

ORIGINAL RESEARCH ARTICLE

Research on the path of Foshan ecological livable city construction—Based on resident satisfaction survey

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ABSTRACT

Eco-livable city is a word that has been frequently seen in major media in recent years and has become the construction goal of many cities at home and abroad. At present, most of the construction of ecological cities or livable cities is based on objective indicators and rarely considers the important subjective indicator of residents' satisfaction. Using the questionnaire survey method, from the perspective of residents' satisfaction, the path of building an ecologically livable city in Foshan is discussed, the weak links in Foshan's ecologically livable construction are obtained, and the priority development path of Foshan's ecologically livable city construction is proposed. Foshan's urban planners and builders provide some references, and hope to provide references for the ecological livability construction of cities similar to Foshan.

Keywords: ecologically livable; urban construction; residents' satisfaction; Foshan

1. Introduction

Since the reform and opening up, China's urbanization level has increased year by year, and people's requirements for the quality of material and spiritual life have also increased. There is an urgent need for the "ecological livability" of cities. Many cities are carrying out the practice of ecologically livable city construction in full swing. Accordingly, a number of scholars have conducted theoretical research on the practice of ecologically livable city construction. For example, Chen considered that ecological environment and living environment are the proper meaning of ecologically livable city in the research on the construction of ecological livable city in Nantong, and believed that the construction practice of ecologically livable city in Nantong

should highlight people-orientedness and adapt to people's living as the core^[1]. Qian took Huzhou City as an example. She believes that the essence of ecological livability is the harmonious unity of economy, society and nature. When building an ecologically livable city^[2]. Huzhou City should pay more attention to the combination of urban humanistic environment and living environment. Liang took Huaihua City as an example, believing that the focus of eco livable city construction lies in ecological construction and planning, and in the process of building an eco livable city^[3]. Huaihua City should create an urban eco livable development model with low energy consumption, low emission, high efficiency and high efficiency without reducing citizens' living standards. Xie *et al.* took Tianjin as an example and believed that the construction of an ecologically livable city is

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to build the city into a city with a perfect combination of natural environment and human environment and a harmonious coexistence of social system and ecosystem^[4]. Taking Pengyun as an example, we believe that to improve the living quality of the city, we must promote the economic and cultural prosperity of Pengyun at the same time^[5]. To sum up, at present, the theoretical research time on eco livable cities in China is relatively short, and there are few special works^[6]. Among them, the construction of eco cities or livable cities is mostly constructed from objective indicators, and the important subjective indicator of residents' satisfaction is rarely considered^[7], but residents' satisfaction can truly reflect the eco livable level of a city. Ignoring residents' satisfaction results in the construction direction of the city being contrary to the expectations of urban residents, and sometimes even leads to the opposite consequences. Finally, it will inevitably lead to improper allocation of resources in the process of urban construction, which is often very different from the personal feelings of people living in these cities.

In recent years, Foshan has demonstrated strong economic strength, enhanced urban competitiveness, rapid social development and continuous improvement in popularity and cultural taste. However, in the process of urban development, the problem of environmental pollution has become increasingly prominent, the ecological environment situation is grim, and the ecological livability needs to be improved. As early as 2011, the 12th Five Year Plan for Scientific and Technological Development of Foshan issued by Foshan municipal government has taken "creating a livable urban environment" as the main task^[8]. After several years of construction, Foshan's ecological livable city construction has achieved some results, but in the process of specific construction and implementation, it often focuses on the objective evaluation index system and pays less attention to the important subjective index of residents' satisfaction. Using the questionnaire survey method, this paper discusses the path of building an ecologically livable city in Foshan from the perspective of residents' subjective satisfaction, and puts forward the optimal construction path in line with Foshan's

economic and social conditions and Foshan residents' satisfaction, in order to provide some reference for Foshan's urban planning and builders, and also hope to provide reference for the ecological livable construction of similar cities in China.

2. Survey methods and basic statistics

2.1. Investigation method

The total sample of this survey is 550 valid questionnaires, and the effective rate is 90.9%. The questionnaire is mainly composed of two parts. One is the respondents' personal information such as age, gender and place of residence. The second is the respondents' satisfaction with the indicators of each ecologically livable city. In order to ensure the effectiveness and representativeness of the sample, the research group mainly adopts two measures: the first is to select Foshan students as much as possible and make use of their geographical advantages to select 4–6 neighbors or relatives for household investigation. The second is to conduct centralized training for the students participating in the survey, and require the residents surveyed to explain the relevant knowledge of the questionnaire, so that the respondents can understand the concept and indicators of ecological livability, so as to make the selection behavior of the respondents consistent with the current situation. Finally, the effective questionnaires collected are counted by Excel software.

2.2. Index selection of ecologically livable cities

The construction of an ecologically livable city must attach great importance to public satisfaction. If a city wants to become a real "eco livable city", an extremely important subjective indicator is the "satisfaction" of residents with the city, that is, whether different groups living in the city can feel the ecology and livability of the city. In terms of livability, we emphasize the three principles of livability and the four principles of operation. When we select the indicators, on the basis of following the above four

principles, we pay special attention to the subject status of residents, because the service object of ecological livable city construction is urban residents, and the subject of construction is also urban residents. Urban residents have the most say in how their own urban ecological livable level is. Therefore, emphasizing the dominant position of residents is an important principle in the selection of indicators, and the opinions of residents should be considered as an important factor in the evaluation. From this, we selected nine indicators, including the status of urban pollution control, urban environmental quality, sustainable development, urban safety, housing conditions, education status, medical level, urban infrastructure construction and economic development level.

2.3. Basic statistics

The basic information statistics of the respondents in this questionnaire are shown in **Table 1**. Among the 500 valid questionnaires, 51.4% were men and 48.6% were women. The proportion of men and women was basically the same, and men were only 2.80% more than women. In terms of age, among the respondents, the frequency of the 16–30 year old group was 221, accounting for 44.20%. The frequency of the 31–40-years-old group was 105, accounting for 21.00%. The frequency of 41–50-years-old group was 95, accounting for 19.00%. The frequency of 51–60-years-old group was 54, accounting for 10.80%. The frequency of groups over 60-years-old is 25, accounting for 5.00%.

Table 1. Statistical results of basic information of respondents

Project characteristics	Category	Frequency	Percentage (%)
Age	16–30 years old	221	44.20%
	31–40 years old	105	21.00%
	41–50 years old	95	19.00%
	51–60 years old	54	10.80%
	Over 60 years old	25	5.00%
Gender	Male	257	51.40%
	Female	243	48.60%

3. Satisfaction of Foshan residents with the indicators of eco livable city construction

3.1. Statistical analysis of Foshan residents' satisfaction with various indicators

The level of satisfaction of Foshan residents with the status quo of urban pollution control

In the survey of Foshan citizens' satisfaction with the current situation of pollution control, 37 people chose the very satisfactory option, accounting for 4.7%. 162 people chose satisfactory options, accounting for 32.4%. 200 people chose the basic satisfaction option, accounting for 40.0%. 87 people chose dissatisfying options, accounting for 17.4%. 14 people were dissatisfied with the option, accounting for 2.8%, as described in **Figure 1**. Generally speaking, only 37.1% of the citizens are very satisfied or relatively satisfied with the current situation of urban pollution control, while the proportion of people who are basically satisfied, that is, reluctantly satisfied, is the highest. More than 1/5 of the citizens are still dissatisfied or very dissatisfied, and the pollution control work in Foshan needs to be improved.

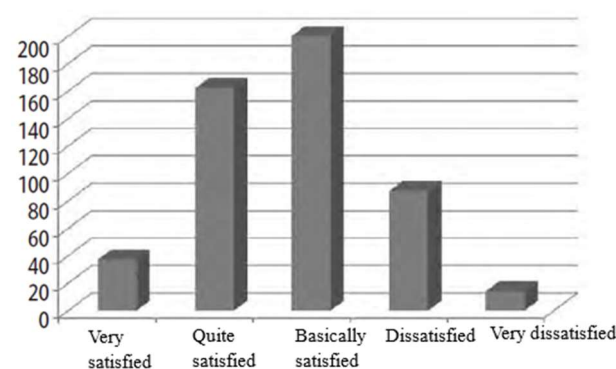


Figure 1. Residents' satisfaction with the current situation of urban pollution control.

Satisfaction of Foshan residents with urban environmental quality

It can be seen from **Figure 2** that in the survey of Foshan citizens' satisfaction with the current urban environmental quality, 35 people chose the very satisfied option, accounting for 7.0%. 220 people chose satisfactory options, accounting for 44%. 36.0%

were satisfied with the options. 60 people chose dissatisfying options, accounting for 12.0%. There were 5 people who chose very dissatisfied options, accounting for 1.0%. Overall, 51.0% of the citizens are very satisfied and relatively satisfied with the choice of urban environmental quality, and the majority are satisfied, but 13.0% of the citizens are still dissatisfied and very dissatisfied. The urban environmental quality of Foshan needs to be improved.

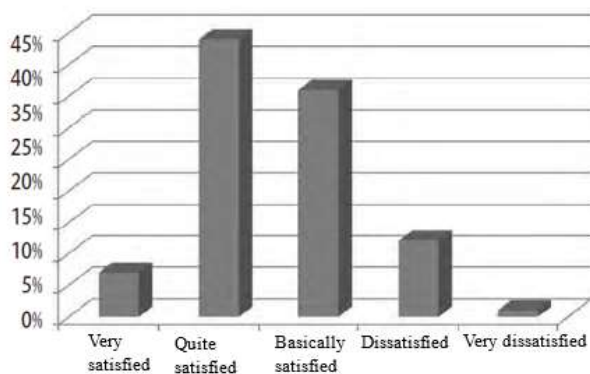


Figure 2. Residents' satisfaction with urban environmental quality.

Satisfaction of Foshan residents with sustainable development

As can be seen from **Figure 3**, in the survey of Foshan citizens' satisfaction with the sustainable development of the current urban environment, 60 people chose the very satisfactory option, accounting for 12.0%. 200 people chose satisfactory options, accounting for 40.0%. 195 people chose the basic satisfaction option, accounting for 39.0%. 40 people chose dissatisfied options, accounting for 8.0%. The number of people who are not satisfied with the options accounts for 0.5%. Generally speaking, 52.0% of the citizens are very satisfied or relatively satisfied with the degree of sustainable development. Generally speaking, the citizens are satisfied with the degree of sustainable development in Foshan, and only 9% are dissatisfied.

Satisfaction of Foshan residents with urban safety

As can be seen from **Figure 4**, in the survey of Foshan citizens' satisfaction with the current urban safety, 75 people chose the very satisfied option, accounting for 15.0%. 205 people chose satisfactory

options, accounting for 41.0%. 180 people chose the basic satisfaction option, accounting for 36.0%. 35 people chose dissatisfying options, accounting for 7.0%. There were 5 people who chose very dissatisfied options, accounting for 1.0%. Overall, 52.0% of the citizens are very satisfied and relatively satisfied with the choice of urban safety, and only 8% are dissatisfied with the urban safety of Foshan.

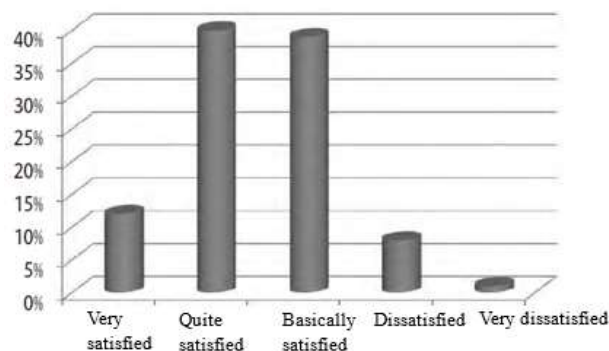


Figure 3. Residents' satisfaction with sustainable development.

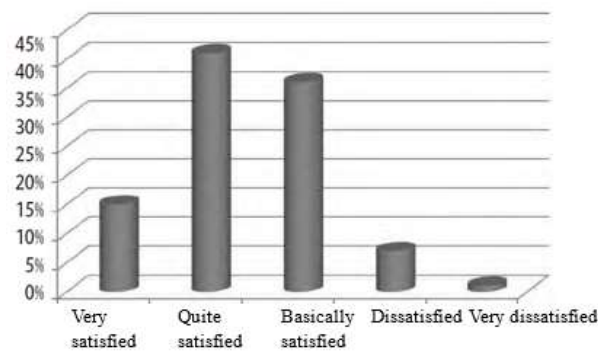


Figure 4. Residents' satisfaction with urban safety.

Satisfaction of Foshan residents with housing conditions

As can be seen from **Figure 5**, in the survey of Foshan citizens' satisfaction with the current housing conditions, 41 people chose the very satisfied option, accounting for 8.0%. 193 people chose satisfactory options, accounting for 39.0%. 180 people chose the basic satisfaction option, accounting for 36.0%. 75 people chose dissatisfied options, accounting for 15.0%. 11 people chose the dissatisfying option, accounting for 2.0%. Generally speaking, only 47.0% of the citizens are very satisfied and relatively satisfied with the choice of housing conditions, while the proportion of basic satisfaction, that is, reluctantly satisfied, is also relatively high. More than 17.0% of the citizens are still dissatisfied or very dissatisfied.

The housing conditions in Foshan need to be improved.

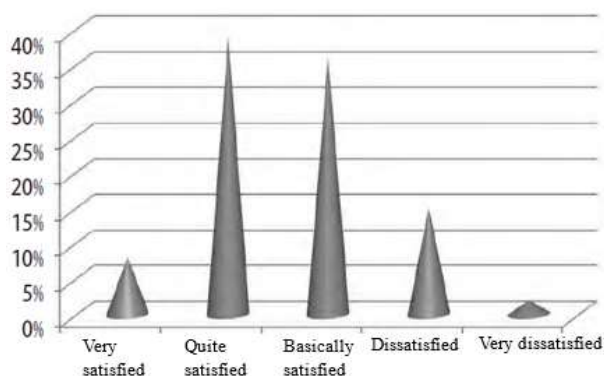


Figure 5. Residents' satisfaction with housing conditions.

Satisfaction of Foshan residents with education in Foshan

As can be seen from **Figure 6**, in the survey of Foshan citizens' satisfaction with the current education situation, 67 people chose the very satisfied option, accounting for 13.4%. 229 people chose satisfactory options, accounting for 45.8%. 160 people chose the basic satisfaction option, accounting for 32.0%. 38 people chose dissatisfied options, accounting for 7.6%. There were 6 people who chose very dissatisfied options, accounting for 1.2%. Generally speaking, the satisfaction rate of citizens with the education situation in Foshan is high, and only 8.8% are dissatisfied.

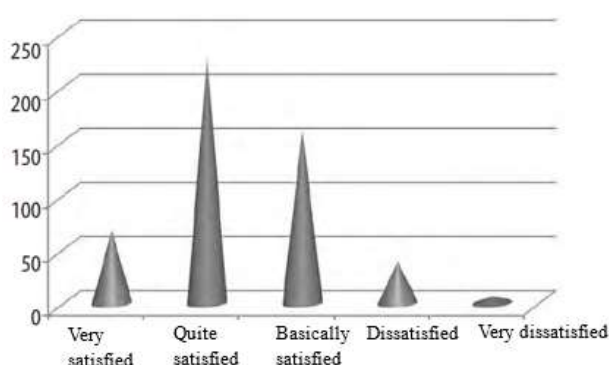


Figure 6. Residents' satisfaction with education level.

Satisfaction of Foshan residents with medical level

As can be seen from **Figure 7**, in the survey of Foshan citizens' satisfaction with the current medical level, 58 people chose the very satisfied option, accounting for 11.6%. 216 people chose satisfactory

options, accounting for 43.2%. 175 people chose the basic satisfaction option, accounting for 35.0%. 44 people chose dissatisfied options, accounting for 8.8%. 7 people chose the very dissatisfied option, accounting for 1.4%. Overall, 54.8% of the citizens are very satisfied and relatively satisfied with the choice of medical level, and the proportion of basically satisfied, that is, reluctantly satisfied, is also relatively high. 10.2% of the citizens are still dissatisfied or very dissatisfied, and the medical level in Foshan needs to be improved.

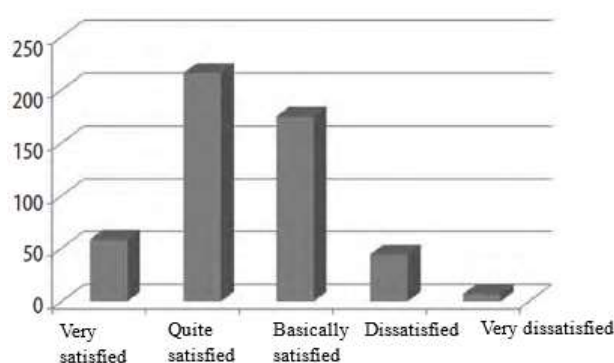


Figure 7. Residents' satisfaction with medical level.

Satisfaction of Foshan residents with urban infrastructure construction

As can be seen from **Figure 8**, in the survey of Foshan citizens' satisfaction with the current urban infrastructure construction, 58 people chose the very satisfied option, accounting for 11.6%. 213 people chose satisfactory options, accounting for 42.6%. 182 people chose the basic satisfaction option, accounting for 36.4%. 40 people chose dissatisfied options, accounting for 8.0%. There were 6 people who chose very dissatisfied options, accounting for 1.2%. Overall, 54.2% of the citizens are very satisfied and quite satisfied with the choice of urban infrastructure construction, but 9.2% are still dissatisfied and very dissatisfied.

Satisfaction of Foshan residents with the level of economic development

As can be seen from **Figure 9**, in the survey of Foshan citizens' satisfaction with the current level of urban economic development, 48 people chose the very satisfied option, accounting for 9.6%. 193 people chose satisfactory options, accounting for 38.6%.

193 people chose the basic satisfaction option, accounting for 38.6%. 60 people chose dissatisfied options, accounting for 16.0%. There were 6 people who chose very dissatisfied options, accounting for 1.2%. Generally speaking, the most people who choose the highest satisfaction rate of Foshan's economic development are "relatively satisfied" and "basically satisfied", indicating that citizens have high expectations for economic development, and 17.2% are dissatisfied at the current level. Therefore, the construction of ecological livability in Foshan must take into account economic development.

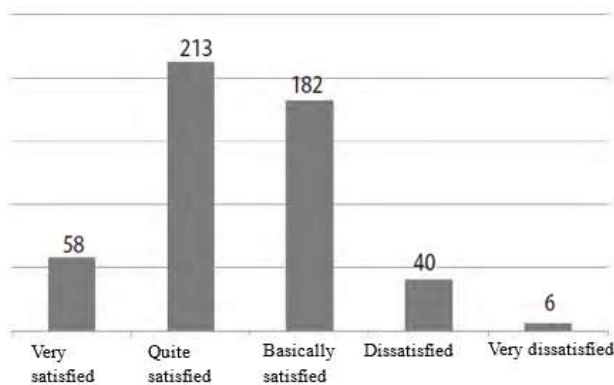


Figure 8. Residents' satisfaction with urban infrastructure construction.

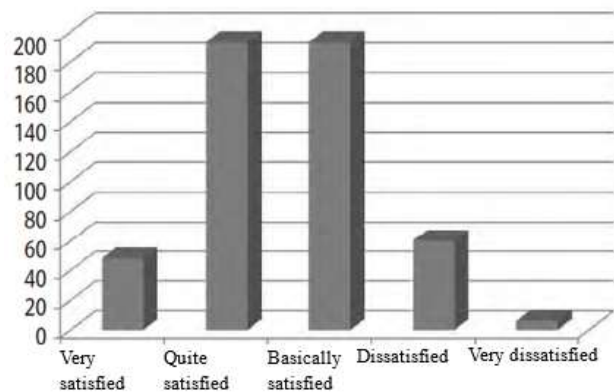


Figure 9. Residents' satisfaction with the level of urban economic development.

3.2. Comparative analysis of overall satisfaction of Foshan residents

Ranking of residents' satisfaction with various indicators in Foshan

When measuring the overall satisfaction of Foshan residents with various indicators, it is expressed by the sum of very satisfied and relatively satisfied, while the basic satisfaction is reluctantly satisfied, so

it is not added to the overall satisfaction. As can be seen from **Figure 10**, among the nine indicators, the highest level of residents' satisfaction is education, accounting for 59.20%, followed by urban safety, with residents' satisfaction at 56.60%. In third to sixth place are the four indicators of medical level, infrastructure, sustainable development and environmental quality, with residents' satisfaction ranging from 55% to 50%. The three indicators with the lowest residents' satisfaction are the level of economic development, housing conditions and pollution control. The satisfaction is less than 50%, of which the residents' satisfaction with pollution control is the lowest, accounting for only 39.80%.

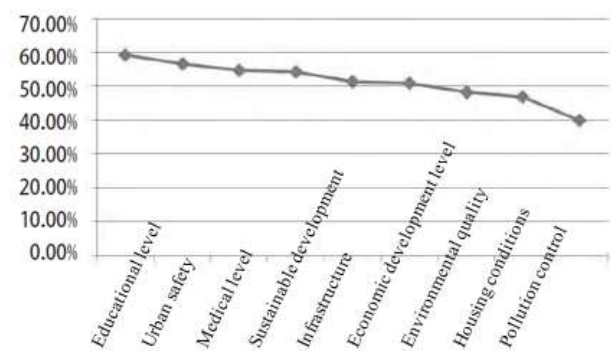


Figure 10. Ranking of residents' satisfaction with various indicators in Foshan.

Comparison of satisfaction of residents of different genders in Foshan

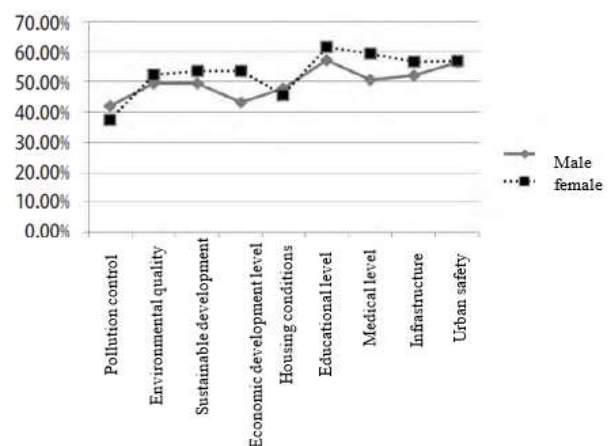


Figure 11. Comparison of satisfaction of residents of different genders in Foshan.

It can be seen from **Figure 11** that men are more satisfied than women with pollution control and housing conditions. There are many differences between men and women. In terms of environmental

quality, sustainable development, economic development level, education level, medical level and infrastructure, the satisfaction rate of women is higher than that of men. In terms of urban safety, there is little difference between men and women, and the satisfaction rate of men is slightly higher than that of women.

Comparison of satisfaction of residents of different age groups in Foshan

Among the five age groups surveyed in this survey, residents aged 60 and over have the highest overall satisfaction. Seven of the nine indicators rank first, namely environmental quality, economic development level, housing conditions, education level, medical level, infrastructure, and urban safety. Among the other two indicators, sustainable development ranks second and pollution control ranks fifth. The overall satisfaction of residents aged 41 to 50 is the lowest among the five age groups. Among the nine indicators, six rank last, and the other three rank fourth. See **Figure 12** for details.

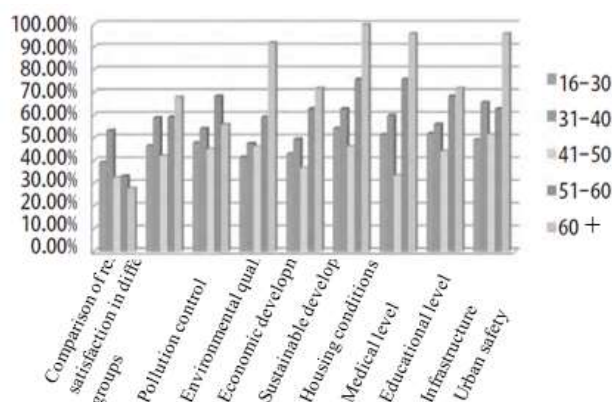


Figure 12. Comparison of satisfaction of residents of different age groups in Foshan.

3.3. Summary

From the above survey and statistics results, it can be seen that the three indicators with the lowest satisfaction of Foshan residents are economic development level, housing conditions, and pollution control, ranking seventh, eighth, and ninth respectively, accounting for less than 50%. Among them, residents have the lowest satisfaction with pollution control, at only 39.80%. Therefore, in the process of building

an ecologically livable city, Foshan must put pollution control first, followed by strengthening the protection of housing conditions. At the same time, we must further improve the level of economic development. In addition, the satisfaction of men is lower than that of women, so we should pay more attention to the collection of men's opinions and feelings on ecological livability. In addition, attention should be paid to the needs of residents aged 41 to 50 for the construction of ecologically livable cities.

4. Priority development path design for Foshan to build an ecological and livable city

According to the above survey and statistics on the construction of eco livable city in Foshan, the following suggestions are put forward as the priority development path for building eco livable city in Foshan.

4.1. Strengthen publicity and create an ecological and livable social atmosphere

Building an ecologically livable city is a social system project with strong comprehensiveness and a long-term nature, which cannot be achieved overnight. A long-term mechanism must be established to bring the government, society, and the public into the framework of building an ecologically livable city, with the government taking the lead and driving the participation of society and the public. To build an ecologically livable city in Foshan, we must work together from top to bottom and reach a consensus between cadres and the masses, which requires increasing publicity and transforming the top-level design of an ecologically livable city by the leading group of Foshan into practical actions of all cadres and the masses in the five districts of the city. So, how can we make the cadres and the masses understand why to build an ecologically livable city, what kind of ecologically livable city to build, and how to build an ecologically livable city? There are many ways. For example, we can combine major newspapers, television stations, radio stations, networks, and other news media, or carry out lively and colorful publicity

activities through multiple channels, forms, levels, and targets, so as to implement the major strategic deployment of building an ecologically livable city.

4.2. Effectively strengthen environmental construction and governance, and strive to optimize the production and living environment of ecologically livable cities

Foshan is a large manufacturing city. Famous industries include Shiwan ceramic industry, the Shunde steel industry, the Shunde plastic industry, the Nanhai nonferrous metal industry, the Zhangcha textile industry, etc. Relying on these industries, Foshan has been.

Maintaining the good momentum of sustained and rapid economic development, the regional GDP rose to RMB 70,117 billion by 2013, and Foshan ranked 15th in the GDP ranking of prefecture-level cities in China. However, most of these industries are heavily polluting and labor-intensive, mainly industries with high energy consumption and high pollution, which not only brings prosperity to Foshan's economy but also poses a great threat to Foshan's environmental protection, ecological environment, production, and living environment. In order to build an ecologically livable city, improve and enhance the overall urban image and living quality of Foshan, attract and retain high-end talents, and achieve sustainable economic development, Foshan must strive to build and improve the level of environmental protection, build a good green leisure system, and improve the operation and management system of various life convenience, so as to make the ecological environment of the whole city evolve towards the goal of being suitable for people's living and production.

4.3. Continue to consolidate the material foundation of building an ecologically livable city and promote the transformation of industrial structure

Material is the foundation, and only on the basis of strong economic strength can a city provide a guarantee for the construction of ecologically livable material facilities. Sustained economic strength must

be supported by advanced industrial structure and strong development potential. Therefore, in the coming period, Foshan must change the traditional extensive economic development mode to intensive development, change from incremental expansion to qualitative improvement, and change from investment-driven to the coordinated development of investment, consumption, and export, so as to finally achieve sustainable economic development.

4.4. Promote urban construction focusing on improving people's livelihood and strive to solve residents' housing problems

The report of the 17th National Congress clearly pointed out that we must pay more attention to social construction and strive to ensure and improve people's livelihoods on the basis of economic development. It mentioned that all people should learn and teach, have medical treatment, and live in a certain place. When building an ecologically sound and livable city, Foshan must also consolidate these aspects, especially giving priority to solving the housing problems of its citizens.

Conflict of interest

The authors declare no conflict of interest.

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