

A Study On The Impact Of Climate Change On Health Condition Of The People Living In Coastal Region Of Cuddalore

***A. Arulmozhi & ** Dr. T. Sezhian**

Abstract

Climate Change has a number of immediate and long-term impacts on the fundamental determinants of human health. There exists a close association between human health and climate change. The Tamil Nadu coast is highly vulnerable to a wide range of the Climate Change related events, particularly cyclones and floods that cause inundation of low lying coastal areas resulting in damages to crops and property. As per Indian Meteorological Department, a large number of the total cyclonic storms generated in the Bay of Bengal are passing through the Tamil Nadu state. Of the total population, about 47 percent live in the coastal areas and their livelihoods mainly depend on agriculture and fishing activities, which are highly susceptible to adverse climatic conditions.

The Climate Change is anticipated to have a long-term impact on human health, marine and terrestrial ecosystems, water resources and vegetation. Climate Change impacts are discussed in the context of potential rise in sea-level, accelerating sea erosion, increasing risks from cyclones and storms. It is evident to note that the ongoing flooding and inundation are due to backwater and freshwater floods, droughts and increasing salinisation of land. Climate Changes in temperature, precipitation and humidity have direct and indirect potential impacts on human health in the coastal regions. The preliminary assessment indicates that there is an increase in mortality rates due to cardiovascular and respiratory illnesses, thermal stress, and increased frequency of infectious vector borne diseases in the region. With this background, the paper deals with the health problems faced the people living along the coastal villages in Cuddalore district.

Key Words: Climate Change, Impacts on Human health, Coastal region

* **Ms. A. Arulmozhi**, Ph.D. Scholar, Department of Economics, Annamalai University

** **Dr. T. Sezhian**, Associate Professor & Supervisor, Department of Economics, Annamalai University, Deputed to, Dharmapuram Gnanambigai Government Arts College for Women, Mayiladuthurai.

Introduction

Climate Change has a number of immediate and long-term impacts on the fundamental determinants of human health. There exists a close association between human health and climate change. The Tamil Nadu coast is highly vulnerable to a wide range of the Climate Change related events, particularly cyclones and floods that cause inundation of low lying coastal areas resulting in damages to crops and property. As per Indian Meteorological Department, a large number of the total cyclonic storms generated in the Bay of Bengal are passing through the Tamil Nadu state. Of the total population, about 42 per cent live in the coastal areas and their livelihoods mainly depend on agriculture and fishing activities, which are highly susceptible to adverse climatic conditions.

The Climate Change is anticipated to have a long-term impact on human health, marine and terrestrial ecosystems, water resources and vegetation. Climate Change impacts are discussed in the context of potential rise in sea-level, accelerating sea erosion, increasing risks from cyclones and storms. It is evident to note that the ongoing flooding and inundation are due to backwater and freshwater floods, droughts and increasing salinisation of land. Climate Changes in temperature, precipitation and humidity have direct and indirect potential impacts on human health in the coastal regions. The preliminary assessment indicates that there is an increase in mortality rates due to cardiovascular and respiratory illnesses, thermal stress, and increased frequency of infectious vector borne diseases in the region. With this background, the paper deals with the health problems faced the people living along the coastal villages in Cuddalore district.

The impact of natural disasters like floods, cyclones and rising sea levels are evident in many coastal pockets of Tamil Nadu. A preliminary survey of the coastal districts in the state revealed that Cuddalore district has been the worst affected of all districts in the recent past, with the impact of tsunami in 2004, cyclone Thane in 2011 and cyclone, Neelam in 2012, creating a detrimental impact on coastal communities

and their activities, particularly fishing. This has in turn affected their livelihood to a great extent.

The effects of global warming include its effects on human health. The observed and projected increased frequency and severity of climate related impacts will further exacerbate the effects on human health. Fishermen are at higher risk of drowning and work related traumatic injuries, asphyxiation, skin allergies, gastric, skin and esophageal cancers and lesions. Exposure (sun, weather extremes) conditions are also been observed to be health concerns for fishermen. Isolated working conditions, long shifts without sufficient rest, adverse weather, lack of formal safety training, inadequate personal protective equipment, and work related stress have been attributed to the increase risk associated with fishing.

The health problems experienced by the fishermen are back pain, burning in the eyes, scratching and stings injury, skin allergy, shoulder pain and muscle cramps and knee and joint pain.

IMPACT ON DISEASES

Impact on Vascular Disease:

Disease Erythromelalgia is a vascular disease that is commonly triggered by the involvement of change in temperature, which leads to syndromes including burning pain, increased temperature, erythema and swelling, of mainly the hands and feet that are affected. Epidemic Erythromelalgia due to a sharp decline in temperature followed by a capillaries increase of temperature and the effects on the body. The intense expansion of capillaries irritate the nerve endings around and thus lead to symptoms including burning pain, increased temperature, erythema and swelling. As climate change proceeds, more Erythromelalgia outbreaks may occur because of the extreme weather events that are projected to increase in coming decades.



Erythromelalgia

Impact on Infectious Diseases

Warming oceans and a changing climate are resulting in extreme weather patterns which have brought about an increase of infectious diseases both new and re-emerging. These extreme weather patterns are creating extended rainy seasons in some areas and extended periods of drought in others, as well as introducing new climates to different regions. These extended seasons are creating climates that are able to sustain vectors for longer periods of time, allowing them to multiply rapidly, and also creating climates that are allowing the introduction and survival of new vectors.

Impact of Warmer and Wetter Climates

Mosquito-borne diseases are probably the greatest threat to humans as they include Malaria, Elephantiasis, Rift Valley fever, Yellow fever and dengue fever. Studies are showing higher prevalence of these diseases in areas that have experienced extreme flooding and drought. Flooding creates more standing water for mosquitoes to breed, as well as shown that these vectors are able to feed more and grow faster in warmer climates. As the climate warms over the oceans and coastal

regions, warmer temperatures are also creeping up to higher elevations allowing mosquitoes to survive in areas they had never been able to before. As the climate continues to warm there is a risk that malaria will make a return to the developed world.

Ticks are also thriving in the warmer temperatures allowing them to feed and grow at a faster rate. The Black legged tick, a carrier of Lyme disease, when not feeding, spends its time burrowed in soil absorbing moisture. Ticks die when the climate either becomes too cold or when the climate becomes too dry, causing the ticks to dry out. The natural environmental controls that used to keep the tick populations in check are disappearing and warmer and wetter climates are allowing the ticks to breed and grow at an alarming rate, resulting in an increase in Lyme disease, both in existing areas and in areas where it has not been seen before.

Other diseases on the rise due to extreme weather include Hantavirus, Schistosomiasis, onchocerciasis (river blindness), and tuberculosis. It also causes the rise in heavy fever, as when the weather gets warmer there is a rise in pollen levels in the air. Warmer temperatures may also lead an increase in aggression levels. Research has shows links between higher temperatures and increased aggressive and criminal behaviour. This can be seen by the rise in the rate of criminality during the warmer summer months.

Malaria

Malaria is a mosquito-borne parasitic disease that infects humans and other animals caused by microorganisms in the Plasmodium family. It begins with a bite from an infected female mosquito, which introduces the parasite through its saliva and into the infected host's circulatory system. It then travels through the bloodstream into the liver where it can mature and reproduce. The disease causes symptoms that typically include fever, headache, shaking chills, anemia, and in severe cases can progress to coma or death.

Climate is an influential driving force of vector-borne diseases such as malaria. Malaria is especially susceptible to the effects of climate change because

mosquitoes lack the mechanisms to regulate their internal temperature. This implies that there is a limited range of climatic conditions within which the pathogen (malaria) and vector (a mosquito) can survive, reproduce and infect hosts. Vector-borne diseases, such as malaria, have distinctive characteristics that determine Pathogenicity. These include the survival and reproduction rate of the vector, the level of vector activity and the development and reproduction rate of the pathogen within the vector or host. Changes in climate factors substantially affect reproduction, development, distribution and seasonal transmissions of malaria.

Female mosquitoes will need more food (human/animal blood) to sustain life and to stimulate production of eggs. This increases the chance of spread of malaria due to more human contact and a higher number of the blood sucking insects surviving and living longer. Mosquitoes are also highly sensitive to changes in precipitation and humidity. Increased precipitation can increase mosquito population indirectly by expanding larval habitat and food supply. These prime temperatures are creating large breeding grounds for the insects and places for the larvae to mature. Increased temperature is causing snow to melt and stagnant pools of water to become more common. Bugs that are already carrying the disease are more likely to multiply and infect other mosquitoes causing a dangerous spread of the deadly disease.

Climate change has a direct impact on people's health in places where Malaria is not prevalent. In communities of higher altitudes in Africa and South America, people are at higher risk for developing malaria in recent years because of an increase temperature. Mosquitoes are sensitive to temperature changes and the warming of their environment will boost their rates of production. A fluctuation of two or three degrees is creating exceptional breeding grounds for mosquitoes, for larvae to grow and mature mosquitoes carrying the virus to infect people that have never been exposed before. This is a severe problem because people in these communities have never been exposed to this disease causing an increased risk for complications from malaria such as cerebral malaria (a type of malaria that causes mental disability, paralysis and has a high mortality rate) and death by the disease. Residents of these

communities are being hit hard by malaria because they are unfamiliar with it; they do not know the signs and symptoms and have little to no immunity.

If there is a slight discrepancy in the normal temperature, the perfect conditions for the insects to multiply are created. People that have never been infected before are unknowingly at risk for this deadly disease and do not have the immunity to combat it. An increase in temperature has the potential to cause a widespread epidemic of the disease that has the capacity to wipe out entire populations of people. It is important to track the prevalence, species and number of insects carrying the disease as well as the number of humans infected in countries and places that have never seen malaria before. It is simple for the slightest of fluctuation in temperature to cause a catastrophic epidemic that has the possibility to end the lives of many innocent and unsuspecting people.

Dengue Fever

Dengue fever is an infectious disease caused by **Dengue viruses** known to be in the tropical regions. It is transmitted by the mosquito *Aedes* or *A. aegypti*

The greater incidence of this disease is believed to be due to a combination of urbanization, population growth, increased international travel and global warming. The same trends also led to the spread of different serotypes of the disease to new areas, and to the emergence of **dengue hemorrhagic fever**. There are four different types of viruses in dengue fever. If someone is infected with one type of dengue virus, he or she will have permanent immunity to that type of dengue virus, but will have short term immunity to the other type of dengue fever. Some of the symptoms of dengue fever are fever, headache, muscle and joint pains and skin rash.

Dengue fever used to be considered a tropical disease, but climate change is causing dengue fever to spread. Dengue fever is transmitted by certain types of mosquitoes, which have been spreading further and further north. This is because some of the climate changes that are occurring are increased heat precipitation and humidity which create prime breeding ground for mosquitoes.

The hotter and wetter a climate is, the faster the mosquitoes can mature and the faster the disease can develop. Another influence is the changing El Nino effects that are affecting the climate to change in different areas of the world, causing dengue fever to be able to spread.

There are many things that can be done, both on a governmental level and on an individual basis. One improvement would be having a better system of detecting when dengue outbreaks may happen. This can be done by monitoring environments, such as temperatures, rainfall and humidity that would be attractive to these types of mosquitoes and help them to flourish. Another useful plan is to educate the public by letting them know when a dengue outbreak is occurring and what they can do to protect themselves.

Tick Borne Disease

The effect of climate on the tick life cycle is one of the more difficult projections to make in relation to climate and vector-borne disease. Unlike other vectors, tick life cycles span multiple seasons as they mature from larva to nymph to adult. Further, infection and spread of diseases such as Lyme disease happens across the multiple stages adding additional variables to consider. Infection of ticks happen in the larval/nymph stage (after the first blood meal) when they are exposed to *Borrelia burgdorferi* (the spirochete responsible for Lyme disease), but transmission to humans doesn't occur until the adult stages. Initial symptoms of tick-borne infections are generally quite similar to that of other viral illnesses. This includes fever, headache, fatigue, and general malaise.

Impact on Mental Health

While the physical health impacts of climate change are well known, the impact on mental health has only begun to be recognized in the last decade. According to American Psychologist Clayton & Doherty in 2011, concluded that global climate change is bound to have substantial negative impacts on mental health and wellbeing, effects which will primarily be felt by vulnerable populations and

those with pre-existing serious mental illness. Three classes of psychological impacts from global climate change: direct, indirect, and psychosocial.

Direct Impacts

Direct impacts on mental health happen when a community experiences extreme weather and changed environment. Direct impacts like landscape changes, impaired place attachment and psychological trauma are all immediate and localized problems resulting from extreme weather events and environmental changes. Extreme weather events cause negative changes to landscape and agriculture. This leads to communities facing economic aspects, especially for communities that use agriculture as a main source of income. After economic fall, communities face loss of livelihoods and poverty. Many communities will also face isolation, alienation, grief, bereavement, and displacement from these effects. Individuals will have an increased rate of anxiety and emotional stress. The rate of effects on mental health increases in already-vulnerable communities. Clayton reinforces that the more powerful the extreme weather event, and the more frequent these weather events are, the more damage is done to the mental health of the community. Some of the extreme weather events responsible for these mental health changes include wildfires, earthquakes, hurricanes, fires, floods, and extreme heat.

Indirect Impacts

Indirect impacts on mental health occur via impacts on physical health and community wellbeing. Physical health and mental health have a reciprocal relationship. If the physical health of an individual is negatively impacted, the decline in mental health will soon follow. These impacts are more gradual and cumulative. They are threats to emotional wellbeing through concern and uncertainty about future risks. They are also large-scale community and social effects, like conflicts related to migration and subsequent shortages or adjustment after a disaster. Extreme weather events play a major role here; their impacts can be indirect, not just direct. This is due to the effect on physical health from extreme weather events. Each extreme weather

event affects humans in different ways, but they all lead to the decline of mental health. Heat indirectly causes mental health issues through physical health issues.

The World Health Organization presents the fact that high extreme heat is directly related to certain ailments like cardiovascular disease, respiratory disease, and asthma. As climate change continues, heat will continue to rise and these problems will exacerbate. These physical problems lead to mental health problems. As physical health worsens and is less curable, mental stability starts to deteriorate.

Oceans and Human Health

Perhaps one of the most recent adverse effects of climate change to be explored is that of ocean acidification. Our oceans cover approximately 70 percent of the Earth's surface and support a diverse range of ecosystems, which are home to over 50 percent of all the species on the planet. Oceans regulate climate and weather as well as providing nutrition for a vast variety of species, humans included. Covering such an extensive part of the planet has allowed the oceans to absorb a large portion of the carbon dioxide (CO₂) from the atmosphere. This process is part of the carbon cycle in which the fluxes of carbon dioxide (CO₂) in Earth's atmosphere, biosphere and lithosphere are described. Humans have drastically added to the amount of carbon dioxide (CO₂) in the atmosphere through the burning of fossil fuels and the process of deforestation. Oceans work as a sink absorbing excess anthropogenic carbon dioxide (CO₂). As the oceans absorb anthropogenic carbon dioxide (CO₂) it breaks down into carbonic acid, a mild acid, this neutralizes the normally alkaline ocean water. As a result, the pH in the oceans is declining. In the research surrounding global climate change we are only just beginning to realize that our oceans can sequester a finite amount of (CO₂) before we start seeing impacts on marine life that could lead to devastating losses. Acidification of our oceans has the potential to drastically alter life as we know it from extreme weather patterns and food scarcity to a loss of millions of species from the planet all of these consequences hold the potential to directly affect human health.

CONCLUSION AND SUGGESTIONS

Conclusion

Global climate change is likely to change the frequency of extreme weather events: tropical cyclones may increase as sea surface waters warm; floods may increase as the hydrological cycle intensifies; and heat waves may increase in midcontinental locations. The production of various air pollutants and of allergenic spores and pollens would be affected by warmer and wetter conditions. Climate change also is expected to affect health via various indirect pathways, including the patterns of infectious diseases; the yield of food-producing systems on land and at sea; the availability of freshwater; and, by contributing to biodiversity loss, may destabilize and weaken the ecosystem services upon which human society depends. Adaptations to the health hazard posed by global climate change can be both proactive and reactive and can occur at the macro, and micro-scales; that is, at the population, community and individual levels. Climate change represents a one-off global experiment so there will be limited opportunity to carry out preliminary evaluation of adaptation options.

From the discussion of climatic-change on human health problems faced the people living along the coastal villages are concluded and suggestion are as follows.

Suggestions

1. Conducting awareness programme to redeem them from their poverty these will include encourage them to save at least a minimum amount from their earnings. Encourage them to live a contented life with what they have.
2. In order to spend the time fruitfully they should be encouraged to occupy themselves with some form of self employment particularly off season in fishing.
3. The government should pay their attention to recover socio economic condition of families affected by the unpredictable climate change. Particularly, the government should provide necessary support to fishing labourers families. Because, they are

suffering to manage their day to day life for the reason of impact of unpredictable climate change.

4. The government should provide the compensation to person who lost their fishing equipments due to the unpredictable climate change.
5. The village dweller told that, the government doesn't provide the loan for upgrading their work condition. So the government should even arrange or provide a loan for the labourer, fishermen or small boat owner to start the fishing activities individually.

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