



The study on regional longevity in the context of population aging in China

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Part 1 Aging of the population in China

1. Type of population change

- From 1949 to 1970, China's population was in the natural state of development. In 1980, the population structure transitioned from the youth type to adult one, till the 2000, it became an elderly type, and after 2020, it will enter into an ageing society.
- It takes only sixty years of three stages to complete the transition of "population revolution": from 1950 to 1970, mortality rate dropped from 18 ‰ to 8 ‰ below (Fig. 1) and life expectancy (Fig. 2) increased from 40 years to 60 years; from 1970 to 1990, the total fertility rate declined from 6 to replacement level; from 1978 to 1998, natural growth rate declined from the 15 ‰ to 10 ‰; and from 1980² to 1999, the age structure was of the transition from the adult type to elderly type (Fig. 3 and 4).

Mortality rate (1950 - 1970) 18-7

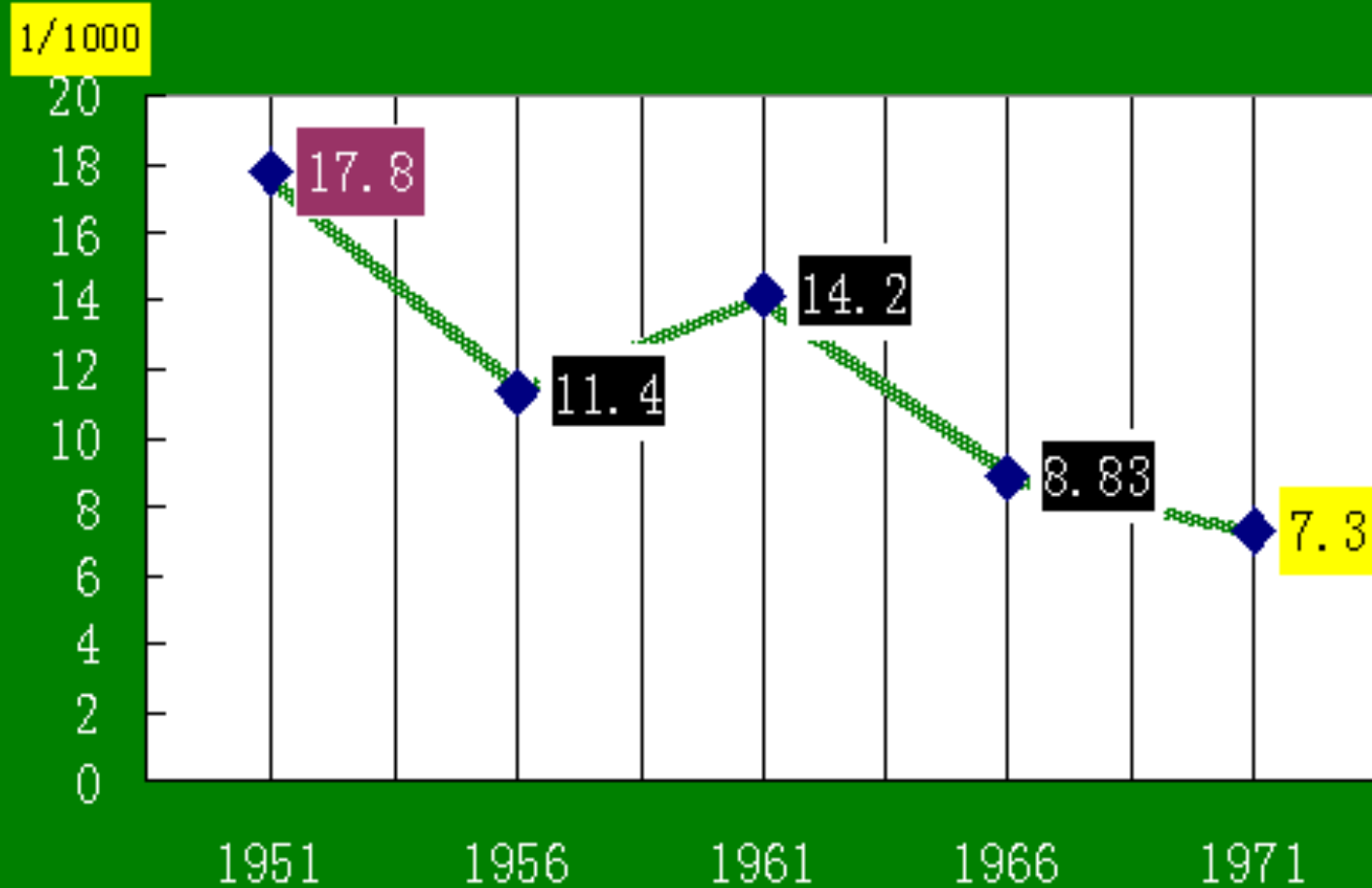


Figure 1 The mortality change of China

Life expectancy(1950 - 1970) 40 - 60 year

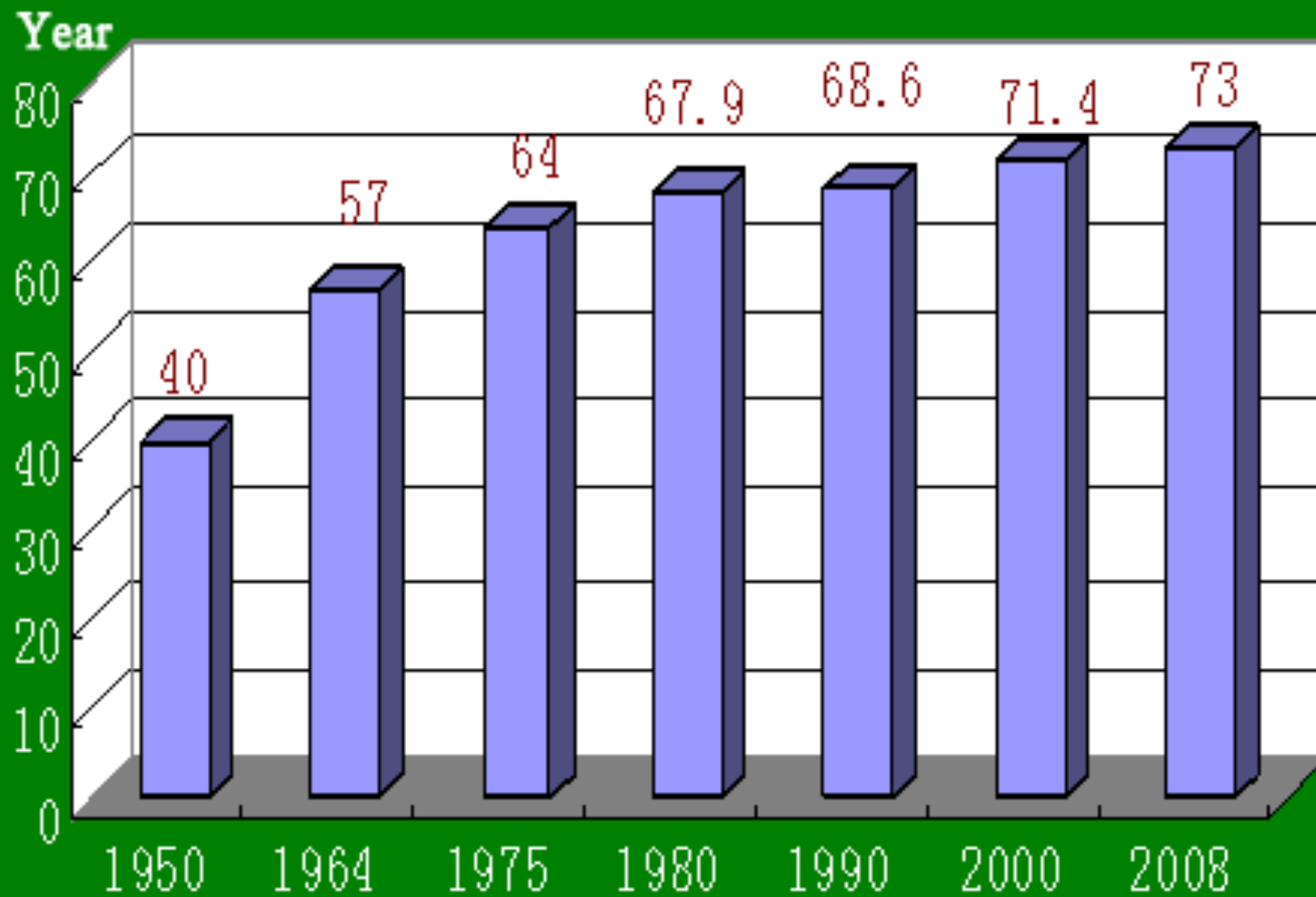


Figure 2 The life expectancy of China

TFR (1971-1991) decline to replacement level



Figure 3 The birth rate change of China

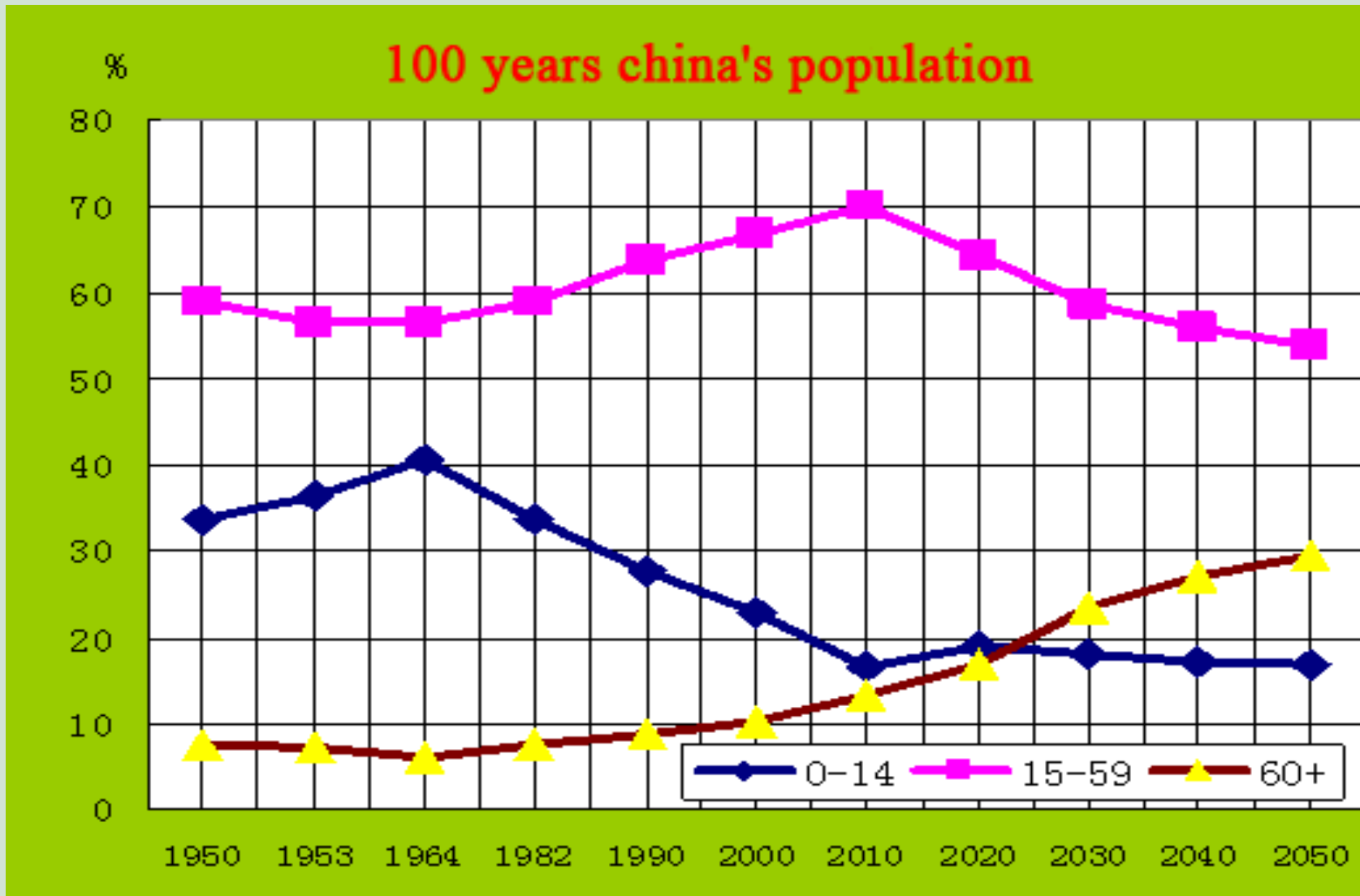


Figure 4 The population change of China

■ 2. Aging and Elderly Care

Predicted in 20 years, the phenomenon of “the impact of age structure” will appear, namely, the proportion of elderly population to the total population will over the proportion of children, the society will be into the aging society. Therefore, it is a long way to go to solve the problem of China’s population: the last 50 years of the 20th century, the issue was to solve the problem of population expansion, but in the first 50 years of the 21st century, the issue will be changed from raising children to the care for elderly (Fig.5 and Tab.1).

Old age dependency ratio (60+/15~59)

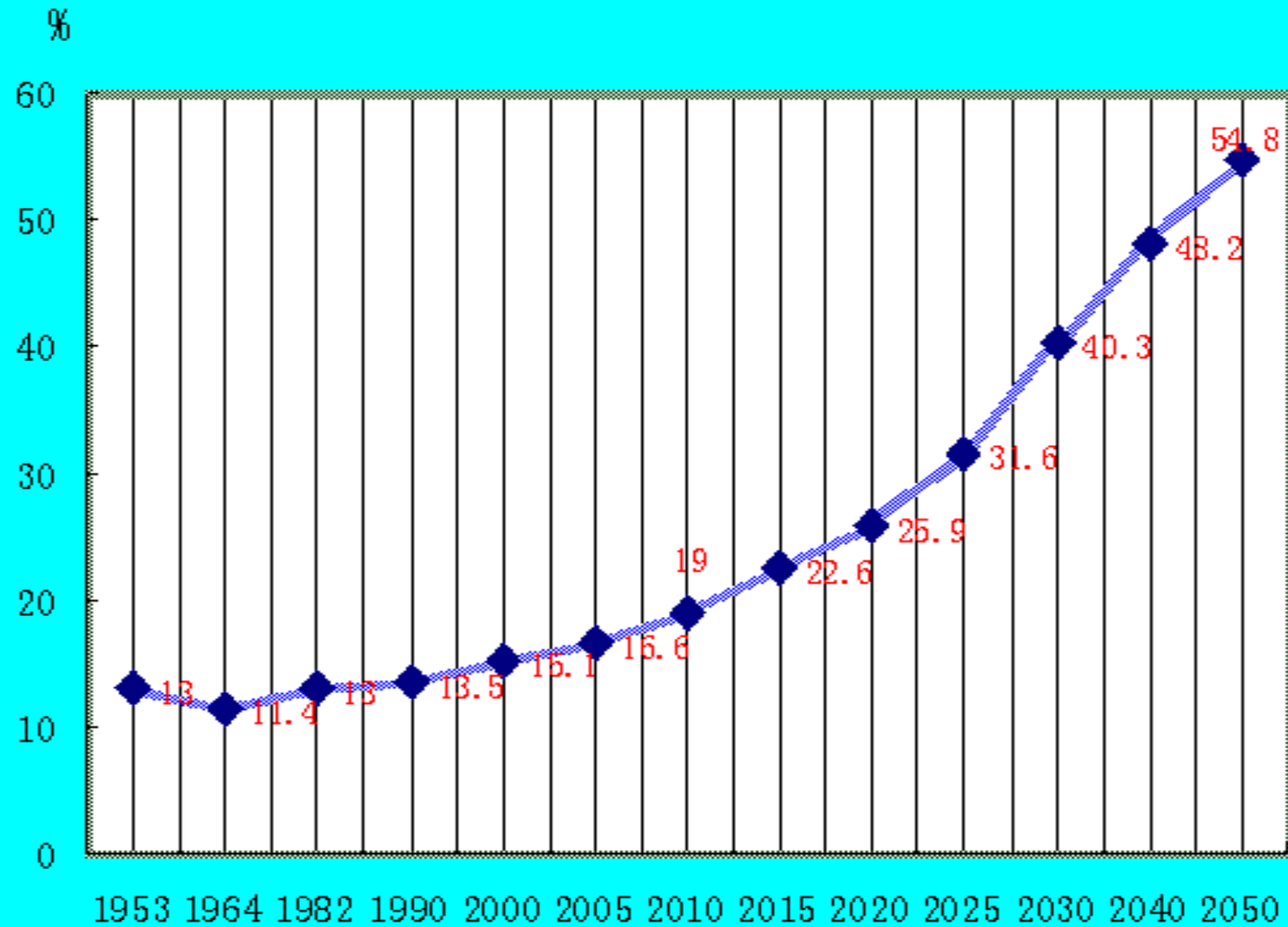
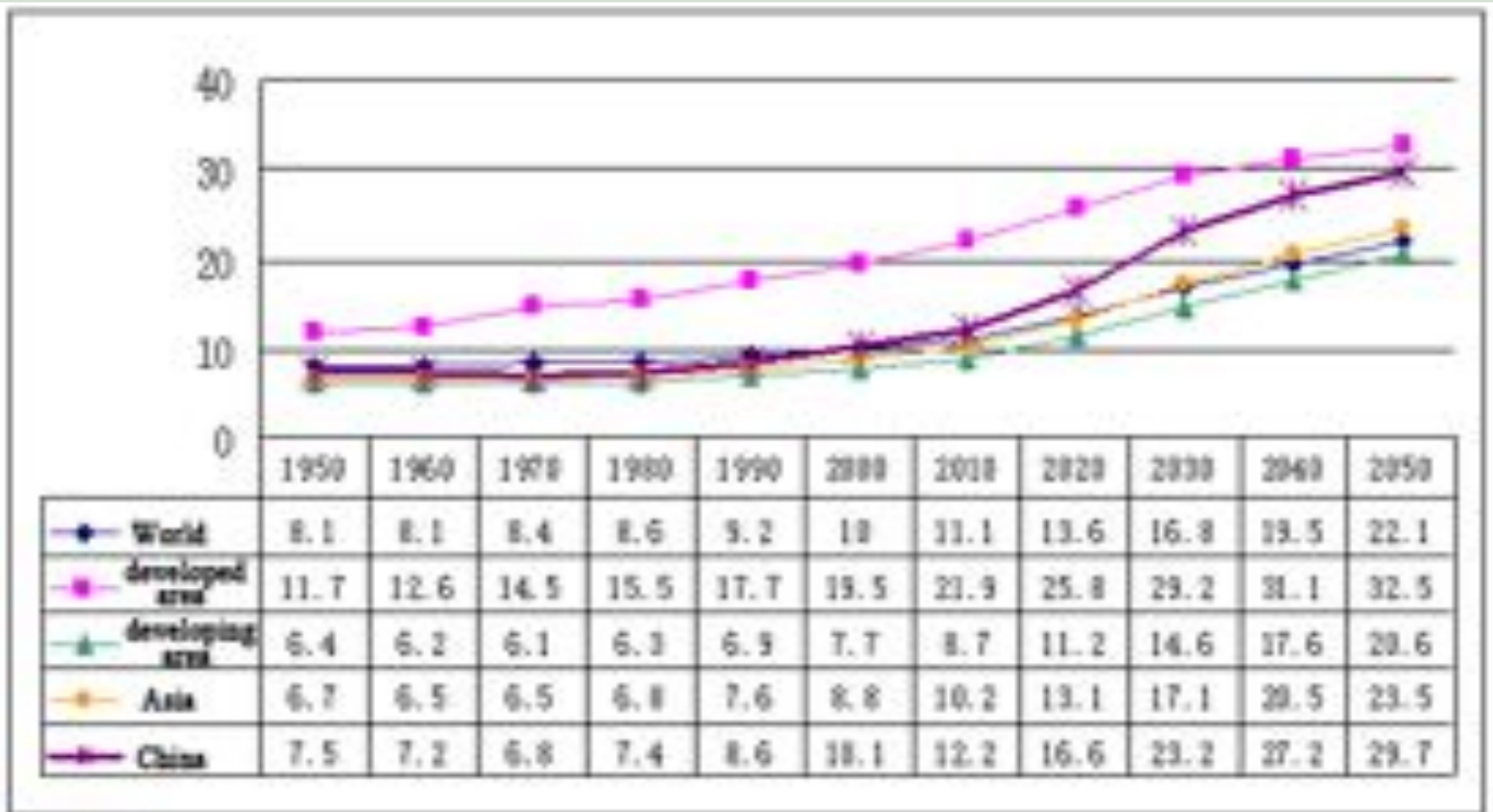


Figure 5 The dependency ratio of elderly

Table 1 Comparison the aging rate of China and the world



3. Growth of the oldest old

The oldest old citizens increase of 6 times in the past 50 years. It is now expected to reach 25 million people. The growth rate is faster than the total population and elderly population. In the condition of less developed economies and inadequate social security, the growth of centenarians is much faster. In 1953, the centenarian population was 3384 and currently the population expected to reach 25 thousands, almost increased seven times than that in 1953. It is particularly to be concerned those areas where the total centenarian population has been of 1 / 10 thousands or more (Fig. 6, 7, 8).



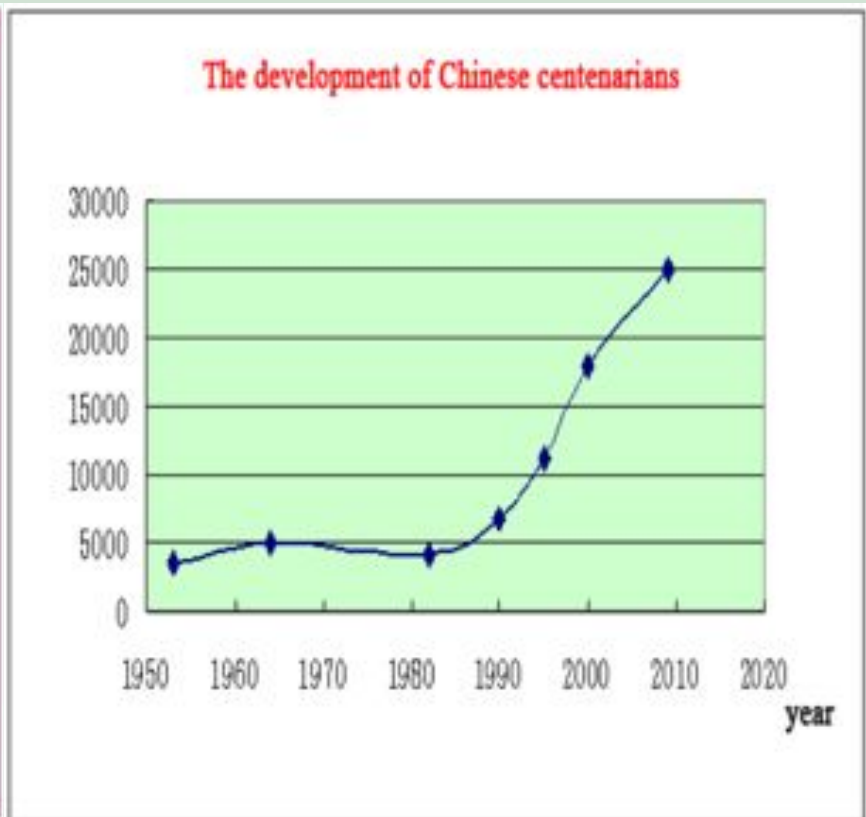
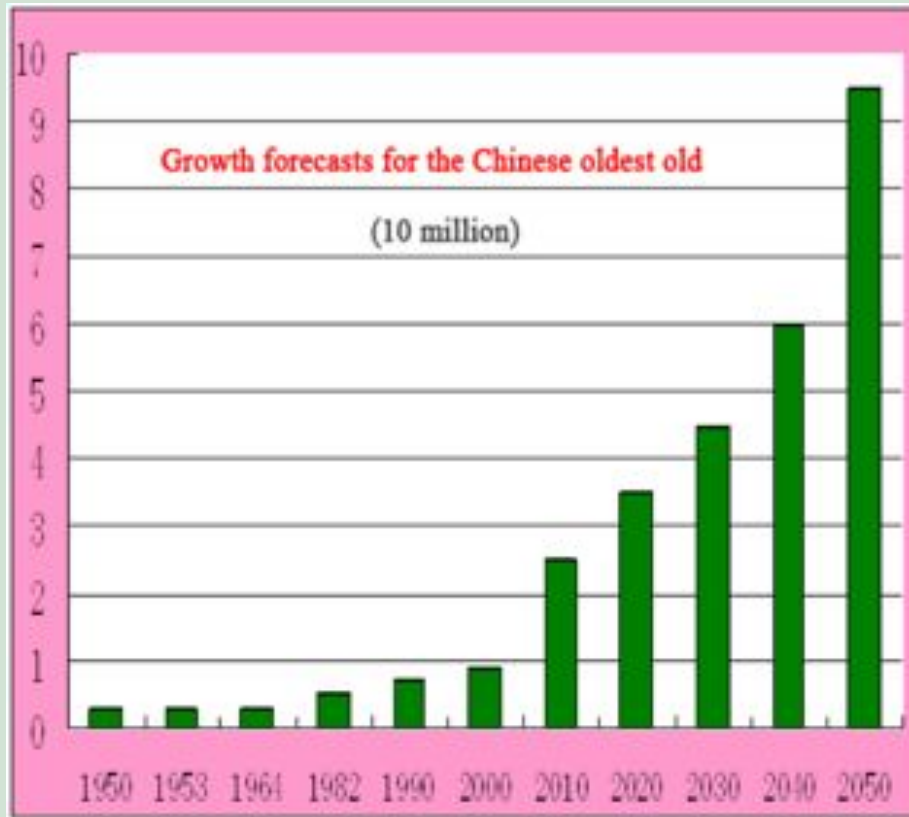


Figure 6 The change of oldest old in China. Figure 7 The change of centenarian in China



Distribution of centenarians in China

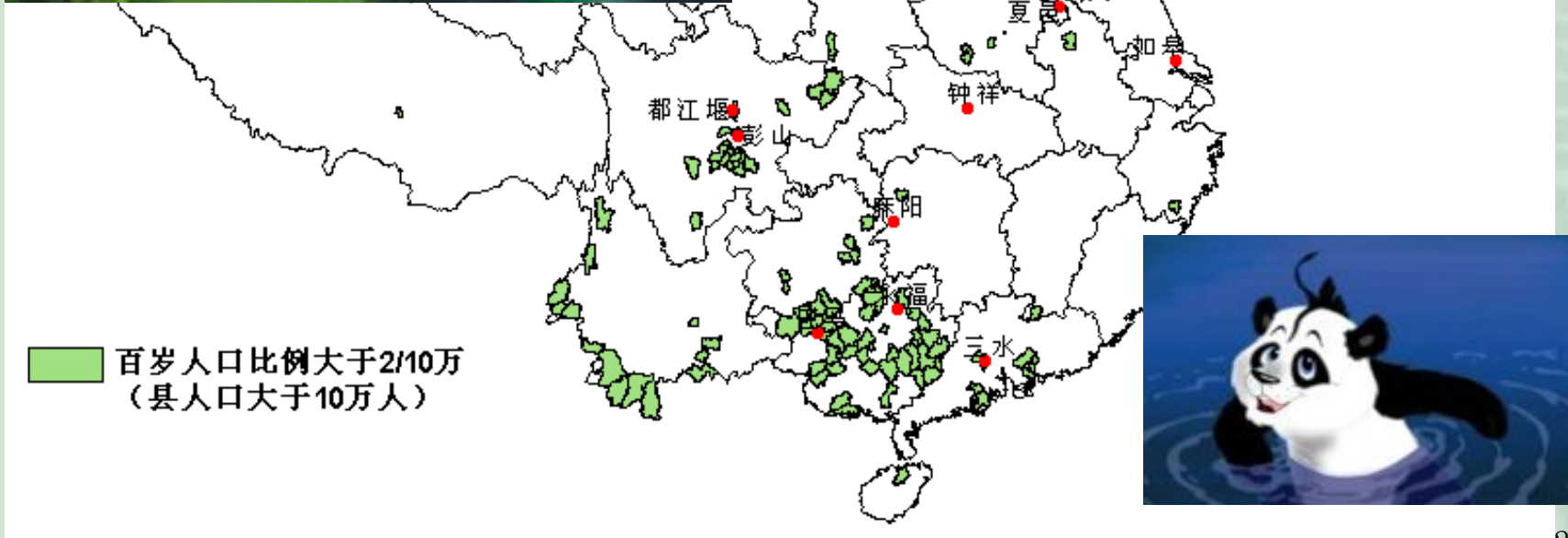


Figure 8 The distribution of longevity areas in China

Part 2 Study on regional longevity in China

1. Research scheme

- From the macro, meso and micro-level, study focused on longevity regions and their formation was carried out by cross-disciplinary, penetration, and integration of initiative. The evolution of longevity history, besides the social, economic and environmental factors was analyzed to find the objective basis for supporting systematically the identif

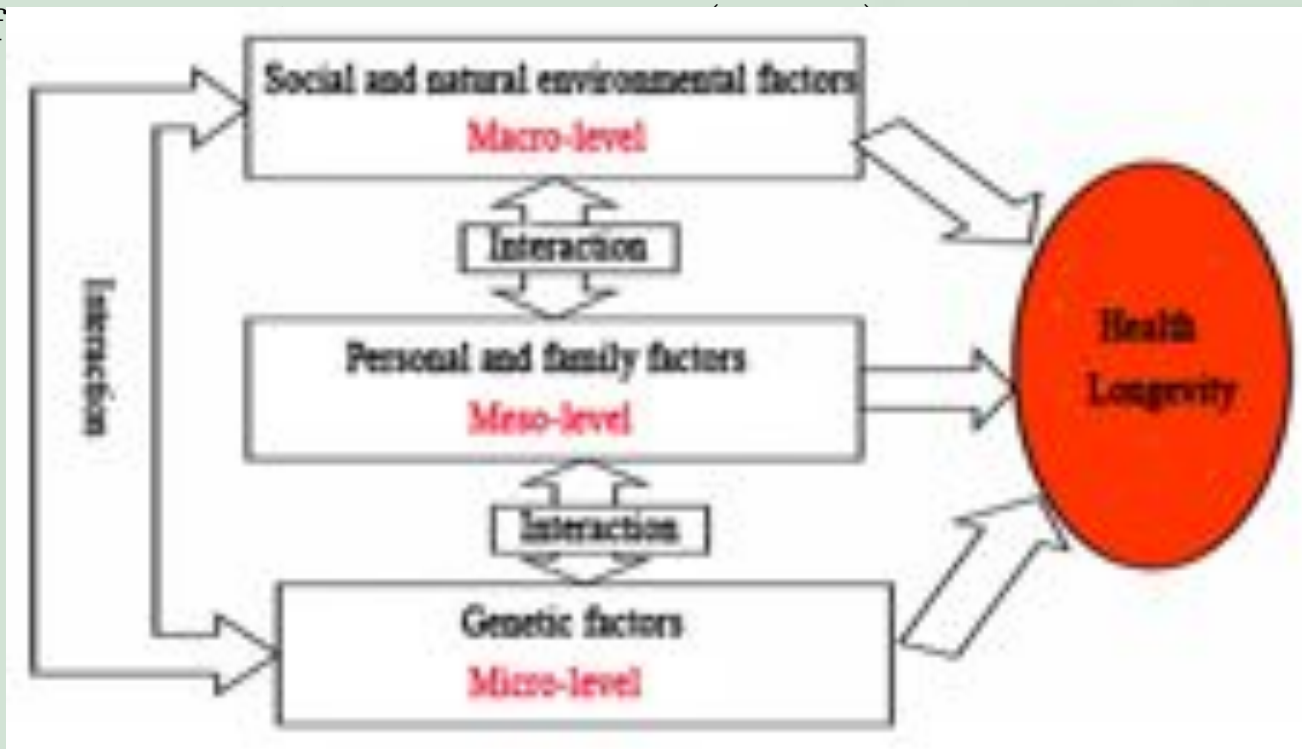


Figure 9 The concept frame of study

Part 2 Study on regional longevity in China

2. Research Method

- The traditional qualitative and quantitative methods were used to illustrate the relationship between environment and longevity, furthermore combining those with rational evidences to verify the research model.
- The disciplinary integration approaches are the innovation and established growth point for the study on regional longevity which has broken the traditional habit of individual's longevity research model.

3. Factor analysis

- Human geographic environment: human geographic environment refers to regional combination of society, culture and industrial activities. This includes population, nationality, settlement, politics, community, economy, traffic, military, social action and so on. Human factors include dietary habit, life style, marriage, occupational and educational background. Moreover people's own factors such as heredity, sex and psychology are included as well.
- Physical geographic environment: physical geographic environment may affect the change of human health (rate, composition, life expectancy, aging, and migration). The important factors should be investigated are listed as follow:
 - Natural factors: climate, soil, water and air
 - Direct factors: drinking water, air, humidity and temperature
 - Indirect factors: soil, irrigation water



4. Main results

- 30,000 centenarian and oldest old were tracked and sample survey was conducted in the past 30 years. The environmental indices were also detected in 20 longevity regions. The results indicate that about 15% longevity factors are influenced by genetic factor, while more than 80% are affected by social factor, individual factor, and environmental factor which is associated with the study results from WHO and Denmark.
- Four major harmonious principal parts: human and ecological environment, human and social development, people to people, mankind themselves.
- Four major health knowledge: spiritual, material, medicine, biology.
- Side soil support people.



Side soil support people:

- Water environment: the quality of most drinking water samples from longevity regions accords with the hygienic standard of China and guideline of WHO.
- Soil environment: soil environmental quality is in line with second grade of Chinese soil environmental quality standard (GB-15619-1995). The soils contain low concentration of Cu, Fe, Mn, and Pb.
- Food: the concentrations of pollutants in food are much lower than the permission values. The concentrations of Fe, Mg, Sr, and Zn are enriched in food in general, especially the enrichment in Cu, Zn, Se in rice and higher content of Cu, Zn in maize.
- Hair and blood: the contents of Mn, Se, Ca, Li, and Mg are abundant in hair of centenarian and blood, while the contents of Cr, Cd, Cu, and Ni are low.
- Moreover, good health is significantly resulted from Sr, Ca and Se in food. Longevity areas are mainly located in the areas with high concentration of Se in environment (Fig. 10).



Figure 10 The selenium landscape and local of longevity counties in China¹⁸

Part 3 Longevity county is the model for the realization of healthy aging society

- How to deal with the challenges of aging society, there is no successful experience to draw on for China. Therefore, we must strengthen the study on aging social characteristics and patterns for initiatives with Chinese characteristics and achieve healthy aging. China's experience tells us that longevity region, in many ways reflects social stability, harmonious development of economy and environment, higher level of health and well-being, and high index of happiness. Based on the reality of longevity regions as an example, it is of universal significance to explore the achievement of healthy aging society,
- According to our study in the past 20 years, we have proceed to develop a sets of standards of Chinese longevity county since 2004 and one year later, **examination and appraising of " Chinese longevity county"** began in nationwide, and 20 of them have been approved.

1 The principles for examination and appraising of "Chinese longevity county"

- This consists of five principles as follows:
 - 1) The standard should be accord with scientific development perspective, it should be benefit for harmonious development of population, economy, society, culture and natural environment. This could promote to improve the life quality of local citizen;
 - 2) Indicators with international standards, and achieved social consensus;
 - 3) In line with China's current social and economic development of the real;
 - 4) Standard is dynamic, constantly adjusting with the economic and social development;
 - 5) Should be scientific, operational, simple and clear.

Standard is from multi-disciplinary experts of different academic institution and this does not interfered by the government officials.

2 The frame and contents of the standard for Chinese longevity county

- The standard content consists of indicator system in three levels(Fig.11):
 - The first, this is prerequisite condition. Designated area is fixed, and the region's population has a certain size. With the historical changes, the social environment, natural environment and economic environment must have an integral stability.
 - The second, this is **essential** conditions. Three core indicators: 1) the representation of longevity, that is, the proportion of the total population to centenarians must reach international consensus standards; 2) the integrity of longevity, which reflects the health of the region, the average life expectancy was significantly higher than the national average of 3 years of age in the county; 3) longevity of sustainability over the age of 80 existing in the region in the total population, a proper proportion of centenarians verified by calculating the sustainability of at least 20 years.
 - The third, this is the reference condition. Those are supporting conditions such as regional social, economic, cultural, and natural environment which are important **compositions of** longevity

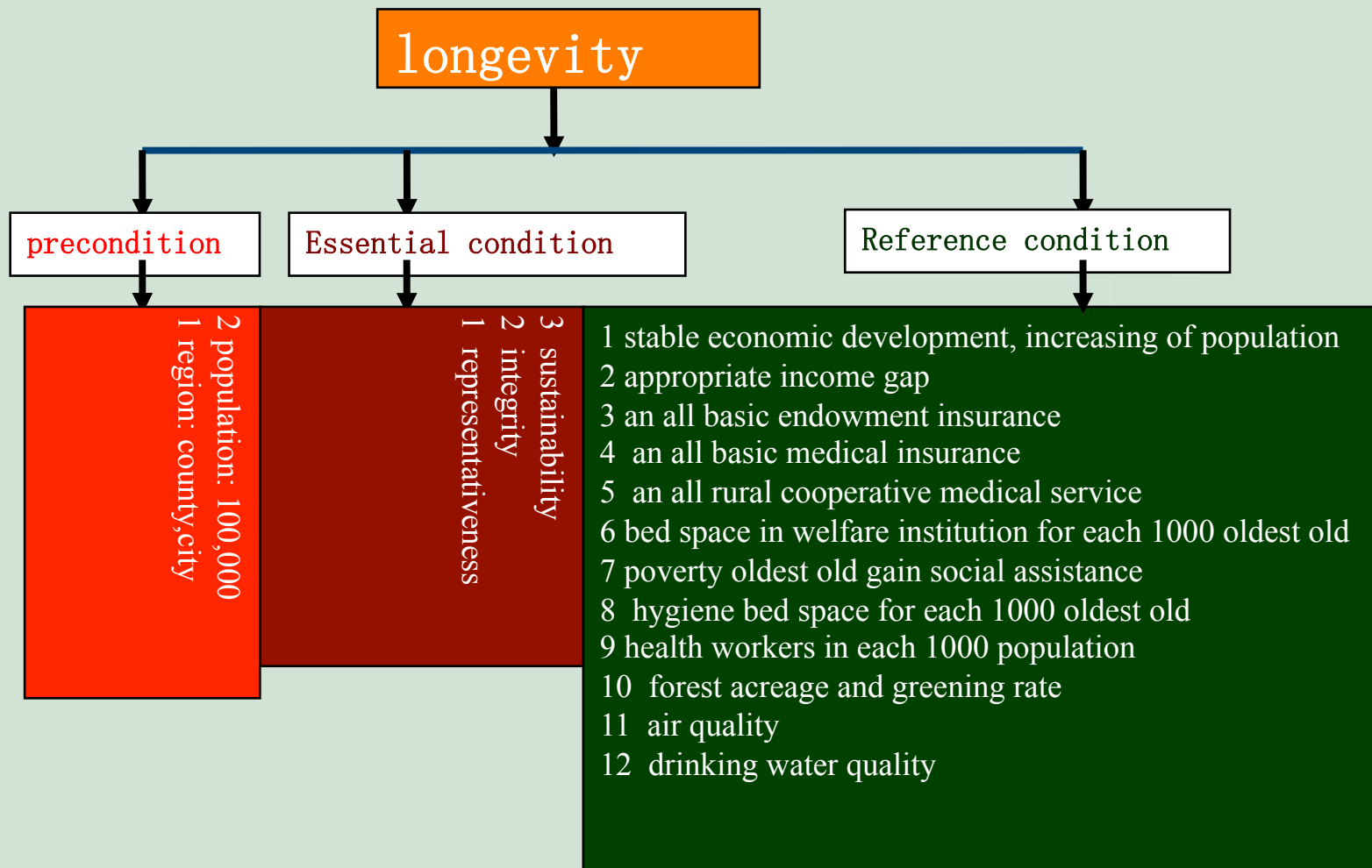


Figure 11 The standards for the examination and appraising of "Chinese longevity county"

3 The significance for the examination and appraising of "Chinese longevity county"

- Firstly, the work promotes the development of longevity theory and longevity culture. It enhances the longevity, environmental protection consciousness, and happiness index of public in China.
- Secondly, the work provides an effective carrier to implement the scientific concept of development and injects new activity for the development of longevity areas, promotion of regional demographic, economic, social, cultural, and environmental development, which had a role model for the whole country;
- Thirdly, the work improves the awareness and integrated competitiveness of the approved area. It becomes an important social name card of locals which is close to the wishes of the people, and is accord with the scientific concept of sustainability development.
- Fourthly, the work promotes the development of local longevity economy. It also promotes the development of longevity related industries such as real estate, tourism, entertainment and health leisure industry.
- Fifthly, the longevity is the objective reality of "healthy aging society" and the experiences from this work have important and universal significance for dealing with aging.

4 The photos of Chinese longevity county



Jiaolin g
Guangdong



Bozhou
Anhui

**Chongming
Shanghai**



Chengmai
Hainan



Lianzhou
Guangdong





**Yongfu
Guangxi**



Thank you !

