

RESEARCH FRAMEWORK ON THE SUITABLE DEVELOPMENT MODEL AND MECHANISM OF GREEN SETTLEMENT IN THE YANGTZE RIVER DELTA

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ABSTRACT: By selecting a breakthrough point from the Green Settlement of towns and cities in the Yangtze river delta, which is of great significance to the sustainable development strategy for human settlement in China, this research tries to integrate the enduring regional “genes” of settlement, to explore the external character and internal law of the basic urban residential unit, and grasp its controlling/adjustment mechanisms. On this base, detailed goals, evaluation systems, space/form models and suitable technologies of sustainable development are expected to be established. Thus, the sustainable development strategy for human settlement in that region can be promoted and serve as a guide for China as a whole.

RESEARCH BACKGROUND

As China's society and economy develop, urbanization is occurring at an unprecedented speed. The urban population among the whole nation skyrocketed to 35% in the year 2000 from 13.6% in 1980. Today, there are about 800 cities and 20,000 towns in China. The annual housing construction area has surpassed 600 million square meters, and the average area of a house now exceeds 8 square meters per person. In the future, we can expect the construction of human dwellings in urban areas will continue to expand. As a result, the population and related housing space and form will be drastically reshuffled.

Human settlement in China's rapidly developing society is challenged by two problems. The first is the new demands brought by accelerating urbanization and the development of economy and society, such as job opportunities, housing, transportation, infrastructure, etc. The second is the fact that limited resources (land, energy, bioresources, and water) are rapidly being wasted and polluted. Fortunately, relevant research on human settlement is being widely carried out. A nationwide research team has been formed and regional research bases have been set up: in southwest China, the research focus is on suitable models for a mountainous region; in the

northwest Loess plateau, the research focus is on new cave-housing; in the region along the middle part of Yangtze river, the research focus is on modern pillar-supported housing, and etc. So far, we may boast of a lot of inspiring achievements. However, most of the research has been focused either on detailed construction technology or on large-scale regional problems. In comparison, research on the middle-scale settlement has been scarcely attempted. This study is an effort to amend that problem and diversify the research on China's current human settlement issues.

RESEARCH SIGNIFICANCE

Research Perspective Orientation and Methodology

Due to its great regional diversity and un-balanced economic development, China poses great challenges to researchers on human settlement. There is no shortcut for this study; it requires long-term hard work and patience. We cannot pursue too many topics or hurry toward a summary of this research, which in fact is impossible at present; instead, we must concentrate on the basic theory and suitable paths of development for each region from detailed case studies. Thus, we can make preparations for a large-

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scale strategic layout in terms of theory and methodology while we await some substantial breakthrough.

Research Focus - the Human Settlement in the Yangtze River Delta

Since ancient times, the Yangtze River Delta region has played an important role in China's economy, society and culture. In recent years, this region has enjoyed great advances in development. Authoritative statistical data indicate that the main economic index in this region remains ahead of the whole country. In the year 2000, the GDP of this region increased by 10.8%, 2.8% higher than the average. At the same time, small-sized towns and cities have mushroomed and thus exhibit various development models.

However, the existing problems are also very serious:

- The urban construction level and quality lag far behind the high-speed economic development.
- Random construction has caused large-scale agricultural land occupation, waste of resources, and environmental pollution.
- The "small but all" development model and orderless competition have brought a lot of redundant construction and thus wasted a great deal of investment.
- Towns and cities lack co-ordination in the process of infrastructure facilities construction.
- Local ecological and cultural characters are declining rapidly.

Thus, it is imperative to look for an alternative development model and promote human settlement construction that keeps pace with the economic development. At present, although many scientists have done work on suitable models from their own disciplines and perspectives, there has so far been no comprehensive research to integrate all the fruits of these studies focusing on human settlement.

Because the Yangtze River delta region plays an ever-more important role in China's economic development and the sustainable construction of human dwellings, Green Settlement research in this region will be an important part of China's human settlement research as a whole. In addition, due to the demonstration effect of this prosperous region, its style will have strong influence on the sustainable development of China's human settlement elsewhere.

Research Kernel - Green Settlement

Green Settlement is based on the model of interdependence offered by ecological systems and takes "sustainability" as its ultimate goal. It integrates the natural ecological system, productive activity and living environment so as to further the most harmonious relationship possible between natural and cultural resources. Green Settlement is guided by the principles of biological co-existence, multi-grade transition and the circulation of materials in the ecological system. It is characterized by high efficiency and harmony, self-renewal, a lack of waste, comfortable living and cultural preservation. Green Settlement is the ideal settlement mode and represents the latest trend in development.

The research on sustainable development for human settlement involves innumerable aspects and topics, making it both comprehensive and extremely complex. We wish to focus the research on one point and with this as a base, to explore the basic theory and controlling/adjusting mechanisms. The whole research should observe the principle of "focus on limited-scale, limited goals, key problems and feasibility." The present research concentrates on the typical Green Settlement of Yangtze River Delta region. This kind of multi-disciplinary overall study has seldom been attempted. Hence, this project can complement the region's Human Settlement research system, and may also make it possible to obtain some kind of breakthrough.

- In terms of scale, this research can be divided into three levels: urban region, settlement environment, and housing form.
- Green Settlement involves many aspects of the sustainable development goal system. In addition, it has some typical characteristics and is relatively independent. This will help us to recognize the basic principles of Green Settlement through its external characteristics.
- The research results can be anticipated. All these factors will facilitate practical construction and its necessary adjustments.
- A lot of fruitful work has been performed on subjects related to Green Settlement and can provide a good foundation and advanced starting-point for comprehensive research. Here is also the best point to integrate the work of architecture and other subjects.

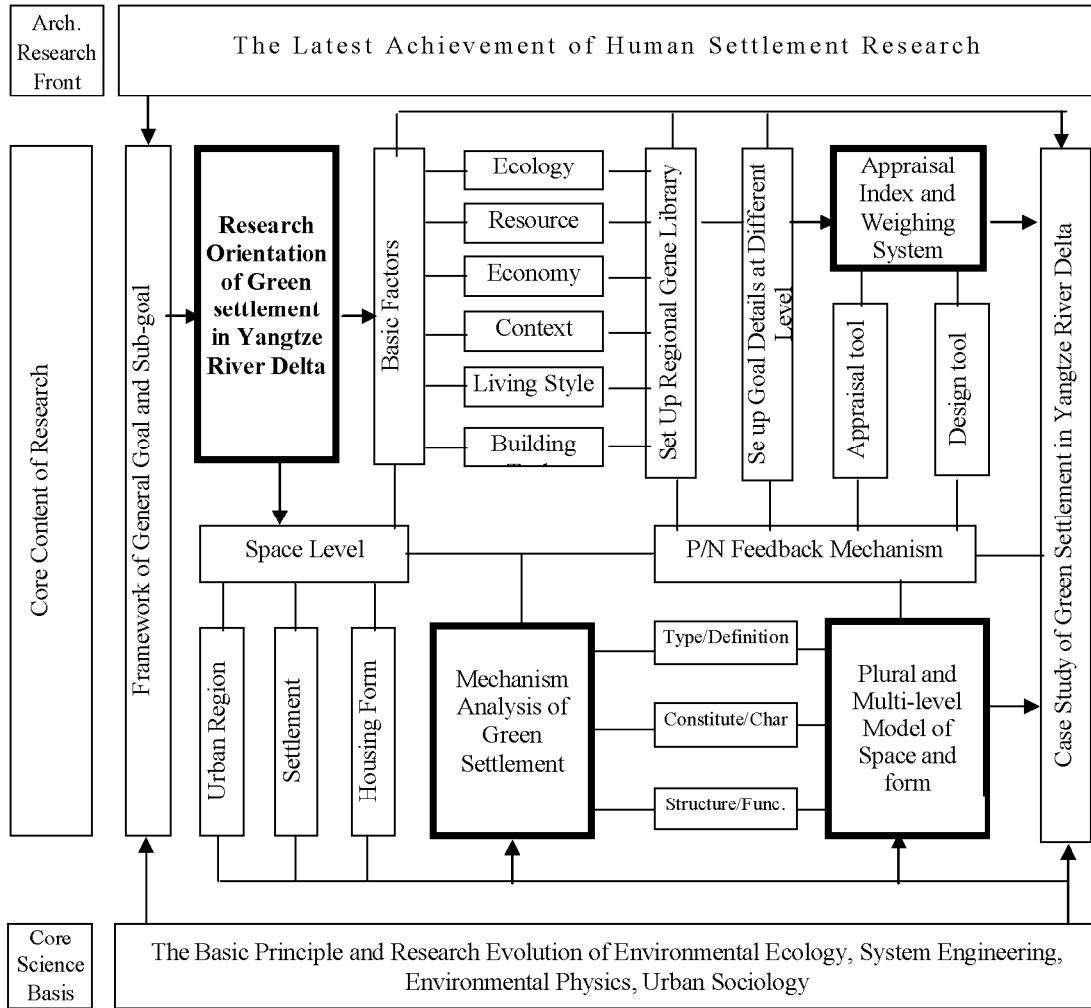


Fig. 1 Concept of the research

- In some cities/towns, the chain of history and social change is rather complete. Moreover, there are distinct traditional contexts and distinguished local features. All these factors will be of great help in exploring the “regional genes”.
- The research schedule can be connected with the normal ecological circulation period of the environment, facilitating data collection and analysis, and also helping us achieve the anticipated goal within a limited time.

PROPOSED RESEARCH PROGRAM

Research Goal

The general goal of China’s Human Settlement research is to discern a sustainable development strategy as shown in Fig. 1. As a part of this complex work, the present project is based on current social, economic and environment situations in the Yangtze River Delta region (Fig. 2), which is of great significance to China’s development in human settlement construction. Finally, this project selects this region as a breakthrough point for typical research on Green Settlement:



Fig. 2 Map and Topography of the Yangtze River Delta Region

- to explore the enduring and sustainable “regional genes”, and have them revitalized, reshuffled or integrated;
- to discover the external character and internal mechanisms of regional “green settlement”;
- to establish detailed goals and appraisal systems;
- to study space/form patterns and suitable comprehensive technologies;
- to set up a “common language” and basic platform to be shared by all Green Settlement

construction in this region.

Research Content

- 1) Exploiting, reshuffling and integrating the enduring “regional genes” of settlements in Yangtze River Delta region:
 - to grasp the basic knowledge of the specific ecological environment, resource conditions, social economy, historical context, living style, building

Research framework on the suitable development model

technology, and existing relationship with green settlement;

- to set up the sustainable development “regional gene library”

2) The character and mechanism of green settlement in the Yangtze River Delta region:

- to clarify the type and definition of urban green settlement;
- to analyze its content and character
- to grasp its structure and function
- to explore the positive/negative feedback of adjusting/controlling mechanism.

3) An appraisal index system of green settlement in the Yangtze River Delta region through a combination of qualitative study and quantitative analysis:

- to set up detailed goals
- to establish the appraisal index and weighting system; the appraisal tool should also be considered as a design tool and a transformation method.

4) Space/form of green settlement in the Yangtze River Delta region:

- to explore the construction methods and steps of space/form;
- by analyzing its type and hierarchy, to set up a plural and multi-level space/form model.

5) Case study of green settlement

- through typical case studies, to test the credibility and feasibility of the theory;
- to analyze comprehensively the relationship and inter-controlling method of the physical factors of the settlement environment;
- to optimize various suitable technologies.

Research Method

1) Integrate multidisciplinary research, referring to the latest studies on Human Settlement in China and abroad.

2) Combine qualitative study with quantitative study, paying more attention to quantitative findings, particularly the study of multi-level detailed goals and index systems.

3) Consider the static structure or pattern of systems, but focus on the dynamic processes and transformation mechanisms.

4) Study the feedback/adjusting mechanisms within systems, but concentrate on the revitalization and reinforcing methods provided by negative feedback.

5) Consider both the concept and form, but prioritize the space form model.

6) Emphasize the physical environment index and controlling methods, but also attach importance to the comprehensive usage of concrete suitable technology.

The Possible Application of this Research Goal

1) The concrete fruits of this research will provide local governments and lawmakers a relatively complete referral index for designing the settlement's construction strategy.

2) Facing the pillar industry of the national economy; the study aims to provide a concept and feasibility study for the production of related new material and new technologies; particularly to achieve some substantial progress in developing suitable local building technologies, such as the space form, energy and land saving, water saving and rain-water utilization; resources-orientated disposal of wastes; proper ways of decreasing disasters or adapting to disaster; and ecological restoration technologies for soil, vegetation and micro-climates of construction-finished areas.

3) This study can also demonstrate a new research model for the field of Human Settlement and provide inspiration to other related research.

CONCEPT MODEL OF THIS RESEARCH

Human settlement is a huge, open and complex system. Hence, the selection of a starting point and research perspective is a great challenge. After a long time pondering, we put forward this research concept. From this flowchart, it is seen that this research framework includes four key parts: the research orientation, the appraisal index and weighting system, the internal mechanism and the pattern of space and form. This orientation decides the unique character of this research. The appraisal index and weighting system is not only an evaluation tool, but also a tool to guide the designing process. The internal mechanism of Green Settlement is the core of this research and is being interpreted by form and space.

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