

## Radio Serial : Climate Change and Global Warming

### Episode - 38

#### EFFECT ON FISHING – LIVELIHOOD PROBLEM & DISPLACEMENT

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Anchor: Good morning, listeners. Observations throughout the world make it clear that climate change is real and scientific research demonstrates that the greenhouse gases emitted by human activities are the primary driver. The evidence comes from direct measurements of rising surface air temperature and surface ocean temperatures as well as phenomena such as increases in average global sea levels, retreating glaciers and changes to many physical and biological systems. The problem of extreme weather /climate change concerns not one person, not one state, not one nation but all five continents. Lives everywhere have been disrupted by extreme weather. It could be heat wave conditions, severe thunderstorms, wildfires, extreme rainfall, floods, droughts, snowfall and melting ice, but it has not happened in a part of the world but all over. Climate change poses significant threats to fisheries. Coastal and fishing populations are particularly vulnerable to climate change. This episode highlights the climate change impact on fisheries and related problems followed by displacement of fisher communities besides government efforts for mitigation and rehabilitation.

#### Characters:

**Sagar (50)** : Fisheries officer      **Anand( 48)**: Sagar's friend- Science graduate-Fish Business

**Vasudha (45)**: Wife of Sagar-Environmentalist      **Jalayya (52)**: Fisherman –  
Presently village sarpanch

**Meena (22)**: Daughter –Zoology student

#### SCENE 1

(Pallipalem, a fisher community village in coastal AP. Anand visits his house)

**Jalayya:** Anand bhai. Here is a letter for you. As there is nobody in your old house, the postman gave it to me and asked me to deliver it to you.

**Anand:** Thank you Jalayya bhai. It is from our friend Sagar. Do you remember him. He is coming after 12 years. I am very happy.

**Jalayya:** Sagar!... Oh, I remember him. He studied in the elementary school here. We were all classmates. I stopped education at primary level and remained here to assist my father in fishing. You all went to the town for higher education.

**Anand:** Yes. You are right.

**Jalayya:** When is he coming? Has he given any details?

**Anand:** He is coming on Sunday. He is now a fisheries officer. He is posted to our District. He will visit our village to meet his old friends and understand the livelihood problems of the fisher community.

**Jalayya:** How is he coming? Who will receive him? Our village kacha road is bad.

**Anand:** He is coming in his office jeep. I will receive him at the town office and bring him here.

**Jalayya:** It's alright. I shall be here and join you. We shall take him round the village.

## SCENE 2

**Anand:** Good morning Sagar.

**Sagar:** Oh! Anand. Good morning. Come in. Be seated.

**Anand:** Sagar. Glad to see you after many years.

**Sagar:** It's alright Anand. How are you all? How is Pallipalem ?

**Anand:** Not everything is alright Sagar. I shifted my family to this town. Pallipalem and surrounding villages changed a lot. Many fishermen families left the villages in recent years.

**Sagar:** (Groaning) Very unfortunate. Most of the families in these coastal villages depend on fishing for their livelihood. Pallipalem is a typical fisher community village. We shall visit the village and study the facts at the ground level.

**Anand.** We will go round the village. You can meet the village sarpanch and some others to know the facts.

**Sagar:** Ok. We shall have breakfast now and leave for the village.

(Sounds of plates and coffee cups)

**Sagar:** Anand, come on. Get into the jeep. Driver, let us start. (Jeep starts)

**Anand:** Sagar, we will reach the village in about 1 hour. The road is damaged due to cyclones and heavy rains very often.

**Sagar:** Oh, I see. There are many prawn tanks here. Where are the paddy fields? Where are the coconut groves?

**Anand:** Yes Sagar. Investors from outside have taken lands on lease and started aqua culture.

**Sagar:** I think they are earning a lot.

**Anand:** Even aqua culture is facing problems due to extreme weather conditions in recent times. They are incurring huge losses due to virus attacks, low yields and inferior quality.

**Sagar:** Driver...There are many pot holes on the road. Drive slow.

**Anand:** Sagar, we reached the village. This is panchayat office. We shall get down here. See there, Jalayya is coming. He is our classmate and the village sarpanch now. (Jeep stops)

**Jalayya:** Good morning Sagar. Welcome. I hope you remember me.

**Sagar:** How can I forget you Jalayya ? We were classmates here. Anand told me that you are the village sarpanch now. I want to see the village and study the present condition of fisheries and fisher folk here.

**Jalayya:** Oh Yes. We shall go round the village. Let's have a cup of tea and then move.

**Sagar:** OK

**Jalayya:** Look here, Sagar. Most of these houses are abandoned and the fisher families migrated to nearby towns in search of livelihood.

**Sagar:** This is a major livelihood problem of fisher communities and some poor countries that are highly dependent on fishing for revenue. This should be studied in detail. By the way, how is the elementary school here? Is it upgraded?

**Jalayya:** The school is not upgraded. The student strength has come down drastically as several families migrated to urban areas.

**Anand:** It is true Sagar. Many families traditionally depending on fishing for livelihood find it no longer dependable. There were repeated devastating cyclones and long periods of drought .Tsunami also struck our village. Fishing nets and boats were swept away. There was heavy loss of property. The fish catches are reduced and the income has become very low.

**Jalayya:** yes. The youth in these families are in search of non-fishing employment. Many of them have become construction workers. Some are working at brick-kilns and hotels. The educated among them are doing jobs in the towns.

**Sagar:** OK. Shall we visit the mangroves nearby?

**Jalayya:** Sure. We have to walk a mile.

**Sagar:** I know these areas. I spent my childhood in the village when my father was the head master of the school. We left the village when he was transferred.

**Anand:** Look Sagar. Most of the mangrove trees are cut down and the land is converted into aqua ponds.

**Sagar:** Oh, it's horrible! By the way, what happened to the thatched houses that side?

**Jalayya:** Many houses were destroyed by cyclones and land erosion.

**Sagar:** I have seen how the flourishing fishing sector has been affected. This is prevailing in all coastal villages.

**Anand:** Yes, Sagar.

**Jalayya:** Sagar and Anand. It's 2 pm, lunch time now. I arranged lunch for you at my house. Let us go.

(All sit for lunch. Sounds of plates and murmurs)

**Sagar:** Thank you Jalayya. Thank you, Anand. Next week I am shifting my family to the town. Both of you visit us at our house. My wife is an environmentalist. My daughter is a student of zoology. We will have a discussion on these issues. I will submit a report to the government.

**Jalayya & Anand:** Ok Sagar. (Scene Ends)

### SCENE 3

(Sunday morning 9 o'clock. Sagar, Pridhvi and Meena are all in their house.)

Doorbell rings.

**Sagar:** Meena, somebody has come. Go and open the door.

**Meena:** Plz come in uncles. Plz be seated. Father will come.

**Sagar:** Hi Anand! Hi Jalayya!

This is Pridhvi, my wife. This is Meena my daughter. I told you about them.

**Pridhvi:** Good morning brothers. Sagar told me that you are childhood friends.

**Meena:** Good morning uncles.

**Anand & Jalayya:** Good morning to all.

**Sagar:** Let us have a discussion on what we have seen in your village and the problems of fisher communities in general. Pridhvi and Meena want to join us for the discussion.

**Pridhvi:** Please wait. I will bring coffee for all. We shall start our discussion after having a cup of coffee.

**Anand:** OK sister. ( Sounds of coffee cups)

**Sagar:** Ok. Jalayya you are a fisherman. You have vast experience in fishing. Your family is dependent on fishing for your livelihood. Are you happy now?

**Jalayya:** No, Sagar. Not only my family, there are many other fisher families that are unhappy. Many have migrated to other areas in search of livelihood.

**Sagar:** We must understand the importance of fisheries sector and the reasons for the adverse effects on fisheries in recent years.

**Meena:** Fish is a major source of food for the majority of poor and vulnerable communities in several coastal areas of India and Asia.

**Pridhvi:** You are right, Meena. From local to global levels fisheries and aqua culture play important roles in food supplies, income generation and nutrition.

**Jalayya:** Yes. This sector provides jobs also to many men and women. We take our catch to fish markets and sell there. Women are also involved in this and supplement family income.

**Sagar:** Yes. Fishing sector provides employment to many people in our country. Fish trade supports economic growth in our country and many other developing countries.

**Meena:** I read in our books that fish consumption contributes to food security and diversification of diets.

**Sagar:** It's true, meena. Fish is a rich source of protein and ensures food and nutritional security. The importance of fisheries to national economies is understood at different levels. But, unfortunately the impact of climate change on the sector and its implications for the socio-economic s of the coastal and riparian communities are not given much attention.

**Meena:** Daddy, we see reports of extreme weather in different parts of the world.

**Anand:** Yes. Heat wave conditions, severe thunderstorms, wild fires, cloud bursts, floods, droughts, snowfall and melting of glaciers are being reported at some place or other.

**Jalayya:** You are right Anand. In our area also we experienced tsunami. cyclones Hudhud, Laila, Phailin, Nada etc., caused extensive damage. All our fisher families were badly hit. Fishing suffered a setback with no signs of recovery.

**Prithvi:** All these extreme weather events are evidence for global warming and climate change.

**Sagar:** Now everybody agrees that climate change is real. It concerns not one person, not one state, not one nation but all the five continents.

**Pridhvi:** You know, Japan got three times the average July rain in five days. UK is parched due to heat wave. In the US, California is ravaged by unprecedented wildfire this year.

**Sagar:** Extreme weather events are expanding their foot prints in our country. Currently, the country is reeling under extremely heavy rainfall in some parts and drought in conditions in others. Floods paralysed civic life in Assam, Gujarat and Kerala.

**Anand:** Sagar, how does climate change effect fisheries?

**Jalayya:** I too want to know. I don't have much knowledge about these things.

**Sagar:** no problem jalayya. You will know more from our discussion. We must study the physical and biological impacts of climate change on fisheries.

**Pridhvi:** There are other concurrent pressures on fisheries.

**Anand:** What are they, sister?

**Pridhvi:** We can mention overfishing, habitat degradation, pollution, introduction of new species etc.

**Meena:** Our discussion should cover all these factors although briefly.

**Sagar:** Oh sure. Meena. There are changes in biophysical characteristics of the aquatic environment and frequent occurrence of extreme weather events .These will have significant effects on the ecosystems that support fish.

**Jalayya:** Some fish species that were found previously in our waters are not seen now-a-days.

**Meena:** That means some fish species are extinct.

**Anand:** Yes Meena. I think such extinction is happening everywhere.

**Sagar:** Extinction of fish species causes lower food production for local consumption.

**Meena:** Migration of many fish species is another effect of climate change. Isn't it daddy?

**Sagar:** Yes Meena. Fish migrate to aquatic environments with optimal climatic conditions.

**Jalayy:** Sagar, some fish species in our waters might have migrated. This is having a tremendous impact on our fisher folk. We are not able to follow the fish beyond our borders.

**Sagar:** You are right, Jalayya. All these affect food security. Moreover, most of the fish harvested for export is supplied by small scale fisheries. Reduced fish production has lowered earnings from fish export.

**Jalayya:** I think these effects are only temporary?

**Pridhvi:** No Jalayya ji. The atmosphere and the ocean will continue to warm over the next 50-100 years. Sea level will rise due to thermal expansion and melting of glaciers, ocean acidity will increase and circulation pattern could change at local, regional and global scales.

**Jalayya:** (grunting) These are highly scientific matters. I can't understand.

**Sagar:** Ok. Jalayya. If you understand certain things, you can bring awareness among your community people.

**Jalayya:** Please tell me. I will learn many things from you all.

**Sagar:** The impact of climate change on fisheries involves physical and biological changes.

**Jalayya:** Oh! What are they?

**Meena:** Can I mention the changes, daddy?

**Sagar:** (Approvingly). Yes Meena.

**Meena:** Physical changes include, sea surface temperature rise, sea level rise, changes in salinity and ocean acidification.

**Anand:** Sagar, We know about global warming. Oceans absorb a significant amount of heat emitted globally. How does water surface temperature rise affect fisheries?

**Sagar:** Anand, increased ocean temperature can affect important biological processes of fish including growth, reproduction and swimming ability. Ocean waters become unsuitable for fisheries causing a reduction and possible collapse of fishing activities. Inland waters are equally vulnerable.

**Meena:** Daddy, our zoology professor said that fish have a thermal preference that optimises physiological processes. If water temperature rises above the maximum tolerable limit of a species then its existence is threatened.

**Anand:** What about sea level rise?

**Pridhvi:** I will tell you Anand. Globally sea level has already risen during the 20<sup>th</sup> century largely due to thermal expansion. Sea level could rise nearly twice as much as previously predicted by the end of this century if carbon dioxide and other green house gas emissions continue unabated. A new study by scientists concluded that oceans could rise considerably by the end of the century which could devastate coastal communities around the world.

- Jalayya:** How will it affect fisheries?
- Pridhvi:** In coastal areas, sea level rise may alter the estuarine habitats, inundate wet lands and reduce or eliminate the abundance of submerged vegetation. This will adversely affect those species which depend on these coastal habitats for reproduction.
- Sagar:** With high sea levels, sea ports, existing fishing facilities like jetties and food storage facilities will face inundation. All these will have negative impact on fish production, fish landing, processing and marketing.
- Jalayya:** We notice sea water intrusion into fresh water resources.
- Sagar:** Your observation is correct. Sea level rise may lead to sea water intrusion into ground water and other fresh water resources. This will have negative impact on inland fisheries and aqua culture.
- Meena:** Increase of sea water salinity is also reported due to climate change.
- Pridhvi:** Yes Meena. In fact, climate change can cause increase or decrease in water salinity. Tropical oceans are becoming increasingly saltier. Oceans closer to the poles have become fresher.
- Anand:** So, tropical oceans suffer more from the potential impacts of increasing water salinity.
- Sagar:** You are right Anand.
- Jalayya:** Then how does increasing salinity affect fisheries, Sagar ?
- Sagar:** Jalayya, You see some tiny organisms drifting in seas and fresh water bodies. These are zooplanktons and other planktons.
- Jalayya:** Yes. I see them.
- Meena:** Daddy. They form the base of marine food chain.
- Sagar:** Correct! Changes in water salinity have a negative impact on zooplankton population and other primary or secondary producers in the food chain. The cracks in the food chain ultimately, affect the fisheries adversely.
- Pridhvi:** Not only that. Salinity also determines the survival of organisms in ecosystems.
- Meena:** How is it, mom?
- Pridhvi:** It happens in two ways, Meena, either by having a direct impact on the organisms or indirectly destroying their habitat including their breeding and nursery grounds. Increase in water salinity destroys most of the mangrove forests also.

**Jalayya:** Now, I understand that it is because of change in water salinity that fish population has decreased in our region. Our fisher community is struggling for livelihood.

**Pridhvi:** Jalayya ji, ocean acidification is also responsible for disrupting productivity of fisheries.

**Jalayya:** Ocean acidification! How does it happen?

**Sagar:** I will tell you jalayya. Oceans have the capacity to absorb most of the anthropogenic carbon dioxide emissions. This gas is soluble in water and reversibly converts to carbonic acid. This is the reason why oceans are acidifying alarmingly. This will have a negative impact on ocean ecosystems.

**Jalayya:** Then how are fisheries affected by ocean acidification?

**Pridhvi:** Ok I will explain. Adult fish can tolerate acidic water or higher levels of carbon dioxide in water but their eggs and larval life stages cannot.

**Sagar:** Ocean acidification can slow down the growth of planktons and invertebrates at the bottom of the food chain. This alters the productivity at certain tropic levels. The complex food chain ecosystems are disrupted which affects productivity of fisheries. This is causing tremendous socio-economic effects.

**Meena:** There are biological changes also due to climate change.

**Sagar:** Yes, Meena. . There are changes in primary production and changes in fish distribution. Reduction in primary productivity leads to reduction in fish yields. Surface temperature rise is the main factor affecting primary production.

**Pridhvi:** Changes in fish distribution are changing the benefits and costs of fisheries. Some countries are gaining and some are losing.

**Anand :** How is it, sister?

**Pridhvi:** I will tell you, Anand. Fish species respond to environmental changes such as warming water temperatures. There are changes in migration patterns of fish. Some fish species migrate due north in search of habitat with optimal water temperatures. Hence fish harvest increases in higher latitudes. On the other hand, countries in lower latitudes lose some fish species and stocks.

**Jalayya:** Please tell me about the socio-economic effects also.

**Pridhvi:** It's 1.30 pm. It's lunch time our cook prepared lunch for all of us .Please join us for lunch. Fish soup is specially prepared for you.

(All go for lunch. Appropriate sounds)

#### **SCENE-4**

**Jalayya &Anand:** Thank you sister for the delicious dishes. We shall continue our discussion.

**Jalayya:** Sagar, I asked you about the socio-economic effects of climate change.

**Sagar:** Yes. That is very important. We all must know that sustainable fisheries contribute to poverty reduction through generation of revenues and wealth. Thus they give a socio-economic lift at community level, but per capita food supply is declining in developing countries due to climate change.

**Pridhvi:** Climate change impact on fisheries affects food security including availability of aquatic foods, stability of supply, access to aquatic foods and utilisation of aquatic products. Over fishing aggravates the effects of climate change by creating conditions that make fishing population more sensitive to environmental changes.

**Sagar:** Experts estimate that climate change could force several million people globally to find new places to live by the middle of the century. Fisher communities are particularly vulnerable. In our country there were many climate-related displacements.

**Jalayya:** Government may take some steps to minimise the impact of climate change on fisheries and fisher communities.

**Sagar:** Yes. We have to ensure food security and increase resilience of fisher communities. There is need for increased investment in market development, fisheries governance and provision of economic incentive mechanisms.

**Jalayya:** We are facing marketing problems and loss of income.

**Sagar:** That's true jalayya. Market infrastructure needs to be developed to address post-harvest loss of income.

**Jalayya:** Shrimp and prawn exported to other countries and other states in our own country are rejected because of low quality.

**Sagar:** Quality of fish is also important. Quality loss is associated with rising temperatures or physical damage due to lack of proper handling. It lowers value of fish.

**Anand:** I am in fish trade for many years. Often there are sudden market changes. We are forced to sell our fish at lower rates.

**Sagar:** Yes. We should avoid use of antibiotics and toxic chemicals. Traditional methods of fish preservation such as salting, smoking, sun-drying also cause quality loss such as colour change, mould insect infection etc.

**Prdhvi:** Some policy initiatives are required to save the fisheries sector and stop displacement of fisher communities.

**Sagar:** You are right pridhvi. You know, the Parliamentary Standing Committee on inland fisheries and aqua culture submitted its report to the government recently.

**Jalayya:** What is there in the report, Sagar?

**Sagar:** The panel felt that the Indian fisheries sector was quite obsolete owing to lack of technology and technical know-how of deep sea fishing. The Committee had also raised concerns of unsustainable faring practices leading to environmental damages and loss of indigenous breeds.

**Anand:** What are the major recommendations of the committee, sagar?

**Sagar:** The committee recommended that fisheries be treated on par with agriculture.

**Jalayya:** Excellent! What more?

**Sagar:** The committee suggested training to educate traditional fisher folk about modern and beneficial ways of fishing. Most importantly, the committee proposed insurance cover against natural calamities.

**Jalayya:** All the recommendations of the committee are good. Our community needs to be sensitised on all these matters and the issues concerning climate change.

**Anand & Jalayya :** We had a very good discussion. Thank you, Sagar. Thank you Pridhvi sister . Thank you Meena.

**Sagar:** Ok Jalayya: I too learnt many things from you. I will send my report to the higher authorities. A committee of experts may visit your village soon.

**Jalayya:** By the way, the weather is changing now. The sky is cloudy. Strong winds are blowing. I think a cyclone is brewing.

**Pridhvi :** Meena, switch on the TV. There may be a cyclone alert.

**Meena:** No power daddy. I will bring our transistor radio.

(Radio: Cyclone warning! A cyclonic storm is advancing towards coastal Andhra. Fishermen are warned not to venture into the sea.)

**Jalayya:** I should return to our village early and alert our people.

**Sagar:** Have a cup of tea and go I will ask my driver to drop you in pedapalem.

**Scene End**

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