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TRASH IN OUR BODIES: IMPROPER WASTE MANAGEMENT AND HUMAN HEALTH

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Introduction

We become what we eat and what surrounds us. Today it's the waste that surrounds us that may or may not be distinctly visible. With the growth in population, increase in income and purchasing power and rapid economic growth, the generation of waste has increased manifold. Not only the volume, but the nature and types of wastes have changed dramatically over last decades. Studies have indicated that with the increase in income levels, the volume of biodegradable and organic waste decreases. India alone produces 62 million tonnes of waste every year and it is expected that by 2025, it will rise to 135 million tonnes. To mitigate the adverse effects, the Municipal Solid Waste Rules, 2016 are laid down to provide guidelines for proper waste management stressing the role of bulk as well as institutional generators. However, the implementation of rules is a challenge. The solutions taken at the local level are dangerous and cause adverse health impacts not only to the waste handler or waste collector but also to all the stakeholders. There is a rise in the number of diseases caused due to the leaching of toxic substances in soil, water and air. The air we breathe is polluted and contains harmful gases, the water that we drink is contaminated with chemicals and micro plastics, and the food which we eat contains pesticides. There are enough evidences to show that human bodies are slowly and slowly being converted into dustbin that contains trash. Improper waste management deprives economically strained people of the fundamental right to live a healthy life. The increase in disease burden is attributed to indiscriminate waste disposal.

Improper Waste Management Practices

Dumping of waste of all kinds at a common place away from the towns and cities has been the most common practice of getting rid of the waste. This was fine till the time the population was less, consumption was meagre and our waste mostly consisted of organic matter. With changing times and growing urbanization the waste disposal has become a very challenging issue. It is so because we are producing more, buying more and throwing more but the land remains a constraint. Every minute lakhs of plastic bottles are purchased, every year tons of mobiles, laptops are rendered useless, unimaginable number of straws and other disposable items are thrown. We do not have any mandatory waste segregation policy and all sorts of waste be it highly contagious biomedical waste, or highly chemical rich industrial waste, or not so harmful agricultural waste, everything ends up

together at a common landfill site.

Common waste disposal methods are land filling and incineration. As a result of unscientific landfilling, the poisonous liquid called leachate percolates inside the ground and pollutes the underground water and soil. The communities who are going vegetables here and who are consuming water expose them to various chemicals. While incinerating, most of the volume of the waste is reduced but burning all kinds of waste together generates cocktail of pollutants containing dioxins, furans, sulphur dioxide, nitrous oxide, etc. The dumping of waste at open spaces is one of the primary causes of the release of green house gases into the atmosphere. Likewise in summers, the biodegradable waste decomposes faster and there are several cases of fire occurring at landfills.

Impact on Human Health

According to WHO "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Environment plays an important role in mental and social well being of an individual. From waste generation to waste disposal, at every stage human health is affected. For example, in

its physical form waste may contain toxic and non toxic compounds. When it is burnt or land filled, the composition of this waste changes and chemicals are released into the atmosphere. These chemicals are new to the ecological system and are not decomposed by the microbes or natural processes. These chemicals enter the bodies of living organism through soil-crop-food pathway. This is referred to as Trans-generational effect.

The nature of waste like municipal, electronic,

plastic or biomedical and the extent of duration all have an impact on the health of human beings. It is also true that with same level of exposure not all are equally affected. The children elderly and pregnant women are more susceptible. Likewise, people working in a particular waste management sector also are prone to several diseases. The unauthorised and unrecognised recyclers of electronic waste work in toxic conditions and in the absence of any protective equipment are exposed to waste of all kinds. Most of the e waste consists of the chemicals that are banned long ago in other countries.

The extent of harm mainly depends on nature of exposure pathway like whether the contaminants are coming from air (burning activity which releases dioxins and furans), from water, food or from mother to child. Further, the nature of the waste also has a role to play. There are certain wastes which produce immediate effect while some are seen to show their effect after several years.

WHO has stated that improper medical waste disposal causes parasitic infections, lung infections, skin infections, HIV & hepatitis B and C viruses. Improper E waste management causes neurological diseases and reproductive ailments. Improper plastic waste management is the cause of microplastics that are





there in air and water and playing havoc with human health. Likewise respiratory diseases, asthma, etc are the common problems occurring due to improper agricultural waste management.

However, apart from the demographic variables of age, gender and density, the socio-economic factors are also important in this regard. Certain occupations are more at risk like the various actors in waste management ranging from waste collector, waste dealer, recycler and so on. This gives rise to Environmental Health Inequalities. The poor people are forced to live near waste disposal site. In the name of providing employment, the poor are involved in waste segregation and waste picking. The situation gets worsened in the wake of growing unemployment in the country. The people who live near waste dumping site cannot breathe and therefore NIMBY agitation is fast growing up. The governments are now promoting decentralised waste management. Similarly there are lakhs of waste pickers who collect all form of waste in all its form. The waste is not segregated and they get cuts, wounds while collecting the recyclable materials. The people who work in recycling of electronic waste deal with chemicals and inhale harmful gases. They suffer from skin ailments, abrasions, tuberculosis, and respiratory ailments.

Studies have also indicated that life expectancy of these workers have reduced from their previous generations. The incidence of cancer has also increased in last few years due to heavy metal contamination of our soils and water bodies. Another interesting point to note here is that most of the ailments occur at a very far distance from the place where the chemicals have been released.

Solutions

Growing evidence suggests that chemicals from waste pollute the environment and affect human health but direct correlation has not been established. To reduce the impact first of all there has to



be an evidence of harm established. The impacts are clearly visible in several cases but still many a times the point of release and the site of impact are too far and varied that it is difficult to establish the relation between disease outbreak and improper waste disposal. The government agencies are not able to control the emissions from the site of release and monitoring on site is not possible. Therefore, no action can be taken against the polluter. In such cases, the precautionary principle needs to be applied as early as possible.

The breeding of mosquitoes and spread of dengue, chikenguniya, malaria all is because of improper sanitation and unhygienic conditions. Therefore in spite of scientific evidence there is no policy assurance. The cause and effect relationship is not understood. The technological inputs are very essential. We must give an end to old outdated incinerators and retrofitting but devise better solutions. Awareness of the people is very important. There is a large time lag between the exposure and health ailment. Sometimes it takes several yeasts to show the effect. In that case also it is difficult to arrive at any sound measure. Changes in policy, proper registration of waste pickers, waste generators, and health insurance to all the workers are some if the steps which can be taken up by the government. The waste workers must also be allowed to live a dignified life.

Conclusion

It is clear beyond doubt that improper waste disposal causes number of diseases that are also going to affect the future generation. While planning waste management practices, it is essential to consider the impacts of these poisons.

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AIR POLLUTION ON BIRDS

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Air is all around us, but we can't see it. It's a mixture of different gases. The air in Earth's atmosphere is made up of approximately 78 percent nitrogen and 21 percent oxygen. Air also has small amounts of lots of other gases, too, such as carbon dioxide, neon, and hydrogen. Air is important for living things. People need to breathe, and so do lots of other animals and plants. Breathing is part of a process called respiration. During respiration, a living thing takes in oxygen from the air and gives out carbon dioxide. This process gives animals and plants the energy to eat, grow and live life.

Air pollution means the presence of chemicals or compounds (called pollutants) in the air which are not naturally occurring, and which lower the quality of air, and are harmful to all living things in the atmosphere. Air pollution is majorly caused due to the release of various chemicals into the atmosphere. Air pollution can be both man-made and naturally occurring.

Global air pollution is worsening at an alarming rate. In 2016, a report stated that, in just five years, outdoor air pollution increased by 8% worldwide. The places most affected by this are cities in developing countries such as those in Asia and the Middle East. The air quality regularly fails to meet the safe limit set by the government as well as the World Health Organization (WHO). What's more surprising is that poor air quality isn't just concentrated in highly urbanized areas; it's also affecting small towns and rural parts of the country. Air pollution takes its toll on the economy in several ways: it costs human lives, it reduces people's ability to work, it affects vital products like food, it damages cultural and historical monuments, it reduces the ability of ecosystems to perform functions societies need and it costs money in remediation or restoration.

Indeed, the effects of air pollution on people and the economy are concerning. However, let's not forget that these are not just the things affected by poor air quality. Plants and animals are suffering as well.

Direct impact on birds

Birds are bipedal, warm-blooded, egg-laying vertebrates with about 10,000 living species. The fossil record indicates birds evolved from theropod dinosaurs 200 to 150 million years ago, and the earliest known bird is the late Jurassic Archaeopteryx. There is significant evidence that birds evolved from theropod dinosaurs; as more non-avian theropods that are closely related to birds are discovered, the formerly clear distinction between non-birds and birds becomes blurred. A genetically consistent evolutionary tree would classify birds as reptiles, though some scientists would elevate birds, turtles and crocodilians to their own class, on an equal footing with reptiles.

Globally, 1,223 species of birds, or about 12 percent of the total of 9,998 extant described bird species, were deemed endangered or threatened with extinction by IUCN's (International Union for Conservation of Nature) 2009 Red List. In the United States, about 74 bird species are at risk, about 9 percent of the total.

			
<i>Resplendent Quetzal</i>	<i>Three Wattled Bellbird</i>	<i>Golden-Browed Chlorophonia</i>	<i>Oropendola</i>
			
<i>Rose-breasted Grosbeak</i>	<i>Scarlet Macaw Parrot</i>	<i>Frigate Bird</i>	<i>Collared Redstart</i>
			
<i>Ivory Billed Aracari</i>	<i>Yellow-Thighed Finch</i>	<i>Toucanette</i>	<i>Sandpiper</i>

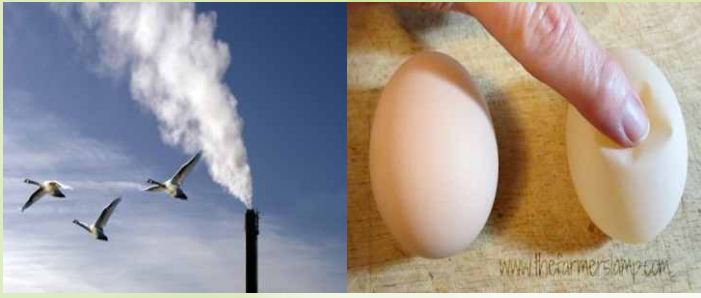


Sources of air pollution

Air pollution comes from different sources and each pollutant has a different effect on birds. The most common air pollutant is carbon monoxide which is caused by the burning of gasoline, natural gas, coal and oil. This pollutant leads to the abnormal breathing of birds as it directly affects their nervous system.

Sulphur dioxide is another pollutant which is caused by the burning of sulphur-containing fuels as well as coal and oil. Industrial processes done in factories including paper manufacturing and metal smelting also cause sulphur dioxide. Sulphur dioxide impairs the immune system of birds and makes them vulnerable to diseases. Sulphur dioxide and heavy-metal particulates were wreaking havoc on the female flycatchers metabolisms, causing them to produce thin-shelled eggs that wouldn't hatch. Moreover, the emissions from coal plants also decrease their erythrocytes or red blood cells.

Volatile Organic Compounds (VOC's) are pollutants that come from fuel combustion, paints and solvents. VOC's cause another pollutant, ozone. In birds, ozone causes several physiological changes which include the shortening of the cilia in the lungs.



The function of the cilia in animals is to filter the air further in the lungs. With shortened cilia, birds' lungs become more prone to diseases.

Impacts on bird habitats

Nitrogen oxides from air pollution are a significant cause of eutrophication – the excess of nutrients in a body of water. Eutrophication can reduce the populations of fish and invertebrates that birds depend on for food.

Additionally, air pollution can change the structure of the forests, including making tree canopies thinner. This is another problem for birds as the absence of thick canopies make them more visible and vulnerable to predators. To prevent this from happening, birds may tend to spend less time foraging for food. In the long run, scarcity in the food supply may cause birds to leave their homes and settle elsewhere.

Helping birds is easy! Just start growing native plants on today

SODIUM IN PLANTS –A BURDEN OR A BLESSING?

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For almost all terrestrial plants, Na^+ is not essential for either growth or development or for reproduction. An exception is a subgroup of C4 plants for which Na^+ has been shown to be essential. These C4 species require Na^+ at trace levels to drive a particular transport process, the uptake of pyruvate into chloroplasts by a Na^+ -pyruvate cotransporter (Furumoto *et al.*, 2011). In all other plants this function is mediated by a H^+ coupled pyruvate carrier. Although this small group of species is the only one for which Na^+ can be classified as an 'essential nutrient' (Maathuis, 2009), Na^+ can nevertheless be beneficial and 'nutritious' in other species. It has been observed many times that, during K^+ deficiency, many (glycophytic) plants respond positively to Na^+ fertilization (Subbarao *et al.*, 2003). For salt-tolerant (halophytic) plants, even high concentrations of Na^+ promote growth. Good examples are species such as *Suaeda maritima* and *Salicornia* spp that show a drastic increase in growth when salt is present in the growth substrate. Even substrates with salinity levels that approach seawater are stimulatory showing that, in contrast to glycophytes, halophytes also benefit from Na^+ at high concentrations.

At low levels, Na^+ not only is harmless but can be very useful, particularly in low K^+ conditions. This is because, in hydrated form, Na^+ and K^+ are chemically and structurally very similar (Amtmann and Sanders, 1999). Thus, many of the roles that K^+ plays in plant cells, including some of the metabolic ones, can

therefore be fulfilled by Na^+ . However, this is unlikely to include the many enzymes that rely heavily on K^+ as cofactor; the different ionic sizes of K^+ and Na^+ mean binding energies and co-ordination within enzymes are quite different between the ions and this is precisely how large selectivity for one or the other is created. The latter is exemplified by starch synthetase (Lindhauer and De Fekete, 1990), an enzyme that tightly binds K^+ ions, which has a requirement of about 50mM K^+ for normal activity (100%) with other, similarly sized cations such as Rb^+ and Cs^+ being about 80% as effective as K^+ and Na^+ only about 20%.

The similar efficacy of Na^+ and K^+ in a number of functions may be exploited in several ways: In soils where K^+ is scarce, increased Na^+ utilization could lower agriculture's dependence on expensive potash fertilizer. Uptake of Na^+ at the root: soil



boundary could also help phytoremediate moderately saline soils. In addition, the presence of small amounts of Na^+ in the growth medium has been shown to improve the taste of many crops including asparagus, barley, broccoli, and beet. Increased Na^+ in plants can also be valuable to herbivores since it is essential to all animal life where it is a principal electrolyte for the ionic balance of

tissues and fluids and for electrical signalling in nerve cells. This Na^+ requirement means that animals with plant-based diets often need supplements, for example, in the form of salt licks, which could be avoided with an increased Na^+ content in grasses and animal fodder. Here are several reasons why sodicity decreases plant growth (Flowers and Colmer, 2008): First, high ambient concentrations of inorganics such as Na^+ and Cl^- lower the water potential and hence create osmotic stress. A logical response to counter this trauma is the uptake of these ions themselves, a strategy that is successfully employed by many salt-tolerant plant species. However, this response can lead to a second issue: a substantial increase in cellular ion contents, particularly of Na^+ , that negatively affects cellular biochemistry. Thus, the potentially beneficial intake of inorganic osmotic needs careful monitoring

and relies heavily on the efficient sequestration of potentially harmful ions in the vacuole. Salt-tolerant species are more capable of achieving this delicate balance than glycophytes, possibly by reducing their net uptake of Na^+ , by limiting Na^+ translocation to the shoot, and by effective cellular partitioning.

Because of the damage caused by salinity /sodicity on agriculture, vast resources have been spent to unravel the responses and mechanisms of tolerance that plants employ to counter this stress.

The result is that we now have a reasonably comprehensive picture of how Na^+ enters plants and how it is distributed within cells and tissues. Understanding how Na^+ enters plants, how it is moved between different tissues and within cell compartments is vital if we want to improve crop resistance to salt stress, but also to increase the value of Na^+ as a functional nutrient. In both cases we require insights into the identities and properties of membrane transporters that catalyse Na^+ movement.

Importance of Apiculture

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Apiculture is also known as bee-keeping and it involves the rearing of honey bees in a box, specifically defined for this purpose. The main motive of this process is to keep the comb foundation of the bees intact and without causing any harm to the bees when extracting honey or wax. Bees are very important for the ecological balance in our ecosystem. They help in pollination and is the world's most important pollinator of food crops. An estimated 1/3rd of the total food consumed is a product of bee pollination. Almonds, apples, apricots, avocados, blueberries, cantaloupes, cashews, coffee, cranberries, cucumbers, brinjal, grapes, kiwis, mangoes, lady's finger, peaches, pears, peppers, strawberries, tangerines, walnuts and watermelons are few products of bee pollination. Also, a colony of bees makes an average of 14 kgs of honey.

Bees are disappearing at an alarming rate. Since 2006, a

phenomenon known as “colony collapse disorder” has affected honey bees in many countries. In this phenomenon, the entire colony of bees are dying there could be many reasons for this. The primary reason being the excessive use of pesticides particularly, neonicotinoids, which was approved in the early 1900's as an alternative to DDT's. Neonicotinoids are quite similar to nicotine. It kills insects by attacking on their central nervous systems. Neonicotinoids affects the receptors of bees, causing it to forget the route, isolating it from the colony, causing exhaustion and ultimately their death. The second reason is loss of habitat. Due to destructive human activities, bees are dying at an indefinite rate since they have no natural places to thrive. Also, they have to travel miles and miles altogether before they can find a suitable source of nectar. By the time they reach the nectar source, they are too exhausted to travel back to their colonies.

As Albert Einstein had rightly said, “If honey bees die out, humans will follow a few years later”, human beings need to regulate their actions in order to save the bees. Apiculture can be practiced not only by the bee-keepers, but also by the common people at a nominal cost whilst producing honey for their own consumption. All one needs to purchase is a set of supplies like the frames which are pre-coated with bees wax so that the honey bees can start producing honey at once. Although the colony can take quite sometime to establish completely, the results will definitely be worth the wait. However, the only factor to be taken care of is that

the hives must be kept near nectar sources like orchards or a garden.

By practicing apiculture, we can surely bring back the bees from the endangered list. Taking small steps like planting nectar-producing flowers will also ensure food supply for the bees. Animal species are getting endangered one

after the other and are slowly on the verge of extinction. Humans should at least make attempts to save the ones they can by good practices.



MULTI-PURPOSE USES OF THE MORNING GLORY (CONVOLVULACEAE) SPECIES IN THE MAYAN CULTURE OF MEXICO

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The Convolvulaceae family has been used since ancient times and is considered as "magic plants", due to their sacred aspects; since they were used in the divinatory and curative media to predict the cause of diseases and to heal the sick. In the Mayan culture the best known species is *Turbina corymbosa* (L.) Raf. ("Xtabentún"). An alcoholic drink is prepared from it that is used in the celebration of good harvests of the milpa. On the other hand, this family is of relevance to ethnobotanical studies; and hence it is necessary to understand the diversity and distribution of Convolvulaceae to revalue its potential sustainable and traditional usage for a wide number of purposes by the indigenous Mayan communities of Mexico. The most economically important species is *Ipomoea batatas* (L.) Lam.; commonly known as the sweet potato. Its root is an edible tuber that is cultivated worldwide, from which canned sweets are made in Mexico. It represents one of the most important traditional crops at regional and national level. Currently, it is cultivated all over the world due to fast and easy growth, serve as a valuable source of nature fiber; and also as important sources of natural antioxidants, vitamins and minerals. Few species of this family have uses as handicraft. Most species have climbing habit and are used as hunter's collar in Campeche (e.g., *Merremia aegyptia* (L.), spinning tops and bridal bouquets (*Ipomoea alba* L.).

Other species with showy flowers and small plants have a high horticultural potential to adorn fences or form arches



for gardens (*Evolvulus alsinoides* (L.) L., *Jacquemontia pentantha* (Jacq.) G. Don). The species of the genus *Ipomoea* L. stand out for their medicinal importance since ancient times, since they are used by the indigenous Mayan communities of Mexico as a purgative or for relaxing. The species *I. jalapa* (L.) Pursh is used as a purgative. Other medicinal species of Convolvulaceae used in the indigenous Mayan culture is *Ipomoea pes-caprae* (L.) R. Br., commonly known as "bayhops or riñonina" (in Spanish). An infusion is prepared from their stems and leaves to counteract inflammation or reduce kidney stones or for naturally removing stones. Furthermore; *I. carnea* Jacq. ssp. *fistulosa*, *I. imperati* (Vahl) Griseb., *I. indica* (Burm.) Merr. and *Evolvulus sericeus* Sw. are used to treat various types of skin burns; while *I. turbinata* Lag. is used in treating liver diseases.

Due to its high nutritional value, around 25 Convolvulaceae species are used as fodder to feed birds, cattle, horses and sheep due to their unique nutritional values. It is quite easy for the indigenous Mayan communities to obtain these plants with sufficient vegetative material along roadsides and near crop fields or natural grazing areas. The Mayan farmers consider plants of Convolvulaceae as natural representation of their indigenous faith on the planet. Many local species are used in traditional apicultural practices for providing adequate nectar and pollens for the bees during the rainy season. For example, *Turbina corymbosa* (Xtabentun) is well known to the local indigenous beekeepers for its use as a bee foraging plant (melliferous flora) during periods of food shortage. *Photo credit: Authors*

ROLE OF MEDIA IN BIOLOGICAL CONSERVATION

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There has been a significant loss of various endangered species in India has been happening at an accelerated rate due to a multitude of anthropogenic factors having cumulative impact on Indian forest, wildlife and biodiversity conservation. A comprehensive list of such anthropogenic factors include: organized poaching and wildlife

conservation policy for protecting forest, wildlife and biodiversity of a megabiodiverse nation like India.

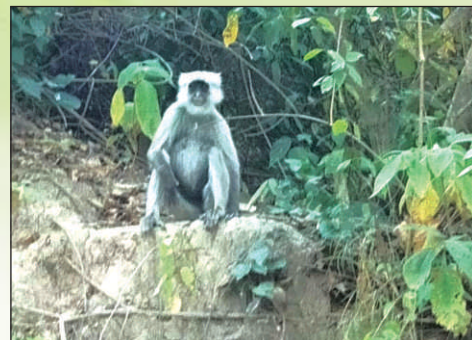
One of the most important aspect of failure of widespread wildlife, forest and biodiversity in India is due to lack of support of the ordinary people at the ground level. This lack of support and initiative from the ordinary citizen regarding conservation initiative stems from the lack of education, awareness and sensitivity about their local ecosystems and the environment. Formal education at the primary secondary and tertiary levels alone could not meet this goal on its own. Though environmental studies have been made a part of the course curriculum in the Indian education system; however, it has stayed only as a 'subject' to complete the curriculum. This has



trafficking with international support from illegal wildlife trade operators across Indian international borders (particularly from China and South East Asia), rapid rise of insurgency in premier forest belts of India, unrestricted and unmonitored anthropogenic forest fires that have went uncontrolled due to mismanagement, massive habitat loss and habitat fragmentation, lack of funding, education, training and modernization of Indian forest guards or ground level forest security forest post independence, poor intelligence network with respect to forest and wildlife biosecurity, illegal human encroachments into forested areas, poor management of exiting forest resources, overexploitation and looting of Indian forest major and minor products/produce happening at an unprecedented rates with covert administrative and political support, over exploitation of freshwater, estuarine and marine natural resources, environmental pollution, Global Warming and Climate Change, poor monitoring and surveillance by state forest departments, archaic and outdated methods of forest and wildlife surveys with questionable analysis of the quality of ground data provided, unplanned expansion of industry, agriculture and infrastructure within forest belts without proper environmental impact assessment studies, high level of incompetency, corruption and lack of credibility in forest staff and concerned officials, lack of public support, engagement, education and awareness about conservation issues among Indian public, politicians and parliamentarians, lack of determined political will to make ground level changes with respect to conservation of forest and environment; and finally lack of a nationwide comprehensive

not successfully translated into a platform for educating the ordinary citizen or the young future citizens of India to be environmentally sensitive. No doubt that currently a significant number of young students as well as ordinary citizens have come forward with the agenda of environmental conservation; however, it is too low in number compared to the human power needed in India to make biological conservation a priority. This gap or disconnect between the common mass and the issue of environmental sensitivity could be bridged by the media.

Over the past three to four decades, Indian media has transformed rapidly into a highly engaging, people friendly platform with formidable strength and power. None can now ignore the strength of Indian media irrespective of whether you are a state or central minister parliamentarian or local or national politician, bureaucrat or technocrat, public or corporate administrator, lawyer or judge, academics or researchers, employer or employee, student or teacher, manager or worker; the media appeals to all at varying levels. This monumental strength of Indian media has played a significant role in raising education and awareness about environmental issues, dangers of pollution, need for the conservation of wildlife, forest and biodiversity among the public quite successfully. Both the English and vernacular press and different platforms of media have done significantly in promoting the need for conservation. The best example that comes to ones mind is the nationwide campaign by every media platform and houses regarding the unfortunate shooting of the tigress T1 or better known Avni. The media was



hugely successful in generating consciousness across the nation regarding the unethical killing of the tiger with judicial and administrative support. Never before did the Indian press and media have taken such considerable step in disseminating information about wildlife across the nation so successfully; and this is globally appreciated!

Unless the Indian nation decides to take a strong and determined action plan for protecting her majestic wildlife and her last remaining forests, it may be too late to save them for extermination in the not so distant future. Last but not the least, I must sincerely thank the effort of Indian media in being proactive towards various ecological and environmental issues and playing an increasingly important role in educating the public regarding the danger of loss of endangered species, forests and biodiversity. I sincerely believe that Indian media should continue and push this agenda forward at various platforms and forums and keep inspiring ordinary citizen to become active conservationist to protect nature.

Thus we can conclude that the media has formidable strength and power within the Indian laws to educate and aware the mass regarding the absolute need for biological conservation of various endangered species in the country. Research journals do provide extensive information on wildlife, forest and biodiversity conservation. Unfortunately, these highly technical information though extremely valuable to researchers and academics; but, barely reach the domain of ordinary citizens across the country. Media can thus play a formidable role in translating those information from the lab and the field to the people so that the richness of Indian natural resources and biodiversity could be realistically appreciated by ordinary citizens. Media can thus inspire the ordinary people extend their dedicated support and push the government to take necessary actions in preventing endangered species of flora and fauna from becoming extinct. Photo credit: S. K. Basu



APPEAL TO LIFE MEMBERS

NESA Life Members are requested to submit short articles for the NESA e-Newsletter that are consistent with NESA's objectives to improve environment. The articles should focus on topics related to environment and facilitate communication and discussion among researchers, academicians and students. The articles for July edition can be submitted to nesapublications@gmail.com before **25th June, 2019**.

Dr. Shefali Gola, Editor, NESA E-newsletter

LIST OF NEW MEMBERS 1st January to 31st May 2019

2045. Dr. Rachana Dubey, Scientist (Environmental Sciences) Indian Institute of Water Management, Bhubaneswar-751023
2046. Dr. Pujari Kadappa Basavaraja, Professor & Head, AICRP, USA, GKVK, Bangalore
2047. Dr. Christine Jeyaselan, Department of Chemistry, Amity University, Noida
2048. Dr. Vaishali Mishra, IITL, Public School, Sector-9, Dwarka, New Delhi
2049. Mr. Sofi Javed Hussain, Department of Botany, Aligarh Muslim University, Aligarh
2050. Dr. Alka Rani, Associate Prof. Department of Chemistry, Hindu College, Moradabad, U.P.
2051. Prof. Kanchan Kohli, Prof. Dept. of Pharmacy, Jamia Hamdard Delhi-110062
2052. Dr. Mallikarjuna Jeer, Scientist (Entomology) ICAR National Institute of Bioti Stress Management, Baronda, Raipur-493225
2053. Dr. Shankha Chakraborty, CSIR, Central Mechanical Engineering Research Institute, Durgapur-713203
2054. Dr. Sayeed Ahmad, Dept. of Pharmacy, Jamia Hamdard University, Delhi-110062
2055. Dr. Ramakrishna P, Teaching Assistant, Dhanalakshmi Srinivasan Agriculture College, NRPC, Tamilnadu Agriculture College, Tamil Nadu
2056. Dr. Tina Mukherjee, Assistant Professor, Department of Chemical Engineering, Scottish Church College, Kolkata-700006
2057. Dr. Rishi Rana, Assistant Professor, Department of Environment Engineering, Juit Wakhnaghat Solan, Himachal Pradesh
2058. Dr. Gopal Lal, Director ICAR-NRCS, Tabiji, Ajmer-305003
2059. Dr. Komal Kumar Javarappa, Postdoctoral Scientist, University of Helsinki, Soittajankuja, Helsinki, Finland.
2060. Dr. Amlesh Bera"Assistant Teacher, Keshia saroj kumar High School, Keshia, Paschim Midnapur-721253
2061. Mr. Mrutyunjay, Technical Assistant in National Food Security Management(NFSM) Project, Sivajinagar, Belagavi-590016
2062. Dr. Sana Shafi Assistant Professor, Govt. Sri Pratap College, Srinagar, J & K.
2063. Dr. Amol kumar Solanke"Scientist, NRCPB, LBS Building, Pusa Campus, New Delhi-110012
2064. Dr. Parmod Kumar"Scientist (Fruit sciences) YSP University of Horticulture Forestry, Nauni Solan-173230.
2065. Dr. Tarun Kumar Bera, Assistant Teacher, Moyna Purnanda Vidyapith, Moyna Purba Mednapur-721629.

To,

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