The Frontiers of Society, Science and Technology

ISSN 2616-7433 Vol. 1, Issue 2: 117-124, DOI: 10.25236/FSST.20190217

# Study on the Development of New Urbanization and the Effect of Ecological Environment in the Agricultural-pastoral Ecotone of Inner Mongolia

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***Absrtact.*** *The improvement of urbanization has a series of negative effects while promoting economic and social development. The level of urbanization in Inner Mongolia has increased at an average annual growth rate of 3.57%. Non-agricultural population and urban built-up area have continued to increase. After 1977, the same number of urban non-agricultural population has increased. The expansion area of urban construction land is nearly four times that before 1997. The scale of expansion not only directly occupies the ecological environment, but also exerts obvious coercive effects on energy, resources and environment. Among them, the total amount of energy consumption, the total amount of urban industrial exhaust emissions and the number of non-agricultural population are exponentially correlated, and the correlation coefficients are 0.96 and 0.91, forming a vicious circle of positive feedback; the total amount of urban domestic water and industrial water is in the same way as the number of non-agricultural population. The binomial correlation coefficient is 0.94 and 0.70, in which the total domestic water consumption is in the rising stage, while the total industrial domestic water consumption is affected by the shortage of water resources, showing a trend of first increasing and then decreasing. To ensure the important ecological status of Inner Mongolia, urbanization must take the road of sustainable development.*

***KEYWORDS:*** *Inner Mongolia; Urbanization; Eco-environmental Stress; Sustainable Development*

## 0. Introduction

Urbanization is a main trend of social and economic development all over the

ISSN 2616-7433 Vol. 1, Issue 2: 117-124, DOI: 10.25236/FSST.20190217

world. The improvement of urbanization level is an important symbol to measure a country's economic development level. Urbanization is also the historical process of human production and life style changing from rural to urban. It is also the process of changing rural population into urban population, improving the city and enhancing the role of regional development. Urbanization is generally regarded as the only way for regional social and economic development, and it has become an important goal and basic means for each region in formulating social and economic development planning[1].

Inner Mongolia is a semi-dry and early-dry continental climate with extremely fragile ecological environment, which is the key area of ecological environment protection in China and plays the role of ecological barrier. Therefore, while improving the level of urbanization in Inner Mongolia, we should pay more attention to the impact of urbanization on ecosystem and resource environment to ensure its ecological status. Taking Inner Mongolia as an example, this paper analyses the possible negative impact of urbanization on resources and environment from the perspective of its characteristics of urbanization development. It is hoped that we can have a more comprehensive understanding of the rapid urbanization development in the region and even in the whole country, take a more sober view of the negative impact of Urbanization development, and deal with the problems in the process of urbanization calmly[2].

## 1. Analysis of the General Situation and Urbanization Characteristics of Inner Mongolia

Inner Mongolia Autonomous Region includes 6 leagues such as Ulan Chabu, 6 prefecture-level cities such as Hohhot, 14 county-level cities, 17 counties, 49 banners and 3 autonomous banners. It covers an area of 110 x 104 km and has a total population of 27.6 million. There are 49 nationalities such as Mongolia, Han, Daur, Ewenki and Oroqen. Located in the northern frontier, it is adjacent to Mongolia and Russia in the north. The terrain is mostly open plateau, which is divided into six regions: Inner Mongolia Plateau, Yinshan Mountain, Hetao-Tumochuan Plain, Ordos Plateau, Greater Hinggan Mountains and Western Liaoning Plain. Most of the areas are semi-arid and dry early continental climate[3].

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Inner Mongolia is one of the important areas of ecological protection in China, which plays the role of ecological barrier. Inner Mongolia is situated in the convergence zone of Eastern monsoon and dry and cold northwest wind. Inner Mongolia Plateau is the wind outlet of northwest wind in China. On the one hand, grassland and desert vegetation in vast areas protect the soil on the surface, on the other hand, they effectively slow down the speed of northwest wind advance, and play the role of ecological barrier in wind prevention and sand fixation, soil and water conservation, maintaining the stability of regional ecosystem, and so on. The benefits of animal husbandry far exceed those of human beings. As the ecological barrier of the motherland, Inner Mongolia has not yet achieved scientific and quantitative research results, but many cases have proved that once the ecological barrier disappears, the consequences will be unimaginable[4].

The geographical position, ecological status and urbanization history of Inner Mongolia determine that Inner Mongolia has different characteristics in urban development from the eastern coastal areas: 1. The number of cities is relatively small, the density is small, and the number of big cities is small. In the old year of 2yi, there were 20 cities in Inner Mongolia, 52 in Guangdong Province, 48 in Shandong Province, 41 in Jiangsu Province and 34 in Hebei Province. There were 40 megacities with a population of more than 100,000 in China, and only one in Inner Mongolia. The average of the whole country is 1.Kox I O4 k, which enlarges one city, while Inner Mongolia has an average of 5.91 x l, which is less than one city. 2. The proportion of urban population is large, and the urbanization rate is higher than the national average. The proportion of urban population in Inner Mongolia has always been higher than the national average. This is mainly due to the uneven distribution of population in Inner Mongolia, the sparse land in rural pastoral areas, the low population density, the relative concentration of urban population and the large number of immigrants. 3. Many of the existing cities are new industrial cities formed with the construction of national key projects and the development of resources. Before liberation, agriculture and animal husbandry dominated Inner Mongolia, and there was basically no industry. In 1949, the total industrial output accounted for only o.39% of the total industrial and agricultural output. After the founding of New China, the focus of national economic construction was in the west. Driven by the investment of national construction projects, a number of new cities emerged in Inner Mongolia. Among these emerging cities, quite a few are resource

ISSN 2616-7433 Vol. 1, Issue 2: 117-124, DOI: 10.25236/FSST.20190217

development and processing cities, such as Wuhai, Baotou, Hollingol, Erguna, Genhe and so on[5].

Through the above analysis, it is found that the development of urbanization in Inner Mongolia is characterized by high agglomeration capacity, industrialization degree and development speed. These characteristics determine that the rapid development of urbanization in Inner Mongolia will inevitably change the original pattern of resource and environment utilization and have a significant impact on the ecological environment[6].

## 2. The coercive effect of urbanization on resources and environment

### *2.1 Stress of Urbanization on Energy and Environment*

The improvement of urbanization level and the increase of urban population will inevitably lead to the acceleration of urban construction. Urban construction mainly includes investment in various infrastructure and real estate construction, such as increasing the building area and residential building area of the city, increasing heating area and paving road area, while urban households have more industrial-related electrical equipment, thus driving the demand and production of iron and steel, building materials, equipment, vehicles and so on. Under the guidance of market information, investment in the industrial sector has expanded, production capacity has increased and output has increased. These products are basically supplied to heavy industries which consume more energy and raw materials, which results in huge demand for energy, electricity, ore and raw materials. Taking energy consumption as an example, the relationship between non-agricultural population and total energy consumption in Inner Mongolia is analyzed. The number of non-agricultural population and total energy consumption showed a significant exponential growth relationship, y 2 27.18 c, the correlation coefficient reached 0.96. It shows that with the improvement of urbanization level, the number of non-agricultural population increases, and energy consumption increases exponentially. Mineral and raw materials are insufficient to be imported, energy and power can only rely on local construction. Urbanization development has great pressure on energy and power. If the supply capacity of energy and power can not meet the demand, economic growth will encounter bottlenecks.

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The development of energy and electricity poses a higher challenge to environmental protection. China has the highest proportion of coal in the world. The proportion of coal production and consumption is as high as 76% and 68.9%. More than two-thirds of the electricity still depends on coal-fired power. The development of nuclear power and renewable new energy sources is constrained by technology, investment and resources. In the future, the pattern of China's electricity mainly depends on coal-fired power can not be changed. China's oil reserves are inadequate, and a large number of imports in the future have become a foregone conclusion. In order to reduce oil imports properly, more power-driven vehicles such as electrified railways, urban rail transit, electric vehicles or oil-electric hybrid vehicles will be added to transport. In fact, more coal will be used to replace part of oil consumption.

Smoke, sulfur oxides and nitrogen oxides emitted from coal combustion are the main pollutants, which directly threaten human health. At the same time, they also cause acid rain that poisons rivers and forests. A large number of technologies and equipment need to be put into treatment. The carbon dioxide emitted can not be recovered, which will cause greenhouse effect when discharged into the atmosphere. In the process of coal mining, coalbed methane is discharged into the atmosphere as a dangerous and harmful gas, which directly pollutes the atmosphere and produces a greenhouse effect. Coal mining process will also make the surface water system around the mining area exhausted, and the groundwater level will drop substantially. The preliminary study shows that every I t coal mining in Shanxi Province causes 2.54 t water resources destruction on average. These problems occur in Inner Mongolia, which has irreversible and destructive effects on the ecological conditions of these areas. Therefore, we must be vigilant against the energy stress caused by the development of urbanization and the consequent ecological environment challenges[7].

### *2.2 Urbanization Development and Industrial "Three Wastes"*

Because industrial production activities are concentrated in cities and towns, if not properly treated, wastewater, exhaust gas and waste residue discharged by industrial enterprises will be concentrated at a single site, aggravating the stress on the ecological environment. The discharge of industrial waste gas is on the rising trend, and the discharge of industrial waste water shows a fluctuating change, which

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increases first, then decreases, then increases. The main reason may be that the state has more strict management measures and penalties for the discharge of sewage, but it is difficult to control the discharge of waste gas, so the discharge of waste gas can reflect the impact of urbanization on the environment. After 2000, industrial wastewater and exhaust gases all showed an upward trend, which was closely related to the continued growth of the proportion of secondary industry in Inner Mongolia after 2000. Analyzing the relationship between non-agricultural population and industrial exhaust emissions, we find that there is an obvious exponential relationship between them, and the correlation coefficient reaches 0.91. This shows that with the increase of urbanization level, the proportion of non-agricultural population increases, the industrial structure changes, the proportion of secondary industry increases, and the consumption of energy increases, which leads to the aggravation of industrial pollution. At the same time, combined with the limitation of urban area, concentrated sewage discharge from various types of rural industries in cities and towns can easily cause the intersection of various pollutants, resulting in the expansion of the pollution capacity of the original pollutants or the derivation of some new pollutants[8].

## 3. Epilogue

In the tide of urban development in the 20th century, there is a consensus that in the process of development, human beings should cherish the ecological environment hundreds of times. The 21st century will be a century in which mankind will cherish the environment more. It is a wise choice for urbanization to take the road of sustainable development. Inner Mongolia plays an important role in China, and is one of the important areas of ecological protection in China. It plays the role of ecological barrier. Therefore, we must attach importance to the coercive effect of urbanization on water resources, energy and environment, guard against the adverse effects of rapid urbanization development and rapid expansion of urban space, prevent extensive waste of land, improve the intensive use of land, and control the speed of urban expansion within a reasonable range according to the carrying capacity of the ecological environment. The unique geographical and ecological status of Inner Mongolia determines that the development of urbanization in Inner Mongolia must be in harmony with the protection of ecological

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environment and the conservation of resources, focusing on the ecological security of the whole country, paying attention to the unity of immediate interests and long-term interests, properly solving the contradiction between short-term economic behavior and the limitation and regeneration of ecological resources, not only to control pollution, In order to control pollution, we should also eliminate the hidden dangers of pollution and realize the sustainable development of the region.

## 4. Acknowledgement

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