Study on Rural Ecological Conservation and Health Care Plan to Respond Aging Population

Jing Yu ZHAO, Fei FU
School of Architecture and Design, Southwest Jiao Tong University, Chengdu, Sichuan, 611756, China
Email: 176165055@qq.com

Abstract. The problem of aging is a problem that the society must face now. Under the rapid development and expansion of modern cities, the traditional village which is the back garden of the city depends on its advantages and characteristics of the farmland water network ecological infrastructure to develop the health planning. It is an important way to develop economic and ecological protection. However, the study of this direction is still in its infancy in China. This paper attempts to establish an adaptive POE evaluation model for elderly open space through the investigation and analysis, and further explore the physiological and psychological needs of the elderly for the environment. Based on the above survey data, this paper studies the planning and planning strategy of the health industry in the natural villages in the suburbs of Dujiangyan. From the point of view of sustainable development, it is more effective to protect and develop the ecological infrastructure of villages.

1 Research Background

1.1 Analysis of the Background of Aging
Since 1970s, the trend of population aging has been continuously increasing in most countries all over the world. In developing countries, this growth rate is the largest and fastest[1]. As it is presented in Table 1.

The United Nations regards--“The population over the age of 60 is 10% of the total population, or the proportion of the population over the age of 65 is 7%,” as a criterion for judging whether a country is entering an aging society or not. China entered an aging society in the late 90s. China's population over the age of 60 reached 230 million, accounting for 16.7% of the total population, of which more than 65 years old population of 150 million, accounting for 10.8% of the total population. Chengdu City, it is predicted that by 2040, the rate of aging will reach 31.3%. The problem of aging will affect the sustainable and healthy development of society and social stability, and should not be neglected.

| Year | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 |
|------|------|------|------|------|------|------|------|
| All over world | 8.1 | 8.1 | 8.4 | 8.6 | 9.2 | 9.8 | 10.7 |
| developed region | 11.6 | 12.6 | 14.5 | 15.5 | 17.6 | 19.2 | 21.2 |
| developing countries | 6.4 | 6.1 | 6.1 | 6.3 | 6.9 | 7.6 | 8.5 |
| China | 7.2 | 7.2 | 6.8 | 7.4 | 8.6 | 9.9 | 11.7 |

1.2 Domestic and International Health Care Status

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd
For a long time, China's health care industry has been a part of the social welfare of civil administration institutions. In recent years, it has gradually moved towards socialization. With the continuous development of social economy and the acceleration of aging, the pension industry has gradually become a new field of private investment. Therefore, how to learn from foreign advanced experience of industrial development and find out the diversified development, it is an important task of health cultivation industry development.

(1) Apartment for the aged: Apartments for the elderly are mainly provided for elderly people with independent living capacity. Divide into: ①Independent-living ②Assisted-living ③acute-care. Classic case: apartment features: Apartment Hotel in France. Features: according to the needs of the elderly to choose long or short stay.

(2) Elderly residential community: The old age community is a full age service oriented pension community with satellite city nature relying on the radiation of large central cities. Collection, pension, medical, life, entertainment and other functions in one. New concept of real estate -- health culture village. Classic case: Taiwan Chang Geng health and Culture Village. Features: complete matching, building communities - Health Culture Village.

(3) The integration of the nursing home and the aged community: The social welfare and pension facilities are combined with the whole aged residential community to realize the sharing of the resources of the aged, medical and recreational facilities. Classic case: the retirement community in Germany. Features: elderly residential and nursing homes combined.

Summary: The experience of domestic and international health care industry shows that the traditional pension facilities in China are of single function. With the improvement of people's living standard, the elderly's demands for facilities for the aged are also increasing. Therefore, the functions of pension facilities are bound to develop in the direction of pension, medical, recreational, recreational and other complex functions.

2 Investigation and Research

2.1 POE Research Methods
Post occupancy (POE) is an evaluation method for built environment. The aim is to look at environmental construction problems in an accurate way. Analyze and evaluate them, and provide a reference for the design of related working days after[2]. We conducted POE studies by data collection methods: It is divided into questionnaire, interview, observation, scale and behavior map. The users' opinions were quantitatively recorded by the scale method. The scale method mainly uses the Semantic Differential (SD) [3]. Behavioral Mapping was originally designed to record the behavior of the building in the design, so as to help the designer connect the design features with the behavior in time and space. This study documents the behavioral characteristics of the elderly in an open space in the suburbs to help designers understand the behavioral characteristics of the elderly and their preferences for the site.

2.2 A Field Study of the Behaviour of Older People in the Countryside
In order to better understand the behavior characteristics of the elderly, in order to make suitable design for the physiological, psychological of the elderly.

Place I, Located next to the irrigation channel in Chengdu, Dujiangyan. Close to residential area. Dense vegetation, quiet environment. Old people like to gather here for leisure and exercise.

As the summer weather is hot, from 9 in the morning to 4 in the afternoon, the old people do not go out much. So we choose afternoon, evening and evening for three periods. Three typical spaces of place I are selected to carry out research work.

2.2.1 Semi Closed Questionnaire Data Analysis and Interview Summary
In our site, we issued 45 semi closed questionnaires and 42 valid questionnaires.

![Age Distribution Map & the Pie Chart of the Main Activities of the Elderly](image)

Through data analysis and interviews, we learned that, the elderly are mainly residents of the neighborhood, and arrive here by foot. The ideal condition of the site for the elderly is divided into two categories, (1) people who prefer to be quiet are mainly elderly (over 75 years old), like a small space enclosed, hold two or three people, and the environment is quiet. (2) The old people who like to be lively, is mainly younger (60~74 years old). The old people like an open space for recreational activities. But no matter which type, most of them like the comfortable space to communicate with each other.

2.2.2 Behavior Distribution and Behavior Map

![Behavior Map of the Elderly in Place](image)

As you can see from figure 2, the main activities in the C area are playing chess and chatting. At B area, people's behavior activities are mainly walking and chatting. In the A area, people's behavior activities are diverse.

2.2.3 Behavioral Frequency Table Analysis

Data records show that the major concentration time of B point is in the evening. Most of the old people gather for a walk, play with their grandchildren, or chat and rest after dinner or after their grandchildren have studied, as it is presented in Table 2.

The main time for C is around seven p.m., as it is presented in Table 3. Since it is a small stage, there are many seats, and the main activities are chess, chat and rest. In the afternoon, because there are few plants around the shelter, the sun is very serious, so people mainly walk through this place.

As you can see from the tables, the old people prefer to stay longer in the place with natural scenery, fresh air, small noise and good sight. Increased frequency of spontaneous activity, such as dispersion,
exercise, etc., increased social activity, such as greeting, chatting, playing chess, etc.. Because of the physiological function degradation, old people can easily feel tired, so the seat set is the key point.

Table 2 Elderly Behavior Frequency Observation Record List in B Point of Place I

| Date       | Time       | The number of people | Passing Frequency (Person/minute) | Activity |
|------------|------------|----------------------|-----------------------------------|----------|
|            |            |                      | Walk                | Chat      | Entertainment | other |
| 2017/6/2   | 15:00-15:30| 27                   | 0.9                  | 17        | 6            | 0     | 3     |
| 2017/6/5   | 18:30-19:00| 43                   | 1.4                  | 21        | 16           | 1     | 5     |
| 2017/6/7   | 18:00-18:30| 79                   | 2.6                  | 37        | 38           | 4     | 7     |
| 2017/6/9   | 16:00-16:30| 37                   | 1.2                  | 28        | 7            | 0     | 2     |
| 2017/6/12  | 19:00-19:30| 67                   | 2.2                  | 51        | 13           | 0     | 3     |
| 2017/6/13  | 17:00-17:30| 54                   | 1.8                  | 28        | 21           | 0     | 5     |

Table 3 Elderly Behavior Frequency Observation Record List in C Point of Place I

| Date       | Time       | The number of people | Passing Frequency (Person/minute) | Activity |
|------------|------------|----------------------|-----------------------------------|----------|
|            |            |                      | Walk                | Chat      | Entertainment | other |
| 2017/6/2   | 14:30-15:00| 6                    | 0.2                  | 3         | 3            | 0     | 0     |
| 2017/6/5   | 19:00-19:30| 69                   | 2.3                  | 7         | 16           | 41    | 5     |
| 2017/6/7   | 17:30-18:00| 67                   | 2.2                  | 12        | 22           | 27    | 6     |
| 2017/6/9   | 16:30-17:00| 41                   | 1.2                  | 13        | 18           | 6     | 4     |
| 2017/6/12  | 18:30-19:00| 81                   | 2.7                  | 11        | 24           | 33    | 13    |
| 2017/7/13  | 16:00-16:30| 26                   | 0.9                  | 12        | 12           | 0     | 2     |

2.2.4 SD Questionnaire Data Analysis

We send questionnaires in two places—place I & place II. A total of 68 questionnaires were issued and 65 valid questionnaires were issued. Place I: (1) business format: Around the residential area and the taxi driver's canteen; (2) Traffic: Small traffic flow; (3) landscape condition: Water landscape design prominent. Place II: (1) surrounding formats: residential areas, business district; (2) Traffic: near the city trunk road, large traffic flow; (3) landscape condition: a strip of green along the road.

As can be seen from the table 4, there are great differences among the 1. water quality evaluation, 2. vegetation evaluation and 3. activity site evaluation. We can learn that older people are more sensitive to these three feelings. Good water, rich vegetation, large site, rich and reasonable layout of the place, loved by the elderly. This is instructive to the actual project afterwards.

Table 4 SD Method (semantic differential method) Questionnaire Data line Analysis Chart

| Evaluation Project | Adjective | SD Evaluation Scale |
|--------------------|-----------|---------------------|
|                    |           | Very Commonly | Middle | Commonly | Very |
|                    |           | -2            | 0     | 1        | 2    |
| Geographical Location | Accessibility | Convenient |         |          |       |
|                     | Entrance position | Showy         |         |          |       |
| Function Layout | Space area | Big           |         |          |       |
|                   | Site type | Abundant       |         |          |       |
|                   | Site layout | Reasonable    |         |          |       |
| Landscape Elements | Water | Water Quality | Good    |         |       |
|                     | Participatory | Good          |         |          |       |
|                     | Appearance | Beautiful     |         |          |       |
|                     | Plant species | Varied        |         |          |       |
|                     | Plant color | Abundant      |         |          |       |
|                     | Comfortable |               |         |          |       |

2017/6/2 | 14:30-15:00 | 6 | 0.2 | 3 | 3 | 0 | 0 |
2017/6/5 | 19:00-19:30 | 69 | 2.3 | 7 | 16 | 41 | 5 |
2017/6/7 | 17:30-18:00 | 67 | 2.2 | 12 | 22 | 27 | 6 |
2017/6/9 | 16:30-17:00 | 41 | 1.2 | 13 | 18 | 6 | 4 |
2017/6/12 | 18:30-19:00 | 81 | 2.7 | 11 | 24 | 33 | 13 |
2017/7/13 | 16:00-16:30 | 26 | 0.9 | 12 | 12 | 0 | 2 |
3. Actual project research

3.1 Definition of Rural Ecological Infrastructure

Domestic and foreign research and application of urban ecological infrastructure are more, but there are still few researches on ecological infrastructure in rural areas. This concept originated in the West and was first found in the study of the human and biosphere program (MAB) of UNESCO. It refers to the maintenance of land life safety and health key spatial pattern, so that the city and the residents to obtain sustainable natural services (ecological services) the basic guarantee, is not to violate the constraints of city expansion and land development. Represents the lasting support of the natural landscape and the hinterland to the city. Compared to the concept of ecological infrastructure as a basic structure of the natural system, another meaning is the "ecological" artificial infrastructure. It is recognized that the artificial infrastructure has changed and destroyed the natural system. For example, transport facilities, are thought to be the major cause of landscape fragmentation and habitat loss. People began to design and reconstruct ecological infrastructure. Such artificial infrastructure is also referred to as "eco based" infrastructure or "green" infrastructure.

Referring to the relevant laws and regulations of China's new rural construction. Rural infrastructure includes four major categories: agricultural production infrastructure, rural living infrastructure, ecological environment construction, rural social development and infrastructure. This paper focuses on ecological environment construction: mainly refers to the natural forest resources protection, protection forest system, seedling project construction, the problem of ecological protection and construction, wetland protection and construction, returning farmland to forest farmers' food and firewood, income and other livelihood and long-term development.

In this paper, the concept of rural ecological infrastructure is formulated as: Within the scope of the village, the normal operation of the village system should be maintained, and the ecological protection and construction will be emphasized, and all rural infrastructure facilities with ecological services and resources will be provided.[4]

3.2 Analysis of Rural Ecological Infrastructure in Project

The site of the project is located in the suburbs of Chengdu. Some rural ecological infrastructure is as follows: Linpan landscape (referring to the farmhouse and the surrounding trees, bamboo, canals and peripheral arable land formation of rural living patterns); paddy field, high quality natural resources
such as riparian water system in the South of the base; Temple - the longzang temple in the southeast of the base; There are many old trees and beautiful scenery in the temple; Base covers an area of more than 300 acres, and surrounded by the river; West of the project base has azalea field, and there is a patch of bamboo forest landscape in the north. Provide a better natural resource base for the construction of garden health care areas (recreation and recreation) and agricultural and horticultural fields. For these good resources, we adopt adaptive design, conservation design. Do our utmost to preserve natural resources and restore the original resources of the site. We design temples, flower fields and bamboo forests as landscape axes to build a garden community for the elderly. Unlike all previous ways to push down the interior resources of the site, we have designed on the basis of the physiological and psychological needs of the elderly. Maximize the advantages of the site itself.

4. Summary
With the approaching of the aging society, the aging of the population has attracted the attention of the Chinese government and the wide attention from all walks of life. Providing all the convenience to participate in social life and dignity for the elderly is not only the needs of the elderly groups, but also the need to build a harmonious society. [5]

Based on the rural ecological infrastructure and planning pension industry research, China's current development is relatively small. But the rural population of our country is numerous, the cultural background difference is big, the economic base disparity is big. In recent years, the rural areas have been changed indiscriminately, the new rural areas have been unreasonably planned, and a great deal of reclamation has been carried out, resulting in the deterioration of the rural environment. Originally superior natural resources were destroyed. Therefore, the planning of new rural infrastructure should be adapted to local conditions. Local characteristics should be brought into full play in planning and design. We should fully respect the wishes of the local people. Pay attention to the protection of rural ecological infrastructure. It should reflect the local features of the countryside and prevent the destruction of the natural features of the countryside.

Acknowledgement
The content of this paper is based on a project funded Science and Technology Bureau of Chengdu science and technology Huimin technology research and development project "based on GIS platform agricultural village Ecological Infrastructure Research"(2015-HM01-00356-SF); The key research base of Social Science in Sichuan -- Sichuan circular economy research center -- "recreation mode based on farmland water network pattern ecological protection mechanism"(XHJJ-1522)

Brief introduction of the authors
Jing Yu ZHAO¹, graduate student, architecture design and theory major of architecture and design school, Southwest Jiao Tong University, email: 176165055@qq.com

Fei FU², Ph. D., associate professor, master tutor, School of architecture and design, Southwest Jiao Tong University. Research field: eco city design, email: fufei2000@163.com

References
[1] LEI Huang, long XU, Dao Ming ZHU, study on the relationship between hobbies and mental health among elderly people in urban and rural areas. [J] health education. 2013.
[2] Tian Fang, Yang Lei, POE, practice, application and Exploration -- Taking the building of Kunming University of Science and Technology as an example, [J]. architectural practice, 2015.
[3] Qu Ying, Beijing City Park elderly use status (POE) study, [D]., Beijing Forestry University, 2015.
[4] Duan Yong, Fu Jianxin. Application and Enlightenment of village ecological infrastructure [J]. Modern decoration and theory, No. 2013, No. 01.
[5] Sun Ying. Leisure behavior of urban elderly in China. [J] urban problems, 2000.