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**ENVIRONMENTAL INFORMATION AWARENESS, CAPACITY BUILDING**  
**& LIVELIHOOD PROGRAMME (EIACP) PROGRAMME CENTRE RP**  
**(Ministry of Environment, Forest & Climate Change, Govt. of India)**

# WHALES

Weapon in the fight against Climate Change

WHALES PLAY A KEY  
PART IN  
HELPING TO COMBAT  
CLIMATE CHANGE

Volume No.: 21  
Issue No.: 04  
October - December 2022

# CONTENTS

1. Introduction.....	3
2. Saving planet from Climate Change.....	4
3. Role of whales in reducing climate change.....	4
4. A strategy to protect whales can limit greenhouse gases and global warming.....	5
5. Whales are key contributors to ecosystem wellbeing.....	7
6. A new mind set is needed urgently....	7
7. References.....	7

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# EDITORIAL

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures. There is simply no time to waste. We need urgent and ambitious action at every level like individual as well as natural level to reduce climate change. Everyone has the ability to do something to address our climate challenge E.g. Whales.

Whales accumulate carbon in their bodies during their long lives. When they die, they sink to the bottom of the ocean; each great whale sequesters 33 tons of CO<sub>2</sub> on average, taking that carbon out of the atmosphere for centuries. The way that whales feed, poo, migrate, and dive between the surface and the ocean depths (known as the 'whale pump'), circulates essential nutrients throughout the ocean. This in turn supports healthy marine ecosystems and the growth of phytoplankton, which locks in a massive amount of carbon from the atmosphere. In this newsletter IITM - EIACP tried to focus on this natural defence mechanism fight against climate change.

**Dr. B.S. Murthy**

# NATURE'S SOLUTION TO CLIMATE CHANGE

## INTRODUCTION

The climatic change has become a global concern over the last few decades. Besides, these climatic changes affect life on the earth in various ways.

These climatic changes are having various impacts on the ecosystem and ecology. Due to these changes, a number of species of plants and animals have gone extinct.

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle.

But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas but now is threatening the way we live and the future of our planet.

Climate change will undo a lot of the progress made over the past years in development.

Fossil fuels – coal, oil and gas – are by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions. As greenhouse gas emissions blanket the Earth, they trap the sun's heat.

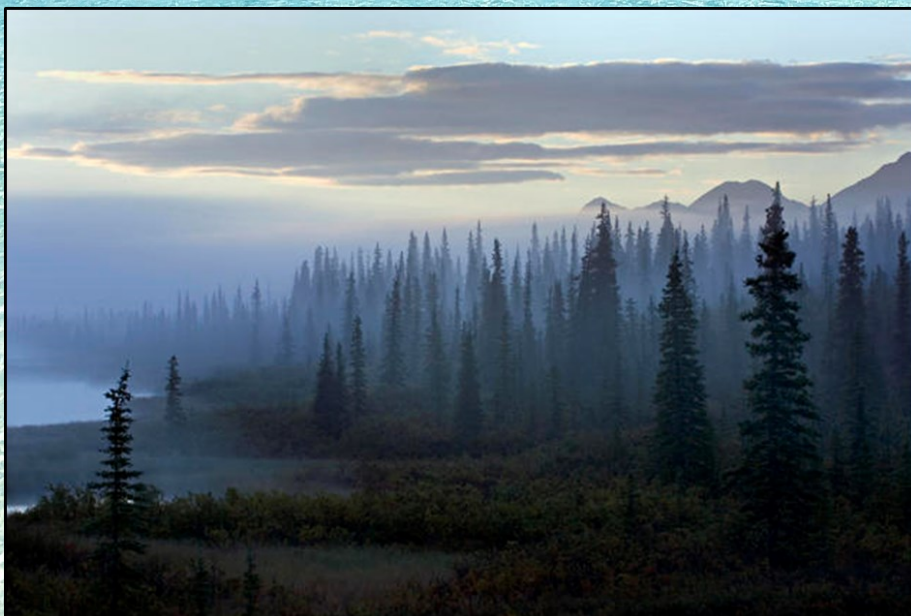
This leads to global warming and climate change. The world is now warming faster than at any point in recorded history.

Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature. This poses many risks to human beings and all other forms of life on Earth.

It can also exacerbate, as we are already seeing, current threats such as food and water scarcity, which can lead to conflict. By addressing climate change, we can build a sustainable world for everyone.

Restoring and protecting nature is one of the greatest strategies for tackling climate change, but not just for the obvious reason that it sucks carbon out the air. Forests, wetlands, and other ecosystems act as buffers against extreme weather, protecting houses, crops, water supplies and vital infrastructure.

The strategy of using nature as a defence against climate impacts is called **Ecosystem-based Adaptation (EbA)** – in essence, look after nature and it will look after you.



Among the most important natural climate solutions is protecting “frontier forests” pristine woodlands that serve as natural carbon sinks. Intact tropical and northern forests, as well as savannas and coastal ecosystems, store huge amounts of carbon accumulated over centuries.

Thriving natural ecosystems are great at storing carbon, so investing in their protection and restoration is a necessary step to reducing global warming. At the same time, healthy ecosystems are in a better position to withstand climate change impacts, which means they’ll be more likely to continue providing the foundational natural building blocks we rely upon for human life, like clean air, clean water, food security, and flood control.

## SAVING PLANET FROM CLIMATE CHANGE

When it comes to saving the planet, one whale is worth thousands of trees.

Whales are social, air breathing mammals, they feed their babies with their own milk, and they take extraordinarily good care of their young and teach them life skills.

### **How many types of whales are there?**

There are currently around 90 recognised species of whales, dolphins and porpoises; they are collectively known as ‘cetaceans’ or simply ‘whales’. There are 15 baleen whales, 3 sperm whales, 23 beaked whales, 2 monodontidae (narwhal and beluga), 42 dolphins (including 4 river dolphins) and 7 porpoises .

Cetaceans are broadly divided into two groups, depending on whether they have teeth (odontocetes) or baleen (mysticetes).

Baleen whales, such as the blue whale, are sometimes called the ‘great whales’ due to their overall larger size. There are 15 baleen whales altogether: these whales have baleen plates in their mouths to sift their food - plankton, krill (little shrimps) and small fish - from seawater.

Toothed whales account for all the remaining species of whales, dolphins and porpoises and they all have varying numbers of teeth. Toothed whales eat mainly larger fish, squid, octopus and at times, other marine mammals.

## ROLE OF WHALES IN REDUCING CLIMATE CHANGE

Scientific research now indicates more clearly than ever that our carbon footprint—the release of carbon dioxide (CO<sub>2</sub>) into the atmosphere where it contributes to global warming through the so-called greenhouse effect now threatens our ecosystems and our way of life. But efforts to mitigate climate change face two significant challenges. The first is to find effective ways to reduce the amount of CO<sub>2</sub> in the atmosphere or its impact on average global temperature. The second is to raise sufficient funds to put these technologies into practice.

Many proposed solutions to global warming, such as capturing carbon directly from the air and burying it deep in the earth, are complex, untested, and expensive. What if there were a low-tech solution to this problem that not only is effective and economical, but also has a successful funding model?

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An example of such an opportunity comes from a surprisingly simple and essentially “no-tech” strategy to capture more carbon from the atmosphere: increase global whale populations. Marine biologists have recently discovered that whales—especially the great whales—play a significant role in capturing carbon from the atmosphere (Roman and others 2014). And international organizations have implemented programs such as Reducing Emissions from Degradation and Deforestation (REDD) that fund the preservation of carbon-capturing ecosystems.

Adapting these initiatives to support international efforts to restore whale populations could lead to a breakthrough in the fight against climate change.

The carbon capture potential of whales is truly startling. Whales accumulate carbon in their bodies during their long lives. When they die, they sink to the bottom of the ocean; each great whale sequesters 33 tons of CO<sub>2</sub> on average, taking that carbon out of the atmosphere for centuries. A tree, meanwhile, absorbs only up to 48 pounds of CO<sub>2</sub> a year.

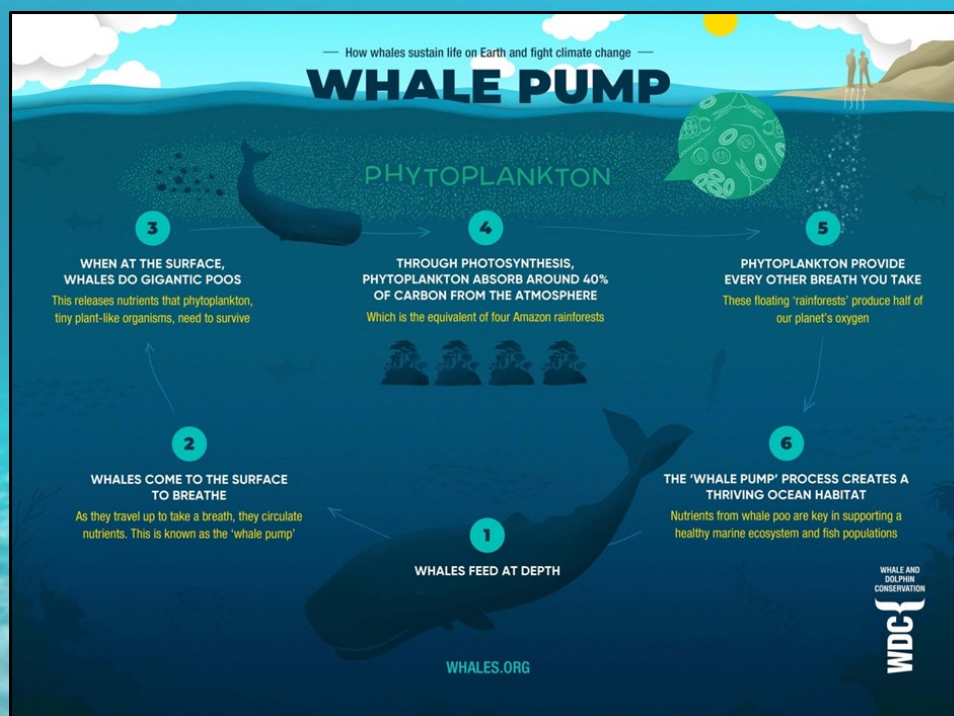
Protecting whales could add significantly to carbon capture because the current population of the largest great whales is only a small fraction of what it once was. Sadly, after decades of industrialized whaling, biologists estimate that overall whale populations are now to less than one fourth what they once were. Some species, like the blue whales, have been reduced to only 3 percent of their previous abundance.

Thus, the benefits from whales’ ecosystem services to us and to our survival are much less than they could be.

## A STRATEGY TO PROTECT WHALES CAN LIMIT GREENHOUSE GASES AND GLOBAL WARMING

### 1. THE WHALE PUMP

Wherever whales, the largest living things on earth, are found, so are populations of some of the smallest, phytoplankton.



The way that whales feed, poo, migrate, and dive between the surface and the ocean depths (known as the ‘whale pump’), circulates essential nutrients throughout the ocean. This in turn supports healthy marine ecosystems and the growth of phytoplankton, which locks in a massive amount of carbon from the atmosphere.

## 2. LETTING WHALES LIVE

These microscopic creatures not only contribute at least 50 per cent of all oxygen to our atmosphere, they do so by capturing about 37 billion metric tons of CO<sub>2</sub>, an estimated 40 per cent of all CO<sub>2</sub> produced. In recent years, scientists have discovered that whales have a multiplier effect of increasing phytoplankton production wherever they go.

Whales' waste products contain exactly the substances notably iron and nitrogen phytoplankton needs to grow. Whales bring minerals up to the ocean surface through their vertical movement, called the "whale pump," and through their migration across oceans, called the "whale conveyor belt". Preliminary modelling and estimates indicate that this fertilizing activity adds significantly to phytoplankton growth in the areas whales frequent.

Despite the fact that nutrients are carried into the ocean through dust storms, river sediments, and upwelling from wind and waves, nitrogen and phosphorus remain scarce and limit the amount of phytoplankton that can bloom in warmer parts of the oceans. In colder regions, such as in the Southern Ocean, the limiting mineral tends to be iron.

If more of these missing minerals became available in parts of the ocean where they are scarce, more phytoplankton could grow, potentially absorbing much more carbon than otherwise possible.

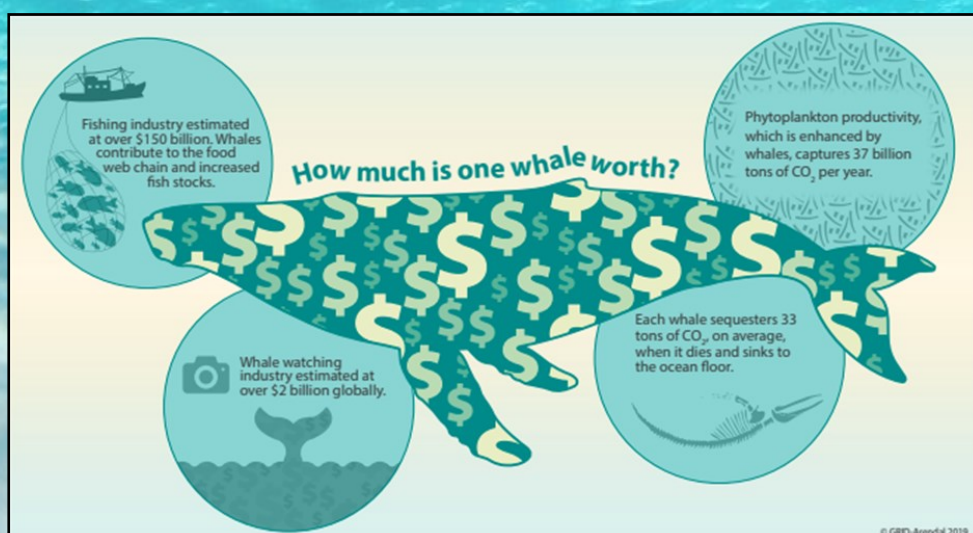
This is where the whales come in. If whales were allowed to return to their pre-whaling number of 4 to 5 million from slightly more than 1.3 million today. It could add significantly to the amount of phytoplankton in the oceans and to the carbon they capture each year.

At a minimum, even a 1 per cent increase in phytoplankton productivity thanks to whale activity would capture hundreds of millions of tons of additional CO<sub>2</sub> a year, equivalent to the sudden appearance of 2 billion mature trees. Imagine the impact over the average lifespan of a whale, more than 60 years. Despite the drastic reduction in commercial whaling, whales still face significant life-threatening hazards, including ship strikes, entanglement in fishing nets, waterborne plastic waste, and noise pollution. While some species of whales are recovering—slowly—many are not.

Enhancing protection of whales from human-made dangers would deliver benefits to ourselves, the planet, and of course, the whales themselves.

This "earth-tech" approach to carbon sequestration also avoids the risk of unanticipated harm from suggested untested high-tech fixes.

Nature has had millions of years to perfect her whale-based carbon sink technology. All we need to do is let the whales live.



# WHALES ARE KEY CONTRIBUTORS TO ECOSYSTEM WELLBEING

Whales play a significant role in the health of our environment and understanding of marine mammals. Furthermore, they support growing economies that rely on whale watching and spectator activities by bringing in capital through tourism. economic system. Whale parts and oil were sold and used for many different things, including soap, margarine, corset material, and transmission oil additives.

During the whaling era, many species were slaughtered, causing many of them to become endangered and contributing to all sorts of environmental changes that have affected the earth's ecosystem, from increased levels of carbon dioxide to global warming (which is affecting our polar ice caps) and changes in the feeding habits of many aquatic life forms due to a destabilised food chain.

Today, however, commercial whaling activities are illegal, and those caught hunting whales may face steep fines and jail time.

While there are still groups that continue to hunt these marine mammals,

the number of participating commercial whalers is continuing to decline. The prohibition of commercial whaling has allowed certain species to begin to repopulate their numbers and grow.

## A NEW MIND SET IS NEEDED URGENTLY

International institutions and governments, however, must also exert their influence to bring about a new mind set an approach that recognizes and implements a holistic approach toward human survival, which involves living within the bounds of the natural world.

Whales are not a human solution these great creatures having inherent value of their own and the right to live but this new mind set recognizes and values their integral place in a sustainable ocean and planet. Healthy whale populations imply healthy marine life including fish, seabirds, and an overall vibrant system that recycles nutrients between oceans and land, improving life in both places.

The “earth-tech” strategy of supporting whales’ return to their previous abundance in the oceans would significantly benefit not only life in the oceans, but also life on land, including our own.

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## LET'S TAKE ACTION TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS



Scan & Submit your  
Achieved Goals

The Sustainable Development Goals (SDG's) are the blueprint to achieve a better and more sustainable future for all. It is a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

IITM-EIACP would like to hear your contribution towards sustainable development goals to tackle climate change. You can submit individual or Organizational activity or contribution which support SDGs.



All queries and feedback addressed to:

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