



Climate Change

A Primer for Coastal Communities



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What you can learn from this document

- Climate change is a long term, over a decade or more, change in weather pattern
- Climate change is now permanent and things are set to become worse
- Climate change is caused primarily by release of greenhouse gases into the atmosphere
- These gases are carbon dioxide, methane, nitric acid and fluorinated gases
- The gases do not allow heat and energy from the earth to escape and sends them back to the earth leading to global warming
- The gases are released due to human activity and therefore climate change is man made
- Climate change can cause natural disasters like cyclones and floods to be more intense and frequent
- Climate change has severely affected agriculture and can lead to health problems
- The impacts of climate change are felt most in coastal areas
- Though the rich and developed countries have contributed most to climate change, it is the poor and developing nations which are being most affected
- Communities can take steps to mitigate and adapt to climate change

1. What is climate? How is it different from weather?

We often tend to confuse between climate and weather. How do we differentiate between the two? We must know that the difference is a matter of time and space. *When we talk of weather we actually mean what we face day to day.* For example when we say, “It is extremely hot today” we are talking of the weather. *Climate on the other hand is the weather behaviour over a much greater period of time.* While talking about climate we are discussing the weather behaviour pattern over a decade or more. While talking about the climate we say, “Since the Super Cyclone of 1999, the summers have become extremely hot and people are dying of sunstroke. Rainfall also has become erratic.”

2. What is climate change?

According to the United States Environmental Protection Agency (EPA), “Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation (rainfall), or wind patterns among other effects, that occur over several decades or longer.”

Thus climate change is

- A significant change in the weather for a long period of time, more than 10 years
- Climate change includes major changes in temperature, rainfall, wind patterns etc

How many of us have observed such changes? We all have, haven't we? Our summers have become hotter, rain is now not timely, and cyclones have become more powerful. Now are you convinced that we are experiencing climate change?

We are now aware about the local affects of climate change. What is happening around the world? Should we not know?

In India, like in Odisha, many places are seeing changes in rainfall resulting in more floods if there is more rain, droughts if there is less rain and sudden heavy rainfall. Due to increase in temperature oceans are warming and the quality of water is changing to become acidic thus affecting various fish and other organisms living in the sea. Are you not observing that your fish catch from the sea is decreasing every year? The glaciers are melting resulting in rise in sea levels. So now you understand why the sea is behaving so unpredictably!

Will these changes continue? Our scientists say that not only will they continue but will get worse! Ultimately they will adversely and irreversibly affect both our society as well as environment within a few decades.

3. What is the cause of climate change?

If the climate is changing there should be a reason, is it not? Can you think of any? What do you think is happening? Can you sit and discuss with your friends and family?

While you think on your own come let us see what the scientists have to say. *Scientists point out that release of "greenhouse gases" into the atmosphere causes climate change.* What are these greenhouse gases? They are carbon dioxide, methane, nitric oxide and fluorinated gases.

How do they cause climate change?

These gases trap heat in the atmosphere and therefore cause temperatures on earth to rise as heat and energy from the earth cannot escape and again return to the earth. The major contribution to this warming is Carbon Dioxide. It is estimated by the US EPA that carbon dioxide constitutes about 82% of the greenhouse gases.

How is Carbon Dioxide released into the atmosphere?

Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement). The best way to stop carbon dioxide from entering into the atmosphere is to reduce dependence on fossil fuels, reduce the use of petrol or diesel powered automobiles, restrict industrial activity that releases carbon dioxide, protect trees and forests, and plant more trees. Trees and plants can absorb carbon dioxide.

The other greenhouse gases are released by the production and transport of coal, natural gas and oil, use of refrigeration, use of chemical fertilizers, mining, various industrial activities, and the increased pressure on earth by the increasing needs of the population.

Are you beginning to understand something? Go through the above two paragraphs again if you have not been able to realize what is happening and why climate change has become a big threat.

Ok, so let us tell you. *Almost all the factors point out the fact that primarily it is manmade activity is causing climate change.* It is up to us to restrict our destructive activities and adopt a nature friendly life if we are to survive on this earth.

However there are very few people and even very few nations who are willing to do that. People do not want to give up their comfort and lifestyles, companies do not want to give up their profits and nations do not want to stop “growing”, even if it leads total destruction of the environment and extinction of all species including humans. Thus greed and ambition are the root causes of climate change, if we want to get to the basic reasons.

Do you know what is very painful about climate change? *While the rich and powerful nations are contributing to climate change by their extravagant lifestyles, it is the poor and vulnerable populations living in developing nations that are bearing the impact.* The impacts of climate change will be felt most in coastal areas. That is us!

4. The Impact of Climate Change

4.1 Impact on agriculture

India has been severely affected by climate change, particularly in the field of agriculture. While earlier India boasted of six seasons, now they have been reduced to three; summer, winter and the rainy season. As per a World Bank study, conducted by the Potsdam Institute for Climate Impact Research and Climate Analytics, the warming climate and changes in rainfall pattern has severely affected agriculture.

The decline in monsoon has started since 1950s. While there are droughts in many parts of the country, flooding has become a threat to other parts. There is also heavy to very heavy rainfall within very short periods. All these are effects of climate change.

Droughts are expected to be more frequent in some areas, especially in north-western India, Jharkhand, Odisha, and Chattisgarh. Crop yields are expected to fall significantly because of extreme heat by the year 2040. The situation will become worse as due to over use of groundwater, water tables are expected to fall and lead to a shortage in water needs for agriculture.

The Himalayan range has always affected the climate of India. Owing to climate change, most Himalayan glaciers have been melting over the past century. As the climate is getting hotter every year, the loss of snow cover over the Himalayas will reduce the water flow to northern India's rivers, primarily the Indus and the Brahmaputra, which depend on the Himalayan glaciers. This can severely impact water availability and irrigation.

India is already witnessing sea-level rise and storm surges leading to salt water intrusion into the coastal areas, impacting agriculture, degrading ground water quality, contaminating drinking water and increase in related diseases.

India has two staple cereals, rice and wheat, which have both been impacted by climate change. With rising temperatures and erratic monsoon yields are falling and so are attacks by pests. The country will one day be importing these cereals if climate change effects persist putting a severe strain on the food security situation in the country.

Have you not observed these impacts in your region? What else have you observed? Can you write a few lines and share with your friends and other community members?

4.2 Impacts on Health

Health of humans is endangered because of climate change. Increased temperatures can increase the numbers of heat related illnesses and death particularly among those suffering from chronic diseases, the malnourished, and the elderly. The increase in frequency and intensity of extreme weather events like cyclones and storms can lead to very strong winds and flooding that can injure or kill people. The reduction and pollution of drinking water sources will lead to diseases like diarrhoea and dysentery. Air pollution will lead to diseases like allergies, asthma, bronchitis, heart attacks and diseases from industrial pollutants and automobile emissions. Damp, humid and hot weather will breed mosquitoes and lead to increased cases of malaria and dengue. Decrease in food production will lead to increase in malnutrition. *Do you want these to happen?*

4.3 Impacts in coastal regions

Coastal regions are particularly vulnerable to climate change. As a result of melting glaciers and increasing temperatures of water, the sea will surge forward into the land displacing millions of people and putting their lives and livelihoods at risk. Recently the Government of Odisha has declared that 50 km of its coastline is under severe threat from sea erosion. At Pentha and Satabhaya in Kendrapara we are observing the sea destroying embankments and coming forward to engulf villages. As a result of the swelling up of the sea the rivers will find it difficult to release their waters into it and instead the sea water will be forced into the rivers changing the composition of the water. As a result the balance between sweet and salt water in the rivers will be disturbed and there will be less fish in the waters, hampering the livelihoods of fishermen. We have already read about how agriculture will be affected by climate change. In coastal regions the rising salinity in water and soil will further impact agricultural activities. The cyclones and storms hit coastal areas the hardest and if they increase in frequency and intensity, the storms and the sea surges will severely affect the coastal populations. All this is not new to you. *You are already experiencing it!*

5. How has Odisha been affected by climate change?

An award winning journalist for his writings on climate change, Richard Mahapatra writes that probably due to climate change Odisha has faced natural calamities in 95 of the last 105

years ending in 2007. Odisha which traditionally received 120 days of rain now receives rainfall only for 90 days, and that too is erratic. Floods have occurred for 50 years, droughts for 32, and cyclones have struck for 11 years. In 1998 an unprecedented heat wave claimed 2200 lives, climbing to 3000 till 2007. Who can forget the Super Cyclone of 1999 that rampantly destroyed lives, livestock and property, wiped out villages, felled trees and electricity poles and claimed at least 10,000 lives! Cyclone Phailin that struck on 12th October 2013 devastated many coastal areas and the floods that followed made lives miserable for even those living inland. Today the very word Cyclone strikes terror in the minds of people. To all these calamities are being added other natural hazards like earthquakes and tsunamis.

The future looks very dark is it not? But wait, *there is hope*.

6. How communities can tackle climate change

The experts say that climate change cannot be stopped as the rich and developed nations have already released enough carbon dioxide and other gases and damaged the environment to make the process permanent. Added to it are the efforts of the developing nations like India and China who are following in the footsteps of countries like the USA to try and become economic superpowers. Therefore there is no political will to stop and reverse climate change.

However would you just sit and watch if your life and that of your family was in danger? Or would you, along with other community members, like to do something about it?

6.1 Community led initiatives

How can communities who are facing the dangers of climate change help themselves?

6.1.2 Reduce emissions of greenhouse gases

First of all you have to understand what is meant by “carbon footprint”. To put it very simply it is the amount of the carbon dioxide that your activities generate over a time frame of usually a year. We have already read what activities lead to carbon dioxide emission into the atmosphere. Let us repeat it here, “Carbon dioxide enters the atmosphere through burning fossil fuels (coal, natural gas and oil), solid waste, trees and wood products, and also as a result of certain chemical reactions (e.g., manufacture of cement).” We also read that, “The best way to stop carbon dioxide from entering into the atmosphere is to....protect trees and forests, and plant more trees. Trees and plants can absorb carbon dioxide.

Now ask yourself;

- Do I use a motor cycle that runs on petrol?
- Does my cooking stove use kerosene, or fuel wood?
- Does what I do destroy forests?

You can also ask these questions as a community.

Now you, and your community have to reduce your “carbon footprint”, that is you have to reduce activities that release green house gases like carbon dioxide, nitrous oxide, methane etc into the atmosphere.

You can undertake positive activities like;

- Using solar panels for your lighting and cooking needs
- Use fuel efficient and smokeless stoves
- Switching over to organic form of agriculture
- Use bullocks to plough instead of tractors or other machines
- Protect forests in your vicinity
- Plant trees in lands lying vacant
- Plant trees on both sides of road
- Do not disturb or destroy wetlands in your area

6.1.3 Become climate resilient

You already know by what you have read so far, is that climate change is caused mostly by human activity motivated by greed and love for power. Neither individuals nor nations are willing to rectify themselves and reduce activities that are harmful for the environment. Therefore it can be concluded that climate change cannot be stopped. Scientists also say that what we have already done so far has done enough damage for climate change to continue even if all activities are stopped.

Climate change cannot be stopped. However all is not lost. *Communities can adapt to climate change in such a manner that it does not affect them drastically and enables them to return to their routine lives as soon as possible.*

This can be done by taking the following steps;

- Organise yourselves into committees at hamlet, village and Panchayat levels. If you work as a group instead of as individuals you can get better results. Ensure equal representation of women in these committees.
- Discuss what climate change is and how it can affect you.
- Make notes about all the climate change impacts and consequent natural hazards that you are noticing in your lives as well as environment and how they are affecting you, as individuals and as communities.
- Identify people in your community who are affected the most and who need help to survive as they do not have the resources to cope. Give importance to women, children, the elderly and disabled.
- Discuss and make notes about what steps can be taken to survive despite the impacts of climate change. How lives, livelihoods, houses, assets and livestock can be protected. Try insuring your lives and poverty through micro-insurance.
- Discuss and identify livelihood options that can provide food and income opportunities even under adverse conditions and can survive disasters.

- Form small groups in every village who can take charge, issue warnings of impending natural hazards, search and rescue trapped people, provide first aid, take care of cyclone shelters and look after water and sanitation issues.
- Identify development works, like increasing number of concrete buildings, filling up of ponds and wetlands, destruction of forests, increasing use of chemical fertilizers and pesticides in agriculture etc and think of restricting them.
- Identify areas where development can lead to protection against climate change impacts and hazards like planting trees, construction of roads to shelters, digging of ponds, building or strengthening of embankments etc and encourage them.
- Prepare village level Community Contingency Plans based upon your study of climate change impacts of the village and identification of the most vulnerable.
- Approach the Sarpanch and PRI members for help and involve them such that village level Community Contingency Plans can be included in Panchayat Plans.
- Study all the government plans and schemes available in the region and list how they can be utilised to adapt to climate change and reduce risks from disasters. Approach government departments dealing with disasters for information and training.
- Discuss about possibilities for creating an Emergency Disaster Fund from voluntary contributions from households.
- Meet government department officials, local administration and elected members of the Assembly in the area and seek solutions for your climate change and disaster risk problems.
- Spread awareness about the entire procedure to other communities and localities by forming networks and raise your voice to be heard at state and national levels.

Those who are involved with the Project Paribartan being implemented in 84 villages of 8 GPs in two blocks Rajanagar and Balikuda in the two coastal districts of Kendrapara and Jagatsinghpur are already familiar with these steps, are you not?

Conclusion

What do you feel now after reading this booklet? Have you understood why the weather is behaving so strangely? Have you understood why natural calamities like cyclone and floods are happening more frequently? We hope you have understood things in the proper perspective. However we also want to know if you have understood how to respond to the crisis. Can you now do your bit to reduce the impact of climate change? Can you adapt to climate change and become climate resilient? Can you reduce the impact of disasters? Can you organize yourselves and raise your voice?

If the answers are yes, please go ahead and we wish you all the best!