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#BeatAirPollution

World Environment Day — 5 June 2019

António Guterres
Secretary-General of the United Nations

THE THEME for this year's World Environment Day is air pollution. All around the world — from megacities to small villages — people are breathing dirty air. An estimated 9 out of 10 people worldwide are exposed to air pollutants that exceed World Health Organization (WHO) air quality guidelines. This is lowering life expectancy and damaging economies across the planet.

To improve air quality, we must know our enemy. Deaths and illnesses from air pollution are caused by tiny particles that penetrate our defences every time we fill our lungs. These particles come from many sources: the burning of fossil fuels for power and transport; the chemicals and mining industries; the open burning of waste; the burning of forests and fields; and the use of dirty indoor cooking and heating fuels, which are major problems in the developing world.

This polluted air kills some 7 million people each year, causes long-term health problems, such as asthma, and reduces children's cognitive development. According to the World Bank, air pollution costs societies more than $5 trillion every year.

Many air pollutants also cause global warming. Black carbon is one such example. Produced by diesel engines, burning trash and dirty cookstoves, it is extremely harmful when inhaled. Reducing emissions of such pollutants will not only improve public health, it could alleviate global warming by up to 0.5°C over the next few decades.

Tackling air pollution therefore presents a double opportunity, as there are many successful initiatives that both clear the air and reduce greenhouse-gas emissions, such as phasing out coal-fired power plants and promoting less polluting industry, transport and domestic fuels. With investments in renewable energy sources outstripping those in fossil fuels every year, the rise of clean energy is helping globally. Cleaner transport is also growing around the world.

It is in such initiatives, designed to improve air quality and fight climate change, that hope lies. I urge everyone attending the Climate Action Summit that I am convening in September to draw motivation from such examples. There is no reason why the international community cannot act. Precedent exists in the Montreal Protocol. Scientists identified a grave threat to public and planetary health, and Governments and businesses acted to successfully protect the ozone layer.

Today, we face an equally urgent crisis. It is time to act decisively. My message to Governments is clear: tax pollution; end fossil fuel subsidies; and stop building new coal plants. We need a green economy, not a grey economy.

On World Environment Day, I ask each of us to act so we can breathe more easily. From pressuring politicians and businesses to changing our own habits, we can reduce pollution and beat climate change.

Mix, throw and grow:
Greening Pakistan with seed balls

Courtesy: temasek.com.sg

Pakistan has one of the highest rates of deforestation in Asia, but these residents are hoping to change that with a little bit of ingenuity — and a ball of fun.

Sustainability is are the core of everything we do at Temasek. This article is part of Generational Investing, an ongoing series featuring individuals and activities that create a better world for future generations, through creativity, innovation and sustainable practices.

Seed Balls to Restore Forests

At the northern corner of Islamabad, the capital of Pakistan, sits the majestic Margalla Hills National Park (MHNP), replete with lush forests and gentle rolling hills that a diverse range of flora and fauna calls home.

Just a short 30-minute drive away from Islamabad's busy city streets, MHNP is an oasis of peace and serenity for many urban dwellers who visit its numerous hiking trails.

Its extensive parklands, however, are now under threat due to a host of problems, including littering, clearing of forest land and aggressive logging.

"More and more forestland in Pakistan is being cleared for the construction of houses and road networks to [accommodate] population growth. I have [been witnessing] the loss of forest cover in our country since young," shares the managing director of engineering consultancy firm SMEC Oil and Gas Tassadaq Malik, who grew up traversing the trails of MHNP.

Troubled by the loss of biodiversity and dwindling green spaces, Tassadaq and a group of like-minded residents in Islamabad are stepping up.

Happy Trees' Friends

More than just your average citizens, Tassadaq and his friends are members of the "Throw and Grow" initiative, a volunteer effort organised by SMEC Oil and Gas's staff and family members, and supported by the Islamabad Wildlife Management Board (IWB).

With the help of the IWB and local villagers who live at MHNP, the volunteers collect seeds of native tree species such as the lebbek and golden shower tree.

Healthy seeds are first picked out and placed in the middle of a mixture of clay and organic compost. Then, the mixture is rolled into a ball, forming an outer layer that protects the seeds from being eaten by animals and insects,

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Haseeba Maryam

Air pollution sources and impacts in Pakistan

Air pollution in Pakistan's urban regions is among the most severe environmental problem in the world and it caused considerable human health hazard and damage to the economy. Pakistan is one of the most .....

Air pollution sources and impacts in Pakistan

Haseeba Maryam

Trends of air pollution in Pakistan suggest that, without achieving targeted measurements for the reduction of urban air pollution, this issue could become even worse in upcoming times and may affect individuals at higher rate. According to economic calculations of 2010, In South Asia, Pakistan is most urban populated country; about 37% of its population is located in urban areas. It is also predicted that more than 60% of Pakistan's population will become urbanize by 2050. Urbanization and industrialization when combined with motorization, it leads to the increased deterioration of urban air quality

Air pollution in Pakistan's urban regions is among the most severe environmental problem in the world and it caused considerable human health hazard and damage to the economy.

Pakistan is one of the most populated countries of South Asia and it is going through simultaneous motorization and enhanced utilization of energy. Quality of life and human health in large urban centers is damaged by air pollution and also contributed to degradation of environment.

Air pollution sources:

Traffic

Over last 20 years, there is huge jump was observed in the number of vehicles in Pakistan which was from 2 million to 10.6 million which contributed to the annual growth rate of 8.5%. From the year 1991 to 2012, there is 450% increase was observed in the number of motorcycles and scooters and 650% increase was observed in the number of motorcars. The number of mobile sources boosted up highly after 2003.

Industries

Sufficient amount of air pollutants are emitting to air from those industries which are burning fossil fuel as a source of energy. Major contributors of poor quality of air are large-scale factories which use furnace oil having higher sulfur contents, some which are cement industries, fertilizer plants, sugar industries, steel mills and power plants. Large number of small or medium scale industries like waste recycles plants, brick kilns, re-rolling steel mills, recycling of steel and plastic forming factories are also contributed at higher rates in urban air pollution. These industries also produces huge amounts of industrial waste comprises of wood, plastic, paper and tires. To overcome the electricity shortage problem usage of small diesel power generators also added-up in air pollution. Low or no maintenance of industrial appliances like boiler or generator also causes air pollution.

Burning of solid waste

Non-point sources like burning of solid waste also caused air pollution in Pakistan. According to estimations there is daily basis generation of about 54,000 tons solid waste is observed in Pakistan, most of which is burned for waste reduction. This unethical and unaware burning of solid waste lead to the production of toxic gases like carbon monoxide (CO), particulate matter (PM) and volatile organic compounds (VOCs) into the environment.

Agriculture

In Pakistan burning of crop residual is common practice followed by farmers which contributed to air pollution by producing particulate matter. Particulate matter in air cause some serious issues to human health and environment like production of smog, respiratory diseases, eye irritation, dust and many others.

Impacts

According to World Health Organization (WHO) in Pakistan, from 2007 to 2011 reported concentrations of particulate matter (PM), sulfur dioxide (SO2), and lead (Pb) were greatly higher than WHO guideline for air quality.

In Pakistan, top priority environmental issues are air pollution, water scarcity, lack of sanitation and hygienic conditions. As a result of these problems public have to face problems like higher premature mortalities and learning disabilities. Almost 35% Pakistanis are living in urban areas out of which lower class community faced more outdoor air pollution and affected adversely.

In 2005, due to ambient air pollution in urban areas more than 22,600 deaths of adult population was observed. Only outdoor air pollution caused almost 80,000 admissions in hospitals each year, from which 8,000 cases of chronic bronchitis and about 5 millions cases are of poor respiration in children under the age of 5 years.

South Asian regions have highest ratio of harm caused by air pollution in the urban areas of Pakistan and in these areas high profile cases of death and depression was observed which also include traffic accidents. All of these evidences are enough to confirm the urgent need to improve air quality in Pakistan, but unfortunately this issue attained least attention. This issue must include as a priority issue while making policies related to environmental protection of Pakistan.

Current situation, along with industrialization and urbanization, indicated that quality of air in Pakistan may get worse over passing time period unless required interventions are adopted in short span of time and also there is need of strengthening the institutional and technical capabilities of the organizations working for air quality management (AQM).

There is also dire need of allocation of resources to AQM as it acts as main pillars for green growth of country. According to World Bank, countries which choose "clean and sustainable" development are growing much faster than the countries who achieve development at the cost of environment.

Conclusion

Above mentioned trends of air pollution in Pakistan suggest that, without achieving targeted measurements for the reduction of urban air pollution, this issue could become even worse in upcoming times and may affect individuals at higher rate. According to economic calculations of 2010, In South Asia, Pakistan is most urban populated country; about 37% of its population is located in urban areas. It is also predicted that more than 60% of Pakistan's population will become urbanize by 2050. Urbanization and industrialization when combined with motorization, it leads to the increased deterioration of urban air quality.

Government of Pakistan (GoP) should seriously think on implementation of priority interventions in the short term and building the institutional and technical capacity to adopt additional measures over the medium and long term.

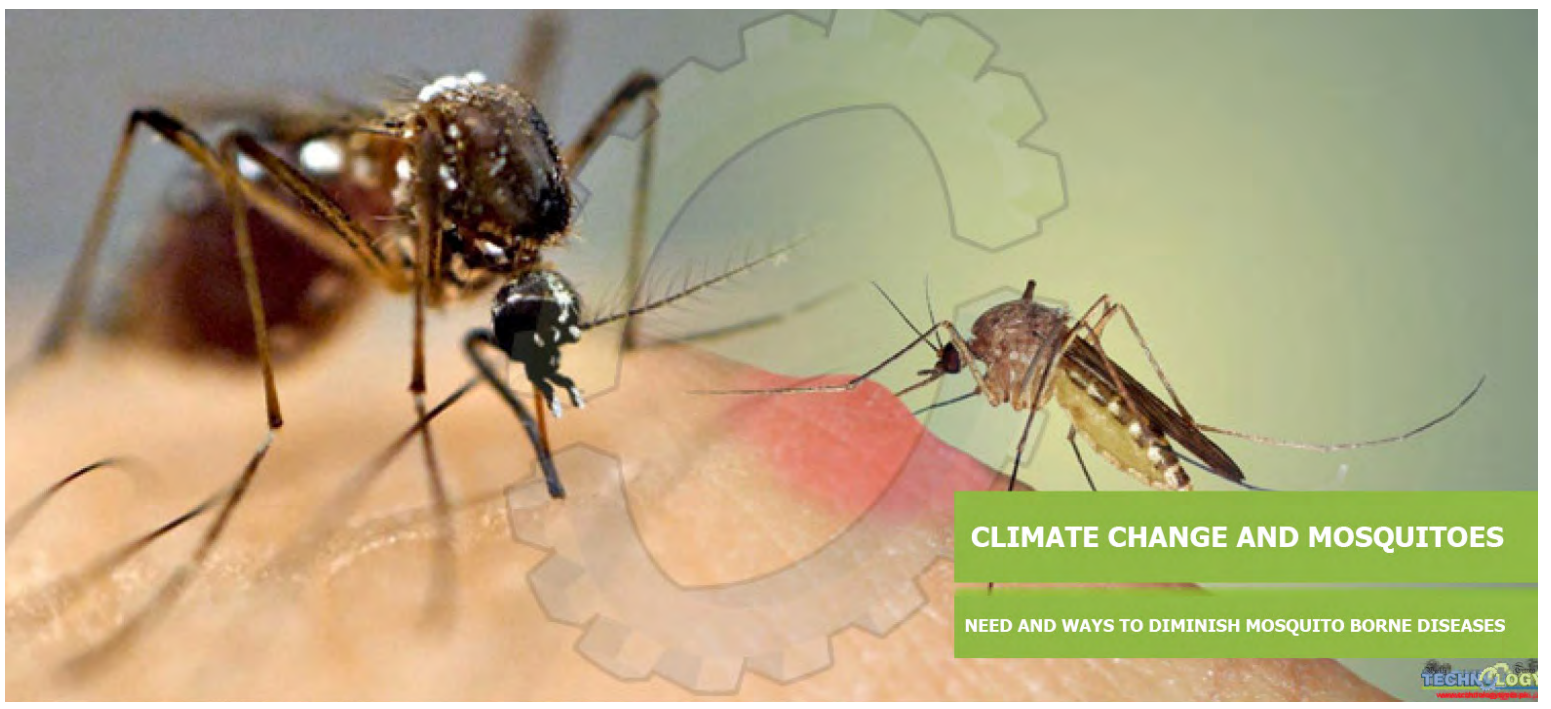
Toqeer Ahmed

Climate Change and mosquitoes: need and ways to diminish mosquito borne diseases

Climate change is impacting water related diseases throughout the world and one of the most significant public health complications. Some mosquitoes are the important vectors of diseases like malaria, dengue .....

Climate Change and mosquitoes

Toqeer Ahmed[1] and Muhammad Mukahtar[2]



Climate change is impacting water related diseases throughout the world and one of the most significant public health complications. Some mosquitoes are the important vectors of diseases like malaria, dengue fever, dengue haemorrhagic fever, chikungounia, yellow fever, filariasis etc. Vectors growth is influenced by many environmental factors like urbanization, deforestation, rainfall, travel and trade.

According to American mosquito control association, 40% of the world's population is susceptible to malaria and one child is killed after every 40 second by malaria. Thousands of people in Pakistan were diagnosed with dengue fever since 2010. According to WHO, 16580 cases and 257 deaths were caused by dengue fever in Lahore while 5000 cases and 60 deaths from rest of the country since 2010.

Malaria is caused by biting female mosquitoes named Anopheles (Anopheles gambiae; the most active one) which transmit plasmodium into the blood of human and mostly active at night. Malaria is caused by transmission of parasites Plasmodium malaria, P. falciparum and other species. They lay eggs in stagnant water, pools etc. They complete their life cycle in 7-20 days with four different stages.

Transmission and severity of disease depends on areas and age of the person. High temperature affects the virulence capacity of Anopheles. Dengue fever is a mosquito related viral disease spread through biting of mosquito Aedes aegypti and A. albopictus which are active both in dusk and dawn. Dengue fever spread through four closely related viruses or stereotypes 1-4. Unlike Anopheles, Aedes aegypti lays their eggs in clean water and must feed on blood to lay eggs.

High temperature kills mosquitoes but warmer temperature increases their biting capacity and reproduction. Symptoms appear 3-7 days after biting and last 3-10 days. This disease spread through mosquito bite and rarely transfer through organ transplants and blood transfusion.

These vectors related diseases are influenced by climatic factors like temperature, humidity, change in rainfall pattern, floods along with urbanization and anthropogenic activities. Climate controls the distribution, life cycle and efficiency of transmission of diseases.

Malaria and dengue fever flourish after monsoon especially during August to November. Warm and humid climate support the growth and transmission of parasites through vectors. Surface water, vegetation, mid-season temperature supports the growth and provides habitat for breeding.

With the changing rainfall pattern and increase in temperature may change the mosquito species, population density and geographic distribution. Low temperature (<10oC) kills the Aedes eggs, larvae and adults. Yi and coauthors (2014) reported the effect of global warming on mosquitoes and related diseases and their control strategies.

Numerous ways are used to control mosquitoes which include chemical, biological, environmental management, personal protective measures and physical methods. Chemical methods include the use of tested and recommended insecticides (Pyrethroids for killing adults and larvae) should be used one month before transmission time.

These should be used under supervision of experts and trained staff (a team of Entomologist, vector control supervisor and field staff). Chemical spray or aerial spray of chemicals by low flying aircrafts (to cover large area or when there is limited access by vehicles) should be accomplished at their habitats, resting sites and breeding places after regular intervals of 2-3 weeks in homes for killing vectors. Spray should be done on all sleeping rooms, washrooms, walls corners etc.

For dengue control; manmade habitats should be screened and Methoperene/Altosid (Briquets) and Diflubenzuron (Dimlin) should be applied. As reported by Yi and coauthors (2010), diesel oil is effective in killing larvae and pupae of the mosquitoes in small water resources but this can kill unwanted aquatic animals. They suggested golden bear oil but only available in USA.

They suggested various ways to control mosquitoes like mosquito's traps, genetically modified male mosquitoes, mosquito counter device etc. As suggested in guidelines for control of vectors of public health importance (2010) by Ministry of Health that during epidemic or outbreak indoor fogging or space spraying is important for the control of dengue.

Larvicides should be applied on clean and stagnant water. In case of drinking water Abat/Temephos, Methoperene/Altosid (XR Briquets), Bacillus Thuringienesis (BT), Diflubenzuron (Dimlin) are recommended larvicides. When using for drinking water dose related manufacturer instruction should strictly apply. Alphacypermethrin 10%, Deltamethrin 1.5% and Sumilarv are commonly used insecticides for the control of mosquitoes.

Biological methods include growth of insecticide repellents plants in home, gardens and nearby places. These plants include basil (Ocimum bacillicum), lemon thyme (Thymus citriodorus), lemon grass (Cymbopogon citratus), Lemon balm (Melissa officinalis), sweet wormwood (Artemisia annua) and rosemary (Rosmarinus officinalis).

Crushed leaves can be applied on the skin as mosquito repellent and an effective remedy but this will be of short duration. Natural oils like Neem (Azadirachta indica), Soya bean (Glycine max) oil and catnip (Nepeta cataria) are effective remedy which can be used as mosquito repellent.

Another biological method includes Bacillus thuringiensis a naturally growing bacterium that can eradicate larvae of the mosquito. This weapon can be used in standing water, ponds etc. which also safe to human beings and aquatic animals.

Various fish types like gold fish, cat fish are predators of mosquitoes, but a fresh water fish commonly known as mosquito fish (Gambusia affinis) is used in mosquito control program in California. This feed on larvae and eggs of mosquitos, other insects and fish eggs.

It is not recommended for water resources like lakes, rivers etc. containing other useful aquatic animals. Native fish or larvivorous fish can also be used for the control of mosquitoes as they are well adapted to the natural habitat. Dragonflies are good to control mosquito as adults feed on adult while larvae feed on mosquito's larvae.

These need special environment like water, vegetation; rocks etc. are useful for small ponds, gardens in home for controlling mosquitoes. Blue bird (Sialia spp.), frogs and toads are excellent predator of mosquito and their larvae.

Environmental management is important especially the controlling of mashes, open drains, standing water in the open fields etc. controlling marshes, surface water, gardening and waste management.

Personal protection measures include personal protective clothing, bed nets (long lasting insecticide treated nets and curtains at the doors), use of gauze in the doors and lotions for insect repellents. Picaridin/Icaradine and DEET are best recommended repellents can be used in emergency.

Cloth can be treated with Permethrin to control mosquitoes at the recommended dose 1.25mg/m2 after every five washing. Physical methods include closing the doors especially in the morning and evening etc.

With the changing climate, more attention is required from the experts, health department, before spread of dengue and malaria in Pakistan this year and in future. It is advisable that malaria and dengue control program should be a part of national policy of health with strong commitment of resources and implementation of policies.

Awareness and educating people among the community is very important about vector borne diseases especially mosquito related diseases like malaria and dengue fever. Awareness campaigns can be started from educational institutions, offices, corner meetings etc. Cleaning at household level with detergents, insecticides and other surface cleaning agents are highly recommended.

Media can play important role in spreading awareness through newspapers, TV programs, talk shows etc. Reduction of breeding sources and waste management campaign are very important at community level. Health protection campaigns should be the top priority.

This article is collectively authored by Toqeer Ahmed 1 and Muhammad Mukhtar 2. The authors work at the 1Centre for Climate Research and Development (CCRD), COMSATS University Islamabad, and 2Department of Zoonotic and Vector-Borne Diseases & Epidemic Investigation Cell, Public Health Laboratories Division, NIH-Islamabad.

Toseef Rehman

Changing environment and evolving organisms

Different organisms live in their environment. They interact with their environment. Interaction with the environment is the basic need of an organism. But not all organisms interact with their environment in the same.....

Changing environment and evolving organisms

Toseef Rehman

Different organisms live in their environment. They interact with their environment. Interaction with the environment is the basic need of an organism.

But not all organisms interact with their environment in the same way. We may have some examples here. As an organism living in deep sea have different way of living as compared to those who are living on the land. Then again if we talk about land animals they show different behaviour according to their surroundings. For example – a rat lives in a thickly grown forest with plenty of water; and a rat living in a desert having no or very less water supply.

This behaviour is innate from an organism that how he manages to live in his surroundings. If we clear observe this thing we come to know that this behaviour is actually forced by the environment.

Again we take the example of two rats living in the same two different environments, one in forest and the other one in desert; they are predated by same organisms with few exceptions and are predated by birds (hawks, owls and Kestrels etc.), Felines (bob cat, cougars), Snakes (rat snakes) and Weasels. These organisms save themselves by hiding themselves.

But when we talk about a forest and a desert, a forest has better places to hide as compared to the desert. So the rat in the desert is forced by the circumstances to become more active and agile as compared to the rat in forest.

Their body color also differs which help them to live in their respective environment. Not only the predator but also the other physical conditions like Temperature, air, food sources, availability of water and many other factors affect the organism to behave in a different way in his environment.

Here a question arises that if the origin of each organism is same then how they differ? Evolution helps us to answer this question. Actually the problems by the organism in one time changed the genetic makeup of coming generations to cope with that problem in a better way. So the organisms changes their physical behaviour and even metabolism of their body to become better adopted to their environment

When we talk about present time, our environment is changing continuously. Humans are playing key role in changing the environment. Humans are modifying the world in many ways, and not all of them for the better.

The changes we cause are often severe challenges to animals, plants and microbes in nature, from the introduction of pathogens or exotic invasive species to adding toxic substance or excessive nutrients, or causing climatic change. Often several changes occur at once.

If this modification will not be done in an environment friendly way the organism will be forced to keep on evolving and we should keep in the mind that not all time the is good. So the structure of life and organisms will totally change in future. This could prove very destructive.

From page 1: **Mix, throw and grow: greening Pakistan with seed balls**

while providing nutrients for the seeds to grow.

Next, comes the fun part: once shaped and formed, these seed balls are tossed by volunteers in places with proper conditions for germination. Many younger volunteers, especially children, often use slingshots to playfully launch their seed balls into the wild.

Once the seed balls land in an optimal environment, the seeds will germinate within three to four weeks, or six to eight weeks if they have a thicker seed coat, says Tassadaq.

Since June last year, hundreds of Islamabad residents have been partaking in this family-friendly activity.

"Parents are especially eager to bring their kids along because they see that this is a fun and meaningful contribution towards saving the environment," Tassadaq explains.

Seeds of Hope

Making and throwing seed balls may be a treat for kids, but the activity isn't all fun and games. Tassadaq estimates that this innovative method of planting trees has a success rate of between 25 and 35 percent, which is higher than conventional reforestation methods.

The seed ball initiative could go a long way in Pakistan's reforestations efforts, especially at a time when industry experts are warning that the country could risk losing all its forests within the next 50 years. According to the United Nations Food and Agriculture Organization (FAO), over one-third of Pakistan's forest area was lost in just two decades between 1990 and 2010.

The loss of forest area directly impacts the lives of numerous locals. More than 100 million people in Pakistan are said to be directly dependent on natural resources such as forests for their livelihoods, be it for food or trade.

This is where the "Throw and Grow" initiative comes in. Aside from helping to restore Pakistan's depleting forests, the activity also provides an additional source of income for local villagers.

SMEC Oil and Gas's staff and their friends and families pay villagers to gather the seeds, clay and organic compost needed to make seed balls. These seed balls are then sold to MHNP visitors, with sales from the proceeds poured back into the "Throw and Grow" initiative, making the project a self-sustaining one, explains Tassadaq.

Get the (seed) ball rolling! Residents, even the youngest ones, often gather at Margalla Hills National Park to make seed balls. Kids particularly enjoy making seed balls because it's fun!

While more needs to be done to reverse the country's deforestation crisis, Tassadaq is pleased that response to the initiative has been overwhelmingly positive so far. Among those who have expressed interest in distributing the seed balls on a much larger scale are the World Wide Fund for Nature and the Pakistan Air Force, he proudly adds.

"With the attention that our 'Throw and Grow' programme has been gaining, I believe that seed balls could soon be embraced as a popular method of reforestation here — and hopefully this could even bring about a green revolution in Pakistan."

Hammad Ur Rehman

Brain storming facts about climate change

Climate change is one of the most discussed word now a days, among the gatherings, wherever people gather they talk about it. But, we don't take steps to stop it. The humans are major reason for earth's climate change.....

Brain storming facts about climate change

Hammad Ur Rehman Bajwal, Muhammad Kasib Khan, Arsalan Zafar, Saad Salman Khan, Abdullah Khalid Chatha

Global warming is a long-term process, but that does not mean that every year will be warmer than the previous one. Day to day and year to year changes in weather patterns will continue to produce some unusually cold days and nights, and winters and summers, even as the climate warms. Sea ice is affected by winds and ocean currents as well as temperature. The pH of water is becoming lower, going towards acidic, so the sea creatures whom are composed of minerals like corals are composed of calcium carbonate they are getting dissolved readily, so it became very difficult for them to maintain their shells

Climate change is one of the most discussed word now a days, among the gatherings, wherever people gather they talk about it. But, we don't take steps to stop it.

The humans are major reason for earth's climate change. The atmosphere is getting warmed. The glaciers are melting and there is rise sea level. Now there are departments in every country whom are dealing with this issue. So scientific information is necessary for communities to decide in accordance to and make policies.

Greenhouse gasses play important role in climate warming. Such as CO2 (Carbon dioxide) absorb the infrared radiation emitted from the earth's surface. All of this is due to increased concentration of these gasses in the atmosphere. Roughly in last 100 years, the global average surface temperature has increased by 0.9 °C.

Along this the ocean is getting warmed. So, marked increase in sea level and decrease in arctic ice. All these events are due to increased concentration of greenhouse gasses.

Other greenhouse gasses like methane and nitrous oxide are also increasing. Human activities have disturbed the natural carbon cycle by buried fossil fuels and burning them for energy, thus releasing CO2 to the atmosphere.

In nature there is continuous exchange of CO2 in atmosphere by plants and humans. Plants release CO2 during photosynthesis and humans during process of respiration, it's a natural cycle which is going on by nature.

The additional CO2 from burning of fossil fuel and deforestation has disturbed the balance of the carbon cycle, because the natural processes are too slow to restore the balance, compared to the rates at which human activities are adding CO2 to the atmosphere. Adding more CO2 to the atmosphere will cause surface temperatures to continue to increase.

As the atmospheric concentrations of CO2 increase, the addition of extra CO2 becomes progressively less effective at trapping Earth's energy, but surface temperature will still rise. A very small amount of CO2 (1% of combustion of fossil fuel) is also emitted in volcanic eruptions.

This is balanced because CO2 is removed by chemical weathering of Rocky Mountains. The sun is primary source of energy to run this ecosystem. But it has very tiny role in climate change.

While at the same time global surface temperatures have increased. All major climate changes, including natural ones, are disruptive.

Past climate changes led to extinction of many species (like mammoth, black rhino and dinosaurs), population migrations, and pronounced changes in the land surface and ocean circulation.

The pace of the current climate change is much faster than most of the events in past, making it more deleterious for human societies and the natural world.

The observed warming rate vary from year to year, decade to decade and place to place, as is expected from our understanding of the climate system.

These short-term changes are mostly due to natural causes, and do not contradict our fundamental understanding that the long-term warming is primarily due to anthropogenic changes in the atmospheric levels of CO2 and other greenhouse gases.

Global warming is a long-term process, but that does not mean that every year will be warmer than the previous one. Day to day and year to year changes in weather patterns will continue to produce some unusually cold days and nights, and winters and summers, even as the climate warms. Sea ice is affected by winds and ocean currents as well as temperature.

Sea ice in the partly-enclosed Arctic Ocean seems to be directly responding to warming, while changes in winds and in the ocean seem to be dominating the patterns of climate and sea ice change in the ocean around Antarctica.

Earth's lower atmosphere is becoming warmer and moister because of human-emitted greenhouse gases. This gives the potential for more energy for bad weathers such as storms and certain severe weather events.

Consistent with theoretical expectations, heavy rainfall and snowfall events (which increase the risk of flooding) and heat waves are generally occurring more frequently. Extreme rainfall varies from region to region. There are also changes in the global sea level, the rise in level of tide is 0.12 inches per year.

The overall rise for 100 years is about 8 inches at global level. All these results are due to climate warming. There are changes in ocean water chemistry as well.

The pH of water is becoming lower, going towards acidic, so the sea creatures whom are composed of minerals like corals are composed of calcium carbonate they are getting dissolved readily, so it became very difficult for them to maintain their shells.

Even though an increase of a few degrees in global average temperature does not sound like much, global average temperature during the last ice age was only about 4 to 5 °C (7 to 9 °F) colder than now.

Global warming of just a few degrees will be associated with widespread changes in regional and local temperature and precipitation as well as with increases in some types of extreme weather events. These and other changes (such as sea level rise and storm surge) will have serious impacts on human societies and the natural world.

This article is jointly written by Hammad Ur Rehman Bajwa, Muhammad Kasib Khan, Arsalan Zafar, Saad Salman Khan, Abdullah Khalid Chatha. The authors are from Department of Parasitology, University of Agriculture, Faisalabad, Pakistan

M. Zia ur Rehman

Nanotechnology: a solution for environmental pollution

Environmental pollution is increasing rapidly due to unlimited disturbance of human beings for the existence of natural environment. Human activities such as industrialization, uncontrolled transportation, ...

Nanotechnology: a solution for environmental pollution

Muhammad Zia-ur-Rehman, Haseeba Maryam, Hinnan Khalid and Muhammad Zeeshan

Environmental pollution is increasing rapidly due to unlimited disturbance of human beings for the existence of natural environment. Human activities such as industrialization, uncontrolled transportation, deforestation and urbanization are affecting natural world and environment in worst manner. Remediation of environmental pollutants through nanotechnology is receiving a considerable growing awareness.

Major environmental pollutants caused by these activities are sulfur oxides (SOx), nitrogen oxides (NOx), carbon oxides (COx), hydrocarbons (HCs), particulate matter (PM), harmful radiations, organic pollutants (VOCs), heavy metals (lead, arsenic, chromium, cadmium, mercury) and noise pollution. These pollutants can cause some serious threat to environment and life of plants, animals and humans, by producing acid rain. Some natural phenomenon such as volcanic eruption also has sulfur containing pollutants.

Various factors like unlimited usage of pesticides, herbicides, fertilizers, sewage-sludge and oil spills can cause water pollution. All these environmental pollutants (air, water and soil) are found as mixture and are very hard to remediate. Now it is becoming very essential to monitor, remediate and treat these environmental pollutants for the survival of mankind and other kinds of life on Earth. For this purpose many latest technologies are developing and are being in use by researchers.

Today there are numerous remedial options for the treatment of environmental pollutants such as remediation standards method, site assessment method, mapping remediation, remedial technologies (thermal desorption, excavation, surfactant enhanced aquifer remediation, pump and treat, solidification and stabilization, in-situ oxidation, soil vapor extraction, bioremediation, collapsing air micro bubbles), transport and emergency safety assessment, emission standards, environmental protection agencies (EPAs) and environmental impact assessment method (EIA).

Nanoparticles have distinctive property of having surface area less than or equal to 100 nm. Due to nano-size surface area nanoparticles can move with the aqueous phase environmental components and can reach to the targeted contaminant zone, there they can be attached to contaminants and then start reacting with contaminant

A new environmental remedial technology known as “Nanotechnology” is now taking place of all previous technologies because it can totally degrade most of the pollutants (organic) and can be produced from low cost raw material. Nanotechnology is now being in use in different fields of life such as food, biomedical and agriculture sector for the purpose of pollutant remediation. Nanoparticles can be found naturally, but for their better efficiency and usage scientists are producing them artificially, called engineered nanoparticles. According to estimations, there are more than 800 kinds of engineered nanoparticles now available commercially.

Nanoparticles have distinctive property of having surface area less than or equal to 100 nm. Due to nano-size surface area nanoparticles can move with the aqueous phase environmental components and can reach to the targeted contaminant zone, there they can be attached to contaminants and then start reacting with contaminant.

Some types of nanoparticles with their remedial properties are: iron based nanoparticles for remediation of heavy metals, organic or inorganic pollutants present in soil, ground water and waste water, bimetallic nanoparticles have catalytic activities and can reduce phyto-toxicity caused by heavy metals, Nanoscale zero-valent iron particles can remove organic contaminants, dendrimers removes heavy metals and have wide applications in biomedical field i.e. anti-viral drugs, tissue repair and chemotherapeutic process, calcium peroxide nanoparticles removes biological contaminants and micelles removes poly aromatic hydrocarbons.

Titanium dioxide nanoparticles are also very useful for environmental remediation in term of total degradation of organic pollutants from waste water and heavy metals from soil. Silver nanoparticles are diversely used in the fields of cosmetics as antimicrobial agent and also in household products and water filters. Zinc oxide nanoparticles in suitable amounts, size and structure can be used as catalyst, photo-catalyst, electrical and opto-electronic processes.

Remediation of environmental pollutants through nanotechnology is receiving a considerable growing awareness. Distinctive abilities of these particles like wider surface area, more reactivity and emergent properties at nano-scale are gaining more interest of researcher to use them as remediation of contaminants present in environment. But there are also some challenges associated with the usage of nanoparticles, as most of them have ability to form aggregates and can make clusters.

Media on which nanoparticles are used can limit their activity and efficiency according to their chemical and physical characteristics. Keeping in mind all characteristics of nanoparticles, it is crucial to make nanoparticles which must be environmentally friendly. Processes of their synthesis should also not destructive or waste generating.

Moreover, products developed by nanotechnology must be directly or indirectly beneficial for human and environment and should also enhance sustainability of natural world. Nano-products should also produce along with proper awareness for the persons using them. Like other remedial techniques there must be environmental impact assessment of nano-products. By keeping in mind all these facts use of nanotechnology can revolutionaries the world of mankind.

This article is jointly written by Muhammad Zia-ur-Rehman, Haseeba Maryam, Hinnan Khalid and Muhammad Zeeshan

Hina Baloch

Air pollution an invisible slayer

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This year 2019, World Environment Day (WED) is putting a spotlight on the theme of "Greening the Blue" having the focus of beating air pollution an issue chosen by China. Whereas, last year 2018 India hosted WED aimed to "Beat Plastic Pollution".

"Mask challenge" is the core event of this year. Through this event, UN insists people all around the globe to indicate an action which they will carry out to overcome air pollution. In order to celebrate people around the world people had make beautiful Air Pollution Mask from different sort of innovative materials and then share their images on social media, tagging other organization and individuals they wanted to get involved in the challenge. Additional to this, a lot of other smaller groups and people are too carrying out projects to participate in the cause on the event of WED.

WED, June 5th historically elected by United Nation (UN) since 1974. WED is broadly celebrated in more than 100 countries because it has grown-up into a global platform for public outreach. Objective behind the celebration of WED is awareness, encouragement and take necessary action for the protection of environment.

WED was recognized by the UN General Assembly in 1972 on the very first day of Stockholm Conference on the Human Environment, which led to the creation of the United Nations Environment Program (UNEP). With having two years gap first WED was celebrated having the theme of "Only One Earth" and the idea for spinning the center of these events through selecting different host countries started in 1987.

China is a country deeply affected by the environmental problems. Domestically China has proved remarkable leadership in tackling air pollution and now they are ready to help the world for greater action. China is taking the lead and stimulates global action to protect millions of lives because Air Pollution is a global threat upsetting everyone. As per World Health Organization (WHO) UN and governments coated seven million people, together with 600,000 children expire yearly from causes related to poor air quality. Around four million of these deaths happened in Asia-Pacific.

Research has connected air pollution as the source of cancer, heart disease, stroke, and respiratory diseases such as asthma. Inhalation of dirty air can reduce the mental development of children and cause wide-ranging health problems.

To reduce air pollution public awareness campaigns, along with individual engagements play a very important role to meet regional and global carbon footprint reduction goals. For example, European Union set a target to cut 40 percent in greenhouse gas discharge at least.

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Technology is pivotal in this regard to enable the change to a cleaner economy and a healthier society. Investment in technology and empowering citizens and supporting action in key areas, including industrial policy and research can help to overcome the menace of air pollution. Technology can examine environmental impacts like air quality and carbon impressions and help to find more eco-friendly ways of production in industries.

Technological capabilities along with the public awareness provide us much more breathing room to fight against air pollution and together solve the riddles of climate change before it's too late.

China reduced pollutant emission by going out green: Yao Jing

Yao Jing is a Chinese diplomat currently serving as Chinese Ambassador to Pakistan. He entered the Ministry of Foreign Affairs in 1991 and held various posts at the Ministry of Foreign Affairs. He is committed to increase people-to-people contacts between the two neighbouring and brotherly countries China and Pakistan. In connection with World Environment Day, Yao Jing expressed his views with Technology Times for increased environmental challenges and strategic moves made by Government of China to combat them.

TechnologyTimes: What would you say about the theme of World Environment Day, Beat Air Pollution?

Yao Jing: Air pollution constitutes one of the most serious environmental challenges the world is facing today. The theme for World Environment Day 2019 is Beat Air Pollution, which aims at pushing governments, industries, communities and individuals around the world to jointly explore renewable energy and green technology, to improve the air quality in cities and districts worldwide.

After a span of 17 years, China once again hosted the World Environment Day Celebration. President Xin Jiping sent a congratulatory letter to the event. To mark the event, China published the Report on Air Quality Improvement in China (2013-2018), issued China Ecological Civilization Awards, announced the Most Commemorable Volunteers for Ecological Conservation, and released Outstanding Cases of Public Participation. Besides the host city of Hangzhou, many other Chinese cities also held various events for World Environment Day to promote public awareness of environmental protection.

TT: What will be the contribution of the Chinese Embassy regarding pollution issues in Pakistan?

YJ: The Chinese Embassy attaches great importance to pollution governance in Pakistan. It will work closely with concerned Pakistani governmental departments (such as the Ministry of Climate Change and the Ministry of Science and Technology) as well as think tanks, industries and international organizations to advocate sustainable ways of production and living and harness environmental pollution through practical means.

TT: As this year China is hosting World Environment Day, what measures are taken by the Chinese government to overcome air pollution, especially for Beijing?

YJ: China has maintained an important participator, contributor and leader in global ecological civilization. The 3-Year Campaign Plan for Fighting for Blue Sky issued by the Chinese government in June 2018 stipulates that after 3 years of hard work, the general emission of main gas pollutants should be greatly reduced and the density of fine particulate matter (PM2.5) should be obviously lowered to substantially improve air quality. The document also puts forward concrete tasks as for harnessing industrial pollution, comprehensively addressing dispersed, disorderly and polluting firms, promoting clean energy heating in Northern China and control of total coal consumption.

A Review of 20 Years' Air Pollution Control in Beijing issued by United Nations Environment Program in March 2019 showed the great progress achieved by China in implementing the above- mentioned plan. In a short span of 5 years from 2013 to 2017, the average annual air density of PM2.5 in Beijing has been reduced by about 35%, and that of Beijing-Tianjin-Hebei District by 25%.

TT: What is the contribution of China for making global environment cleaner?

YJ: China attached great importance to ecological conservation. Adhering to the belief that green environment equals treasure, China advocated harmonious coexistence between humanity and nature, included ecological civilization into the overall plan for national development, and achieved great progress in building a beautiful China. Looking into the future, China would like to join hands with other parties in adhering to green development, strengthening the base of ecological civilization. China will fully implement the UN 2030 Agenda, protect Mother Nature that humanity depends on for existence and contribute to building a beautiful world and a community of shared future for mankind.

China actively pushed the Paris Agreement on Climate Change to be reached, put into force and implemented. China set up South-South Cooperation Fund for Climate Change with 20 billion RMB and Belt & Road International Alliance for Green Development. Thanks to China's efforts, green development cooperation has been included into China-Africa cooperation documents and such visions and vocabulary as green development and ecological civilization have been adopted in UN documents. China, while developing itself, is also providing wisdom and support for other developing countries to pursue green modernization.

It is everybody's responsibility to protect the environment. Ecological conservation is by no means the sole duty of governments and enterprises. It also needs common people's efforts to enhance ecological awareness and put ideas into practice. By protecting the common home of humanity, we can do our parts in better preserving the environment

TT. What is the role of public awareness in combating environmental challenges?

YJ: It is everybody's responsibility to protect the environment. Ecological conservation is by no means the sole duty of governments and enterprises. It also needs common people's efforts to enhance ecological awareness and put ideas into practice. By protecting the common home of humanity, we can do our parts in better preserving the environment. We may proceed from the following points in our daily life: do not litter and classify the waste; protect forests and wild animals; reduce pollutant emission by going out green.