

## Episode 41

### On the Services of Man: The Ocean Ecosystem

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**Episode summary:** This episode highlights how the ocean is vital for life on Planet Earth. It describes the various ways in which it supports ecosystems, biodiversity, and human livelihoods and activities.

#### Setting

Sunderban islands in West Bengal

#### Characters

**Farah:** Young girl from a fisher family. Aged 8 years.

**Imon:** Tia's older brother. Aged about 14-15 years

**Sameer:** Tia's father, fisherman and community leader

**Ela:** Tia's mother, community health worker

**Farah:** Adult female on a teaching fellowship in the Sunderbans

**Jacob:** Adult male on his teaching fellowship in the Sunderbans

**Tia (excitedly):**

Wake up, wake up baba, it's almost dawn and you promised....you promised!

**Sameer (half-asleep):** mmhmm

**Farah:** Baba, you promised! Wake up! You promised you'd take me out on the boat with you today.

**Sameer (half-asleep and mumbling):**

huh? Today? What?

**Tia (frantically):**

Baba!! You said when I turned 8. It's my birthday and I'm 8 years old today. You took dada out when he turned 8. It's not fair! You promised!!

**Sameer (more awake but still lazy):**

Okay okay my little Captain. I'm up. At least let me wash up and have my tea. Go see if mummy has finished packing the tiffin. Tell her she needs to pack extra because Farah didi and Jacob dada are coming with us too. They asked me if I could take them to Sagar Island today.

**Tia (excitedly clapping):**

Yaaayyy, I love Farah didi and Jacob dada!! I'm so happy!! This is the best birthday ever!!

**Ela (exasperatedly but indulgently to Sameer):**

You really should not have made her such promises. She has hardly slept a wink all night and woke me up a whole hour early to prepare everything! I've packed the extra tiffin for Farah and Jacobin the big steel carrier too. Make sure you give them the right one haan – the one with the green handle, I've cooked their food with less chillies and oil.

**Farah:** Why Ma, don't Farah didi and Jacob dada like chillies?

**Ela:** They do, but not as much as us. Farah didi was telling me that in her hometown near Ahmedabad, their cooking is actually sweet...not spicy.

**Farah:** What about Jacob dada? Do they also eat sweet food in his home in Goa?

**Ela:** I'm not sure, Tia. I don't think their food is sweet in Goa. I remember the snacks Jacob dada brought back for us were quite spicy. They just use different spices than us Bengalis.

<<Sighing>>...Poor things...I worry for those two at times; they are so young and both are so far away from their homes. They must miss their families...and their usual home food.

**Sameer:** Ah Ela, don't worry about them. I feel proud when I see smart and self-reliant youngsters like them. They are outsiders here but they are so humble and adjusting. I want Imon and Tia also to be capable and independent like that when they grow up.

**Ela:** Have they really been here for almost two years already? It feels just like yesterday that they arrived to start their teaching fellowships here.

**Farah:** Baba...Ma...stop talking so much now!! Baba, drink your tea quickly! The sky is already turning pink...the sun will be up before we can even get to the boat...and...Farah didi and Jacob dada will be waiting!

**Ela:** Okay okay Tia...no need to get so excited. IMON...IMON...Are you awake? Come have your tea and breakfast. Tia...go see if dada is awake?

**Farah:** Yes, yes I'm up. It's not like anyone can sleep anyway with all this yelling and shouting at the crack of dawn.

**Tia (gloating):**

Dada, baba is taking me out on the boat with you all today. I am 8, and just as big as you were when you went out fishing for the first time. Now I'm just as good as you!

**Imon (snorts):**

Ha, you wish you were as good as me! Let me remind you, little monkey, there is only one Imon and everyone knows I'm the best!

**Ela:** That's enough now, Imon! Wash up, drink your tea and help your father carry the supplies out. And for heaven's sake, try not to trouble your sister, it's her birthday today and she has been looking forward to this outing for a long time.

**Imon (cheekily):** I don't need to trouble her; she was born troubled!

**Ela (sternly):** Imon!

**Imon (cheekily):** Okay okay, whatever you say mumma-bear!

<<Beach scene: Sounds of waves against the shore; seagulls and crows; fishermen calling out to one another, preparing their nets and setting off with their boats>>

**Tia and Imon (yelling across the beach):**

Farah didi...Jacob dada...we're over here...this way...come over here!!

<<Farah and Jacob (out of breath from jogging over)>>

**Farah:** Hi kids!! Good morning Sameer Kaku!

**Jacob:** Good morning everyone!

**Sameer:** Good morning Farah, good morning Jacob!

**Jacob:** What is this? Little Tia? Are you also coming out with us today?

**Sameer:** It's her birthday and I promised to take her fishing out on the boat when she turned 8. She's been driving me mad to keep my word. I hope you will not mind if she comes with us today.

Farah (chirpily): What? Of course not! Happy Birthday, Tia!! Why didn't you tell us before, Sameer kaku? 8!! That calls for a big celebration! How lucky we are to have a birthday girl going on the boat with us!! Aren't we Jacob?

**Jacob:** We sure are!! Happy Birthday, Tia! Let's get this party started shall we...

<<Sounds of heaving...pushing the boat out into the waves...climbing on board...motor engine...and then sounds of waves lapping against the sides of the boat>>

**Farah:** It's so beautiful out here. I wish I were a fish, so I could live in the sea forever. Why do we have to live on land? Why can't we live in the ocean?

**Farah:** Actually Tia-rani, did you know that all life on our Planet once came from the ocean? Many many billions of years ago there were only creatures that lived in the ocean...and all of us today...humans, animals, birds...are all descendants of these creatures.

**Farah:** What? When? What were these creatures? Were they mermaids?

**Farah:** Well we are talking something like 3 billion years ago. Earth was a young Planet back then and did not look anything like it does today. It was too hot to live on land and there was too little oxygen in the air to breathe. There were also no plants or vegetation to eat. The sea was the only place where anything could survive comfortably and so the ocean was the cradle of all life.

**Farah:** Wow! That's so cool; I wish I were around then. I could live in the ocean and swim anywhere I wanted.

**Farah:** What happened then, Farah didi? Why did the ocean creatures leave the sea?

**Farah:** Well after many more billions of years...approximately about 400 million years ago, the land slowly became more suitable for life. There was just the right amount of oxygen to breathe and varieties of food to eat. Some of the ocean creatures began to venture outside the water for longer and longer periods of time.

Farah: Farah Didi, what made the land more suitable to live on? Where did the oxygen and food come from?

**Farah:** Excellent question, Imon! You see, actually the ocean had a lot to do with it. There were these super tiny plants and other living organisms on the surface of the ocean called phytoplankton. And when I say 'tiny', I mean microscopic...for example...just a single drop of water can have thousands of phytoplankton cells!!

**Imon and Farah:** Woah!!

**Farah:** So they're sort of like the tiny organisms and germs that we can't see on our skin?

**Farah (laughing):** Yea, something like that! Anyway, the phytoplankton did nothing but drift around on the currents all day and photosynthesise. Do you know what that is?

**Farah:** Yes. We learnt in school that photosynthesis is how plants make food. They take in water, sunlight, and carbon dioxide from the air and turn it into energy to grow. They also make oxygen while making food and release this into the atmosphere for us to breathe.

**Farah:** Very good, Imon! You're absolutely right!! So you see the prehistoric phytoplankton and all the underwater plants filled the Earth's atmosphere with oxygen. This made the land more and more suitable

to live on. In fact, we still have phytoplankton on our ocean surfaces today, and do you know...they carry out HALF of Earth's photosynthesis!! That's a big feat for such little fellas!

<<Imon and Farah giggle>>

**Farah:** Farah Didi, we learnt about dinosaurs in school. Did the dinosaurs also come out of the ocean?

**Farah:** Ah...let's get back to our story and find out. So some of our ocean creatures, which we call tetrapods, were already amphibious...

**Farah:** What does amphi...am-phi-bi-what??

**Farah:** Amphibious. It means these creatures could spend time both in the ocean and on land with no problems. But now they began to leave their ocean home and spend more time on land than ever before. These creatures were all sorts of shapes and sizes. Some looked like crocodiles, some like lizards, and some even like eels and snakes.

**Farah:** Sort of like fish with feet??

**Farah:** Cool!

**Farah (laughing):**

Yea, sort of! Anyway, the tetrapods quickly adapted to life outside the water and made homes all over the land. Slowly even their bodies started to change and they developed special traits to suit the climates, terrains and food of their different habitats. Some grew wings to fly with; some got hard shells and camouflage to defend against predators; and others such as the dinosaurs grew to massive sizes to eat the abundant prehistoric vegetation,.

**Imon (laughing):** So the dinosaurs just ate a lot and got really fat...that's why they were so big??

**Farah (laughing):** Not quite Imon, there are other reasons besides the ample vegetation for why the dinosaurs were supersized. Earth's temperatures at the time and their own body temperatures had a lot to do with it.

...anyway you get the picture...all creatures on Earth today are related and can trace their history back to common ocean ancestors. And that's not all, all land and sea creatures are still evolving, so the Earth and its inhabitants are going to look entirely different in billions of years from even now!

**Farah:** Aww, I wish I could go into the future and see how everything is going to look!!

**Jacob:** Well, you can kind of see into the future already, Imon. You know the hermit and shore crabs you have here? All those guys are great examples of evolution in action.

**Farah:** What do you mean?

**Jacob:** Well these crabs once lived in the ocean, but now they have adapted to life on land and spend most of their time on it. But you must have seen that they have to make regular trips back to the ocean to dampen their gills and also get their daily salt intake, right?

**Farah:** Yea I've seen that...I've seen some of the crabs go all the time, and some only once everyday or once in 2-3 days.

**Jacob:** Ah so you see...they are becoming less and less dependent on the sea. One day, who knows, all these crabs will be fully terrestrial and never need to go back to the sea...except of course if they want to take a relaxing seaside holiday.

<<Tia and Imon chuckle>>

**Farah:** So if sea creatures are slowly evolving into land creatures, why don't we just drain the ocean? It's so over-crowded everywhere! Don't you think if we turned some of the ocean into land, it will make some more space for us?

**Jacob:** That's a very interesting thought, Imon. It is true that 80 percent of the earth's surface is covered by ocean, but it is only because of the ocean that we can actually live on the other 20 percent of Earth that is land.

**Sameer:** I don't understand, Jacob. I thought the ocean was only important for us fisher folk who live on the coast and derive our sustenance, incomes, and livelihoods from the oceans. Not many other people seem to be concerned about ocean and coastal issues.

**Jacob:** You're right Sameer Kaku...few of us realise the importance of the ocean. We are linked to the sea with every drop of water we drink and every breath of air we take. Even the weather everywhere is thanks to the oceans absorbing most of the sun's heat.

**Sameer:** What about our coral reefs, mangroves and rocky shores? I always feel that the more we damage these...the more we are vulnerable to the impacts of storms and harsh weather.

**Farah:** You're right, Sameer kaku, the shores and coastlines do protect us from extreme weather. Just yesterday, I was talking to my friend at the University of Delhi. She was telling me about her study on the Super Cyclone that hit Orissa in 1999. Do you by any chance remember that cyclone?

**Sameer:** The 1999 Orissa cyclone? Yes, I remember it very well actually. Ela kakima and I had just got married that year. There was so much wind and rain even here in the Sunderbans during the cyclone. All the villagers had to take shelter at the Mission school. We were afraid the building would collapse in on us.

**Farah:** Yes that's the cyclone I'm talking about. Orissa got the very worst of it. My friend's team found there were more cyclone-related deaths in coastal villages with sparse mangrove cover. Villages along the same coast with thicker mangrove belts had fewer casualties.

**Sameer:** Farah, I'm happy to hear that your friend's study confirms what we coastal folk know so well in our hearts. The ocean and her shores protect and sustain us in every way, and the least we can do is return the favour. After all, our survival depends on it!

**Farah:** Sameer kaku, your words remind me of a beautiful quote that my mother sent me on Whatsapp the other day... "The ocean stirs the heart, inspires the imagination and brings eternal joy to the soul".

**Jacob:** How true...the ocean definitely inspires and rejuvenates. Come to think of it, it is part of the history of so many civilisations and nations.

**Farah:** True...and India is a good example. The Bay of Bengal, Indian Ocean and Arabian Sea have always been vital to our international affairs, travel and trade.

**Sameer:** ...and the oceans naturally protect the Indian peninsula too...

**Jacob (laughing):** Oh I think being surrounded on three sides by seas is a double-edged sword...it can get India into some pretty 'hot water' ...pardon the pun!! After all the British did sail into India on the Bay of Bengal, didn't they!

**Sameer (lauging):** Good point Jacob, can't argue with you there!

<<All laugh>>

**Jacob:** But I agree there's no denying how important oceans are to India. Almost 36-crore-people live along the coastline and we are the 7th largest fishing nation in the world. Even aside from the millions of people that survive off fishing, the seas employ scores of people in other industries too.

**Sameer:** Do you mean industries besides ports, shipping and seafood processing?

**Jacob:** Yea...tourism, hospitality, energy and research, for example. Oh...and engineering, steel and lumber. And as much as I hate the environmental destruction and pollution caused by oil and natural gas, these fossil fuels from deep in the ocean depths power our lives and keep us moving.

**Farah:** Did you all know that many of our creams, hair-care products and cosmetics also come from coral reefs and marine organisms? Even medicines...for example...drugs for TB and HIV, come from the ocean.

**Sameer:** pAnd can you imagine life without salt!

**Farah:** That's a great point Sameer kaku.

**Tia (eagerly):** Yea!! It's also so much fun to swim in the sea when it rains...

**Imon (disgustedly):**

Tia, that's not even relevant...you're such a baby!!

**Farah:** Oh Imon, be nice to your sister. Tia, it's lovely that you like the rain. It really connects with what everyone is talking about actually. Without the ocean there would actually be no rainfall or freshwater anywhere on Earth! Can you imagine that?

**Farah:** How is that, Farah didi?

**Farah:** Well the ocean is a vital part of the water cycle. Do you know what that is?

**Imon (excitedly):** I do, I do....

...(as if reciting from a textbook):“The sun’s rays heat the oceans and turn some of the water into clouds. When the clouds get cold and heavy they fall down to Earth as rain. The rain fills up rivers, streams and other water bodies...and the whole cycle repeats again and again.”

**Jacob:** Very good Imon, I can see now why you are the best student in your class! You’ve perfectly described the four stages of the water cycle...evaporation, condensation, precipitation and collection. But do you know that other than making rainfall, the ocean and water cycle have other superpowers too?

**Farah:** Superpowers?

**Jacob (in a theatrical voice):** Yea, they’re called the El Niño and La Niña superpowers.

**Farah:** I don’t understand, what are these superpowers?

**Jacob:** Well in some years during December, the Pacific Ocean becomes extra heated by the sun. This gives the Pacific Ocean the El Niño superpower, and it can get the weather and rainfall around the world to do anything it commands!

**Imon (puzzled):** How Jacob dada?

**Jacob:** Did you notice the rains this year and the last were very less and late?

**Farah:** I guess...

**Jacob:** It's true...all over India the Monsoon rains these last two years were lighter than usual, and they also started late. This was because the water cycle in the Pacific Ocean developed its El Niño superpowers.

**Farah:** What do you mean Jacob dada?

**Jacob:** What I mean is during these last two years when the waves in the Pacific Ocean became hotter than normal the air around them also got heated. This changed the usual wind patterns and affected weather all around the world. Even our Monsoons got affected.

**Imon (seriously):** Oh, that explains why they were late also...even the Monsoon clouds are following IST...Indian Stretchable Time...

<<All laugh...and short pause in the conversation>>

**Jacob (wistfully to no one in particular):**

Isn't it amazing that all the water on the Planet, all the droplets in Earth's lakes, rivers and streams were once part of the ocean?

**Sameer (sagely):**

That's why they say all rivers and waterways on Earth lead to the ocean; I suppose every droplet finds its way home.

**Jacob:** Well said Sameer kaku.

<<After a pause...Jacob chuckles and continues>>...not only do the droplets find their way home, they come home bearing gifts.

**Farah:** Gifts? What gifts?

**Jacob:** Well, look around you and you'll see the gifts I'm talking about. You live in a very extraordinary part of India, Tia. Your home, the Sundarban Delta, is special not only because it spans two countries, India and Bangladesh, it is at the mouth of four mighty rivers. Can either of you tell me the names of these rivers?

**Farah:** That's easy! The Ganga and Brahmaputra flow into the Bay of Bengal on the Indian side, and the Padma and Meghna are on the Bangladeshi side.

**Jacob:** Right on, Imon!! These four rivers start all the way high in the Himalayas and travel through many mountains, valleys, fields and forests before they get here. They pick up lots of mud, stones and minerals from all these places and bring your Sunderban Delta all these rich gifts of sediments and nutrients.

**Farah:** Yuck what awful gifts! I would not like mud and stones for my birthday!!

**Jacob (laughing):** Ah but that's you, little Tia. The Sunderban Delta loves the treasures the rivers bring. The silt and stones you think are so awful are like delicious food and sweets for the land here. They make your Sunderbans one of the most fertile areas in India and also feed your mangrove forests that everyone wants to cut down for their hardy wood. Not only that...all your prawns, crabs and other fish know that the best nurseries for their babies are tucked between the roots of the mangrove trees!

**Farah:** Jacob dada, is this why the Sundarbans are a UNESCO World Heritage site?

**Jacob:** Yes Imon, the Sunderbans are one of the few places where you can find close to 50 endangered animals in the same place. Can either of you name some of these?

**Imon (in his usual know-it-all, textbook-recitation style):**

I know, I know! India's national animal...the Royal Bengal tiger...umm...the Olive Ridley sea turtle...uh...the saltwater crocodile...hmm...the Gangetic dolphin...oh...and the King Crab.

**Sameer:** Ah Jacob, there are fewer birds, fish and animals in these parts now than when I was growing up. The sea has also risen and swallowed more than half of our Sunderban islands. Most of your Ela kakima's childhood village, Mousuni, is now just an abandoned island, underwater. Their whole community had to shift. The same thing happened to people who lived on parts of Sagar, Lohachara, and Bedford islands. On top of all these troubles, our crops are failing. Some surveyors who came here a few years ago told us it's because our soil and water are now saltier. Can you believe that? I'd never heard of such things when I was a boy. But everyone agrees that it seems to be happening more and more over the last forty years or so. I worry about what will be left of the Sunderbans for Tia and Imon when they grow up.

**Jacob (sombrely):**

Yes Sameer kaku, I can see how salty soils are a problem. It's because the dams upstream are blocking a lot of the river sediment and freshwater that came to your Sunderban Delta. There is not enough river water reaching here nowadays to flush out the sea salt from your soils. There is also not enough sediment collecting here to strengthen your islands and shorelines. This is why your crops and mangroves forests are also suffering so much these days.

**Farah:** Sameer kaku, our global climate is also changing so much. The oceans absorb HALF of all carbon dioxide and methane in the atmosphere, but even they have their limits. We are emitting so much carbon and cutting down so many forests that forget global warming, melting ice caps and rising sea levels, we are turning the ocean itself acidic! <<Pause>>...Very soon not just you all in the Sunderbans but also all of us around India are going to feel the very real effects of climate change.

**Jacob:** We don't have to wait very long; climate change is already happening around India. Even in cities like Delhi and Mumbai...oh and Bangalore...which was always famous for its pleasant weather...we are having unnaturally hot summers and either extremely cold, or non-existent winters.

**Farah:** Seasons are terribly unpredictable too. Places like Karnataka are drought-stricken due to poor rains...while at the same time places like Rajasthan are flooded by excess rains. It's crazy!

<<Pensive pause in the conversation>><<sound effects of sea gulls, waves against the boat>>

**Farah:** That's why I think that we all need to go back to the ocean! We can swim around all day and not worry about the cold or heat or rains or money or any other problems.

**Imon (cheekily):**

Great idea Tia, why don't you jump into the water and lead the way. And when you get back this evening, you can make friends with all the shore crabs and see if they will take you on their daily sea trips to wet their gills. And what fun if magically you grow some gills!! You'll sound like a gurgling, bubbling underwater monster when you talk and no one will be able to understand you!!  
Hahaha

**Tia (petulantly):** I will not!!

**Sameer:** Okay, okay kids; that's enough...enough of all this chatter now. Aren't you all hungry? Ask Farah didi and Jacob dada if they would like to eat now? Ma has made a special birthday feast -- luchi-aloo'r dom and beguni ...and bhapa ilish , cholar dal and daab-chingri to go with the rice. There's also payesh for dessert.

Farah: mmmm...all my favourites!!

**Farah:** That sounds really delicious actually!

**Jacob:** Yea...a proper royal feast! I didn't even realise how hungry I am. Thank heavens for Ela kakima's glorious cooking!

<<Sounds of steel tiffin containers clattering, laughter, indiscernible chatter....paper parcels being opened...eating, appreciation of food...etc....to fade>>

<sup>1</sup>type of puri with dumaloo

<sup>1</sup>friedbrinjal

<sup>1</sup>steamedhilsa fish

<sup>1</sup>Dal made from Bengal gram/ channa dal

<sup>1</sup>prawns cooked in tender coconut/ coconut-prawns

<sup>1</sup>kheer/ payasam