.

ILLEGAL FISHING

Illegal fishing is a major global problem. It damages marine environments, undermines legal fishers and erodes food security around the world. Controls that protect our oceans, such as no-fishing zones or closed seasons, are not respected by everyone, and illegal fishing is widespread. According to the Marine Resources Assessment Group’s report “The Global Extent of Illegal Fishing”, an estimated 11.06 to 25.91 million tonnes of fish, valued at between US\$10 billion and US\$23 billion, are caught through illegal, unregulated and unreported fishing each year. Unregulated, illegal fishing poses a huge environmental threat to ecosystems and marine life.

Some of the worst environmental problems are caused by destructive fishing practices. Two particularly destructive tools are cyanide solution, which stuns fish and makes them easier to catch, and explosives such as dynamite, which kill fish and allow them to be easily scooped up by nets. Such indiscriminate fishing practices can have a devastating impact on marine species and habitats.

Sharks are protected under the Wildlife Protection Act of 1972. According to a survey conducted from 1999 to 2000, as many as 591 sharks were killed for their meat as well as for liver oil that was used to waterproof wooden boats. Investigators observed that sharks and dolphins were killed openly at government-owned ports. Sharks were sold for as little as 2,000 rupees. Authorities did not act to prevent the killings, which violated the Wildlife Protection Act of 1972. Illegal fishing and governments’ irresponsible attitude towards this grave problem are endangering marine life.

Although dolphins are often considered among the most intelligent animals on Earth, many of them are killed mercilessly for their meat and oil. Investigators documented



incidents in which dolphins were sold openly in fish markets. The dolphins were cut to pieces in front of customers. Generally, one person bought an entire dolphin and then sold the pieces to others. According to investigators, dolphin meat is sold for as little as 70 rupees per kilogram.

FISH FARMS (AQUACULTURE): UNDERWATER FACTORIES

Fish farming, or “aquaculture”, has become a multibillion-dollar industry, and more than 30 per cent of all the sea animals consumed each year are now raised on these “farms”. The UN FAO reports that the aquaculture industry is growing three times faster than land-based animal agriculture is, and fish farms will surely become even more prevalent as our natural fisheries become exhausted.

Aqua farms are located both on land and in the ocean. Land-based farms raise thousands of fish in ponds, pools or concrete tanks. Ocean-based aqua farms are located close to shorelines, and fish in these farms are packed into net or mesh cages. All fish farms are rife with pollution, disease and suffering.

According to investigators, the ponds in some government fish farms were kept in such an unhygienic condition that they were no better than drainage water, and many fish who were forced to live in dirty water contracted skin diseases. Fish were infested with parasites and suffered from other illnesses. Fish became stressed as handlers carelessly transferred them from ponds to plastic bags that lacked adequate water and oxygen. Fin rot is common in farmed fish because they are generally kept in extremely crowded spaces and the water in their tanks lacks oxygen and is of a poor quality. When left undiagnosed, the disease can spread to other fish.

Aqua farms squander resources. As noted earlier, it can take up to 2.5 kilograms of wild-caught fish to produce just 400 grams of farmed fish. The farms also pollute the environment with tonnes of fish faeces, antibiotic-laden fish feed and diseased fish carcasses.

Fish on aqua farms spend their entire lives in cramped, filthy enclosures, and many suffer from parasitic infections, diseases and debilitating injuries. Conditions on some farms are so horrendous that many fish die before farmers can kill and package them for food. In short, fish farms bring suffering and ecological devastation every-



where they go. Many land-based aqua farms are located indoors, so farmers even control the amount of light that fish get. These farmed fish will spend their entire lives cramped together, constantly bumping against each other and against the sides of their extremely crowded cages.

RAISING FARMED FISH

When they are only 4 to 7 inches long, young fish (called “fingerlings”) are transported from the hatchery where they were born to the fish farm. This is the first of many moves that they will make before they go to the slaughterhouse.

In intensely crowded fish farms, small fish are bullied and killed by larger fish, so fish are continually sorted to ensure that faster-growing individuals are moved to the appropriate size grouping. At each sorting, they are netted or pumped out of their tanks and dumped onto a series of bars and grates with varying space gaps to divide them by size and redistribute them into different netted cages or tanks; small fish slip through the small grates, and larger fish fall through the larger gaps.

This process, called “grading”, is stressful and sometimes deadly, often resulting in scrapes and the loss of scales. Each fish is graded as many as five times during



Fisherfolk blamed for mass destruction of Charkop mangroves

Simit Bhagat | TNN

Mumbai: Kandivli residents and activists are blaming Koli fisherfolk for massive destruction of mangroves in the area over the past seven months and have sent written complaints to the collector and state officials about the threat to the eco-system in Charkop, Sector 8.

The villagers have allegedly constructed a bund for fishing activities, resulting in tidewater being blocked before it reaches the mangroves. As a result, an entire patch of mangroves in the area has been damaged and the remaining ones are threatened.

KANDIVLI RESIDENTS, ACTIVISTS UP IN ARMS

The Mangrove Society of India (MSI) has submitted a complaint letter to Vishwas Patil, Mumbai suburban district collector; Sham Lal Goyal, chairman of Maharashtra Coastal Zone Management Authority; Neela Satyanarayana, Maharashtra additional chief secretary (revenue and forests); D N Jadhav, police commissioner and Meena Gupta, secretary, Union ministry of environment and forests.

Said Manisha Chalwadi, a resident of Charkop Sector 8,

“Since the past seven months, the locals have constructed a bund leading to a blockage of the water needed for the mangroves to survive. The Kolis have built the bund for fishing and have also put up nets in this mangrove patch.”

Kaustubh Bhagat, an MSI activist, said, “Due to this bund, the tide water is blocked, due to which the entire patch of mangroves in the area has already been damaged and the remaining ones won’t survive for long. This is a clear-cut violation of the Coastal Regulatory Zone laws and also the high court order which states no construction activity can take place within 50 metres of mangroves.”

Residents said that though the matter has been brought to the notice of the authorities, nothing has been done to stop the rampant damage to mangroves, considered to be important buffers in Mumbai’s ecosystem. Chalwadi said, “Although we have complained to the authorities, including the collector’s office, no one seems to be interested in taking action against the fishermen eroding the mangroves.” The letter has been dispatched along with photographs and Google Earth satellite images to prove the blatant disregard for the law.





his or her life. Though not apparent on the surface, each of the aqua farm cages that fish are redistributed to is stuffed with as many as 3,000 fish.

High-tech, high-volume systems control food, light (on indoor farms) and growth stimulation. Drugs, hormones and genetic engineering are used to accelerate growth and change reproductive behaviour. High mortality rates, disease and parasite infestations are common. Deformities and stress-related injuries are also regular occurrences. On some farms, as many as 40 per cent of the fish are blind – though farmers tend not to address this because it does not affect their bottom line.

CROWDING

Because they are designed to navigate vast oceans using all their senses, many fish go insane from the cramped conditions and the lack of space on fish farms. The tight enclosures inhibit their ability to navigate properly and cause them to knock against each other and the sides of the enclosure. This jostling causes sores and damages their fins as well.

According to one investigator, “Trout farms are so overcrowded – with hundreds of fish in each pond – that a 1.5-foot [18-pound] fish spends his or her entire life in a space the size of a bathtub”.

FISH FEED

Many species of farmed fish are carnivorous, which means that fish must be caught from our already-exhausted fisheries to feed the fish on aqua farms. Aqua farmers have even begun to feed fish oil and fish meal to herbivorous fish in order to make them grow faster. Fish farmers also lace fish feed with powerful chemicals and antibiotics to ward off the deadly diseases that are caused by the overcrowding and filth. It's likely that these fish pellets are the reason that PCB and dioxin levels in farmed fish are up to seven times higher than the already dangerous levels found in their wild counterparts.

ENVIRONMENTAL CONCERNS

Commercial fishing and aquaculture have an extremely negative impact on the environment. Commercial fishing destroys biodiversity. As wide nets sweep the fish in their path, they take coral habitats with them. Commercial fishers have devastated the ocean's ecosystem to the extent that some large fish populations are only 10 per cent as large as they were in the 1950s.

According to one study, the world's oceans could be empty of fish by 2048 because of overfishing, loss of habitat, climate change and pollution. Fish farms have caused serious eutrophication of water columns and sediment in enclosed coastal areas, causing seabed environments to become drastically depleted of oxygen.

An increase in the number of motorised and mechanised trawlers used in fishing has contributed significantly to water pollution and the deterioration of oceans. At any given time, nearly 3 lakh fishing boats can be found in Indian waters, and of these, nearly 2 lakh are either mechanised or motorised, which causes significant water pollution.

Fishing has an impact on sensitive habitats, endangered species and the marine food chain, which need to be maintained to keep the oceans healthy and productive. The impact that fishing has on ecosystems is complex, hard to measure and varies from one fishery to the next.

Fishing also contributes to climate change and the depletion of fossil fuels. A study in the journal *Ambio*, which is published by the Swedish Academy of Sciences, concluded that the fishing industry consumes as much fuel



as the Netherlands, the world’s 18th largest oil consumer. Peter Tyedmers of Dalhousie University in Halifax, who led the study, found that, in 2000, fishers burned 50 billion litres of fuel and caught 80 million tonnes of fish. Fishing accounts for 1.2 per cent of global oil consumption.

Because fisheries are poorly managed, the environmental impact tends to go unchecked. Unsustainable fishing practices put resources and people’s livelihoods at risk. The UN FAO estimates that 11 of the world’s 15 major fishing areas and 69 per cent of the world’s major fish species are in decline and in urgent need of better management. Fishing is done on a larger scale than ever before, helped by technological advances such as electronic fish locators, more powerful engines, onboard freezers, at-sea refuelling and technologically sophisticated seabed mapping. These improvements make fishing faster and increase its impact on marine habitats, fish stocks and endangered species. According to the UN FAO, there has been a fivefold increase in the total weight of fish taken out of the oceans in the last 50 years, from 19 million tonnes in 1950 to approximately 100 million tonnes in 2000. Depleted, unproductive oceans are bad news for everyone.

OCCUPATIONAL HAZARDS IN FISH PROCESSING UNITS

A study conducted by the Indian Council of Medical Research, which followed 185 female workers in fish

processing units, found that most of them suffered from shoulder and back pain.

Women in these units are exposed to cold environments, chlorinated water and bioagents from fish meat. They experience headaches and irritation of the eyes (including eye-watering) while at work, which may be caused by respiratory irritants that are present in the air inside the units. The women complained of hand injuries more than any other ailment, and many of the women had repeatedly injured their fingers. Seventy-two women reported blanching of their fingers and 34 per cent reported numbness in their hands. They also suffered from Raynaud’s phenomenon in their fingers and dermatitis in their hands and feet.

ARE FISH GOING THE WAY OF THE DINOSAURS?

A 2005 UN FAO report concluded the following:

- One-quarter of the world’s fish stocks are overexploited, depleted or recovering from depletion. They have endured excessive fishing pressure, which has reduced them significantly. There is no possibility of further exploiting these stocks, and in some cases the stocks may be further depleted.
 - About half of the stocks are fully exploited. They are being fished at or close to their maximum sustainable limits. There is no room for further exploitation of these fish stocks.
 - Around one-quarter of fish stocks are underexploited or moderately exploited and could perhaps produce more.
- Since the UN FAO started monitoring the global state of stocks in 1974, the following has occurred:
- There has been an increase in the proportion of overexploited and depleted stocks.
 - There has been an overall increase in the proportion of fully exploited stocks.

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Rampant killing of sharks along east coast

29 Jan 2006, 0024 hrs IST, Arun Kumar Das, TNN

NEW DELHI: It's a matter of delicacy. Sharks are being rampantly killed by an organised mafia for their fins in coastal Orissa. The illegal trade is estimated at a whopping Rs 100 crore a year.

In 2001 alone, the wildlife department made a seizure of shark fins worth Rs 10 lakh in Puri. Biswajit Mohanty, secretary, Wildlife Society of Orissa, says, "If one goes to any fishing base in Orissa, one will find evidence of killing of sharks."

Earlier, only a handful of fishermen were involved in the trade, but now they've gone upto 2,000. Sharks are being killed almost daily."

The fins are used for shark fin soup, a highly-priced delicacy abroad, which fetches upto \$ 100 a bowl. The sharks are exported illegally to Hong Kong, Singapore and China.

Sharks facing extinction risk



Washington: Sharks might soon be seen in the official list of animals at global risk of extinction, for a new research has shown that they are disappearing from the world's oceans. The study has shown that many large shark species have declined by more than 50 per cent due to increased demand for shark fins and meat, recreational shark fisheries, as well as tuna and swordfish fisheries, where millions of sharks are taken as bycatch each year. The World Conservation Union assessed the global status of the sharks. "As a result of high and mostly unrestricted fishing pressure, many sharks are now considered to be at risk of extinction," said Julia Baum, an NSERC Postdoctoral Fellow at Scripps Institution of Oceanography and a member of the IUCN's Shark Specialist Group.



- There has been a consistent decrease in underexploited and moderately exploited stocks.

Because of overexploitation, indiscriminate fishing and water pollution, many fish have gone extinct:

- According to a fisheries department study, many well-known fish such as hilsa toli have become extinct.
- Other species such as the nados, pabda, folui, chital, sarpunti, karat, banspata, polos and tangra are likely to disappear soon.
- Eighty-two varieties of freshwater, cold-water, brackish and marine-water fish are either endangered or vulnerable.

All this is happening because governments are failing to adequately restrict fishing during certain seasons or to check government ports to see if endangered fish are being killed or shipped there.

If you eat fish, you are supporting an industry that plunders our oceans and has no regard for the horrible pain and suffering that fish and other marine animals endure, and you are encouraging the destruction of the biodiversity that is imperative to the survival of all underwater life. Scientists warn that the damage caused by the fishing industry is irreparable. If you care about the environment, keep fish off your plate and leave them in the ocean where they belong.

THINK FISH IS A HEALTH FOOD? THINK AGAIN

Fish flesh today is badly contaminated with toxic chemicals that are known to cause cancer and brain degeneration, and it is also more likely than any other food to make you sick from bacterial contamination.

Fish live in water that is so polluted, you would never dream of drinking it. But you’re ingesting this toxic brew – bacteria, contaminants, heavy metals and all – every time you eat fish.

Fish’s bodies absorb toxic chemicals in the water around



them, and the chemicals become more concentrated the higher the fish are in the food chain. Big fish eat little fish, and the bigger fish absorb chemicals from all the other fish they eat. Fish flesh stores contaminants such as dioxins, which are linked to cancer; radioactive substances such as strontium 90; and other dangerous contaminants such as cadmium, mercury, lead, chromium and arsenic, which can cause health problems ranging from kidney damage and impaired mental development to cancer. These toxins are stored in the body fat of humans who eat fish, and they remain in their bodies for decades.

Seafood is also one of the major causes of food poisoning in India. Mumbai has the country’s most polluted coastline. Many of its waterways are polluted with human and animal faeces, and this waste carries dangerous bacteria such as *E coli*. So when we eat fish, we unnecessarily risk contracting nasty bacterial illnesses that can lead to mild or extreme discomfort, nervous system damage and even death.

BEING BOILED HURTS

Crabs and lobsters feel pain and experience fear just as dogs, cats and humans do, but many people view them as little more than swimming vegetables. Many crabs are killed with hammers, electrocuted, chopped up or microwaved – all while they are still conscious. Both crabs and lobsters are routinely thrown into pots of scalding-hot water and boiled alive – the animals will fight so hard against a clearly painful death that their claws often break off in their struggle to escape. With clear evidence that crabs and lobsters are sentient beings who suffer when they are mistreated, and have the capacity to feel pain, the only ethical conclusion is that every effort must be made to treat these animals humanely.

TOXIC FLESH

Fish can accumulate extremely high levels of chemical residues in their flesh and fat – as much as 9 million times that of the water in which they live. Mercury isn’t



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Watch out for heavy metal in your fish

16 Mar 2009, 0527 hrs IST, Madhavi Rajadhyaksha, TNN

MUMBAI: If you are a fish-eater, it might be a good idea to check if your catch comes from Versova. Mackerel and pomfret from Versova docks were found to be laced with unusually high quantities of mercury when fish from four Mumbai docks were tested at a local environmental medicine institute. Fish from other docks in the city have, however, been declared "safe" to eat.

The study conducted by the Indian Institute of Environmental Medicine (IEM) at Kasturba Hospital in Chinchpokli, was initiated in 2006 to analyse the content of heavy metals in popular fish after an environmental NGO "alleged" that edible fish consumed in Mumbai contained dangerously high levels of metals. The researchers tested six varieties of fish – pomfret, surmai or king fish, mackerel, rava or Indian salmon, and brown prawn – for five types of metals over the next two years. The fish were tested thrice to correctly ascertain safety levels.

Given that Mumbai has a coastline of 140 km, fish is a staple diet of many residents. "It is a good source of protein and is the poor man's food. We wanted to eliminate our fears by scientifically testing fish," said Dr Rohini Chowgule of IEM. Fish are, in fact, the second-largest source of mercury and other metals affecting people, next only to those exposed to metals on their jobs.

Mercury levels of mackerel from Versova were found to be 1.78 ppm, which was higher than the permissible limits of 1 ppm. Pomfret, too, was flush with mercury with 1 ppm of mercury. "The higher levels can be attributed to the sewage sludge outfall from this area," said Dr Aditi Deshpande, who co-authored a research paper which was recently published in the international journal, Environmental Monitoring and Assessment. While most of the fish from Versova is sold around the local market, fishermen said suppliers often bought fish from these docks and distributed it to other parts of the city.

"Mercury poisoning is a cause for concern as the metal is known to adversely affect the nervous system, kidneys and also the skin," added Dr Chowgule.

Fish from other parts of the city which were analysed for the same metal were, however, cleared of mercury contamination. For instance, fish from Sassoon docks showed mercury presence ranging from 0.02 to 0.05 ug/g, well within the permissible limits.

The fish from Versova as well as other docks cleared the safety standards for other

Fears of 'toxic' West Bengal fish

By Amitabha Bhattacharya
BBC News, Calcutta

Alarming levels of toxic mercury have been found in fish in the Indian state of West Bengal, experts say.

They say that popular varieties of fish used for human consumption are contaminated both in the water and when on sale in the markets.



The NGO study was conducted throughout West Bengal.

The findings were made by two Indian non-governmental organisations who carried out research across the state.

The state government has yet to respond to the findings, but it has blamed heavy industry for the contamination.

Poisonous

The study was undertaken by two Indian NGOs - Toxics Link and Disha - throughout West Bengal at water sources and in markets.

"The study shows that popular varieties of fish contain mercury concentrations in excess of the Prevention of Food Adulteration (PFA) Act standards of 0.5 parts per million," the report says.

Out of the 264 samples tested at an accredited laboratory, 129 of the

the only dangerous toxin in fish flesh; people who eat fish also ingest PCBs. Fish-eaters who ingest these dangerous chemicals suffer from an increased risk of cancer, and their mental cognition and sexual health may be affected. Researchers at the University of Illinois found that fish-eaters with high levels of PCBs in their blood had difficulty recalling information that they had learned just 30 minutes earlier.

PCBs are synthetic chemicals that were once used in hydraulic fluids and oils for electrical capacitors and transformers. Excessive use of PCBs has resulted in environmental contamination around the world, and levels of the chemical are especially high in fish. PCBs are dangerous because they act like hormones, wreaking havoc on the nervous system and contributing to a variety of conditions, including infertility and other sexual problems.

Mercury levels rising dangerously

Ravi Agrawal and Kishore Wankade say that the state of mercury pollution in India is alarming and needs the concern of all. They provide a factsheet with alternatives.



- Write the author
- Environmental Hazards Homepage
- Environment Homepage
- Download Mercury factsheet (312KB)
- Printer friendly version

June 2003 - The Prevention of Food Adulteration Act (1955) aims to protect consumers from adulterated food and ensure food safety. These rules declare mercury as a poisonous metal and limit its concentration in fish to 0.5 ppm and in other food items to 1.0 ppm. Methyl mercury is one of the more dangerous forms, and its concentration in fish is limited to 0.25 ppm. The Bureau of Indian Standards (BIS) has laid down safety limits for drinking water at 0.001 mg of mercury per litre. The WHO and the Food and Agriculture Organisation (FAO) have specified limits on the concentration of methyl mercury for fishes. On the basis of risk assessments, a number of countries have stipulated levels of daily or weekly mercury intakes.



Mercury being sold in highly unsafe conditions in a Delhi market

All of that is based on no solid foundations. Mercury is a potent neurotoxin. Even at extremely low levels of exposure, it can cause permanent damage to the human central nervous system. The addition of even 0.9 grams of mercury, that is, one minuscule fraction (1/70th) of a teaspoon – is enough to contaminate a 25-acre lake, rendering fish contaminated and unsafe to eat. At

PCBs do not dissolve in water and are stable in both hot and cold temperatures. They enter the environment mainly through waterways. Eventually they find their way to the oceans, where they are spread throughout the planet by ocean currents and are carried in the tissues of migrating fish. Consumption of animal fat and fish from contaminated sites is the main source of PCB contamination in humans. Researchers have also found that PCBs are readily absorbed from the gastrointestinal tract and are deposited from there into liver and fat tissue. They can pass through the human placenta and can appear in breast milk. Studies have shown that PCBs affect sperm motility and foetal growth as well as neurological development in offspring (which can lead to lower IQ scores, slower reflexes, attention deficit disorder and reduced memory capacity). PCBs have also been suspected of causing liver

cancer and malignant melanoma, but researchers say the relationship to the chemical is not clear.

IT'S THE MERCURY

“Consumption of fish and other sea animals is the sole source of human exposure to methyl mercury.”

– New England Journal of Medicine (2003)

Around the world, fish are accumulating mercury in their flesh from industrial pollution. Fish absorb and ingest mercury and store it in their tissues. If you eat fish, your body will absorb mercury from the fish, which can lead to serious health problems – and fish consumption is the sole source of human exposure to mercury.

Eating even small amounts of fish flesh can have a big impact on the levels of mercury in one’s blood.

MERCURY IS A POISON

“We found that if people eat fish, the mercury goes up. They stop eating the fish, the mercury goes down. It’s that simple.” – Dr Jane M Hightower

Mercury is known to cause severe health problems, including brain damage, memory loss, personality change, tremors, spontaneous abortion and damage to a developing foetus. Mercury poisoning from eating fish can also cause fatigue and memory loss, which some doctors call “fish fog”.

A recent study found high levels of mercury in samples taken from West Bengal fish. Many of the samples had mercury levels that exceeded the limits set down in the Prevention of Food Adulteration Act.

A recent article in *The Times of India* stated that mackerel and pomfret from Versova docks were found to be laced

with unusually high levels of mercury. Conducted by the Indian Institute of Environmental Medicine (IITEM) at Kas-turba Hospital in Chinchpokli, the study was launched in 2006 to analyse the content of heavy metals in popular fish after an environmental NGO alleged that edible fish consumed in Mumbai contained dangerously high levels of metals. The researchers tested several fish, including pomfret, kingfish, mackerel, ravas and brown prawn, for five types of metals over a period of two years. The fish were tested three times to ascertain mercury levels.

“Mercury poisoning is a cause for concern as the metal is known to adversely affect the nervous system, kidneys and also the skin”, said Dr Rohini Chowgule of IITEM.

High levels of mercury – which accumulate in the environment, in fish flesh and in the bodies of people who eat fish – contribute to birth defects, and several studies have demonstrated lower mental acuity among the children of women who consume fish during their pregnancies. Experts advise young children, pregnant women, nursing women and women of childbearing age to avoid consuming swordfish, king mackerel, shark and tilefish because of the high mercury levels that they contain.

According to Dr Annie Mathew, senior paediatrician at St Stephens Hospital in Delhi, mercury can cause irreversible damage to children. In India, fish is a major cause of high mercury levels found in the blood of women of childbearing age.

A study conducted by San Francisco physician Jane Hightower found that dozens of her patients had high levels of mercury in their bodies and that many showed symptoms of mercury poisoning, including hair loss, fatigue, depression, difficulty concentrating and headaches. She found that her patients’ symptoms improved when they stopped eating fish. “[Mercury is] a documented poison. Wherever it’s seen, it’s been a problem”, says Hightower.

Researchers have also shown that mercury in marine animals can cause heart problems in humans who eat them. A recent report by the Research Institute of Public Health in Finland showed that men who have elevated levels of

Mumbai has country’s most polluted coastline

Affected seafood damages nervous system

Jugal R Purohit
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Damage to nervous system

SEAFOOD lovers in the city have reasons to worry. A countrywide survey by the Union government on the quality of seawater, reveals Mumbai has the ‘longest stretch of polluted seawater’ in India. This means, that clean water, in other cities, is found at a distance of 2 km from the seashore, but in Mumbai, the distance is 5 km. This is where most fishing takes place.

Not 5 but 10 km

Said Rajaunsh Tapke, editor, Sagar Shakti, a fishing-based journal, “Water in the city is polluted not just up till 5 km, but close to 10 km. Most of the fishing takes place there.” He added that seawater was polluted across Maharashtra’s coastline from Dahanu to Sindhudurg. Sewage pollutes the shore near cities, while other parts are polluted due to the release of untreated chemical waste into the sea.

Officials from the National Institute of Oceanography (NIO) and the state’s fisheries department said cases of damage to the nervous system to food poisoning, depending on the material polluting the water, are detected among those eating affected seafood.

The survey also claims municipal sewage is the biggest polluter in the city. A Maharashtra Pollution Control Board (MPCB) official said, “The sewage is mostly untreated.” MPCB data also suggests that seawater is turning alkaline and the level of dissolved oxygen, essential for life under water, is fast depleting.

Polluted creeks

“Pollution has driven away fish like shellfish, boi fish and crabs from creeks like Dharavi, Sewree, Mahul, Trombay, Worli, Mazgaon and Thane,” said Ramkrishna Keni from the Koli Mahila Sangharsh Samiti.



KAHAN GAYE WOH DIN? Fishermen say, of late, fewer varieties of fish are available near Mumbai’s coast

Said activist Debi Goenka, “Edible creatures like prawns, lobsters and crabs are found in mangroves, marshy lands and closer to the shore and thus we are at risk.” Meanwhile, fishermen were unwilling to confirm the dangers of eating seafood, but admitted that fewer varieties of fish are available than before near the city’s coast.





mercury in their blood from eating fish are approximately 1.5 times more likely to suffer from heart problems, including heart disease and heart attacks.

FOOD POISONING: CATCH OF THE DAY

According to the Centers for Disease Control and Prevention, approximately 75 million cases of foodborne illness occur every year, leading to hundreds of thousands of hospitalisations and thousands of deaths. Seafood is the number one cause of food poisoning in the US. Seafood poisoning can cause mild to extreme discomfort, nervous system damage and even death. And seafood poisoning is on rise as oceans become warmer and more polluted. Seafood poisoning comes from eating foods contaminated with viruses or bacteria such as salmonella, listeria

and *E. coli*. When *Consumer Reports* looked at bacteria levels found in fresh fish at supermarkets across the US, it found that between 3 and 8 per cent of the samples tested had “unacceptable” levels of *E. coli*, a bacterium that comes from human or animal faeces.

THE SEAFOOD ECONOMY

According to the UN FAO, as the world’s population grows, the demand for fish is expected to continue to grow. Based on current levels of consumption and projected population growth, demand could reach 120 million tonnes a year by 2010, which is a substantial increase from the 75 to 85 million tonnes consumed in the mid-1990s. But despite its contribution to various countries’ gross domestic product, the fishing industry is a major detriment to both animals and people. The industry flouts most norms and rules, is one of the major causes of

ecological destruction and endangers the health of both fish-eaters and people who are directly involved in the industry.

CLIMATE CHANGE

Climate change has the potential to dramatically alter the world as we know it. In the next few decades, it could change the temperature of oceans, seas and lakes around the world, and its impact on fishing and marine ecosystems is not fully understood. However, it seems likely that many vulnerable marine species and many fisheries will be seriously affected as the complex ecosystems that underpin them face new and uncertain challenges.

The Intergovernmental Panel on Climate Change has identified the following effects of climate change:

- Changes in the geographic distribution and abundance of fish stocks as water temperatures change in seas around the world.

- Extinction of local species in some regions.
- Changes in the geographic distribution of both predators and prey, which could disrupt food chains and affect fish.
- Rising sea levels, which would reduce the total area of wetlands and other low-lying habitats that are important to fish reproduction.
- Rising water temperatures in lakes.
- Disruption in fishing activity as new weather patterns stop fishers going to sea.

These changes may affect fisheries worldwide, but the impact is likely to be particularly damaging for fishers in developing countries.



WHAT YOU CAN DO TO HELP FISH

Go Vegetarian

By leaving fish off your plate, you'll be doing your part to end their suffering. With so many reasons not to eat fish and so many delicious vegetarian "seafood" alternatives, choosing a fish-free diet is easier than ever!

Swear Off Lip-Ripping

There are many great ways to enjoy the great outdoors that don't cause animal suffering or habitat destruction. Grab a mask and a snorkel and start exploring the fascinating world below the water's surface. Go for a relaxing walk along the water's edge or volunteer to help clean up

the litter and cast-off fishing gear that clutters so many of our shorelines. Take up kayaking or canoeing or brush up on your backstroke. Once you close your tackle box and open your mind, you'll be able to enjoy the beauty of our lakes, rivers and oceans without contributing to animal suffering or environmental destruction. When you put down your fishing pole and pick up a fish-friendly hobby, everyone wins!

Go Public

Leave a stream of leaflets and stickers in your wake! Changing personal habits is a great way to save fish and other animals – and you can help get the public hooked on compassion by hitting the streets and spreading the word.





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