



**POPULATION GROWTH AND ITS EFFECTS ON NATURAL RESOURCES
IN SOUTH AFRICA**

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Abstract

The aim of the paper is to investigate how population growth affects natural resources in South Africa. The growth of the population affects natural resources because individuals require resources like land, food, and water for their survival. Therefore, as the population increases quickly, it places strain on the natural resources, resulting in a negative impact on them. It is reported that there are over 7.884 billion people in the world, and this number is projected to increase further. Countries such as South Africa, Botswana and Namibia experience rapid population growth due to the presence of illegal immigrants and a high birth rate. Therefore, the available resources cannot meet the needs of every individual in the nation. The paper suggests that population growth poses a threat to natural resources and must be managed before it becomes a critical issue leading to resource depletion in South Africa. This study is solely qualitative research that utilised a desktop-based approach, particularly PRISMA method to gather data on the effects of population growth on natural resources. The primary results of this paper show that the rising population in South Africa impacts natural resources due to a higher influx of illegal immigrants who also depend on these resources for their survival. The paper

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also reveals that even though there are methods of birth control available, they are not being effectively utilized by individuals to regulate birth rates. Hence, the conclusion of the paper is that the increased population growth has a negative effect on natural resources due to the unmanageable influx of immigrants in South Africa. This paper recommends that the South African government needs to effectively manage the presence of illegal immigrants within the country.

Keywords: *Birth-rate, Illegal immigrants, Natural resources, Population growth, South Africa.*

Introduction

Living organisms are born to consume resources; thus, the survival of human beings depends on the level of resources at disposal (Michel, 2021). However, when the rate at which the population growth is high, the natural resources are negatively impacted (Maja & Anano, 2021). Evidently, the study done by Ray and Ray (2011) in India reflects that rapid population growth is threatening the environment through the expansion and intensification of agriculture. This is because the government uses means such as the green revolution to increase the production of food for the purpose of accommodating rapid population. According to Wassie (2020), the measures put in place are a threat to the environment. For example, fertilizers used to make soil fertile are considered a threat to soil when they are used regularly (Unat, 2020). The world population is projected to grow from 7,7 billion in 2019 to 10,9 billion in 2100 (Maestas, Mullen & Powell, 2023). According to Sadigov (2022), the world population is more than 7 billion 884 million, which is stated to be high, and it worries humanity. Furthermore, not only is the population growing rapidly, but the growth even exceeds the level of production and improvement in the social needs of people (Unat, 2020). The main concern is that there is high population growth in developing countries compared to developed countries, and emerging countries have limited resources (Ray & Ray, 2011). For example, Ethiopia as a developing country is regarded a popularised country and its large population places a great burden on the sustainability of its resources (Wassie, 2020).

In South Africa, more than 60% of the population reside in urban areas and Gauteng province is populated because it receives the most migrants (Zubaidi, Martorell, Bugharbee, Olier, Hashim, Gharghan, Kot & Khaddar, 2020). Due to the high population, the consumption of resources will increase substantially, which is a threat to resources (Pratiwi, 2020). The population is growing and is expected to grow even more in the near future (Sadigov, 2022).

Therefore, this could negatively impact natural resources because to survive natural resources are required (Higo & Uk, 2015). Therefore, the purpose of this article is to investigate how population growth impacts natural resources in South Africa. First, the paper outlines the methodologies underpinned by the study and the theoretical framework guiding the study. Second, the article discusses the causes of population growth in South Africa. Third, the paper reveals the implications of population growth on natural resources in South Africa. Fourth, the paper explores the differences that cause population growth between developed and developing countries. Lastly, the article provides strategies to address population growth, conclusions, and recommendations.

Methodology

This paper adopted a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to collect data. PRISMA is a generally acknowledged methodology for conducting a Systematic Review (SR) (Mishra & Mishra, 2023). This type of a methodology enabled the researchers to acquire relevant information that assisted in achieving the objectives of the study. The PRISMA technique was employed in this conceptual study to identify pertinent literature sources pertaining to population growth and its effects on natural resources in South Africa. As a result, the main instrument employed to investigate the research gap in relation to the problem being studied was a literature review. Key bibliographic databases such as Google Scholar, Elsevier, Science Direct and Sabinet were the focus of this review. The search was specifically focused on concepts such as “South Africa”, “population growth”, “natural resources”, “challenges of population growth” that were used in titles, abstracts, keywords, and references. The included materials were specifically chosen based on their titles and applicability to the topics discussed in this study. It thus, used inclusion and exclusion criteria as outlined below.

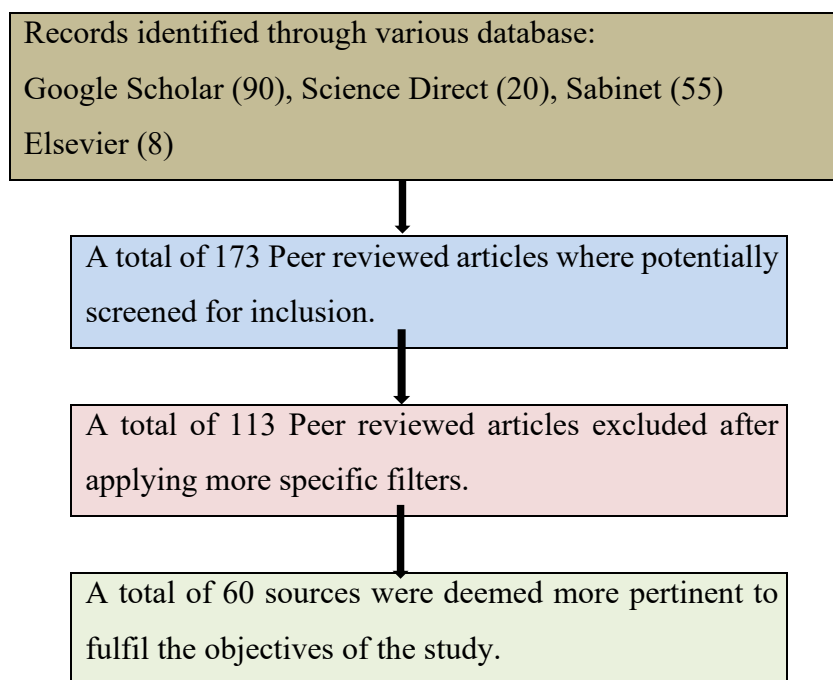
Inclusion Criteria

The analysis comprised published works that were available online and in peer-reviewed publications formed part of this paper.

Exclusion Criteria

Firstly, Literature published in languages other than English was omitted from the research. Secondly literature published before 2015 was excluded and considered literature published from 2015 to 2024. Lastly, literature which was outside the scope and did not have keywords of the study was excluded.

Figure 1: *PRISMA METHOD*



Source: Authors own compilation.

This paper employs a qualitative approach since it makes extensive use of secondary data as a means of obtaining pertinent and necessary information to meet its goals and address its central question. Secondary data are information collected by a party other than the original user. It implies that the data has already been analysed and are available (Thusi & Mashamaite, 2023). Secondary data used includes peer reviewed journal articles. It analysed the existing literature on the impact of population growth on natural resources. The article used the thematic analysis technique to analyze the qualitative data. The data was carefully analysed to discover subjects of the themes that repeat itself and patterns of significance that are frequently present. Therefore, the themes under review of the literature were carefully developed to provide the meaning and clarity of the article.

Theoretical Framework: Malthusian Theory (Neo Malthusian)

The problem of population growth has long made economists and social scientists concerned (Oladimeji, 2017). One of the known economists was Thomas Malthus, who developed Malthusian theory regarding population growth and food production in 1789 (Unat, 2020). According to Malthus, population growth is a problem. The Malthus quote says: 'the population is growing geometrically while food production is only increasing arithmetically and unless the population is checked at a time, the population could have doubled its number every quarter of

a century' (Pratiwi, 2020). He believes that the consequences are that when time goes on, the population will continue to grow and exceed the capacity of agriculture to support everyone (Dean, 2015). Furthermore, even if there is usage of technology to improve food production, it will be for short term and will disappear eventually in the long run with the increasing population (Azam, Khan & Khan, 2020). Malthus, who is a priest, indicates that people should abstain until they get married to have children (Oladimeji, 2017). For improvement, some researchers in the social science field who also see population growth as a problem re-evaluated the Malthus model (Soby, 2017). The theory became a Neo-Malthusian theory that involved methods of contraceptives to reduce the population.

The paper argues that population growth is a problem because it negatively impacts natural resources. This is because when the population increases, more measures have to be imposed to accommodate everyone, however, measures such as the green revolution with the intention to increase the production have a negative impact on the natural resources, particularly land. Thus, Malthusian theory supports the argument, making the theory relevant to the paper. The higher the population growth, the higher the number of resources to be consumed, which could lead to depletion.

The Causes of Population Growth in South Africa

The following section discusses the factors that cause population growth in South Africa. This section discusses the following cause of population in South Africa: birth rate and immigration.

Birth Rate

The birth rate refers to the number of births per 1,000 for the country's population, averaged over the year (Kearney & Levine, 2012). According to Sultan (2018), there are certain factors that lead to a high birth rate. The most common factor is teenage pregnancy, particularly in underdeveloped countries (Goodkind, 2017). It has been stated that being on a low economic trajectory in life causes many teenagers to have kids while they are still young and unmarried (Kearney & Levine, 2012). This is because they engage in unprotected sex with their partners (Kearney & Levine, 2012). For validity, in South Africa, people between the ages of 13-25 are regarded as the sexually active population and contribute to the increase in the population growth (Aguilera & Korinek, 2020). According to Barron, Subedar, Letsoko, Makau, and Pillay (2022), adolescent girls aged 15-19 in South Africa increased by 17.9% between 2017-2021. China developed an unprecedented program to control its population in 1971, which was able to avert about 400 million births (Sedgh, Finer, Bankole Eilers & Singh, 2015). This was

realized when it was uncontrollable. Sultan (2018) states that family planning was introduced and plays an imperative role in the population dynamic. However, the practice of family planning is low, as teenagers who are not prepared to do family planning engage in unprotected intercourse (Le & Nguyen, 2020). Furthermore, the reason for the lack of practice of family planning is due to a lack of access to resources and education that increase the birth rate (Bongaarts, 2020). The birth rate differs between developed and developing countries and between rich and poor (Goodkind, 2017). For example, a study by Aguilera and Korinek (2020) has shown that the birth rate in South Africa is higher than in the United States because methods of family planning in the United States were introduced early in the 1990s compared to SA as a developing country.

Immigration

Immigration refers to the process of moving from one's original country of birth to another country (Light & Thomas, 2021). For example, countries from the southern part of Africa migrate to South Africa for different purposes in large numbers (Wotela & Letsiri, 2015). According to Elsherbini and Elsherbini (2024), the reason for immigration is because people want better opportunities. For validity, Zimbabwe's economic conditions caused an increase in migration to neighboring countries such as South Africa and Botswana (Wotela & Letsiri, 2015). Thus, the number of people migrating increases the population of the countries and consumption of the resources (Mehmood & Balakrishnan, 2020). According to Light and Thomas (2021), immigration is divided into two: legal and illegal immigration; however, uncontrolled illegal immigration poses a great threat to natural resources. It is because countries only provide resources to their original citizens and legal immigrants, but illegal immigrants also require resources (Aguilera & Korinek, 2020). About 8 million undocumented immigrants participated in the US labour market in 2015, which constitutes 5% of the total labour force (Barron et al., 2022). However, increased immigration comes with greater challenges to job opportunities and resources (Light & Thomas, 2021). Policies in different countries, such as the USA and Kenya, are used to control illegal immigrants; however, it is difficult to control them (Wotela & Letsiri, 2015). For example, currently the South African government finds it difficult to know the number of illegal immigrants. Also, even when illegal immigrants are taken back home, they always return, stating that their countries lack opportunities.

Implications of Population Growth on Natural Resources in South Africa

The following section reveals how population growth affects natural resources in South Africa. The resources impacted include land, water, plants, ecosystem, and animals. The implications include water shortage, deforestation, and habitat loss, pollution, and erosion.

Water Shortage

Water resources such as rivers, deltas and coastlines are considered the main characteristics required when expanding cities to accommodate the growth of the population, leading to exploitation (Baus, 2017). Due to exploitation, the water becomes a shortage. For example, in one of the largest cities in India, Madras, due to increased population growth, people have to wake up between 4:00 and 6:00 AM so that they can line up at the public taps for water (Nawaz et al., 2017). This indicates that not everyone in the city has access to water, as some may not be able to bathe due to either a lack of water or because it has been used by others. The problems surrounding water shortages highlight the disparities between different regions of the world. In many parts of Africa, the burden of fetching water often falls on women, who may have to walk long distances each day to collect it. Meanwhile, in developed countries like the United States, water demand has increased significantly, increasing by 150% over a 30-year period. Globally, it is estimated that around 1 million people lack access to clean drinking water (Guney, 2017). Underdeveloped countries face more severe challenges compared to developed nations when it comes to water scarcity. For example, in South Africa, some villages experience such severe shortages that the government provides water tanks to distribute water to residents once a week, which still proves insufficient (Baus, 2017). Environmental factors also play a role, as changes in climate patterns have led to irregular rainfall, even during expected rainy seasons, exacerbating the scarcity of water resources in various regions.

Deforestation and Habitat Loss

Excess population growth often leads to forest clearing and the conversion of natural ecosystems into urban or agricultural areas (Mugure & Kibutu, 2023). As cities expand, they push animals out of their natural habitats, contributing to the depletion of various plant and animal species, largely due to insufficient environmental impact assessments, where development is prioritized over environmental preservation (Landrigan, 2017). According to Baus (2017), a US scientist noted that "the earth is amid its sixth mass extinction of plants and animals, with nearly 50% of all species disappearing." This rapid decline in biodiversity is one of the reasons why people now have to pay to see certain species that are becoming increasingly rare, as seen in places like Kruger National Park in South Africa (Baus, 2017). However, the

environment tends to respond to these disruptions if it is not properly maintained. For example, in India, the destruction of mangrove forests left coastal communities vulnerable to the devastating effects of the 2005 tsunami. Another significant cause of habitat loss is poaching, particularly targeting animals such as rhinos and elephants for their tusks (Nawaz et al., 2019). During the past 20 years, rhino poaching has been a prominent issue in South Africa and worldwide, as efforts to protect this species have only intensified its demand (Herbig & Minnaar, 2019). Despite the introduction of poaching licenses, these regulations have not been effective in curbing illegal hunting activities (Lunstrum & Giva, 2020). Deforestation is also closely linked to poverty, especially in rural areas where people rely on cutting trees for firewood to meet their daily energy needs, accelerating environmental degradation (Xu, Nie, Ding & Hou, 2018). These interconnected issues highlight the critical need for sustainable development strategies that address both human needs and environmental conservation.

Pollution

With the growing population, three major types of pollution—land, air, and water—are becoming increasingly severe (Baus, 2017). Rising demand for water, combined with inadequate wastewater treatment and management systems, often leads to contamination of surface water bodies such as rivers and lakes (Mugure & Kibutu, 2023). For example, the city of Shanghai in China faces significant issues with contaminated groundwater due to the increasing demand for water resources (Xu, Nie, Ding & Hou, 2018). In Kenya, growing water needs have forced the government to continually exploit groundwater resources, further straining this vital supply (Okello et al., 2015).

Land pollution is also increasing as the expanding population generates more waste, including pollutants from businesses, agriculture, and households (Landrigan, 2017). As the number of people increases, so does the volume of garbage and industrial waste, which contributes to the degradation of land quality. Moreover, air pollution is exacerbated by the emissions from companies (such as mines and factories) and automobiles, surpassing what the environment can naturally sustain (Ukaogo, Ewuzie & Onwuku, 2020). For example, many Asian countries rely heavily on gasoline, which results in significant atmospheric pollution (Landrigan & Fuller, 2015). Emissions released during these processes contribute directly to climate change, leading to higher temperatures, increased sea levels, and more frequent extreme weather events (Landrigan, 2017).

In urban areas of China, as one of the world's largest producers of goods for western countries, the high levels of green emissions have become a significant concern, negatively impacting the

health of city dwellers (Baus, 2017). This pollution has been linked to an increase in respiratory diseases among residents. Unfortunately, developing countries often bear the brunt of pollution generated by industrial activities in developed countries, suffering the consequences despite contributing less to the problem. The resulting air quality problems highlight the urgent need for global efforts to address both the causes and effects of pollution to safeguard public health and the environment.

Erosion

Erosion occurs when the top soil is left exposed to the forces of rainfall or wind, which can easily remove and carry away soil particles from the surface (Pimentel, 2006; Owens, 2020). This natural process is accelerated in areas such as China and India, where approximately 5.5 billion and 6.6 billion tons of soil are lost annually, respectively. Together, these two countries account for approximately 17% of the total land area of the world but face significant soil degradation (Baus, 2017). In the United States, an estimated 3 billion tons of soil are eroded each year, highlighting the global scale of this problem (Baus, 2017).

Soil erosion significantly reduces soil quality, posing a major threat to agriculture, which relies on fertile land for about 99.7% of food production (Pimentel, 2006). As a result, many valuable lands become unproductive and are often abandoned due to their decreased agricultural viability (Wuepper, Barrelli & Finger, 2020). The decline in soil fertility directly threatens the world's food supply, as global agricultural productivity is heavily dependent on maintaining high-quality soil. Without fertile soil, food shortages could become inevitable, leading to higher food prices and increased food insecurity, especially for impoverished communities (Baus, 2017; Wuepper et al., 2020). The Food and Agriculture Organization (FAO) estimates that agricultural production must grow by at least 70% by 2050 to meet the demands of the world's growing population (Guney, 2017). Addressing soil erosion is crucial to achieving this goal, as loss of fertile soil directly affects our ability to produce sufficient food. To ensure global food security, it may also be necessary to consider strategies to manage population growth, as unchecked expansion places additional pressure on natural resources.

Causes of Population Differences Between Developed and Developing Nations

Population growth varies significantly between developed and developing countries due to various factors. Developing countries make up about 74% of the world's total population, while developed nations account for just 26% (Fedwab & Loungani, 2021). Understanding these

differences requires examining factors such as education, healthcare, family planning, and economic conditions.

Education and Empowerment of Women

Education, especially among women, plays a crucial role in population growth. In developed countries, such as the United States, women often have greater access to education and career opportunities, leading to lower birth rates (Guney, 2017). Higher levels of education are associated with a preference for smaller families, as women are empowered to make informed decisions about family size and career goals (Baus, 2017). In contrast, in many developing countries such as Somalia, educational opportunities for women are limited, leading to higher fertility rates (Nawaz et al., 2019). Illiteracy among women in these regions often means that they have less knowledge about family planning and birth control options, contributing to larger family sizes (Sultan, 2018). While birth control measures are becoming more accessible in developing nations, a lack of proper education on how to use them effectively reduces their impact (Le & Nguyen, 2020).

Healthcare and Family Planning

Access to healthcare services and family planning resources also significantly influences population growth. Developed countries generally have robust healthcare systems that provide easy access to contraceptives, leading to lower fertility rates. For example, women in China benefit from well-developed healthcare infrastructure, which helps maintain lower birth rates (Dean, 2015). In contrast, healthcare systems in developing countries like South Africa are often underresourced, with limited clinics and inadequate family planning services (Soby, 2017). In rural areas of South Africa, many communities have to rely on mobile clinics or travel long distances to access healthcare, making it difficult for women to obtain birth control (Barron et al., 2022). This lack of access contributes to higher birth rates and challenges in managing population growth in these regions (Azam et al., 2020).

Economic Factors (Employment Opportunities)

Economic conditions also play an important role in influencing population growth rates. Developed countries like Japan have lower population growth due to higher levels of industrialization, urbanization, and better job opportunities that lead to delayed marriages and fewer children (Sedgh et al., 2015). For instance, as of 2023, Japan's manufacturing sector employed over 10.55 million people, illustrating a strong industrial base that often shifts focus away from early family formation (Ishikawa, 2023). On the contrary, developing nations such as Nigeria face rapid population growth driven by high birth rates among economically

disadvantaged populations and rural communities (Mugure & Kibutu, 2023). In such areas, limited economic opportunities often lead to early marriages and larger family sizes. In India, child marriage remains prevalent, which results in young girls having more children at an early age, contributing to higher fertility rates (Light & Thomas, 2021). Furthermore, employed women in developed countries are more likely to prioritize their careers, resulting in a preference for smaller families. They understand the benefits of having fewer children, which allows for a better quality of life and more opportunities for their families. This economic stability contrasts with developing nations, where economic pressures often push families toward having more children.

Recommendations to Address Rapid Population

Managing rapid population growth requires a multifaceted approach that includes education, policy re-evaluation, international cooperation, healthcare improvements, and sustainable development practices. Here are some recommendations to effectively deal with the challenges posed by the increasing population.

Education and Awareness

Implementing comprehensive family planning education programs in both urban and rural areas of South Africa is crucial (Adekola & Mavhandu-Mudzusi, 2021). Providing clear information on how different family planning methods work can help people understand their importance in controlling population growth. Raising awareness, particularly in rural areas, about the responsible use of natural resources is also essential (Pata, Aydin & Haouas, 2021). For example, promoting practices such as replanting trees after cutting can help reduce deforestation and ensure resource sustainability. Educating communities about the consequences of overuse of natural resources can lead to more responsible behavior that will help protect these resources for future generations.

Re-Evaluation of Illegal Immigration Policies

Countries should re-examine their immigration policies to effectively manage illegal immigration, which can contribute to population increases and put pressure on natural resources (McAuliffe, Coppari, Abbasi-Shavazi & Maunganidze, 2024). Stricter border security measures and consistent border personnel monitoring can help prevent illegal entry. However, a more humane approach would involve giving undocumented immigrants the opportunity to register legally, which could make immigration more manageable. By taking these steps, countries can better control population numbers and reduce the strain on their resources (Amarante, 2020).

Cooperation with other countries

Addressing global population issues requires collaborative efforts among nations (Aronson, Goodwin, Orlando, Eisenberg & Cross, 2020). Many developed countries depend on the resources of developing nations to meet their own population needs, which can lead to environmental degradation, climate change, and pollution. Strengthening international cooperation is vital to ensure that resource extraction practices are sustainable and environmentally responsible (Aronson *et al.*, 2020). Collaborative efforts can also focus on providing developing countries with support to improve healthcare, education, and economic opportunities, ultimately helping to stabilize global population growth (Haque, Islam, Rahman, McKimm, Abdullah, & Dhingra, 2020).

Establishment of Clinics in Rural Areas

Governments should invest in healthcare infrastructure in rural areas to ensure easy access to family planning and contraceptive services (Khan, Akter, & Islam, 2022). By providing clinics with comprehensive family planning options, people in these regions can make informed decisions about childbirth, reducing the birth rate and alleviating the pressure on natural resources (Haque *et al.*, 2020). The availability of healthcare services in rural areas should be treated as a fundamental investment, promoting a healthier and more sustainable population growth rate.

Sustainable Development Practice

Sustainable development focuses on meeting the present needs without compromising the ability of future generations to meet theirs (Hajian & Kashani, 2021). Governments must ensure that any projects aimed at accommodating the growing population are designed with the environment in mind (Satterthwaite, 2021). Conducting thorough environmental impact assessments for each project is essential to identify and mitigate the negative effects on natural resources. Striking a balance between development and environmental conservation will promote sustainable development and preserve resources for future generations.

Conclusion

The aim of this paper was to investigate the impact of population growth on natural resources. Population growth is a global phenomenon that has a significant impact on natural resources. The paper discussed the causes of population growth. Then it revealed the implication of population growth on the natural resources of the country. Lastly, it provided strategies for dealing with population growth, conclusion, and recommendations. People use more energy,

water, and land as they are born into the world and live longer. This strains the ecosystem and causes problems such as overfishing, deforestation, and water shortages. Sustainably managing resource consumption and population growth is essential to ensure that present and future generations can meet their demands. As the adage saying says: “take care of the environment, and the environment will take care of you”. This paper concludes that population growth causes negative impact towards the natural resources, thus, this paper provided recommendations that if they are implemented the global world would be a better place for its inhabitants.

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