

**Episode No: 24**

**Global Warming and Emerging new Diseases**

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*(Signature tune.....Fades out)*  
*(Title music.....Fades out)*  
*(Opening music.....Fades out)*

**Narrator:** Friends, in the last episode of Radio Serial (name of the serial), we discussed that how global warming is becoming a serious health problem around the globe. Those areas which were unfavorable for vectors of many diseases becoming favorable due to increasing humidity and global temperature. Consequently, disease organism are shifting and expanding their areas. They are emerging in the areas which were previously considered free from that particular disease. Most striking example is Malaria, which is reaching in various parts of China, Europe, America, African highlands, where it was never observed before. World Health Organization has issued warnings about the diseases which may cause epidemics. As globe warms, melting permafrost may release “Zombie Pathogens” that have been frozen in ice for centuries. Increasing global temperature is affecting the life cycle and productivity of vectors responsible for spreading disease causing organism. Due to warmer atmosphere these vectors mature early and produce more offspring in their fertile life as their life cycles are getting shorter. This ultimately leads to rapid enhancement of vector population.

Vasudha bhabhi’s brother who fell sick in Nairobi with Malaria, is completely cured by now, is on leave from his office for restoration of his health. He is coming to India with one of his Indian friend who works in World Health Organization office in Kenya. There is going to be good drama and exchange of knowledge among them. Get involved in the active discussions from now.

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

**Scene 1**

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

**Place:** Drawing room in Medha’s house

*(Doorbell rings)*

**Female Voice** *(coming from inside):* Coming, hold on dear.

*(Footstep Noise)*

**Female Voice:** Sagar, you are late today.

**Sagar:** Oh come on, Vashudha. It is simply half past five.....five minutes this way or that way, depending upon traffic congestion is usual make no difference.

**Vasudha:** Actually, I was waiting for you from an hour, so I thought you are getting late.

**Sagar:** Is there something, I mean good news?

**Vasudha:** Bhaiya has called from Nairobi, he is coming to India on post illness rest along with one of his friend working in the World Health Organization.

**Sagar:** Oh, so this is reason for this change and this glow of your face.

**Vasudha:** Oh Sagar come on, I am simply informing you and you ....naughty.

**Medha(coming closer):** Mom who is coming ?

**Vasudha:** Your maternal uncle, who lives in Nairobi.

**Vivek:** Mama, Ok then we will have a lot of fun..... endless fun is waiting for us.

**Medha:** Nonsense, he is coming here to recuperate from illness and this moron will have fun.

**Vasudha;** Ok.....Ok leave the door, let your papa come in.

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

## Scene-2

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

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

*(Doorbell rings)*

**Vasudha:** Medha, probably Bhaiya has come. Go and open the door.

*(sound effect of door opening)*

**Medha;** Oho, Mama, good morning.

**Vasudha:** Leave the door and let him come inside

*(footsteps)*

**Male Voice:** Good Morning Didi.

**Vasudha:** Come Prashant, come here... you are looking so weak. Your disease has badly affected you.

**Prashant:** Nothing much Didi..because you love me so much that's why you are over reacting. Didi this is Vikas, my friend in Nairobi.

**Vasudha;** Yes, Prashant you talked about him on phone.

**Prashant:** He works in World Health Organization on a senior post. He is from India.

**Vivek:** Good morning, Mama Ji, how are you ?

**Prashant;** I am fine, Vikas this is Vivek,

**Vivek:** Studying in 9<sup>th</sup> class Vikas uncle.

**Vikas:** Oho, a learned young man.

**Vasudha:** Come over here Vivek, let bhaiya sit comfortably. *(Every one laugh)*

**Prashant:** I am comfortable didi.

**Vasudha:** Vikas bhaiya why are you so calm and quiet? Don't feel shy. You are like Prashant to me. Feel at home.

**Vikas:** No No Didi I am at ease..don't worry

**Sagar:** Yes Vikas, don't hesitate... give some liberty to these hooligans, I mean medha and Vivek, you will never get a chance to be silent.

**Vivek & Medha:** *(Simultaneously)* Come on papa, we are not so bad.

**Sagar:** Prashant, tell me what happened to you?

**Prashant:** Not much, initially I had high fever for four-five days. When it was investigated, it turned out Malaria.

**Sagar:** and here your sister becomes so panicky that I had to go to my doctor friend and there she took his long interview.

**Prashant;** same was with my wife. Actually there malaria is considered so horrible disease that everyone got panicky. It is different from India.

**Sagar;** How are you now. Is there everything alright, Prashant?

**Prashant;** Almost....feeling a little exhausted. So when I got recuperation leave, I come straight to India to meet you.

**Sagar:** It's good... Vasudha bring some tea and breakfast for Prashant and Vikas.

**Vasudha;** Ok.... Give me some time and it is there.

*(Vasudha exits)*

**Sagar:** Vikas why you are so reserved and silent>? Feel free, you are just like Prashant to us.

**Vikas:** No Jija ji, I am not silent, I am listening carefully.

**Medha:** Vikas uncle do not listen only, keep talking also.

**Vivek:** When Ma went to doctor Shekar's Hospital we too accompanied her.

**Medha:** He said that the place, where prashant mama works, was a malaria free area in 19<sup>th</sup> century.

**Vikas:** Yes he was right.

**Vivek:** Then why it is there, now?

**Vikas;** because the temperature and other climatic conditions, there were not favorable for the vectors spreading malaria parasites.

**Vivek:** Which vector?

**Medha:** Mosquito, mosquitoes spread malaria, don't you know that..... you learned student of ninth class?

**Vivek:** Why now it become favorable there for mosquitoes. ?

**Vikas:** Mosquitoes prefer moist and warmer climate to breed.

**Medha:** and global warming turned that unfavorable climate into favorable one for them, isn't it?

**Vikas;** Yes Medha, this is not only with malaria. It is also happening with many other diseases such as Chagas disease, Leshmaniasis, Lyme disease, Babiosis etcetera.

**Vivek:** What is happening to these diseases, Vikas uncle?

**Vikas:** These diseases are shifting or increasing their zones.

**Vivek:** What does it mean?

**Prashant:** It means that these diseases are now spreading in those areas where these were non-existence, few years back.

**Medha:** and these are becoming more severe and intense.

**Vikas:** Wow, how do you know it, Medha ?

**Medha:** I was there, when doctor Shekar, told it to Ma.

**Prashant:** Same thing has happened with malaria in Kenya. That's why people become panicky when they get infected with malaria.

**Vikas:** Global warming and climatic changes affect disease profile in many ways.

**Sagar:** Many ways.....?

**Vikas:** One, as I have already informed you that some diseases are expanding their zones such as Malaria, Dengue, Zika etc. These are now found in these areas where they were nonexistent.

**Medha:** and it will have serious health consequences.

**Prashant:** Yes, the disease burden will crash the health budget of many developing countries.

**Vikas:** Not only this, it will also adversely affect the global water cycle.

**Vivek:** Water cycle, what is this?

**Medha:** Due to atmosphere temperature and heat, the water from ponds, lakes, river and ocean, evaporates consistently.

**Vivek:** I know.... nothing is new in that. These water vapors are condensed in clouds and come down to earth as rain.

**Medha:** Most of it again goes to lakes, ponds, river or ocean. Some part of it is absorbed by soil and goes to the deeper layers of earth for further use by us through wells, pumps etc.

**Vivek:** and, some of it remains frozen on hill tops as ice caps which ultimately melts and come in these water bodies.

**Prashant:** So you know everything about water cycle in detail. This whole cycle of water from water bodies to clouds and to water bodies again is called "Water Cycle"

**Vivek:** Oh, such a simple thing has a complex scientific name.

**Vikas;** When global warming heats up the air, this hot air holds more humidity than cool air.

**Vivek:** What will this do, vikas uncle?

**Vikas:** In nutshell it will cause "extremes of seasonal events".

**Vivek:** Extremes of seasonal events, what does it mean?

**Prashant:** It means that some areas of earth experience torrential rains, floods and hurricanes; while in other areas, there will be drought like conditions, warm winds etc.

**Vikas:** That's why people started using the term 'climate changes' instead of "Global Warming".

**Sagar:** Climatic Changes.....?

**Vikas;** Yes, because it does not only increase the global temperature but many associated climatic changes, do occur side by side.

**Sagar:** I think, climatic changes are the main cause of this nuisance.

**Vikas:** You are right Sagar Ji. When there is flood the water accumulates at various places.

**Medha:** and this stagnant water cause more humidity.

**Vikas:** Humid and warm atmosphere favors growth of mosquitoes and house flies.

**Sagar:** which in turn spread malaria, cholera and diarrhea in these areas.

**Prashant;** You are right Prashant, in these circumstances the sewage treatment facilities of towns are crashed.

**Vikas:** There are special provisions in sewage treatment plant for these emergency situations. This overflow is filtered through some large filters and released to water boats, untreated.

**Medha;** Untreated ....!

**Prashant:** One cannot hold this water in the human dwelling, it has to go out by whatever possible way.

**Sagar:** but this way, it may pollute water boats and even the underground water.

**Vikas:** It has already happened in Chuck Island of Micronesia. After flood, the number of patients of diarrhea diseases increased their tremendously.

**Sagar;** After floods, it does happen here in our cities and rural areas too.

**Vikas;** Due to these climatic changes, the disease causing organisms are also getting resistant for antibiotics and disinfectants.

**Medha:** Vikas uncle, do these climatic changes not affect the organisms and worms etc. living in the soil?

**Vikas:** Yes they do, the climatic changes cause change in the soil constituents besides causing changes in disease causing organism. Let's take the case of round worm the Ascaris and hook worm.

**Vivek:** Ascaris, the one which come out writhing with poop, looking like un-segmented earthworm?

**Vikas;** Yes

**Medha;** and this hook worm...?

**Vikas:** It looks like miniature Ascaris. Both of these worm reside in human intestine. Larva of hook worm penetrates the intact skin of the soles of barefoot walkers and reaches into his vascular system.

**Vivek:** From here they go to lungs and coughed into the wind pipe of the patient. From here they reach their ultimate destination. The intestine from where they come out with feces.

**Prashant:** In intestine they suck blood and cause anemia.

**Vikas:** Medha, both Ascaris and Hookworm thrive well in the soil when its temperature is 18 degree centigrade or above. The moisture of soil prevents their eggs and larvae from drying.

**Medha:** and global warming is providing them favorable circumstances. That's why these diseases are emerging in the areas, where these were non-existent.

**Vikas:** You are right Medha. There are diseases which had eloped for the time being but are returning back at some place  
*(footstep... Vasudha enters the room).*

**Vasudha:** Returning what... this time I am the one who has returned back, that too with tea and pakoras. Prashant do you have some food restrictions?

**Prashant:** Fortunately none, otherwise I have to break these.

**Vasudha:** Ok. then meeting is dismissed. Let them have some breakfast... let them have bath. You can hang on later, if you want Medha

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

**Scene-3**

(Opening music.....fades out)

**Place:** Drawing room

*(Vivek, Medha, Vasudha, Sagar, Vikas and Prashant are talking in the drawing room?)*

**Vasudha:** Vikas bhaiya would you go for shopping?

**Vikas:** nothing much, just wanted to purchase something for Amma and Bapu. That can be done in the evening also.

**Vasudha;** Ok..Ok..Then have some rest otherwise this duo will not let you do anything.

**Prashant:** No didi, we are enjoying it. On my last visit both Medha and Vivek were quite young, now they are grown up young people.

**Vikas:** Yes Prashant, it is remarkable. Medha has deep interest in global warming and climate change. This is a good sign that these teenagers are taking interest in these burning issues from this age.

**Vivek:** Nothing remarkable Vikas uncle, I know what is cause of her interest?

**Vasudha:** You know the reason?

**Vivek:** Yes she has been assigned a project on this subject. Otherwise she didn't even took interest in our house drainage, what to say of global warming.

**Prashant:** Is it true Medha? Have you been assigned project on global warming?

**Medha:** *(in low voice)* yes, *(in loud voice)* so what?

**Prashant:** Exactly what is your topic, Medha?

**Medha:** Global warming and human health.

**Prashant:** Then you are lucky, Medha.

**Sagar;** Why?

**Prashant:** Jija ji because Vikasis most suitable person to guide Medha, on this subject. It is a part of his job and fortunately he is here in the hour of need.

**Vasudha:** Vikas bhaiya do you look after these issue in WHO?

**Vikas:** Yes didi.

**Vasudha:** It means meeting will continue and Vikas will not be allowed to rest.

**Vikas:** No didi, I do not need rest. I am feeling fresh with Medha and Vivek.

**Vasudha:** Ok, then let me take the leave. I have see arrangements for lunch.

*(footstep, Vasudha exists).*

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

#### **Scene-4**

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

**Place:** Drawing room.

*(Medha, Vivek, Prashant and Vikas are talking)*

**Medha:** Vikas uncle you told us there are number of diseases which were considered eloped from earth are re-emerging.

**Vivek:** Which One?

**Vikas:** Not one but many, such as Anthrax, Monkey pox, Zika Virus, Cholera, Dengue, West Nid Virus, Hanta Virus etc.

**Prashant;** Now these are coming back, emerging in new areas.

**Vikas:** In July 2016 herds of reindeers started getting anthrax infection. In a short period and 2,300 reindeers died due to anthrax disease.

**Vivek:** Anthrax, what is this?

**Vikas:** This infection affects cattle and pet animals caused by bacteria, Anthrax bacillus. Half of the infected cattle die in no time.

**Prashant;** The people who look after cattle do also get this infection from affected cattle.

**Medha:** Is it dangerous for humans also?

**Vikas:** Yes, in humans, it affects skin, lungs and intestine. The disease in which lungs are affected is called "Pulmonary Anthrax". Half of the patients of pulmonary anthrax eventually die.

- Medha:** But we have a vaccine for Anthrax, which was originally made by Louise Pasture.
- Vikas:** Due to this vaccine, we could wipe out this disease in early 20<sup>th</sup> Century. Last patient of anthrax was seen in 1941.
- Medha:** Then what happened in 2016, how it re-emerged?
- Vikas:** Quite interesting. Probably carcass of a reindeer died of anthrax was buried beneath the layers of hard ice could “permafrost”, 75 years back.
- Prashant:** It remained locked in permafrost until bizarre warm summer temperature thawed the frozen soil and the corpse inside released the anthrax bacteria which were in suspended animation for 75 years.
- Medha:** Looks like another Jurassic Park story.
- Vikas:** In short time, 72 people including 41 children were hospitalized and one 12 years old child and his grandmother died of anthrax.
- Medha:** Very sad and surprising.
- Vikas;** They day may come when you will not be surprised on such happenings.
- Vivek:** Why Vikas uncle?
- Vikas:** This is not only the story of anthrax, this is happening with Zika virus disease too.
- Vivek:** Zika Virus?
- Vikas:** Yes, Zika virus resembles with Dengue and Chikungunya virus. All these three are spread by Ades aegypti, a day time mosquito which can breed in bottle cap’s worth of rainwater.
- Medha;** I know about Dengue fever. In this platelets in the blood are reduced in number and rarely bleeding may occur from different parts of body, which may kill the patient.
- Prashant:** Chikungunya is also a viral fever with severe joint pain. There is no cure for this disease and treatment is focused only on relieving pain and fever.
- Vikas:** Now it has been identified in over 60 countries across the world.
- Vivek:** Alarming.

**Vikas:** Zika virus is also spread by Aedes mosquitoes. First case of Zika virus infection in humans was reported in 1960 in Nigeria.

**Medha:** so it is a recently discovered disease?

**Vikas:** Yes, for many years, it was limited to countries falling within a small strip around equator such as Central Africa Republic, Egypt Gabon Sierra Leon, Tanzania, Indonesia, Malaysia, Philippines, Thailand, and Vietnam etc.

**Vivek:** But now?

**Vikas:** Few patients of Zika were seen in 2014 in French Polynesia and Ester Island. In 2015 Brazil observed an epidemic of microcephaly.

**Vivek:** Microcephaly, what is this?

**Prashant:** Microcephaly means small size of the head. Then it was discovered that the cause of babies born with small head is Zika Virus infection in their mothers during pregnancy.

**Vikas:** Usually Zika virus does not cause much discomfort in the patient but is devastating in pregnant women causing smaller head size in that unborn child which may including low IQ levels later in life.

**Medha:** was epidemic of Zika in Brazil due to global warming and climatic change?

**Vikas:** Yes, this epidemic started after heavy rains in Southern Brazil and Uruguay in preceding winters.

**Prashant:** These rains cause much stagnant water bodies, which are favorable breeding grounds for Aedes mosquitoes.

**Vikas:** Same thing may happen with Cholera also.

**Prashant:** In our childhood cholera happened to be a common disease, killing thousands of people every year but in last 50 years it is disappearing gradually.

**Vikas:** No Prashant, cholera is reemerging now. Many patients cholera are found in developed countries too.

**Medha:** Why vikas uncle?

**Vikas:** Cholera is spread by houseflies. These houseflies grow rapidly in hot and moist atmosphere. In our last meeting at WHO headquarter specialist were worried about reemerging of cholera.

- Medha:** Thawing of permafrost may reintroduce many any diseases in future.
- Vikas:** Not any but many, such as smallpox which had been declared nonexistent in 1980.
- Medha:** Vikas uncle, can we have altogether new diseases due to these climatic changes..... I mean the diseases which were never existed before.
- Vikas:** It may happen Medha. In 2015 scientists discovered a giant virus which was active even after buried for 30,000 years under the ice sheets.
- Vivek:** Amazing!
- Vikas:** But fortunately it invades a type of amoeba only. But this may happen to some other organism with a capacity to invade humans also.
- Prashant:** This may be very dangerous.
- Vikas:** Of course, because for such disease we will be helpless because for these diseases neither we have drugs and vaccines nor our bodies would have immunity against them.
- Medha:** Like a science fiction movie.
- Vikas:** World Health Organization published a list of such diseases which have the potential of being an epidemic.
- Vivek:** Which one?
- Vikas:** These are Creman Congo Fever, Nipah Virus Disease, Rift Valley Fever, Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome.
- Prashant;** Probably, we do not have vaccine against any of these?
- Vikas:** yes Prashant you are right, till now we do not have effective drugs and vaccines against these viral diseases, prevention is the only way out.
- Medha:** ....and that is possible by decreasing the rate of global warming.
- Prashant:** .....and this needs, better understanding, commitment and cooperation.

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

**Narrator:**

Friends, today you listened about emerging diseases due to global warming and associated climate changes. It is true that we cannot halt or reverse these climate changes altogether. But we can decrease the rate of these changes by making some adjustment in our lives by becoming friend of nature. So start it today to save our tomorrow.

In the next episode of science radio serial (name of the serial) we will discuss about (excerpts of next episode). So don't forget to tune in your radio, same day, same time, till then NAMASKAR.