

Research on the Impact and Strategy of the Accelerating Urbanization in China

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Abstract: As urbanization accelerates at an unprecedented pace, especially in rapidly developing nations like China, a range of significant challenges has emerged. This essay will explore four major issues arising from urbanization: polarization, urban planning difficulties, pollution, and global warming. These problems not only impact rural and urban areas but also pose serious threats to the global community. Polarization exacerbates income inequality, leading to a widening gap between rural and urban populations. Urban planning issues, such as inadequate infrastructure, strain city resources, causing congestion and inefficiency, pollution, fueled by industrial growth, deteriorates air quality, posing health risks to citizens; while global warming, driven by increased carbon emissions, accelerates climate change with severe consequences worldwide. To address these challenges, solutions such as boosting farmers' incomes, constructing viaducts and taller buildings, promoting the use of masks, and reducing carbon emissions are proposed. However, the feasibility of these solutions depends on each country's financial capacity and available resources. Therefore, this essay will assess the practicality of these measures and their potential to mitigate the risks associated with rapid urbanization.

Keywords: Urbanization, Polarization, Global Warming, Strategy.

1. Introduction

1.1. Research Background

According to data from the World Bank Group, approximately 4.4 billion people, or around 56% of the global population, currently reside in cities. This trend is expected to intensify, with projections indicating that by 2050, nearly seven out of ten people will live in urban areas, effectively doubling the urban population from its current level [1]. While this rapid urbanization has contributed to improved economic conditions, it has also led to significant challenges. The growing urban population drives up demand for housing, public infrastructure, transportation, services, and job opportunities, putting immense pressure on cities to accommodate this influx. As a result, the swift pace of urbanization has not only enhanced economic prospects but also exacerbated problems related to urban planning, resource allocation, and overall quality of life.

1.2. Literature Review

Peng Gong et al. analyzed that the rural-to-urban migration caused not only economic change but also many health problems for both rural and urban populations in China. Health concerns resulting from the rural-to-urban migration included those related to air pollution, traffic, and work dangers, as well as those related to dietary changes. The low vaccine coverage of the migrant population has also led to the spread of infectious diseases. It also introduced what governments need to improve infrastructure and develop new policies to solve this problem [2]. Yang et al. found that urbanization has brought a lot of environmental and socioeconomic problems. They proposed that in order to solve these problems, the Chinese government needs to think both qualitatively and quantitatively, learn from history, and take a people-centered approach [3]. Jianyun Zhang et al. found that as the global climate changed and rapid urbanization has taken place, urban flooding is becoming increasingly common in China. They analyzed how global climatic change and urbanization processes affect the mechanisms of urban precipitation, including extreme rainfall, and outlined the impact of urbanization on the flooding process from the surface runoff and the volume of flow parts [4].

Most researchers have mainly studied how urbanization affects the lives of people who live in urban areas, how to redesign cities, and how to develop new plans to solve these problems and achieve sustainable development. However, very few articles have shown how urbanization influences both urban, rural and the whole world.

Hence, this paper will mainly talk about the impact of accelerating urbanization on both urban and rural areas as well as the whole world and how these impacts cause problems for the local people. At the same time, this study will provide some solutions to this problem.

2. Case Description

China is a country in East Asia with a population exceeding 1.4 billion. Since the reform and opening up, China's booming economy and the huge number increase in population, which the total population in China increased from 987.05 million to 1410.78 million in 2024, which has around 1.4 times increased, has accelerated the process of urbanization [5]. The greatest and quickest urbanization pace in human history is currently taking place in China. China's urban population rose from 172 to 770 million people between 1978 and 2015, resulting in a rise in the country's urbanization rate from 18% to 56%. The number of cities increased from 193 to over 650 in the same period [3]. Urbanization brings both economic and social improvements to China. However, it also leads to many issues, such as environmental problems that harm residents' health [2]. So, this paper will use China as the main example to analyze how accelerating urbanization causes changes and leads to problems.

3. Analysis on the Problem

3.1. Influence of Accelerating Urbanization

3.1.1. Polarization between Urban and Rural Areas

For rural areas, the main impact of urbanization is uneven urban and rural development caused by population migration. The distribution of resources is uneven, and urban cities are usually built in places that are rich in resources. Hence, it leads to slower development in rural areas compared to cities. Because rural areas lack a factor of production, they have fewer natural resources, a low level of skilled labour, poor capital, and no entrepreneur to provide the initial ideas for development. The movement of young people to the urban areas, however, has strengthened the gap. This leads to infrastructure development in urban and rural areas being out of balance, with urban infrastructure

developing faster and having better quality due to the governments being their investors [6]. In contrast, the government makes fewer investments in rural infrastructure, and most of it is resolved by rural residents as rural areas have lower income, public utility development is lagging, so the living conditions of residents are poor [6].

3.1.2. Urban Planning Issues

Then, talking about the urban area, the main impact is the urban planning issues, including congestion and housing shortages that are all caused by population increase in the short term. For the traffic parts, as the population increases with urbanization, the original transportation channels are not enough for the increasing number of cars to pass, which leads to congestion. In the same way, there is not enough land for all citizens to live. As a result, the houses are getting smaller and smaller while the housing price is rapidly growing. The urban residents' living area was 33.7 square meters in 2020, and there were still some Beijing families experiencing housing shortages. 1.85 million households in Beijing, which is 24% of all households, have a living area of less than 20 square meters [7].

3.1.3. Pollution

Most importantly, but also most seriously, urbanization causes pollution, and not just for cities; because of the atmospheric circulation, air pollutants can spread to rural areas and even the world. As people's daily lives generate pollution, while urbanization makes the population in cities rise significantly, pollution also increases. Meanwhile, China's rapid growth in industry area also means it produces more pollution from the factories. As air pollution is mostly caused by industry, transportation, coal-fired power stations, and home use of solid fuels, China suffers from serious air pollution. The data from the Air Quality Life Index (AQLI) shows that China has a pollution ranking, which was 13 out of 252 countries, with 30.2 Particulate Pollution ($\mu\text{g}/\text{m}^3$). In contrast, Beijing's particulate pollution is still 40% more than that of the most polluted county in the US. 99.9% of China's 1.4 billion residents stay in regions with yearly average particle pollution levels above the World Health Organization's guidelines.

3.1.4. Global warming

Global warming is currently being considered as one of the most important climate problems around the world. At the same time, as a result of pollution, global warming has become more serious after rapid urbanization. TC Chakraborty and Yun Qian found that in the past, when there was climate change or when people were predicting future climate, they usually did not consider urbanization as a factor, as cities did not cover a lot of areas historically [8]. However, TC Chakraborty and Yun Qian have shown that cities now have a huge impact on global warming by combining global surface temperature data with historical estimates of urban area, especially for Asian countries that are urbanizing rapidly [8]. Therefore, they expected that urban expansion in the next century would indicate a further increase in the surface temperature [8]. In China, the regional warming rate is higher than the global level, and 2023 is the warmest year since the beginning of the 20th century [9]. From 1961 to 2023, the annual average surface temperature in China showed a significant upward trend, with an average increase of 0.30 °C every 10 years, higher than the global average warming level during the same period [9]. These data all show that China's quick urbanization makes global warming more serious.

3.2. Problems Caused by Accelerating Urbanization

3.2.1. Problems Caused by Polarization between Urban and Rural Areas

The main issue caused by polarization is the difference between rural and urban income. In China, the per capita disposable income for urban residents in 2021 is \$474,12 compared to \$189,31 for rural residents [10]. There is about 2.5 times the gap between the income. This leads to the infrastructure development gap being hard to fix. And this creates a cycle. Rural people live worse and have less income because of poor infrastructure and lack of investment, which leads to a lack of money to improve their lives. However, this problem is hard to solve as it depends on the country's finances.

3.2.2. Problems Caused by Urban Planning Issues

In addition to slowing the sustainable growth of healthy cities, traffic congestion has increased energy use, noise pollution, traffic accidents, and environmental harm such as global warming, which are problems for all people that make their living standards worse. The housing shortage causes more problems for individuals, especially poor citizens. A study sample comprising 1613 main respondents in Beijing collected data on life stress, residential crowding, depression, and socioeconomic control variables. There are 1618 on stress, 692 on residential crowding, 120 on depression, and 18 on control factors, according to the research [11]. As the data shows, the crowded living place caused mental issues for the residents. In order to increase the living standard of the residents who live in cities, how to deal with these problems seems more important to the local governments.

3.2.3. Pollution Leads to Health Problems

The pollution generated by industrial activity is more serious as it can directly cause even more severe health issues. Since Holland et al. showed in the 1970s that high levels of particulate matter and other air pollution cause dangers to human health, there has been a strong and consistent relationship established in the literature between exposure to critical pollutants and negative effects on human health [12]. Dockery and Pope discovered evidence of health risks to humans from even low levels of air pollution in later publications [13]. Pope, Dockery, and Schwartz published a literature review on the impacts of particulate air pollution and concluded that higher levels of particulate matter are linked to a higher risk of respiratory conditions, such as asthma, as well as a higher chance of cardiopulmonary death [14]. Particulate pollution is also one of the five biggest dangers to human health in China, reducing the average Chinese person's life expectancy by 2.5 years, with smoking only shortening life by three years. These studies show that the gases produced by industrial manufacturing are harmful to health. Therefore, that is why we need to solve the pollution problems caused by urbanization in order to give citizens a better living environment.

3.2.4. Hazards of Global Warming

Computer predictions indicate that, depending on the global climate model (GCM) and shared socioeconomic pathway (SSP) scenario used in the simulations, the global surface temperature may rise from 1.3 °C to 8.0 °C by 2100 [15]. As the surface temperature increases, glaciers and frozen soil will melt, which will cause the rising sea level. This can flood the low-lying Aewas areas and cause serious impacts on coastlines and the marine environment. This will also influence the hydrology cycle and damage the water supply system and energy production in the downstream cities. It can also lead to changes in the ocean currents, making fishermen lose their jobs. Hence, as global warming brings a lot of negative impacts and is regarded as irreversible, it is a crucial issue that needs to be prevented.

4. Suggestions

4.1. Solutions to Polarization

Polarization, driven by the rapid pace of urbanization, is largely a consequence of the widening gap between urban and rural development. To mitigate this issue, it is essential to accelerate growth in rural areas, which requires increased government efforts and funding. One approach is to enhance government finances through policy adjustments, such as raising taxes, to improve public infrastructure in rural regions. By bolstering the agricultural sector, raising agricultural prices, and enhancing farmers' income, the gap between urban and rural areas can be narrowed. The Chinese government is currently focusing on making agricultural products more popular through advertising, thereby helping to raise farmers' income. Additionally, non-governmental organizations (NGOs) can play a crucial role by setting up donation campaigns to improve the standard of living in rural communities. Given that countries with high urbanization rates typically enjoy higher personal incomes, addressing polarization is relatively more feasible compared to other urbanization challenges.

4.2. Solutions to Urban Planning Issues

Urban planning issues, particularly housing shortages and noise pollution, underscore the challenges faced by cities in managing land scarcity. A straightforward approach to these problems is to increase the availability of roads and housing. However, in densely populated cities where available land is scarce, building viaducts and taller buildings has become a common solution. While this approach addresses immediate needs, the broader challenge lies in the potential need for comprehensive city redesigns, which are both costly and complex. Partial changes may prove ineffective, prompting many large cities to develop surrounding areas as an alternative solution. Expanding the city's footprint provides additional living space for citizens, helping to alleviate overcrowding without requiring extensive urban redesigns.

4.3. Solutions to Pollution

Pollution, a significant global issue exacerbated by urbanization, poses severe risks to public health and the environment. Despite the Chinese government's 2013 Air Pollution Control Action Plan, which aimed to reduce emissions through ecological advancements and a blend of government and market regulation, substantial progress remains elusive [16]. While popular methods like tree planting and promoting public transportation contribute to reducing pollution, their impact is often gradual and limited. Given the slow progress and the immediate health risks posed by pollution, a practical solution for urban residents is to wear masks to mitigate exposure to harmful pollutants. While this approach addresses the symptoms rather than the root cause, it is currently the most effective means of protecting public health.

4.4. Solutions to Global Warming

Global warming presents challenges similar to those of pollution, though on a broader scale. Numerous strategies have been proposed worldwide to curb global warming, yet the issue persists. In 2021, the Chinese government introduced a strategy to control greenhouse gas emissions in key industrial sectors, promote green and low-carbon development in urban and rural areas, and build a green transportation system [17]. Despite these efforts, public awareness and engagement with global warming remain limited. To enhance the effectiveness of these initiatives, the government could consider raising carbon taxes, with the funds directed towards improving emissions control facilities

in factories and supporting reforestation projects to achieve carbon neutrality. While the fight against global warming is complex and long-term, these measures represent actionable steps that could yield significant environmental benefits over time.

In conclusion, addressing the challenges posed by rapid urbanization requires a multifaceted approach. From tackling polarization by boosting rural development to addressing urban planning issues through innovative construction solutions, and from mitigating pollution by encouraging protective measures to combating global warming with strategic policy interventions, each solution must be tailored to the unique circumstances of the affected regions. The success of these solutions will largely depend on the financial resources and political will of the countries involved, but with concerted efforts, significant progress can be made in improving the living standards of citizens worldwide.

5. Conclusion

For the main problem in rural areas, which is polarization caused by the different speeds of development in urban and rural areas, the solution is to raise funds to improve the infrastructure in rural areas as well as raise farmers' income. Then, talking about urban planning issues, which could cause mental problems, lowering living standards, building higher, or expanding urban areas seems to be the solution. For pollution and global warming, these two problems are similar and both hard to solve. Making strategies to lower carbon emissions and wearing masks to prevent citizens from having health problems can reduce their effects but still cannot solve them. All the solutions show that they need funds to deal with them, so whether the countries will be able to solve them seems to depend on their domestic finance.

The whole world is now developing very fast, so more and more problems related to urbanization will be discovered, and for future development, finding solutions is important. Some solutions can also be used as preventions, for example, planning the urban area in advance, like allocating industrial and residential areas in the city to reduce the health problems caused by pollution to urban residents, and learning how to arrange transportation systems to avoid congestion. Even though some problems still can not be solved, educating them first and using prevention to lower the impact is also important.

The main limitation of this essay is that it lacks practice. The solutions are given based on theory, and whether they will be effective or cause additional problems is not certain. In the future, some small-scale practices can be used to determine their effectiveness in order to strengthen these solutions further. At the same time, finding out how to deal with pollution problems is important for countries with large rates of urbanization.

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