A Study Circle Process for Environmental Pollution and Management

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Abstract – Diseases develop not only because of errors in genes or genes themselves, but also because of environmental problems or a lack of awareness of such problems. Diseases may be prevented or treated more effectively if people lived in a sustainable, pollution-free environment. Although raising awareness may help in the short term, sustainable solutions need long-term standards. Remembering the old adage that "prevention is better than cure" TIPS, or Treatment Including Prevention Services, may play an important role in reducing the spread of illness and environmental damage. A sustainable community, free from the perpetual detriment of sickness and pollution, need TIPS. Unlike at a hospital or clinic, there is no established relationship between the patients and the medical staff at TIPS. The primary goal of the facility is to foster a healthful and conscientious community and environment in which illness prevalence may be reduced over time. The Study Circle (SC) unit and the treatment unit will collaborate in a central location. The Alliance for Environment and Human Resource Development runs a program called SC on health and the environment. The objectives of SC on health and the environment are to identify the advent of environmental pollution, talk about the health problems that have arisen as a direct result of that pollution, raise public awareness of those problems and the environmental issues that cause them, and then come up with solutions to those problems.

Keywords – Study Circle, Environmental Pollution, Environmental Management, Air Pollution, Global Warming, Climate Change.

I. INTRODUCTION

From the dawn of time, man has had a tight relationship with the entire living and inanimate environment, which surrounds it. This relation underpins complete contemporary movement toward protecting the environment. To secure the circumstances necessary for their existence, man has become more interested in developing in a way that is in harmony with the surrounding natural environment. Human's constant yearning to bring harmony between nature and human needs becomes stronger with each technological advancement (from plows and wheels to computers). While modern urban, industrial, economic, and technological development has brought about many positive outcomes, it has also brought about many negative ones, such as industrial water and air pollution, unmanaged deforestation and their transformation into ozone layer destruction, agricultural land, and global warming resulting to a change in climate, the accumulation of different wastes (such as radioactive ones), and the extinction of particular animal and plant species.

Preventing and eliminating such inconsistencies now places a premium on environmental safeguards. The responsibility to safeguard the planet now requires a trilateral understanding of the supranational (international), national, and local levels. Thus, measures at the international, national, regional, and municipal levels are required if the normative framework is to be successful. Due to rising populations and rising levels of production, the landfills that collect our

garbage are multiplying at an alarming rate, and the ecosystem is suffering as a result. Daily, urban areas create just as much garbage as rural and agricultural regions. Approximately more than 10 million tons of oil products and 500 billion tons of wastes end up in seas and rivers each year. More than 1 billion tons of ash and aerosols are released into the atmosphere annually by industrial facilities and transportation. Years of trash accumulate at the land's end. Seventy percent of all trash ends up in landfills. Decomposition of trash via biochemical processes has a negative impact on ecosystems [1].

Insects, mice, and rats, all of which make a significant contribution to disease spread, thrive on the municipal garbage, which contaminates the vegetation, and soil, groundwater, surface water, and air in enormous amounts. The health of future generations is at risk because of this new predicament. This raises the challenge of preventing pollution via responsible garbage disposal. Industrial waste, municipal solid trash, agricultural waste, electronic waste, medical waste, and other mixed wastes are only few examples of the wide variety of waste compositions. Particularly problematic are the various adverse effects hazardous waste (chemical, biological, and nuclear) has on human health and the environment. Solid trash per capita ranged from 100 to 330 kilograms in the early 1990s, with higher figures recorded in the European Union (414 kilograms) and North America (720 kilograms). Waste generation and waste generation per capita are both on the rise across the globe [2]. The major issue is that instead of being recycled or composted, this garbage is dumped in vast landfills in populated areas, where it poses a threat to human health and the environment.

This paper provides a study circle discussion of environmental pollution and management. The rest of the paper has been organized: Section II provides a background analysis of the paper, introducing the health and environmental problems in Bangladesh. Section III focuses on the importance of pollution management. Section IV defines the study circle process, defining the objectives and response pattern of the study circle. In Section V, a detailed discussion of (i) ground rules of discussion, (ii) typical discussion platform and activities other than discussion, (iii) compiling the discussion, and (iv) the representative team, has been provided. Section VI provides recommendations to the study such as embracing ecological thinking, unplanned urbanization, solid waste pollution, medical waste pollution, air pollution, sound pollution, and water pollution. Lastly, Section VII draws a conclusion to the article.

II. BACKGROUND ANALYSIS

This review research is comprehensive and was conducted using just secondary sources. In order to identify significant environmental issues and provide a framework for addressing them, a comprehensive evaluation of existing research papers was conducted. There have been several systematic qualitative and quantitative studies conducted in Bangladesh on various aspects of environmental challenges. There have been several studies done on the topic of pollution in the nation, including those of water, air, solid waste, noise, and industry. This page draws mostly on Internet-based qualitative and quantitative research works and articles dealing with air, water, soil, and noise pollution in Bangladesh. Documents were evaluated to extract data and provide a high-level summary of potential environmental issues in Bangladesh.

Bangladesh is a nation that has a population of roughly 165.78 million as at 2021 and an area of about 147,570 square kilometers. It has a very high population density compared to other nations. The situation is becoming direr due to the proliferation of large, potentially harmful pollution bodies. Because of the fast growth of metropolitan populations, existing healthcare facilities cannot keep up, and as a result, many individuals in these areas suffer greatly from preventable illnesses [3]. Pollution and a general lack of health awareness have contributed to widespread illness among the local population. It has been discovered that city people are experiencing fundamental health difficulties due to their own actions in certain circumstances. Our collective health and community are suffering as a result of all of these factors.

Health and Environment Problem in Bangladesh

In Bangladesh, there is a severe lack of medical professionals relative to the population. Unprecedented growth, pollution, and a general lack of awareness have contributed to an increase in the prevalence of illnesses including dengue fever, encephalitis, and viral fever among infants. The poor and disenfranchised are suffering from a lack of instruction on basic hygiene. The cost of healthcare is high for the people of Bangladesh. Diseases develop not only because of errors in genes or genes themselves, but also because of environmental problems or a lack of awareness of such problems. Bangladesh's government spends a lot of money on health care, yet that money primarily goes toward treating, medicating, and vaccinating people against illnesses that cause not only physical but also financial devastation. In reality, no one is making an effort to stop the spread of environmental illnesses that are hitting people from every direction. Poverty, overpopulation, and a lack of education all contribute to the widespread environmental deterioration and natural resource depletion that can be seen on a regular basis in Bangladesh. The loss of forest cover, the disappearance of wetlands, the depletion of soil nutrients, etc., are all symptoms of this phenomenon.

The Constitution of Bangladesh mandates that the government provide citizens with access to quality, affordable healthcare. Bangladesh's health, nutrition, and population policies are guided by the goal of providing all citizens with the best possible health and wellness. The World Health Organization (WHO) recommends allocating at least 15% of a country's overall budget in the health sector. Notwithstanding the recommendations by the WHO, Bangladesh's annual healthcare budget remains woefully inadequate. Public health services received just 5% of Bangladesh's overall budget in FY 2018-2019.

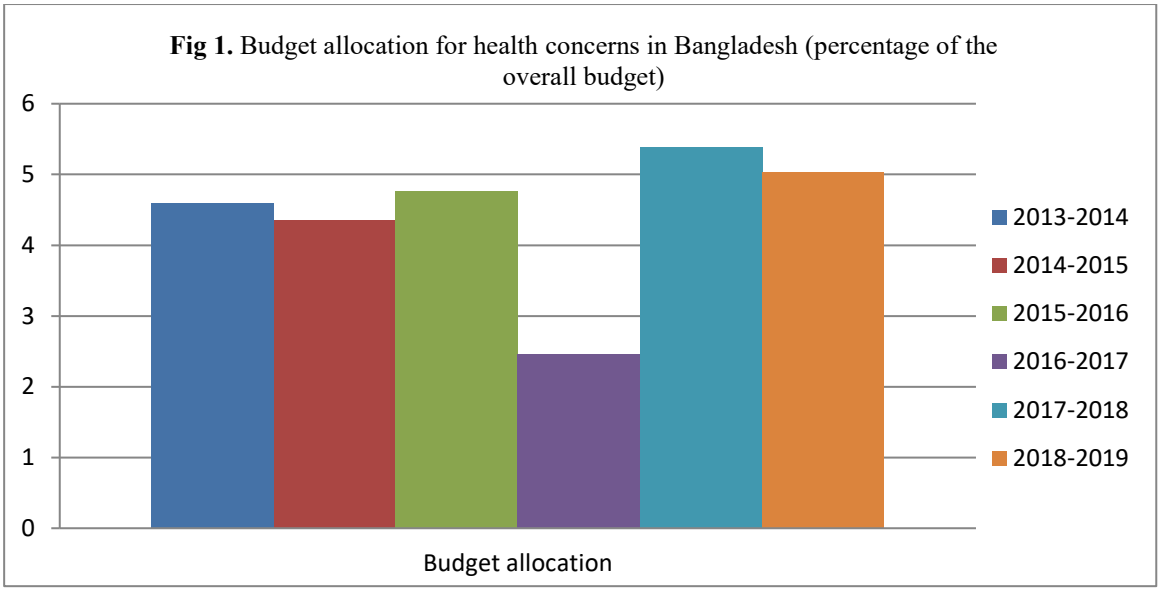

Fig 1. Budget allocation for Health Concerns In Bangladesh (percentage of the overall budget)

Fig 1 depicts the development of Bangladesh's health budget during the previous six fiscal years. The number shows that the percentage of the federal budget spent on health care has remained stable over the last six years. For the last half-decade, the health budget has averaged around 5% of overall spending. In addition, healthcare funding has remained relatively flat even while the population and the prevalence of new illnesses have both grown. Health spending received 4.6% of the overall budget in FY 2013-14 and 5.0% in FY 2018-19. Government healthcare spending, however, has not grown in line with rising demand.

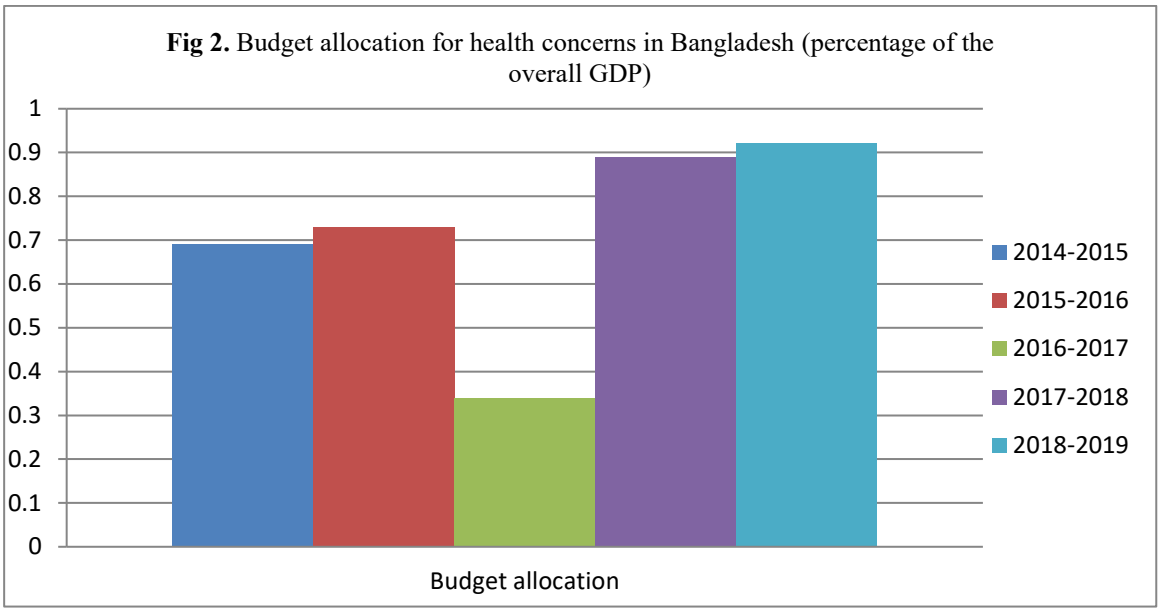

Fig 2. Budget allocation for Health Concerns In Bangladesh (percentage of the overall GDP)

The World Health Organization (WHO) suggests that nations spend about 5% of their GDP on Medicare. Yet, the Bangladeshi government has not yet allocated more than 1% of GDP [4]. **Fig. 2** shows that over the last five years, healthcare spending has averaged less than 1% of GDP. Health care had a budgetary allocation of 0.69 percent of GDP in 2014-2015. Even after five years, the budget has only reached 0.92 percent of GDP (2018-19).

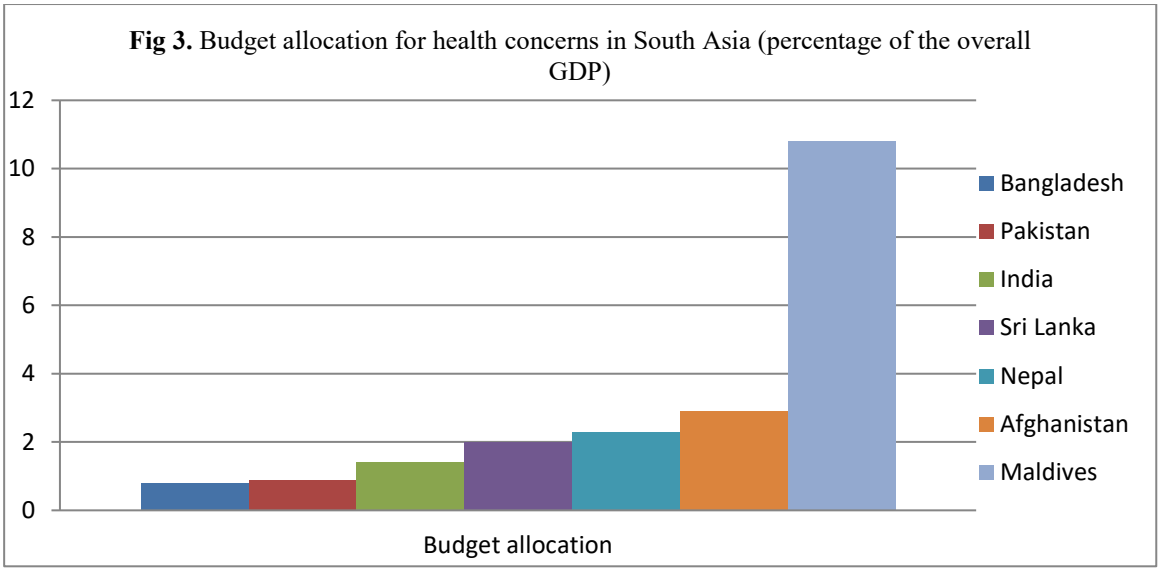

Fig 3. Budget allocation for health concerns in South Asia (percentage of the overall GDP)

Fig 3 displays the share of GDP spent on healthcare in South Asian nations. As compared to other South Asian nations, Bangladesh's share of GDP devoted to health care is the lowest. **Fig. 3** shows that the Maldives spend more of their GDP on healthcare than any other country, and this amounts to 10.8 percent. When compared to other South Asian nations, Afghanistan's 2.9% health budget allocation to GDP is second highest [5]. The percentages given by Sri Lanka, India, and Pakistan are somewhat greater than those allocated by Bangladesh.

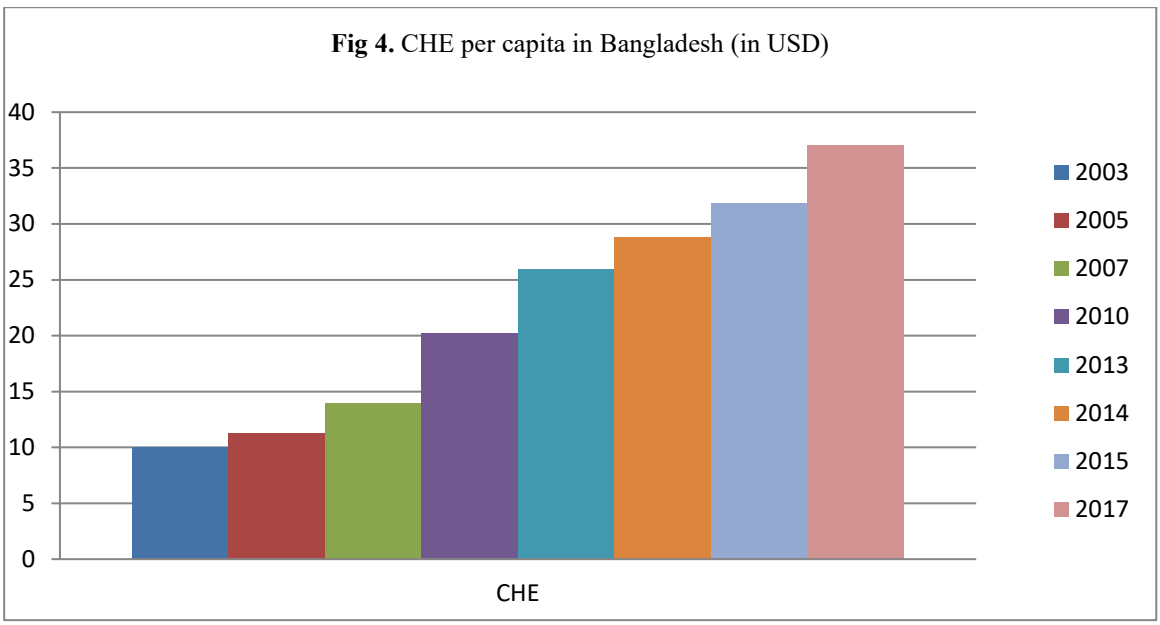

Fig 4. CHE per capita in Bangladesh (in USD)

Bangladesh has an extremely little public health budget on a per capita basis. Bangladesh spent just $37 per person on health care in 2017, which is less than a third of the $85-$112 that the World Health Organization recommends. Low budget allocation and poverty both reduce people's ability to access the health care system, despite rising health expenditures per capita. **Fig. 4** shows the current health expenditure (CHE), and in 2003, the average citizen of Bangladesh received US$10. The 2010 budget increase brought the total to $20.2. The current health spending per capita has climbed to $37 in 2017 [6]; however this is still far below what is needed to keep up with rising costs of living and medical technology.

The social and economic costs of natural disasters like floods, cyclones, and tidal bores may be enormous. Cholera and other waterborne infections pose a significant risk to the population's health in Bangladesh. Drinking water from surface rivers was a major source of illness for the people of Bangladesh until the 1970s [7]. Bangladesh's underprivileged

population has access to clean water thanks in large part to shallow wells constructed by aid organizations like UNICEF. Arsenic, a toxin found naturally in the alluvial soils of Bangladesh, was found to have poisoned several of these wells in the 1990s.

III. IMPORTANCE OF POLLUTION MANAGEMENT

Maintaining a healthy environment is a major challenge for modern society. The sustainability level of our planet's resources is under doubt due to the planet's growing population and the exponential rise in human activity. There is nothing left on Earth that has not been altered in some way by humans or polluted. The constantly-increasing human population and subsequent rise in consumption per-capita has placed severe pressure on the planet's dwindling natural resources. Moreover, air, soil, and water resources have been contaminated all across the world due to urbanization, industrialisation, and contemporary farming techniques. Future generations will have a tough time surviving because of the overexploitation and chemical contamination of the Earth's natural resources.

Global warming will cause temperatures to increase by 0.2 °C by 2050, according to numerous organizations' projections. These institutions include the Organization for Economic Cooperation and Development (OECD), and the United States Development Authority (USDA). This has already altered the planet and will continue to do so. Glaciers and polar ice are melting at rates two to three times greater than in the previous century because of global warming. An estimated one of the worst periods of biodiversity loss is occurring on Earth right now, with consequences that are both far-reaching and difficult to forecast. According to Sanders [8], the present degree of extinction of animal and plant species as a result of human activity is hundred times more than the natural condition in the past, and as things stand, this number might rise to thousands in the nearest future. At the present speed of decline, coral reefs, for example, are forecasted to be entirely eradicated within the very near future, taking a number of other species with them into extinction.

Humans have damaged natural systems at an alarming rate in pursuit of short-term benefits. The effects of human actions on the planet's ecosystems, economy, and the survival chances of many species are all difficult to predict. Despite the rapid development of technology, there are still individuals in the world who do not have enough to eat to maintain a healthy weight or grow to adulthood. We have problems with access to clean water, with clean air, and with the steadily worsening issue of land degradation. Land degradation has touched almost every nation in the globe, and saline soils are expected to grow by 50% by 2050. By 2050, humans will have produced 27 billion tons of MSW, which will need significant technological input to handle and will play a massive influence in shaping the environment [9]. Non-biodegradable trash is rising at an alarming rate, with certain particularly deadly recalcitrants building up in food chains and contributing to human illness, environmental degradation, and the extinction of wildlife, among other problems. According to a study published in Scientific Reports, a floating garbage patch of plastic trash in the Pacific Ocean is over 1.5 million km^2 (almost twice Texas's size) [11]. We need to find a speedy replacement for these dangerous human inventions since they are piling up water bodies and land at an unparalleled pace [12].

It is highly vital to examine the effect of human activities on localized environment and the globe in general on a frequent basis. While cutting-edge tech and equipment may aid in a situation's evaluation, eco-friendly solutions are also required. The answers to these issues are found in biotechnological methods and environmentally friendly technology. To mitigate global warming and reduce our reliance on fossil fuels, researchers are working to commercialize green fuels and other alternative energy sources. Similarly, biotechnological technologies are being used to control pollutants, organic wastes, and biodegrade polluted locations. Bioremediation is also a vital task that is being addressed for restocking the damaged habitats suing phytoremediation and microorganisms approaches. Food insecurity is one of humanity's most pressing problems. The widespread dominance of toxic agrochemicals on the market is a major reason why sustainable agriculture has not been attained. Maintaining soil fertility and microbial diversity as a strategy to attain food security sustainably remains a problem. In the future, scientists want to replace artificial fertilizers and pesticides with natural biostimulants and biopesticides, with promising early results. Biological methods will also be necessary in the future for managing crop stress and increasing yield in marginal, fragile, and harsh ecosystems. Both food safety and the long-term health of agricultural ecosystems will benefit from this [13].

So, achieving environmental sustainability is one of the most pressing goals of our time. Researchers, academics, scholars, governments, and NGOs throughout the world are focusing their efforts on this field, which affects people locally and globally. In light of rising human population and unchecked environmental destruction, environmental sustainability has emerged as a crucial tactic. It is out more vital objective to leave the world as a self-sustaining framework with equitable survival prospects not just to out upcoming generations but also to the various species co-habitating with humans. As people today enjoy the conveniences of economic prosperity, upcoming generations are on the edge of encountering a polluted environment and a limited physical resource [14].

In order to produce the goods necessary for the many infrastructures that support daily living, massive quantities of natural resources must be extracted and processed. This results in the emergence of several new economic sectors. More than 70,000 different products are made by chemical manufacturing organizations using resources including water, metals, minerals, air, oil, and natural gas. Heavy chemical production, which creates chemicals in vast quantities, emerged with the dawn of the industrial era. In order for measures to be taken to prevent pollution from occurring, particularly in the energy, agricultural, federal, user, and industrial sectors [15]. Wetlands, groundwater supplies, and other key ecosystems must be protected if we are to prevent pollution in their regions [16].

Abatement of pollution is any action taken to reduce, remove, or avoid pollution. Source reduction is a waste management strategy that emphasizes prevention over cleanup. There are only minimal risks to human health and the environment due to the low levels of pollution. Lowering water and chemical feed use and protecting vulnerable regions are two examples of pollution avoidance in the agriculture industry. Use of eco-friendly fuel sources; increased energy efficiency are two examples of pollution control measures in the energy industry. We have stopped water waste by fixing dripping faucets and hoses, shutting off lights when they are not in use, and filling reusable water bottles rather than using disposable ones in the classroom and at home. Implementing strategies for water and energy management; switching to non- or low-toxic alternatives for common cleaning and maintenance products; Reduce the amount of waste created during manufacturing by finding alternative uses for commodities like drums and pallets. Improved machinery and technological infrastructure are essential to the success of this procedure. Consist of coordinated materials

The Environmental Protection Act of 1986 was passed by Congress to include environmental considerations into the planning process. Substitute the basic elements. Reduce pollution from all sources, enforce bans on polluting industries, and make sure they're operating legally. The monetary expenses of both are reduced by this method. By preserving and maintaining natural resources, pollution prevention helps the environment and the economy. Industrial output increases and the burden on homes, companies, and communities to deal with pollution decreases. Protecting our ecosystem is an integral part of being personally and socially responsible. Many measures might mitigate the effects of our consumption patterns. We need to put a cap on how much power comes from fossil fuels. Instead, we should encourage people to make use of alternative energy sources. To protect our planet from the dangers of global warming, we must unquestionably implement measures to reduce emissions of carbon dioxide and other greenhouse gases.

The primary concern in today's world is environmental pollution, which includes things like trash creation, the usage of dangerous pesticides on a massive scale, global climate change, the occurrence of numerous catastrophes throughout the globe, etc. Learning how to adapt to and reduce the effects of the world's climatic change on agriculture, human health, civilization, water supplies, etc., and correctly managing the environment for the well-being of all living things, are all very important. An Approach to a Fix Diseases might be prevented and treated if people from all walks of life worked together to create a sustainable, pollution-free environment. Although raising awareness may help in the short term, sustainable solutions need long-term standards. Remembering the old adage, "an ounce of prevention is worth a pound of cure," TIPS, or Treatment Including Prevention Services, may play an important role in reducing the spread of illness and environmental damage. A sustainable community, one in which illnesses and pollutants don't play a constant role, need TIPS.

Unlike at a hospital or clinic, patients and medical staff at TIPS have no formal ties to one another. The primary goal of the facility is to create a community and environment that are self-sustaining and health-conscious so that the prevalence of health problems may decline over time. The Study Circle (SC) unit and the treatment unit will collaborate in a central location. The medical practitioner will conduct a physical examination and treat the patient accordingly. Patients who may have been unwell as a result of environmental problems or a lack of awareness will be rounded up and organized by SC organizers for treatment and participation in the SC. The SC unit facilitator will next meet with the doctor and event planners to discuss potential strategies for preventing future outbreaks. The planned Center would investigate the root causes of health problems and take corrective measures through the SC on Environment and Health.

IV. STUDY CIRCLE PROCESS

Working in Study Circle (SC) is like participating in a little democracy. The members of the community from many backgrounds get together to address a shared problem in a series of SC meetings. A SC is an 8-12 person group conversation in which everyone has an equal say. The group is directed by a neutral facilitator who is not necessarily a subject specialist. The facilitator asks questions to get people talking and to keep them on topic. The SC is managed in an informal and welcoming manner. In the Nordic nations, notably in Sweden, Finland, and Norway, SC is commonly used as a social mobilization program. As a result, stable democratic administrations have been established in those nations. The SC process was carried out in accordance with fundamental democratic norms. To facilitate conversation and eliminate misunderstandings, we gave each group's members a pamphlet outlining the current situation and the level of pollution, as well as a few questions about the various forms of pollution that will be brought up.

Objectives of the Study Circle on Environment and Health

The objective of the SC on environment and health are to identify the origin of ecological pollution, discuss the health problems that have arisen as a direct result of that pollution, raise public awareness of those problems and the environmental issues that cause them, and then come up with solutions to those problems. This SC program may be used to have a conversation on one of five environmental challenges, including (a) unorganized urbanization; (b) air pollution; (c) ineffective waste disposal pollution; (d) water pollution; and (e) noise pollution. The causes and effects of these issues on people's health, both individually and collectively, are sorted out once the repercussions of these issues have been identified. In the last phase, participants deliberate in order to provide a set of corrective measures.

Response Pattern of the Study Circle Participants

The SC members' reaction pattern, beyond debate, will reveal causes, repercussions, and corrective activities that might be implemented on each distinct sort of pollution. This sequence indicates that the items are most universal first and then most group-specific. After the round table debate, participants identified the underlying issues, the resulting pollution, and potential solutions. The guidelines are difficult for a single person to put into practice. The goal is to deliver the suggestions to policymakers at the regional and national levels, together with a representative of each SC team and TIPS health unit, in the hopes that some or all of the proposals will be implemented, if not immediately then at least over time. The local ward commissioner will be at the bottom of the chain, above them being the Member of Parliament and Ministers of the relevant Ministries. Involvement from the community, facilitated by the SC unit, continues to play a crucial role in the manifestation of the issues. In addition, people will take action to lessen environmental pollution if they know that the illnesses attacking them are caused by it.

V. DISCUSSION

The Association for Environment and Human Resource Development (AFEAHRD) has obtained funding from NDI (National Democratic Institute) for global affairs, the USAID (United States Agency for International Development), and SIDA (Swedish International Development Agency) to undertake SC on health and environment. The SC on Environment and Health's first cycle of activity began in April 2003 and concluded with a summit conference in October of that year. An overview of the research methodology and results are provided below. Successfully concluding with a number of valuable suggestions, the 10 circles have presented policymakers with information about the root causes, effects, and possible solutions to pollution-related health concerns. The organizer was responsible for coordinating the SC's members, doing administrative tasks, and drafting reports. Facilitators keep the SC conversation lively and objective so that work can be done quickly.

Ground Rules for Discussion

The guidelines ensured that everyone could take part freely and without fear of reprisal. Some of the guiding principles of discussion include listening carefully to each other, learning from each other, and waiting patiently for a change to speak. In order to be on time, it is relevant to provide scope to members, eliminate side discussion, work with facilitators, become a good listener, switch off mobile phones, and do not interrupt other while they are speaking, were some of the SC's house rules. The facilitators were also instructed to prevent the group from digressing into other topics. Participants valued guidelines such as raising hands before asking questions and refraining from speaking up while someone else was talking.

A Typical Discussion Platform and Activities Other than Discussion

The groups were all given the same set of questions to get the ball rolling on their discussions. They were provided a pamphlet covering the following informational groundwork: 1) Spontaneous Urban Development 2) Pollution from garbage dumps (3) Pollutants in the Air 4) Air pollution, 5) soil pollution, and 6) water pollution. We also sent an annex with relevant environmental regulations and news articles for their perusal. The average size of a circle ranged from 10 to 12 people. Each conversation lasted 5 days and 2 hours every day. The SC's mission was to save the environment and human health by nonviolent, democratic means of action.

Compiling the Discussion

The discussion pattern follows a three-step process: identifying the reasons, weighing the consequences, and offering solutions. The organizers and facilitators were tasked with taking notes from all SCs at the outset of the meeting. After they had finished gathering their notes, they gave them to the coordinator to check. When the coordinator reviewed it, it was returned to the representative committee so that the Group members could see whether any important information was left out. A final report based on their comments was delivered and discussed during the Report Presentation and Discussion meeting.

Representative Team

This proposal comes from a group of concerned citizens who feel empowered to speak out for positive public welfare reform. The group has taken the suggestions to policymakers on both the regional and national levels in the hopes that some, if not all, of them would be implemented. The local ward commissioner will report to the Member of Parliament, who will report to the Minister of the relevant Ministry. Two people from each SC subgroup make up the core "Representatives Team" working on this. In addition to holding casual meetings with residents in various Dhaka neighborhoods, this committee will officially submit its suggestions to the city's policymaker. After the ten SC groups concluded their work and before the Report Presentation and Discussion Meeting were held, this group met five times to discuss how to put the recommendations into action. The Report Presentation and Discussion Meeting that the participants in **Fig. 5** put together is one of their many triumphs. The following suggestions on five widespread environmental concerns emerged from Study Circle talks and were presented by the Representation Team to the Policy Makers in October 2003.

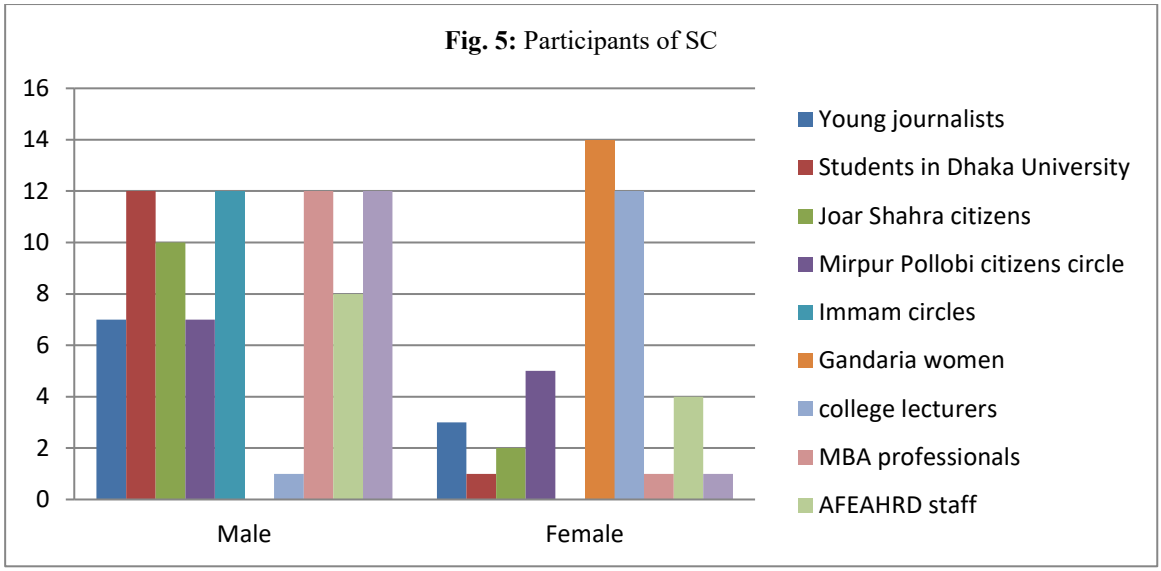

Fig 5. Participants of SC

VI. RECOMMENDATIONS

Embracing Ecological Thinking

The natural ecosystem is at the center of ecological thought. The principles of natural systems are applied to the study of human systems and settings by way of analogy. Metaphors are used when someone try to explain something in an unknown setting by conjuring a picture from something in a more familiar context, as is the case here. The more complex the phenomenon is being witnessed, the more researches depend on the employment of metaphorical languages to explain them, which may be problematic in research. Although while metaphors are vital to effective communication, they may easily be misused if not used with caution or completeness, as seen in the following paragraph.

Sociologists affiliated with the Chicago School extended ecological terminology and thinking to urban studies following World War One. However, support for these concepts decreased over time. Ecology as a lens through which to comprehend human social environments lost favor when biological concepts like "competition" and "survival of the fittest" were linked to immoral practices and laws. The Nazis' use of evolutionary biology terminology to defend their version of natural selection is a prime example. A handy, reasonable justification and explanation for all the aggressive, selfish behavior that man is capable of is provided by Darwinian ideas of evolution, as noted by Freguglia [10]. Because of this, the ecological metaphor is no longer widely used, and the proper role of the biological sciences in comprehending society is still being questioned critically, just as metaphorical understandings in science are being questioned critically.

Many causes may be responsible for the recent resurgence of ecological language and thought in the field of public health. The re-identification of the inextricable connections between health inequality and social inequality, the increasing identification of the complexity level of public health issues (such as the increasing capacity of exploring the gene-environment interactions), and the growing impatience with individualism and mechanical and linear approaches of construing causality all play a role. Evidence of a location's independent impact on health provides an additional push, as does the explanation-seeking activity necessitated by this research. The physical, social, cultural, and historical features of a given setting are all taken into account, as are the qualities and behaviors of the people living in that context (as well as larger-scale trends like globalization, urbanization, and environmental change). A focus on examining behavior in natural (non-experimental) contexts and the interconnectedness and reciprocal interaction of people/organisms and their environments are also fundamental tenets of an ecological approach.

The water and sewerage authority, the electric supply authority, the telephone and telegraph authority, and the gas connection authority all need to work together to ensure the public's safety. Dhaka's metropolitan area desperately needs administrative decentralization. Chittagong, the commercial capital, might become the next center of commerce. The government-run municipal corporation's service delivery might be contracted out to the private sector. Playgrounds, parks, ponds, and wetland areas all need regular upkeep. New urban areas have been planned with these factors in mind. There are designated spots where factories, shops, and homes must be built. When being constructed, homes must have sufficient open space surrounding them and be built according to authorized designs. It is essential that tall structures have earthquake safety features.

Teachers, religious leaders, and municipal ward commissioners might join a community mobilization organization to speed up development in the region. Strict adherence to the law is required. The execution of the Metropolitan Court Act is necessary to complete the picture. Employees of Dhaka City Corporation and linked Ministries need training to improve service delivery. Constructing detour routes and making some highways one-way are also viable options for reducing gridlock. Cities and towns need to develop their outskirts. In order to carry out the intended development activities, it is

necessary to clear the area of any unlawful structures, including unlicensed slums. There has to be stricter enforcement of legislation and the closing of legal loopholes (see **Fig 6**).

Unplanned Urbanization

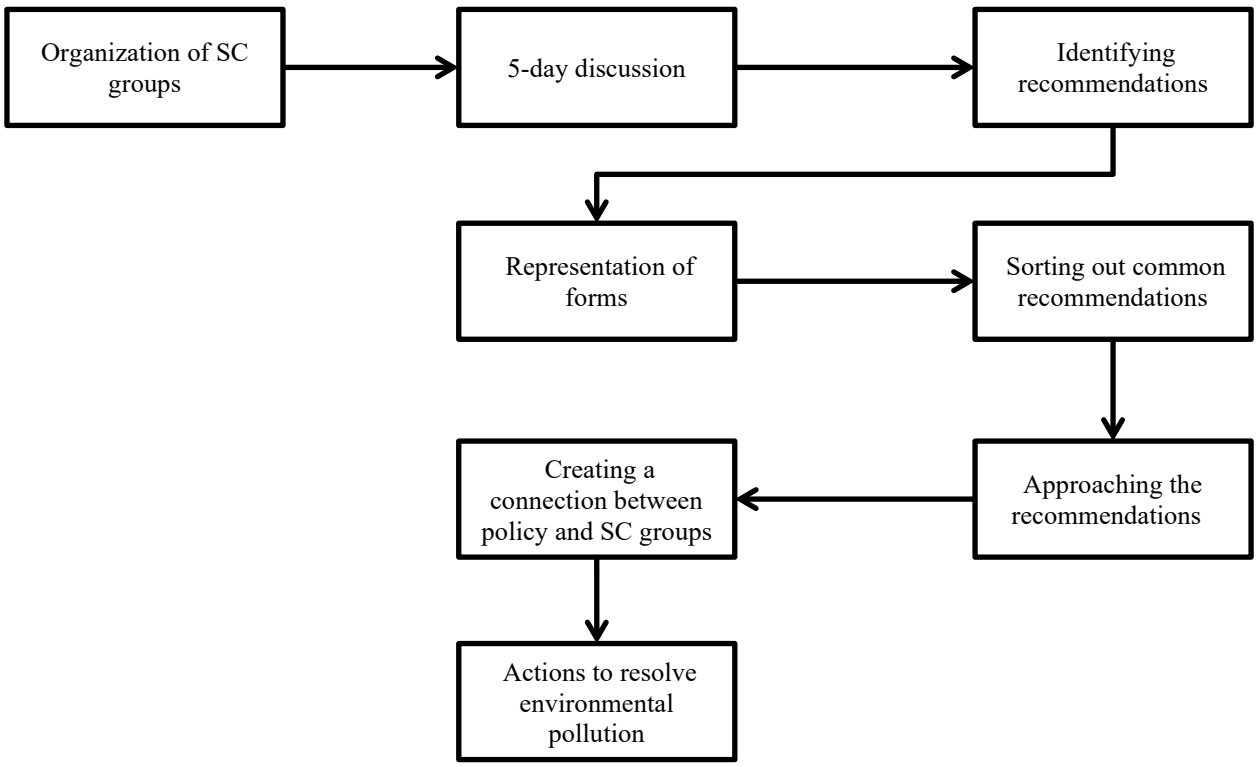

Fig 6. The role of the SC Team Members

Solid Waste Pollution

Waste is an asset that should be used rather than discarded. Biogas and compost or manure from natural sources might be produced from trash. It would be more effective to collect garbage from each residence rather than leaving it in dustbins on the side of the road. To prevent trash from blowing all over the road, covered trash cans should be constructed instead of just placed there. Regular nighttime trash pickup is required. There has to be education on the need of sorting trash at home into biodegradable, nonbiodegradable, and toxic materials.

Medical Waste Pollution

Within the medical center, hazardous waste might be incinerated. To prevent the transmission of disease, only specially designed vehicles should be used to transport items out of the complex. It would be possible to sort recyclables like syringes, saline, and bottles. Waste management policy has to be more scientific and long-term. Medical trash should never be combined with regular garbage. There needs to be more public restrooms and more trained personnel to keep them clean and running smoothly. Restrooms accessible by the public might be installed at gas stations. Women's restrooms may be located in a separate building.

Air Pollution

It is necessary to relocate brick kilns to a specific location outside of the city. We need larger chimneys and the switch to natural gas from firewood. Road construction can only be done at night. There ought to be a prohibition on old cars driving throughout the city. The following actions could be performed to prohibit smoking. Public venues must be smoke-free zones. Cigarettes and their components ought to be taxed more heavily. There should be age restrictions on who may buy cigarettes and other smoking accessories in public locations. The use of famous models to promote smoking in the theater, film, or other mass media must end. The government might designate designated smoking areas. Mosquito and fly populations might be reduced with the use of insecticides, but only to a certain degree. In constructing dwellings, it is essential to maintain enough ventilation. To reduce emissions, the Bangladesh Road Transport Authority (BRTA) may provide driver education.

Sound Pollution

The rule of law must be strictly enforced. The relevant authorities need to implement stringent measures to ensure that the decibel limits for individual automobiles, pedestrians, and other mobile objects in quiet regions, residential areas,

commercial areas, industrial areas, and mixed areas are adhered to. In order to keep an eye on the city's noise levels, several measurement devices will need to be placed throughout it. The use of hydraulic horns must be restricted, and all horns must be turned down to within the legal decibel range. Laws might be put in place to prevent excessive noise from broken automobiles. Mics should not be used in front of schools, hospitals, and other places where residents need peace and quiet.

The scope of any such exceptional usage must be kept narrow. In urban regions, microphone usage must be restricted to public spaces designated as such by the local government. This may only be used for campaigning, meetings, processions, etc. We need to relocate the mills and industries that are now positioned next to residential areas to more remote industrial zones. Religious leaders may help promote civic awareness by engaging in activities like media campaigns and the creation of civic groups and campaigns. The current traffic system must be updated. More traffic officers might be hired and trained, and more stringent penalties for infractions of traffic regulations enacted.

Water Pollution

Human activities consistently contribute to water pollution. Major ones include the random movement of industrial, municipal, and domestic pollutants in sewers, rivers, lakes, and other bodies of water. The daily sewage discharge as well as other effluents into the globe's water supplies is estimated to be 2 million tons. Approximately more than 70% of untreated physical wasters and 90% of raw materials are deposited into sources of surface waters in developing countries. Point sources and non-point sources are the two most common types of water contamination. It's not too difficult to identify, monitor, and manage point sources. Releases from urban sewage treatment plants and other contemporary facility are examples of point sources of water contamination. Whereas Non-Point suggests that there were several toxins released into the environment.

Pollution is difficult to monitor and regulate since its source and discharge cannot be determined. For instance, the usage of human land and untreated overflow originating from rural areas emptying into rivers are examples of non-point source pollution. Rainwater runoff that collects contaminants from several sources is another potential example of a non-point pollution sources. The application of concentrated mineral droppings and the resulting contamination of rural groundwater lead to rising concentrations of components in both surface and ground waterways, mostly from non-point sources, which are more difficult to predict than point sources. The widespread use of nitrogen droppings, domesticated animal manure, the fixation on vegetables, and the mineralization of soil nitrogen all contribute to the horticultural movement's status as a significant non-point pollution sources.

The cities of Dhaka, Chittagong, Khulna, and Bogra are the epicenters of Bangladesh's manufacturing industry. Paper, medicines, food industry, pesticides, metal industries, manure, painting and coloring, tannery, materials, and other similar sectors are major contributors to water pollution. Most untreated mechanical wastes flow into more than 200 rivers in Bangladesh. Dhaka, Bangladesh, regularly spews forth over 16,000 cubic meters of toxic waste from its 700 tanneries. The DoE has identified 1,176 polluting industrial units located throughout the country. **Fig. 7** displays the water contamination levels in the five most developed areas of Bangladesh in 2001.

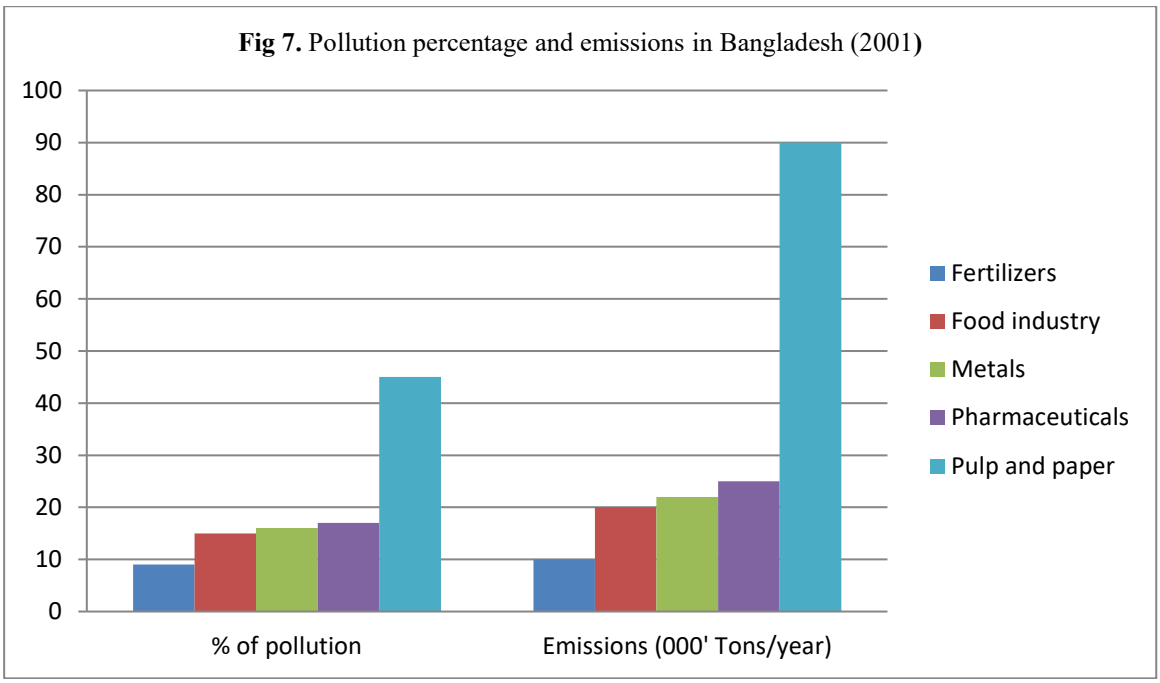

Fig 7. Pollution percentage and emissions in Bangladesh (2001)

Fig 7. Pollution percentage and emissions in Bangladesh (2001)

The practice of extending sewage systems into rivers must be outlawed. A recycling system should be put in place if there are no other options. Water supply lines cannot be installed near a sewer line. The correct care of these is required. Instead of releasing harmful mill and factory waste into natural waterways, it must be sent to a waste treatment facility. Laws against the encroachment of structures into riverbanks must be strictly enforced. The regulation of wetlands must be strictly enforced. The removal of aging and dysfunctional blood arteries is necessary. To prevent ships from dumping hazardous waste into water supplies, strict penalties must be enacted. Water drainage pipes should be inspected regularly and maintained clear of debris to avoid flooding. Maintaining navigability of rivers calls for periodic dredging. Surface water might be reused instead of groundwater for most purposes. The goal might be achieved by collecting and storing rainwater. Re-excavation of ponds is an option in the event of a recently built city. There ought to be a penalty for disposing of deceased animals in waterways.

VII. CONCLUSION

In 2003, Dhaka was among the world's most polluted megacities. Dhaka's residents are more aware of their rights as global citizens in terms of the environment. A mechanism for collecting trash has been established. By collaboration with other environmental advocacy groups, significant progress has been made. They include the use of unleaded gasoline, the elimination of two-stroke engines, the elimination of plastic bags, the creation of a river task force, the implementation of a wetland preservation legislation, the creation of new construction regulations, etc. In addition, the city of Dhaka now has a Detail Area Plan (DAP). DAP is included in the Structure Plan because of its intrinsic usefulness for those aims: (i) Provide access to necessary facilities and services in the research area via well-organized preparation. (ii) Provide a welcoming environment in which business is encouraged. (iii) Protect the region from flooding by enhancing its drainage system. (iv) Provide hubs of support to facilitate city expansion.

Moreover, Bangladesh has improved its environmental law and order. In 2003, the Study Circle on Environment and Health conducted a case study in the city of Dhaka to demonstrate that pollution control is doable using TIPS. The policymakers have taken the initiative to tackle the concerns seriously, despite the fact that there are some outstanding suggestions to be solved. The good effect is that the pollution situation in Dhaka city has been improving over time. The average person in that area has taken it upon themselves to rid their neighborhood of pollution. People have come to understand that environmental pollution is mostly to blame for their health problems. Because of this widespread attitude, policymakers have responded quickly to the need to reduce pollution. In the regular SC discussion unit, TIPS works on both present and future pollution challenges. To Improve Pollution Sustainability (TIPS) is one such scheme. When all the evidence is considered, TIPS emerges as a potent tool for eliminating local pollution. Climate change and other forms of global pollution will suffer as a result. By learning that majority of the illnesses they are experiencing are directly attributable to environmental pollution; people will build via TIPS the feeling of urgency to eliminate pollutions.

Data Availability

No data was used to support this study.

Conflicts of Interests

The author(s) declare(s) that they have no conflicts of interest.

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Ethics Approval and Consent to Participate

The research has consent for Ethical Approval and Consent to participate.

Competing Interests

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