

EPISODE NO: 16

Title : Sea Level Change

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**Radio Serial Title : Climate Change & Global Warming
Segment : Proof in favour of Climate Change**

Characters:-

**Ananth: Father----- Professor
Usha: Mother----- Activist
Naveen: Son
Neha: Daughter----- College student
RanjanDas: Co-Passenger---Seafood exporter**

SCENE --- I

(At railway station Chennai- A family travelling to Kolkata by Coromandel express)

Announcement : Your kind attention please. Train no: 12842, Coromandel express is ready to leave Chennai from platform no:2. Passengers are requested to board the train.

Ananth: Hey! Come on. The train has arrived. Our coach no is S2. Let us get into it soon. Naveen, you take the suitcase. Neha, you take care of mother while boarding. Come on.

Naveen: Hey pa! This is our seat. Our seat numbers are from 20 to 24.

Co-passenger: Hello Sir, welcome. I am Ranjan Dass. This is my wife Susmita. We travel upto Kolkata. What about you?

Ananth: Nice to meet you sir. I am Ananth. We are making a trip to Kolkata. First, let's arrange our luggage conveniently. We have enough time to relax. Neha, you may occupy the window seat.

Neha: Thanks daddy. I'll sit with my story book. Mummy you sit near me.

Ranjan: Hello beti. What is your name? what do you do?

Neha: Hello sir. I am Neha. Doing my master degree in Environmental science in TN agricultural college. This is my mother Usha, an activist.

Naveen: I will sit in the upper berth and let me have fun there.

Ananth: No Naveen, This is Coromandel express. It travels on the Coromandel coast. You shall enjoy the beauty of the bay of Bengal. The train passes through Vijayawada, Rajamundry, Vizak, Bhubaneswar, Karakpur and reaches Howrah junction. All the way you may enjoy the natural beauty of the coast.

Naveen: What is Coromandel coast?

Ananth: Hello son! The south eastern coast region of the Indian sub-continent is called Coromandel coast

Neha: The coast has an average elevation of 80 metres and is backed by the Eastern ghats, a chain of low flat-topped hills.

Ananth: Hello Ranjan sir, hope you are comfortable with my family members. We are not disturbing you in anyway. Are we?

Ranjan: Not at all. We are happy to travel with you sir. By the way what do you do in Chennai?

Ananth: I am a professor in Tamilnadu Fisheries University. I have a conference in Kolkata. My family also joins me to visit Kolkata. What about you sir?

Ranjan: I run an export business in Kolkata. I sell sea food to other countries. I came to Chennai to attend a wedding function.

Neha: How was your Chennai visit? Did you enjoy the climate of Chennai?

Ranjan: Really. Our Chennai visit was very interesting. We enjoyed the culture of Chennai. Hot temperature is the only problem. It was so hot.

Ananth: Yes sir. We do feel the change in temperature in the recent years. The science world says that, it is due to global warming.

Naveen: Neha, what is climate change?

Neha: It is a change in global or regional climate pattern. It is due to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.

Ranjan: very interesting. In our city also we also face this problem. Can you explain in detail sir?

Ananth: Let's have our lunch now. After taking a little rest, we shall continue our dialogue.

Neha: We have brought lunch from home. Let's share it. Is it okay?

Ranjan: It is our pleasure. We do have some food. Let's share and have our lunch. Susmitha, please take our food and water bottle.

(After lunch)

Naveen: Thank you uncle. Your Bengali sweets are so tasty!

Ranjan: Your lemon rice with potato is also wonderful. By the way, what is your plan in kolkotta? We are happy to invite you to our house. Please come and spend a day with our family.

Ananth: Thank you for the invitation sir. After my conference in the university, we shall visit your home.

Ranjan: Sure sir.

SCENE - II

(University conference on climate change. Professor Ananth delivers his lecture)

Announcer: Now I invite Prof. Ananth from Tamilnadu Fisheries University to present his paper on Climate Change.

Ananth: Good morning friends.

I am Prof. Ananth, presenting some interesting facts about sea level rise. To understand the sea level rise, we need to consider what happened since the last glacial maximum 20,000 years ago.

Changes in sea level can be measured with respect to nearby land or a fixed reference frame. Change in mean sea level is measured by coastal tide gauge called relative sea level changes. Global average sea level change over the last 200 years is within a range of 0.10 to 0.20 m. Thermal expansion is expected to contribute the largest component to sea level rise over the next 100 years. And finally sea level change will not be geographically uniform. So information is needed to assess the impact on coastal region.

That's all.

Now the participants may raise your questions.

Q 1. Can you list few factors contributing sea level change?

Ananth: There are three important factors contributing sea level rise. A glacier contribution – a green land contribution and Antarctic contribution.

Q 2. Then what is the role of thermal expansion in sea level rise?

Ananth: Ocean thermal expansion leads to an increase in ocean volume. Thermal expansion is expected to contribute the largest component to sea level rise over the years to come.

Q 3. Sir, melting of sea ice is often discussed with sea level rise. What is your view?

Ananth: Sea level would be unaffected by the melting of sea ice, whose weight is already supported by the ocean.

Q 4. Can you explain the factors in detail?

Ananth: As the ocean warms, the density decreases and the volume of the ocean increase. This thermal expansion is one of the major contributors to sea level changes during 20th and 21st centuries.

Water at higher temperature at greater depth expands more for a given heat input. Salinity changes within the ocean also have a significant impact on the local density and thus local sea level changes.

Climate change is projected to reduce the amount of water frozen in glaciers and ice caps, because of increased melting and evaporation.

Q 5. How is sea level measured?

Ananth: “Mean sea level” at the coast is defined as the height of the sea with respect to a local land bench mark.

Q 6. Sir, Please correlate your presentation with glaciers and ice caps.

Ananth: A glacier, icecap or ice sheet gains mass by accumulation of snow which is slowly transformed to ice and loses mass mainly by melting at the surfaces. Some melt water may refreeze within the snow and some snow may sublimate.

Announcer: Thank you Prof. Ananth sir. You have given a detailed presentation on sea level rise. We thank you for your patient answering to the various questions raised by our participants.

Thank you sir. Now I invite the next speaker.....(sound fades)

SCENE III

(Ranjan's house at kolkatta)

Ranjan: Hello Ananth sir, warm welcome to your family. Please come in sir.

Usha: Very nice to visit your home. How are you Mrs. Ranjandass?

Ranjan: We are very fine. Let's have tea now. By the way, how was your program? Have you finished your work?

Ananth: Yes. It was a successful one indeed! It was about Sea level rise and its effects.

Ranjan: Is it a reality? Is there any evidence?

Ananth: It is a reality sir. Ice sheets and glaciers undergo climate related melting when a glacier loses ice mass, its gravitational attraction is reduced. Ocean water nearby moves away, causing sea level to rise faster far away from the glaciers. The resulting pattern of sea level change is known as a sea level fingerprint.

Neha: Is there uniformity in sea level rise throughout the globe?

Ananth: Sea level rise in California and Florida generated by the melting of the Antarctica ice sheet is up to 52 percent greater than its average effect on the rest of the world. The sea level will not rise uniformly everywhere on earth, and it will even drop in some locations.

Ranjan: How do geologists react to this? What is their opinion on sea level rise?

Ananth: Marine terraces and buried wetlands are only two of many types of geological evidence for earlier sea levels.

Geologists also study "Foraminifera and diatoms" for evidence of ice age and sea level change. These fossils can be used as indicators of past climates as different species lived in different water temperatures.

Naveen: Interesting dad! Please share more information.

Ananth: Many marine organisms, including "Foraminifera" have hard shells made of calcium carbonate. The composition of oxygen isotopes found in the shell can be measured to determine what the water temperature was like, when the organism was formed.

Ranjan: What is the expected sea level rise sir?

Ananth: Atleast since 1880, the average global sea level has been rising. Historical measurements from tidal gauges show a rise of about 18 cm over a century from 1897 to 1997. In 2007 the intergovernmental panel on climate change (IPCC) projected a high end estimate of 60 cm through 2099. But their 2014 report raised the high and estimate to about 90 cm.

Usha: Is there any evidence in the past history?

Ananth: Rock like formation in shallow ocean waters called methane hydrates prime suspects of global warming millions of year ago.

Ranjan: Can you tell us the consequences the humankind would face?

Ananth: The consequences for mankind would be catastrophic. Two thirds of the world's mega cities are less than 10 meters about sea level. Together west Antarctica's and Greenland's frozen reservoirs would lift ocean levels by 13 meters. Another 12 meters of potential sea level rise is locked in parts of the East Antarctic ice sheet. The risk of tipping cascades could be significant at 2 c temperature rise and could increase sharply beyond that point.

Neha: It is said that the world ocean, which has an average depth of about 3800 meters contain over 97% of the earths water. Is it correct?

Ananth: Yes indeed! Antarctic ice sheets, The green land ice sheets and the number of non-polar glaciers or ice caps presently contain water sufficient to raise sea level by 6m, 7m,0.5m if they melted entirely. Moreover sea water density is a function of temperature. As a result sea level will change if the ocean temperature varies without any change in mass.

Ranjan: May I know the condition of sea level rise in the pre-industrial era.

Ananth: The earth's average temperature would stabilize 4 or 5 degree Celsius above pre-industrial levels, rather than 1.5c to 2c called for in the 196 nation pact. The world is struggling to curb the man-made carbon pollution that amplifies the likelihood and intensity of deadly heat waves, droughts and super storms.

Usha: Ok. We had discussed a lot on sea level rise and its consequences. We had also discussed some evidences in support of this. Now it is time to have lunch.

Ranjan: Let's have the dinner with Coromandel sea food.

SCENE END