

## Episode No: 23

### Global Warming and Changing diseases

Script, research and English transcription by  
Dr. Arvind Dubey

(Signature tune.....Fades out)

(Title music.....Fades out)

(Opening music.....Fades out)

**Narrator:** in the last episode of radio serial (name of the radio serial) you listened that (summary of the last episode of the serial). Due to routine industrial emissions, automobile emissions, burning of fossil fuels; vast amount of greenhouse gases, especially carbon dioxide, are added to our atmosphere each day. As a result mean temperature of earth is rising gradually and taking its toll. According to a study means temperature may go up by 5 degree centigrade, by the end of the century. No doubt it will melt the glaciers around the world and subsequently the sea level will rise. As a result this many human habitats may submerge and may cause a big problem of mass evacuation and migration of human population to already overcrowded cities and villages. Besides this, global warming is having a negative impact on human health in number of ways. Turning fertile land into marshland by rising sea level will pose a direct threat to human nutrition due to reduction in agricultural land. Global warming is also indirectly affecting human health by number of ways. Increasing in temperature will facilitate the development of disease carrying arthropods or vectors. As a result they will be abundant and will carry more number of parasitic organisms per vector. Secondly global warming will also extend the natural ranges of these disease causing organisms and make regions of the globe habitable, which were was previously uninhabitable for parasites. Emergence of malaria in Highland regions of East Africa is a good example. These climatic changes will make life cycles of these vectors and parasites shorter and may make disease more serious. Few new diseases may emerge. Many previously eloped diseases may reappear. Dengues, Ebola, Zika virus disease are the new editions. Anthrax and Cholera are reappearing. Some benign diseases are causing epidemics and have potential to cause a pandemic. We will discuss some of these burning issues of human health in today's episode of the serial. Vasudha bhabhi is distress by the news of her brother's illness, who is serving in Kenya and is down with the Malaria.

*(Change over music.....fades out)*

#### **Scene- 1**

*(Opening music.....fades out)*

**Place:** Drawing room in Medha's house.

(TV is on, Sagar: is listening news on TV. Medha and Vivek are there, doing odd jobs)

**Vasudha:** (calling from distance) Sagar, where are you, please come inside..... come inside.....I have to talk to you about something very important.....come inside...

*(Sagar decreases the volume of television)*

**Sagar:** Medha, I think your mother is calling from inside, go and see what the matter is?

**Medha:** papa send Vivek, you see I am busy. Vivek go inside and see why mother is calling?

*(Footsteps, Vasudha: enters)*

**Vasudha:** (in angry tone) Hell with your television, I am shouting from base of my lungs but nobody is listening. Even if someone is dying, you people don't care at all.

**Sagar:** what is the matter Vasudha? Why are you so angry? What happened? I asked Medha to go inside and see why you are calling butt she passed it to Vivek.

**Vasudha:** (in angry tone) These lazy children.....do you expect them to do a job? Rather they aspire to have a personal servant for themselves.

**Sagar:** ok, ok, now tell me what is the matter?

**Vasudha:** Dada is very sick.

**Sagar:** your elder brother, the one who is posted in some hilly region in Kenya? Vasudha: Yes, bhabhi ji just called me from Kenya.

**Sagar:** What happened to him?

**Vasudha:** He has malaria and that too very severe type. Bhabhi was crying on phone.

**Sagar:** Malaria but I think he is posted in a highland area of Kenya. Malaria does not exist there.

**Vasudha:** do you think bhabhi is lying?

**Sagar:** No, no, I don't mean that. Actually before our marriage I was also sent there on deputation.

**Vasudha:** I know that, you have told me number of times.

**Sagar:** These areas were supposed to be free of Malaria. Even mosquitoes were not there. Because these areas are highland areas so have low atmosphere temperature which does not allow mosquitoes to flourish there.

**Vasudha:** It was 25 years back.....quarter of century. Things have changed now. Dada's whole family is suffering from Malaria. It is a common scenario in every household.

**Sagar:** strange....

**Vasudha:** Besides it is usually of very severe type. People are dying there because of malaria.

**Medha:** Do you know papa why has this happened? A place where malaria and mosquitoes were nonexistent, is now brimming with patients or severe Malaria? It is because of global warming and associated climatic changes.

**Vasudha:** Ok ok I have enough of your global warming. Do you think whatever bad, happening in this world, is due to global warming and associated climatic changes?

**Medha:** My dear Ma, whatever bad is happening in the world, half of it is anyhow connected to this global warming, understand?

**Vasudha:** Just shut up, you educated people have blown up a little thing out of proportion.

**Vivek:** Of course, Medha thinks that she is very intelligent, though she is next to nothing.

**Vasudha:** Can't you both sit silently for a while? (In sad voice) Sagar will bhaiya be ok with time?

**Sagar:** of course, after all it's only Malaria, nothing serious.

**Vasudha:** No, no Sagar, bhabhi was telling that there Malaria is usually very serious. People are dying there because of Malaria.

**Medha:** Has Mami said this?

**Vasudha:** Yes. Sagar, will bhaiya be ok with time?

**Sagar:** Actually I don't know much about Malaria. But one of my classmate is doctor, probably posted here as district malaria officer. He can help us to know better about malaria.

**Vasudha:** Then we shall go to him, as early as possible.

**Sagar:** Yes we will go to him, today.

(Change over music.....fades out)

## Scene- 2

(Opening music.....fades out)

**Place:** Hospital premises.

(Sagar and Vasudha have reached hospital, accompanied by Medha and Vivek.)

**Vivek:** Is this the hospital, where your batch mate works, papa?

**Sagar:** Yes my friend Dr Shekhar: works here. We have to search where he is sitting?

**Medha:** Look papa, here he is, look at this name plate.

**Sagar:** yes Medha let's enter the room.

*(Give appropriate sound effects)*

*(Change over music.....fades out)*

### **Scene- 3**

*(Opening music.....fades out)*

**Place:** Doctors Shekhar's room in the hospital.

(Sagar, Vasudha, Medha and Vivek enter the room- give appropriate sound effects)

**Sagar:** (coughing) May be come inside doctor?

**Shekhar:** Oh my god, Sagar, this is you.....and bhabhi ji you too, what a lucky surprise?

**Medha and Vivek:** (simultaneously) we too are here doctor uncle.

**Shekhar:** Oho, come, come.....you have made my day.....come inside. Bhabhi ji you come this site on this chair.

**Vasudha:** No, no, Shekhar: bhaiya I am comfortable here.

**Shekhar:** Well Sagar, till I send someone for tea and snacks, tell me is everything ok with you?

**Sagar:** why?

**Shekhar:** People usually go to the doctors, when they are in trouble. (laugh)

**Sagar:** We are not the exception, Shekhar.

**Shekhar:** Really, then tell me about your problem and don't worry. Is someone sick in your family?

**Sagar:** Something like, my brother-in-law is posted in Kenya near Nairobi. He is sick with malaria and your bhabhi is very upset.

**Shekhar:** Ok.

**Sagar:** I tried to explain her that it is simply Malaria but she is insisting that her brother is seriously sick. I.....

**Vasudha:** Shekhar bhai sahab his wife told me on phone that their Malaria is not like as it happens in India. It is very serious disease there which may kill the patient.

**Sagar:** and since then both the ladies have created a chaos in the family, which I think is out of proportion to the problem.

**Shekhar:** No Sagar, she is right. Malaria in Kenya is a different and a new addition to the diseases prevailing there.

**Sagar:** Shekhar, do you too think that a person can die of malaria?

**Shekhar:** Of course, people die of Malaria, especially if it is complicated to Cerebral Malaria.

**Vivek:** Cerebral Malaria?

**Shekhar:** Malarial disease involving brain.....this causes convulsions altered sensorium and coma.

**Vasudha:** Oh no, is Malaria such a dreaded disease? (Pause) I told you Sagar but you ridiculed me.

**Shekhar:** In India Cerebral Malaria is not so common that's why we take Malaria so lightly.

**Medha:** Many or my classmates suffered from malaria and they return to school after 4-5 days absence.

**Shekhar:** But it is different in Kenyan Highland rather to say in South African Highland areas. In places like Nairobi, where your maternal uncle lives, Malaria turns into Cerebral Malaria, quite frequently.

**Vasudha:** Why it is so Shekhar bhaiya?

**Vivek:** because mosquitoes there are large and of dangerous type isn't it, Shekhar uncle?

**Shekhar:** Mosquitoes are same but the person getting Malaria are different from our country.

**Medha:** Different, how they are different?

**Shekhar:** These are the places where Malaria was nonexistent. These areas were called malaria and mosquito free areas so that people residing in these various areas didn't have immunity against malaria parasite.

**Vasudha:** Why it is so?

**Shekhar:** Bhabhi whenever we come in contact of malaria parasite, we may or may not have Malaria but our body's immune cells recognize malaria parasite antigen and our immune system does makes some preparation to handle malarial parasites in future.

**Medha:** This preparation is called “immunity”, isn't it?

**Vasudha:** What this immunity does in malaria?

**Shekhar:** The memory of malaria parasite persists for longer periods. Whenever malaria parasite again enters the body of this immunized person, it is recognized by immune cells of the body and destroyed by antibodies, before it can cause harm to the body or can produce disease.

**Vasudha:** So immunity is disease fighting capacity of the body which you call immunity.

**Shekhar:** Yes bhabhi ji, in India we encounter malaria parasite so frequently that we are naturally immune to it. That's why severe forms or Malaria are not so common in our country.

**Medha:** ..... and this doesn't happen in the Kenyan and South African highlands areas.

**Vivek:** Why?

**Shekhar:** recently I have attended a conference organized by World Health Organization abroad. There they told us some interesting facts about malaria in these regions.

**Medha:** .....interesting facts?

**Shekhar:** yes Medha, till the end of 19th century there was no Malaria or mosquitoes in these regions.

**Sagar:** yes, so when Britishers went there they selectively settled in these areas because these regions were free from Malaria, deadly disease of those times.

**Medha:** but why?

**Shekhar:** due to climate.

**Vasudha:** Climate, what was so special with the climate of these areas?

**Shekhar:** Bhabhi ji, Anopheles mosquitoes which cause malaria can successfully complete their life cycle when atmospheric temperature is above 16 degree centigrade,

**Vivek:** .....and temperature of these areas was colder which became even lesser during winters. So Anopheles mosquito, so the malaria parasite, could not thrive there.

**Vivek:** What a guess from a moron like Vivek?

**Vivek:** and what a nonsense comment from Medha di?

**Sagar:** Please behave yourself, you both.

**Vasudha:** But what happened now, Shekhar bhaiya, which is causing such a dangerous form of malaria?

**Shekhar:** Bhabhi ji due to our excessive use of fossil fuel, industrialization, excessive deforestation and increasing petroleum vehicles, the climatic temperature increased, gradually.

**Sagar:** It has reached to the level which became favorable to the mosquitoes and malaria parasite, both.

**Shekhar:** Gradually the glaciers of these hilly regions started melting and atmosphere become moist and warm. It was very favorable for mosquitoes and malaria parasite.

**Medha:** This way malaria reached in these so called safe areas.

**Shekhar:** When people of these areas who didn't have immunity against malaria suffered from malaria their bodies have no defense against this disease.

**Sagar:** That's why it became a common disease here and that too a very dangerous one.

**Vasudha:** It means the malaria emerged there due to ill effects of global warming?

**Medha:** ..... and we are the main cause of global warming, aren't we?

**Vasudha:** So we are the ones who help transporting malaria to emerge in these places.

**Sagar:** But Shekhar Vasudha's brother is from India and you say we Indians are very robust against malaria.

**Shekhar:** Yes we Indians are naturally immune to malaria.

**Vasudha:** It means my brother will not be in much danger from malaria? Shekhar: I think so bhabhi ji.

**Vivek:** See papa, what is global warming has done? It has changed the scenario and even the disease patterns.

**Shekhar:** You are right Vivek.

**Vivek:** Why it is so Shekhar uncle?

**Shekhar:** Due to progressively increasing amount of greenhouse gases in the atmosphere the average atmospheric temperature is gradually increasing. It may increased by 5 and half degree by the end of this century.

**Vasudha:** Then what will happen, Shekhar bhaiya?

**Shekhar:** This may cause major climatic changes.

**Medha:** Like?

**Shekhar:** it may cause excessive rains somewhere and other places the condition like extreme draught.

**Medha:** Due to increasing moisture and warmth, insects, mosquitoes and other disease vectors will flourish.

**Vivek:** .....and ineffective diseases will increase and become more intense.

**Shekhar:** Yes Malaria is on rise since the year 2000 in Anhui province of China which was previously supposed to be malaria free.

**Vasudha:** Is this too because of global warming, Sekhar bhaiya?

**Shekhar:** yes bhabhi ji.

**Vasudha:** Does this global warming effect malaria only?

**Shekhar:** No, there are many diseases which are emerging at the places where they were not existent or very rare.

**Medha:** Many diseases Shekhar uncle?

**Shekhar:** yes Medha like chagas disease, Leishmaniasis, Lyme disease, Babesiosis, Intestinal worms, Anthrax, Cholera, Dengue, Ebola virus disease, Zika virus and many more.

**Vivek:** Chagas disease, what is this?

**Shekhar:** This dangerous disease is caused by a unicellular organism, Trypanosoma.

**Medha:** But our Biology teacher taught us that Trypanosoma causes sleeping sickness, spread by Tsetse fly.

**Shekhar:** You know it right Medha. A species of Trypanosoma- Trypanosoma brucei causes African sleeping sickness but Chagas disease is caused by another species of Trypanosoma- Trypanosoma cruzi and it is spread by Triatomine bug.

**Vivek:** Triatomine bug?

**Shekhar:** Because these bugs bite over the face especially over eyelids so they are commonly called kissing bugs.

**Vivek:** Kissing bugs.....interesting name.

**Shekhar:** But simultaneously dangerous one. These bugs bite over the face in the night and after bite they defecate there.

**Vivek:** Wonderful, just think if we humans could do the same. (Laughs)

**Medha:** Just shut up Vivek.

**Shekhar:** The feces of these bugs contain Trypanosoma. This bite causes itching at the place of bite and when the victim scratches to relieve the itching, these trypanosoma enter into the blood circulation of the victim through the fresh bite wound.

**Sagar:** .....and this way Trypanosoma infect us?

**Shekhar:** Yes Sagar, it causes swelling at the place of bite which is usually eyelid, little swelling in the glands around the neck and fever.

**Medha:** So in the beginning it looks like common fever?

**Shekhar:** yes Medha, in two third of the victims the disease ends here.

**Vasudha:** and in the rest one third?

**Shekhar:** Bhabhi ji, in the rest one third, it reactivates after a period of 10 to 30 years. This time it involves heart. Victim's heart enlarges and ultimately it fails and patient dies.

**Vasudha:** Shekhar bhaiya is this also related to global warming?

**Shekhar:** Yes bhabhi ji, years back this disease was common Latin and South America.



**Sagar:** so?

**Shekhar:** Now it has moved to many parts of North America, where it was almost nonexistent.

**Vivek:** Why it is so Shekhar uncle?

**Shekhar:** Because of changes in climate which is warmer now and favorable for Tritomine bugs too. Besides, this is more severe than that in Latin America.

**Sagar:** why?

**Shekhar:** Because of warmer climate these ticks experience more thirst. To quench this thirst they feed on human blood more frequently and attain adulthood early, and quickly become ready to transmit disease.

**Medha:** I have read in Sunday edition of a daily newspaper that numbers of filarial patients are also growing rapidly.

**Vasudha:** Is it also due to global warming?

**Shekhar:** Of course bhabhi ji. The Filaria parasite too is spread by mosquitoes.

**Sagar:** so?

**Shekhar:** In last meeting of World Health Organization problem of Filaria was, discussed in detail.

**Vivek:** why?

**Shekhar:** Because specialists presume that with the current rate the number of filaria patients may increase up to three fold.

**Vasudha:** So the situation is quite grim with filaria too?

**Shekhar:** Not only filaria, there are many communicable diseases which are on rise due to global warming and climatic changes.

**Vasudha:** So global warming is the main culprit?

**Shekhar:** But bhabhi ji this is not the only cause, however it is the main one.

**Medha:** I told you that, ma.

**Shekhar:** In Canada, England and United States, a special type of tick is found which is commonly called black legged or deer tick.

**Vivek:** Deer tick?

**Shekhar:** yes Vivek, but its scientific name is Ixodes tick.

**Medha:** Ixodes tick?

**Shekhar:** Yes, it spreads a bacterial disease called Lyme disease and also Babiosis, caused by a unicellular organism.

**Sagar:** so what's special in it?

**Shekhar:** I told you that I attended a WHO conference recently.

**Vasudha:** yes...

**Shekhar:** In the conference there was a long discussion over this bug.

**Vivek:** Why?

**Shekhar:** Because both are serious diseases and the most important is that these diseases have reached to warmer areas of England and United States of America too, where these where not seen before.

**Medha:** .....and this is because of global warming, right?

**Shekhar:** Yes, due to global warming temperature of these new found areas become favorable for these ticks.

**Medha:** So now Lyme disease and Babiosis are rampant in these areas.

**Shekhar:** Not only rampant but their intensity too is increasing.

**Sagar:** at last, we humans are getting dues of our callousness with which we dealt with our environment.

**Vasudha:** That's true but there are many things which are necessary for human civilization and progress. On other side these are actively contributing to global warming

**Vivek:** What are these, ma?

**Sagar:** Such as industrialization, burning of fossil fuels, petroleum driven vehicles and many other things.

**Shekhar:** I agree, but we should put limits on it, we should use them conservatively.

**Medha:** That's right but many nations like United States of America still do not understand the need of hour.

**Sagar:** Yes USA has refused to cut down on his part of greenhouse gas emissions.

**Shekhar:** The will understand, they have too.

**Sagar:** But then it will be too late.

(Change over music.....fades out)

#### Scene -4

(Opening music.....fades out)

**Place:** Drawing room of Sagar's house.

(Sagar, Vasudha, Medha and Vivek have just returned from Dr. Shekhar's hospital)

**Medha:** Shekhar: uncle is very intelligent person, very well read.

**Sagar:** Nothing much, I know him very well. He had just returned from World Health Organization conference so he is brimming with knowledge.

**Vasudha:** You may say so; he is your Batch mate. However he talks truth, every time he had a point.

**Vivek:** which truth Maa?

**Vasudha:** When I was a child, there was no Dengue, no Chikungunya.

**Medha:** Then there was malaria, a pandemic of malaria.

**Vivek:** Pandemic, what does it mean?

**Medha:** when a disease spreads globally at a given time, is called pandemic. In ma's time millions of people use to die with malaria.

**Vasudha:** That was because of lack of effective drugs, effective measures to control mosquitoes, absolutely not because of human induced climatic changes.

**Sagar:** It means diseases have increased since then?

**Vasudha:** Absolutely, and these have become dangerous too.

**Vivek:** .....and now occurring in the places where they were nonexistent.

(Change over music.....fades out)

**Narrator:** So friends in this episode of radio science serial (name of the serial), you listened about effect of global warming and associated climatic changes on diseases and so on human health. Diseases are reaching to the areas where they were nonexistent these are becoming more intense and lethal day by day. In the next episode of this serial we will discuss more about these diseases. Which disease has a potential of being epidemic of pandemic, which new diseases may appear on the earth after years of absence? So do not forget to tune in your radio set, same time, same day, till then goodbye.