

HCFI Dr KK Aggarwal Research Fund

HCFI Round Table Environment Expert Zoom Meeting on “Soil Protection: For Earth Protection and Life Protection”

June 19, 2022 (Sunday, 12 noon - 1 pm)

- As per the recent State of the Environment Report 2022 released by the Centre for Science and Environment (CSE), almost 30% of India’s geographical area is under degradation which means decline in productivity of land in terms of biodiversity and economy triggered by various factors such as climate change along with human factors.
- Agricultural land in India is around 36%, forest land is ~22%. These are the lands most commonly being degraded.
- This affects all of us and leads to food insecurity due to reduced yield and climate change due to release of soil carbon and nitrogen oxide.
- As per the report, 14 states have seen more than 10% rise in the share of degraded land compared to other states. Maximum land degradation has occurred in Punjab, Mizoram, Arunachal Pradesh, Tripura, Assam and Nagaland.
- Isha Foundation has initiated “Save soil movement”. It is a global movement to initiate a conscious approach to soil and planet in all. As part of this movement, a journey of over 30,000 km across 24 nations will also be undertaken.
- Earth supports 8 million plant and animal species in different geographical ecosystems maintained by the soil.
- Soil holds water and conserves ground water, which maintains productivity of the soil.
- Soil has been our past; it is our present and future. Soil protection means earth protection and life protection.
- Soil is required not just for agriculture, but also for horticulture, creating meadows, etc.
- Soil is an important part of UN the Sustainable Development Goals (SDGs): Goals on zero hunger (SDG 2), climate action (SDG 13) and life on land (SDG 15).
- Environment has never been considered as “one system”. Land, soil, river, oceans are all interlinked.

Any problem in one is bound to alter the other natural systems.

- Soil protection has largely been ignored; hence the problem of soil degradation.
- Changes in land use pattern, terrain and slope have led to problems like floods. Lack of proper planning of cities has added to the problem.
- The most active part of the soil is humus, which is now mostly missing. It absorbs solar rays. Sunlight helps in the sequestration process in the soil. In the absence of humus, soil acts as a mirror and reflects the sunlight back in the atmosphere, which increases the overall temperature.
- About 30% of native biomass has been lost, which has greatly disturbed the biodiversity and food pattern. About 20-25% plants and animals are at risk. Five hundred fifty-nine of 6,190 domesticated mammals used for food and agriculture have been lost and 1,223 are on the verge of extinction.
- Soil represents the largest terrestrial carbon pool.
- Carbon creates, soil preserves.
- Carbon sequestration by soil minerals represents a promising strategy for climate change mitigation. Soil protection can make climate resilient.
- The carbon sequestration process occurs inside the soil. Carbon discharged in the atmosphere acts like a heater, when carbon is in the soil, it is a coolant.
- Soil carbon storage can be increased by 453% to 757% if it is cultivated according to land type and plant type.
- Conservation of agricultural crops practices such as proper management of agriculture residues, zero/reduced tillage and residue retention. Burning of agriculture residue in thermal power plants is dangerous. It should be done at site so that minerals are not lost and remain the soil.
- Soil amendment such as addition of biochar has been advocated as a promising technology for simultaneously increasing crop yield and mitigation of climate change.
- A law to conserve soil was introduced in the US in 1990 and it had some penalty clauses also. In 1996, Federal Agriculture Improvement and Reform Act

- was passed for wetland conservation and regulation of soil erosion control, which had a vital impact on conservation of soil and fertility.
- The concept of crop rotation seems to be forgotten now. It is very helpful in diversifying soil conservation.
 - There is a need to shift to the old agricultural practices.
 - An integrated approach for soil conservation includes mitigation of resources, conservation of soil fertility by minimizing the synthetic fertilizers and pesticides, enhancing the organic manures and green manure, soil testing, reclamation and conservation and a balanced and integrated approach for good nutrients, development and conservation of water resources, crop diversification and organic farming. There are other strategies also to conserve soil – tillage of land, which is not being used frequently to sow crops. It saves soil from erosion and also increases its water holding capacity; moisture of the soil is maintained.
 - Strip cropping, as a method to prevent soil erosion, is used to get some buffer from rivers or water bodies when a slope is too steep.
 - Many wetlands in villages have been converted into agriculture lands, which is not good as wetlands maintain ground water balance and ground water recharge.
 - Many practices such as dumping of municipal waste, tilling in a manner that allows soil erosion, have damaged the soil.
 - Taking care of soil *per se* is missing in the legal framework, in contrast to air and water.
 - There is a need for policies to revitalize the ecology and soil.
 - Engineering efforts are necessary to see that erosion is controlled.
 - Laws regarding what can be added to soil and what are the norms to be met before anything is put in the soil are needed. This is not just to take care of ground water but to also take care of soil *per se*.
 - At the same time, it must be ensured that soil is conserved by preservation of erosion and by deposition of fresh soil during floods and other methods that keep soil healthy.
 - Attitude of man has been to take care of natural resources. A sense of duty toward environment is missing.
 - Tradition of paying high regard to these natural resources should be restored. It is a cultural effort but will empower proper attitude and actions to ensure soil conservation.
 - Nitrogen and phosphorus are very important for soil. If carbon, nitrogen and phosphorus are less, biodiversity will be very less.
 - Government has distributed Soil Health Cards to farmers. It is a pioneering program, but there is lack of awareness about this.
 - Climate is the major factor for soil erosion. Other factors such as type of soil, type of plantation on that soil, biological activities also affect soil erosion.
 - Soil erosion occurs at a faster rate on slopes, particularly steep slopes, as the speed of water is increased and its transportation capacity is also increased.
 - Adoption of ridge furrow system will also help to check soil erosion.
 - The direction of crops on slopes should be perpendicular to the wind to reduce erosion.
 - A team of soil health volunteers must be created.
 - Soil, as a resource, has been greatly misused. It has largely been a neglected area unlike air and water as it does not affect man directly.
 - Mining and infrastructure development are the two major activities that are greatly affecting soil.
 - The impact of infrastructure development on soil has to be assessed. At present, the only requirement is that the top soil should be preserved and used in gardens, etc.

Participants: Mr Paritosh Tyagi, Dr Dipankar Saha, Dr SK Tyagi, Dr SK Gupta, Dr Sanjeev Agrawal, Mr Neeraj Tyagi, Mr Varun Singh, Dr Anil Kumar, Dr S Sharma

HCFI Round Table Environment Expert Zoom Meeting on “Ban on Identified Single Use Plastics: A Step Towards Reducing Plastic Waste Pollution and Health Effects of Microplastics”

Speakers: Mr Amit Jain, *UNEP* and Dr Kamal Sharma, *CEO-WeCare*

July 3, 2022 (Sunday, 12 noon - 1 pm)

- Single use plastics (SUPs) are of great convenience in daily life. But they have a major effect on environment and human health.
- Open burning of plastic waste, indiscriminate dumping of single use plastics in water bodies and

sewers, plastic contamination of seafood and microplastics are why single use plastics need to be phased out.

- There is lot of ongoing research on microplastics.
- It is estimated that there are more than 1.5 million trillion microplastics in the oceans.
- The government of India has banned the manufacture, sale and use of single use plastic products effective from 1st July, 2022. The list of banned SUPs includes 19 priority products. The regulatory action had begun early this year, when advisories had been issued to State Pollution Control Boards (SPCBs).
- This mission began in 1999 by banning thin polythene bags. There were further amendments and the first Plastic Waste Management Rules came in 2016 to increase the thickness of plastic bags to 50 microns. But we have been unable to eliminate even one SUP.
- Poor enforcement may be one reason, but the major reason is poor socioeconomic status.
- Collection of plastic waste is a huge problem.
- If there are no convenient and cost-effective alternatives and if enforcement is not strong, the plastic pollution problem will remain and go on increasing.
- Plastic is found everywhere. It started in 1950s when plastic was discovered. It is a universal packaging option across all sectors.
- Because of its widespread use over the years, we are now facing a problem of plastic pollution.
- This plastic is being transported from land through rivers to seas and oceans. Seas and rivers are a major part of food chain.
- About 80% of microplastics in the ocean come from the shipping industry.
- The source of microplastics has to be identified and act to control it.
- More than 10 rivers have been identified as carriers of plastic waste. The Ganges in India is one of them.
- Plastics are being recycled, but this is not adequate. There are different types of plastics; for some there is no business sense in recycling them, so they are dumped.
- Efforts are ongoing to identify hotspots of plastic leakage in the plastic value chain – from usage point to disposal point.
- More reforms are needed to so that a lifecycle approach can be adopted. To implement the lifecycle approach, market-based instruments were designed. Products need to be designed in a way that they generate revenue.
- There is a need to produce alternate products; at the same time, our habits too have to improve.
- All stakeholders – general public, producers as well as the informal sector needs to be involved in enforcing this ban.
- Microplastics are tiny plastic particles (<5 mm) that result from both commercial product development as well as the breakdown of larger plastics.
- Microplastics cause water, air and soil pollution. Through the food chain, microplastics enter the body and affect different organs and harms human health.
- It is speculated that microparticles carry viruses and make their lifecycle longer.
- Though their concentration is not so much at present, the impact would be visible in the next three decades. This would require modification of regulations related to air/water/soil pollution.
- Microplastics are being studied, but now there is a need to make it a movement, so that all states can get their water bodies evaluated with regard to microplastics.
- The capacity and capability of research institutes should be increased so that they can identify the microplastics and analyze them.
- The policymakers too have to be aware about microplastics.
- The way out of this problem is to comply with regulations as much as possible. This will be a gradual process and will not happen overnight.
- The 3Rs (Reduce, Recycle and Recover) must be kept in mind. First reduce consumption and then move on to resource efficiency and find out alternate materials – their cost-effectiveness, circularity.
- Awareness will have a major impact so a mass movement should be started.
- There is a need to develop infrastructure to manage it in a responsible manner.
- One way of dealing with the problem can be to fix the responsibility or extended producer responsibility (EPR), i.e., they take back the plastic produced by them so that it is in safe hands for safe handling, treatment and disposal.

MEDICAL VOICE FOR POLICY CHANGE

- Identify what can be controlled and what cannot be controlled. If responsibility cannot be fixed, then ban on such materials may be required.
- Use of other materials such as paper, glass, aluminum to replace plastic packing is not feasible as there are environment intensive. The cost of production of alternatives and their impact on the environment needs to be taken into consideration. Their compostability and biodegradability needs to be looked at. Rapid tests are not available to check compostability and biodegradability.
- Kulhad has been suggested as a replacement, but it is more carbon intensive and also requires top soil for manufacture.
- The industry is working towards sustainable packaging.
- Penalty for not complying with the ban should be imposed on the basis of the date of manufacture as the supply chain is long. This needs to be clarified from the regulators.
- A buffer time is needed for the markets.
- Instead of holding everybody accountable, the responsibility should be concentrated with the manufacturer, which is easy to identify and therefore also easy to control.
- Unless we stop manufacturing, this problem cannot be controlled.
- Currently, there is a gap between understanding, planning, mode of implementation and monitoring. These gaps need to be plugged.
- People have to be made aware that plastic is harmful. It is a derivative of phthalic acid, which is a potential carcinogen.
- The medical fraternity needs to come forward to create awareness about the harmful effects of plastic, similar to the scale of awareness that has been created about COVID-19.
- To have an effective ban, we need to learn from the past. For this, it has to be seen if the regulations are enforceable.
- SUPs have percolated down to people of lower income, so it is difficult to eliminate.
- Awareness, rational use and segregation are key.
- A behavioral change is required. We have to think and act differently.
- Research and development are necessary.
- The alternatives should be convenient, cost-effective and not hazardous to the environment.

Participants: Mr Vivek Kumar, Dr Anil Kumar, Mr Paritosh Tyagi, Dr Dipankar Saha, Mr Amit Jain, Dr Kamal Sharma, Dr SK Gupta, Dr Sanjeev Agrawal, Mr Pradeep Khandelwal, Mr Neeraj Tyagi, Dr Tripta Gupta, Dr S Sharma



Nonalcoholic Fatty Liver Disease and Dementia

Nonalcoholic fatty liver disease (NAFLD) may increase the risk of dementia, suggests a recent study from Sweden published in the journal *Neurology*. It further says that those with heart disease and stroke are particularly at risk. Data from 2,898 patients with NAFLD, aged ≥ 65 years, from the Swedish National Patient Register (NPR) between 1987 and 2016 was evaluated to investigate a possible association between NAFLD and risk of new-onset dementia. A total of 28,357 matched controls, without NAFLD, were also selected. Over a follow-up period of 5.5 years (median), 145 (5%) NAFLD patients and 1,291 (4.6%) patients without NAFLD developed dementia. The rate of dementia was 38% higher among NAFLD patients after adjusting for risk factors such as diabetes, hypertension, obesity (adjusted HR [aHR] 1.38). None developed Alzheimer's disease. The incidence of vascular dementia was 44% higher in the presence of NAFLD with aHR of 1.44. Co-existing heart disease increased the risk of dementia by 50% (aHR 1.50). The risk increased by 2.5 folds among patients with NAFLD and stroke (aHR 2.60). This study has shown a link between NAFLD and all-cause dementia, mainly vascular dementia but not dementia due to Alzheimer's disease. This relationship was particularly robust in patients with comorbid heart disease. This risk was independent of the cardiometabolic risk factors. NAFLD is increasing in prevalence globally. Since it is mostly asymptomatic, the diagnosis is often missed resulting in inaccurate estimation of the interrelationship, which according to the authors is a limitation of their study.

(Source: Shang Y, et al. Nonalcoholic fatty liver disease and risk of dementia: a population-based cohort study. *Neurology*. 2022;10.1212/WNL.000000000200853.)