

Human Lives vs Economic Growth: Understanding Environmental Injustice through
Industrialization and Peri-Urbanization, Using the case of Cancer Villages in Jiangsu
Province, China

By

Yankun Li

A Thesis Submitted to
Saint Mary's University, Halifax, Nova Scotia
in Partial Fulfillment of the Requirements for
the Degree of Masters of Arts in international Development Studies

January 2022, Halifax, Nova Scotia

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Approved: Dr. Anthony O'Malley
Supervisor

Approved: Dr. Karen McAllister
External Examiner

Approved: Dr. Xiaoping Sun
Reader

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Abstract

Cancer village, also known as *aizhengcun* in Chinese, refers to the villages that show extensive high cancer rates. These villages tend to locate in peri-urban areas around cities, and this issue is more serious in east coast China compared with other regions. Cancer village is not only a public health issue caused by water pollution, but also a social justice issue whose root causes include income gap and the systemic inequality created by *hukou* system. This thesis uses the lens of environmental justice to show that cancer village is a form of environmental injustice caused by pollution and social stratification by using the case of Jiangsu Province, China. Empowerment of the vulnerable communities is considered as a critical solution to this issue.

Acknowledgement

It has been a long journey with joy, tears, and perspiration for me to complete this thesis. I am more than delight to see my harvest of my research after the delicate work for almost two years. Besides celebrating this landmark myself, I really want to thank the people mentioned following. I can never fully express my thankfulness to any of you, and I always know that I could not have made it without your support and encouragement. 谢谢你们!

First, I would like to thank my supervisor, Dr. Anthony Holland O'Malley, for all his trust, support, encouragement, and valuable feedback. All of them are like a lighthouse that have helped me navigate through the sea of literature and data, and finally led me to the shore of success. 谢谢您!

Second, I would like to thank Dr. Xiaoping Sun and Dr. Karen McAllister for being the reader and external examiner of my thesis. Thank you so much for your time and efforts in making this a better thesis. 谢谢你们!

Also, I would like to thank my parents for all their support and understanding. With the strike of COVID, I was unable to go home and join them at some important events and holidays. But I can always feel their best regards from the other side of the world. 谢谢你们!

Besides, I also want to thank three of my best friends: Saiqi Guan, Jiayu Liang, and Kaihong Ren (last name in alphabetical order). They are the ones whom I have turned to most every time I felt I could not make it. This is the least I can do to appreciate our precious friendship. 谢谢你们!

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Chapter 1: Introduction

A "cancer village", also known as a cancer cluster, or *aizhengcun* (癌症村-cancer village) in Chinese, is the name given to villages in which there is a strong correlation between high cancer rates, environmental pollution, and social inequality. *Aizhengcun*, indicates a community, normally using the concept of “*cun*” (village), which is the main administrative unit in rural China, where rates of cancer are considerably in excess (at least twice that) of China’s normal death rate from cancer (Cheng, & Nathanail, 2019, p. 1933). In developing countries, severe pollution has been caused by rapid industrialization and neglect of the environmental impacts. It is the poor communities who are more likely to live close to polluting sites due to their limited economic ability and lack of choice. In China, the issue of *aizhengcun* is more noticeable in eastern coastal areas due to the rapid economic development in the region. The region of my study, Jiangsu Province, is in this area. However, the east coast region of China is also famous for its economic prosperity and high urbanization rate. The contrast between the active economic vitality and accelerating development and the social phenomenon of *aizhengcun* reflects the inequality in urbanization in China. At the same time, *aizhengcun* in east coast China tend to locate in peri-urban areas, which are the intersection between urban and rural areas. The creation of peri-urban areas is inseparable from the rise of township-village enterprises (TVEs, described in detail below) in east China. This thesis aims to understand the issue of *aizhengcun* in the context of peri-urbanization and industrialization and to use the concepts of environmental justice to

understand why industrial workers, especially migrant workers, are disproportionately affected by industrial pollution, and why empowerment plays a key role in solving this issue.

The critical role played by urbanization in economic prosperity is provided by the development trend of developing countries over the past few decades. Urbanization is defined as “a process which reveals itself through temporal, spatial and sectorial changes in the demographic, social, economic, technological and environmental aspects of life in a given society. Urbanization is a progressive concentration of population in an urban unit” (Kingsley Davis as cited in Narayan, 2014, p. 901). Urbanization has been a visible trend in most developing countries in the world due to its effectiveness in boosting economic prosperity and further development, with more than 80 percent of GDP globally generated in cities (World Bank, 2020). It is estimated by the United Nations that India, China and Nigeria together are expected to account for 35 % of the growth in the world’s urban population between 2018 and 2050; India is projected to add 416 million urban dwellers, China 255 million and Nigeria 189 million, respectively (UN, 2018b, p. 1). However, due to the similar histories of colonization and underdevelopment and their overall priority of economic prosperity, a variety of common problems are shared by developing countries in their path to urbanization, including overpopulation in urban centers, the lack of infrastructure and support of social welfare systems, and growing income disparities. Another common trend in the urbanization process in developing countries is peri-urbanization. This refers to “a process in which rural areas located on the urban outskirts become more urban in terms of economic structure, social fabric and physical appearance, while the areas in question still, to a great

extent, remain dominated by rural institutions” (Zhu & Guo, 2014, p. 1121). Therefore, peri-urban areas are key landmarks in urbanization, as “it implies development of mixed land uses outside designated city boundaries” (Hudalah et al., 2007, p. 503). Peri-urban areas tend to become the focus of urban issues due to a lack of regulation and the fact that they fall outside policies of urban planning. Among all the issues, one problem that not only concerns the future of the people in one country, but also affects the destiny of all populations, is the environmental pollution created in low-income countries in their process of industrialization and urbanization.

Industrialization is a key step to urbanization and development under the framework of Modernization theory. Industrialization is considered to have an intertwined relationship with urbanization as industrialization boosts urbanization and urbanization advances industrial structures. Bao and Fang describe urbanization as “... a dynamic process of relocating the population from relatively low-density rural areas to very high-density urban areas, with a transformation from an agriculturally based economy to the manufacturing workshop” (2011, p. 531). Industrial growth in developing countries is the main driver of their economic growth, which has exceeded the growth of developed countries in recent years. It was projected by the International Monetary Fund in January 2020 that the economic growth rates in the US, Euro Zones, UK, and Japan would be only around 1 percent, while the economic growth rates in major developing countries and areas would be much higher, with the expectancy of China at 5.8 percent, in Sub-Saharan Africa at 3.5 percent, and the Middle East at 2.8 percent (IMF, 2020). Even though the global pandemic has decreased the accuracy of

the prediction, what should be recognized is that the fast-paced economic growth in developing countries is the result of industrialization and urbanization.

Economic prosperity is certainly a positive result of urbanization. However, in this process, environmental issues caused by energy extraction, building of factories, and emission of pollutants have also become key problems faced by most developing countries. Authorities of some developing countries prioritize economic development and ignore environmental issues, as they believe environmental issues can be solved after the national economies are boosted. However, the overlooking of environmental impacts will not only constrain the future development in these countries but will also cause severe social problems, such as lower life expectancy and higher mortality rates. The increasing scale of urbanization and the increasing reach of environmental issues on towns and cities require a more holistic view on the relationship between urbanization and environmental issues and call for the inclusion of environmental concerns within urban policy making.

Unfortunately, environmental concerns tend to be missing when generating urban policies within a structure of urban planning, especially when economic growth is the major focus of the local and national governments. Due to the lack of regulation and a comprehensive social welfare system, pollution and the series of problems resulting from different types of pollution, are transferred to the vulnerable communities in their societies. This transfer is an issue that is usually defined as “environmental inequality or environmental injustice” since there is an unequal distribution of suffering from pollution. There have been a fair number of studies looking into the issue of environmental justice, and how it can be

achieved. Boone and Fragkias suggest that environmental justice focus on fairness, especially the fairness in decision-making processes (2013, p.54-55). However, fairness is only one dimension for achieving environmental justice. A more detailed discussion about environmental justice will be presented in my theoretical framework.

At the global level, environmental injustice is also the result of inequality, including the inequality between different races, classes, and genders. However, environmental injustice discussed in this thesis is caused chiefly by the disparity between rural and urban development, especially in the peri-urban areas. Specifically, what is seen in most developing countries is the widening gap in standard of living between rural and urban areas. Due to the fast-paced development in urban areas, the prices of land and labor there also rise. Therefore, many factories would prefer choosing their sites in rural areas due to the low cost of land and abundance of cheap labor. This can also be considered as part of the urbanization process since the residents who live near the factory gradually move away from engagement in agricultural activities and become workers in nearby factories. What also should be pointed out in this relocation process is that there tends to be a lack of regulation about environmental pollution for the factories in rural and peri-urban areas, which may also be a reason why they choose to build their sites in rural areas. With that being said, the residents who live near the factories may enjoy the opportunities of higher wage off-farm employment, but they are also exposed to all sorts of environmental pollution. With little regulation established and extremely limited education, the residents living nearby the polluting factories are powerless when their lives are threatened and livelihoods are destroyed by the pollutants in the air,

water, and soil. This has become a shared problem in both developed and developing countries, but the issue is less researched in developing countries than in developed countries.

Environmental injustice between rural and urban areas, including peri-urban areas, exists in both developed countries and developing countries. It is derived from the subordinate position of rural areas to urban areas and the economic disparity between rural and urban areas. Kelly-Reif and Wing (2016) suggest that environmental injustice is a form of urban exploitation since the urban population obtains its food and energy from nearby rural areas but repays them with pollutants and environmental degradation. More importantly, such injustice also tends to relate to the inequality between classes and races, which means that marginalized, vulnerable communities, such as the poor and ethnic minorities, are more likely to face this issue.

This thesis will explore the dilemma and paradoxes in urbanization and development in developing countries focusing on environmental justice, especially environment justice amid the industrialization that accompanies urbanization. I will be using as a case study the cancer clusters or cancer villages in Jiangsu Province, China. The fast-paced urbanization and high economic prosperity show the successful side of industrialization in Jiangsu Province, while the severe pollution in Jiangsu Province and the widespread cancer villages show the vast inequality arising from industrialization and urbanization.

The term, *aizhengcun*, translated in English as “cancer villages”, is defined as the clusters which have much higher cancer rates and cancer death rates than the national average. For example, according to Liu (2010), in an *aizhengcun* in Shaanxi Province, 26

families contain cancer patients in a village of 30 families in total. The cancer rates in two *aizhengcun* in Tianjin were 1.3% and 2.1 %, while the average cancer rate of Tianjin is 0.12% and national average is 0.07% (p. 10). Jiangsu Province is known for its leading position in economic development and urbanization in China, but also suffers from the negative consequence of pollution, mainly water pollution, and presents severely unbalanced development between different areas in the province. As one of the developing countries taking a leading position in the world, the fast-paced trend of urbanization in China has received global attention. According to the National Bureau of Statistics of China, the urbanization rate in 1980 in China was 19.93%, and it reached 60.6% in 2019 (2020). In other words, the urbanization rate in China tripled over the last forty years. Due to rapid urbanization, a variety of socio-economic issues has occurred in China because of the inadequate infrastructure and outdated regulations and policies. Among all these issues, I will be focusing on the widening gap between rural and urban areas in China that result in environmental and health issues for people who live in those areas at the edge of rapid urban expansion, the peri-urban areas in China.

Environmental protection has become a heated topic in China in recent years, and there have been more policies generated specifically to address environmental issues. However, it is still important to point out that environmental pollution is still a major issue in China due to its energy structure and limited technological capabilities. Coal is the primary source of energy and accounts for 70 % percent of energy consumption. This is much higher than the percentage of coal used for energy in developed countries, which is only 20 % (Zhang and

Wen, 2008, p. 1257). Because of this energy consumption structure, China is one of the countries in the world that suffers the most from air pollution and a variety of related issues, such as acid rain and smog. Besides air pollution, water pollution is also an urgent issue in both rural and urban China. The majority of cities in China suffer from water shortage due to the high density of urban populations and a lack of effective water resource management. It is pointed out by Bao and Fang (2011) that there was a huge surge in domestic and industrial water use in China between 1980 and 2008 due to the rapid industrial development. However, during this time agriculture water use also remained high (p. 534). Besides an overall water shortage in the country, water pollution is a much more severe issue in rural areas than in urban areas. Wang and his colleague point out that the establishment and rapid development of rural industries in China after the 1978 “reform and reopen” policy acted as a key engine in the process of development in China. However, without many regulations and limited budgets distributed for resource and environmental management, these industries have also generated enormous environmental costs, including severe water pollution (2008, p.648-51). In addition, the improper use of fertilizers for farming also contributes to rural water pollution in China. Wu et al. (2015) suggest that nearly 200 million rural residences in China have no access to clean drinking water (p. 429). Serious water pollution in rural areas and a lack of water resources in the country as a whole result in severe problems in accessing water resources in rural China. This is also the root cause of diseases caused by lack of clean, potable water.

As mentioned above, there has been a rise of rural industries in China, and the residents living in nearby areas tend to leave agriculture and join the labor force in the factories. These rural industries are located in areas that can be described as peri-urban, that is, areas located at the edge of expanding urbanization. These areas have some of the features of urban areas (some industrialization, nascent regulatory frameworks, some urban infrastructure, etc.), but in many ways remain distinctly rural. According to Tian and Gou, peri-urbanization is characterized by “rapid changes in land use, building styles, economic activities, inconsistencies between administrative structure and territory, and influxes of new population” (2019, p. 1). Because of the frequent migration to and within peri-urban areas and the unclear responsibility between administrations, peri-urban areas tend to be associated with loose regulation and are usually the sites of severe pollution from the industries located there. These areas are often also associated with high crime rates, and corruption. The reason behind the loose regulation is that peri-urban areas are in an awkward position between the traditional dichotomy of rural and urban. They are not traditional rural areas since most of the previous farmland has been put into industrial use; neither are they urban areas since they are not officially incorporated into urban jurisdictions. One consequence of this loose regulation is the severe pollution from industries. This, combined with the fact that most economically marginal people live near the polluting sites due to their limited budgets and need for cheaper housing, creates a serious situation. In Jiangsu, migrant workers tend to be the ones with low economic capacity, which makes them the main victims of pollution.

Peri-urbanization is a much more obvious trend in the more developed areas of China, such as the Pearl River Delta, Yangtze River Delta, and the Beijing-Tianjin-Hebei Region (Tian & Guo, 2019, p.1). This thesis will focus on how the industries located in peri-urban areas in Jiangsu Province have created pollution, especially water pollution, which becomes a fatal threat to local people. Jiangsu Province is around the Yangtze River Delta and enjoys fast-paced economic development, so the trend of peri-urbanization is visible in this province. Cheng and Nathanail (2019) suggest that the development of economic prosperity and a high percentage of tertiary industries in Jiangsu province can be shown to be related to the water pollution in rivers and other main bodies of water, which results in the severe health issues of people living near the factories.

One of the visible problems resulting from the contaminated water are the high death rates caused by cancer. *Aizhengcun* is a more serious social problem in the eastern region than in the central and western regions of China because of rapid urbanization and industrialization. According to Lora-Wainwright (2017), the first article using the term “*aizhengcun*” in a newspaper was with reference to mining, but in the next ten years, the number of news reports about “*aizhengcun*” escalated and reached a peak in 2013. This was also when the central government of China officially admitted the existence of this problem (p. 33-37). Cheng and Nathanail (2019) suggest that there are still more than 400 “*aizhengcun*” in China right now, and Jiangsu Province is the one of the worst provinces suffering from this issue due to its development of tertiary industries and manufacturing (p. 1933). Besides being recognized as a public health issue, *aizhengcun* is also considered to be

a social issue. The denial of the problem by the state government at the beginning, the delay of action to mitigate the problem until only recently, the lack of participation and overall powerlessness of the villagers in the decision-making process, are all reasons that contribute to the issue of environmental inequality and the lack of environmental justice in the affected peri-urban areas, where most of the *aizhengcun* are located.

To focus my research, I developed the following research question:

How can environmental justice be integrated into planning for peri-urban industrialization?

The data used in this thesis are mainly from secondary sources. Field work, which I at first considered, was out of the question due to the global pandemic. Regardless, there are a considerable variety of sources used in this thesis to provide a holistic view of the issue and allow triangulation of the data. Academic literature accounts for a majority of the sources used. Besides academic literature in English by Western scholars, there is also literature by Chinese scholars. However, the theories used in this thesis are constituted by literature from the Western thinkers. There is a high diversity of data included in this thesis, which uses research done by both Chinese and Western scholars on the issues of pollution and social inequality, and how they contribute to the social phenomenon of *aizhengcun*. The *hukou* system (treated in detail below)—the Chinese mandatory residential registration system, whose major purpose is to control arbitrary migration, is considered as one of the key factors that contributes to the differentiated social services provided between rural and urban areas in China (Liu, 2005, p. 135). There has been abundant research done by both Chinese and

foreign scholars about how it exacerbates urban and rural inequality in China. Other types of sources used included news reports from diverse news agencies, government reports, government proposals, and laws (including several Five-Year Plans published by the central government of the People's Republic of China (PRC), reports from Ministry of Ecology and Environment of the PRC, and the environmental law of China with its amendments, and reports from non-governmental organizations, such as China Water Risk and Green Anhui. The news articles were collected from diverse news agencies to provide a variety of perspectives on the issue of cancer villages, and some include pictures of the polluted areas and interviews with local people. The government reports, laws, and regulations indicate how the central government of China takes action on water pollution and informs a discussion about how local communities are affected. The reports from NGOs play a significant role in critical review of some of the policies made by the central government in China, and they also represent the grass root voices on the issue of water pollution and cancer caused by pollution. The different types of sources provide diverse data and perspectives on the issues discussed in the thesis.

This Introduction (Chapter 1) provides the general background for the thesis, defines key concepts used in the thesis, and specifies the research question and thesis statement. Chapter 2 sets out the central issues and debates, and provides the theoretical framework of the thesis. Critical urban theory is introduced as an important framework to understand the power imbalance and inequality in the process of urbanization. Key concepts of environment justice and equality are also presented as the major theoretical support to understand why

cancer villages are a social issue. The Environmental Kuznets Curve hypothesis is introduced as a counter theory and is used to discuss whether it is plausible to ignore the environment and the well-being of the vulnerable communities to achieve economic prosperity in the short term. Chapter 3 provides a discussion and my conclusions, along with a few recommendations, in the light of the data collected in my research. This chapter stresses that one of the major factors contributing to *aizhengcun* is the powerlessness of the affected communities, highlighting that their needs have been constantly ignored in the process of urban planning.

Lastly, I will argue that villagers are an integral part of the process development, and their voices should be heard by the authorities in the process of decision-making. Specifically, I will argue that cancer villages (*aizhengcun*) are a complex social issue that results from environmental injustices and social inequality. Villagers' livelihoods are ignored due to the excessive attention put into the local economy. Worse still, the vulnerable position of the villagers limits their abilities to protect their rights. Therefore, the key solution to this issue is to empower the villagers, so they can be meaningfully involved in the decision-making process.

Chapter 2: Central Issues and Landscape of the Debate

2.1 Urbanization and the Creation of Peri-urban Areas

Vast peri-urban areas are created as a necessary step of urban expansion. According to UN Habitat, the urban centers in developing countries are expanding rapidly caused by urban population surge. UN Habitat (2020a) points out that between 2000 and 2015, cities grew by 1.5% a year in terms of area. Growth in the land covered by cities was higher in low-income countries (2.6%), than in middle-income countries (1.9% in lower middle and 1.5% in upper middle) or high-income countries (1%) (p. 4). In 2020, there are 1934 metropolises with more than 300,000 inhabitants representing approximately 60% of the world's urban population; a new metropolis will arise every two-weeks in the next fifteen years for a total of 429 new metropolises led by a population surge in metropolis of 3.47 billion (UN Habitat, 2020a, p. 3& 5-6). Between 2009 and 2019, there has been an obvious urban growth in developing countries in Africa and Asia. United Nations Conference on Trade and Development (UNCTAD) points out that the urbanization rate increased from 42.3 in 2009 to 49.1 per cent in 2019 among developing countries (2020). UN Habitat points out that in 2020 that the world will continue the process of urbanization, from 56.2 % today to 60.4% by 2030. Developing countries in Asia and Africa will be the main contributors as they will compose 96 % of urban growth. Among all the developing countries, India, China, and Nigeria will contribute 35 percent of global urban population between 2018 and 2050 (p. xvi). The fast

pace of urbanization in developing countries is closely related to their industrial development and economic prosperity.

It has been mentioned in the earlier sections that urbanization is an inevitable step in development, especially its close connection to economic prosperity. Even though there are theories that claim there should be other alternatives to social advancement, industrialization combining urbanization is still the only proven successful approach. It has been suggested that the countries presenting a high speed of urbanization tend to be the countries showing strong economic development. Spence et al. (2008) propose that it is difficult for countries to reach an income level of \$10,000 per capita before reaching about 60 % urbanization (p. 3). Chen et al. (2014) use the example of China to prove this point, as in the past 30 years, China has had an uninterrupted annual economic growth rate of 8.9%, along with annual urbanization growth of 1% (p. 6). Such economic growth rate and urbanization rate are remarkable for the country with the largest population in the world. India is another case that can improve this point as Delhi is expected to be the largest city in the world by 2030, taking over the position held by Tokyo (UN, 2018a, p. 4). What brings Delhi to this key position is the rapid economic development in India. The cases from China and India prove the correlation between economic development and urbanization, as economic development is the main drive for urbanization, and on the contrary, higher urbanization rate can better facilitate economic prosperity. However, besides economic development in the urbanization process, environmental issues have also been witnessed to be intensified by industrialization and the concentration of population.

2.2 Critical Urban Theory and Understanding the Injustice in Urbanization Process

The key theoretical base to understand the issues mentioned in this thesis is the critical urban theory. Critical urban theory is the school of thought that focuses on inequality, injustice, and power dynamics in the urbanization process. This point of view is developed in post development and Marxist theories and proposes that industrialization is not the only path of urbanization, and that urbanization can be achieved through an inclusive and environmentally friendly approach. More precisely;

Critical urban theory rejects inherited disciplinary divisions of labor and statist, technocratic, market-driven and market-oriented forms of urban knowledge. Rather than affirming the current condition of cities as the expression of transhistorical laws of social organization, bureaucratic rationality or economic efficiency, critical urban theory emphasizes the politically and ideologically mediated, socially contested and therefore malleable character of urban space—that is, its continual (re)construction as a site, medium and outcome of historically specific relations of social power. Critical urban theory is thus grounded on an antagonistic relationship not only to inherited urban knowledge, but more generally, to existing urban formations. It insists that, another, more democratic, socially just and sustainable form of urbanization is possible, even if such possibilities are currently being suppressed through dominant institutional arrangements, practices and ideologies. (Brenner, 2009, p. 198)

In other words, critical urban theory “emphasizes the politically and ideologically mediated, socially contested and therefore malleable character of urban space – that is, its continual

(re)construction as a site, medium and outcome of historically specific relations of social power” (Brenner, 2016, p. 25). That is, critical urban theory studies try to deconstruct what makes urban become urban, and how the superiority of the urban areas are constructed in the historical process, through various institutions. Based on a Marxist point of view, critical urban theory discusses the exploitation from urban areas to rural areas in the process of urban development. One of the major critiques it provides is about the commodification of land and other resources led by capitalist urbanization. The process of urbanization means the creation of peri-urban areas since peri-urbanization is a key step of urbanization. Due to the complex social dynamics in peri-urban areas, peri-urban areas are not the focus of many urban issues, but are actually a good representation of the inequality and injustice in the country as whole. Vulnerable communities are even more disenfranchised in this process as their lack of economic capacity limits their access to the urban areas, especially the social services provided in large urban centers. Their vulnerabilities are reflected even more in peri-urban areas than urban centers. Therefore, critical urban theory provides a key theoretical background of institutional inequality in the process of urbanization, which results in the development of urban areas alongside the underdevelopment of rural areas.

Critical urban theory has proved as a suitable framework to understand the Chinese context, and there have been scholars using this framework to interpret the issues of “cancer villages”. A paper presented by Liu and Fu in a conference in 2007 suggested that “cancer villages” are a paradox between development and poverty. Their root cause is the widening rural-urban disparity, and especially the increasing underdevelopment in rural areas. Because

of this, the policymakers in nearby cities tend to ignore the environment in rural areas, as well as the livelihoods of people who live there. The framework established by Liu and Fu echoes the essence of critical urban theory, which is the inequality between rural and urban development. In short, the issue of “cancer villages” in China is more than an environmental issue, but also a sociological issue that reflects the inequalities and disparities between urban areas and rural areas. Because of this, critical urban theory provides the key theoretical base to tackle the socio-economic inequalities between urban areas and rural areas and offers solutions to policymakers about how to achieve a more sustainable path of urban development.

However, at the same time, it is also important to note that critical urban theory only presents one way of viewing the rural-urban relationship. More importantly, critical urban theory fails to create a practical solution for policymakers. Instead, the entire theory is based on academic logic and assumption, which lack practicality. For example, part of the quote from the leading scholar Brenner says “[critical urban theory] insists that another, more democratic, socially just and sustainable form of urbanization is possible, even if such possibilities are currently being suppressed through dominant institutional arrangements, practices and ideologies” (Brenner, 2009, p. 198). What it suggests is some possible ways out that may work out in the future, but that have neither been successfully achieved nor attempted in any countries in the world. In short, this thesis recognizes the key theoretical concepts raised as part of critical urban theory, but also points out its overall flaws of being idealist and lacking in feasibility in both the short and medium term.

2.3 Environmental Justice in Urbanization

A key concept suggested in critical urban theory is environmental justice. It has been recognized that one of the inequalities in the process of urbanization is that safe and clean environments are not enjoyed by all residents. Vulnerable communities tend to bear more environmental burdens involuntarily and are not well compensated for their loss. This phenomenon is usually referred to as environmental injustice and environmental inequality. There are minor differences between these two concepts, but both focus on the unfair treatment or distribution of what mainstream economics sees as externalities, especially the negative ones, such as air and water pollution.

Before defining environmental justice, the first term that should be properly defined is justice. Schlosberg (2009) points out that most contemporary theories about justice are built on John Rawls' theories, which focus on the distribution of goods and the best practices in such distribution (p. 3). The main principle of John Rawls is that an egalitarian way of distribution of resources should be pursued by the government, which is the main approach to build an unbiased social justice within society (Rawls, 1971). According to Schlosberg (2009), such a view of justice is not wrong, but certainly not enough. Besides, many classic contemporary justice theories do not include the environment as part of their conception of justice and the discussion around environmental justice is limited to poor distribution, which describes how negative externalities, such as pollution, are distributed, and how this distribution is unfair and unjust (p. 4). Schlosberg (2009) suggests that environmental justice, which is the aim of the environmental justice movement, should incorporate the key theories

about distribution, recognition, participation, and capabilities, and the comprehension of these theories should be applied to communities, rather than individuals (p. 4-5). Schlosberg's work on the issue of environmental injustice has influenced the subsequent works of other scholars. Davoudi and Brooks (2014), for example, argue that the framework of environmental justice should combine "...an expanded interpretation of distributive justice with concerns for recognition, participation, capability, and responsibility" (p. 286). This follows the same path as Schlosberg's view, as it not only includes distributive justice, but also concerns the process of decision-making. What is unique and critical in Schlosberg is the emphasis put on recognition, as Schlosberg suggests that recognition of vulnerable communities' existence, their cultures, especially their understanding on the relationship between human and nature, plays a vital role in the process of decision-making process. The case given by him is the requirement from the Coordinating Body for the Indigenous People's Organizations of the Amazon Basin (COICA), as they insist that both the state government and NGOs should recognize the status of the indigenous population, and respect their indigenous laws and practices (Schlosberg, 2004, p. 526). In short, what Schlosberg is proposing is that environmental justice be more than distribution; it is rather a complex process of recognizing different communities, allowing them to participate in the decision-making process, so their capacity for development will not be jeopardized.

There were also earlier views about environmental justice before Schlosberg's work. For example, Bryant (1995) suggests that "[e]nvironmental justice refers to those cultural norms, values, rules, regulations, behaviors, policies, and decisions to support sustainable

communities where people can interact with confidence that environment is safe, nurturing, and productive” (p. 6). The main difference between Bryant’s view and Schlosberg’s view is that Bryant views environmental justice as a stage that is constituted by norms, values, policies, etc., and that a healthy environment is considered as established at this stage; while Schlosberg believes that environmental justice is a process full of social movements, through which the communities, which are previously ignored or oppressed, finally gain recognition and have their voices heard. Bryant’s view is not wrong but is too idealistic compared with Schlosberg’s. It is difficult to reach the stage that all the communities co-exist in one environment, and all feel satisfied. Therefore, environmental justice should be viewed as a changing process, though equalization between communities can be found.

Environmental inequality is a term that is often used interchangeably with environmental injustice. However, there are differences between their definitions and their focuses. According to Pellow (2000), environmental inequality focuses on “broader dimensions of the intersection between environmental quality and social hierarchies”; addresses “more structural questions that focus on social inequalities and environmental burdens” (p. 582). Pellow’s definition on environmental inequality stresses that environmental inequality is caused by the intersection of environmental pollution and social stratification. This also suits the context of my thesis, but Schlosberg’s definition stresses more on communities and points out the future direction of environmental movements. There are some overlaps between the definition of environmental justice from Schlosberg and the definition of environmental equality from Pellow, as both argues for structural changes in

decision making, so that the negative environmental burdens will not only affect certain communities.

In short, the key elements that can be extracted from Schlosberg's view on environmental justice are his stress on the recognition of vulnerable communities and empowerment of these communities in the decision-making process. Schlosberg suggests that environmental justice should go beyond the issue of distribution and stresses the importance of incorporating the livelihoods of the vulnerable communities. Empowerment in vulnerable communities is therefore an effective way to incorporate their voices in the decision-making process. It can also be considered as a practical approach for policymakers when generating policies to achieve higher environmental justice in their societies.

Based on the comparison between the different concepts of environmental justice and the concept of environmental equality, it is shown that the concept of environmental justice from Schlosberg will fit best in my thesis. The reason is that the powerlessness of the villagers results in ignorance of the issue by the policymakers. It is this powerlessness that prevents their voices from being heard by policy makers and forbids them from taking part in the decision-making process. There is a lack of recognition from the government on the status of the villagers and their situations. According to the theory of Schlosberg, recognition from local government is the first step of introducing environmental justice. Therefore, the key solution to this problem is to recognize the vulnerable status of the villagers in front of the wealthy and powerful TVE owners so that the villagers can have the possibility of participating in the decision-making process.

2.4 Environmental Injustice and Urbanization

The rapid urbanization in developing countries has also created various issues due to the incompatibility between the urbanization rate and infrastructure-building rate. The incomplete infrastructures and insufficient social welfare systems have disproportionately affected the poor population. That is, the prosperity and convenience of urbanization are enjoyed by the privileged group who own power and wealth, while the vast majority must suffer from a variety of social, environmental, and political disruptions. Among all these issues, environmental pollution in developing countries is excessively affecting the vulnerable communities as they are either forced to live near pollution for cheaper shelter, or do not have enough resources to visit hospitals when their health is affected.

To begin with, environmental injustice is not limited in developing countries, but also has severe impacts in developed countries. Environmental injustice is a result of other social inequalities. Regardless of what the specific inequalities might be in different countries and social settings, poverty, or income gap continues to be one of the major factors that contribute to environmental injustice since a community with less economic capacity and power has less choice regarding its residential environment. Other factors, such as gender, can further marginalize part of the poor people even further. Women and children are extremely vulnerable groups in this sense. It is clearly shown that poor people are affected more by pollution, including water pollution, air pollution, and noise. Because of this, the so-called environment/poverty nexus has been recognized as a global issue and the Millennium Development Goals also addressed this issue. Nonetheless, environmental injustice remains a

global issue that affects the livelihoods of marginalized populations. The Sustainable Development Goals (SDGs) continue to stress fairness and equality on housing. Jahan and Umana (2003) summarized a variety of UNDP publications, suggesting that about 650 million people in developing countries live on marginal and ecological fragile land; 25 million agricultural workers globally, with 11 million from Africa, were poisoned by pesticides; 15 million children in Latin America are affected by lead poisoning; water-related diseases kills 3 million people in developing countries, with the majority being women and children under 5 (UNDP as cited in Jahan and Umana, 2003, p. 60). According to the data collected by Mink (1993) for the World Bank Discussion Paper, 60 % of urban poor population in Indonesia rely on unprotected wells for water; and in rural areas, only 36 % of population have access to clean water. An estimated 37 % of the poorest households in Jamaica rely on rainfall for water, which is twice as high as in higher income communities (p. 2). Babanyara et al. (2010) estimated that water contamination is responsible for the spread of typhoid, cholera, amoebic infections, bacillary dysentery, and diarrhea, which account for 80% of all diseases in developing countries and at least responsible for up to 90% of the 13 million child deaths each year (p. 141). These cases suggest that access to clean water, which has been recognized as a basic human right, is rather luxurious in some developing countries where there is a major gap between the rich and the poor.

Low-income communities around the world tend to be exposed to more hazardous environments, such as living near polluting industries and garbage disposal sites. A case is suggested by Young (2013) in Brazil, as in one of the major slums, only 10% of the garbage

is collected daily, 56.2% of the streets have no paved roads, and only 54.2% of sewage is connected to the general collection service (p. 105). A similar case is also suggested by Alves and Ojima, which is that São Paulo City is divided into “poor regions”, “middle-class regions”, and “high-class regions” based on the residents’ income. And, in “poor regions”, the proportion of people exposed to environmental risk areas reaches an impressive 28.3% for 2000, which means 1.1 million people are not only living in poverty, but are also faced with environmental risk (2013, p. 124).

2.5 Peri-urban Development and Environmental Injustice in China

As one of the leading developing countries in the world, China has experienced rapid urbanization. Guan et al. (2018) point out that the urbanization rate has reached over 50 % in 2010, which has been a more significant achievement than other developing countries in the world (p. 98). Eberstadt et al.(2019) suggest in their report on the characteristics of urbanization, that urban areas in China experienced a population increase of half a billion people between 1985 and 2015, which took account for more than a fourth of the worldwide urban population growth (p. 4). The rapid urbanization process in China is not driven by the natural birth rate but rather by large scale rural-urban migration. Ann et al. (2014) point out that the total number of rural-urban migrants in China had reached 250 million by 2011 (p. 178). Guan et al. also raised a similar point, recognizing that rural-urban migrants play the key role in urbanization in China (2018, p. 100). However, the rate of establishing of infrastructure is not keeping up with the rapid pace of urbanization in China. That is, the

limited services and resources can only be enjoyed by a limited amount of population. Such a distribution reflects inequality based on incomes, classes, *hukou*, etc.

There have been a variety of socio-economic issues arising during urbanization process in China. Guan and fellow scholars list the following six fundamental concerns that have emerged from the Chinese urbanization process: unequal treatment of rural-urban migrants generated by the residence registration system (*hukou*); high resource consumption but low efficiency; increasingly severe pollution and environmental degradation; un-controlled land development; unreasonable urban scale structure system; and the widening gap and inequality between rural and urban areas (2018, p. 100-105). The issues raised by Guan et al. are also seen in other research discussing the route China took for urbanization. Eberstadt et al. (2019) make a similar point about the *hukou* system, suggesting that *hukou* system has led to many contradictions and inequalities in the process of urbanization in China. However, the authorities show no intention of reforming the system (p. 8). Chen et al. (2019) also state that the problems revealed through the process of urbanization in China drew academics' attention to the importance of rural-urban integration and resource management (p. 1649).

As mentioned above, one of the common problems arising from the process of urbanization is inequality. Inequality can exist in various social dimensions. On a macro level, it can be shown as policies that are designed to only benefit certain areas in the country; on the micro level, individuals can receive differential treatment due to their different income levels, social classes, etc. China is no exception to this situation. Up until now, inequality has been, and continues to be, a major issue in Chinese society.

The inequality between rural and urban areas in China is a long-standing issue which was shaped by the policies about urban and rural development since the creation of the PRC. Lu and Chen (2006) suggest that it is the dual policies that tore the rural and urban areas apart, namely the *hukou* system, which is used to prevent arbitrary and voluntary rural-urban migration (p. 46). By displaying a series of diagrams showing the gaps between rural and urban development, Lu and Chen show that a few policies may have boosted rural development, but the overall trend of the gap between rural and urban areas in China has been widening since the establishment of the PRC. Lin and Chen (2011) point out that the newly established PRC chose a heavy industry-oriented development strategy, and the consequences of this development strategy were a higher urbanization rate and inequality between rural and urban development. In other words, an urban-biased perspective of development was introduced at the early stage of the creation of the PRC, which means that the development focus was put on urban areas with preferable policies and bigger budgets (Cai, 2003). Chen et al. (2010) also point out that an urban-biased education budget is a key factor that has enlarged the rural-urban inequality. In short, rural-urban inequality is an inevitable consequence considering the development strategy chosen from the very beginning of the PRC. Even though the urbanization trend and policies generated in recent years aim at attempting to decrease the gap between rural and urban development, the unequal level of development between rural and urban areas is still the root cause of many social issues.

As was said above, peri-urban areas are automatically created in the process of urbanization, and peri-urban areas play a critical role in urban development and economic

growth in China. However, due to the unique land ownership and land use rights in China, it is a complex but blurry regulatory system that applies to most peri-urban areas in China. Tian and Guo (2019) characterize peri-urban areas in China as “a mix of state-owned and collectively owned land, and its governance involves multiple layers... most state land is managed by city governments, and collectively owned land has been managed by township, administrative village, and natural village” (p. 63).

The complex result of the development disparity between rural and urban areas, and inequalities between diverse levels of income and social classes, is also reflected in how people of different income levels in China deal with pollution. Wang and Zhang (2016) present a conclusion, which is far from surprising, that high-income individuals are affected less by pollution since they have more ability to reduce their exposure to the pollutant (p. 362). In the later sections discussing the pollution issue in Jiangsu Province, it is shown that there is an inverse ratio between the income of households and the scale of impacts from pollution. The lower income a household receives, the more likely they are to suffer from pollution.

2.6 Connection between Urbanization and Pollution

Industrialization leads to increased economic output, which acts in a synergistic way with urbanization in developing countries (Chen et al. 2014, p.1). Most countries in the world have either experienced industrialization or are in the process of industrialization. However, one of the major negative effects of industrialization and urbanization is environmental

pollution, due to increasing industries, more traffic, and rapid population growth. Pollution has become a major concern for most developing countries. There have been a variety of types of pollution, including air pollution, water pollution, and soil pollution, among others. Pollution is believed to prevent the sustainable development of cities if not dealt with promptly or effectively. Also, pollution has caused health issues for people around the world.

To give an example: water pollution is a major global environmental issue. Similar to the negative effects of air pollution, water pollution leads to a decrease in biodiversity in rivers and the spread of infectious diseases due to organic pollution in bodies of water (Wen et al., 2017, p. 1). The shortage of freshwater resources and increasing water pollution is a more severe issue in developing countries: Awoke et al. (2016) suggest that there is a correlation between the lack of freshwater and water pollution in developing countries, resulting from unregulated water usage and water pollution caused by industrial development, agricultural practices, and daily consumption by the people (p. 695). More importantly, the impact of water pollution is differentiated between social groups based on their economic capacities. Communities with lower economic capacity tend to be affected more by water pollution as they are forced to live in inferior areas and have less access to water-purifying facilities. The case of Jiangsu Province discussed in this thesis is a good example.

Continuing with our example, in recent years, water pollution has captured the attention of the central government in Beijing. Considerable investment and infrastructure projects have been launched to solve the issue of water pollution. According to the *Chinese Bulletin on the State of the Ecological Environment 2018* published by Ministry of Ecology

and Environment of the PRC, among 1036 polluted water bodies in 36 cities, 1009 have been eliminated or basically eliminate pollutants and odor. Cumulatively more than 39,000 enterprises in 24 industries were issued with an "Issuance of Enterprise Pollution Discharge Permit " (p. 5-8). The *Implementation of the Water Pollution Prevention and Control Action Plan* published in 2019 re-stressed the determination of solving water pollution, stating that the comprehensive improvement of the rural environment of 188,000 villages has completed. 3,624 of the 3,626 problems in 899 county-level water sources were rectified, and 10,363 problems in 2,804 water sources were rectified, so that the level of drinking water safety for 770 million residents was consolidated and improved.

It can be concluded that even though urbanization is recognized as an inevitable step in most countries and this trend has positive effects on people's daily lives through the establishment of living facilities and employment, pollution generated in the process of urbanization has caused severe problems worldwide, and this burden is unequally shared. It is a good sign that the central government in China has started to devote more attention to environmental issues and strengthen legal enforcement. However, the fact remains that too many vulnerable communities have been forced to shoulder more environmental burdens while enjoying fewer of the benefits and conveniences brought by urbanization, and it that it takes both time and comprehensive policies to improve the situation of all vulnerable communities.

2.7 Environmental Kuznets Curve Hypothesis and Its Justification on Environmental Pollution

I would like to devote a brief space to discussion of a mainstream alternative understanding of urbanization and pollution, only because it is used by many mainstream multilateral agencies and is used in policy formulation, especially when advising developing countries on pollution. It is my opinion that it is flawed, but it must be discussed.

A high degree of urbanization is believed to be the ultimate solution for current urban issues, especially for addressing urban pollution. The Environmental Kuznets Curve (EKC) hypothesis presents a very optimistic view about the relationship between urban development and pollution. The EKC hypothesis was suggested by economist Simon Kuznets in 1995, who proposed that environmental degradation will worsen at the initial stage of economic development but will be solved once the economy has developed to a certain level when society will have sufficient revenue to begin to invest in improving environmental problems. This curve was confirmed by Grossman and Krueger in 1995 and developed into an inverted U-shaped relationship between the level of environmental degradation and income by presenting empirical evidence from 14 countries about their air and water quality and income per capita as shown in *figure 1* (Torras & Boyce, 1998, p. 148). That is, the level of environmental degradation is posited to increase along with economic growth at an early stage, but after a certain point, the level of environmental degradation declines as income per capita grows (Apergis & Ozturk, 2015, p. 16). To explain this in a more simplified way, environmental degradation is seen as an expected side effect at the initial stage of urban

development and is assumed to be solved when the development of a given society reaches a certain level.

Figure 1. Schematic of Inversed U-Shaped EKC hypothesis.

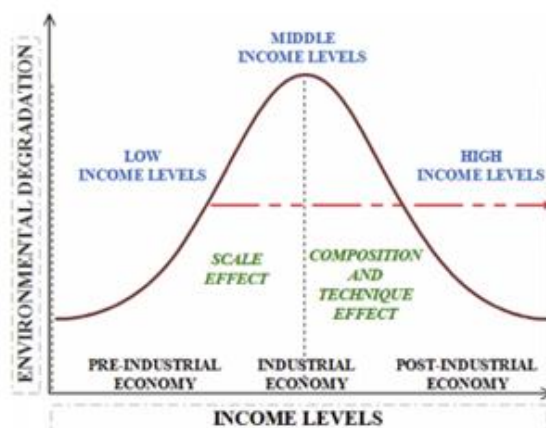


Fig. 1. Schematic of Inversed U-Shaped EKC hypothesis [Source: Authors].

Note. Adapted from “Empirical study of the environmental Kuznets curve and environmental sustainability curve hypothesis for Australia, China, Ghana and USA” by Sarkodie, S. A., & Strezov, V, 2018, *Journal of Cleaner Production*, 201, p. 99

The EKC hypothesis discusses whether economic development can be the ultimate solution to environmental issues, and whether the advancement of technologies can be the major approach to solve environmental pollution. The EKC hypothesis has been used to justify the pursuit of economic growth while ignoring its environmental effects, especially the negative ones (Gangadharan & Valenzuela, 2001, p. 514). This justification is often seen in currently developing countries as they fit the early stage described by EKC hypothesis, which is that of a country at the early stages of industrialization, when pollution increases due to the

rapid development of industries along with an overwhelming neglect of the importance of clean environment due to emphasis on job creation in the society (Lau, et al. and Dasgupta et al. as cited in Sirag et al., 2018, p. 146). However, considering the close relation between the environment and human health, environmental issues can pose severe threats to human health. If a state government chooses not to solve environmental problems in the process of economic development, while they may be able to solve environmental issues eventually, in the meantime, there will be a large population whose lives are threatened by various environmental issues. In short, using the logic of the EKC hypothesis, the environmental problems in developing countries caused by rapid industrialization and urbanization are temporary, and are expected to be solved when the economies reach a level that enables the societies to invest in solving environmental issues. What is constantly ignored is how industrialized pollution affects human health, and whose health and lives are affected the most.

The use of the EKC hypothesis in explaining and justifying the ignoring of environmental problems in developing countries in the process of industrialization has aroused controversy and met with much critique. Even though studies have shown that environmental issues which have negative impacts on human health can be steadily improved with the development of the economy (Dinda, 2004; Agras, & Chapman, 1999), major critiques are related to the inequality among the population in developing countries where the vulnerable communities are exposed to more pollution and face bigger risks posed by pollutants and other related environmental problems. Torras and Boyce (1998) suggests that

greater income inequality is related to higher levels of air pollution in low-income countries, especially sulfur dioxide and smoke (p. 155). They also recognize that political rights play an important role in solving environmental issues. That is, the empowerment of vulnerable communities by recognizing their rights is not only a key step for decreasing social gaps, but also an integral part of solving environmental problems.

Another major critique of the EKC hypothesis is that it was initially built on limited indicators of air and water quality, which restricts its application. Dinda (2004) suggests that other indicators, including municipal solid wastes, urban sanitation, access to safe drinking water, energy use and traffic volumes, have been used to test the EKC hypothesis, and most of these indicators do not support the EKC (p. 441). Furthermore, the role played by technology is considerable regarding addressing environmental issues, as Sirag et al. (2018) suggest. The EKC hypothesis only holds true when a country is in a stage of economic development in which technologies are available that improve energy saving, renewable energy and energy efficiency (p. 147). However, green technology is generated from a concern about environmental issues and increased stress on a clean environment from both civil societies and the policy makers, which means that environmental issues will not necessarily be solved along with economic development, but as part of the advancement of social consciousness about the importance of the environment.

The EKC hypothesis presents a rather optimistic view on the relationship between industrialization, pollution, and environmental issues than the view of critical urban theories. The hypothesis has been validated in many countries since the development of the economy

and advancement in technology enable these countries to allocate more resources to solving environmental problems. However, the limited indicators used in the hypothesis also weaken its range of application. Besides, it is also important to recognize that the hypothesis is built on a macro-scale perspective of the society, which ignores the extended negative impacts that various environmental issues, especially pollutants, placed on vulnerable communities.

Beyond this, the EKC has also been criticized for nationalizing these environmental issues. In other words, considering the current global political economy, many developing countries are accepting the polluting industries that are abandoned by developed countries as a starting point for economic development. That is, environmental pollution is not necessarily decreased, but is rather transferred between countries. The EKC fails to acknowledge this and limits its scope within countries.

2.8 Peri-urban Development and Environmental Pollution in China

After the launch of “Reform and Reopen” policy in China in the late 1970s, economic development in China has accelerated rapidly. What also takes place in the meantime has been the rapid urbanization process. Yu et al. suggest that the urbanization rate in China increased from 17.92 % to 54.8 % in 2015 (2018, p. 1). According to the report from the National Bureau of Statistics of China (2021), over 60% of population has become permanent urban residents by the end of 2020, which means that approximately 870 million people, have been living permanently in cities and 580 million in rural area (Li et al., 2016, p. 516). Guan et al. (2018) stress that the pace of China's urbanization significantly accelerated since 1996

and then maintained at a high speed with an annual increase by 1.35 % from 1996 to 2015, which is 4.5 times higher than that in 1949–1978 and 1.9 times higher than that in 1978–1996. In 2011, the urbanization level of China exceeded 50% for the first time and the permanent population living in urban areas exceeded those living in the countryside. (p. 98). It is pointed out by Ann et al. (2014) that, urbanization in China only used 30 years to catch up with what has taken 200 years to accomplish in western countries (p. 178). Even until recent years, the amount of rural-urban migration is still high, which means urbanization is still an active process in China. It is estimated by Li et al. (2016) that there have been almost 270 million rural-urban migrants in 2014, not including the non-working family members, such as children and elder relatives they bring along (p. 517). The urban worker with a rural *hukou* is called “floating population” (liú dòng rén kǒu 流动人口) in Chinese society and literature. According to Schoolman and Ma (2012), there were approximately 80 million “floating population” in 2000, and the number exceeded 120 million in 2007, which is equal to one third of total population of the U.S. (p. 142). In one word, the rapid urbanization in China is the result of both national policies and large scale rural-urban migration. The rapid urbanization process is also intertwined with the priority on industrial development and economic prosperity.

It is fair to say that rural-urban migration in China is the main drive to the urbanization process. Chen et al. (2019) estimate that the total number of migrant workers reached 281.71 million in 2016, with an increase of 4.24 million over 2015 (p. 1683). Guan et al. (2018) suggest that the rate of urban population increased from 36.22% in 2010 to 56.10% in 2015,

by 19.88 percentage points in 15 years, while the urbanized rate of the national registered population grew merely by 13.82 percentage points (p. 100). Both researches indicate that rural-urban migration composes integral part of urbanization in China.

One of the most serious results of the income gap between rural and urban residents is limited access to social services, including education and health services, of the rural residents and rural workers living in urban areas. At the same time, the *hukou* system further differentiates the rural population who do not hold urban *hukou* by restricting their access to superior social services, which marginalizes them in the future. It is pointed out by Lu and Chen (2006) that the ratio of urban-rural real income reached 2.46 in 2000, and if we take into account the differentiated education and health service between rural and urban areas, this number is most certainly bigger (p. 43).

2.9 The rise of TVEs, Urbanization, and Economic Development

One of the major unique characteristics in the process of urbanization in China is the rise of rural industries, which are known as township (xiāng 乡) and village (cūn 村) enterprises (TVEs). There were a variety of reasons that led to the rise of TVEs, including the traditional values that tie peasants to their villages and national policies that promote economic development in rural areas. Shen and Ma (2005) suggest that from 1978 to 1996, the number of TVEs in China increased from 1.52 million to 2.34 million, while their employment grew from 28.3 million to 135 million persons (Cui and Ma as cited in Shen and Ma, 2005, p. 764).

It is important to acknowledge the contribution of the rise of TVEs in the urbanization process in China as well as economic prosperity. They have played a key role as the pioneers after the launch of the “Reform and Reopen” policy. They have successfully completed the transition of a massive rural population from agricultural production to industrial production. This reform has raised the income of residents significantly. DaCosta and Carroll (2001) point out that in 1978 1.5 million TVEs employed 28.2 million workers, whereas by 1996, 23.4 million TVEs employed 135.1 million workers, and in the coastal areas where there were policies set to attract foreign investment, TVE net value reached an average of more than US\$200 billion in the 1990s (p. 230). According to Liang (2006), TVEs in the eastern region created US\$2.428 billion of added value in 2003 alone (p. 237). Based on these data, it shows that TVEs have played a critical role during the national process of urbanization in China. Since most of them are located in peri-urban areas, TVEs are the major contributors to peri-urban development in China.

However, the urbanization process led by TVEs is incomplete and lagging. The nearby residents who engage in industrial production can rarely receive an urban *hukou*, which limits their access to better services. At the same time, most of the TVEs use more labor intensive, low technology traditional production modes, which not only waste resources, but also generate severe pollution, which causes serious health problems to residents. Liang (2006) points out that over 80% of TVEs are dominated by family businesses, and only less 1% of TVEs are publicly traded. Liang also suggests that most TVEs are involved in traditional labor-intensive sectors such as textile, clothes, light industry, and building materials (p. 237).

That is, even though the key role played by TVEs were recognized as indispensable at the early stage of urbanization, they have now become the source of environmental and social issues in peri-urban areas due to their outdated technology and management systems, and have become the source of severe pollution.

In a word, it is important to acknowledge the fact that the process of urbanization is expeditious and is built on massive rural-urban migration, which provides abundant labor for urban development. However, it is also important to point out the inherent social inequality established by the *hukou* system, which acerbates the income gap between urban population and rural population. The inequality caused by *hukou* system is not addressed by the development of TVEs since the majority of the workers in TVEs remain in peri-urban areas and are not entitled to an urban *hukou*. Given the drastic income gap between the ordinary workers and the owners of TVEs and the severe pollution caused by TVEs, the residents living in peri-urban areas nearby TVEs are extremely vulnerable since they are not only restricted from accessing important forms of medical support, but are also economically deprived and exploited.

The economic prosperity in China shows a regional disparity. The east coast enjoys more economic development and higher urbanization rates than the provinces located in the west. Jiangsu Province, located in the east coast of China, has taken a leading position in economic development and has experienced rapid urbanization. Shi et al. (2018) suggest that Jiangsu province enjoys one of the highest urbanization rates in China, with highest GDP per capita (p. 3). However, unbalanced development between provincial regions still exists, and

there is a large development gap between different parts of Jiangsu Province, especially between rural and urban areas.

The urbanization trend started in Jiangsu province much earlier than most parts of the country. Shen and Ma (2004) point out that during the initial period of "reform and opening" the township and village enterprises (TVE) in southern Jiangsu province were partially collectively owned, and played an active role in the process of development in 1980s, and that this model of development was later known as the "*Sunan* (southern Jiangsu) Model" (p. 761). Liang (2006) demonstrates the evolution of TVEs based on the point of ownership: they were "...set up by townships, villages, several households (or partnerships), individual household (or private), or jointly by Chinese and foreign partners through shareholding mechanisms or shareholding cooperative systems. In terms of forms of organizations, some are established as companies or partnership entities, but mostly are now privately owned." (p. 235)

According to Chen and Guo (2021), the Sunan model is one of the three prominent types of TVEs, the other two being Wenzhou model and Zhujiang model (p. 22). There were actually five major types of TVEs that were growing, which were small scale steel, machinery, chemical fertilizer, coal, and cement industries (Gu et al., 2011, p. 547). Generally speaking, all these five types of TVEs are heavy-polluting industries. Therefore, the urbanization that is built on the development of these industries is at high cost to the natural environment. Moreover, even though the income gap may not be that obvious with the overall economic development in Jiangsu, there are still apparent differences regarding

welfare, social services, infrastructures, etc. (Ye et al., 2017, p. 113). Besides, the rapid urban growth also presents a lack of thorough urban planning regarding land use, as Liu et al. (2010) points out that urbanization and industrialization in southern Jiangsu is at the cost of arable land (p. 652).

The unique mode of industrialization and urbanization in Jiangsu province brought wealth and prosperity to the province in a short time. However, what also came along with this process was environmental pollution and degradation.

2.10 How TVEs Lead to Pollution

Due to the rapid urbanization and industrialization, the neglect of the environment has resulted in a variety of environmental issues in not only Jiangsu province, but also the whole Yangtze River Basin, including water, air, and soil pollution, acid rain, and loss of biodiversity. Because of this, the Yangtze River Basin has been recognized as an eco-environmental vulnerable zone (Gu et al., 2011, p. 549).

One of the major sources contributing to the pollution in Jiangsu province is poor environmental management from the township enterprises in Jiangsu province. Even though the township enterprises play a key role to the prosperity in Jiangsu province, a considerable amount of them consume energy inefficiently, and are heavy polluters due to a lack of antipollution techniques (Ming & Xu, 2013, p. 533; Yan, 2009, p. 50). The township enterprises tend to be located in rural areas that are close to urban areas. Because of this,

there tends to be a lack of regulations on environmental pollution of these township enterprises as they are not under the authority of the industry-related departments in the city, while the township officials are not fully aware of the importance of the environment before pollution has become a severe issue to the villagers. It is also often the case that these township officials are also part of the owners of these township enterprises. There tends to be an intersection between the owners of the TVEs and the local political leaders at the village level, or even at the township level. This intersection also provides strong incentives to local political leaders to defer to TVEs, or turn a blind eye to pollution, since the economic benefits of TVEs are also part of their personal interest, and in any case the officials are able to move to urban areas since they have the wealth to escape from the pollution caused by TVEs. In a word, even though there are environmental laws and regulations in China, it is hard to enforce these with respect to TVEs in peri-urban areas. This is not only caused by the complex land ownership and land use rights in peri-urban areas, but can also be attributed to the intersection between local political leaders and TVEs' owners.

Soil pollution with heavy metals is one the most widely researched issues in recent years, since once heavy metals enter human bodies, they tend to accumulate and then lead later on to serious diseases such as cancer. Jiang et al. (2015) show that in one of the rural-industry towns in Jiangsu province, residents there are exposed to arsenic through food consumption, and the accumulation of this heavy metal has increased the carcinogenic risk of all age groups living there. Residents are also exposed to other heavy metals through food consumption. The research done by Huang et al. (2015) indicates that the residents in Jiangsu

province are exposed to a series of heavy metals due to the high concentration of these heavy metals in the soil, with cadmium and mercury observed in most soil in the research.

A social issue related to pollution is that vulnerable groups are more likely to be exposed to pollutants but are less able to afford medical costs for treating the subsequent diseases or pathological syndromes. Schoolman and Ma (2012) suggest that large populations of rural migrants in Jiangsu province are disproportionately exposed to industrial pollution (p. 145). This is caused by the restrictions caused by the *hukou* system since the rural migrant workers do not possess an urban *hukou*, so they tend unwilling to go to hospitals in cities due to the high private cost resulting from them not having residential access to normal health services. This also applies to those who live near the polluting industries in rural Jiangsu. Most people who live near these enterprises are normally no longer engaged in agricultural practices and tend to work in these factories. However, due to the limitation of *hukou* system, many of them are still registered as “farmers” since the areas are not fully urbanized; that is, are peri-urban. This limits their access to healthcare services when they have to deal with the diseases resulting from different sorts of pollution. The creation of *hukou* was meant to restrict random and unmanageable population flow after the establishment of the PRC. However, in recent times as more and more people are absorbed into both migratory urban employment or into peri-urban areas with TVE employment, people in these peri-urban, but basically rural, areas are restricted when accessing better and more comprehensive social services.

Without a clear purview of jurisdiction over TVEs and the areas where they are located, environmental regulations for them are unable to be enforced, and where there are attempts at such regulations, they are weakly implemented. There is considerable corruption. It was mentioned earlier that there tends to be an intersection between the management personal of TVEs and village- and county- level administrative officials. Because of this, it is expected that in generating policies, what is prioritized is not the communal interest, but rather the individual and family interests of local elites who have control on both TVEs and the village committees. Dacosta and Carroll (2001) use the word “fuzzy” to describe the ownership of TVEs in China since most TVEs lack a well-defined management structure; however, the township and village officials possess all the key components of property rights, namely control of residual income, the right to dispose of assets and the right to appoint and dismiss managers and assume direct control if necessary (p. 234). This further proves that the interest of TVEs is intersected with the personal interests of local officials, which means there is a high possibility that they prioritize their own economic benefits over the well-being of the whole communities’, and especially the health of the local environment.

Chinese society is known to be a strongly particularist society (in Chinese, an “acquaintance society”--shuren shehui/ 熟人社会), whose main feature is that the connections between families and individuals overrides ability and due process, that is the deep social valuation of ascription over achievement. This feature is strengthened by the kinship relationships inside a village. Because of this, social mobility in villages is considerably lower than in more cosmopolitan urban areas. The families that form the local

elites almost never change, and normally such domination passes on between generations. Therefore, for the families who have less economic ability, and the migrant TVE factory workers who are seen as “outsiders” by the villagers, cannot improve their situation if the people at a higher position purposely ignore their suffering for their own economic benefit.

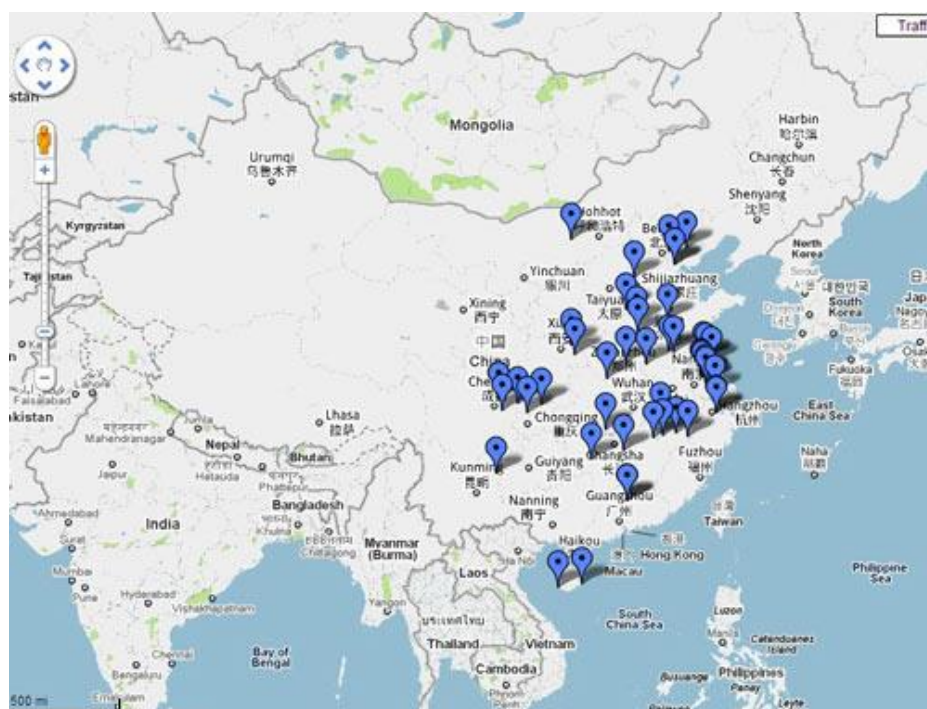
In summary, the role played by the township and village enterprises is a key factor contributing to the fast urbanization in Jiangsu Province. However, I believe I have shown that in this industrialization process the absence of any ongoing official recognition of TVE environmental pollution severely harms the interests of the people actually living and working there due to both the pollutants and, as a deeply exacerbating factor, the restrictions on health care services placed by the *hukou* system.

2.11 Cancer Villages in China

Cancer has been recognized as one of the leading death causes in China. Some types of cancer, such as lung cancer, are correlated with individuals’ harmful living habits, especially smoking. However, some other types, including esophageal cancer, stomach cancer, and liver cancer have appeared in increasing numbers, increasing in regions where *aizhengcun* are found. According to cancer statistics for 2015, Chen et al. (2016) identified lung cancer being the most common type of cancer and the leading cause of cancer deaths, followed by stomach, esophageal, and liver cancers. It is estimated that 4,292,000 new cancer cases will occur and that approximately 2,814,000 Chinese will die from cancer in 2015, which is equal to over 7500 cancer deaths on average per day (p. 115 & p. 119). Ebenstein (2012) suggests

that stomach cancer and liver cancer now represent China's 4th and 6th leading causes of death, and in combination with other digestive tract cancers (e.g., esophageal) account for 11% of all fatalities and nearly one million deaths annually (p. 2). Han et al. (2016) point out that the first *aizhengcun* (cancer village) was identified in 1954, although it didn't receive the attention it now receives. But the number exceeded 300 by the end of 2011, with 186 arising between 2000 and 2009 alone, which was called "the decades of cancer" by some scholars (Gong and Zhang as cited in Han et al., 2016, p. 1229). The peak number of cancer villages once reached 450 (Shagun, 2016, p. 190). However, cancer village is a rather ambiguous concept itself and is not a term fully recognized among academics and policymakers, so the exact number fluctuates based on the definitions used by different scholars. For example, according to Gong and Zhang (2013), a village can be identified as a cancer village if its cancer case rate is markedly higher than the national average, or if its cancer mortality rate is higher than national average, or if its cancer case rate and mortality rate taken together are higher than other comparison villages, and so on (p. 157). Nevertheless, the famous "Cancer Villages in Mainland China", as shown in Figure 2, still confirms the existence of more than 200 cancer villages. Granted, there are other causes that lead to cancer such as consumption of tobacco and alcohol. However, it is absolutely essential to take into account the connection between pollution and increasing cancer case and mortality rates, especially pollution caused by TVEs in peri-urban areas.

Figure 2: Cancer Villages in Mainland China



Source: Shanghai Daily, 2013.

Cancer villages received a much higher media attention in the last decades before the central government of China started to strengthen law enforcement in recent years. Regardless, cancer villages bring to the fore the issue of environmental injustice, and how the residents in peri-urban areas are ignored in the decision-making process due to their limited economic capacity, official residential restrictions, and general powerlessness. For example, it is estimated that for over 40% of the rural population's (this would include peri-urban areas) what is considered potable water cannot meet basic health and safety standards, while there are millions of people have no access to clean drinking water, with some of their drinking water has been severely contaminated (Jiang as cited in Wu et al., 2015, p. 424). According to China Water Risk (2013), 789 villages researched have shown that drinking

water in the ground and on the surface is polluted in varying degrees. According to Lora-Wainwright and Chen (2016), a number of articles have reported on water pollution and its effects on nearby areas, including changes in the color of the stream, livestock deaths, crop failures, high cancer rates, and men's inability to pass the physical test required to join the army. In some areas, lead in the soil exceeded the Chinese national guidelines by 44 times and cadmium by 12 times (p.400). The documentary from Now Finance reports that in Shenqiu village in Henan Province, there were over 1000 people who died from cancer in one year; in another village in Anhui, 2150 people died from cancer in one year. The cancer death rates of these two villages together were double the national average, while the cancer rate of the village in Henan alone is 5 times higher than national average (2013). Zhang et al. (2014), shows that residents from sampling sites that are close to contaminated waters, including rivers and lakes, have an 80% of their mortality rate caused by esophageal cancer, while the remaining sampling sites show less than a 20 % mortality rate caused by the same type of cancer. A "distance threshold" clearly existed in this research, put at 10km (p. 55). In their research, Gong and Zhang (2013) show that 205 *aizhengcun* are within 3km of a river, which is 58.4% of the total, and 284 are within 5km of a river, which equals to 80.9% (p. 159). This shows that that water pollution is the prime cause of *aizhengcun*. Shi (2019) also suggests that in 355 confirmed *aizhengcun*, 94.65% are caused by pollution; among the 338 *aizhengcun* caused by pollution, 318 of them result from water pollution, which is equal to 94.08% (p. 878). Besides, Shi also points out that chemical plants, processing plant/ paper mill, and garbage, are the top three causes of water pollution (2019, p. 878-79).

Returning to our main theme, pollution disproportionately affects vulnerable communities, namely the poor communities and the peasants. In mainland China, the number of cancer villages increases along with the speed of economic development. Cui et al. listed all the known cancer villages in mainland China based on provincial units, which is given as Table 1 below. It shows that cancer villages are most numerous in eastern China, exactly where the economic activity, industrialization and urbanization are most prominent. In addition, Cui et al. (2020) also point out that the issue of cancer villages has accelerated since 2000.

Table 1. Chinese Cancer Villages by Provincial Units

Chinese cancer villages by provincial administrative units.			
Provincial units	N (%) of Cancer villages	N (%) of Counties *	Density of cancer villages 10^{-3} , km ⁻² †
East China	214 (46.3%)	114 (11.7%)	2.02
Hebei	53 (11.5%)	22 (12.8%)	2.81
Jiangsu	38 (8.2%)	19 (18.1%)	3.56
Shandong	36 (7.8%)	23 (16.4%)	2.29
Guangdong	30 (6.5%)	16 (13.2%)	1.67
Zhejiang	20 (4.3%)	13 (14.4%)	1.90
Fujian	18 (3.9%)	9 (10.6%)	1.45
Hainan	10 (2.2%)	4 (20.0%)	2.83
Tianjin	4 (0.9%)	3 (18.8%)	3.36
Liaoning	2 (0.4%)	2 (2.0%)	0.14
Shanghai	2 (0.4%)	2 (1.9%)	2.43
Beijing	1 (0.2%)	1 (6.3%)	0.61
Central China	194 (42.0%)	69 (8.9%)	1.15
Hunan	65 (14.1%)	24 (19.7%)	3.07
Henan	46 (10.0%)	12 (7.5%)	2.78
Anhui	31 (6.7%)	12 (11.4%)	2.21
Jiangxi	22 (4.8%)	11 (11.0%)	1.32
Shanxi	16 (3.5%)	11 (9.2%)	1.02
Hubei	8 (1.7%)	6 (5.8%)	0.43
Heilongjiang	4 (0.9%)	3 (2.3%)	0.09
Jilin	2 (0.4%)	1 (1.7%)	0.10
West China	54 (11.7%)	43 (4.0%)	0.08
Yunnan	19 (4.1%)	5 (3.9%)	0.50
Shaanxi	7 (1.5%)	6 (5.6%)	0.34
Sichuan	7 (1.5%)	5 (2.8%)	0.14
Chongqing	6 (1.3%)	4 (10.0%)	0.73
Inner Mongolia	5 (1.1%)	4 (4.0%)	0.04
Guangxi	3 (0.6%)	3 (2.8%)	0.13
Guizhou	3 (0.6%)	2 (2.3%)	0.17
Gansu	2 (0.4%)	1 (1.2%)	0.05
Ningxia	1 (0.2%)	1 (4.5%)	0.19
Xinjiang	1 (0.2%)	1 (1.0%)	0.01
Qinghai	0	0	0
Tibet	0	0	0
Nationwide	462 (100%)	226 (7.9%)	0.48

* the total number of counties in 2010 for each provincial administrative unit were used and obtained from CSY (2011);

† the land area of each provincial administrative units was obtained from CSY (2006)

Source: Cui et al., 2020, p. 6

Lora-Wainwright observes that *aizhengcun* is a “cultural, social, economic, and political phenomenon” (2017, p. xxxiii). This suggests that *aizhengcun* are not only a consequence of pollution, especially water pollution, but also that they are a consequence of unequal development, insufficient infrastructure, and societal inequality caused by the income gap and access to social services.

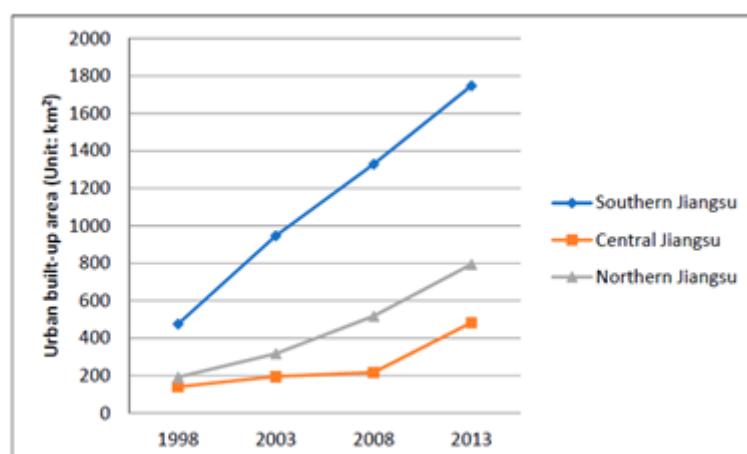
I would now like to end this Chapter by taking a closer look at Jiangsu Province, which is one of the provinces that has reported significant rises in *aizhengcun*, to explain what the specific factors are that contribute to severe pollution, and what has made the affected communities so powerless that they are unable to receive fair compensation and just treatment.

2.12 Economic Development and Pollution in Jiangsu Province

Jiangsu province belongs to the Yangtze River Delta (YRD), which is located on the east coast of China. YRD consists of the Jiangsu province, Shanghai, Zhejiang province, and Anhui Province together occupy a geographical area of 358,000 square kilometers with a current population of 235 million (Xinhua News, 2021). It is considered the most developed and prosperous area in China because of its economic growth. Gu et al. (2011) point out that, the Gross Domestic Product (GDP) of the YRD accounted for 17.5% of the whole nation’s GDP of 4.3 trillion yuan, in 2008, and the per capital GDP was 44,468 yuan, twice the national average. Jiangsu’s population is 80.3 million people, of which 55.2 million people live in urban areas; the urbanization rate is thus 68.76% (p. 364). Economic prosperity inside

Jiangsu Province is unbalanced, with Southern Jiangsu being the most prosperous, Central Jiangsu in the middle, and Northern Jiangsu being the poorest. According to Tang and Feng (2015), the GDP per capita for each region was 79501, 47442, and 29774 RMB (p. 359). As shown in Figure 3, the urbanization rate of Southern Jiangsu continues to be much higher than other two regions, and increases much faster. They have also suggested that the development in Southern Jiangsu province can be attributed to the rise of township enterprises back in the 1980s.

Figure 3. Changes of urban built-up area from 1998 to 2013 in Jiangsu Province divided into Southern Jiangsu, Central Jiangsu, and Northern Jiangsu.



Source: Shi et al., 2018, p.6

The economic development in Jiangsu province is at the expense of the environment and the livelihoods of peasants, especially in Southern Jiangsu province, where the TVEs arose. It is estimated by Liu et al. (2010) that a total of 182,485 ha of arable land was lost to urban settlement during 1990 to 2006, which was the period of TVEs development, which are

unrenewable energy-intensive and environmentally unfriendly (p. 653). Ming and Xu (2013) point out that by the end of 2011 the total number of TVEs was more than 1.635 million, their output valued at 10.1 trillion yuan by the end of 2011 (p. 533).

Among all the types of industries, Jiangsu is known for its developed printing and dyeing industries. According to the documentary made by Now Finance (2013), over 30 % of printing and dyeing products in China come from Jiangsu Province. However, this type of industry not only makes high demands on the water supply, but also generates enormous water pollution the form of industrial effluent. Based on the calculation done by Zhang et al. (2016), the textile industry generates the highest water pollution. Based on their equation¹, for every 1% increase in output value in this industry, industrial wastewater discharge will increase by 0.6678 %, followed by chemical plant being 0.6568% and the third being paper mills of 0.6478% (p. 167). A similar argument is also raised by Yao et al. (2019) based on research about wastewater discharge in three coastal cities in Jiangsu (Lianyungang, Nantong, and Yancheng), suggesting that within the 6,001 enterprises that discharge wastewater directly into city rivers, the most polluted ones are textile manufacturing. Among the 5,595 enterprises that discharges their wastewater into Yangtze River, above 40 % are textile manufactures and related factories (p. 31-32).

¹ $\ln y_{it} = \beta_0 + \beta_1 \ln \text{output}_{it} + \varepsilon_{it}$
(Y is the discharge amount of pollutants (such as industrial wastewater, COD, ammonia nitrogen); β_0 is a constant term, output is the total industrial output value, β_1 is the logarithm of the total industrial output value; the parameter to be estimated, ε_{it} represents the random disturbance term, and the variable subscript i represents different industries, the subscript t represents different years)

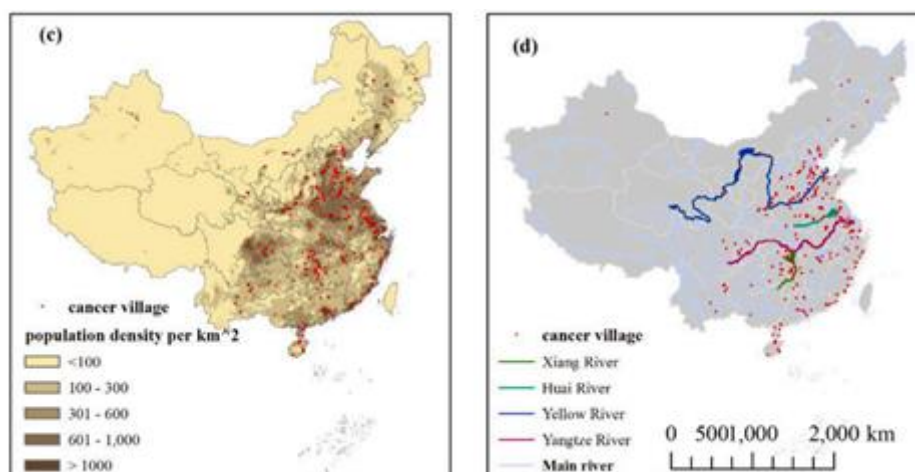
The rise of TVEs also deepened the issue of regional inequality in Jiangsu Province, especially between Sunan (Southern Jiangsu) and Subei (Northern Jiangsu), with the former being much wealthier than the latter. This regional inequality is also connected to the amount of environmental pollution and the predominance of *aizhengcun*. According to Wei and Fan (2000) suggest that the policy of “Reform and Opening” favored Sunan a lot more than Subei, with over 70% of foreign direct investment concentrated in Sunan, and almost 50 % in Suzhou alone in 1995 (p. 462).

2.13 Cancer Villages in Jiangsu Province

The issue of water pollution has been recognized as the major environmental and social issue in Jiangsu Province and is also believed to be the main cause of the concentration of *aizhengcun* and high cancer rates. The main reason behind is the rapid urbanization process and a lack of environmental protection awareness. There has been a large amount of untreated industrial effluent discharged into the Yangtze River, and into the Huai River, which developed into severe water pollution. According to Huang et al. (2015), the wastewater produced in Jiangsu Province increased from 2.9 billion tons in 1980 to 6.0 billion in 2012, reflecting the rapid urbanization process (p. 176). Water pollution is extremely harmful for people who rural and peri-urban areas and who take water directly from tributaries of the Yangtze River. As they do not possess enough facilities to purify the water, contamination will enter their bodies through water, fishes from the river, and agricultural products that are irrigated by the contaminated water. That is, people who live in

rural areas near the river tend to face a bigger risk of diseases caused by water pollution. Among all the diseases, cancer is considered the most fatal one, since it takes longer time for the patients to diagnose and start the treatment, and the treatment of cancer tends to be very expensive and unaffordable for families who depend on farming or local off-farm employment, for example in TVEs. Figure 4 shows that Jiangsu Province has the most cancer villages due to its association with Yangtze River and Huai River. Research done by Cheng and Nathanail (2019) indicates that water pollution has a direct link to the rate of cancer in villages, as 76% of cancer villages are within a 3km threshold from the polluted rivers, and almost 90% of cancer villages are within a 5km threshold from the polluted rivers (p. 1938).

Figure 4. Spatial Distribution of Cancer Villages based on Population Density and Association with Major Rivers in China.



Source: Cui, et al., 2020. P. 8

Chapter 3: Discussion and Conclusions

3.1 Environmental Inequality in Jiangsu

We can see immediately that water pollution contributes significantly to cancer in *aizhengcun* in Jiangsu Province, which has differentiated effects on different social groups based on different income levels. It seems to me that there are lessons from China that are helpful to countries at the similar stage or have similar social issues. The primary issue is that pollution is much more than simply a suite of environmental issues that require scientific solutions; they have become social issues that disproportionately affect certain groups due to their vulnerability. Under most circumstances, such vulnerability results from poverty and income inequality. Such inequality can pose a huge threat to social stability. Therefore, the solution to these environmental issues also requires a systemic solution from both local and national government to eliminate inequality.

The case from Jiangsu Province shows how social stratification and income inequality due to urbanization and industrialization have placed different environmental consequences on different social classes. There is a clear social stratification created in Jiangsu Province, especially in rural areas, based on ownership of the means of production, in this case land. At the bottom of the social pyramid are migrant workers from other poorer provinces and local villagers who can only do off-farm work at the factories. The similarities they share include the lack of health insurance because of the *hukou*, the inability to move to cleaner areas, and the economic inability to pay for treatment of disease, especially fatal and expensive ones such as cancer. At the top of the pyramid, are the local elites. It is common that the village

leaders are stakeholders in local TVEs, or that local enterprises seek to insert their influence into the village committee to the full extent that they can. Due to local economic and political elites, the inequality of economic benefits and political representatives are exaggerated along with the growing economy.

The result of the lack of representatives and powerlessness in the decision-making process forces vulnerable communities, namely the poor communities, to internalize their suffering with pollution. In the book *Resigned Activism* written by Lora-Wainwright about how villagers react to the severe water pollution and seeing people around suffering and dying from cancers, a shared helplessness results in a situation of being powerless about seeking change. The individual and concrete effect of this is that very few affected residents discover cancer at an early stage. Most of them can only notice it and be diagnosed at the terminal stage of cancer, when it is no longer treatable. Cao and Yin (2014) suggest that most cancer patients from *aizhengcun* and surrounding areas pass away less than a year after their diagnosis (p. 120). This also explains the connection between not only the high cancer rates but also the high cancer death rates in the villages called *aizhengcun*. The fact that water pollution has almost become a “curse” to some areas, especially for people with less income, is heartbreaking.

An even more serious issue is the loss of trust for local government, which severely threatens social stability. Being forced to live with pollution and seeing no possibility of change, the affected residents do not believe local government will do anything to solve the issue of pollution or anything else to improve their well-being. The anthropological research

done in areas of *aizhengcun* by Lora-Wainwright, Chen and other suggest a weak trust between residents and local government. Because of this, rumors which exaggerate the situation about cancer rates and mortality rates can easily circulate. One example mentioned by Chen and his research team (2020) is that a well-circulated list of cancer patients from a village in Jiangsu turns out to be exaggerated and fake as many names on the list do not exist at all. Such rumors do not solve any issues but are used as a means for unscrupulous media simply to attract attention. In the end, rural dwellers who suffer from water pollution gain hardly anything. Another situation that could take place due to the lack of trust between peri-urban dwellers and local government is protests and other and so-called "micro-destructions" against development projects and government properties. However, according to the cases presented by Lora-Wainwright (2017), such a situation mostly takes place in wealthy areas where there is a strong kinship inside the villages and when the villagers and TVE owners share similar interests. In the case of Jiangsu province, the dynamics inside the village are complex, and the residents who suffer from pollution the most tend to be the migrant workers from other poorer areas. Without much policy support or education, they are not likely to protest or choose other aggressive behavior, and their choices are limited to internalizing their suffering caused by pollution, which leads to their lack of trust in the government.

Another issue that also stands out is the individualization of the cause of cancer, which is known as "blaming the victim". A common example is portraying smoking as the major cause of cancer. For example, the book "Chinese 'cancer village'" by Ajiang Chen (2020), states that personal habits, specifically smoking among men, is considered the main cause of

cancer. There is no intention in this thesis to deny the scientific correlation between smoking and cancer. The point is that individual behavior should not be the principal focus of searching for causes of cancers. Instead, the preferred perspective is to investigate the surroundings of individuals and look for cause of cancer in a more comprehensive approach. Ajiang Chen mentions that there is an obvious higher ratio of smoking among men than women in the villages where he and his team did research, and that there is also a general trend in large number of Chinese farmers, especially male farmers, to smoke cigarettes. By showing that there is also a higher ratio of male lung cancer patients than female patients in the village, Chen suggests that smoking is the primary cause of lung cancer in the village. However, not all patients smoke, but they all live in heavily polluted areas. Frankly speaking, smoking can contribute greatly to the risk of cancer, especially lung cancer, but the effect brought by long-lasting environmental pollution cannot be ignored. With what has been discussed earlier, cancer is known to be a complex disease caused by a series of factors. Therefore, the individualization of "blaming the victim" for cancer simplifies the issue and ignores the impact from the surrounding environment. This advocating misdirects the future of scientific research, since it should not be focusing on individual behaviors, but rather should placing its emphasis on factors that affect the entire population in a given society. At the same time, the individualization of responsibilities on the issue of cancer forces individuals to blame themselves rather than questioning the surroundings, which could pose an even bigger risk to human health. Individualization of the hazards also prevents the government from seeing environmental issues as a social issue or seeing the disenfranchised positions of the vulnerable communities.

The lessons from the environmental inequality in Jiangsu Province mainly focus on how the issue of *aizhengcun* should be viewed and how the mutual trust between residents and local government can be established. The case from Jiangsu province shows the mindset of the migrant workers when they are forced to internalize their suffering from pollution. It also discusses why the stress on personal habits causing cancer can lead to a segmented view and which ignores the structural inequality that leads to cancer.

3.2 The Special Case of Water Pollution in Jiangsu Province

Firstly, there is a lack of environmental regulation enforcement, especially towards local TVEs. Government officials face a complex dilemma which is balancing environmental cost and local tax revenue. It was mentioned earlier that TVEs have played a key role in the amazing economic development in Jiangsu Province. However, on the other side, TVEs are also known for their environmentally unfriendly ways of production. There are several reasons contributing to this situation. Many TVEs are inherently polluting due to the industries they are in, such as textile and papermaking, and the effort it requires to improve their emission can be unaffordable to many TVEs. Another situation is green technologies are available, but the owners of the TVEs are not willing to apply these technologies due to their costs and their effects on production and therefore profits. Many TVEs remain in a traditional mode of production, which generates severe pollution. At this stage, the role played by local government is a key factor in pushing forward improving the production mode of TVEs by a series of practices, including introducing green technologies, generating environmental

policies, and providing funding for enterprise technological modification. In the case of Jiangsu Province, it is clearly shown that local government failed to fully fulfill its responsibilities in this regard.

Moreover, TVEs are in the middle of the jurisdiction between the nearby city municipality and the township, which puts them in a grey area regarding regulating them as they don't seem to be in the jurisdiction of either side. In the areas where TVEs are located, the percentage of residents engaging in farming is low, and even the ones who do, farming is not at the center of their daily productive life, so it is hard to categorize them as farmers, who are under the jurisdiction of the village and the county. However, most residents still hold an "agricultural" residential *hukou*, which means they are not classified as urban residents either, and are therefore not under the jurisdiction of the city municipality. This awkward situation also applies to TVEs, as they are at the middle ground between the traditional definition of urban and rural. The result of this is that TVEs have had considerable autonomy in the process of their development. This autonomy brought economic prosperity in a short period of time but has been unable to continue due to the lack of government support on the matter of preferential policies, funding, and technological support.

The issue of water pollution and the related social issue of *aizhengcun* in Jiangsu Province suggest that clear and practical environmental regulations play a key role in the process of solving environmental issues, while the powerful implementation and enforcement of these regulations are also required. The cause behind the failure of improvement can be attributed to local social structures that are primarily built upon kinship relationships and

individual connections. Such a type of social structure has little possibility of social mobility and leads to an unhealthy mixture of the public interests of the village as a whole and the individual interests of the elite group. The lesson that stands out in this section is that there is a need to breakdown the monopoly of the economic and political power of local elite groups to provide more channels of communication and to have more voices heard.

3.3 Regulating TVEs In Jiangsu Province

Urbanization in Jiangsu Province is lagging its level of industrial development. That is to say, the percentage of population who engage in industrial production is much higher than the percentage of urban population in the province. This issue is related back to the development process of Jiangsu Province. As discussed above, the rise of TVEs was a key step in the development process of Jiangsu Province and continues to play a significant role in contributing to economic prosperity and creating job opportunities. However, the pollution caused by TVEs is also a headache for policymakers, which gives them incentives to keep TVEs far in the administrative background—“out of site, out of mind”.

Another issue that arises in the process of development of TVEs is the growing social gap and inequality caused by the unequal distribution of income. Inequality caused by the income gap is one of the unavoidable issues that have been considered as a major negative consequence of urbanization and industrialization. Especially in developing countries, the lack of a complete social welfare system, monopoly on production resources, and corrupt government officials can lead to severe inequality and social stratification in the process of

urbanization. The case in Jiangsu Province is no exception. It has been discussed earlier about how “acquaintance society” affects local social structure, which leaves no channel for vulnerable communities to express their needs. Besides that, the TVEs development mode has caused unbalanced and unequal regional development, which forces the people from poor regions to come to wealthier regions for job opportunities and become migrant workers. In the case of China, the *hukou* system severely restricts the protection and support which migrant workers have access to when they choose to work in other places other than their hometowns, the place of their natal residence. A widespread mocking description of Jiangsu Province in China says that Jiangsu is the most “split” province as there is a lack of provincially recognized identity since people from one city can never like people from other cities in the province. People from wealthier cities think the outsiders are “dirty peasants”; while people from poorer cities believe people in richer cities are “stealing and making unjust money”. This description reflects the regional unequal development in Jiangsu Province. The lack of solidarity in Jiangsu Province poses a threat to its future development and social cohesion.

The urbanization and industrialization in Jiangsu Province also show that water pollution is a development issue, be solved simply, a la Kuznets, with higher economic prosperity, since *aizhengcun* have spread throughout the countryside of the whole province. It requires coordinated policies that prioritize the environment as much as economic development. In Jiangsu Province, no matter whether it is the wealthier Sunan (Southern Jiangsu), or the poorer Subei (Northern Jiangsu) or central Jiangsu, *aizhengcun* appear in the

process of economic development, and then remain to be a social issue since local government will not trade economic development for a better environment, will require a much longer time and more prudent policies. Currently, the issue of *aizhengcun* is much severer in Subei than in Sunan since the economic development in Subei is far behind that of Sunan. To complicate the situation, there are industries moving to Subei based on preferential policies. The increasing number of industries in Subei did successfully contribute to local poverty reduction but has also led to severe pollution

Being one of the wealthiest and most economically active provinces in China, the issue of *aizhengcun* in Jiangsu Province reflects a variety of social issues. The root cause of the majority of these issues is clear: It is the enlarging inequality, including regional inequality, class inequality, which clearly intersects with environmental issues. Even though the importance of economic development should be recognized, the role of equality and the sustainability of the environment should not and cannot be ignored in the process of development in a given society.

3.4 Urbanization and Environmental Justice in China

The major issue that is reflected in the case of *aizhengcun* in China is marginalization of vulnerable communities caused by systemic inequality, that is, the outcome of urbanization and industrialization is not distributed in an equal way. Instead, only the ones who own capital and means of production enjoy the fruits of economic growth and the convenience brought by urbanization. At the same time, their wealth is built on the exploitation of those at

the bottom. Lora-Wainwright (2017) suggests that the average income of a migrant worker at the TVEs she researched was between 700 Yuan and 5000 Yuan (108 US \$ to 774 US \$) per month in 2009 (p. 65). At the same time, they must pay rent, a “sanitation cost” specifically designed for people whose *hukou* is not registered locally, and a higher rate for water and electricity (Lora-Wainwright, 2017, p. 69). In other words, compared with local people who have houses or land that are rented out to migrant workers or local enterprises, migrant workers have less income sources but higher living expenses. They may consider themselves benefiting from the economic opportunities provided by the TVEs, but it is hard for social scientists to make the claim that they are benefiting, considering their increased living costs and the harm brought on by the severe pollution they must face daily. As was mentioned in the last Chapter, justice covers a wide variety of perspectives, including equal distribution, participation, and decision-making. When applying these principles in the context of environmental impact, it calls for an equal distribution of the benefits, and an equal share of the negative externalities, such as environmental pollution.

Another issue that arises is that it is very difficult to hold the ones that are accountable and require them to compensate those affected fairly. Under these circumstances, it is important for the government to help those most in need. There is a united voice from the literature studying the issue of *aizhengcun* in China which shows that it is not difficult at all to demonstrate a connection between water pollution and high rates of cancer; however, what is more difficult to prove is the specific causality between a specific contamination from a certain factory and a certain type of disease. In other words, almost everyone recognizes that

severe water pollution is a major cause of cancer. However, at the same time, it is difficult to identify which specific factories should be held responsible. This issue gets even more complicated when local politics are involved: the targets of blame are sometimes chosen strategically based on local politics, which are more likely to be enterprises run by outsiders (Lora Wainwright, 2017). At the same time, the lack of solid scientific evidence which can blame specific industries for causing this issue makes it highly difficult for those affected to sue for compensation.

The sad fact is that the majority of cancer patients from *aizhengcun* have reached the terminal stage of cancer when they are diagnosed, and normally pass away within a year. It is impossible for them to go through the process of litigation that may take years, and in this way justice never comes to them. The successful case of litigation over chromium slag pollution took ten years for the affected community to win their case. It is even cruel to think of the number of cancer patients who were affected passed away in the process of litigation. The principle presented by the Government's 10th and 11th Five Year Plans between 2001 and 2010 is known as "...pollution in water should be resolved by the party which caused it" ("Shui wu ran, shui zhi li", "谁污染谁治理") (Lora-Wainwright, 2017, p. 53). This principle did prove to be successful in some areas, but for the areas with multiple polluters, it is difficult to identify how much pollution each industry caused, let alone holding them each one of them accountable. The recently expired 13th Five-Year Plan for 2016 to 2020 suggests there are clear and specific measures for polluting factories, but there is still little about how

the Chinese government can help the communities, namely the migrant workers and other financially challenged individuals who are forced to live near heavily polluted areas.

3.5 Urbanization and Environmental Injustice

Environmental inequality exists widely in every country and affects individuals' lives greatly. The quality of water and air, the level of noise at night, the breadth of the field of view, etc, are all under shadow of environmental inequality. More importantly, different from nature, the urban environment is human-made and is continually changing. Because of this, it is important for city planners to realize how environmental inequality comes into being so they can minimize and avoid it in the future.

One of the key measures of including the voice of the marginalized communities is to include them in the decision-making process and provide them with legal support when their rights are being violated. No matter the major case discussed in this thesis about *aizhengcun* in China, or the case mentioned at the literature review about a mining company vs. indigenous communities in Chile, the biggest commonality between the migrant workers and poor villagers in China and indigenous communities in Chile is that neither of them is included in the decision-making process, and there are no policies that favor them when they need legal support. Equality means more than fair distribution, it also includes participation and decision-making. Therefore, it is important for the policymakers to hear the voices from the most vulnerable communities to avoid planning the cities that result in both environmental and social injustice.

In conclusion, human beings and nature can co-exist in harmony in an ideal world, and industrial development as part of human productivity can also be environmentally friendly. However, in the real world, most industrial development comes with a cost on natural environment, while some costs are reversible, some are not. It is also a harsh fact in the real world that the distribution can be drastically unequal. Some can enjoy the most but pay the least cost, while some others may enjoy the least but have to suffer from the burden that should not be shouldered by them. The issues of *aizhengcun* discussed in this thesis reflect this inequality. At this time, systemic changes should be made so that such inequalities can be reduced in the future. Actions from the government that are explicitly designed for tackling down inequality are essential. This discussion chapter and the next chapter, recommendation and conclusion, are aimed at providing practical suggestions on how to solve the issue of environmental inequality. From this point, there should be faith that in the future more inequalities can be reduced.

3.6 Recommendations

I would like to end this thesis with some concrete recommendations for action with regard to the issues and themes I have presented.

Firstly, it is important to recognize that environmental pollution has differentiated effects on different groups. Under most circumstances, the group with least privilege suffers most from environmental pollution. Their vulnerability prevents them from wider choices of

living conditions, so they are forced to live close to polluting sites. Therefore, the first step of fully recognizing environmental pollution is to build the connection with social inequalities.

Secondly, based on the awareness of social inequality, it is important for the policymakers to include voices from vulnerable communities and take thoughtful consideration about their needs. It has been reiterated in this thesis that urban environments are human made, which means they are planned and subject to change, but also means that bias may be integrated with their original framework for development. Because of this, only if the vulnerable communities who are severely affected by pollution have an opportunity to speak up in decision-making processes can the policymakers remedy their neglect of these groups and their ignorance regarding their needs, so that in the future changes can be made regarding improving their living standards.

Thirdly, there should be more legal support for communities affected by pollution, and compensation should be distributed in a more effective way. The case from Jiangsu Province indicates the sad fact that policies are hardly “on side” with the vulnerable communities who are affected by pollution. Their evidence suggesting the correlation between water pollution and cancer are considered scientifically insufficient in court, so they cannot win the trial or be fairly compensated. The national policies of the PRC against water pollution prioritize retribution of the polluting industries but fail to take care of the communities whose livelihoods are destroyed by this same pollution. It has been demonstrated in the previous chapters that the most disadvantaged groups tend to be affected the most by pollution.

Therefore, it is important to prioritize their needs while still holding the industries accountable.

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