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OVERPOPULATION-A CHALLENGE TO SUSTAINABLE DEVELOPMENT GOALS: SGD 6 (CLEAN WATER AND SANITATION), SGD 7 (AFFORDABLE AND CLEAN ENERGY), SDG 11(SUSTAINABLE CITIES AND COMMUNITIES) AND SDG 13 (CLIMATE ACTION) AND INTEGRATION OF EIA IN DESIGNING MITIGATION FRAMEWORKS

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ABSTRACT

Overpopulation, basically insinuates a situation wherein the Earth can't recuperate the resources used by the total populace. Experts say this has been the case consistently beginning around 1970, with each progressive year turning out to be increasingly harming. To help temper this wildly unsustainable situation, we want to comprehend what's adding to overpopulation and overconsumption and how these trends are affecting everything from environmental change to sociopolitical turmoil. It is not new to us that overpopulation does have a negative impact on the environment. The environment is under extreme stress due to the rapid increase in human population. Overpopulation has negative effects on the environment that go beyond simple environmental damage. It is only logical that an increase in the world's population will cause additional strains on resources. More people means an increased demand for food, water, housing, energy, healthcare, transportation, and more. And all that consumption contributes to ecological degradation, increased conflicts, and a higher risk of large-scale disasters like pandemics thus making it difficult to achieve sustainable development goals including SGD 6 (Clean Water and Sanitation), SGD 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action). Although overpopulation has negative effects on the environment, these effects can be lessened by addressing the problems through strategic planning and practices, efficient government/community involvement and designing effective mitigation frameworks based on the analysis of Environmental impact assessment (EIA) in every step. For a sustainable future, population growth and resource management must be balanced. In conclusion, even though the EIA's main responsibility is to protect the environment, by supporting policies that lessen the pressure from expanding human populations, protecting ecosystems, and encouraging sustainable resource use, it helps address some of the negative environmental effects of overpopulation.

KEY WORDS: Overpopulation; Depletion; Life Expectancy; Pollution; Unemployment; Poverty.

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INTRODUCTION

There are millions of species on Earth. Out of all the millions of species, humans are a superior species. We're only human! Furthermore, it is somewhat ironic that, despite being the only species accountable for environmental degradation and pollution, humans are regarded as superior every now and then, elderly people get nostalgic and tell us about how peaceful and different life was in their day [1]. There were actually people swimming in the rivers which are now polluted by factory waste, there was no need for air conditioners and what not. Most of us have likely seen how human residence has made the limits of our urban communities grow [2]. Recently, there has been a population explosion, and there are numerous causes and reasons for this. There are currently more than 8 billion people on Earth [3]. The United Nations projects that by 2100, there will be 10.8 billion people on the planet, assuming that many nations continue to see steady drops in fertility. Interestingly, the population in 2100 might be 7.3 billion fewer if women's reproductive self-determination gains more ground and fertility declines more than the UN predicts [4]. As of right now, the world's population is still growing at a rate of about 80 million people annually, and our supply of essential and vital non-renewable resources are being exhausted [5]

Some of the factors responsible for causing overpopulation is discussed below:

- **Increase in Life Expectancy:**The average life expectancy in the pre-modern world was thirty years, but due to scientific advancements and the daily discovery of new technologies to combat diseases, life expectancy has nearly doubled. Nowadays, the average person reaches the ripe old age of 70 [6]. It is a major factor in the population explosion and

overpopulation that has occurred. However, there are other factors contributing to the growing population. Life expectancy is rising globally. The majority of us who are alive now will probably live a lot longer than our ancestors did. Since the 1900s, the average life expectancy has more than doubled worldwide, largely due to improvements in general hygiene, general medical care, and technology. While declining death rates are undoubtedly not a cause for concern, widespread, longevity does contribute to the mathematics of increasing population numbers [7, 8].

- **Falling Infant Mortality Rate:**An imbalance between births and deaths is the main, and possibly most obvious, cause of population growth [9]. The World Health Organization (WHO) reports a decline in infant mortality rates worldwide. Newborn babies in the 18th and 19th centuries could not survive long enough to see the world on their own feet because of a lack of information, medical advancements, and vaccinations. Babies were unable to live long enough because of the widespread prevalence of diseases and general lack of awareness. The world has come a long way in reducing the infant mortality death rate, according to the 2019 report Child and Infant Mortality [10]. Between the 1800s and 1950, the mortality rate had been cut in half, rising from 43% to 22.5%. From 1950 to 2019, the mortality rate has been brought down to 4.5%. The drastic decrease rate of decrease in infant mortality rate has resulted in the rise of the population of the world at a great speed. This is welcome public health news, of course [11].
- **Underutilized Contraception:** The UN Population Division reports that the average global fertility rate has decreased over time, from five children per woman in 1950 to 2.4 children per woman today [12]. Contraceptive use has been gradually but steadily rising globally, from 54% in 1990 to 67.4% in 2019, along

with that encouraging trend. However, the use of contraceptives is still generally underutilized [13]. For instance, the World Health Organization estimates that 214 million women in developing nations do not use modern contraceptives in their attempts to avoid becoming pregnant. For a variety of reasons, such as societal conventions or religious convictions that forbid birth control, false beliefs about harmful side effects, and a lack of agency for women to make decisions regarding sex and family planning, these women are not using contraceptives, due to which they are unable to stop conceiving babies which is becoming a cause of increased population worldwide [14]. An estimated 54% of pregnancies were unintended worldwide between 2016-2019. Getting more women the access and agency to utilize family planning methods could go a long way in flattening the population curve [15].

- **Prevailing Uneducation:** Most frequently, overcrowding is observed to be more prevalent in developing countries than in developed ones. It is frequently the case that underdeveloped countries lack adequate education regarding reproduction and preventive measures; as a result, there is a sharp increase in global population, particularly in underdeveloped countries [16]. The majority of people in developing nations are unaware of preventive measures for avoiding pregnancies. Consequently, families with more children than they can afford to feed may be observed [17]. Additionally, it lowers the standard of living. The government is frequently to blame for the lack of knowledge, awareness, education and instruction among the people regarding current

overpopulation trends and strategies for reducing them. If people would be well informed about the consequences of having overpopulation they might start using preventive measures [18].

- **Lack of Female Education:** The gender gap persists even though more women are now able to obtain education. In contrast to 10 million boys, an estimated 15 million girls of primary school age will never learn to read and write [19]. Approximately 130 million girls are currently not enrolled in school worldwide. Delaying childbearing, healthier offspring, and higher rates of participation in the labor force are just a few of the advantages of promoting and enhancing education for women and girls [20]. Numerous data points to a negative relationship between fertility rates and female education. Increasing female education may also help to moderate current population trends if it can postpone or reduce fertility and give girls options other than an early marriage [21].
- **Poverty:** One of the main causes of overpopulation is poverty [22]. While poverty by itself may not cause population growth, when it is combined with a lack of education, it can lead to a temporary spike in population. Underprivileged, illiterate families might choose to have a child because it would mean having more hands to earn money [23]. This frequently has the potential to have a direct adverse effect on the environment and economy. This increases the strain on the environment, which is already deteriorating due to population growth, to meet the demands and needs of the populace [24].

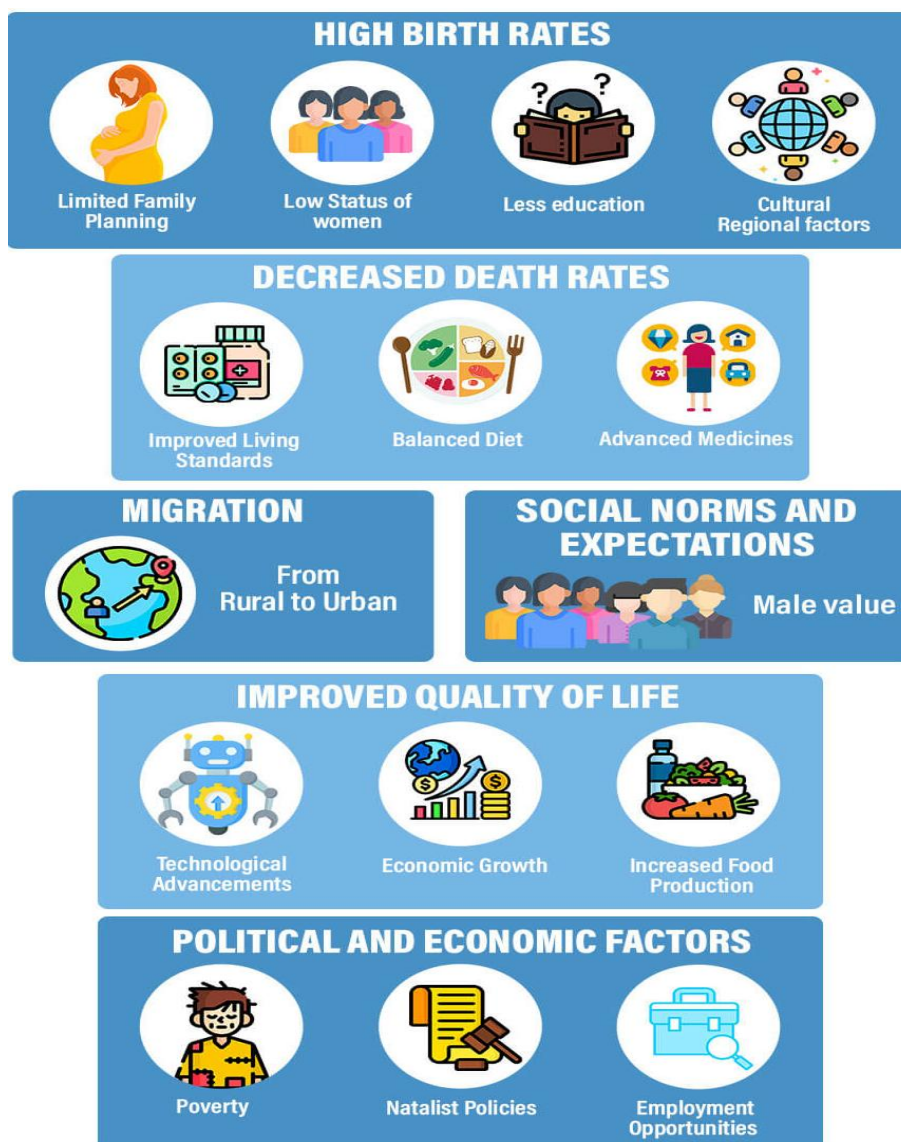


Figure 1: Factors responsible for causing Overpopulation

NEGATIVE IMPACTS OF OVERPOPULATION ON ENVIRONMENT

The environment is impacted by overpopulation in a number of ways which includes:

- Ecological Degradation:** Population growth will unavoidably result in pressures that worsen climate change by increasing deforestation, reducing biodiversity, and spiking pollution and emissions [25]. The survival of life on Earth as we know it is ultimately threatened by ecological disruption and collapse, according to many scientists, unless we take steps to help minimize further population growth into the remaining years of this century. The health of the planet is impacted quantifiably by every increase in the world population [26]. In

developed countries, a family with one fewer child could reduce emissions by 58.6 tonnes CO₂-equivalent annually [27]. I recently saw firsthand how the environment was being degraded by the clearing of a forest to make room for an expressway that was to pass through it. Every day, we all witness environmental degradation in one way or another, but we choose to ignore it because it does not directly affect us. The National Oceanic and Atmospheric Administration's 2019 Global Climate Report states that there has been a 1.1-degree Celsius increase in the average temperature since the 19th century [28]. Although it may not seem like a significant change, it has a significant implication for the environment and our

future. If the average temperature rises at this rate, Sea levels will rise as a result of the ice melting. It will cause many of the new world cities to flood and submerge [29]. The growing population, which is now overpopulated, is one of the most likely significant factors contributing to environmental degradation. There are currently almost 7.6 billion people on the planet. With only a billion people on the planet in 1800, there was hardly any environmental threat or danger. There are numerous reasons why environmental degradation can be attributed to overpopulation and to understand it we need to delve into the specifics of the relationship between overpopulation and the environment [30, 31].

- **Higher Risk of Disasters and Pandemics:** Numerous recent emerging infections that have caused chaos on people worldwide, such as COVID-19, Zika, Ebola, and West Nile viruses, began life in animals or insects before spreading to people [32]. The fact that people are regularly coming into contact with wild animals and destroying wildlife habitats is one of the reasons the world is entering "a period of increased outbreak activity" [33]. With a pandemic currently raging, it is evident how challenging it is to maintain social distance in a world home to almost 8 billion people [34].
- **Farming impacts:** It is common knowledge that humans depend on agriculture for food in order to survive, and this dependence has existed for a very long time [35]. The demand for food has increased as time and population have progressed. In order to get around the problem of feeding more people than there was food, farmers began clearing forests with government assistance in order to gain more territory suitable for farming [36]. This practice caused forests to start shrinking quickly, harming the environment and animals' natural habitats at the same time [37]. The effects of farming go beyond just clearing forests; farmers all over the world also burn their

stubble after harvesting crops. It actually causes a significant amount of smoke and pollution to mix with hazardous chemicals in the surrounding air [38]. The burning of stubble in the Indian states of Punjab, Haryana, and Rajasthan is one notorious instance of this [39]. In these states, stubble burning during harvest season turns New Delhi, the capital of India, into a makeshift gas chamber. Because of the high toxic content of the smoke from these neighboring states, residents of the capital have respiratory issues [40].

- **Deforestation:** Owing to the population's exponential growth, superior species were finding it harder and harder to construct homes for themselves and to navigate the forest when moving from one location to another [41]. They finally came to the decision to completely clear the forest in order to construct homes, roads, and more farming space. The negative effects of deforestation extend beyond just destroying the trees that give us clean air; regrettably, it also causes wild animals to lose their homes because people have taken over their natural habitat and converted it into farms, roads, or residences [42].
- **Eutrophication:** The process that takes place in any body of water, such as a lake or river, is called eutrophication. Eutrophication is the process of adding excessive amounts of nutrients to a lake or river's ecosystem through fertilizers or other human activities [43]. Algae eat the nutrients, which causes an exponential increase in their growth. The presence of algae on the water's surface prevents the plants underneath it from photosynthesizing, which eventually causes the water to lose oxygen [44]. This leads to a disturbance of the water body's ecology and the consequent death of aquatic life. Because of this and because of, the water body's diversity declines and due to the high sedimentation process, the lifespan of the

lake or the river also decreases significantly [45].

- **Loss of freshwater:** There is no longer as much fresh water in the rivers and oceans as there once was because of population growth and our ongoing need for manufactured goods [46]. Factories lose freshwater when they release all of their waste into rivers and lakes. The source of industrial waste is not the only source of pollution in aquatic bodies [47]. Overpopulation-related domestic sources are a major factor in both pollution and freshwater loss in bodies of water. The Ganga River is one instance of an Indian holy river. Hindus regard the water that comes from the Himalayas to be the holiest. The fact that the Ganga is the holiest river did not help to stop its exploitation [48]. The World Health Organization's report states that domestic activities account for 80% of the pollution load on the holy river. The river used to be pure and a great source of fresh water, but as soon as it passes through the plains and into the cities, it starts to get contaminated [49].
- **Global warming and climate change:** Global warming and climate change are obvious examples of the detrimental effects that overpopulation has had on the environment [50]. Concerns about the shifting global weather pattern and the ongoing increase in the global average temperature are shared by scientists worldwide. Several agreements have been signed by various nations to combat climate change and global warming. The Paris Climate Agreement, which was signed in 2016 by the world's most polluting nations, is one of the significant agreements. The agreement states that the signatory nations must control their carbon emissions in order to prevent an increase in the global average temperature of more than 1.5 degrees Celsius [51, 52]
- **Extinction of species:** The impacts of overpopulation, global warming, and

climate change on other species are horrifying. Incredibly terrifying to the point where the entire species may go extinct. 450 million years has seen five previous extinctions, all of which were brought on by natural disasters like meteorites or volcanic eruptions [53]. Scientists fear that global warming and climate change will be the cause of the sixth extinction [54]. A study that was published in a scientific journal states that current estimates of the number of species that could go extinct as a result of global climate change range from 0 to 54% [55]. Australia's coral reefs, a popular tourist destination, are already in danger of going extinct. These are not only species on the verge of being extinct, but there are also several species that are under threat like Asian elephants, giraffes, whales, and sharks, etc [56].

- **Increased habitat loss:** People required larger homes and more space to live as a result of the population explosion. This only meant clearing the forest, entangling the animals in their natural habitat, and upsetting the balance of the ecosystem [57]. The greediest species on the planet is the human race. Humanity has harmed more people than it has helped because of its greed. Needs rose along with the population, which only served to accelerate the loss of other species' habitat [58].
- **Depletion of natural resources:** More people mean a greater demand for resources of all kinds, including fossil fuels. Fossil fuel technology is typically less expensive than alternative sources because it is more established and older [59]. Certain countries cannot bear the expenses linked to more sustainable and renewable energy sources. Fossil fuel consumption increases cause carbon emissions and environmental harm. This exacerbates the effects of using fossil fuels, harms the environment even more, and impedes the natural renewal of resources [60]. It also coexists with the inevitable process of deforestation that

takes place in overpopulated areas. It is obvious that a lot of resources would be needed to meet the demands of such a large population [61]. In economics, it is already well-established that there are finite resources and infinite wants. The strain on natural resources rises along with the population. While some natural resources, like air, sunlight, and water, are abundant in nature, other natural resources, like minerals, coal, and fossil fuels, are scarce and have limited supply. They will eventually run out because of overpopulation and excessive demand for these finite resources [62, 63].

- **Increased emergence of new epidemics and pandemics:** Overpopulation and the emergence of new epidemics and pandemics are strongly correlated. In a 2008 paper that was published in the Journal Nature Research, disease ecology expert Dr. Peter Daszak stated that we can predict with extreme confidence that as the population grows annually, more and more diseases will emerge [64]. The best illustration of how population growth leads to an increase in

the emergence of new pandemics and epidemics is the case of the novel coronavirus. Their interactions with animals and the ecosystem also grow as their population does [65]. The likelihood of new epidemics and pandemics emerging rises dramatically with increased globalization, international trade, and travel. It gets challenging to stop the spread of viruses due to the population load [66].

- **Elevation in the crime rate:** Overpopulation, lack of resources, and unlimited wants ultimately make a man resort to crime in order to maintain a standard of living. This leads to an elevation in the crime rate [67]. Population spurt has forced village people to move to the cities to make their ends meet. Sometimes what happens is that due to unemployment people resort to unconventional ways to earn money. A large population is the reason behind unemployment and unemployment is the reason behind elevation in the crime rate [68, 69].

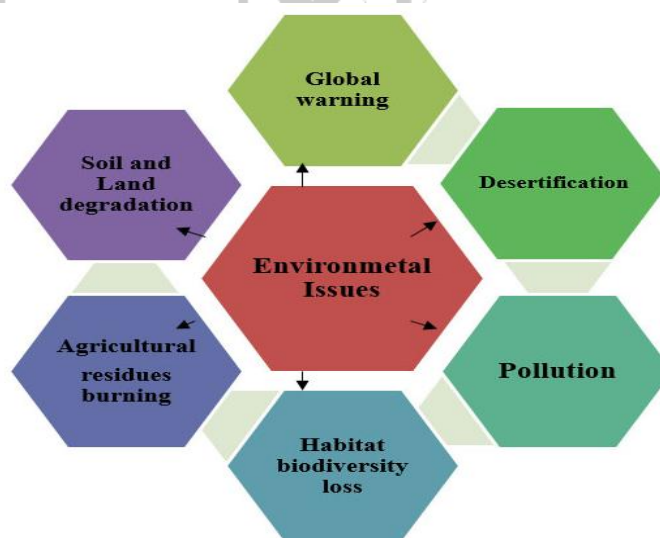


Figure 2: Negative impacts of Overpopulation on the environment

SOLUTIONS TO OVERCOME OVERPOPULATION AND ITS RELATED ENVIRONMENTAL IMPACTS

The issue of overpopulation did not develop overnight, and it will take time to find a solution. Overpopulation control is a long-term process and requires proper planning. One of the most important tools

for preventing overpopulation is the national government. The government must raise public awareness and strive to accomplish the goals including family planning, empowerment of women, offering folks some sort of incentive, inform individuals about birth control options and reduction in poverty

[70,71]. In an effort to reduce population growth, women's education and empowerment were long neglected; however, a 2017 study titled "Three Platforms for Girls' Education in Climate Strategies" found a link between lower rates of infertility and higher levels of education among women [72]. Investment in girl's education is indirectly an investment towards saving the climate

by curbing population growth on the planet [73]. People should also use sensible family planning strategies in order to help to the solution of overpopulation. They must know that bearing more kids isn't doing anything good for the planet [74]. Individuals need to exercise caution and give careful thought to the danger of overpopulation and its detrimental effects.

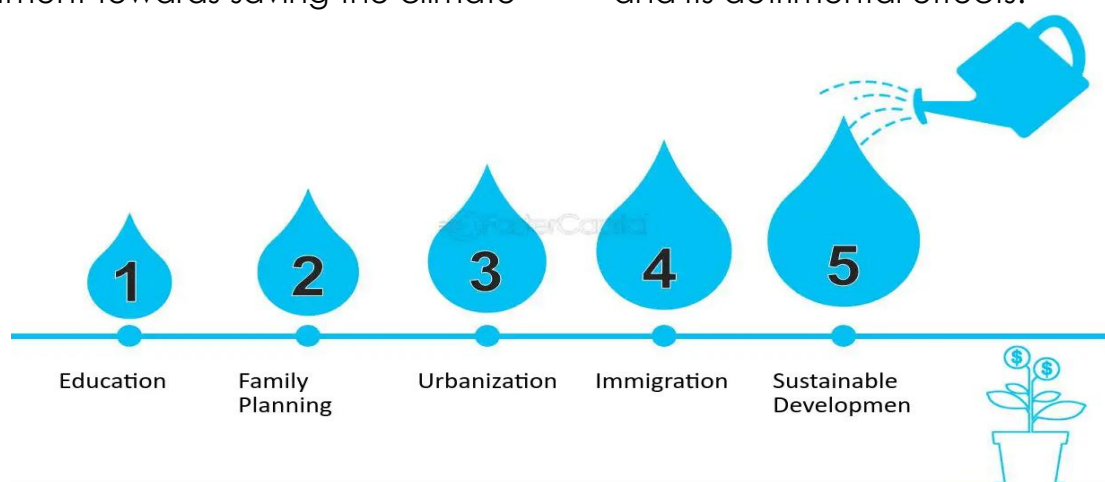


Figure 3: Solutions to overcome Overpopulation

BE THE POSITIVE CHANGE

The benefits of human activity on the environment are growing daily, and promising breakthroughs and technology in sustainability are continually emerging. Still, there are a lot of things that people and organizations can do to contribute to the creation of a more sustainable future. The affiliate program offered by Impact Day is a fantastic way to make a difference. Organizations and content producers can raise awareness of Impact Day 2024 the year's most innovative sustainability event by participating [75].

EIA' S ROLE IN COMBATING OVERPOPULATION

An international non-governmental organization called the Environmental Investigation Agency (EIA) is dedicated to fighting environmental crime and promoting legislative changes that would save ecosystems and biodiversity [76]. The main purpose of an (EIA) is to provide environment-related information to decision makers for better decisions. Also

some major goals of the Environmental Protection Agency (EPA) are to conserve the environment and reduce unauthorized activities that negatively impact ecosystems, such as animal trafficking, illegal logging, and practices that damage the climate [77]. However, the agency's work also indirectly addresses population pressure. Environmental Impact Assessment (EIA) was introduced in the United States in 1969 and in Pakistan, EIA was introduced in 1983 and now exists in nearly all countries worldwide as a tool to achieve sustainable development [78]. It includes multiple actors, such as consultants, proponents, public, non-governmental organizations (NGOs) and regulators i.e. the Environmental Protection Agency (EPA) responsible for regulating the EIA process [79]. The development and performance of the EIA system are also determined by contextual factors, such as clarity and practicality of legislations, support from international donors, socio-economic

conditions, literacy, awareness, and political interference [80].

The role of the EIA in Controlling Overpopulation

- **Protection of Natural Resources:** Unsustainable use of natural resources, such as water, forests, and wildlife, is frequently caused by overpopulation. These resources are conserved in part by EIA's efforts to halt illicit logging, overfishing, and wildlife poaching. The goal of EIA is to guarantee that ecosystems can maintain both present and future populations by encouraging sustainable behaviors [81].
- **Encouraging Sustainable Development:** In order to prevent environmental deterioration, sustainable economic policies are supported by EIA. Resources are strained by overcrowding, but the EIA's actions encourage industries and governments to adopt sustainable production and consumption practices, which can help ease some of the pressures brought on by overpopulation [82].
- **Climate Change Mitigation:** As a result of increased consumption and carbon emissions, overpopulation makes climate change worse. The increase in industrial greenhouse gas emissions and illegal deforestation are closely related to population growth and urbanization, the EIA's efforts to minimize these emissions such as through the HFCs campaign are essential to combating climate change [83].
- **Policy Advocacy and Education:** EIA aims to influence environmental legislation and increase public knowledge of environmental issues through policy advocacy and education. The group works to promote family planning and resource management, which can result in more sustainable population numbers in certain locales, by educating the public, organizations, and governments [84].

- **Preserving Ecosystems amidst Human Population Pressure:** Growing populations frequently invade protected natural areas, destroying habitats and reducing biodiversity. EIA protection efforts for important ecosystems contribute to a balance between environmental conservation and population expansion by reducing the negative effects of growing human populations on these crucial habitats [85].

THE INDIRECT INFLUENCE OF THE EIA ON POPULATION GROWTH

Although population management and reproductive health are not specifically addressed by the EIA, some of the underlying environmental issues related to overpopulation are addressed by its conservation initiatives. In a world where ecosystems are being stressed by population increase, environmental justice and resource protection are important but indirect roles that EIA plays in achieving sustainability development goals [86].

CONCLUSION

In addition to raising many concerns, environmental degradation and overcrowding can make us wonder if we even exist. "Are we really ready for the sixth extinction?" is one question that ought to really get under our skin. Do we actually treat the environment well? Do we truly give nature what it gives us in return? When will the planet be able to support itself after we have abused it? We still have all of these questions unanswered, as does the next generation that is, if they have the same access to the environment as we have. It is our responsibility as fellow humans to address the issue of overpopulation and to use extreme caution to prevent further degradation of the environment. Our small actions could have a significant impact on the environment. One of them is turning off the faucet while brushing

your teeth. It is our job and responsibility as a superior species to undo the harm we have already caused.

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