INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Management of Rural Residential Housing Construction in China's New Village Development: An Empirical Study

HU Yongming

Doctor of Management

Supervisors:
PhD Leandro Ferreira Pereira, Assistant Professor,
ISCTE University Institute of Lisbon

PhD DING Ya, Associate Professor,
University of Electronic Science and Technology of China

May, 2020

BUSINESS
SCHOOL

Marketing, Operations and General Management Department

Management of Rural Residential Housing Construction in China's New Village Development: An Empirical Study

HU Yongming

Doctor of Management

Supervisors:
PhD Leandro Ferreira Pereira, Assistant Professor,
ISCTE University Institute of Lisbon

PhD DING Ya, Associate Professor,
University of Electronic Science and Technology of China

May, 2020

BUSINESS
SCHOOL

Marketing, Operations and General Management Department

Management of Rural Residential Housing Construction in China's New Village Development: An Empirical Study

HU Yongming

Doctor of Management

Jury:

PhD Elizabeth de Azevedo Reis, Full Professor,
ISCTE - Instituto Universitário de Lisboa
PhD Graça Maria de Oliveira Miranda Silva, Associate Professor,
ISEG – Universidade de Lisboa
PhD Nelson José António, Retired Full Professor,
ISCTE – Instituto Universitário de Lisboa
PhD Leandro Luís Ferreira Pereira, Assistant Professor with Habilitation,
ISCTE – Instituto Universitário de Lisboa.
PhD Li Qiang, Full Professor,
University of Electronic Science and Technology of China

May, 2020

iscte INSTITUTO UNIVERSITÁRIO DE LISBOA

Management of Rural Residential Housing Construction in China's New Village Development: An Empirical Study

HU Yongming

Statement of honor

Submission of doctoral thesis

I the undersigned state on my honor that:

- The work submitted herewith is original and of my exclusive authorship and that I have indicated all the sources used.
- I give my permission for my work to be put through Safe Assign plagiarism detection tool.
- I am familiar with the ISCTE-IUL Student Disciplinary Regulations and the ISCTE-IUL Code of Academic Conduct.
- I am aware that plagiarism, self-plagiarism or copying constitutes an academic violation.

Full name HU Yongming

Course Doctor of Management

Student number 74742

Email address huyongming08@163.com

Personal email address

Telephone number +86 13808236652

ISCTE-IUL, 1/5/2020

Signed

[This page is deliberately left blank.]

Abstract

With the continuous advancement of the construction of beautiful new countryside (CBNC) in China, rural housing construction (RHC) has ushered in an unprecedented opportunity. The investment, progress, governance, and security of rural housing construction in new villages have troubled local governments and farmers. These problems have always affected farmers' satisfaction with housing. The literature and practice mostly focus on project coordination, project group management, housing security, rural assistance, rural culture, housing standards, housing policies, dilapidated house renovation. The study focused on the main line of RHC, identified stakeholders of RHC management, studied relevant factors affecting farmers' satisfaction with the quality of RHC, analyzed the satisfaction degree of RHC management, and determined the degree of influence, based on which problems of land use, construction control, and process supervision are solved, and suggestions about investment, quality and safety, and progress control were provided. Through data review, questionnaire survey, quantitative analysis and induction, RHC situation in Suining, Sichuan Province was selected as an example, and the satisfaction model was constructed through stakeholder-related research. The overall housing satisfaction was relatively high, and two thirds of rural residents were satisfied with their existing housing. Through SWOT strategic analysis, it was innovatively proposed to implement agency construction model (ACM) in RHC in the context of CBNC, which provides a more scientific management path for RHC in the context of CBNC.

Keywords: rural housing, construction, management
JEL: Q15; P25

[This page is deliberately left blank.]

Resumo

Com o avanço contínuo da construção de novas e belas paisagens (CBNC) na China, especialmente em 2017, quando o Comitê Central do Partido Comunista da China (CPC) propôs a estratégia de revitalização rural, a CNBC foi aprimorada e o desenvolvimento de áreas rurais encontra outra perspetiva, portanto, a construção de moradias rurais (RHC) inaugurou uma oportunidade sem precedentes, e a área rural viu uma melhoria substantiva das moradias rurais. Nesse contexto, a gestão do RHC tornou-se uma grande preocupação, o que preocupa governos e agricultores locais, especialmente se os agricultores estão satisfeitos, quão satisfeitos estão, quais problemas pendentes existem, como melhorar essas questões, entre outros, tornaram-se o foco principal de gestão do RHC no CBNC. Esta pesquisa toma o RHC e sua gestão como a linha principal, seleciona o RHC em Suining, província de Sichuan como exemplo, usa os princípios básicos da gestão do RHC e combina a pesquisa e a prática de especialistas e estudiosos em gestão de CBNC e RHC na China recentemente. anos. Como resultado, no contexto do CBNC, o autor conduziu um estudo empírico através da construção de um modelo de avaliação de satisfação, usou a SWOT para propor sugestões estratégicas para o RHC no contexto do CBNC e propôs o modelo de construção da agência (ACM) para RHC. O estudo enfoca a principal linha de RHC no contexto do CBNC e expõe os princípios de gerenciamento do RHC no contexto do CBNC, das partes interessadas e outras teorias. O autor conduziu um estudo empírico sobre a satisfação da qualidade do RCH com o gerenciamento do RHC em Suining como exemplo, e analisou as deficiências do gerenciamento do RHC antes de apresentar sugestões, o que abre um novo modelo para o gerenciamento do RHC no contexto de CBNC para governos locais e agricultores.

Palavras-chave: habitação rural, construção, gestão
JEL: Q15; P25

[This page is deliberately left blank.]

摘要

随着中国美丽新村建设的不断推进，农村住房建设迎来了前所未有的大好时机，新村农宅建设的投资、进度、治理安全困扰地方政府和农民，这些难题一直影响农户对住房的满意度。文献和实践大多聚焦在项目协调、项目群管理、住房保障、农村救助、农村文化、住房标准、住房政策、危旧房改造等，本文以农宅建设的管理为主线，识别新村农宅建设管理的利益主体、影响农民对农宅建设质量满意度的相关因素研究、分析农宅建设管理农民住宅满意程度及原因等，揭示其关联因素、确定影响程度，解决新村规划、土地有效利用、建设管控、过程监督等方面的苦恼，特别是投资、质量安全、进度困惑提出建议。通过基础资料查阅、问卷调查、定量分析和归纳等研究方法，选择四川省遂宁市新村农宅建设为例，通过利益相关构建满意度模型，进行调查问卷实证研究，通过回归研究结果表明，遂宁农户住房满意度整体较高，有 2/3 的农村居住对现有住房是持满意态度的。通过 SWOT 战略分析，创新性提出新村农宅建设实施代建管理，为美丽新村的农宅建设提供了一种较为科学的管理路径。

关键词：农宅，建设，管理

JEL: Q15; P25

[This page is deliberately left blank.]

Acknowledgment

As time goes by, the study life of doctoral students is coming to an end. Looking back on the wonderful university life as a doctoral student who have studied for 5 years, there are always many mentors and friends who care, support, and help me, otherwise I cannot complete my graduation thesis as scheduled.

First of all, I would like to thank my supervisors, Professor Leandro Pereira and Professor Ding Ya. Since entering school in October 2015, I have been growing up under the care and guidance of my teachers who are knowledgeable, insightful, and diligent people. Their rigorous and pragmatic attitude towards learning and an optimistic attitude towards life inspired me, and I have benefited greatly in both life and study. This thesis was completed under the careful guidance of Professor Leandro Pereira and Professor Ding Ya, who devoted great efforts in helping me select topic, proposal, research, writing up and finalization. Especially, they worked tirelessly to modify the content of my thesis for many times. Professor Leandro Pereira always replied my e-mail super quickly. Every bit of what they have done was inscribed in my heart. Once again, I would like to express my heartfelt gratitude to my supervisors for their careful guidance.

Secondly, I would like to thank Prof. Nelson Antonio, Prof. Virginia Trigo, Prof. Ma Yongkai, Prof. Xiao Wen, Prof. Sun Ping, Prof. Guo Yukun, and Mr. Rinzin Tsering, who also provided valuable comments on my thesis. During the field investigation, Professor Guo Yukun with amiability, and Mr. Rinzin Tsering helped me to contact locations for sample collection to reach a sufficient sample size. Professor Guo Yukun gave valuable guidance on data analysis. Here, I would like to express my sincere thanks and highest respect to them.

In addition, I would also like to thank all teachers at the University of Electronic Science and Technology of Lisbon University IDMgt programme for their teaching and help in the past five years. Thanks to all the teachers who have taught me and cared for me at UESTC and ISCTE Lisbon University Institute.

I would like to thank all the students in IDMgt class 2015 for their help and care for my study, life, research survey, and friendship of all the students in the school. Thanks to the leaders of the Suining Municipal Government, and the units, individuals and individuals who participated in the guidance, planning, design, construction, inspection, and acceptance of the

construction of new rural houses in Suining for providing assistance to my field research and paper materials. My thank also goes to my translator, Miss Ma Shuxuan for her hard work. Finally, thank my dear family and friends for the long-term encouragement and support in my life and study.

致谢

时光如梭，博士研究生学习生活生涯即将结束，回顾攻读了 5 年的博士研究生这段美好的大学生活，身边一直有许多良师益友在关心、支持和帮助自己，才使自己能如期的完成毕业论文。

首先，我要感谢我的指导老师 Leandro Pereira 教授和丁亚教授。自 2015 年 10 月入校以来，我一直在老师的关心、指导下成长。老师知识渊博，思维深邃，见解独到，诲人不倦，他们那种严谨务实的治学态度和平实乐观的生活态度深深地感染和激励着我，使我在生活和学习上都受益匪浅。本论文是在 Leandro Pereira 教授和丁亚教授的悉心指导下完成的，从选题、开题、研究、撰写到最终定稿都倾注了老师的心血。特别是在素材选择时，老师孜孜不倦的给我修改了多次，Leandro Pereira 教授回复邮箱神速，师恩似海，点点滴滴铭刻在心，再次感谢老师悉心的指导。

其次，我要感谢 Nelson Antonio 教授、Virginia Trigo 教授、马永开教授、肖文教授、孙平教授、郭玉坤教授、仁孜泽仁老师，六位老师也对我的论文提出了宝贵的意见，在实地调研时，和蔼可亲的郭玉坤教授，仁孜泽仁老师帮助我到处联系样本采集地点，以达到足够份额的样本，郭玉坤教授对数据的分析等给予了宝贵的指导，在此，我谨向您们表示我最诚挚的感谢和最崇高的敬意！

此外，我还要感谢电子科技大学-里斯本大学 IDMgt 项目全体老师。感谢五年来对我的教导和帮助。感谢电子科技大学-里斯本大学所有教过我和关心帮助过我的老师。

感谢 2015 级 IDMgt 班的全体同学对我学习和生活上的帮助和关怀；对我论文调查的帮助；感谢学校所有同学的友谊，感谢遂宁市政府的各位领导，感谢参与遂宁市新农村住宅建设的指导、规划、设计、施工、检查、验收等单位和个人对我的实地调研、论文素材提供帮助,感谢我的翻译马淑璇老师的辛勤付出。最后，感谢我亲爱的家人和好友给我生活上、学习上的长期鼓励和支持。

[This page is deliberately left blank.]

Contents

[This page is deliberately left blank.]

List of Tables

[This page is deliberately left blank.]

List of Figures

[This page is deliberately left blank.]

List of Abbreviations

ACM	Agency Construction Model
BOT	Build-Operate-Transfer
CPC	Communist Party of China
CNBC	Construction of New and Beautiful Countryside
NCC	New Countryside Construction
PPP	Public-Private Partnership
RHC	Rural Housing Construction
TOT	Transfer-Operate-Transfer

[This page is deliberately left blank.]

Chapter 1: Introduction

1.1 Research background

1.1.1 Rural construction policy

Over the past 40 years of China's reform and opening up, urban and rural areas has undergone tremendous changes. In particular, rural areas have changed from "de-ruralization" to "reverse urbanization". De-ruralization does not mean de-urbanization. Urbanization needs increased investment in rural areas so that rural areas can achieve urban-rural integration without changing the original structure. Reverse urbanization is a decentralized process of population migration from large cities and major metropolitan areas to small metropolitan areas, small towns, and even non-urban areas. In recent years, CBNC (Construction of Beautiful and New Countryside) and the implementation of the plan of rural revitalization strategy (Office of Rural Work Leading Group in Communist Party of China Central Committee, 2018) (hereinafter referred to as the rural revitalization strategy) have further accelerated the development of the new countryside. CBNC refers to the important historical task of building a new socialist countryside proposed by Communist Party of China (CPC) Central Committee, including specific requirements in production, development, life, village appearance, governance.

As early as the 1950s, CPC Central Committee put forward a call to build a new socialist countryside. During this period, certain results were achieved, which promoted the development of the rural economy and the improvement of the living standards of farmers. Since China implemented reform and opening up in 1978, China has invested many human and material resources in rural construction. China's No. 1 document (which is the first document issued by the government every year, its sector indicating paramount importance and attention) for more than 20 years has been on rural policies, especially the new countryside construction (NCC) that based on the reality, respect farmers' wishes and promote CBNC. The No. 1 document in 1984, the No. 5 document in 1987, and the No. 21 document in 1991 all used the terminology of NCC. Proposal of CPC Central Committee on Formulating the Eleventh Five-Year Plan for National Economic and Social Development (CPC Central Committee, 2005) set forth the requirements for NCC of "productive development, ample living, rural civilization, clean and tidy village, and democratic management". The No.1 document in 2005, Several

Opinions on Increasing Reform and Innovation and Accelerating the Construction of Agricultural Modernization stated that focusing on the integration of urban and rural development will further promote NCC and focusing on NCC and CBNC are the key task of building a well-off society in an all-round way. Article 23 of the No.1 document in 2017 stated that in-depth development of habitat environment governance in rural area, CBNC, prompting architectural design to the countryside, carrying out pastoral building demonstrations, and better design, construction, management, protection, and operation of rural roads.

1.1.2 Rural construction in a period of large-scale development

With the rapid advancement of China's new urbanization and new industrialization, the steady and rapid development of the national economy, tremendous achievements in urban and rural areas, the continuous enrichment of rural construction, there is a trend of accelerated construction in RHC. In recent years, the scale of rural infrastructure investment has been continuously expanding. A series of policies for coordinated development of urban and rural areas, such as Village Revitalization Strategic Plan (2018-2022) (Office of Rural Work Leading Group in CPC Central Committee, 2018), Action Plan for Tourism Infrastructure Renovation and Upgrade in Deeply Poor Areas in Three Regions (Tibet Autonomous Region, Sidi Prefectures in Xinjiang and the Tibetan region in Sichuan Province) and Three Prefectures (Linxia Prefecture in Gansu Province, Liangshan Prefecture in Sichuan Province, and Nujiang Prefesture in Yunnan Province) (China's State Council, 2018) were issued. Rural revitalization of NCC have risen to a new level at national strategy.

At present, weak infrastructure is still a big shortcoming in rural areas, and it is also a key point that should be overcome in the process of implementing the rural revitalization strategy of NCC. The source of funds for rural infrastructure construction mainly depends on government fiscal expenditures. In recent years, fiscal expenditures for rural infrastructure construction have maintained rapid growth, exceeding 130 billion yuan in 2019 (National Research Consulting Group, 2019).

In the context of the rapid development of NCC, the appearance of rural villages will be greatly improved, and it is at the best time to solve the problem of management of RHC projects in NCC. During the national 14th Five-Year Plan period, rural housing investment will continue to increase in the context of rural revitalization. National Statistics Bureau (2020) stated that China's rural permanent population accounts for 57.01% in 2019. Driven by external factors such as housing policies and internal factors of village development, the pace of NCC in China

has gradually catalyzed in recent years. In 2016, the construction area of completed houses in rural areas reached 796.4914 million square meters, and in 2017, the construction area of completed houses in rural areas was 589.926 billion yuan (China Statistical Bureau, 2018). It is fair to justify that RHC projects are in a period of large-scale construction.

1.2 Overview of rural housing in the context of NCC in Suining

1.2.1 Change of rural housing

(1) Spontaneous changes

With the rapid development of China's society and economy, rural housing has undergone great changes in form and living conditions. In terms of building materials, structure and form, rural houses across the country have experienced the following transition: from grass sheds to tile houses, from cottages to buildings, from the use of traditional simple materials to the use of industrial production materials, from small areas to large areas, from meeting the basic survival needs of farmers to the needs of living comfortably. This development process is basically spontaneous without guidance and long-term planning, some old farmhouses also have the value of historical protection as a historical cultural relic with local representativeness in the changes of China's rural housing.

(2) Guiding changes

China's reform and opening up is a turning point in RHC. Under the guidance of the national policy guidelines, RHC has the right direction and a big step forward. Changes in economic capabilities and concepts have laid a solid foundation for RHC and has accelerated its pace. The increase in population and number of households have forced the number of rural houses to rise sharply. The transformation of the social and family structure has intangibly increased pressure on RHC. In order to adapt to changes in residential needs, changes in building technology, structure, and energy equipment are not only the result of technological advancement, but also the need to improve life in rural area. These changes have brought huge changes to RHC. Therefore, in the development RHC for more than 70 years after the founding of the People's Republic of China, 40 years period after the reform and opening-up is the period of greatest change in RHC.

Through research and data analysis, this study found that the appearance of rural houses in Suining has changed significantly, mainly reflected in the use of building materials, structures

and forms. It beautifies the living environment of rural residents and adds green element, environmental friendliness, and style and features of local architecture to CBNC.

1.2.2 Classification of rural housing

(1) Division by building materials

Divided by building materials, RHC in Suining can be divided into three stages: from adobe and wood structure, brick, and wood mixture, to brick and concrete structure and steel-concrete composite. The adobe bricks are made by mixing clay with water to form mud, which is then put into a certain model and formed by drying with the light and heat of the sun. It is a building material originally processed by mankind. It is simple to make, featuring low cost, good insulation performance, yet low strength, easy to soften after water absorption. In RHC, adobe bricks are mainly used to build walls, timber is used to build roofs, beams, columns, doors, and windows. Clay bricks are made by roasting adobe at high temperature with high strength and good water resistance. At the same time, it has a regular shape and uniform size. Thereby, it is easy to build and is the protagonist of wall materials in housing construction in China. Brick-concrete and steel-concrete structure mainly use reinforced concrete and fired clay bricks. Reinforced concrete is a composite material that improves the mechanical properties of concrete by adding reinforcing steel to the concrete and working together. It is used to build beams and columns in the construction of rural houses and fired clay bricks fill the walls. However due to its high cost, it is not popular in RHC in Suining.

(2) Division by structure

Divided by structure, RHC in Suining can be divided into four stages: from adobe and wood structure, brick and wood mixture, brick, and concrete structure, to steel-concrete composite. The adobe bricks and wood mixed structure is a brick wall or brick column built with adobe bricks to bear vertical load, and the timber-built roof structure system is placed on the brick wall or brick column to bear horizontal load. The brick-wood mixed structure is built with fired clay bricks to build the wall or the wall column as a load-bearing structure, and the clay brick also plays a role in maintaining the structure. The wood is mainly used to build a roof structure, placed on the brick wall or brick column to withstand horizontal loads. The brick-concrete structure is a brick wall or brick column as a vertical load bearer, and reinforced concrete is used for floor, beam, lintel, roof, and other lateral load bearer to rest on brick walls or brick columns. Brick-concrete and steel-concrete structure are composed of reinforced concrete to cast beams and columns as the main load-bearing components to form the skeleton of a

residence, clay brick as a structural form of wall filling material. Through the investigation and conclusion of the author, the building structure in Suining includes three structures, and the construction time among them intersects each other. Generally, Suining has experienced the structure changes from adobe and wood structure, brick and wood mixture, brick and concrete structure, to steel-concrete composite. A large number of bungalows still adopt brick-wood mixed structures, especially the single-story houses.

(3) Division by form

In the light of form of building, rural houses can be divided into two types: bungalows and buildings. A bungalow refers to a house with only one floor, while a building refers to a house with two or more floors.

After comparative analysis, this study divided rural houses in Suining into three stages according to the use of building materials, structures, and forms, namely, the stage of bungalow with adobe-wood mixed structure, the stage of bungalow with brick-wood mixed structure, the stage of building with brick-wood, brick-concrete mixed, and steel-concrete mixed structure. At the same time, this research found that the main construction of rural houses in Suining undergone 2 stages: the stage of bungalow with adobe-wood mixed structure (lasting for more than 30 years since the founding of 1950s to the early 1980s) and the stage of building with brick-wood, brick-concrete mixed, and steel-concrete mixed structure (lasting form more than 20 years from the early 1990s to the present). The stage of bungalow with brick-wood mixed structure (lasting for about 10 years) is a transition period. Comparing with bungalow with adobe-wood mixed structure, bungalow with brick-wood mixed structure update its material, but its form and function are not much different due to influence of traditional culture. At the same time, the attempts at the construction method at this stage also paved the way for the construction of brick-wood and brick-concrete steel-concrete buildings. The factors affecting RHC gradually changed during this period. Therefore, the author divided the rural houses in Suining into three stages: traditional period represented by bungalow with adobe-wood mixed structure, transition period represented by bungalow with brick-wood mixed structure and new period represented by building with brick-wood, brick-concrete, and steel-concrete structure.

It should be noted that there is currently a new type of structure, light-steel, gradually appearing in rural areas. Despite of infancy, it gives farmers a new option for building houses.

1.2.3 Present situation of rural housing in the context of NCC in Suining

(1) Diversified sources of funds for RHC

As the pace of NCC continues to accelerate, the scale of RHC projects continues to expand, its number increases, and its scope expands. An increasing number of funds for project gather in the countryside. RHC projects appear in the form of integration. Funds from the agricultural department, development and reform department, transportation department, housing construction department, poverty alleviation department, and the private sector are all integrated into the countryside. RHC projects presents the phenomenon of multi-sector, multi-channel, multi-project, and cross-operation. Project in the field of rural roads, small on-farm waterworks, agricultural industry, housing. account for 90% of total rural construction projects, and multiple projects are promoted simultaneously.

(2) Vague core of RHC management

The diversification of projects and funds make RHC projects use a variety of project management types that engage government, villages, property owners, designers, supervisors, investors, construction contractors and suppliers. In actual project management, there are often inconsistencies in the core of different project management, which seriously affects the collaborative management and efficiency of RHC project, resulting in the unreasonable allocation of resources in various projects, and failing to achieve overall benefits, overall goals, and organization strategic goals effectively.

The government is not only the general coordinator, but also the general organizer of the production process of RHC project. With the participation of multiple villages and parties, many different design institutes, construction organizations, investment organizations, supervision organizations, and supply organizations will appear. Not every party has the ability and conditions to optimize resource allocation across projects and handle complex relationships between projects in real time. Therefore, for the management of RHC projects in the context of NCC, the core of project management of all parties should be the government in spite of agencies representing different stakeholders in the project, and only the government or government-authorized professional agencies representing the property owner can meet the basic conditions for coordinating and managing RHC projects.

(3) Difficult management of RHC

In the process of implementing RHC projects, the resources of manpower, machinery, materials, and funds required by each RHC project usually need to be shared among several RHC projects,

so the deployment and use of them are subject to certain restrictions, which strains the organization and management of the project, and will dwarfs the completion of the investment, schedule, quality and other predetermined goals for the project. In addition, during the implementation of the project, unpredictable factors in the management organization structure, resource allocation and coordinated management also affect the project system, often resulting in delays in the construction period and investment over budget.

1.3 Research questions

1.3.1 Perplexity facing RHC management in Suining

The three rural issues (rural, farmer, and agricultural) have always been issues of people's livelihood to which the Chinese government attaches great importance. China has clarified that the development direction and investment intensity of the countryside in the form of the No. 1 document for many years in a row, and the annual government investment in the countryside has increased year by year. The housing problem of farmers is an important part of the three rural issues. In the process of revitalizing and CBNC, farmers cannot live a happy life until they live in safe and reliable houses that are neat and tidy. Construction is inseparable from the strong support of the government. In addition to the support of the government, the management of residential construction projects is a reality in front of us. The investment, construction period, and construction quality of RHC projects are both concerned by the government and farmers themselves.

CPC Central Committee (2017) proposed rural revitalization strategy at the 19th National Congress of CPC, another major measure for NCC, pointing out that the three rural issues are fundamental issues related to national economy and people's livelihood. The three rural issues, plus the implement rural revitalization strategy in the NCC, should always be the top priority for the work of CPC. Implementing the strategy of rural revitalization, deepening structural reforms on the agricultural supply side, building a modern agricultural industry system, production system, and management system to achieve the in-depth integration and development of rural primary, secondary, and tertiary industries are conducive to promoting the transition from production orientation to quality orientation, enhancing China's agriculture innovation and competitiveness, and laying a solid foundation for building a modern economic system.

The overall development goal of the rural revitalization in the context of NCC is

"prosperous industry, ecology and livability, civilization, effective governance, and affluent life" (Office of Rural Work Leading Group in CPC Central Committee, 2018). "Ecology and livability" are to provide rural houses with complete infrastructure construction, improve settlement environment, ecological environment, and equalization of basic public services in urban and rural areas. The prerequisite for farmers to live in a good house is to build a house for them, and to build a house, it is necessary to manage RHC. However, the following dilemma facing RHC needs to be solved urgently.

(1) Lack of quality and safety supervision and management

In the implementation of NCC, farmers enjoy relatively large autonomy in the construction, expansion, or modification of their houses. Villagers' committees do not have a unified planning function, the township government is not equipped with a quality and safety supervision and management team, and farmers' awareness of quality and safety management is weak when building houses interdependently. Om top of that, no third-party agencies professional at quality and safety supervision and management are introduced in rural areas, causing great hidden dangers in the quality and safety of RHC projects.

(2) No basis for cost accounting

In the process of building houses, farmers have no design and construction drawings, no investment budget for construction, and investment of RHC projects is disorderly. The consumption of manpower, machinery, and materials in RHC cannot be scientifically and reasonably organized, resulting in the inability to accurately control the investment in RHC. In addition, there is no specific basis for the measurement and valuation of RHC, so the calculation of the construction cost of rural housing projects can only be applied to the relevant provisions of urban construction measurement and pricing that cannot accurately calculate the construction cost of rural residential projects.

(3) Slow progress

Site selection, demolition, construction preparation, construction, acceptance, occupancy and many other processes in RHC are closely linked to the government's subsidy policy, exchange of land, material preparation, construction personnel organization, construction sequence arrangement, and farmers' construction capacity, which directly affect the construction period of the project. In the coordination of the government, farmers, villages, construction organizations and other parties, most RHC projects are scheduled to be completed within 6 months, yet normally delayed to 8 months or more.

(4) Lack of planning control and land law enforcement

RHC normally follows inclination of farmers without scientific planning, so the layout and function of rural residence is unscientific. The distribution of rural residence is very sporadic, even occupying arable land. Moreover, some farmers have more than one homestead, and they can choose site selection at random, not completely avoiding the hidden danger points of geological disasters. The appearance of the residence is not uniform without authentic local features, which affects the overall effect of NCC.

1.3.2 RHC management and housing satisfaction

Economic development is the fundamental driving force for changes of rural housing. As the income of rural residents increases, they begin to pursue a relatively high quality of life and living environment. Improving the quality of housing construction is a basic condition. Moreover, most of the rural residents now have a psychological comparison. Higher income of a family determines that they are more likely to pursue comfortable living environment and luxurious housing. Housing construction is their most direct and preferred way to show wealth.

In recent years, with the rapid development of the rural economy, the income level of farmers in Suining has increased significantly, and farmers' requirements for housing have become increasingly higher. They have gradually changed their needs for housing from meeting the needs of survival to development and enjoyment. When farmers become rich, their first consideration is to improve living conditions due to the influence of traditional culture. Although the housing conditions of rural residents in Suining still have a large gap compared with the developed regions in China, rural housing in Suining is gradually developing towards higher floors, larger areas, and better quality. Whether the housing of the rural residents is satisfactory and how satisfied they need to be studied.

1.3.3 Research problem

Rural housing is one of the basic elements necessary for the survival and development of rural residents, and it is the key to rural residents' living and working and maintaining social stability. In recent years, the rural economy has developed rapidly, and the housing conditions of the vast number of rural residents have continued to improve. With the continuous improvement of living standards, the demand for housing will also change accordingly. Therefore, the improvement of housing conditions does not mean that residents are satisfied with their housing conditions. At present, are rural residents satisfied with the housing situation? Have their

housing needs been met? What factors have affected rural residents' housing satisfaction? How is the relationship between housing quality and rural residents' housing satisfaction? The answers to these questions cannot only provide a comprehensive understanding of the gap between the actual housing needs of rural residents and the current status of housing, in order to improve the life satisfaction of village residents, provide an in-depth analysis of the housing problems of rural residents, especially the quality of housing, but also provide a basis for the government to formulate and improve management policies of RHC (rural housing construction, used in previous chapters).

To this end, this research intends to study the following research questions:

1. Identify the main stakeholders of RHC management in the context of NCC.

2. Research on related factors that impact rural residents' satisfaction with the construction quality of rural houses in Suining.

3. Analyze the satisfaction degree and reasons of rural residents' with RHC management in the context of NCC.

1.4 Research objectives and purpose

1.4.1 Research objectives

The first is to review the literature, draw on previous research results, and sort out the relevance of RHC management.

The second is the survey and analysis of RHC in Suining. Through questionnaire survey and field visits, the author grasped the current status of rural housing area, housing structure, housing type, quality control of RHC, farmers' housing satisfaction and housing expectations, and found out problems of RHC in Suining and causes.

The third is to combine quantitative and qualitative methods to analyze factors that impose impacts on farmers' housing satisfaction in Suining. The main purpose of RHC is to provide farmers with more livable housing and improve their housing satisfaction. Therefore, pinpointing factors that impose impacts on farmers' housing satisfaction can provide reference for decision-making in ecologically friendly and livable RHC.

1.4.2 Significance of the research

This study describes RHC in the premise of the implementation of the rural revitalization strategy, takes RHC in Suining as an example, and answers existing problems and it causes of

RHC, housing characteristics, current status of supervision, problems and causes, to realize RHC with centralized planning, distinctive characteristics, ecological livability, government supervision, quality assurance, structural safety, reasonable cost, complete functions, comfortable and beautiful appearance, and holistic supporting facilities, thereby improving housing quality satisfaction of rural residents. This study can provide theoretical contributions to RHC management, as a reference for decision-making in rural housing improvement, and RHC management in NCC.

To this end, this study intends to achieve the following objectives:

1. Under the background of NCC, revealing the stakeholders of RHC management and related factors that affect the satisfaction of RHC.

2. Determining the reasons and degree of impact on rural residents' satisfaction with rural houses.

3. Providing strategic suggestions for RHC and its management in Suining, solving the problems of the government and rural residents in the areas of new village planning, effective land use, construction management and control, and process supervision, especially for investment, quality safety, and progress confusion, and providing reference for decision-making to improve housing satisfaction of rural residents.

1.5 Research methods

In order to enable research to be carried out under the principles of science and objectivity, this research mainly adopted the following methods.

1.5.1 Literature review

Through the domestic and foreign research on rural and housing management and other theoretical methods, the author collected, rearranged and processed various domestic and international statistical data to guide this research, combining with the results obtained by other research institutes.

1.5.2 Questionnaire survey

Farmers from no less than 40 villages in Suining were randomly select to conduct a questionnaire survey, as well as survey other villages with similar backgrounds in China and outstanding construction conditions. Through questionnaire survey, field survey, household

interviews, and interviews with village civil servants, the current status of the village and the process of construction development was understood to provide data support for the research.

1.5.3 Quantitative analysis

The data obtained during the survey used as the analysis object, and the present situation of RHC management in Suining was depicted through descriptive statistics. By constructing a binary Logistic model, factors that have impact on rural housing satisfaction in Suining were analyzed, focusing on the impact of housing quality management on farmers' housing satisfaction. After finding out the existing problems, their causes were discussed and analyzed.

1.5.4 Induction

The inductive method was mainly used in preliminary data processing and summarization in the conclusion stage. Inductive method was used to classify types and level of various villages, based on which they were summarized and analyzed, and foreshadowing the conclusion.

1.6 Thesis structure

Chapter 1 is an introduction, which introduces the background of the research and RHC management in the context of NCC, the motivation of the research, the major research problems, objectives, hypotheses, and significance of the research.

Chapter 2 is literature review. The author consulted the previous research results and started to cover theoretical literature and practical achievements such as management science, new village construction, satisfaction, and construction quality, and found out the deficiencies to provide theoretical support and research for future research.

Chapter 3 is the basic principle of RHC management in the context of NCC and about the stakeholder and satisfaction model of RHC. It mainly introduces the contents and models of RHC management in NCC, and at the same time finds out the existing deficiencies to act as foundation for the study.Through combining stakeholders involved in RHC, the framework of the satisfaction model of RHC was constructed.

Chapter 4 is the empirical research method of RHC management. This chapter explains method adopted in this study, which include questionnaire survey, sample collection description and data collection, statistical analysis and tests.

Chapter 5 discusses findings and factors according to the results after models were operated,

analyzes and finds out the problems and deficiencies in RHC management in Suining.

Chapter 6 is RHC management strategy in NCC, using SWOT to give suggestions for RHC management strategy, responding to the research questions proposed in Chapter 1, giving suggestions to solve the puzzles and improve satisfaction of RHC management in NCC, provides measures to realized sustainable rural development.

Chapter 7 is conclusions and prospects, which includes main conclusions of this study, research contributions and deficiencies, and the future direction.

[This page is deliberately left blank.]

Chapter 2：Literature Review

2.1 Management theory

Taylor (1909), father of scientific management, studied the working methods of how to deliver more effective work in industrial organizations, thus forming his ideas. He argued that due to economic drive and restrictions of physiological function, workers need to be constantly guided, and relevant experimental conclusions also supported this theory, including management by objective and project management.

2.1.1 Management by objective

According to the literature review, "target management" originated from the well-known Drucker (1954) who proposed that everyone should have an objective, and the same is true for sales. Objective orientation is very important for management. The most important objective for managers is their consistency with the objectives of the entire collective. The management concept the author put forward played an important role in the progress and changes of American society and economy. With the continuous innovation and practice of the United States, other countries in the world have gradually adopted and applied it. The earliest application of this management method in the world was by famous multinational enterprises such as Hewlett-Packard, Boeing, and Motorola. After the application in these enterprises, target management quickly became increasingly popular in the market. In addition, the idea of target management is also widely used in other related fields, such as engineering construction. Management of construction projects is often regarded as a group of tasks or activities. It is not difficult to find that target control is the core of management activities of engineering project. In recent years, engineering management scholars have closely studied a series of issues arising from the early warning and planning involved in the objectives of engineering projects, in the hope of achieving optimal objectives in their engineering projects through scientific management.

2.1.2 Project management

As one of many management disciplines, project management has been widely used, and its

role is getting increasing attention in real life. With the continuous progress of society, related theories are gradually improved, and related branches are constantly emerging due to the actual situation. According to the literature consulted, project management is also applied to the process of RHC management.

(1) Project management process and organization theory

Its core theory can be mainly divided into the following three parts, which are work-related process organization, intelligence construction information, and learning organization mode. Wu (2015) considered that management of construction projects is a management work that requires multiple types of works and multiple parties to participate and coordinate. He used intelligent construction theory to informatize management of construction projects, used modern and new information technology in management of construction projects, thus linking information communication between various participants, and solving the problem of information island.

Jiang (2016) believed that the evaluation of human resources, capital, and technology in complex engineering projects can reflect the complexity of large-scale projects through analyzing organizational processes. Liu (2016) portrayed the process and organization of project management in detail. Theses researches are slightly different but impose mutual influence on each other. For example, the relationship between the organization and the process is relatively static, while the intelligence construction information and learning organization is oppositely dynamic. In the specific construction process, the procurement of engineering-related materials belongs to the category of workflow organization.

(2) Stakeholder theory in the project

Many opinions in this theory are mainly derived from researches related to corporate ethics and social performance, and the research of stakeholders starts with corporate management. There are many descriptions about stakeholders, while Gan (2014) adopted the stakeholder theory in his research on sustainable construction model in infrastructure project.

It is worth noting that Mitroff (1983) first proposed this idea. Since then, there emerged a total of 27 representative opinions and application, and the most influential one was argued by Parmar et al. (2010) that organizational objectives and stakeholders are mutually influential and interactive. Luo (2017) both believed that project management and stakeholders influence and interact with each other. Individuals or groups of stakeholders taken corresponding risks because they have invested in human, material, and financial resources in project organization.

Mao, Lu, and Li (2012) conducted a quantitative classification and discussion of stakeholders in sustainable construction of engineering projects and pointed out the dynamic characteristics of stakeholders in sustainable construction of engineering projects. Ren (2019) conducted a research concerning issues such as farmer cooperation, rights and interests protection of farmers in engineering construction, public policy implementation and put forward the three attributes of stakeholder: ownership, power and urgency. Dong (2016) believed that successful project management is to satisfy stakeholders. Zhang (2015a) argued that stakeholder management of project is an important aspect of project management. Yuan and Wu (2015) believed that under the new situation, there are many parties involved in a construction project, and there are conflicts of interest between different parties with different needs. Wang (2014b) said that brand governance for the purpose of brand co-building of maintaining stakeholders has become an important means of achieving brand health and sustainable development. Song et al. (2014) believed that project governance of complex product systems is composed of internal governance, external governance, and environmental governance, and it reflects the integration of stakeholder responsibilities, participation methods and project communication coordination. For the stakeholders of RHC, it is not only one of the most important components of the relevant external environment of RHC project, but also a key part in the management of the construction project. Factors affecting the success of construction projects and satisfaction of rural residents with housing are related to stakeholders. In the identification and analysis of stakeholders in RHC project, relevant important information can be obtained, and it also includes the relevant management measures formulated by the relevant managers.

(3) Program management

It is unavoidable to discuss the cluster effect of the project group that is a very important part of the project management. Niu (2016) built a vertical level flattening and horizontal function coordination project group management organization. Yang (2014) discussed this topic centering the construction of alliance system. You (2017) built a decision-making mechanism for large groups of public projects.

(4) Synergetics theory

Haken (1981) put forward the synergetics with many rich contents, such as the principles of self-organization, coordination, and domination. Wu (2016) and Xue (2015) use synergetics to construct synergistic changes and effects between subsystems, which embodies the synergy

between subsystems, and fully illustrates the self-organization capabilities and functions within the project system itself. The principle of domination means that if the construction of the project is interfered and causes non-equilirium of the overall objective, the fast variable will always try to pull it back to its original equilibrium under certain circumstances. Many researchers (Jiang, 2015; Zhu, 2015; Yu, 2015) thought that collaboration is very important in project management.

2.2 New countryside construction (NCC) and rural housing construction (RHC)

2.2.1 NCC and RHC

(1) China's urbanization and NCC

Chu (2014) argued that the reason why China's urbanization can achieve good results lies in farmers' strong intention to live in city. For the entrepreneurs in the countryside, their wishes are particularly important and significant to urbanization progress. It is believed that there is a positive and significant relationship between industrialization and agricultural modernization and urbanization. Farmers' age, disposable income, age, and household registration policies will all affect farmers' willingness to migrate to a certain extent. For farmers with the idea of obtaining employment, the education opportunities for their children, the attributes of the village where they are located, and the area of their own land will affect their willingness to move to cities to a certain extent.

(2) Architecture of rural planning system

Zhou and Luo (2015) studied the implementation of rural planning and construction and believed that China's current urban-rural structure and system have some drawbacks, so the problems of the rural population, economy, and culture have become more prominent. Transformation is urgently needed for countryside, farmers, and agriculture. Urban-rural contradictions urgently need to be resolved, rural planning urgently needs to be standardized, and planning tools urgently need to be implemented. The essential reason of the problem is the lack of basic theory of rural planning. Drawing on the rich research experience and mature practical achievements in the United Kingdom, and combining with the reality of Chinese villages, a systematic theoretical system conforming to the characteristics of China's rural areas is constructed. The establishment of a sound theoretical system and rural planning complement

each other since it guides the actual planning of rural areas, while allows the planning system to improve the theoretical system. They also advised to establish a three-level network system engaging national level, region level and rural level, highlighted the subjectivity of rural planning, enriched the content of the system, simplify the administrative approval process, and established regional policy and subsidy construction mechanism of the rural area based on category of rural area prescribed in the "spatial development strategy of provincial urban and rural integration" with the idea of urban and rural integration .

(3) Village spatial layout and participation of villagers

Nigati (2015) believed that the urban-rural difference is increasing, urban development is maturing, the gap between urban and rural areas is widening, and rural revitalization has become an important measure for social development in China. Allowing coordinated urban and rural development, and CBNC require multiple measures, not only to solve problems and contradictions, but also to use the advantages of the city to develop resources with rural characteristic, therefore achieving vigorous development of ecology, human and economy. From the level of planning, he discussed the layout of the village, courtyards and buildings, public facilities, and infrastructure. he conducted in-depth analysis on the policy guidelines on rural revitalization, focusing on the protection of rural ecology, the development of characteristics and the construction of landscape facilities, enhancing the layout of rural space, and sorting out the development trend of rural space. Xin (2017) proposed that China's economic development has entered a rapid period, and the pace of overall urban and rural development has accelerated. "Characteristic towns" and "ecologically livable villages" are favored by an increasing number of people. It has become a common pursue and inner appeal for the majority of rural residents to comprehensively promote CBNC, accelerate the renovation of rural residential environment, plan the construction of rural areas. Rural revitalization needs to highlight the participation of farmers. The government should play a guiding role and take multiple measures to stimulate farmers' enthusiasm for participating in rural revitalization, and the governments also need to understand farmers' demands, and designate a scientific and effective rural development plan that is recognized by the masses.

2.3 Foreign studies about rural residential housing

In terms of researches on housing issues in rural areas, there are relatively rich research results in other countries. Rural construction in these countries started relatively early, but the scope of

researches is relatively small, mainly in developed countries such as Europe, the United States, Japan, and South Korea that enjoy rich experiences in rural construction and agricultural movements. In the process of rural construction, these countries took government support as the lead, centralized management of rural arable land and housing construction land, conducted reform of the rural housing system, and large-scale and centralized management of rural land.

It should be noted that foreign social systems, land systems, and housing property rights systems are dominated by capitalist systems. This is very different from China's political and economic systems. Foreign scholars' research on rural housing is mainly concentrated housing security, government assistance, rural housing supply, rural housing social composition and other aspects, which can be seen in Figure 2.1.

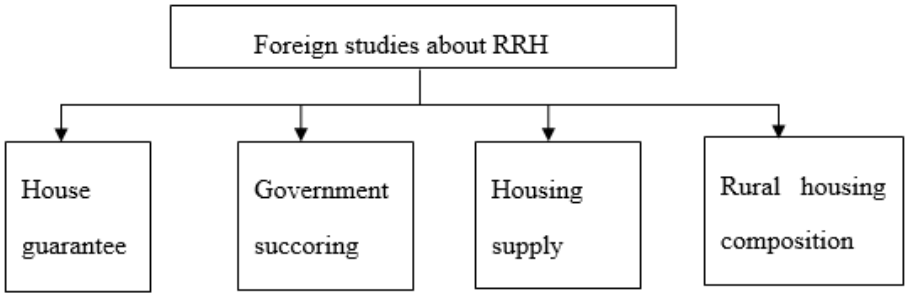

Figure 2.1 Foreign scholars' research on rural housing

2.3.1 House guarantee

Carson and Mattingly (2018) used interviews and focus group to analyze the impact of restricting rural housing stock on workers' families in two new England communities and explored solutions to the housing burden of rural residents. They pointed out that many rural areas face housing affordability and insufficient housing. It is believed that policy makers should consider innovative ways to improve and use existing housing stock to expand affordable, high-quality housing options, and inspected the housing resources, credit policies, and feasible solutions in rural America. Sun (2017) conducted two large-scale surveys of rural housing problems in Shanxi province, analyzing the reasons for the poor housing conditions in rural areas, reasons why many housings were not updated and improved in time, and how to help farmers improve housing problems. In addition, and Yu's (2017) study is very representative in terms of policy system.

2.3.2 Government succoring on rural housing

Ananth (2017) found that in India, solving urban housing problems takes priority over rural

housing problems, and rural housing problems are marginalized through a study of rural India. Compared with urban areas, the poor in rural areas are more concentrated. Due to the generally low income and the existence of seasonal unemployment, many rural households have difficulty obtaining housing ownership. This poses a challenge to the sustainability of the countryside, and as young people migrate to the cities to find jobs, leaving the elderly and children in the countryside, leading to serious polarization and negatively affecting the rural economic development.

Wiegand, Koomen, and Pradhan (2017) used two cross-sectional household surveys and corresponding roadmaps to assess the impact of road development on rural housing welfare in Papua New Guinea from 1996 to 2010. It was found that investment in closing roads to the nearest towns resulted in higher consumption levels and housing quality, and reduced dependence on subsistence agriculture. The World Bank (2016) conducted an analysis of Rural Housing Reconstruction Program in Nepal and provided donations and technical assistance to eligible families through the Nepalese government to ensure that earthquake-safe construction techniques were used to rebuild houses destroyed in the most affected areas in the country.

Kulshreshtha et al. (2020) conducted an informal survey in India to explore the factors that favor and limit the construction and daily use of earth houses. The results show that "image" is the main obstacle preventing people from widely accepting conventional earth houses which are usually tied to poverty. Although modern earthen buildings are needed, they are quite expensive for low-income households. The study has analyzed the role of earth in solving the present housing shortage, and proposed the advice of implementing modern earth building technique in low-cost and affordable rural housing. The proposal made by middle-and high-income families, entrepreneurs and governments can pique wide public interest in earth buildings. In addition, it is of great help to display durable earthen structures in multiple locations and occasions to change the public perception of the image of earth, which could consequently become an ideal material for low-cost housing in rural areas of India.

Regarding the reconstruction of dilapidated houses in rural areas, due to the social system and government structure in China, similar situations in developed countries abroad are rare, and there are few systematic studies on the reconstruction of dilapidated houses in rural China or government behavior by foreign scholars. However, even if there is a big difference between the government behavior in the reconstruction of dilapidated houses in rural areas and that in China, it can still be used for reference from theory and practice.

2.3.3 Supply of rural housing

Scott, Bullock, and Foley (2013) discussed the design of newly developed housing in rural Ireland, analyzed the use of government planning guidelines for rural housing design, and the design preferences of Irish rural public and stakeholder groups. Through analysis of design guidelines, survey results, and focus groups, they found that although planning practitioners can reach consensus on the principle of "good design", this expert-centric view is difficult to be accepted by rural residents. Bobkov et al. (2021) presented the evaluation of the housing supply in rural and urban areas in Russia. Based on the adopted method of determining the housing supply level, the actual housing characteristics are compared with social standards, that is, the regulatory requirements for the area, spaciousness, and comfort of the houses or apartments. The study shows that urban housing is more comfortable but meanwhile more limited in terms of residential area and space vis-à-vis rural housing. In addition, different rural and urban population groups have been identified in terms of housing supply. The survey shows that the proportion of rural residents living in housing poverty (87.8%) — in terms of area and living conditions — is more than twice that of the whole population (41.6%) and more than three times that of urban residents (25.1%).

2.3.4 Composition of rural housing

Satsangi, Gallent, and Bevan (2010) conducted a systematic study on housing issues in rural Britain. The research topics included rural development, economic change, land use, planning, and urbanization. They tried to find out that housing problems in rural Britain have been difficult for more than a century. The cause of the solution. For the supervision of government investment projects, Yao and Guo (2014) discussed the management of government-invested and agency construction project and proposed corresponding control and preventive countermeasures for the operation efficiency and against corruption. Zheng (2014) divided the risks of large-scale engineering projects into market risk, completion risk and institutional risk. Zhao (2019) pointed out that in the life cycle of engineering construction projects, the use of risk management in the planning and construction phases is higher than the concept and termination phases.

2.3.5 Housing satisfaction

Satisfaction research first appeared in the field of psychology and sociology and was subsequently introduced into the field of management. Housing satisfaction is an important

manifestation of an individual's quality of life based on the actual housing needs of residents. Housing satisfaction measures the gap between the actual living conditions and expected living conditions of the family. The smaller the gap is, the higher the residents' satisfaction will be.

Since the beginning of the 20th century, foreign scholars have used empirical methods to systematically study the factors that affect residents' housing satisfaction. Preston and Taylor (1981) constructed a theory and analysis framework for analyzing housing selection behavior based on the theory of personal construction, and found that family life cycle affects cognition, and cognition affects residents' residential migration decisions. Cutter (2013) pointed out that housing quality, surrounding environment, property management and supporting facilities and other factors have an important impact on residents' housing satisfaction. Amerigo and Aragones (1997) studied residential satisfaction from both theoretical and methodological aspects. On the basis of other scholars' research, they established a model for analyzing the relationship between individuals and the living environment. They deemed that the surrounding areas, housing and neighborhood relations can reflect that environmental factors have a direct impact on housing satisfaction.

Although foreign scholars have conducted a large number of studies researching related problems in the field of rural housing, China 's economic development, social system, and timing of rural housing system reform are significantly different from those in developed countries. Moreover, foreign scholars mainly aimed at the security system of rural housing and the improvement of social relief. It is basically impossible to find a special theory designed exclusively for rural housing, so the existing theories cannot directly guide the construction of rural houses in China.

But what is certain is that even though there are differences in the form and scale of rural development in various countries, there are still common areas, such as attaching importance to rural education, focusing on government-led support, improving rural infrastructure conditions, and improving rural economic conditions. Through a series of rural construction and reforms, these countries have achieved remarkable results, narrowed the gap between urban and rural areas, improved farmers 'living standards, enriched farmers' material and cultural qualities, and accumulated rich experiences in rural development. Therefore, foreign literature on rural housing reform, development, system security, still have very important reference value for China's theoretical research on RHC management.

2.4 Chinese studies about rural residential housing

Since the Chinese government proposed New Countryside Construction (NCC) in the 1950s, scholars have studied the development of rural areas. In particular, CPC Central Committee (2005) clearly stated that "to achieve the great objectives of our modernist country, it should be started with the construction of a new socialist countryside". Liu (2012) proposed to solve problems facing farmers, countryside and agriculture, and foster farmers of new type.

Some Thoughts on the Construction of a Happy and Beautiful New Countryside (Hu, 2015) explained the structural safety of RHC and the functional composition of rural housing. Inquiry into the Planning and Management of RHC in New Countryside (Hu, 2016) and Research on Planning and Management of Conservation of Ethnic Villages to Eradicate Poverty (Hu, 2017a), Green Poverty Alleviation in Sichuan Tibetan Areas from the Practice of Li County (Hu, 2017b), and Aid and Help Practice in Suili (Hu, 2018a) all involved the topic, rural housing. Due to the current national vigorous advocacy to actively promote the construction of new rural areas, researchers (Zheng, 2014; Hao & Zhou, 2019; Wang, 2019) have conducted research on rural areas through the perspective of folk culture. They have a common point of view that the role of culture in the current process of new rural construction is particularly important, and specific and feasible opinions and plans are given.

In China, compared with researches about urban housing and rural homestead system, rural housing construction research, especially management research on rural housing construction, is relatively weak. 1781 results were obtained by searching the keyword "homestead" on CNKI, while 41187 results were obtained with "housing" as the keyword. However only 362 search results were found with "rural housing" as the keyword, and only 7 researches were found with "rural housing" and "quality" as keywords. No thesis was found with "agricultural house construction management" as the keyword. As for the small number of China's studies on rural housing issues, they consist of three major topics as shown in Figure 2.2: laws, regulations and standards, policies, and systems, RHC quality, and ways of construction. In addition, there are some studies on the construction methods of houses, such as the study of ACM.

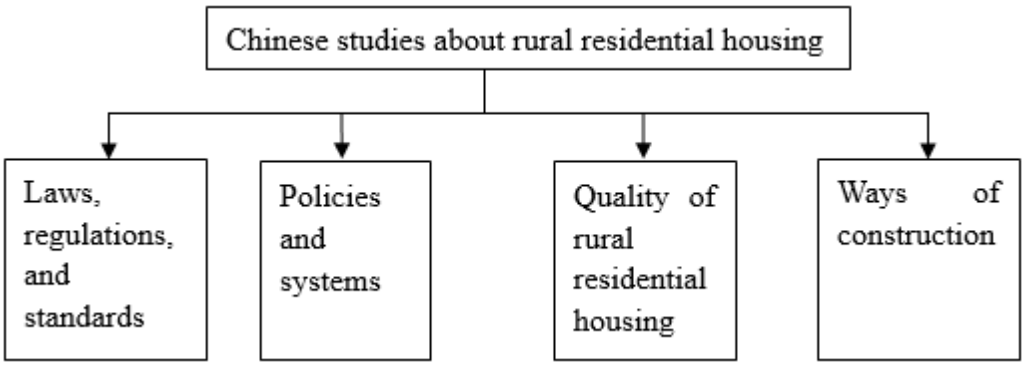

Figure 2.2 China's studies on rural housing issues

2.4.1 Drawing set of rural environmental culture and standards

(1) Rural environmental culture

Jin (2014) believed that with the development of economy and the improvement of farmers' living standards, rural houses will generate huge energy consumption, and from the perspective of human adaptability, he put forward effective solutions to the regional environment and residential environment. Sun (2017) argued that while CBNC strategy is steadily advancing in China, it is worth noting that its ultimate objective is to beautify the rural environment and improve the living conditions of farmers. In the process of rolling out this strategy, the Chinese government has intervened excessively, so that the needs of farmers have not been paid adequate attention, resulting in the loss of the characteristics of rural housing construction and the lack of differentiation. For farmers, their residence can symbolize their identity and wealth. Building a house is the primary choice for farmers. The residence not only meets the needs of residence, but also reflects regional characteristics, national culture, and rural elements. Therefore, it should be practical and environmentally friendly, as well as realize practicality, energy efficiency and sustainability. Zhang (2017) thought that China's cities and villages have been influenced by western concepts to a certain extent, and have also been impacted by modern development concepts, which has caused China's villages to lose their original and authentic characteristics and their uniqueness gradually disappears. It is a prevalent phenomenon that all Chinese' villages are in the same key. In this context, to undermine the conflict between economic growth and traditional culture, and the conflict between farmers' values and rural construction ideas are crucial. By improving the shortcomings in the concept of rural construction and reaching agreement with the needs and concepts of farmers, the differences in aesthetics, living habits, and culture can be reduced. Zhi et al. (2020) investigated the satisfaction level of rural residents regarding local cultural programs and future cultural

needs via questionnaires and interviews in three national-level poverty-stricken counties — Wanzhou District, Fengjie County and Wuxi County. The study finds that the current cultural program development in impoverished areas is still in the preliminary stage without a diversified supply mechanism. The overall satisfaction level of rural residents with cultural program development stands low, especially the public cultural facilities, which bear the lowest satisfaction. On the other hand, rural residents have a low demand for future cultural programs. As such, the result shows a noticeable "double low" phenomenon, that is, rural residents' low satisfaction with present public cultural services and low demand for future programs. Given this situation, the study claims that cultural poverty alleviation in impoverished rural areas should be based on the spiritual perspective among rural residents. Steps should be taken to increase rural residents' cultural demand, provide them with a differentiated and diversified cultural supply, and improve their self-motivation for personal cultural development, so as to improve their satisfaction with present cultural programs and meet future cultural needs in poor areas.

(2) Drawing set of standards

Chi (2014) proposed that in the construction of a new countryside, the most important thing is the construction of rural housing. Housing is the basis for farmers to maintain their daily life, and it is also the foundation for carrying out other production activities. Drawing set of rural housing is an aggregate that encapsulates the core knowledge of construction engineers to design rural housing. To optimize the design of drawing sets of rural housing, comparisons should be made at multiple levels such as family needs, functional design, economy, locality, and shock absorption.

2.4.2 Related regulations and standards in China

(1) Standards

For a long time, the focus of various types of planning and housing construction in China has been on cities, and rural areas have been neglected. There is a lack of complete and systematic rural planning theories, methods, and related regulations and standards. Rural Development and Construction Planning (Wang, 2017) officially ended the blank of rural planning theory in China. Several Opinions on Promoting the Construction of a New Socialist Countryside (CPC Central Committee & China's State Council, 2006) marked the official start of the construction of a new countryside. Yi (2010) discussed China's spatial planning laws and regulations system, studied the relationship between laws and regulations and public

participation, introduced and explained some planning laws and regulations, and put forward useful suggestions for China's rural planning laws and regulations. These suggestions include strengthening the combination of statutory planning and public participation, underlying the strategic function of village planning, boosting the cooperation between the planning department and the land management department, and determining the permitted and prohibited areas for activity. In view of the difficulty of villagers' application for rural residence, Pan et al. (2020) discussed concrete experience in the implementation of the permit system of rural construction planning in Zhuhai city from perspectives of top-level design, permit basis, approval subject and application channels after reviewing the difficulties in implementing the permit system. It is found that efforts should be focused on the establishment of a sound policy system, a practical village planning, a three-tier governance structure, an unobstructed application channel, a dual guarantee system and a sound village-level management system. These measures play a vital role in solving the difficulties of villagers in rural housing application, standardizing rural construction activities, promoting rural characteristics and advancing rural development.

(2) Laws and regulations

Xue and Zhang (2017) analyzed the problems proposed in Measures of Managing Rural Housing Construction in Sichuan Province (Sichuan Provincial People's Government, 2017), such as disorder of rural housing construction, lack of planning, survey and design, supervision, and regulations. Gao (2019) believed that there are no restrictions on the disposition and profitability of building ownership according to current laws in China, but there are many restrictions on the mortgage and transfer of the right to use the homestead. Therefore, the direction and focus of reform should be improving the right to mortgage and transfer homestead. He proposed that from the perspective of perfecting the property rights of homesteads, the provisions in the Property Law prohibiting the mortgage of the right to use homesteads should be deleted, and the right to use homesteads should be granted with the mortgage right, so that the existing rules of integrated mortgage of the ownership of the house and the right to use the land within the area occupied by the house can be implemented holistically. At present, there is a lack of laws and regulations to improve the ACM, and the scope of the responsibility of the ACM is not clear, which leads to the blind operation of the ACM during project implementation. Yi (2019) deemed that some governmental departments are resistant to the ACM, thereby not actively cooperating with the agent construction work and interfering too much with the agent construction institute, because they are unwilling to give up their rights. These circumstances

are due to the lack of sound laws and regulations to regulate the rights and obligations of both parties.

2.4.3 Research related to systems and policies

(1) Systems

For a long time, China has implemented a dual system of "one country, two systems, and urban-rural division". Planning and construction work in rural areas has been neglected. Due to inadequate government management, the rural housing is dominated by individual investment, and its major issue is that the public policy system cannot be integrated with individual investment, causing the phenomenon of poor rural housing quality, short use time, lack of design and unified planning. Due to the chaotic planning, the waste of rural land is serious; supporting facilities cannot meet the standards or the corresponding facilities are lacking. Therefore, it is difficult to upgrade the housing conditions of farmers to a better level. Moreover, due to the lack of policies, laws, and other systems, it is impossible to ensure that farmers receive their due housing rights, and it is difficult to obtain effective financial support.

Under the socialist system in China, if the rural housing problem is solved effectively, it is essential to strengthen the guidance of government departments and change the corresponding laws and regulations. The homestead is loaded with security functions and has property attributes. The weight of the homestead system in different periods varies between these two elements. With the transformation of China's economic structure, the property attributes of homesteads have become increasingly prominent. Gao (2019) rendered that the system of paid use of homesteads is an effective way to solve the current problem of over-occupied homesteads and "one house with multiple homes", but it should also be applied to the initial allocation of areas with tight supply.

In the context of the reform of the national administrative examination and approval system, the authority to approve homesteads should be decentralized to reduce the examination and approval and shorten its process. Liu (2018a) summarized several new types of rural housing development and construction models in China at the current stage, including government construction model, developer operation model, and village collective self-government construction model. Liu (2018b) pointed out that RHC should be reform in an innovative manner via measures including multi-main body construction and multi-channel guarantee, as well as building a new socialist countryside through different angles such as industrialization, construction methods, financial means. In this way, experience can be explored to create

conditions for large-scale rural housing renovation and improving the living standards of farmers.

Wang et al. (2020) conducted a study on the efficiency and distributional effects of China's ongoing marketization reform of rural construction land. The study finds that the marketization of rural construction land has indeed improved the efficiency of land allocation and brought benefits to rural areas — especially the re-distributional effects from urban to the rural areas.

Lv Ping et al. (2020) explained the theoretical significance of establishing a new rural housing system based on the rural revitalization strategy, the level of housing demand and the dual attributes of rural housing. Starting from the limitations of the homestead system, the study finds that the inherent membership attributes, welfare attributes and power ambiguities of the homestead are the source of many contradictions between the system and actual needs. Given this, the study proposes a new rural housing system that aims to build a rural housing supply system for multi-level housing needs and the corresponding rural residential land supply system.

(2) Policies

Zuo (2015) conducted research on RHC in Jiangxi province, and pointed out that the top priority of Jiangxi province is to improve the top-level design of the management system of RHC in accordance with national laws and policies to ensure that RHC is implemented according to law and regulations. He argued that the current urban and rural residential land property rights arrangements have not adapted to the requirements of national development from the perspective of urban development and rural revitalization in the new era. From the perspective of institutional change, it is mainly manifested in two pairs of problems: the lack of function of rural residential land assets and the surplus of function of housing security, the excessive function of urban residential land assets and the lack of function of urban housing security.

Regarding the direction of future reforms, Zuo (2015) proposed that, firstly, urban housing land right should realize the return of housing security; secondly, rural homestead land right should realize the return of asset right, revitalize idle rural homestead resources, enhance rural residents' capacity of asset income, return talent, capital, and technology resources to rural areas. In response to the problems in rural planning in China, Zhou (2016) conducted a comparative study on the planning methods of the United Kingdom and related countries, and at the same time carried out specific analysis and research on China's national conditions to construct a set of reasonable, suitable, and sustainable theoretical framework of China's rural

planning system that has been applied in Guangdong province.

Through research and analysis, the above scholars have emphasized the leading position of government in rural planning and RHC. They provide good theoretical support for relevant government departments in formulating rural policies and planning and construction methods. However, the above-mentioned researches do not involve the category of independent and targeted research on the reform of the rural housing system and lack pertinence in terms of research content and direction.

2.4.4 Research on the quality of rural residential housing

(1) Quality and safety

The quality of rural housing is closely related to the property, life, and safety of farmers. It is also an important indicator to measure the economic level of rural areas and the living standard of farmers, and it can also gage the status of ACM construction. Foreign researches in this field cannot be directly used to guide rural development and RHC in China. However, domestic researches on rural housing, its related policies and other aspects cannot be implemented into policies and systems in a short time, so the status of rural housing cannot be changed and improved in the near future. Therefore, it is necessary to conduct targeted research and analysis on the quality of rural housing, so as to guide RHC directly. The following is the domestic researches on issues related to the quality of rural housing. China's rural area is vast with a large population. With the development of rural economy and the need to improve rural living conditions, rural residents have put forward higher requirements for the quality of the living environment (Shao, 2018).

Luo (2018) used the analytic hierarchy process to evaluate the quality of rural housing in Chongqing, and evaluated the safety, comfort, and practicality of rural housing. It is found that among the many factors impacting housing quality, the safety of housing is paramount, followed by practicality and comfort. Among the safety factors, the construction materials of housing are the most important. Peng (2018) studied the relevant factors affecting quality in engineering projects and designed a quality evaluation system for the construction process of new rural housing.

(2) Rural dilapidated house

Gao (2014) obtained the first-hand information of rural dilapidated houses through the large-scale sample survey of rural housing in the early stage of the 12th Five-Year Plan carried out by China's Ministry of Housing and Urban-Rural Development. Combined with the

statistics of the rural population and farmers, and the large-scale subsidized rural housing projects carried out by the state in recent years, an in-depth study of the dangerous housing rate and the scale of dangerous houses in China's rural housing was conducted, and a more objective national and sub-provincial rural dangerous housing rate and scale of dangerous houses was obtained; suggestions were also put forward in this regard.

The construction of new rural housing and the renovation of old rural housing are important parts of the strategy of poverty alleviation. Zhang (2018) proposed that the location of new rural housing in different places should be planned in a unified manner, centralized and connected to avoid fragmentation, be organized by the village as much as possible to avoid self-construction; attach equal importance to quality acceptance and process management to avoid abnormalities and minorities, pay attention to characteristic styles and avoid the same style in different households, adopt multiple methods to protect the housing safety of poor farmers, and avoid one-sided emphasis on new housing; Qualification approval should be based on household policy, and differentiated treatment should be introduced to avoid one-size-fits-all. Liu (2019) took Liangshan prefecture in Sichuan Province as an example and analyzed the relevant policies and specific practices of rural dilapidated houses.

2.4.5 Housing satisfaction

(1) Housing conditions and satisfaction

In recent years, Chinese scholars have used different measurement methods to study and discuss factors imposing impacts on housing satisfaction from different perspectives. Tan and Zhang (2015) used data from farm household survey to comprehensively analyze the relationship between rural residents' living conditions and their housing satisfaction. The study found that their housing satisfaction is significantly affected by housing quality, so it is proposed that when improving the environment of rural communities, government departments need to pay special attention to the housing and surrounding environmental conditions of backward areas and people in financial difficulties. Zhou and Zhou (2015) analyzed factors exerting impacts on housing satisfaction based on the questionnaire survey data and found that the overall housing satisfaction of rural residents is not high, and income, housing area, age of house, infrastructure, housing loan conditions impose significant impact on housing satisfaction. Based on the sustainable development of rural building structures in China, Zhang et al. (2021) evaluated the costs associated with rural housing construction, and proposed three common structural forms for reference. It is found that the block masonry (BM) has the lowest

emissions and costs, whilst the reinforced concrete frame (CF) has the highest emissions and costs.

(2) Infrastructure support and satisfaction

Zhao et al. (2019) analyzed factors impacting housing satisfaction of rural residents in Jinzhong region based on a survey of farmers and found that the housing satisfaction of rural residents is greatly affected by housing quality and supporting facilities with a positive correlation. Luo (2018) used the analytic hierarchy process to evaluate the quality of rural housing in Chongqing from three aspects: safety, comfort, and practicability. It was found that the safety of rural housing is the most important, and among factors about the safety, farmers pay the most attention to construction materials. Therefore, it is considered that during NCC, the quality of building materials should be strictly controlled. Research results also indicate that security is closely related to the structural layout, structural form, and scientific choice of the house. As for the practicality, it referred to convenient transportation, convenient production, and life, which all implying that the matching of rural housing is also closely related to the satisfaction of farmers.

2.4.6 Defect of RHC and its management principles principles

Unbalanced application of .When discussing the revitalization of a district, county, and village, Hu (2020) pointed out that there are serious flaws in RHC and in construction of beautiful and new countryside (CBNC). No matter it is rural construction in the planned economy era of China, or farmers' independent construction of rural housing after the reform and opening up, or RHC under the background of NCC, government management is inadequate and market potential is not fully utilized. Although the rural construction has made great achievements, and the quality of life of farmers has been greatly improved, the development of the rural areas is still uneven. The rural areas in Shanghai, Chengdu and other places are much more developed than that in Suining. RHC in these developed areas does not fully apply their principles, and there is no unified planning and construction, in a result of which, many rural housings are scatteredly distributed. As a result, rural housing construction in remote and backward areas is even less optimistic.

Practicability needing further examination.In a study of objective management of rural power construction, Zhang, Wu, and Wang (2015) mentioned that rural construction in developed areas is urbanized, lacking the authenticity of rural areas. RHC is often applied by learning principles of urban engineering construction, without consideration of the specific

situation of RHC project, causing the phenomenon that some RHC projects ignore its function, regional characteristics, local culture, style and landscape, and farming. The phenomenon makes RHC a mere symbol of farmer's wealth, and whether farmers are satisfied with their housing is unknown. Some rural houses are even idle and unoccupied, wasteing resources. Xi (2017) reminded rural areas should look like rural areas. NCC should be realistic, advancing with the times, and needs to borrow related principles, but it is not a blind copy. In particular, he emphasized energy-saving and environmental friendliness, and that the quality of the scenic rural housing should satisfy farmers.

2.4.7 Rural housing quality and satisfaction

Huang (2015) argued that to provide good construction engineering service and customer satisfaction survey is the second competition for enterprises to participate in the market, and it is an important part of enterprise image extension and market expansion and consolidation. Deng, He, and Li (2011) considered that the core concept of engineering project management is customer satisfaction. Chen (2015) constructed an index system evaluating the satisfaction of property owners, which provides suggestions with reference value for the rapid development of the supervision company in the industry. For efficient measures and clear directions of the planning and construction of tourist attractions, Mo (2019) constructed an evaluation system from the perspective of tourists to improve the grasp of new needs and clarify the content and direction of scenic spot construction, playing a reference role in the evaluation of related construction satisfaction.

The quality of RHC and the satisfaction of rural residence are very important. At present, the domestic researches mainly focus on housing satisfaction of urban residents, but the empirical research on factors impacting the housing satisfaction of rural residents s rare. In addition, there is no subdivision and comparison of the research objects in the existing researches, and there is also a lack of research on the impact of housing policy and housing finance factors on housing satisfaction. Peng and Kuang (2014) surveyed the satisfaction of the people's livelihood projects and migrant workers, it was found that for migrant workers, safety and security have a significant impact. Therefore, this study took rural residents with different incomes as the research object, used a measurement model, obtained relevant data through questionnaire surveys, comprehensively judged and compared the housing satisfaction of rural residents, and analyzed some important factors that affect the satisfaction of rural residents in China from these 5 aspects: personal characteristics of rural residents, housing characteristics,

supporting facilities, housing quality, living environment, housing policy and housing finance.

At present, related researches in China mainly focus on the housing satisfaction of urban residents, but the empirical research on factors impacting the housing satisfaction of rural residents is rare. In addition, there is no subdivision and comparison of the research objects in the existing research, and there is a lack of research on the impact of housing policy and housing finance factors on housing satisfaction.

2.4.8 Housing construction model (agency construction model)

With the development of social economy, there is an increasing demand for the construction of public engineering projects such as infrastructure. However, the traditional model of public engineering projects invested by the state and constructed by the government is difficult to meet this demand. The monopoly franchise of the project brings inefficiency and chaotic management issues need to be resolved. How to reform the government investment management model has become a focus of attention of governments at all levels. Under this background, in order to solve the problems of low awareness in cost control, low management level, power rent-seeking and other problems in non-profit government investment projects, China began to implement the ACM. It was clearly clarified in Decision of China's State Council on the Reform of the Investment System (China's State Council, 2004) that the ACM should be promoted in the non-profit government investment projects.

Deng, He, and Li (2011) believed that the so-called ACM means that the construction company entrusts the agent company to undertake tasks in different stages including land acquisition, demolition organization, design bidding, construction drawing approval, supervision and construction bidding, materials and equipment bidding, tendering, and completion acceptance organization. Luo (2017) argued that ACM is a project in which the government is responsible for regulation and control, and entrusts the construction, part of management and supervision function to professional institutions. After the project is completed, the project will be delivered to user institute and ACM is a market-oriented construction method that separates investment, construction, management, and supervision functions. There are also views that the ACM is a system that selects professional project management companies to be responsible for construction and implementation through tendering and other methods, strictly controls project investment, quality, and construction period, and transfers them to the user unit after completion acceptance.

ACM is a more advanced management model than the legal person responsibility system

for construction projects, and it is a powerful measure to ensure project quality, speed up construction cycle, and improve investment efficiency (Liaoning Lijie Consulting Co., Ltd., 2006). Ding (2019) thought that ACM is a relatively advanced and mature project method based on legal person operation in the world. It is an important measure and a new attempt to optimize the management of government investment projects in China. As an internationally common management method at this stage, the ACM government-invested projects use tenders and other methods to select more specialized companies to implement project construction, effectively controlling project investment costs, improving project construction quality, ensuring project construction cycle, and improving the overall efficiency of government-invested projects.

Yao and Guo (2014) proposed that as the emerging products of China's investment system reform, ACM has unparalleled advantages over traditional management models, but ACM also has drawbacks and requires effective government supervision. Shi and Liu (2015) considered that in the three-party ACM, the government investor, the user, and the construction agency are a common agency relationship based on two principals and an agent, and there is a potential moral hazard in the agent construction company. In addition, since the introduction of ACM in China is not long, many cities and provinces are still in the exploration stage, so some problems have occurred in the actual operation. Ding (2019) augured that the management of ACM market is chaotic; the related supporting system is imperfect; and the comprehensive competitiveness of the agent construction company is not strong. According to his analysis, main reasons include the inaccurate positioning of the role of the government in ACM, imperfect supporting system and power rent-seeking.

Wu (2013) conducted a systematic study on the supervision system of government invested ACM project, and believed that its essence is composed of a series of stakeholders and a systematic, networked temporary contract organization. Using social network analysis, he conceptualized the supervision system of government invested ACM project into a multi-dimensional supervision network composed of contractual relations, schedule supervision relations, quality supervision relations, and investment supervision relations. Through the calculation and analysis of the characteristic indicators of the supervision network, quantitative analysis of the network organization structure of supervision system of government invested ACM project was conducted.

Hu (2018b) supposed that ACM for urban demolition and resettlement housing projects is a more widely used construction model in the process of resettlement housing construction. Its operating mode is that the government selects a professional project management company as

the legal person during the construction period via bidding and other methods after land planning and consolidation. The legal person shall be responsible for the development and management of the project construction and shall hand it over to the user institute after the completion of the project construction to charge a certain management fee. Zhao (2019) said that ACM has not only changed the investment control of the resettlement housing project, but also changed the cost management of the resettlement housing project. However, ACM in China has a lot of potential and room for development and needs to be improved on the level of project management and project construction environment.

Zhang, Yang, and Wang (2018) analyzed the application and problems of ACM with Wangjiaxin Relocation Project in Shenyang as an example and concluded that AMC has played a positive and effective role in the construction management of government engineering projects. Shen (2019) said that AMC has been successfully applied and implemented in many provinces and cities in China, especially in developed regions. ACM has continued to grow in the market competition. However, it still has many problems in terms of policy and system configuration, difficulty in advancing early work, incomplete personnel quality, and high capital and time costs.

2.5 Practices in different countries

2.5.1 Practices in developed countries

(1) Rural development in Japan

In the process of modernization of rural social management and economic development in Japan, the merger of towns and villages to reduce the number of towns and villages used to be a method that had been applied for many times. After Japan enacted the laws for the compilation of municipalities in 1978, the municipalities were officially designated as the basic humble places in administrative divisions. Since 1899, the municipal system of municipalities has been promoted, and the scale of 300-500 households per municipality has been established. The number of municipalities has been consolidated nationwide. In this way, the number of municipalities has been reduced from 71314 in 1888 to 15820 in 1889 (Suining People's Government, 2015).

Liu (2016) introduced that Japanese residential housing originated from Europe and the United States at the earliest. It is quite different from ordinary housing and has diversified linkages. A set of far-reaching development models in line with Japan's reality has been formed.

He considered that Japan's rural planning and construction is at a world-leading level that faces very similar problems as China's situation, such as geographical location, climatic conditions, economic situation, cultural traditions, and rural development issues. From the perspective of policy and eliminating the differences between urban and rural areas, Japan has vigorously carried out the improvement of the rural living environment. With the construction of a "big country for life", Japan pursues the integrated development of urban and rural areas (Suining People's Government, 2015).

(2) Rural construction in Germany

The construction of urban and rural areas in Germany has gone through a long process, especially the renewal and alternation of rural areas. At present, the integrated pattern of urban and rural areas in Germany has been formed, with different styles of rural areas in different regions. The first is urban-rural equivalence, that is to ensure the rational use of land resources through land consolidation and industrial upgrading, so that urban and rural residents have equal living, working, and transportation conditions, and the equivalence of rural and urban life can be realized. The second is to develop villages in a comprehensive development manner, focusing on the mining of cultural values and the improvement of rural functions. The third is the financial security system, which provides targeted funds and technical support in the construction and maintenance of rural public infrastructure according to the different needs of each village. There is no difference between urban and rural areas in terms of land transactions and peasant housing systems. 90% of the rural areas are home to non-agricultural populations, which promotes the integration of urban and rural development, mobilizes the overall residents' enthusiasm for rural construction, and enhances the rural construction and development capabilities.

(3) The construction model of American public participation to stimulate the endogenous power of the village

Rural planning and management in the United States places great emphasis on local needs, protects interests of residents, and balances various related interests. The whole process of rural planning runs through "bottom-up" public participation and is not in a "top-down" government-led way. Citizens participate in the whole process, deeply understanding the objectives of village construction and putting forward their own suggestions and requirements. The government is to organize, coordinate and guide villagers to express their own opinions and achieve consensus and satisfactory results through full consultation. The public actively

participates in village construction in an all-round way, rural social living conditions have been comprehensively improved, and livability and industry, and cohesion continue to increase. Rural sustainable development strategies emphasize talent training and public participation. Inseparable from the higher comprehensive quality of farmers, rural construction in the United States is highly recognized by the world.

2.5.2 Practices in China

(1) At the national level

As an "upgraded version" of the construction of ACM areas, Guide to the Construction of Beautiful Villages (China's Administration of Quality Supervision & National Standards Council, 2015) clearly stated CBNC should break the traditional NCC with settlement construction as the main body and reverse the way that NCC takes village as the unit, pursue standardization led NCC. Combination of qualitative and quantitative methods, Guide to the Construction of Beautiful Villages (Administration of Quality Supervision & National Standards Council, 2015) identified the overall requirements for village construction and governance, industrial development, and village management in terms of "village planning, village construction, ecological environment, economic development exhibition, public service, rural civilization and grassroots organizations". In terms of village planning, emphasis was placed on adapting to local conditions, saving land and participation of villagers, and it determined the configuration standards and construction requirements for housing construction, ecological environment governance, industrial development, and public service facilities.

In terms of village construction, on the basis of respecting the existing village pattern, it is better to gather together rather than to disperse, and it is better to build, change, and conserve those should be built, changed and conserved, rather than undertaking blind construction. The guide clarified infrastructure planning including roads, municipal facilities, and agricultural production facilities. In terms of ecological environment, the guide made it clear of the requirements for environmental quality such as water, soil, and gas, as well as the prevention of production and domestic sewage, the protection of river systems and the renovation of village. In terms of economic development exhibitions, it mainly clarified the development requirements of agriculture and service industries in beautiful villages. In terms of public services, it mainly discussed the construction standards of medical care, education, culture and sports, social security, labor and employment, public safety, and convenience services.

(2) Practices in Shanghai, a developed region in China

In 1996, Shanghai had 2,984 administrative villages and nearly 50,000 natural villages. The average village area of the administrative village was about 2 square kilometers, and the average population is about 1600 people. The average village area of the natural village was about 13 hectares while the average population was only 90 people. The per capita land area was 186.5 square meters. It was obviously noted that small villages and serious land waste were existing. At the same time, it caused problems such as too much division of farmland, small scale of farmland, and low utilization rate of agricultural land.

In response to the above-mentioned problems, Shanghai implemented the policy of "moving villages and merging settlements, building central villages". Natural villages and administrative villages were rationally merged according to the central plan through the standardization rearrangement and large-scale operation of farmland. In 2005, all villages were merged into 1887 administrative villages. The average area of the administrative village was about 3 square kilometers, the average population was about 1800 people, the average agricultural land area was about 2.35 square kilometers, the rural population per unit of cultivated land is about 770 people per square kilometers, and 153 square kilometers land was saved in Shanghai. According to Shanghai's plan, current villages will be merged into 585 administrative villages in 2020, with an average village area of about 10 square kilometers, an average population of about 3,000 people, an average agricultural land area of about 7.52 square kilometers, and a per unit rural population of about 410 people per square kilometers.

(3) New villages construction in Chengdu, Sichuan Province

Chengdu is the capital city of Sichuan Province, and Sansheng Township in Chengdu is characterized by agritainment that is provided by emerging rural residents to urban residents with a leisure way to return to nature, enjoy physical and mental relaxation, spiritual pleasure. The characteristic of agritainment is that the development of rural tourism has become a highlight and a model. Agritainment normally has beautiful natural pastoral scenery and fresh air, so it can provide a good place for urban residents to soothe or release mental pressure. Farmers benefit from agricultural products processing and provide customers with environmentally friendly green food with good quality and low prices. Agritainment has become an example for NCC. The development of rural tourism has become a highlight and a model, and it is also an example for the construction of a new countryside. The township has an area of 16.31 square kilometers, 8.45 million square meters cultivated land, and 500 square meters per capita cultivated land, and governs 6 administrative villages with a total population of 18,347, including 16,962 agricultural population. The annual flowers planting area is 4

million square meters, with an annual output value of more than 60 million yuan, and vegetable planting area is 4 million square meters, with an annual output value of 40 million yuan. In 2006, the net income per farmer was 7,306 yuan. In April 2019, the township was awarded the titles of the "birthplace of Agritainment in China" and "national AAAA-level tourist attraction" by the National Tourism Administration.

The cultural industry development model of new countryside prioritizes people and culture. The rich cultural connotation is the soul of rural tourism development. Sansheng Township has injected cultural factors into the "Five Golden Flowers" to improve the quality of rural tourism and achieve sustainable development. In the practice of developing countryside, Sansheng Township has gradually formed a work pattern characterized by government leading, departmental participation, industrial support, and farmer households as the main body. "Five Golden Flowers" is a local development slogan and governmental branding using figurative technique. The Five Golden Flowers are flowers, plums, chrysanthemum, lotus, and vegetables, which represents flower industry, fruit industry, herbal medicine industry, tourism industry, and organic vegetable industry respectively. On the basis of unified planning, the relevant government departments solve the basic environment and service functions of rural development such as road network, communication, water diversion, power supply, and gas supply that can be utilized by all villages in Sansheng Township and these villages need to figure out their own ways how to make the most use of the infrastructure.

2.5.3 Design of rural residential housing

(1) Energy conservation

Shao (2018) considered that the construction of economical and environment-friendly houses has become the key issues in CBNC as for how to improve the rural living environment. Yu (2017) combined with the actual situation in the rural areas of northern China, using the relevant theories of green rural housing, and proposed a green construction technology that divide the entire construction process into three stages: pre-construction, mid-construction, and post-construction, and embedded the green concept into the three stages. The content of green concept mainly includes saving construction land through rational design, reducing energy consumption through heating and ventilation, reducing material costs through recycling, and reducing water resource consumption through water saving and classified use. Liu (2013) analyzed the current economic status and constructed a "three sections" design model that saves land, energy, and materials,Wesonga et al. (2021) believe that close attention should be paid to

costs, durability, and efficiency in building new houses, given the high demand for low-cost housing from low-income earners and the tropical climate of Sub-Saharan Africa. Since the wall accounts for a large proportion of the total costs in construction, it is fundamentally important to choose the right kind of wall system. The choice usually depends on the durability, comfort, ecology and economicalness of a given wall system to meet the quality standards and requirement of low cost. Although earthbag system makes it possible to build sturdy, affordable and sustainable houses, it is not widely known yet and therefore its sustainability has not been recognized in the entire construction industry. Based on the degree-day method and life cycle costing analysis of walls in one of the hottest regions in Uganda, the study examines and compares the thermal performance and total life cycle costing (LCC) of earthbag walls and commonly used firebrick walls. The temperature and heat flux are measured on-site according to ISO 9869 and the annual energy requirements obtained. The total LCC is calculated based on the initial construction cost of the wall system and the annual energy cost.

(2) Green buildings

Ni (2016) suggested the construction of ecological new countryside as a solution to improve the building environment in new countryside with hot summers and cold winters. Bai (2015) proposed that when designing rural housing types, the real housing needs of farmers should be considered in real sense, rather than designing blindly away from reality, and the relationship between farmers' needs for their houses and RHC should be understood. It is necessary to humbly learn from the advanced practices and experiences of local residents in the RHC, and at the same time give them scientific and professional guidance to achieve the combination of professionalism and experience. It is essential to analyze the living and production habits of local residents, based on which design green rural housing.

2.6 Research enlightenment

Social systems, land systems, and housing property rights systems are dominated by capitalist systems in other countries, which is very different from China's political and economic systems. Researches in China are mostly from the perspective of government and legal policies.

2.6.1 Improvement of theoretical system

For project management of RHC, the Project Management Institute (PMI, 2017) has formulated and explained some standards for project management. For now, most experts and scholars pay

attention to concepts, connotations, and humanities in the process of studying how to manage RHC projects. PMI also studies related content in the project management process while Project Management Body of Knowledge called on 185 countries around the world to study relevant content in the project management process, but there are few studies on the organization and resource allocation, villager coordination, construction quality, and farmer satisfaction of RHC project management. Although the construction management of rural housing overlaps with the related contents of project management, there will still be prominent differences.

2.6.2 Improvement of management practice

At present, China has not clearly defined and explained the construction theory and management methods of RHC projects but has gradually accumulated some experience through practice and application in recent years. However, the management problems that arise in practice are inevitable, causing some RHC projects to fail and even more cause huge economic losses, which will affect the credibility of the government among rural residents and reduce their satisfaction degree of rural housing. Therefore, it is necessary to improve the practice of RHC management.

2.6.3 Development of third-party professional organizations (agency construction management agencies)

With the steady implementation CBNC and rural revitalization strategy, the construction of new rural housing continues to increase, and RHC projects will continue to be launched. In order to ensure that quality and safety of RHC projects can be satisfied, the project is completed as scheduled and the investment budget is not exceeded, it is feasible and effective to develop professional management company in the field of agency construction, to improve the efficiency and quality of resource use by exerting the role of management agency with professional capabilities, and to provide the role of promotion and supervision for the smooth implementation of RHC projects. At the same time, it also reduces the negative impact of the construction of new rural housing, and develops the market of agent construction management, which achieves many objectives within one stroke.

2.6.4 Close integration of rural housing development and NCC

In any case, residential development is the top priority of the project construction, involving

various livelihood issues. It not only realizes the most fundamental living function, but also involves social security and the health of residents. Although the focus is on construction, the foundation of the residence is to offer a carrier for daily life. Therefore, it should be taken into careful consider whether there are public facilities and services that can improve the quality of life around the project, such as public health, education, and transportation.

2.6.5 Coordinated development of city and new village

The ultimate objective of both urban-rural integration and projects of NCC is to build on the requirements of improving the people's life satisfaction. Therefore, it is obligatory to not only solve the housing needs of urban migrant workers, but also further improve the housing conditions of rural residents to ensure the healthy development of agricultural production. Through the mutual efforts of the two perspectives, the actual quality of the efficiency and distribution of population resource allocation can be improved.

2.7 Research method

In the research of management science, according to the needs of the research, it is the focus of many researchers to choose appropriate statistical methods, test the hypothesis of the problem, correctly analyze and process the data, and deduce the results. Zhou and Song (2019) worked on the source of library science journals and used the survey method to conduct research. They found that the questionnaire survey method has become increasingly widely used in library science researches. In a study on the implementation of rural questionnaire survey methods, problems and skills analysis, Lu and Zou (2018) explained that the survey method is widely used, but this method is also insufficient.

2.8 Chapter summary

The management theory mentioned in this research includes objective management and project management, which is to manage RHC as a construction project. The above foreign studies are set in social systems, land systems, and housing property rights systems are dominated by capitalist systems, which is very different from China's political and economic systems. That is why China's research is mostly from the perspective of government and legal policies.

The author obtained data on the conditions of farmhouses in the surveyed area through field investigation, and then qualitatively analyzed the housing satisfaction of rural households and

the quality of rural houses and gave corresponding suggestions and measures for improvement based on the results of the qualitative analysis. Although there are related studies on quality and safety, and there are materials such as rural survey questionnaires, there is no detailed analysis on the relationship between housing quality and housing safety that affect housing satisfaction. That is to say, domestic and foreign researches have a good reference for the Chinese government to formulate relevant policies, but it is impossible to point out the key factors related to the housing quality factor that impacts farmers' housing satisfaction.

This research takes rural housing construction in Suining, Sichuan Province as the main research object, obtains basic data on rural housing satisfaction and quality in Suining through questionnaires, seminars. Then the author used frequency statistical methods and orderly multi-classification of Logistic regression analysis was conducted to find out the significant factors affecting rural housing satisfaction and housing quality in Suining. The author also took the existing policies and regulations related to the quality management of rural housing construction in China as the theoretical basis and used quantitative analysis results as support to pinpoint problems and causes facing the quality management of rural housing in Suining. Through the relevance of the construction and utilization of farmhouses and SWOT analysis, the author put forward a strategy for the solution of the quality problems of rural housing in Suining. When it comes to the role of guidance, this research also plays a reference role in improving the quality of rural housing in Sichuan Province and China, in CBNC and rural revitalization, as well as enhancing the living standards of rural residents.

Chapter 3: Stakeholders in RHC and Rural Housing Quality Satisfaction Model

By the time of the establishment of the People's Republic of China in October 1949, a great number of constructions were required to develop China when China implemented a planned economy, and the central government arranged fixed asset investment in a centralized manner. In the 1980s, China implemented the policy of reform and opening up, the development of infrastructure construction and the construction industry achieved a leapfrog development, and a contract responsibility system was implemented in the field of construction engineering. Through more than 40 years of concrete construction engineering and repeated summary and reflection and learning lessons from foreign project management systems and methods of construction engineering, China has successively issued documents on project management of construction engineering to standardize its management practice since the early 1990s to the beginning of the 21st century, especially the introduction of nationwide management regulations of construction project in 2000. In this way, the behavior of construction project management was gradually standardized. It can be seen how important the status of engineering project management in the cause of building socialism, which implied the role of management of engineering project.

3.1 New countryside construction (NCC)

Under the influence of the urban-rural dual structure and the Hukou (household registration system), rural development is inseparable from urban development. Urbanization is an important way to solve the problems of agricultural and rural farmers. The focus of construction of beautiful and new countryside (CBNC) is the construction of vast rural areas and the development of rural migrants.

3.1.1 Urban-rural integration

Xi (2015) pointed out that urban-rural integration is an unavoidable in the process of NCC. The cores of urbanization are people, urbanization and the quality of urbanization, and the emphasis is catalyzing the citizenization of rural migrants. He emphasized the mutual coordination

between urbanization and NCC, and the benign interaction between urbanization and agricultural modernization at the National Urbanization Work Conference and in the 2015 National Work Report of the National People's Congress and the National People's Congress, providing a new direction and opportunities for rural development.

3.1.2 Beautiful new countryside

China's No. 1 Document in the past 15 years has focused on the "three rural issues", continuously paying attention to rural development and increasing farmers' income and formulating relevant supporting policies. Lv (2017) summarized that the Chinese government highlighted rural reform and innovation, promoting the simultaneous development of new-type industrialization, informatization, urbanization and agricultural modernization, "new countryside for things" and "new countryside for people", and putting forward the objective of CBNC after 2012. Guide to the Construction of a Beautiful New Countryside (China Administration of Quality Supervision & National Standardization Council, 2015) offered technical guidance for NCC.

3.1.3 Happy beautiful villages

Under the guidance of national urbanization, Sichuan Urbanization Plan from 2014 to 2020 (the Sichuan Provincial People's Government, 2014) further emphasized the orderly promotion of the urbanization of rural migrants, accelerating pace of urbanization rate of the registered population, and steadily propelling the basic public services in cities and towns to fully cover permanent population. These measures became iron-clad policy guarantee for transferring population to happy and beautiful new countryside.

3.1.4 "Innovation, coordination, green, development, sharing" concept

The Sichuan Provincial People's Government (2017) put forward the overall plan for CBNC and NCC from 2017 to 2020 that adopts the concept of innovation, coordination, greening, development, and sharing. The Provincial Government also proposed that CBNC should take NCC demonstration area as the main platform, take the county as the main body, and take the village whose embellishment was approved by government as the unit, and then Provincial Government formulated a series of policy guarantees, compilation methods, technical guidelines, and action plans. CBNC focuses on the four goals of prosperity, wealth, harmony, and village beauty, and puts forward five major action plans of poverty alleviation, industrial

upgrading, old village transformation, environmental improvement, and cultural heritage, with poverty alleviation as the top priority. To strike a balance between urban and rural areas needs the commitment of the development concept of innovation, coordination, greening, development, and sharing, and deepening the targeted poverty alleviation to eliminate absolute poverty and solve the overall regional poverty, which serve as working focus and offer technical support for CBNC.

3.2 Rural housing construction (RHC)

Peng and Kuang (2014), Qu (2017), Hu (2015) analyzed RHC and civil construction projects together, and summarized the definition, classification, characteristics. of RHC. From these researches, it can be concluded that RHC is not much different from general industrial buildings and civil buildings.

3.2.1 Construction engineering

Provisions on the Management of Construction Costs of Construction Projects (China's Ministry of Finance, 2016) stated that construction engineering refers to the activities of expanding and reproducing fixed assets, including new construction, expansion, alteration, repair. Because these activities can be transformed into buildings through construction. Land acquisition, survey, design, bidding, supervision are key parts of construction activities.

3.2.2 Decomposition of project

According to the different components of the construction project, Provisions on the Management of Construction Costs of Construction Projects (China's Ministry of Finance, 2016) stated that construction projects can be broken down into construction projects, individual projects, unit projects and branch projects, as shown in Figure 3.1. The basic contents of construction projects, single projects, unit projects and branch projects are shown in Figure 3.1.

Provisions on the Management of Construction Costs of Construction Projects (China's Ministry of Finance, 2016) gave an example of division of construction in RHC projects, as shown in Figure 3.2. It is a schematic diagram of the division of new construction projects of rural houses in one village. This new RHC project is decomposed into several individual projects such as farmers' residential buildings and activity centers. The individual projects are

also decomposed into several unit projects such as earthwork project, brickwork project, and other branch projects.

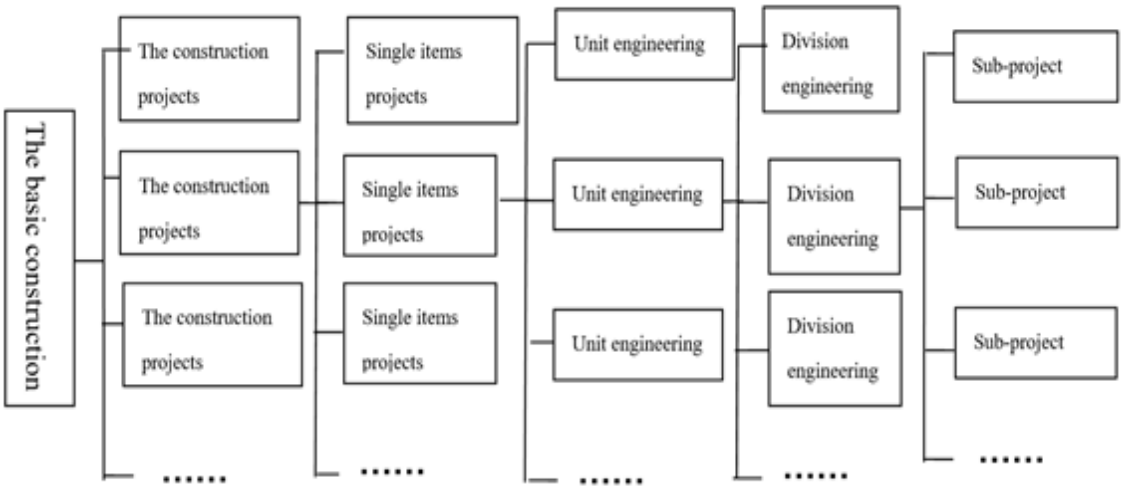

Figure 3.1 Schematic diagram of division of construction projects

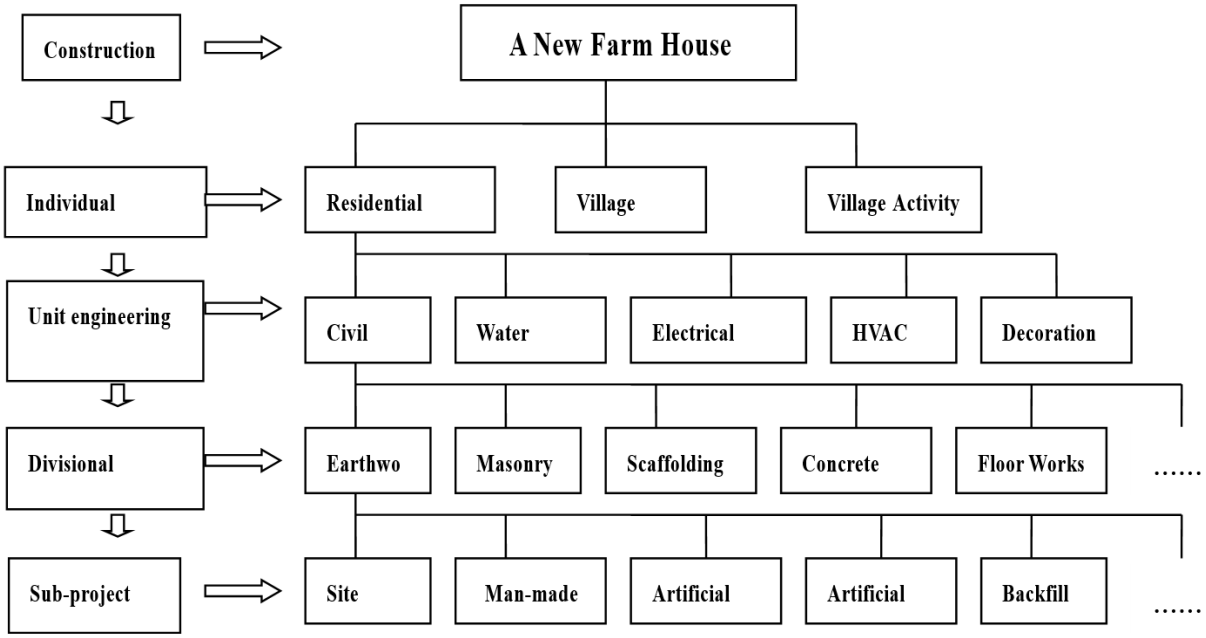

Figure 3.2 Schematic diagram of the division of the construction project of the new house construction in a new RHC

3.2.3 RHC characteristics in NCC

The new RHC project is the most common and important type of project management. The new RHC project has its own characteristics like the general engineering project. Some of the characteristics of general engineering projects can be shared by new RHC projects because they are both engineering projects, but some characteristics cannot be shared by RHC projects. In

addition, new RHC projects have their own objectives and inherent characteristics.

(1) Specific objectives

Time, cost, and resources are the constraints of RHC project, and the project has predetermined goals. The management of RHC projects is to achieve the predetermined goals, solve the problems of the government and farmers, and realize the strategic goals of rural housing quality, cost, and time.

First, the quality objective is to meet the function of rural housing and the quality acceptance of the construction project. Second, the cost objective is that the settlement of RHC project does not exceed the budget, and the budget does not exceed the general budgetary estimate. Third, the time objective is that farmers and the government have a certain time limit for RHC project, hoping that RHC house project can be completed as soon as possible so as to play its role and function before the project deadline.

(2) Intrinsic characteristics of RHC project

Peng and Kuang (2014), Qu (2017), and Hu (2015) proposed that RHC project is basically similar to other construction projects. They are all inherently characterized by large amounts of funds, dynamic construction, single pieces of construction, and cost levels, phased implementation.

First, the scale of projects is huge, and the cost is large. The RHC project is no exception. The investment (cost) can be tens of thousands or hundreds of thousands minimally. Second, as for the dynamic nature, from the start of construction to the delivery of a rural housing, it takes a long period of construction. During the construction period, engineering changes, material prices, labor wages, mechanical equipment, rates, and interest rates may change. The longer the construction period is, the more obvious the time value of the funds can be seen, and the construction cost of RHC project will change accordingly. Third, in terms of the single piece nature, various buildings have their own functions and uses. The geology, foundation, structure, shape, layout, equipment, interior and exterior decoration of rural housing projects are different. The individual differences between the content of the project and the actual objects determine the unity of RHC. Fourth, there are three levels: the total cost of construction of rural houses, the cost of individual projects and the cost of unit projects. Fifth, the stage, the preliminary preparation stage, the survey, and design are divided into stages, construction stage, and finishing stage.

3.3 RHC management

3.3.1 Management framework of RHC

(1) The overall framework of RHC

Zhang, Wu, and Wang (2015) explained the construction progress, quality, investment of power transmission and transformation projects using the method of target management. By sorting and summarizing, the RHC projects can be described from various angles and aspects. In general, the most important system perspectives of RHC projects are environmental system, objective system, technical system, behavior system, organization system, management system, which determines the image of RHC project from all aspects. Several systems of RHC projects constitute a complete picture of the project system of RHC.

First, environment system of RHC. The environment system of RHC refers to the sum of all external factors surrounding the RHC project that determine the success of the project. It constitutes the boundary conditions of a project. The implementation process of an RHC project is the process of interaction between the RHC project and the environment.

Second, objective system of RHC. Since the construction management of rural housing adopts the method of objective management, the planning is very important. The construction management of rural housing should establish an objective system and regard the objective system as a main line for the implementation management of RHC projects. The objective system of the project is very abstract, usually specified by the mission statement, technical specifications, and contract documents.

Third, object system of RHC. RHC project system identifies the type, nature and the deliverable residential products of an RHC project. The realization of the rural housing design task book and technical design documents (physical models, drawings, specifications, engineering scales) is completed through the agency construction management of the project.

Fourth, behavior system of RHC. Behavior is an activity, which requires the RHC project to complete the activities of the rural housing engineering as described by the project tasks, such as the design, construction, supply, and agency management. The logic between these activities constitutes an orderly and dynamic working process.

Fifth, organization system of RHC. RHC project organization is a system composed of actors of RHC project. Owners, agent company, construction company, design company, supervision company, subcontractors, material, and equipment suppliers. participate in the construction activities of an RHC projects. The organizational system formed between these

actors through administrative or contractual agreements.

(2) Management system of RHC

RHC project management system should plan, demonstrate, and control the objective system of the project, thereby ensuring the realization of the goal of the project through project management. The management system of RHC project should plan, evaluate, and conduct quality control of objects of the RHC project.

First, basic objectives of RHC project management. Ensuring the success of an RHC project is the overall goal of the construction management of RHC project, so the index of a successful RHC project is the overall index of RHC management, and it is the sum of all project management objectives of RHC at all levels. The indicators of a successful RHC project are mainly the life span of RHC project and the overall indicator of RHC project.

The three major objectives of RHC project management generally consist of a mission statement, technical design and design documents, and contract documents (survey design contract, construction contract, agent construction contract, supervision contract, procurement contract). Therefore, the management of RHC projects should strive to balance the three major objectives. Any emphasis on the shortest construction period, the best quality, and the lowest cost is unscientific. The balance of the management of RHC project is not only reflected in the overall objective, but also reflected in each unit of RHC project, which constitutes the basic logic of the management objectives of RHC project.

Second, system structure of RHC project management. The management system of RHC project is composed of the processes, technologies, methods, and equipment included in RHC project. In order to achieve the objective of RHC project management, the whole process and multi-directional management of RHC project should be carried out, as shown in Figure 3.3.

RHC project is a huge and complex system, which is composed of multiple engineering subsystems. HRC project tend to contain all the engineering subsystems defined by the scope of RHC project. The scope of RHC project determines the scope of management objects of RHC project.

According to the needs of the property owner, the project management of RHC can be managed through the whole process, which contains planning, design, bidding, pre-construction preparation, construction, construction closing, or a certain stage can be acted by an agent according to the owner's requirements. This research focuses on the construction stage.

In the project manager department of RHC project management, the professionalism of

RHC project management can be perceived from duration management (duration plan, schedule control), cost management (cost budget, preparation of bids, preparation of revenue and expenditure plans, financing plans, cost control), resource management (resource supply planning, control of resource procurement and supply process), quality management (design quality, construction quality, material quality, technical standards), organization and information management (establishing project management institutions, implementing responsibilities, document issuance and filing, organization and coordination), contract management (bidding, contract execution and implementation, contract change management, claims And dispute management), safety and environmental management (construction safety, civilized construction, employee health, environmental protection) risk control (risk identification, risk analysis, risk countermeasures and risk control). A complete system managing agent construction of rural housing integrates the above-mentioned aspects into an orderly whole. Point A in Figure 3.3 is the cost planning of the reaction process subsystem 2. This research focuses on the three aspects: time limit, quality and cost, and others are also covered in this research.

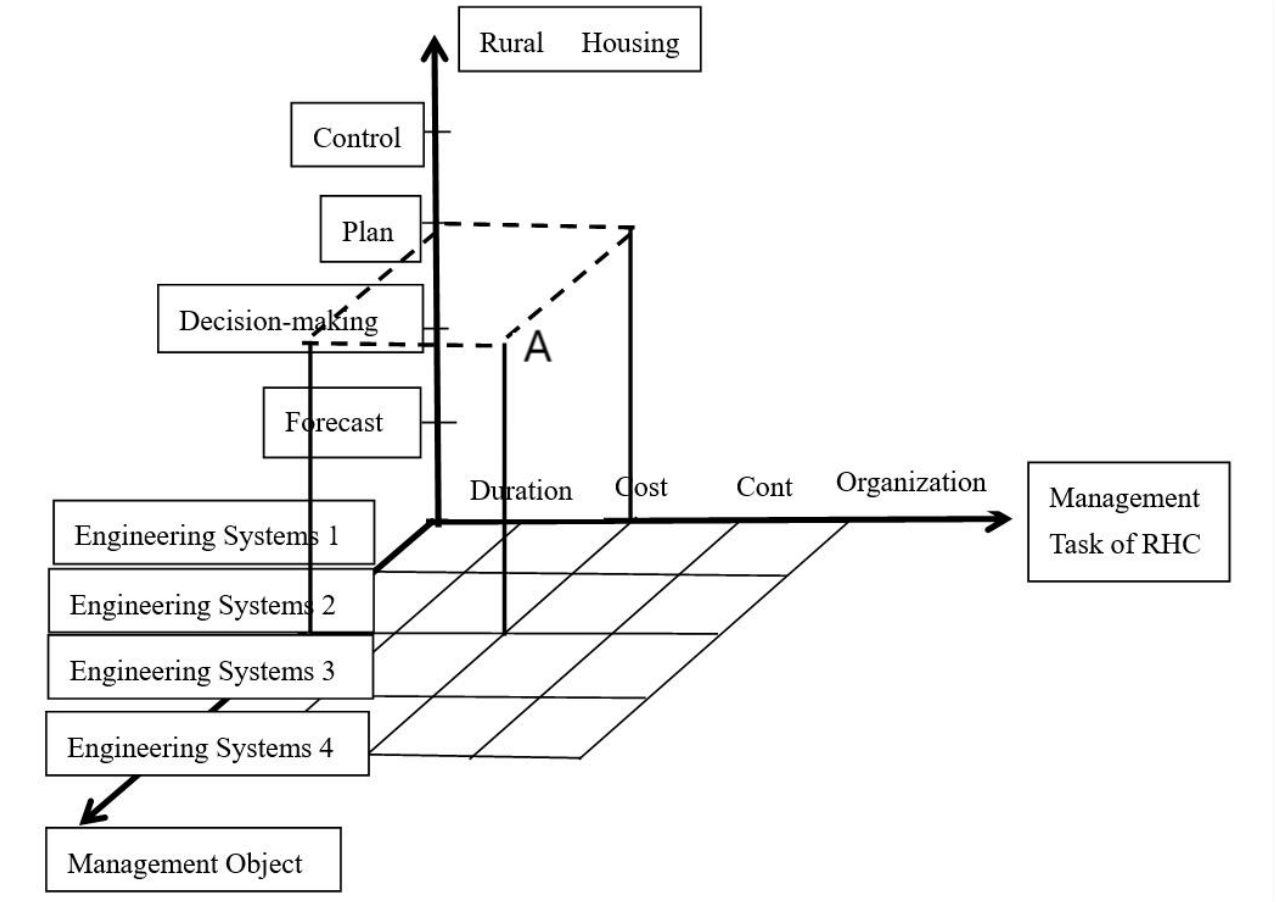

Figure 3.3 System structure diagram of RHC project management

3.4 Quality system of RHC

3.4.1 Connotation of construction quality

The RHC project against the background of NCC involves the quality of RHC projects. According to Construction Engineering Quality Management Regulations (China's Central Government, 2019) that is revised based on the regulation in 2000, construction quality is a broad concept, which includes not only the construction quality itself, but also the quality of safety, investment, schedule, environment, and supporting service. It is closely related to direct experience of rural residents. The task decomposition, management measures, processes in the implementation phase of RHC need to be planned in advance. Figure 3.4 shows the quality diagram of RCH management.

3.4.2 Quality management objectives of RHC

According to Sichuan Province Rural Housing Construction Management Measures (Sichuan Provincial Government, 2017), the objectives to be set in RHC management have all-round and multi-angle characteristics. The specific objectives can be divided into economic, safety, time, environment and other objectives, while considering functionality and reliability. For different projects, different objective plans will be presented, and the subsequent construction will be developed step by step according to the plan, so the actual factors to be considered at different stages are also very different.

First, functional requirements. All projects are carried out in order to form a function, so in the process of RHC management, functionality should be given the top priority of consideration.

Second, external conditions. In the early stage of management, all relevant external conditions should be mastered as completely as possible, and a scientific analysis should be formed for the reference of project construction. For example, local conditions such as climate and hydrology should be investigated, and relative data should be collected.

Third, economic (cost) objective. This is a key factor that impact RHC project. The first thing that must be clear is that the difference between the rural housing and other housing constructions is that the rural housing is not for economic benefit, but for the best practical effectiveness. This determines that the construction of rural housing should meet the needs and expectations of rural residents for housing. On the other hand, the actual economic situation needs be considered. The cost cannot be too high, but it can ensure that all costs are worth it.

The market factor is actually an implicit factor for the project, and it is also an expectation of the entire society for the proiect.

Fourth, safety objective. The rural housing should be safe, which implies not only the safety of the construction process, but also the safety of use, without major structural defects.

Fifth, time objective. The time objective includes the progress of construction and completion of acceptance within a scientific and reasonable time, and includes the life of its use, and no major quality or safety issues will occur within the design period.

Sixth, quality objective. RHC construction should be carried out in accordance with the relevant provisions of the construction project to ensure that the RHC project is qualified.

Quality control of the final stage of RHC project. After the final completion of RHC project, the quality of its completion should be evaluated and judged with a relatively high criteria, to measure whether the RHC project has reached the quality standard, before considering whether it can be accepted as a completed project.

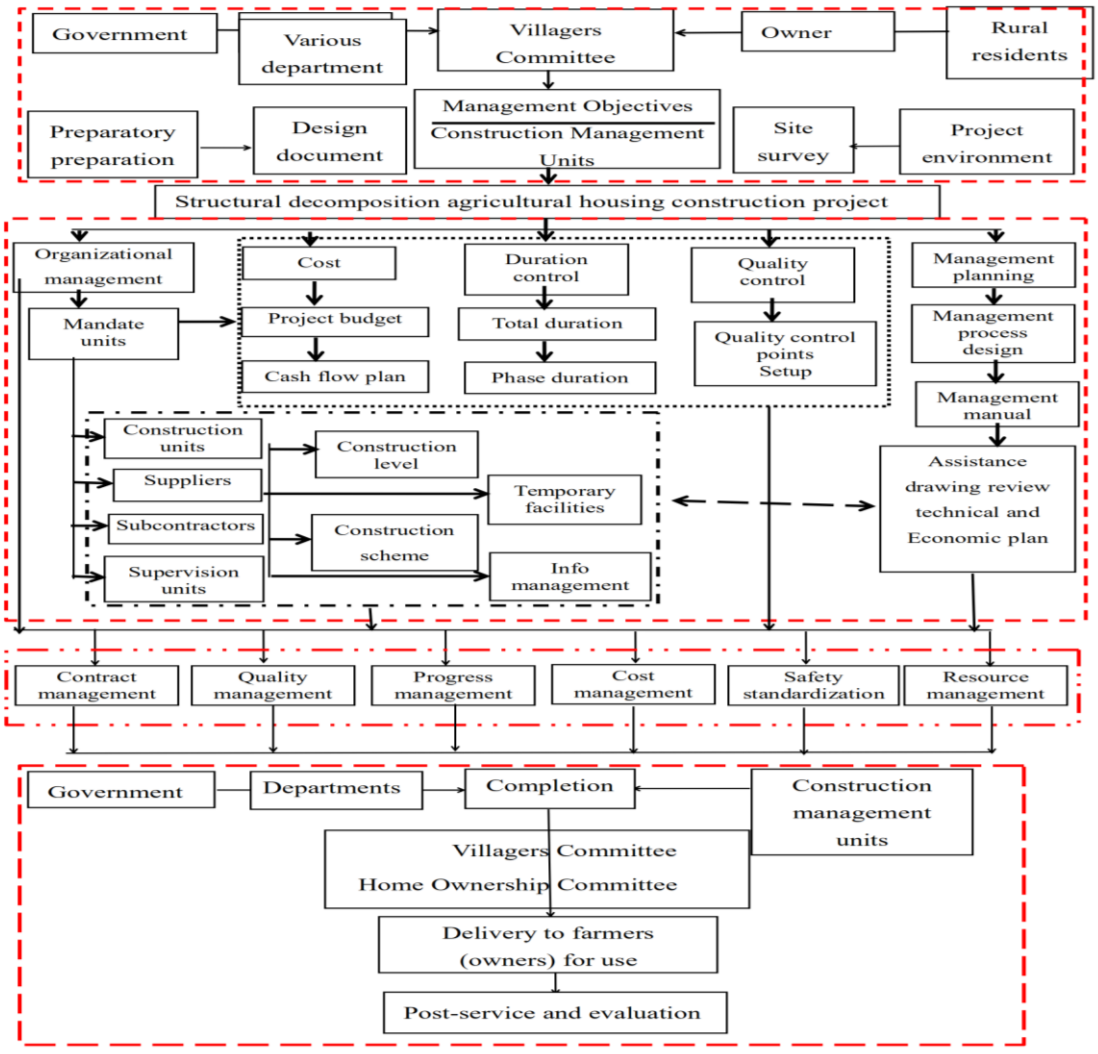

Figure 3.4 The quality diagram of RCH management

3.5 Stakeholder identification and analysis

The identification and analysis of stakeholders is to identify and analyze people or organizations with interests in RHC project and management. First, the stakeholders of the project are identified, followed by a specific classification of them, and they are fully investigated and understood, so that they can support the decision-making of relevant personnel.

3.5.1 Stakeholder identification

Chen and Ma (2016) believed that the basic link for effective stakeholder management is the identification of stakeholders. Their study identified the stakeholders in three steps. The first step is to collect data and analyze. By sorting out the data, the stakeholders of RHC can be identified and its classified. The second step is expert judgment, namely interviews by experts over preliminary identification results to allow them to judge who is the stakeholders of the project from the level of RHC project. The third step is group discussion. According to the results of expert interviews, the final stakeholders are sorted out, and determined through academic discussions.

1. Stakeholder list. Combined with the collation of the survey data, the stakeholders in RHC project were initially defined, as shown in Table 3.1.

2. Expert interviews. In order to clarify the interests related to RHC, the author conducted expert interviews. In May 2019, a total of 10 senior experts were selected. The experts have worked for more than 20 years in this industry. They all have the titles of professors or senior engineers or hold senior leadership positions. Among them, 2 are experts in the field of scientific research and teaching; 1 is from an architectural engineering design and research institute; 2 are from government departments; 1 is a land arrangement expert; 2 are senior management personnel in construction enterprises; 1 is a project management expert; and 1 is in charge of technical supervision of the supervising enterprises. The interview had two forms: face-to-face interview and telephone interview. Before conducting the telephone interview, relevant documents were arranged, and the list was submitted to the expert. After collating and summarizing the opinions of 10 experts, the following suggestions were obtained: First, the local government and relevant functional departments can be merged into one stakeholder; second, stakeholders' identification at the level of RHC project can ignore management personnel and employees; third, professional contractors and construction companies can be

merged into one stakeholder, covering all construction stakeholders in RHC project.

Table 3.1 Stakeholders in RHC project

No.	Stakeholders	No.	Stakeholders	No.	Stakeholders	No.	Stakeholders
1	Central government	2	Local government	3	Functional departments	4	Property owner (village committee)
5	Industry organizations	6	Design and planning company	7	Construction company (contractor)	8	Professional subcontracting
9	Supervision company	10	Consultancy	11	Suppliers	12	Villagers around the project
13	Financial institutions	14	Insurance company	15	The masses	16	Media
17	Research institutions	18	Land consolidation	19	Management company	20	Staff (senior executives)

3. Group discussion. In October 2019, the author brought the revised stakeholder list to an academic exchange meeting about project management of urban and rural construction in Chengdu for discussion, invited participant of the meeting to mark those they considered as stakeholders of an RCH project and not to mark those they considered not. Participants included 3 professors, 2 associate professors, 8 PhD students in engineering management related fields and 15 master students. Their judgment results are shown in Table 3.2. Based on the above discussion and taking selection percentage of more than 60% as the threshold (Wang, 2017), 13 categories of stakeholders in an RHC project were summarized, as shown in the following table:

Table 3.2 Group discussion and revised results

Stakeholders	Percentage	Stakeholders	Percentage
Central government	46.4%	Local government	100%
Property owner (village committee)	89.3%	Financial institutions	85.7%
Land consolidation company	35.7%	Supervision company	100%
Construction company	100%	Consultancy	100%
Suppliers	100%	The masses	75.0%
Research institutions	75.0%	Insurance company	42.9%

3.5.2 Direct stakeholders

(1) User organization

The user organization is the company who owns the ownership of the project in the future, being able to make the project from nothing to the something. It is also a clear service object of the project. The user organization of RHC project is the village committee and using people of RHC project is the farmers. The interest pursuits of user organization are mainly quality, safety,

progress, investment, environment. In contrast, the interests pursuits of management organizations are more extensive in order to let user organizations satisfied with the investment on quality and safety on the basis of progress, but when obtaining the relevant remuneration, it may cause interest conflicts between these two parties, thereby affecting the implementation progress of the project.

(2) Management organizations

The management organization is an important factor for the successful implementation of RHC project. At the same time, its work effects directly affect the beneficiaries of the project and directly affect the satisfaction of the quality of rural housing. After formulating a plan, the management organization mainly bears the obligations entrusted by the village committee or government agency, but in the process of implementing the RHC project, the object that is obliged to perform the obligations is the other party of the contract, namely the government agency and the owner. In the specific implementation process, the management organization first considers its own cost and profit, which is determined by its economic nature with the ultimate goal of achieving profit. The main income for management organizations is the management fee stipulated in the contract, a certain percentage of saved investment used in the RHC project, and the additional benefit due to the early completion and delivery of the project.

(3) Survey and planning institutions

The main task of the survey and planning institution is to formulate a specific project plan and submit the plan proposal to the contract client in accordance with the project plan, and to provide technical assistance to the client free of charge during the implementation process. Its needs and expectations are mainly to gain economic and social benefits by occupying the market. The survey and design institutions are at a disadvantage of information about the intention of the property owner and application for payment of remuneration. The survey and planning institutions mainly consider whether the construction project meets the requirements of the entrusting party, with rare concern on the social function of RHC project, and they do not tend to adopt new technologies, materials, which reduces the probability a success RHC project and undermines the satisfaction of rural residents. When the information is asymmetric and the integrity of the designer is not high, there may be a tendering cheating between the designer and the contractor caused by the pursuit of higher benefits. The designer will choose a design plan that is not detailed enough to obtain the design changes or drawings during the construction phase. It can be seen that the design institution has a great influence on ACM (agent

construction model, used in previous chapters) project.

(4) Construction companies (contractors)

The construction company is the main implementer of RHC project, and its quality, ability, and level are directly related to the success of RHC project. Its main requirement is to obtain a reasonable profit from the contracting of the project. During the tendering process, due to information asymmetry and market competition, the construction company will try its best to win the bid with the lowest price, and then seek contractual loopholes in the project implementation after the tendering to increase its own interests, which become a potential hindrance of achieving a successful RHC project. In the implementation phase, because the construction party has no direct economic relationship with the long-term and ultimate benefits of RHC project, the construction party will adopt extensive management to fulfill the contract, and they will only pursue construction according to the plan and completion of tangible tasks, without paying any attention to the communication with other stakeholders. Therefore, the construction party only cares about how to complete the tasks required for the completion and acceptance and minimize the cost as much as possible. When facing any construction risk, the construction company will take measures to protect itself from economic losses.

(5) Material and equipment suppliers

The responsibilities of the supplier are mainly to provide materials and equipment that meet the specific technical requirements and quality standards of the project, and to solve the problems of equipment operation and maintenance for the management company in a timely manner during the construction of the project. The main purpose of the supplier's performance of the contract is to obtain the expected profit within the time limit specified in the contract. The second objective is that the supplier hopes to establish a long-term strategic partnership with the other party after the cooperation is completed, so as to expand its share in the rural market.

(6) Engineering consulting companies

The consulting company mainly provides the project with full-time consulting and management services needed for project construction, including engineering design and specific implementation, in order to realize the expected benefits for farmers after investing in RHC project. Feasibility study consulting, bidding agents, insurance intermediaries, lawyers, accounting firms generally provide services as required to meet the economic interests of their respective interest. The main role of project supervision is to provide services for pre-construction preparation, equipment installation and commissioning, as well as project

acceptance and post-warranty. Its main interest requirement is to ensure the quality of RHC project, and safe production, thus obtaining economic benefits.

(7) Banks

As an institution for financing or guaranteeing agricultural construction projects, banks provide credit support for agricultural construction projects, and can supervise the projects in order to guarantee the performance credit of the owners, managers or construction companies.

(8) Insurance companies

There are risks in RHC projects, and insurance is an important means needed to manage the risks that appear in RHC projects. The role of insurance companies is to provide financial guarantees for any participators that are unwilling or even unable to bear the risks in any stage of project construction. The project risks are all unpredictable in the early stage of construction, and the risks may exceed the tolerance of some organization. Therefore, insurance companies mainly obtain multiplied profits through minimized costs through venture capital investment. The needs and expectations of the owner and the insurance company are the same, which is there is no loss or risk in the end. In order to prevent moral degradation and adverse selection of the insurance company, the insurance company should become a part of the risk management of RHC project. The differences between the expectations and information of the project stakeholders are shown in Table 3.3.

3.5.3 Indirectly related stakeholders

Indirectly related stakeholders mainly refer to those who have not directly signed a contract with the RHC project, but there are various legal links in the process of implementing the project, or they can obtain benefits from the completion of the RHC project. Indirectly related stakeholders mainly include people or governmental departments related to the project, such as development and reform commission, finance department, housing construction department, planning department, land department, fire protection, civil air defense, and people's congresses, political consultative conferences, disciplinary inspections commission, supervision department, audits, news media, village committees of the RHC project, and the public. These governmental departments can be divided into examination and approval departments and supervision departments. Indirect stakeholders are also an important part of the satisfaction of rural housing quality. The indirect stakeholders of RHC project are shown in Table 3.4.

(1) Approval departments

The development and reform, finance, housing construction and other approval departments do not have a contractual relationship with RHC project. They mainly approve and manage the project. The project should be approved by the government agency before the investment, use of funds, management and supervise. Their interest demands are the supervision and control of government funds, and social influence of the project, which can reflect the government's control over the project. These government departments require the owners to report on the situation at each stage to urge the completion of objectives, and they may also hinder the progress of the project. The approval of RHC project uses the measures for the management of general construction projects, so the owner should go through the procedures of each link in the construction process in accordance with the relevant regulations.

Table 3.3 Direct stakeholder needs and expectations

Name	Organization	Needs and expectations	Advantages	Weaknesses
User (Owner)	Government (village committees, farmers)	Supervision of project implementation, social benefits, and social image (used by farmers)	Your own intentions	Unprofessional, management unit compliance capacity and use of funds
Management	Company with managerial competence or qualifications	Low investment, high returns, short duration, good quality and safety	Professional, own management level and ability to perform	Qualification for survey, design, supervision, cost, contractor qualification, capability, reputation, technical knowledge, and project management concept
Survey design	Survey and design	Occupation of markets, benefits, talent, and technology	Professional, planning, design, technical, economic and price information	Building intent and financial capacity of the user
Construction company	General contracting, professional and labor subcontracting	Profit, security, market expansion and good relations	Technical, quality, management, and other capabilities	Building network and financial capacity
Suppliers	Material suppliers, equipment suppliers	Market expansion, profitability	Cost and performance of products	User's financial capacity to pay and material equipment requirements
Advisory company	Bidding agent, insurance intermediary, supervision, cost	Self-interest, fulfillment of contractual tasks	Professional competence	Credibility and performance capacity of the contracting parties
Bank	Bank	Guaranteed performance	Professionalism	Performance Assurance by the user or agent
Insurance	Insurance company	No risks	Professionalism	Management capacity, risk size of the project

Table 3.4 Indirect stakeholders of RHC project

Approval departments	Supervisory departments
1. Development and reform department 2. Financial department 3. Construction authorities (including construction, planning, land, environmental protection, civil air defense, fire protection) 4. Government assessment agency	1. People's Congress, CPPCC and other external supervision departments 2. Discipline inspection, supervision, audit, and other internal supervision departments 3. Industry association 4. Media, the public

(2) Supervisory departments

Although relevant government department, industry associations, news media and other supervisory departments have not signed any relevant contracts with the project, these agencies and organizations as supervisors will have a significant impact on the construction work. The audit department has the investigative power to investigate the use of funds during the construction process of the project. During the whole process of RHC project, it is responsible for checking the compliance of the investment management department and the project management department, guarantee reasonable through reasonable payment channels, and whether the fund for designated purposes is used in accordance with the prescribed purposes. The supervision agency is mainly responsible for supervising the government organizations involved in the project construction and the appointed staff who exercise the rights to avoid violations of laws and disciplines, so as to ensure the smooth implementation of the project in a clean environment. Civil associations or people represented by social forces also have the right to supervise, for example, through civil organizations and other channels, they propose necessary amendments and criticisms of problems arising in the construction process and convey opinions of the government and the main body of the project organization to the masses, so that the masses understand the reasons and basis for government and project decision-making. They play the role of communication and supervision in this regard.

Stakeholders are closely connected and mutually constrained. The interrelationships among the stakeholders of RHC project are shown in the above figure (Figure 3.5). Different stakeholders have different needs and expectations. In addition to the user of the project, direct stakeholders generally seek to maximize their own economic interests. There is a conflict in the coordination of interests among various organizations that adopts different measures to influence RHC project. Therefore, during the implementation of RHC project, on the one hand, it is necessary to strike an interest's balance of all parties according to the degree of influence and nature of stakeholders; on the other hand, information disclosure should be paid attention to, and the supervision of government agencies and civil organizations should be given full play to

supervise the progress of the project.

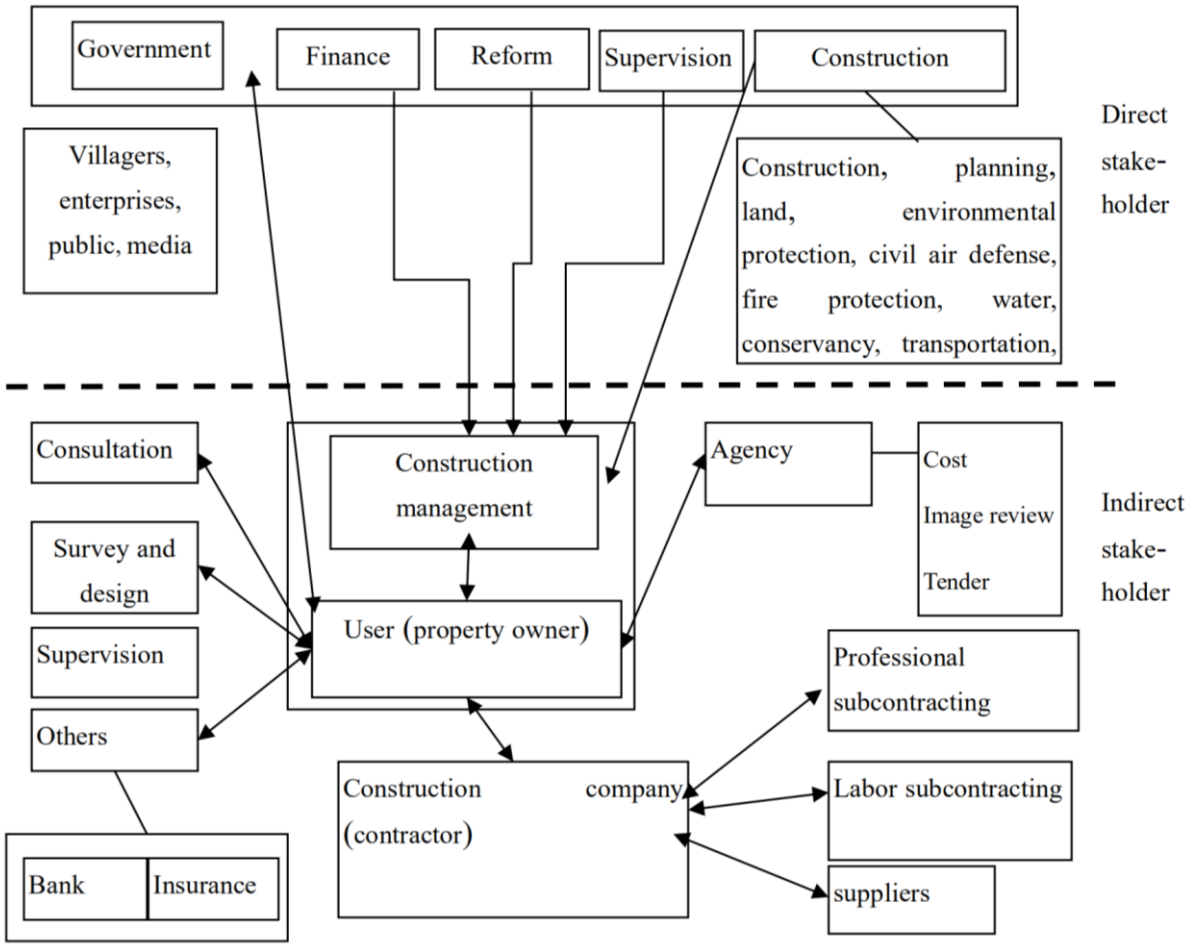

Figure 3.5 Stakeholder relationship

3.6 Model building

3.6.1 Quality of RHC

In the management of construction quality, many researchers have studied this issue from the construction process. Wang (2017), Zhang (2015b) believed that element integration of man, machine, material, and environment (4M1E) should be implemented in the quality control of construction projects, quality control activities need to be verified in each stage to ensure that there is no problem in the entire progress, or the source and measures of problems can be determined immediately when there is a problem. Preventing problems early can effectively reduce economic losses. Sometimes, in order to make the effective work, quality control will be responsible for monitoring the entire process to ensure that no mistakes are made. Wang (2014a), Xu and Zhao (2016), and Li (2017) considered that the probability of quality problems

in construction projects has great contingency but is inevitable to some extent. Therefore, it is necessary to find out the key factors that affect the quality that impose impacts on the project inevitably regardless of the size of the fluctuations. In order to effectively solve the quality problems of RHC projects and prevent the occurrence of quality problems, it is necessary to thoroughly study the mechanism of these key factors, find the source of the complexity of quality problems, and improve the satisfaction of housing quality.

3.6.2 Rural housing satisfaction

The term "housing satisfaction" has been put forward for a long time. Huang (2017) proposed the people's dream of "settlement" which means that people can live in peace and confidence, and the action to improve the satisfaction of the quality of residential projects. Forte and Russo (2017) stated that opinions and expectations of residents throughout the design and construction process will increase satisfaction of residents. Tao, Zou, and Wu (2019) argued that improving the residential experience of residents is the basis and premise for the sustainable development of property rights houses. According to the three aspects of the external environment, construction status and social life of the residence, Zhang and Yang (2015) examined the satisfaction status of the residents in detail, and suggestions are made to improve the location conditions of the affordable housing by updating and improve the housing facilities and planning. Similarly, in NCC, the quality of building should be stringently controlled. Housing quality has a direct impact on the lives of residents, and the evaluation of satisfaction. This study selected rural housing in Suining as the background and combines previous studies to summarize the factors affecting rural housing satisfaction in Suining.

3.6.3 Factor framework

Based on previous studies on rural areas and housing, and theories of stakeholders in this chapter, this study first sorted out 39 factors that have an important impact on the satisfaction of farmers with rural housing, and these 39 factors can be divided into 5 levels, including personal characteristics, housing characteristics, housing quality characteristics, housing finance, and housing management and services.

(1) Characterization of housing quality

The housing type (X_1): It is defined according to the floor of the house. There are single-story houses and multi-story houses, and single-story houses include bungalows and tile houses.

Nature of housing (X_2): Whether self-built houses enjoy government subsidies.

Housing structure (X_3): The main wooden structure of the rural housing, including adobe-wood structure, brick-wood structure, brick-concrete structure, and reinforced concrete structure.

Building method (X_4): Building method includes self-built by farmers and unified government planning.

Homestead area (X_5): The homestead area includes less than 50 square meters, 50-100 square meters, 100-200 square meters, 200-300 square meters, and more than 300 square meters.

Housing area (X_6): The housing area includes less than l50 square meters, 50-100 square meters, 100-200 square meters, 200-300 square meters, and more than 300 square meters.

Property right certificate (X_7): Whether farmers have obtained rural housing ownership certificates.

Housing age (X_8): The years of completion of the construction of the house includes less than 1 year, 1 to 2 years, 3 to 6 years, 6 to 10 years, 11 to 20 years, and more than 21 years.

Housing use time (X_9): The annual living time of farmers living in rural homes includes less than 1 month, 1 to 2 months, 3 to 5 months, 6 to 10 months, and long-term residence throughout the whole year.

Housing construction period (X_{10}): The time it takes for farmers to build a house from the start of construction to the completion includes less than 2 months, 2 months to 6 months, 7 months to 1 year, 1 year to 2 years, and more than 2 years.

Construction cost (X_{11}): The total amount of money spent by farmers to build their houses includes less than 20,000 yuan, 20,000 to 50,000 yuan, 60,000 to 100,000 yuan, 11-15 million yuan, 16 to 200,000 yuan, 21 to 300,000 yuan, 310,000 to 500,000 yuan, more than 510,000 yuan.

(2) Characterization of housing quality

Geographical location (X_{12}): the location and feng shui of the farmer 's location of his house.

Farmhouse type (X_{13}): floors of the arm house, such as single and multiple floors.

Housing area (X_{14}): the total area of houses occupied by farmers, including housing and auxiliary houses.

Housing quality (X_{15}): any quality defects in rural housing, such as subsidence of foundations, leaking roofs, cracked pipes, exposed steel bars, cracked walls, improper circuits.

Supporting infrastructure for water supply and drainage, roads and other supporting facilities (X_{16}).

Exterior design (X_{17}): the exterior shape and style of the house.

Housing environment (X_{18}): the surrounding environment where the house is located, including public services, natural ecological environment, convenient production, and life.

Other elements (X_{19}): any other element in addition to the above-mentioned ones.

(3) Household financial situation

Self-owned funds (X_{20}): All funds needed by farmers to build houses are their own savings.

Relatives and friends borrowing (X_{21}): When building a house, insufficient part borrows money from relatives and friends for building a house.

Bank loans (X_{22}): When farmers build houses, insufficient parts are loaned to financial institutions for construction.

Government subsidies (X_{23}): Farmers enjoy their own subsidies given by the government for building houses

Proportion of own funds (X_{24}): The proportion of farmers' own savings spent on building houses. No loans, less than 30%, 31% to 50%, 51% to 80%, more than 80%.

(4) Respondent's personal status description

The head of the household (X_{25}) the subjects surveyed in this study are male and female.

Age of household head (X_{26}): the age of the surveyed subjects is divided into under 18 years old, 18 to 25 years old, 26 to 30 years old, 31 to 40 years old, 41 to 50 years old, 51 to 60 years old, 61 years old and above.

Family type (X_{27}): The household type of the respondent is divided into poor households and non-poor households.

Number of households (X_{28}): The number of households in the surveyed households contains 1, 2, 3, 4, and more than 4.

Education level (X_{29}): The education level of the respondents includes elementary school or below, junior high school, high school / secondary school / technical school, college, undergraduate and above.

Annual household income (X_{30}): The total income of the surveyed family in the previous year, including crop production, aquaculture development, migrant workers, asset income, operating income contains 6 options: less than 10,000 yuan, 10,000-30000 yuan, 30,000 50000 yuan, 50000-100000 yuan, 100000-150000 yuan, more than 150,000 yuan.

Main source of income (X_{31}): The main source of income of the households surveyed includes agricultural production, working abroad, opening a business, and others.

Main place of residence (X_{32}): The main place of residence of the respondents and their families includes rural hometowns, townships, county towns, Suining urban areas, and others.

(5) Description of construction management and service status

Construction application (X_{33}): Whether farmers have taken the initiative to apply to the government or relevant competent authorities before going through the relevant statutory rural housing construction procedures.

Professional housing design (X_{34}): Whether farmers hire professional design personnel to design the proposed housing carefully and professionally before building a house.

Foundation survey (X_{35}): Whether farmers hire professional surveyors to carry out geological survey on topography and foundation before building houses.

Building process supervision (X_{36}): Whether there is professional or government departments in the process of building houses to supervise and manage the quality and safety of the house. It is divided into whole-process supervision, which only supervises some links and no supervision at all.

Construction Team Qualification (X_{37}): Whether farmers hire professional craftsmen or construction teams with construction qualifications issued by the government.

Construction Standard (X_{38}): Whether farmers build houses with reference to relevant national construction standards.

Construction drawings (X_{39}): Whether farmers build houses according to the designed construction drawings.

3.7 Research model selection

3.7.1 Model selection

In order to analyze factors having impacts on housing satisfaction of rural residents, and to further clarify the degree of impact and significance, a measurement model was established to analyze these factors. The author took housing satisfaction as the dependent variable. The response to whether farmers are satisfied with their housing is "yes" or "no", which is virtual dichotomous variable for housing satisfaction, so the binary logistic regression model was selected to analyze these factors.

Taking satisfaction of rural residents with housing as the dependent variable Y, namely the type 0-1 dependent variable. Satisfaction is Y = 1, and dissatisfaction is Y = 0. Assume that the probability of Y = 1 is P. X (i = 1, 2, ..., n) is the explanatory variable, namely various main

factors having impacts on personal characteristics, housing characteristics, housing financial policies, housing quality characteristics, housing construction services and management. Bi (i = 1, 2, ..., n) is the regression coefficient of the i-th factor. Then the logistic probability function is:

$$P_i = \frac{1}{1+e^{-Y}} = \frac{1}{1+\exp\left[-(\beta_0+\sum_{i=1}^{n}\beta_i X_i)\right]} \tag{3.1}$$

In formula (4.1), Y is a linear combination of variables X1, X2, ..., Xn, namely:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon \tag{3.2}$$

Among them: β0 is a constant, ε is a random disturbance factor.

Transform formula (3.1) and formula (3.2) to obtain the logistic model in the form of occurrence ratio:

$$\ln\frac{P_i}{1-P_i} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon \tag{3.3}$$

3.7.2 Variable selection and assignment

Based on the above assumptions, when constructing the Logistic model of the factors having impacts on the housing satisfaction of rural residents, 5 categories and 39 explanatory variables were selected (see Table 3.5 for details).

3.8 Chapter summary

The basic principle of RHC and its management is the most basic work of NCC and RHC management. This chapter describes specific content of NCC and RHC from the perspective of NCC, the characteristics and classification of RHC, and the framework of RHC management. It is worth noting that the quality management of RHC is a critical and systematic project, which involves a wide range, many contents, and intricate relationships. The description in this chapter is the following research hypothesis, data collection and analysis, empirical analysis and discussion of farmhouse quality satisfaction, find out the shortcomings of the construction and management of rural houses in Suining, and put forward strategic suggestions for the construction and management of rural houses in Suining.

This chapter is based on the previous chapters of RHC management, followed by the identification and analysis of RHC stakeholders, and summarizes the types of direct and indirect stakeholders in the process of RHC management. A clear statement of stakeholders acts

as a backbone for RHC and its construction quality, and in this way the construction of a framework for the satisfaction of rural housing has a solid foundation. The author proposed 5 potential dependent variables for housing satisfaction and 39 unset variables, reflecting A regression model of rural housing satisfaction. A binary logistic regression model was used to describe factors exerting impact on rural housing satisfaction. A regression analysis model of rural housing satisfaction was constructed, and hypotheses about RHC management were proposed to lay the foundation for follow-up research.

Table 3.5 Description of model variables

Name of variable		Definition and value of variables
Housing satisfaction (Y)		Overall evaluation of housing by respondents, satisfaction =1, dissatisfaction =0
Explanatory variables		
Housing characteristics	Housing type X_1	Bungalow =1, building =2
	Housing nature X_2	Self-built without subsidy =1, housing with government subsidy =0
	Housing structure X_3	Wood structure =1, adobe wood structure =2, brick and wood structure =3, brick and concrete structure =4, reinforced concrete structure 5
	Housing X_4	self-built =0, government unified planning 1
	Homestead Floor Area X_5	Below 50 m^2=1, 150~100 m^2=2,100~200 m^2=3,200~300 m^2=4, above 300^2 =5
	Housing X_6	Below 50 m^2=1, 150~100 m^2=2,100~200 m^2=3,200~300 m^2=4, above 300^2 =5
	Housing title certificate X_7	yes=1, no =0
	Housing age X_8	Less than 1 year =1~2 years =2,3~6 years=3, 6~10 years =4, 11~20 years=5, more than 21 years= 6
	Duration of housing use X_9	Use time per year, less than 1 month =1,1~2 months =2,3~5 months=3,6~10 months =4, throughout the year=5
	Duration of housing construction X_{10}	Less than 2 months =1, 2 months ~6 months =2, 7 months ~1 year =3, 1~2 years=4, more than 2 years =5
	Housing costs X_{11}	below 20 thousand=1, 20~50 thousand=2, 6~10 thousand=3, 11-15 thousand=4, 16~200 thousand=5, 210~300 thousand =6, 310~500 thousand= 7, more than 500 thousand=8
Housing dissatisfaction factor		
	Location X_{12}	yes=1, no =0
	Housing X_{13}	yes=1, no =0
	Area X_{14}	yes=1, no =0
Quality of housing	Quality X_{15}	yes=1, no =0
Features	Facilities such as water supply and drainage, roads X_{16}	yes=1, no =0
	Design X_{17}	yes=1, no =0
	Housing environment X_{17}	yes=1, no =0
	Other elements X_{19}	yes=1, no =0
Source of housing costs		
	own funds X_{20}	yes=1, no =0
Housing finance	Borrowing from relatives and friends X_{21}	yes=1, no =0
	Bank loans X_{22}	yes=1, no =0

	Government subsidies X_{23}	yes=1, no =0
	Share of own funds X_{24}	Non-borrowing=1, less than 30%=2, 31~50%=3, 51~80%=4, more than 80% = 5
	Gender X_{25}	Sex, male =1, female =0
	Age X_{26}	Under 18=1, 18~25=2, 26~30=3, 31~40=4, 41~50=5, 51~60=6, older than 61=7
	Family type X_{27}	Type of household surveyed, poor household =1, non-poor household =0
	Households X_{28}	Number of family members. 1 =1, 2=2, 3=3, 4=4, more than 5=5
Personal characteristics	Education X_{29}	Level of education, primary or below=1, junior secondary =2, senior secondary/technical =3, junior college =4, undergraduate and above=5
	Annual household income X_{30}	Below 10 thousand=1, 10 thousand~ 30 thousand=2, 30 thousand~ 50 thousand=3, 50 thousand~100 thousand=4, 100 thousand~150thousand=5, more than 150 thousand=6
	Main sources of income X_{31}	Agricultural production =1, working =2, business =3, other =4
	Primary residence X_{32}	Rural area=1, township =2, Suining county=3, Suining city =4, other =5
Housing management and services	Application for Construction X_{33}	yes=1, no =0
	Housing Professional Design X_{34}	yes=1, no =0
	Foundation survey X_{35}	yes=1, no =0
	Housing process supervision X_{36}	The whole process of supervision =1, only part of the supervision =2, no supervision = 3
	Construction team qualification X_{37}	Qualified =1, unqualified =0
	Construction Standards X_{38}	yes=1, no =0
	Construction drawings X_{39}	yes=1, no =0

[This page is deliberately left blank.]

Chapter 4: Research Method for Satisfaction of RHC Management

4.1 Research method

In this chapter, based on the satisfaction model of RHC management proposed in Chapter 3, RHC in Suining was taken as a sample, and the situation of RHC management in Suining is surveyed through questionnaires, using a combination of quantitative research and statistical analysis to research and analyze the satisfaction of rural housing quality. Hypotheses were verified through data collection from the questionnaire surveys, and analysis conclusions were obtained accordingly. Data closely related to the research from the relevant literature were achieved and summarized it into useful information. Aiming at a research on RHC management, a questionnaire survey was conducted, and then the room for improvement and improvement in RHC management was deduced based on the attributes of the variables through regression analysis and discussion.

4.1.1 Advantages of questionnaire survey

There are many advantages of the survey method. Lu and Zou (2018) proposed several advantages that can be applied to this study based on the results of previous studies. First, the questionnaire survey is more intuitive and clearer, and the subject of the study can be focused on easily with this method. The questionnaire is designed with an appropriate number of items so that the respondent can fully accept this method. The second is that the questionnaire survey is a field survey. The data collection is more economical at lower cost. The third is high efficiency. According to the needs of the research, through the appropriate survey process management, the data needed for the research can be collected quickly and effectively. Fourth, the quality of the collected data is high. According to the reliability and validity of the scale, the high-quality basic data can be collected through the questionnaire survey with sufficient sample size. Fifth, the fitness is relatively high. With reasonable design of the questionnaire, the respondent can understand the questionnaire accurately, and the expected results can be easily achieved.

4.1.2 Disadvantages of questionnaire survey

Each research method is not perfect and is always more or less flawed (Lu & Zou, 2018). First, the quality of the questionnaire is influenced by the designer of the questionnaire. The questionnaire is designed according to the researcher's knowledge level, social beliefs and values. Therefore, the questionnaire may directly lead the interviewee into the researcher's pre-designed viewpoint.

Second, questionnaire survey requires the respondent to have certain knowledge. The questionnaire usually requires the respondent to answer the questions given in the questionnaire. If they do not have certain knowledge, the respondent cannot accurately understand the content of the questionnaire, causing the survey distortion or questionnaire invalidity.

The third is that the questionnaire needs personal communication between the researcher and the investigator. There may be an intention that the respondent wants to express cannot be directly articulated to the researcher, resulting in an incomplete record of the respondent's opinion.

Fourth, respondents' cognitive levels vary greatly, and they can understand the same question in different ways and answer it according to their own judgment and explanation, as a result of which they give some irrelevant answers.

Fifth, the respondent is easily influenced by neighbors' answers. The questionnaire may be manipulated by the respondent, so respondents are unable to tell the truth of questions.

The questionnaire in this study focuses on the satisfaction of RHC management. The questionnaire is designed based on relevant factors such as the basic information of farm households, the basic situation of housing construction, the security situation of rural housing, and the expectations of farmers on RHC management. The questionnaire needs to provide valid data to test the models and hypotheses proposed in Chapter 4.

4.2 Research design

4.2.1 Questionnaire design

The preparation and selection of measurement tools in the questionnaire survey directly impact the reliability and value of the research, which is a very important work in the research. This study used the Likert multi-selection scale, which considers scales as equidistant variables. In the Likert scale, the internal consistency of the five-point scale is better, and when the number of choices exceeds five, it is difficult for ordinary people to distinguish, which leads to

difficulty in achieving reliability. Therefore, this study used Likert five points scale (Zhou & Song, 2019).

For the purpose of research, the author carried out a large amount of literature collection, carefully analyzed and sorted out the previous research results, combined with the research theory and work experience that the author possessed, and preliminary designed the questionnaire.

Due to the wide range of personnel and scope involved in this study, experts were invited to review the scale to ensure the validity and reliability of the questionnaire. The experts participating in the review included 1 doctor and 1 professor who are engaged in management science research in colleges and universities, 2 department leaders in RHC industry, 2 senior engineers of RHC management enterprises, 1 senior engineer at the level of professors in the Sichuan Village and Town Design Institute, 1 senior planner from Suijing Urban and Rural Planning Institute, and 1 registered supervision engineer of the supervision enterprise managed by the Sichuan Provincial Construction Department. The author asked these experts to review each item of the scale one by one. Experts put forward amendments on whether the meaning in the scale is clear, whether the concepts used in the questionnaire are different, whether the terms are accurate, whether they can meet the objectives of the study, whether they can produce earnest and objective answers of the respondents. Based on the opinions of experts, the author adjusted the items, added suitable items, deleted the unsuitable ones, revised the unsuitable terms, and determined the finalization of questionnaire for RHC management in city.

4.2.2 Variable design

In the questionnaire survey, the number of items have a direct impact on the size of the function value. A great number of items makes the possibility of the potential variables greater. Theoretically, it can reflect problems more accurately, but too many items cause perfunctory of respondents, thus affecting the analysis results (He & Hu, 2002). Therefore, the questionnaire needs to determine the appropriate number of questions. This questionnaire design first defined four concepts related to the survey, including RHC, construction quality, construction management, satisfaction to avoid ambiguity understood by respondents in the survey. The main content of the questionnaire followed, including basic information of farmers' households, basic conditions of farmers' housing construction, security conditions of farmers' housing, and expectations of farmers on RHC management.

1. Basic information of farmer households includes a total of 8 items, mainly to obtain the

gender, age, education, family size, family type, resident, family income and income source of the respondents.

2. The basic situation of farmer's housing construction include a total of 20 items, mainly on the type, nature, construction method, house site area, the number of house site area, housing area, property rights certificate, construction year, construction duration, residence time, project cost, source of funds, government approval, government supervision, how to deal with the original homestead, the structure of the house, whether it is professionally designed, and whether they are satisfied with the housing.

3. The security situation of the farmer's housing consists of 9 items, mainly including whether the farmer's housing construction is done by a professional team, whether the construction refers to relevant housing standards, whether the construction drawings are important, whether there is quality supervision during the construction process, whether a safety accident occurs, whether there are quality defects, how to deal with quality defects, and the most important factors affecting safety.

4. Farmers' expectations on RHC management consists of a total of 6 items, mainly measuring the expected courtyard form, structural form, government policy, construction model, most concerned issues, and the form of RHC that farmers.

At the end of the questionnaire, the author left a column for the respondent to provide information that they thought not comprehensive enough in the scale to add variables.

4.3 Data collection

4.3.1 Sample selection

The main object of this research is farmers because they have direct sensation of RHC and its management. The collection of sample data is based on the understanding and cognition of RHC management. In order to understand the housing satisfaction status of rural residents in Suining and find out the factors affecting their housing satisfaction, the author personally led a team into 5 survey groups and conducted a questionnaire survey on 1,000 random rural households in five districts and counties in Suining.

In order to improve the representativeness of the sample and the dispersion of the sample in Suining, the questionnaire was conducted in five ways to meet the coverage and breadth of the survey of RHC management in Suining (as shown in Table 4.1).

Table 4.1 Source distribution of the sample

Data sources	Number of issued questionnaires	Number of retrieved questionnaires	Number of valid data	Proportion of valid data (%)
Construction industry authorities (10 villages)	200	188	188	95.3
Township Government (5 townships)	120	120	108	
Personal contacts (10 villages)	200	200	178	
Other government departments (10 villages)	220	202	196	
Internet	260	254	249	

1. 200 questionnaires were randomly distributed through the construction industry authorities, maximally taking into consideration the scope and breadth, decentralization, and representativeness of the industry management. Together with members from construction industry authorities above the county level, the author also went to villages, and guided rural resident to fill in the questionnaire in a face-to-face manner to ensure the objectivity and authenticity of their response. They randomly selected 10 villages to issue questionnaires.

Suining Housing and Urban-Rural Construction Bureau and Chuanshan Housing and Urban-Rural Construction Bureau.

1. 200 questionnaires were randomly distributed through the township government. Since the residents of towns and villages live in a relatively scattered way, the questionnaire was distributed by taking advantage of the concentration of people when they rushing to the market. Questionnaires were distributed in a total of 5 townships accompanied by township officials in a random manner.

2. 200 questionnaires were randomly distributed through his personal connections. Since the author oversaw the construction business, the author used opportunities in his work, and invited members in village government to help him in conducting random surveys in households. Questionnaires were distributed in a total of 10 villages.

With the help of development and reform department, poverty alleviation and development department, agriculture and rural department, statistics department, natural resources and planning department, and other departments in governments at all levels, 220 questionnaires were distributed in a total of 10 villages, including farmers with unified planning and construction of housing, such as centralized resettlement and relocated households.

260 questionnaires were distributed on Internet. The author used network technology to post the questionnaire on 2 social media platforms, QQ and Wechat, invited rural residents who can use smart phones or computers to participate in the questionnaire. Responses with a reply

within the time limit were used for this study, and responses with a reply beyond the time limit were not qualified for data collection. The use of modern network technology collected data included the participation of the farmer friends of the author's own hometown in the online questionnaire.

4.3.2 Data collection

(1) Data retrieving

A total of 1,000 questionnaires were distributed online and offline, including 740 paper questionnaires (offline) and 260 questionnaires borrowed using network technology as the media (online). As for the questionnaires collection, some of them were collected immediately after the answers, and some of them were collected uniformly by village cadres from household to household. The time limit for the questionnaire collection of the above-mentioned five ways to issue questionnaires was different, but the maximum collection duration was 5 days. When cleaning the data from questionnaire, it was found that 36 questionnaires that could not be answered within the time limit because some respondents had concerns on revealing the truth or they could not understand some items. 964 questionnaires were recovered, with a recovery rate at 96.4 %. The sample recovery rate exceeds 90%, and the survey recovery rate is still quite high, which can meet the needs of the sample size of this study.

(2) Data cleaning

In order to improve the statistical quality of the sample, after the sample data is retrieved, the sample cleaning work was carried out immediately. Data cleaning was conducted through screening answers to the question of the respondent. Samples with logical contradictions and exactly same options in responses were cleaned up. By sorting out, 45 questionnaires did not meet the requirements of the survey, and 919 valid questionnaires were obtained. Among them, there were 249 online questionnaires and 670 offline questionnaires. The sample effective rate was 95.3%, and the sampling efficiency was over 90%.

4.4 Statistical analysis

4.4.1 Statistical analysis methods

The subjects of this study are mainly farmers, village cadres, and a small number of township cadres. All of them have experience in RHC and are able to provide the data required for the

survey. In this study, SPSS statistical software was used to conduct Logistic regression analysis of effective sample data from 919 respondents, including factor analysis, correlation analysis, regression analysis and these analysis methods are suitable for the needs of this study.

This study mainly took rural housing construction in Suining, Sichuan Province as a sample, focusing on rural residents contacted by the Suining Housing and Urban-Rural Construction Bureau, Chuanshan Housing and Urban-Rural Construction Bureau, Pengxi County Development and Reform Bureau, Daying County Poverty Alleviation Development Bureau, Shehong County Natural Resources Bureau, as well as farmers in villages, towns and villages. This study did not involve urban residents in RHC and construction enterprises.

4.4.2 Statistical description analysis

A statistical description was conduct before statistical analysis to make a descriptive analysis of the collected data. The basic situation of the 919 rural households surveyed in Suining is distributed in Table 4.2, and the statistical characteristics of the data are initially grasped.

Poor households accounted for 20.2%, general farmers accounted for 67.7%, village group cadres accounted for 7%, and township cadres accounted for 5.1%; those with annual household income below 10,000 accounted for 15.2%, and 10,000 to 30,000 accounted for 28.2%, 30,000 to 50,000 yuan accounted for 21.8%; 50,000 to 100,000 yuan accounted for 19.8%; 100,000 to 150,000 yuan accounted for 11.1%; 3.9% had the annual income of more than 150,000 yuan. Sample distribution is relatively even.

Table 4.2 Statistics of the basic situation of the sample

Category		Frequency	Percentage (%)
Gender	Male	591	64.3
	Female	328	35.7
Age	Below 18	13	1.4
	18～25	56	6.1
	26～30	77	8.4
	31～40	189	20.6
	41～50	270	29.4
	51～60	176	19.2
	Above 61	138	15
Family type	Non-poor household	733	79.8
	Poor household	186	20.2
Family size	1 people	36	3.9
	2 people	83	9
	3 people	206	22.4
	4 people	248	27
	5 people and above	346	37.6
Education level	Elementary school or below	252	27.4
	Junior high school	331	36

	High school / technical secondary school / technical school	184	20
	Technical high school or above	63	6.9
Annual family income (yuan)	Below 10000	140	15.2
	10000～30000	259	28.2
	30000～50000	200	21.8
	50000～100000	182	19.8
	100000～150000	102	11.1
	Above 150000	36	3.9
Main source of income	Agricultural production	177	19.3
	Migrant work	564	61.4
	Business	61	6.6
	Others	117	12.7
Main place of residence	Rural hometown	485	52.8
	Township	91	9.9
	County	92	10
	Suining downtown area	141	15.3
	Others	110	12

4.5 Analysis of housing satisfaction of rural residents

In this survey, the answer to the question of "Are you satisfied with the current housing?" is divided into four levels, namely very satisfied, basically satisfied, not very satisfied and very dissatisfied. The overall housing satisfaction of rural residents in Suining is shown in Table 4.3, of which the "basically satisfied" rate is the highest, reaching 44.6%; followed by "very satisfied", accounting for 29.8%; only 6.3% of residents expressed dissatisfaction with existing housing. The rate of expressing "very satisfied" and "basically satisfied" is as high as 74.4%, which is equivalent that two thirds of the rural residents are satisfied with the existing housing.

Table 4.3 Overall housing satisfaction of rural residents

Satisfaction	**Very satisfied**	**Basically satisfied**	**Less satisfied**	**Not satisfied**	**Total**
Frequency	274	410	177	58	919
Percentage	29.8	44.6	19.3	6.3	100

Table 4.4 Housing satisfaction of rural residents with different incomes

			Annual family income (yuan)					
			Below 10000	**10000-30000**	**30000-50000**	**50000-100000**	**100000-150000**	**Above 150000**
Satisfa	Very	count	30	104	53	58	18	11

ction	satisfied	% Of household annual income	21.40%	40.20%	26.50%	31.90%	17.60%	30.60%
		count	62	91	103	88	49	17
	Basically satisfied	% Of household annual income	44.30%	35.10%	51.50%	48.40%	48.00%	47.20%
		count	38	48	34	18	31	8
	Less satisfied	% Of household annual income	27.10%	18.50%	17.00%	9.90%	30.40%	22.20%
		count	10	16	10	18	4	0
	Not satisfied	% Of household annual income	7.10%	6.20%	5.00%	9.90%	3.90%	0.00%
		count	140	259	200	182	102	36
Total		% Of household annual income	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

The housing satisfaction of various categories of people is shown in Tables 4.4 and 4.5. According to the data in Table 4.4, with the increase of family income, the housing satisfaction of rural residents also increases, and there is a positive correlation between the two ($P < 0.05$). From the perspective of households in five income levels, the housing satisfaction of middle-income households is the highest, and that of the lowest-income households is the lowest. The relationship between household income and housing satisfaction generally shows an "inverted U" curve. From Table 4.5, there is a positive correlation between rural residential housing area and housing satisfaction. Larger the housing area tend to bring higher housing satisfaction of rural residents.

Table 4.5 Housing satisfaction of rural residents with different housing areas

			Housing area				
			Below 50m²	**50-100m²**	**100-200m²**	**200-30m²**	**Above 300m²**
Satisfaction	Very satisfied	count	5	151	84	27	77
		% Of housing area	19.20%	39.20%	23.70%	21.60%	25.00%
	Basically satisfied	count	5	137	175	78	15
		% Of housing area	19.20%	35.60%	49.30%	62.40%	53.60%
	Less satisfied	count	8	76	71	18	4
		% Of housing area	30.80%	19.70%	20.00%	14.40%	14.30%
	Not satisfied	count	8	21	25	2	2
		% Of housing area	30.80%	5.50%	7.00%	1.60%	7.10%

Total	count	140	26	385	355	125
	% Of housing area	100.00%	100.00%	100.00%	100.00%	100.00%

4.6Tests

4.6.1 Validity and reliability analysis

Validity analysis includes the external validity, content validity and expert validity analysis of the scale to check the correctness and reliability of the research results, which is the scale can represent the basic characteristics of rural housing in Suining and measure the theoretical characteristics. Reliability analysis is to disclose the consistency of measurement and further understand the reliability and validity of the questionnaire.

In terms of validity analysis, this study has done some work on improving external validity and content validity in the previous chapters, mainly via conducting profound analysis on literature. The questionnaire also refers to theoretical research, methods and conclusions in researches at home and abroad. Experts were also required to review the questionnaire. Through the examination of external validity, content validity and expert validity, the questionnaire can reflect the research content.

Reliability analysis was carried out at the same time through comparison and stability of the measurement results. According to expert recommendations, in order to reduce the amount of work, the statistical data of the housing structure in the sample was compared with the census data of the National Statistical Department. Difference within 5% means that the survey data is valid and credible (Zhou & Zhou, 2015). The survey statistics and census results are shown in Table 5.3.

As can be seen from Table 5.3, the statistical data of the proportion of reinforced concrete structures and brick-concrete structures increased slightly, while the proportion of brick (stone) wood structures and bamboo-straw adobe structures decreased slightly. This is in line with the policies of construction of CBNC, precise poverty alleviation, rural dilapidated housing reconstruction, and farmers' housing security that have been vigorously implemented in recent years. It also shows that the results of this sample survey are highly representative and accurate to present the reality of rural housing in Suining. The results of multiple measurements reflected in Table 4.6 have strong robustness, and the reliability and validity of the questionnaire are high through comparison and measurement results.

Table 4.6 Comparison of housing characteristics

Housing characteristics	Structure type	Steel-concrete	Brick-concrete	Brick-wood	Civil	Wood	Others
Data source	Survey	11.4%	46.2%	23.4%	14.5%	2.3%	2.2%
	Census	11.2%	46.3%	24.6%	15.9%	3.8%	1.0%
Consistency		Yes	Yes	Yes	Yes	Yes	Yes

4.6.2 Logistic model regression analysis

This study mainly examines the impact of housing quality on housing satisfaction of farmer. The author used the Logistic regression model to increase the independent variables one by one to explore the significant changes of the dependent variable. Model 1 shown in Table 4.7 only includes the variable of housing characteristic. In model 2, the variable of housing quality characteristic is added. In model 3, the variable of housing finance characteristic is added. In model 4, the variable of individual household characteristic is added. In model 5, the variable of RHC management and service is added. Table 4.4 lists the estimation results of the survey statistical model of the factors having impacts on the housing satisfaction of rural residents in Suining in this study. It can be seen from Table 4.7 that after each increase of variable and further adjustment of control variables, the significance of housing characteristics and housing quality characteristics remains basically unchanged, indicating that the estimation results of this model are relatively robust.

Table 4.7 Logistic model regression results of factors affecting housing satisfaction of rural residents

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Housing type X_1	0.226	0.326*	0.269	0.166	0.196
Housing nature X_2	-0.251	-0.243	-0.194	-0.371	-0.706*
Housing structure X_3	0.219**	0.192*	0.197*	0.173*	0.188*
Housing X_4	0.881**	0.875**	0.742**	0.739**	0.427*
Homestead Floor Area X_5	-0.17*	-0.097	-0.119	-0.106	-0.14
Housing X_6	0.084	0.161	0.167	0.157	0.332*
Housing title certificate X_7	0.797**	0.365*	0.356*	0.428*	0.124
Housing age X_8	-0.598**	-0.624**	-0.628**	-0.636**	-0.568**
Duration of housing use X_9	0.209**	0.208**	0.225**	0.253**	0.234**
Duration of construction X_{10}	0.038	0.152*	0.163*	0.2*	0.159*
Housing costs X_{11}	0.42**	0.314**	0.312**	0.382**	0.287**
Housing dissatisfaction factor					
Location X_{12}		-0.597**	-0.608**	-0.673**	-0.943**
Housing X_{13}		-0.043	-0.035	-0.1	-0.172
Area X_{14}		-0.909**	-0.921**	-0.934**	-0.823**
Quality X_{15}		-1.255**	-1.28**	-1.262**	-1.182**
Facilities such as water supply and drainage, roads X_{16}		-0.193	-0.22	-0.297*	-0.49**
Design X_{17}		-0.599**	-0.561**	-0.529**	-0.499*

Housing environment X_{17}		-0.412*	-0.375*	-0.418*	-0.352*
Other elements X_{19}		-0.209	-0.271*	-0.222	-0.237
Source of housing costs					
own funds X_{20}			0.305	0.112	-0.164
Borrowing from others X_{21}			0.2	0.236	0.177
Bank loans X_{22}			0.517*	0.508*	0.347*
Government subsidies X_{23}			0.19	0.286	0.052
Share of own funds X_{24}			-0.316**	-0.303**	-0.304**
Gender X_{25}				-0.138	-0.083
Age X_{26}				0.019	-0.002
Family type X_{27}				-0.887**	-0.914**
Households X_{28}				-0.321**	-0.326**
Education X_{29}				0.025	0.013
Annual household income X_{30}				-0.047	-0.021
Main sources of income X_{31}				0.403**	0.286*
Primary residence X_{32}				-0.084*	-0.048
Application for Construction X_{33}					0.036
Housing Professional Design X_{34}					-0.767*
Foundation survey X_{35}					-0.109
Housing process supervision X_{36}					-1.065**
Construction team qualification X_3					1.566**
Construction Standards X_{38}					0.011
Construction drawings X_{39}					-0.081
Constant term	0.456	1.633	1.843	2.867	6.542
R2	0.403	0.494	0.504	0.536	0.59

Note: * and ** indicate significant differences at the 10% and 5% significance levels respectively.

R^2 display: values of R^2 in model 1 to model 5 are 0.403, 0.494, 0.504, 0.536 and 0.590 respectively, showing an upward trend. The adjusted R^2 is 0.59, indicating that the independent variable of model 5 can explain 59% of the change in the dependent variable (rural housing satisfaction), which is a good fit.

4.7 Chapter summary

Based on the propositional hypotheses and model proposed in Chapter 4, this chapter articulates how to design the questionnaire based on the rural housing situation in Suining, select the samples reasonably, conduct quantitative and qualitative analysis on the survey data, use Logistic model regression analysis and discussion to verify the degree of housing satisfaction and the significance performance of farmers' satisfaction with housing, thus providing a basis for discussing these problems in RHC in the next chapter.

[This page is deliberately left blank.]

Chapter 5：Discussion and Findings

With empirical results of logistic model regression about factors that impose impacts on rural residents' housing satisfaction in Chapter 4, this chapter discusses and analyzes the results and finds out the deficiencies in RHC management

5.1 Empirical results

According to the tests through adding feature variables one by one, as shown in Table 4.7. The author sorted out the significance of housing satisfaction as shown in Table 5.1 below and analyzed the impact of various factors on the housing satisfaction of rural residents.

Table 5.1 Empirical results

Item	Content	Impact coefficient	Result
Housing characteristics	Housing age	-0.568	Very significant
	Housing use length	0.234	Very significant
	Construction cost	0.287	Very significant
	Nature of housing	-0.706	Significant
	Housing structure	0.188	Significant
	Way of construction	0.427	Significant
	Housing area	-0.14	Significant
	Construction period	0.159	Significant
Housing quality	Housing location	-0.943	Very significant
	Housing area	-0.823	Very significant
	Quality defects	-1.182	Very significant
	Supporting facilities	-0.49	Very significant
	Exterior design	-0.499	Significant
	Exterior environment	-0.352	Significant
Housing finance	Bank loan	0.347	Significant
	Proportion of farmers' own funds	-3.04	Very significant
Household characteristics	Family type	-0.914	Very significant
	Family size	-0.326	Very significant
	The main source of household income	0.286	Significant
Construction management and service	Professional housing design	-0.767	Significant
	Construction supervision	-1.065	Very significant
	Qualification of construction team	1.566	Very significant

5.2 Analysis and discussion

The following analysis uses the estimated results of Model 5 as an example to analyze the

impact of various factors on the housing satisfaction of rural residents.

5.2.1 Housing characteristics

It can be seen from Model 5 that various factors of housing characteristics have a significant impact on rural residents' housing satisfaction. Among them, the impact of housing age, housing usage time, and housing cost on housing satisfaction is very significant; housing nature, housing structure, building methods, housing area, and housing construction period have significant impacts on housing satisfaction.

First, compared with the old houses, new houses use new materials and new construction methods. Therefore, the quality of new houses is higher, and its area is larger, so they are more in line with the needs of rural residents.

Second, rural residents who use their housing for longer time each year have higher housing satisfaction. Rural residents who use their housing for longer time tend to invest more in their housing, while those who use their housing for short time each year invest less in RHC and relative maintenance, therefore causing lower satisfaction.

Third, higher housing cost brings higher housing satisfaction of farmers.

Fourth, the coefficient of the nature of the housing is -0.706, indicating that farmers who received government subsidies have higher satisfaction with housing. This shows that policies related to the improvement of rural housing and relocation, including the housing reform under the background of NCC (new countryside construction), targeted poverty alleviation policies, housing relocation due to ecology conservation, and disaster avoidance that have been implemented in recent years, have significantly improved the rural housing conditions and increased farmers' satisfaction with housing. This has really provided farmers with benefits and improved the welfare of farmers.

Fifth, the coefficient of the housing structure variable is a positive value, indicating that the higher the quality of the housing structure is, the higher the farmers' satisfaction is. Compared with traditional wooden, adobe-wooden, and brick-wooden houses, brick-concrete and steel-concrete structural housing is obviously more popular with rural residents, which is also the general trend of RHC.

Sixth, the coefficient of the house construction method is 0.427, which is a positive value, indicating that compared with the self-constructed housing, the farmers' satisfaction with housing unifiedly planned by government is higher. Housing unifiedly planned by government includes housing planned and constructed both unifiedly, unifiedly planned but self-constructed

housing, and purchase of commercial housing. To increase the satisfaction of rural households, the proportion of unified governmental planning should be increased.

Seventh, larger housing area brings higher housing satisfaction of farmers, which is in line with the author's expectations and assumptions. However, the housing area with the highest satisfaction of farmers is 200 to 300 square meters, while the satisfaction with housing of more than 300 square meters is relatively low. Reasons are as follow. First, at the present stage, the rural households are becoming smaller, and the resident population is about 5 people at most. The area under 300 square meters is generally sufficient. The decline in the marginal utility of users over 300 square meters is obvious. Farmers with houses of more than 300 square meters generally belong to the rural high-income group, and their housing requirements are generally higher, so they use urban housing as reference and examples when building their housing in rural area. However, the supporting facilities and environment in rural area are far behind those in urban areas, causing their dissatisfaction to some extent. 7.10% of the rural households with a housing area of more than 300 square meters said they were very dissatisfied with the housing, only better than the group with an area of less than 50 square meters. From the perspective of resource utilization and actual interests of farmers, it is necessary for the government to set an upper limit on the area of houses built by farmers. In the future, self-built houses in rural areas will not be able to be blind, and the construction area should be controlled within 300 square meters.

Eighth, contrary to our expectations, the impact of housing construction period on housing satisfaction is positive. Longer construction period accompanies higher housing satisfaction. Through further investigation, several reasons were examined. One is that housing construction are always large projects, resulting in long construction periods, but the quality of housing built in long period is normally high. Second, the housing investment exceeds the economic affordability of farmers, and the shortage of funds lead to the interruption of building construction. from one aspect, long construction period reflects that farmers pay more attention to construction, so they devote more energy, thus having higher housing satisfaction.

5.2.2 Housing quality

From the perspective of the factor of housing quality, housing location, area, quality, supporting facilities have a significant impact on housing satisfaction, and appearance design and external environment have a significant impact on housing satisfaction. The coefficients of these factors are negative, indicating that housing dissatisfaction is mainly affected by these factors.

5.2.3 Housing finance

For most rural households, building a house is a top priority in life, and the cost of building a house generally costs farmers' wealth accumulation of a few years or even more than ten years. Among housing finance factors, the impact of bank loan variable and the proportion of farmers' own funds is significant. First, it shows that farmers who have loans for housing construction are more satisfied with their housing, but the proportion of farmers who can obtain loans for housing construction is very small. Only 17.9% of farmers can get financial support when building houses. In the future, rural financial development should be intensified, and by improving product design and system policies, farmers in rural area should be given more financial support. Second, it is shows that lower proportion of self-owned funds in RHC leads to lower satisfaction of rural households.

Through analysis, it was found that only 35.8% of the residents in Suining rely on their own funds when building houses, and nearly 10% of the farmers have less than 50% of their own funds for building houses. Borrowing to build houses, especially borrowing from relatives and friends to build houses, have brought huge economic pressure and mental pressure for farmers, reducing their housing satisfaction. The money borrowed by farmers is usually used to build the main structure of the house. After the main body of the house is built, farmers often lack enough money for decoration, which leads to the luxury of the exterior but shabby interior, which affects living utility and housing satisfaction to a certain extent.

5.2.4 Rural household characteristics

It can be seen from the analysis that among the various factors of the characteristics of farmers, the type of family, the number of families and the main source of income of the family have a significant impact on the housing satisfaction of farmers. The impact coefficient of family type is a negative value, indicating that compared with non-poor households, the housing satisfaction of poor households is lower. In recent years, with the implementation of the poverty alleviation policy, the housing conditions of poor households have been greatly improved, and objective of "2 worry-free and 3 guarantees" (No worry about eating nor wearing. Guaranteeing their compulsory education, basic medical care, and housing safety) have been achieved. NCC and poverty alleviation provide housing for poor households, but basic one. Therefore, it is rational that their housing satisfaction is relatively low. However, it should be noted that the current situation of poor households with low housing satisfaction should also be paid attention to. Factors having impacts on their housing dissatisfaction should be pinpointed through

investigation, so as to facilitate the subsequent improvement of relevant policies.

The number of families also has a negative impact on housing satisfaction. Larger number of families brings lower housing satisfaction. The reasons are as follows. First, under the condition of a certain housing area, the larger the family population is, the more complicated the population structure is, and the smaller the per capita housing area is, which affects their housing satisfaction. Second, rural housing generally ignores well-thought design. When a large number of family members live in together, they have to share certain space, so irrational in the design will become more obvious, which also undermined the satisfaction of residents. The coefficient of the main source of household income is a positive value, indicating that housing satisfaction of those with business as the main source of income is higher than those of migrant work, and housing satisfaction of migrant work is higher than those with agriculture production as the main source of income. The reason behind is related to the economic income of farmers. Higher economic income allows farmers to invest more in their housing, thus bringing higher housing satisfaction.

5.2.5 Management and service for housing construction

The analysis shows that the vast majority of RHC, especially old rural housing, is mainly built by farmers, and lacks government supervision and professional intervention. Model 5 shows that RHC management and services have an important impact on farmers' housing satisfaction. Among them, the professional housing design, supervision of the construction process and the qualification of the construction team have a significant impact on the housing satisfaction of farmers. If the construction team has the qualifications for construction, the farmers' housing satisfaction is higher. More government supervision also leads to higher housing satisfaction. The impact of these two factors is in line with expectation of the author, and also validates hypotheses in this study. However, the i coefficient of professional design factor is negative, which means that after professionally designed housing, the housing satisfaction of farmers is lower. This precisely reflects that the current rural housing design lacks relevance to the actual needs of rural households, simply copies urban housing, resulting in disappointment in rural households. It can be said that professional team's involvement increases their expectation, but greater expectation only ends in greater disappointment. When the farmer builds a house, the farmer tends to look for someone to design it, reflecting that the farmer has relatively high requirements for housing, but construction results are difficult to satisfy. This shows that at this stage, there is still a wide gap between rural housing design and the actual needs and

expectations of farmers.

5.3 Research findings

The results of regression research show that under the background of construction of beautiful and new countryside (CBNC), the state has invested heavily in rural infrastructure construction, the rural environment has been greatly improved, and the housing conditions of rural residents in Suining have been greatly enhanced. The overall housing satisfaction of farmers is relatively high.

5.3.1 Continuous improvement of housing area and housing structure

Since the reform and opening up, with the growth of farmers' income, the proportion of housing consumption expenditure in farmers' total expenditure has been rising, and the per capital housing area of farmers has increased significantly.

The survey shows that the current residential area of only 2.8% rural residents in Suining is less than 50 square meters; residential area of 55.3% rural residents is 100 to 200 square meters; residential area of 13.6% rural residents is 200 to 300 square meters; and 3% of the rural family has housing that is more than 300 square meters.

With the rapid social and economic development of Suining and the improvement of farmers' living standards, the safety requirements for building structures in the countryside are becoming higher and higher, and the housing frame structure has also undergone significant changes. At present, the frame structure of newly built houses for rural residents is mainly brick-concrete structure, but the proportion of reinforced concrete structure has increased significantly due to the advantages of durability, reinforcement design, and convenience for later reconstruction. The standardization of housing construction in rural areas has gradually improved. The proportion of government-built and self-built houses in the past five years has exceeded 30%.

With the continuous improvement of living conditions, the housing satisfaction of rural residents is increasingly higher (as shown in Figure 5.1). 29.8% of surveyed families indicated that they were "very satisfied" with their housing, and 44.6% of surveyed families indicated "basically satisfied", which means that two thirds of rural households were satisfied with the existing housing in total. 19.3% of survey families indicated and "less satisfied", and only 6.3% of the residents said they were very dissatisfied with the housing, which is responses from the construction of old houses or adobe houses such as houses with history of over 20 years old.

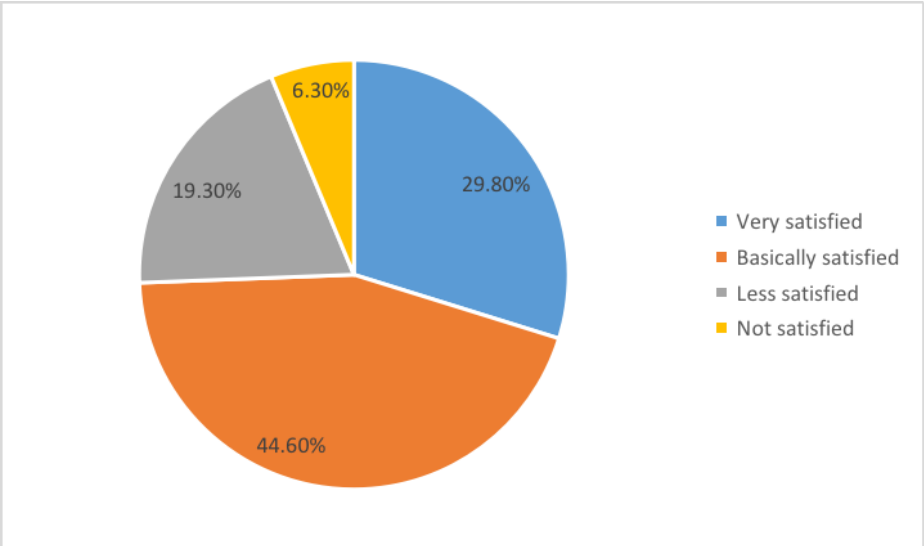

Figure 5.1 Farmers' housing satisfaction

5.3.2 Characteristics of NCC

(1) Small and decentralized village scale

Suining Municipal Government Communique (2019) showcased that at the end of 2018, the average area of village administrative area, cultivated land area, permanent population, and labor resources in the city was 261 hectares, 102 hectares, 877 people, and 774 people (see Table 5.2). The above-mentioned index at the level of villages is all less than the average (see Table 5.3). The number of low-value villages is much higher than that of high-value villages. There are many low-value villages, but the index value is close to the average, and the number of high-value villages is small, but the index value is far from the average. The index was grouped into five groups isometricly: very low, low, medium, high, and very high. The villages with the indicators below the medium group account for the vast majority. It shows that the phenomenon of land population dispersion in rural area has not been fundamentally dealt with for a long time, and the process of rural population aggregation and resource integration needs to be accelerated.

Table 5.2 Basic characteristics of administrative villages in Suining

Basic statistics	Administrative area (hectare)	Cultivated land area (hectare)	Permanent population (people)	Labor resources (people)
Average	261	102	877	774

Maximum	996	360	3596	3399
Minimum	40.5	4	104	4

Table 5.3 Basic characteristics of administrative village groups

Groups	Administrative area (hectare)	Cultivated land area (hectare)	Permanent population (people)	Labor resources (people)
Very low	46.2	2.42	51.9	45.0
Low	45.2	3.03	37.2	49.0
Medium	7.0	1.03	8.7	5.1
High	1.3	0.15	1.8	0.8
Very high	0.3	0.05	0.4	0.1

(2) Centralized and low-value population density, differentiated district and county, a great number of migrant workers, and upside down between the area of the administrative area and the number of permanent residents

First, the population density deviates to low value, and there are great differences between districts and counties. Suining Statistics Bureau (2019) stated that by the end of 2018, rural resident population per square kilometers in Suining was 336, 411 in Chuanshan District, 329 in Anju District, 266 in Pengxi County, 316in Shehong County, and 453 in Daying County, with a 70% difference between the most densely populated district and the least one. In terms of villages, the population density of villages is relatively concentrated, the mode is lower than the average, and 54.2% of the villages have population densities lower than the Suining's average value.

Second, there are a large number of people who are migrant workers, so the left-behind population accounts for a relatively high proportion, and most left-behind population are the elderly. Suining Statistics Bureau (2019) presented that by end of 2018, the proportion of the rural household registration population in Suining that had been away in cities as migrant workers for more than half a year was 32.5%, and the figure in Chuanshan District, Anju District, Pengxi County, Shehong County and Daying County were 24.3%, 33.9%, 44.5%, 28.6%, 25.5% respectively, with 20.2 percentage points difference between the highest value and the lowest value. In 23.7% of the villages in Suining, the proportion of people who went out in cities as migrant works exceeded 50%. The left-behind population accounts for 17.5% of the permanent resident population, and the proportion of left-behind elderly, left-behind women, and left-behind children was 53.8%, 27.2%, and 19.0%, respectively. There is a hidden danger of reduction in the resident population and labor resources.

The third is upside down between the area of the administrative area and the number of

permanent residents. Suining Statistics Bureau (2019) demonstrated that by the end of 2018, permanent resident population in 12.7% of the total administrative area of Suining accounted for only 8.7% of the total population, among which there were 37 villages with a population density of less than 200 people per square kilometer. However permanent resident population in 1.9% of the total administrative area accounted for 4.7%, among which there are 28 villages with a resident population density of more than 1,000 people per square kilometer.

Fourth, the average number of households is relatively stable. Suining Statistics Bureau (2019) indicated that by the end of 2018, the average resident population of village households in Suining was 2.8, and 76.5% of the village households had an average resident population within the range of 2 to 4. Therefore, there was a high linear correlation between the resident population and the number of resident households. The number of resident households in Chuanshan District, Anju District, Pengxi County, Shehong County and Daying County were 2.8, 2.8, 2.7, 2.7 and 2.8 respectively. It shows that the overall rural industry is still not well-developed. The long-term trend of declining permanent population and labor resources should be paid attention to. Rural planning needs to be adjusted. There are differences in the formulation and implementation of rural policies in districts and counties, and the rural family structure tends to stabilize.

(3) Declined degree of arable land use, centralized villages, and significant difference between districts and counties

Suining Statistics Bureau (2018), village-level arable land replanting index averaged 1.91 in Suining, a decrease of 0.64 from 2015. The figure in Chuanshan District, Anju District, Pengxi County, Shehong County, and Daying County was 2.00, 1.60, 2.41, 1.89, and 1.55, respectively, with a height difference of 55%. There was a significant difference in the cropland replanting index among the counties. In terms of villages, about 46% of the village arable land replanting index is concentrated in the range from the first mode and to the second mode, the mode is still lower than the average, and the number of low-value villages is higher than that of high-value villages. It shows that the phenomenon of land abandonment and use change in various districts and counties obviously exists. There is still room for improvement in agricultural production capacity, and there are significant differences in agricultural industrial policies and their effects.

5.3.3 Current status of RHC

Economic development is the fundamental driving force for rural housing changes. As the income of rural residents increases, they begin to pursue a relatively high quality of life and

living environment. Improving the quality of housing construction is a basic condition. Moreover, most of the rural residents now have a psychological comparison. The higher the income of a family, the more comfortable and comfortable living environment and relatively luxurious housing. Housing construction is the most direct and preferred way to show their wealth.

In recent years, with the rapid development of the rural economy, the income level of farmers in Suining has increased significantly, and farmers' requirements for housing have become increasingly higher. They have gradually changed from meeting the needs of survival to enjoyment. Affected by traditional ideas, after becoming rich, the first consideration for farmers is to improve living conditions. Although the housing conditions of rural residents in Suining still have a large gap compared with the developed regions in China, rural housing in Suining is gradually developing towards higher horizon, larger areas and better quality.

(1) One household with several housings

In the rural areas of Suining, farmers keep their habit of building houses along the mountains and the water. In recent years, with the acceleration of poverty alleviation projects, such as NCC poverty alleviation projects, relocation poverty alleviation, reservoir relocation, geological disaster relocation, and adobe housing renovation, rural residents' quality of life has been rapidly improved, and their living environment has been optimized to ensure that all residents, including the rural poor, live a good house and live a good life.

While the housing conditions in rural areas are improving day by day, due to lack of planning, most of the newly built houses in rural areas are concentrated in the periphery of villages, forming hollow villages. It is difficult to implement the "one household, one house" rule. After the approval of the homestead, although agreement is signed with the farmers to demolish old housing after the new house is built, there is a period of time for the new house to be built. Village civil servants change every three years, thus lacking effective supervision, so the "approval new houses and demolish old houses" cannot be in place. In the investigation, although some villages signed agreements with farmers to pay for old housing, and farmers paid security deposits, some farmers would prefer not to withdraw from old houses at the cost of deposit. In addition, because the farmers who have homesteads approved are all those with housing difficulties, the homesteads withdrawn are small in size, scattered in distribution, complex in ownership, therefore low in utilization rate. The hollowing of villages has led to a large number of idle old houses in rural areas.

According to the third agricultural census of the National Statistical Bureau (2016), 99.5%

of rural households in Suining have their own houses. Among them, those who own 1 house account for 79.8%; those who own 2 houses account for 19.10%; those who own 3 or more houses account for 0.7%; those who own commercial houses account for 19.9%. For the treatment of the original homestead, 57.9% of the rural households chose to rebuild on the original homestead, 7.5% had undergone land reclamation and cultivation, but 10% were idle. More than 20% farmers possess two or more homesteads because they build new housing but do not demolish the old one. This not only causes a waste of land resources, but also violates the "one household, one house" rule stipulated in the Land Management Law (National People's Congress, 2019).

(2) Idle housing

Suining Statistics Bureau (2019) proposed that the urbanization level of the permanent population in 2017 reached 48.5%. The rural permanent population is 1.6658 million, a decrease of 338,400 from that in 2010. Based on the household registration population, the rural migrant workers in rural areas have reached 1,263,300, which means that one-third of the population of Suining went out to other cities to work. With the continuous reduction of the rural permanent population, the phenomenon of empty houses in the countryside has been caused, and gradually changed from the "hollowing" population to the "hollowing" of rural areas involving population, land, industry, and infrastructure. A large number of "hollowing villages" have emerged, which has become a problem faced by the implementation of the rural revitalization strategy.

The study found that only 50.3% of the rural housing is used for living throughout the year, which just reached half. Up to 15.78% of rural housing is used for less than a month throughout the year. Normally these housings are temporarily occupied and used during China's lunar new year, the Spring Festival, while in the rest of the time, the doors are locked. Up to 27.2% of the houses are used for less than 2 months. 16.4% of the houses are only used by the elderly. A large number of idle houses are in disrepair, which seriously affects the style and environment of the entire village. The hollowing of the population and the hollowing of the houses have become important issues facing the social and economic development of rural areas in Suining.

It can be seen that although the rural housing conditions in Suining have been significantly improved and the housing consumption level has been improved, the rural living environment is still very poor, and infrastructure such as roads, water and electricity, communications, medical and health, cultural and education are still incomplete. The number of vacant and idle rural houses continues to rise, and the problems of quality and safety are still widespread. To

summarize, RHC needs to be further improved.

5.3.4 RHC problems

(1)High construction costs and overburdened farmers

89% of the existing housing in rural areas of Suining are self-constructed by farmers (unified planning and self-built 11.3%, self-built by farmers 74.4%). Almost all self-built houses in rural areas are designed by farmers, which is closely related to their production and living habits. It is an important symbol of the farmer's living level, and it also shows the rural customs. Self-construction is the most important and common housing development model in the vast rural areas of China since the founding of People's Republic of China. Houses planned by government and constructed by farmer accounted for 11.3%. Houses planned and constructed both unifiedly by government accounted for 8.5%, with the majority of the relocation of centralized resettlement households. The purchase of commercial housing accounted for 3.6%, and others accounted for 2.2%.

Judging from the duration of construction, the proportion of RHC in Suining over 1 year is as high as 10.7%, and 4% of houses were constructed in more than two years. In the process of housing construction, farmers need to consume not only the material cost that can be calculated, but also to supervise the construction process or even do the construction by themselves. While paying the material cost and opportunity cost, they also have to bear an incalculable mental burden. The average cost of existing housing in rural areas (reaching the checking-in standard) exceeds 100,000 yuan (see Figure 5.2), and 20% of the housing constructed in the past five years cost more than 200,000. This has caused a heavy economic burden on rural residents. Especially in the context of the current underdeveloped rural housing financial system, most farmers can only borrow money from relatives and friends when building houses, and some even borrow money from usury. Of the 919 households surveyed by the author, only 35.8% had no loans to build houses (including renovation of dilapidated houses and poverty alleviation and relocation), those with less than 30% loans in their total cost were 29.6%, and those with 31% to 50% loans accounted for 25.5%. 2.6% of households borrow more than 80% loans.

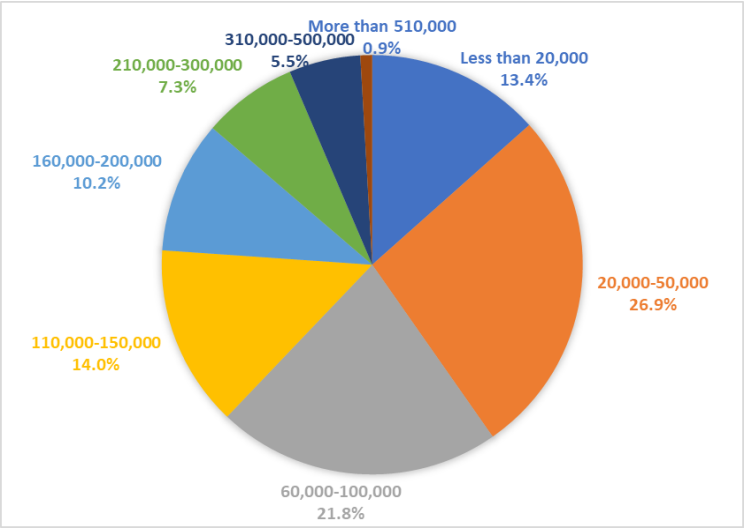

Figure 5.2 Cost of RHC

From the perspective of main income sources of farmers in Suining, 61.4% of farmers depend on migrant work, 19.3% rely on agricultural production, only 6.6% of households derive their main income from business, and income from other ways accounted for 12.7%. Regardless of whether it is agricultural production (Agriculture is mainly obtained by growing food crops, the annual mu income is only 600 to 1000 yuan, a family have 0.3-hectare land averagely, so the annual agricultural income can reach up to 5,000 yuan each family) or the income of migrant work, the annual income less than 30,000 yuan accounted for 43.4%. After deducting daily expenses, the income that can be accumulated for housing construction is very limited, so housing construction has caused a heavy economic burden on farmers. The main channel for borrowing money is from relatives and friends. While bringing pressure on debt repayment to farmers, borrowing money also puts a heavy human relationship burden on them. This may also be an important reason for the excessive burden of human relations in rural area.

(2)Low level of housing design and construction, and problems with housing quality

The proportion of rural housing planned and constructed unifiedly in Suining was only 8.5%, and the proportion of housing self-built by farmers was as high as 89%. Of the 919 households surveyed in this study, only 20.1% of the houses were designed by professionals, and only 20.3% were underground survey, and only 26.2% were built by a qualified construction team. 31.0% of the housing construction was based on relevant construction standards. Most of these houses are houses built by the government in recent years. The vast majority of self-built houses lack professional design and construction.

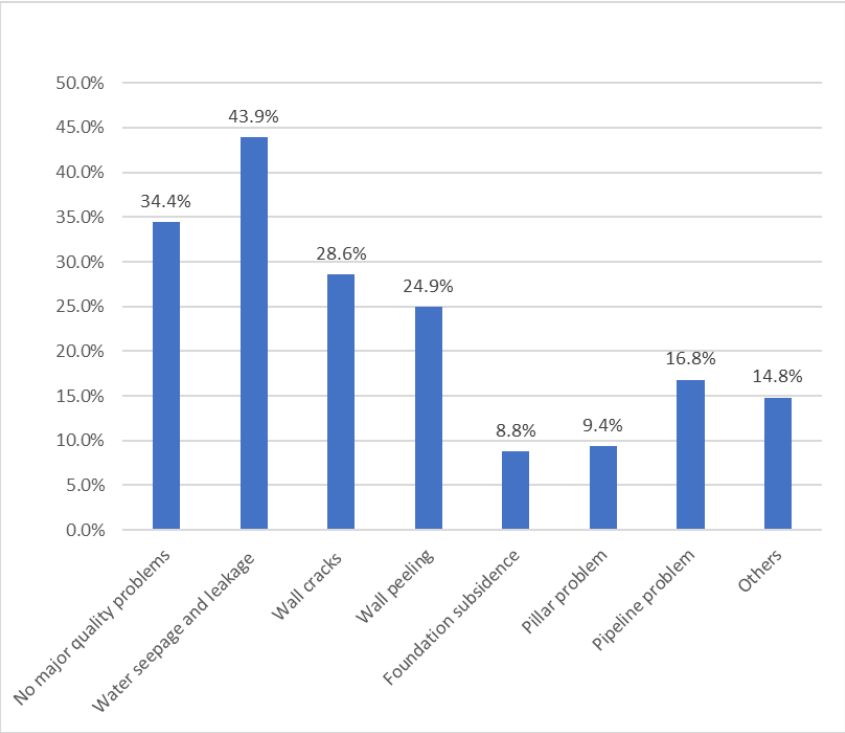

Figure 5.3 Rural housing quality issues

It can be seen from Figure 5.3 that only 34.4% of the houses had no major quality problems, and water seepage and water leakage have become common phenomena. Wall cracks accounted for 28.6%, and those with foundation subsidence were close to 10%. Due to the general lack of awareness of earthquake prevention and disaster mitigation among farmers, most of the rural houses have not been designed for earthquake resistance, resulting in poor earthquake resistance in rural housing. Some small-scale earthquakes can cause a large number of house collapses, huge damage to public facilities and serious economic losses. For example, on January 31, 2010, a magnitude 5.0 earthquake caused more than 100 houses to collapse (China Broadcasting Network, 2010). The unreasonable setting of domestic sewage system is another prominent problem in the design of rural housing in Suining. NCC and rural revitalization requirements are more reflected in guaranteed safety of drinking water, without enough attention paid to sewage discharge.

As can be seen from Figure 5.4, in addition to environmental factors that are difficult for farmers to control, farmers' dissatisfaction with housing is mainly related to the design and construction of housing. Supporting facilities, housing quality, and are the three factors with the most concerns from farmers. First, this shows that the construction of rural infrastructure lags behind and the external environment needs to be improved. Rural public services and infrastructure used not to be an investment focus, which needs to be heavily invested in the future. Second, the problem of housing quality is outstanding, and the government needs to

strengthen publicity and guidance, and increase investment in planning, design, and construction. That there are many quality problems demonstrates that RHC in Suining emphasized quantity rather than quality in the past.

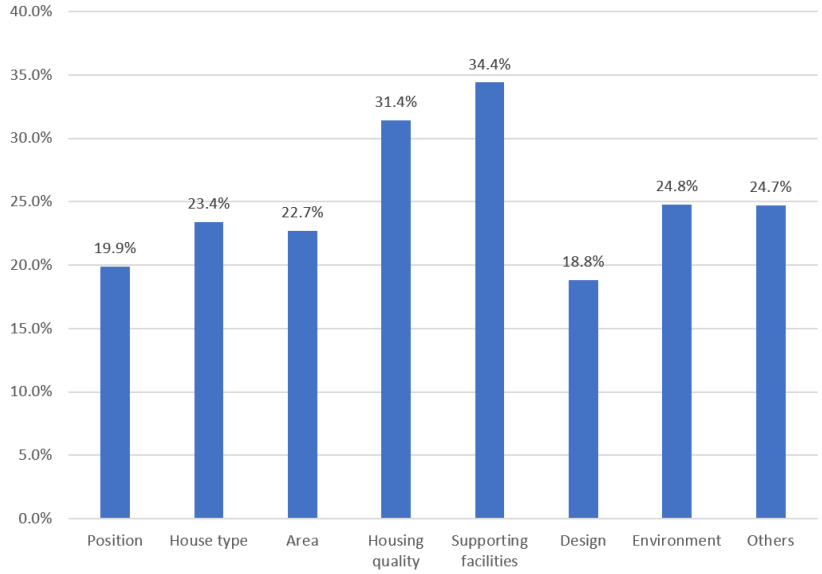

Figure 5.4 Factors of dissatisfaction of farmers' housing

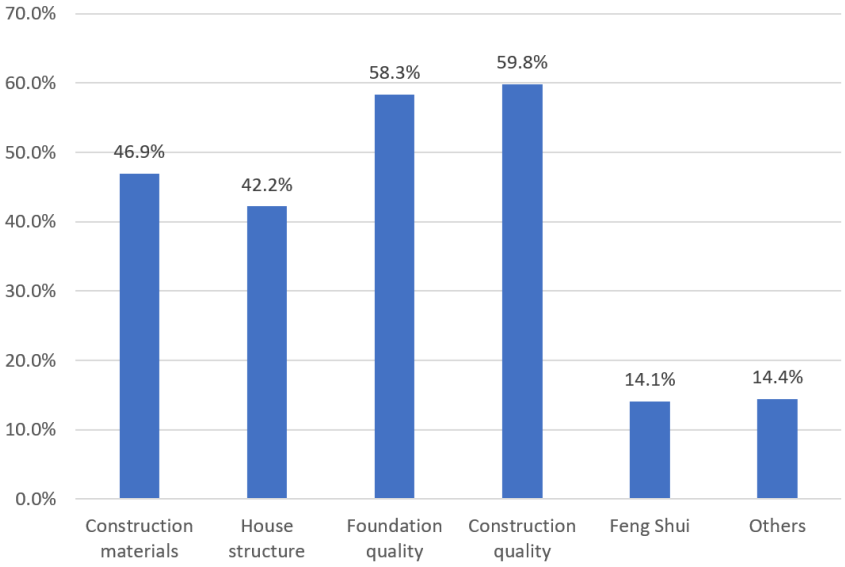

Figure 5.5 Factors impacting rural housing security

When asking farmers "what are the most important factors affecting housing safety" (see Figure 5.5), the most chosen option is construction and foundation quality, with construction accounting for 59.8% and foundation accounting for 58.3%, respectively, both higher than construction materials at 46.9%. It shows that the construction quality of rural housing has become one of the pain points of RHC. Farmers pay enough attention to the construction and design of housing, but due to the lagging behind in the construction of relevant professional services at this stage, coupled with the low income and limited affordability of farmers, it is

difficult for farmers to gain market-oriented solutions to professional services such as housing design and construction.

Compared with the national average, there is still a certain gap in the quality of rural housing in Suining, which can be explained by two data. By the end of 2016, 36.2% of rural houses in China were equipped with flush toilets, while in Suining, it was 28.3%, 7.9 percentage points lower. By the end of 2017, more than 70% of rural housing in China are of brick-concrete structure and concrete structure, while in Suining, it was only 57.6%, 12.4 percentage points lower (National Statistical Bureau, 2017).

(3)Different housing construction standards and lack of planning and supervision

The study found that in many new villages, although they are newly constructed, they do not take a new look, failing to form a centralized layout. Farmers build houses at will. They often build their own houses according to their own preferences. The construction is disorderly. New housing continues to extend to the periphery of the village, showing a "ring expansion". Most of the sites are located on their own reserved land, contracted land or both sides of the road with convenient transportation. These site selections are random, thereby not enabling to form a community. Where new roads are repaired, new houses are built, shaping "linearly expanding".

The villagers have a small amount of construction projects, the construction is not difficult, and the construction period is short. Although the approval of the land use is strict, due to villagers' weak concept of legal system and limited government supervision capacity, if the villagers have raised enough funds, they will start construction. The problem of construction without government approval is more or less frequently seen.

Among the surveyed households, only 31% said that they referred to the relevant construction standards when constructing their houses. It can be seen that most RHC in Suining does not have a unified standard, resulting in messy RHC. Housing construction is carried out in accordance with certain standards with unifying area, height, structure and style of the housing, which not only shapes the characteristics of the village, but also helps reduce neighborhood conflicts caused by building houses, thus promoting social harmony.

As grassroots organizations, the role of village committees and township governments in the entire social and economic development process cannot be ignored. Housing construction is one of the most vital interests of farmers, and the standardization and rationality of its construction should be valued by grassroots organizations. However, it was found in the survey that only 20.8% of relevant grassroots departments supervised RHC process, and only 19.0%

supervised some RHC links. 60.2% respondent said that there was no supervision at all, which means that most rural self-built houses is in the blind spot of government supervision, and RHC and supervision have become the weak link in the construction process.

(4)Gap between the current status and expectations of rural housing

From the perspective of housing area, only 22.7% of the respondents were not satisfied with the housing area. It shows that rural residents have their own homesteads and are relatively free to build houses, and their housing area can generally meet their production and living needs. It may be considered insufficient because the inherited housing area is small, or the family population is increasing without financial ability to buy a larger homestead, or there is enough homestead but no ability to build new housing to meet demand. According to the survey, only 5.2% of the farmer's homestead area is less than 50 square meters, 44.5% is 50 to 100 square meters, and 43.7% is 100 to 200 square meters. These figures explain that if there is sufficient economic capacity, the housing area does not constitute a limiting factor for housing satisfaction of most farmers.

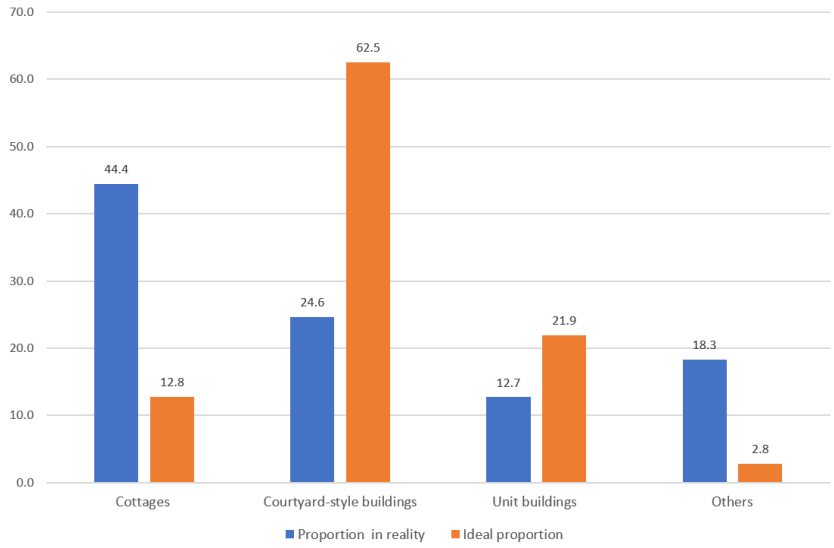

Figure 5.6 Comparison of the status quo and ideal of housing types of rural residents

From the perspective of housing type (see Figure 5.6), 62.5% of the respondents wished to live in courtyard-style buildings, which accounted for the largest proportion, but in reality, only 24.6% of the respondents lived in courtyard-style buildings. The proportion of those who wanted to live in cottages were only 12.8%, but 44.4% of the respondents lived in cottages. The proportion of those who wanted to live in unit buildings accounted for 21.9%, but in reality, only 12.7% lived in unit buildings, which is the lowest proportion of housing types in reality. The housing expectation of farmers is very different from the reality. In terms of expectation,

the proportion of courtyard-style buildings was the largest, exceeding 60%, while in terms of reality, the proportion of cottages was the largest, which is close to 50%. Respondents like to live in a courtyard-style building because this kind of building looks beautiful, comfortable, and stylish, and has a yard as a support for small-scale family breeding or planting. Courtyard-style has the advantages of a bungalow and urban building, adapting to rural production and life, and farmers' habits.

For the general villages that do not have advantages in location and underdeveloped secondary and tertiary industries, courtyard-style buildings should become the first choice for future RHC. First, it can improve the living quality of farmers and enhance the quality of life. Second, unified planning can help to achieve centralized living, improve the degree of land saving and utilization and the efficiency of infrastructure allocation. For villages with obvious location advantages and good industrial development prospects, it is necessary to focus on unit buildings with higher land use efficiency through demolition of old buildings, new land replacement. Rural residents living in these village can take the lead in realizing localization and urbanization.

From the perspective of the housing structure (see Figure 5.7), 55.7% of the respondents hoped that the housing is a reinforced concrete structure. In reality, the structure of reinforced concrete accounted for only 11.4%, and the actual proportion is very different from the hope. On the one hand, it shows that at present, due to the relatively backward rural social economy, the rural households have limited economic capacity, the housing quality is generally not high, and the proportion of adobe houses, soil (stone) wood, and brick wood structures is as high as 42.4%. The rural housing reform is facing great pressure. On the other hand, it shows that the reinforced concrete structure housing is the future trend. With the improvement of the economic conditions of rural residents, residents above middle income in the countryside will choose the reinforced concrete structure, and residents below middle income may choose a more affordable brick-concrete structure. However, if rural housing is dominated by brick-concrete structures, especially reinforced concrete structures, homestead land reclamation and cultivation will face huge challenges in the future. Therefore, for future housing construction, the government should conduct unified site selection and planning, control the land structure and land scale, improve the efficiency and effectiveness of rural construction land from the source, and protect the cultivated land.

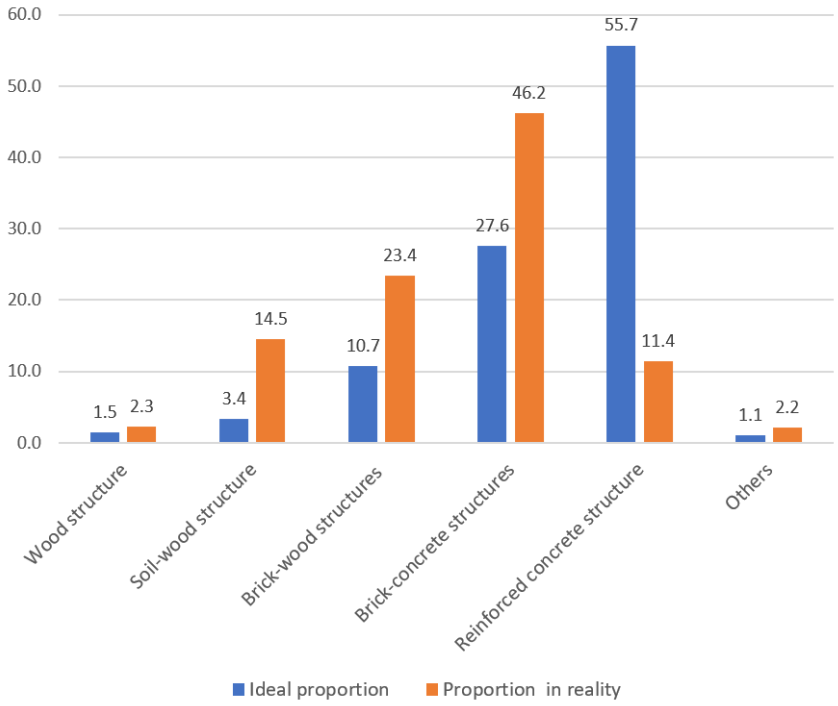

Figure 5.7 Comparison of the current status and ideal structure of rural housing structure

(5)Farmers' expectations of RHC management

From the perspective of the ideal way of building houses (see Figure 5.8), 39.4% of the respondents chose unified planning and construction, and 22.1% chose unified planning and construction by themselves. In total, 61.5% of rural residents hope that the government can plan countryside in a unified way, which explain that unified planning and construction by government should become the mainstream model for RHC in the future. Only 17.4% of the farmers chose to build by themselves, indicating that farmers have realized the disadvantages of high cost, low quality, and poor design of self-built houses, and that is the reason why they hope that the government can participate more in RHC. The proportion of commercial houses purchasing was as high as 19.4%. This part of the rural residents has a strong market competitiveness and a high economic affordability. They long for urban lifestyle and they will be the vanguard of rural urbanization.

From the perspective of the supporting policies expected by farmers (see Figure 5.9), on the one hand, 70.3% of farmers hope that the government can provide building subsidies, indicating that farmers are facing great economic pressure relying solely on themselves at this stage. This is mainly due to the low income of farmers. From the previous analysis, it can be seen that about half of the rural households have an annual income of less than 30,000 yuan, but now the construction materials and labor required for building houses are all rising. Building a

house with its own capacity indeed gives rise to mounting pressure for farmers. This requires the government to actively act and effective measures to reduce the cost of RHC. On the other hand, the pressure to build a house is also related to the unreasonable housing concept of farmers. Unreasonable phenomena such as unrealistic housing comparison, requirement beyond economic ability and actual housing needs should be guided and educated.

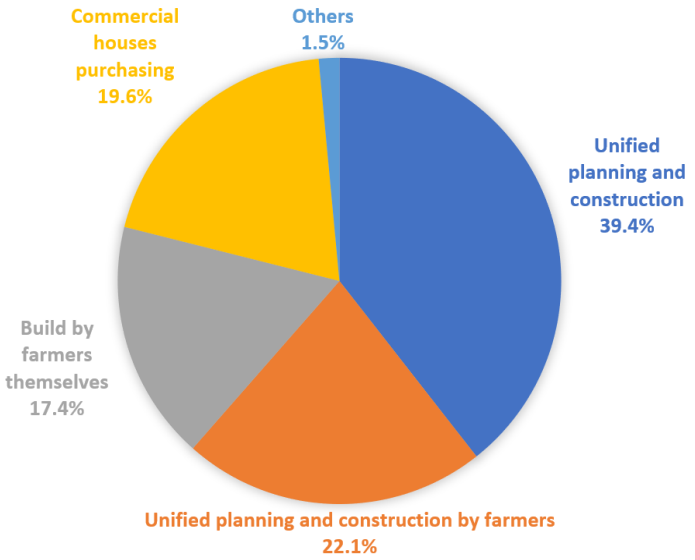

Figure 5.8 Farmers' ideal housing construction model

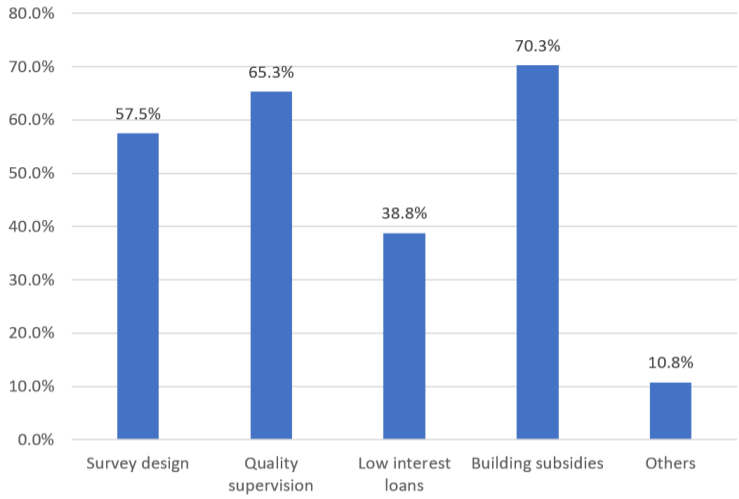

Figure 5.9 Housing support policies expected by farmers

More than half of the rural households choose "quality supervision" and "survey design", which was 65.3% and 57.5% respectively. There were no government supervisions on the construction process of more than 60% of the existing rural houses. Only 20% construction were through survey and design. This shows that at this stage, rural residents attach great importance to housing quality supervision and survey design. There is a great demand in this regard, and the government has the responsibility and obligation to provide such services.

Only 38.8% respondents chose "low interest loans", lowest of the 4 options. On the one

hand. It shows that there is a large demand for financial loans, and nearly 40% of residents need to receive preferential financial services, which is double the current situation of 17.9%, which means that the current loan services provided by banks have not met the needs of farmers. IT shows that farmers are not mature enough to borrow money from financial institutions to build houses. Farmers are still more accustomed to borrowing money from relatives and friends.

As can be seen from Figure 5.10, the most important issue for farmers in Suining regarding housing construction is "housing quality", with a ratio of up to 71.4%. As the largest fixed asset of a family, housing can be used for decades or even hundreds of years through several generations. Therefore, farmers attach great importance to the quality of houses, but since the previous houses were mainly built by farmers, there are often many quality problems with these houses. Farmers are eager for the government to aid in housing quality. "Construction cost" ranked second, and the proportion is as high as 56.9%. How to effectively control the cost of constructing a house on the premise of ensuring quality is what the government needs to consider. To effectively solve these two problems at the same time, "standardized construction" is an ideal choice. It can solve the problems of building materials and building structures that farmers care about. By strengthening communication with farmers, it can also solve the problem of housing types, so as to better meet the needs of farmers. At the same time, "unified planning and construction" is also the ideal way for farmers to build houses, which was selected by 39.4% respondents, the highest proportion among all the ways of building houses.

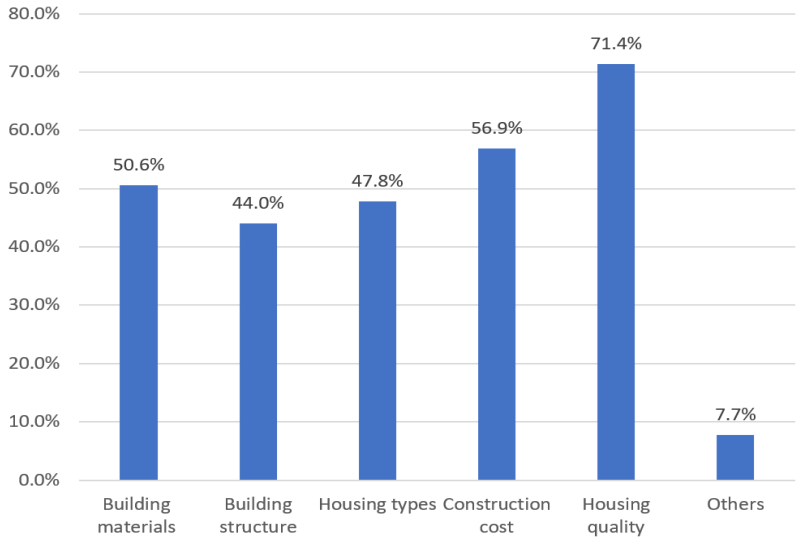

Figure 5.10 Housing construction issues most concerned by farmers

5.3.5 Problems in the management RHC

(1)Low level rural planning

Judging from the situation in the past ten years, the relevant planning of villages and towns in Suining has obvious stage characteristics. Planning layout and method adjustment are inseparable from the economic and social needs at that time. Through continuous efforts to build demonstration towns, central towns, and NCC for many years, the coverage of village and town planning has been greatly improved. However, due to the fact that leaders in a few places do not attach importance to planning, and the poor work of some planning departments, the problem of low level of village planning is still serious in some places.

First, rural planning deviates from rural development. In recent years, some urban industrial and commercial capitals, especially real estate developers, have seen business opportunities in rural revitalization, so they develop modern agriculture in rural areas around the city, develop rural complexes, and characteristic towns. For their own benefit, some developers have designed blueprints that look high-end, beautiful, and tempting. This kind of planning generally makes an issue about the transfer of farmland, forest land and homesteads, engages in centralized development and centralized resettlement, and even engages in real estate development in disguise in violation of China's policies and laws. Local people are resettled in concentrated residential areas, and even forced to live in skyscrapers constructed as housing placement by the government. The collective construction land vacated become available for real estate property.

The second is the lack of standardization of village and town planning. This is mainly manifested in the lack of planning awareness of some civil servant and local talents in rural area. When planning rural construction projects, they prepare local new village construction plans based on their own experience or copying others' rural planning plans in some extreme cases. This kind of planning are generally not standardized, and some are even simple texts and sketches. Because rural planning compilers are often not broad in vision and lack relevant expertise, they limit the construction level and development of CBNC.

The third is the lack of effective RHC guidance measures. The government and the design institute have not put forward specific solutions to the practical difficulties involved in the implementation of the village planning, such as property rights division, land circulation, and multiple households in one house. Current guidance lacks connection with the land use planning. Village planning does not coordinate with the requirements remedying hollow

villages. Farmers are skeptical and uncooperative about the implementation of the plan. These are reasons why planning is shelved and difficult to implement or fail.

(2)Lack of the management of rural construction craftsman

In the past ten years, the construction sector has been restricted by regulations, policies, management costs and other reasons. In addition to incorporating public buildings, government investment projects, commercial housing development into the construction industry management. In addition to some irregular rural construction craftsman training in conjunction with NCC organized by the construction sector, management of other industries involving private RHC is basically stalled.

On the one hand, the laws and regulations for the design and construction management of self-built houses by farmers are insufficient, and the coercive force is not enough. Administrative Licensing Law (National People's Congress, 2004) abolished the Administrative Measures for the Qualification of Construction Workers in Villages and Towns (China's Ministry of Construction, 1996), then there are no documents at the national level managing the qualifications of rural individual craftsmen. Construction regulations such as Construction Engineering Safety Management Regulations (China's State Council, 2004), Construction Engineering Quality Management Regulations (China's State Council, 2019), and Construction Law of the People's Republic of China (National People's Congress, 2019) all avoid construction supervision of low-rise housing by farmers, resulting in the fact that the self-built houses by farmers do not need design drawings and construction supervision, which further leads to the lack of legal basis for the construction authorities to carry out the design and construction management of self-built houses by farmers.

On the other hand, at the national level, there are some regulations for the construction management of self-built houses of farmers, but the implementation is very weak. Several Opinions on Strengthening the Quality and Safety Management of Village and Town Construction Projects (China's Ministry of Construction, 2004) put forward the "classification guidance" of construction projects in village and town, RHC projects above the designated size (All construction projects in village and town, including public construction projects, houses built by with more than two floors, and other construction projects with an investment of more than 300,000 yuan or a construction area of more than 300 square meters) require strict supervision and management in accordance with relevant national laws, regulations and mandatory standards for engineering construction. As a policy guidance document at the

national level, the mandatory binding force is insufficient, and there is no requirement to review the design drawings of self-built houses by farmers.

(3)Hollow village phenomenon to varying degrees

At present, the momentum of disorderly building houses in some rural areas is still relatively strong, especially the arbitrary occupation of fertile farmland and the blind expansion to the periphery of the village, resulting in the existence of hollow villages with varying degrees. This phenomenon is mainly caused by the following reasons.

First is the lack of scientificity in the location of the house. Affected by traditional ideas, many farmers chose to locate their houses by "feng shui" or close to the "traffic line". There is no unified planning. There are many new houses around the village, and most of the homesteads are idle, resulting in many lands being idle and wasting. In the construction of new houses, it is prominently articulated in the preference for single-family houses in free spaces with fewer joint-building houses. Although the building area is only more than 100 square meters, many houses occupy more than 200 square meters since there are roads in the front of the main house, smaller houses in the back, pigpens and toilets on the sides, and gaps and passages should be left around. In some extreme cases, some housing occupies even over 500 square meters.

The second is the low proportion of rebuilding or demolishing old houses. According to the survey, most villages have the phenomenon of "hollow village", and this phenomenon is more sever and its speed is more accelerated in more remote and larger villages, because of the low economic benefits of land, difficulties in supporting infrastructure, and low income of the people. It is conservatively estimated that more than one-third of the newly built houses in rural areas are built on fertile farmland or cultivated land, and the proportion of old houses that are renovated or demolished is very small. A large number of abandoned old houses (unoccupied or used only as storage places for used items) occupy land for village construction and bring serious safety hazards. Some villages with small scales or good economic foundations have relatively low degree of "hollowing" because of the limited available land, the convenience of renovating hollow villages, and the high economic and social benefits embedded in land. In addition, some farmers buy houses in cities and towns, and they regard their old houses as their ancestral property, but no one can inherit or reuse their houses and homesteads, exacerbating the phenomenon of hollow villages. In recent years, the urbanization rate of Suining has been increasing, so the rural population has decreased while the construction land area has increased,

forming a pair of prominent contradictions.

The third is the lack of public facilities forces the migration of farmers. The roads in many villages are not asphalted, which cause dust on a sunny day but mud on rainy day. Since most villages do not have underground drainage facilities, the old houses in the villages cannot drain water. Most of the old houses have small courtyards, so the reconstruction on the original site is limited. Many inconveniences and environmental remediation make farmers eager to move outside the village. In addition, most of the original houses are dilapidated, exceeding the service life. There are hidden safety hazards in the structure. However, the self-demolition does not bring any compensation to farmers who therefore have no enthusiasm for remediation.

(4)Difficult land law enforcement

There are many departments involved in land law enforcement in rural area, with a wide range of law enforcement targets, and a variety of new and old problems intertwined. This endemic brings great difficulties to law enforcement. Townships, villages, and relevant departments shy away from these difficulties, and there are phenomena of weak and inadequate law enforcement. These are outstanding headaches to pinpoint, stop and investigate land violations, and the overall effect of land supervision and law enforcement is not satisfactory. There are the following contradictions and problems.

First,The law enforcement mechanism has not been straightened out.The main manifestations are the lack of strong organizational leadership, the unclear responsibilities of law enforcement subjects, and the lack of an effective coordination mechanism and a joint handling mechanism with equal rights and responsibilities. Villages and towns, villages and related departments work on their own, without mutual help to make up what the other lacks. The phenomenon of buck pass, disputes and "rolling your own" occurs from time to time, failing to effectively form a joint work force.

The second is that The strength of the law enforcement team is weak. Compared with the current task of land law enforcement supervision, the existing management agencies and teams of law enforcement are obviously insufficient, far from being able to meet the needs of the work. In particular, most villages and towns have only 1 to 2 people in local Land and Resource Department, and their work is basically passive.

Third, The style of law enforcement is single and weak. When investigating and handling most of the illegal cases in rural areas, the farmers are already building houses or have been built. The farmers have invested huge amount of money, which may be their savings for many

years. If the house is forcibly demolished, law enforcement will inevitably cause great losses to the people and cause social instability. Forcible demolition violates the essence of governing for the people, but non-demolition makes the relevant policies useless, creating a dilemma for land law enforcement. At present, land law enforcement in Suining rarely implements forced demolition, and fines as an alternative are more frequently adopted.

5.3.6 Room for improving housing satisfaction

The survey shows that farmers' housing satisfaction with rural housing in Suining is still quite high, but there is still much room for improvement. Farmers' housing satisfaction is affected by multiple factors.

First, compared with traditional building structures, in the process of NCC, brick-concrete and steel-concrete structures can provide higher quality housing services and are more popular with rural residents. This should be the future trend.

The second is that the government's unified planning method of building houses can improve the housing satisfaction of farmers. The unified planning of RHC s both necessary and feasible.

Third, there is a significant law of diminishing marginal benefits of housing area on housing satisfaction, and it is necessary to set an upper limit on rural housing area.

Fourth, rural infrastructure facilities and external environment have an important impact on farmers' housing satisfaction. It is imperative to guide rural households to live concertedly, improve public service facilities, and accelerate rural environmental improvement.

Fifth, strengthening the construction of rural financial service system and providing farmers with more feasible financial services.

Sixth, introducing professional companies to provide professional housing design according to the actual needs of farmers, scientific and rational planning, and improving housing functions.

The seventh is to strengthen the government's supervision on RHC which will help to improve the quality of housing construction and increase the satisfaction of farmers. It is possible to develop a uniformly constructed RHC model in which professional agencies build rural housing and deliver them to farmers. Building housing with readily move-in condition can increase farmer's satisfaction on rural housing.

5.4 Chapter summary

After the logistic model regression in the previous chapter, this chapter discusses and analyzes five relevant factors, housing characteristics, housing quality, housing finance, farmer characteristics, and RHC and services. The author found that many problems that need to be resolved, including low level in rural planning, hollow villages, small and scattered village size, concentrated and low value population, large differences between district and county, stable households, large outbound population, upside down between area and population. In terms of RHC, the following problems are pinpointed: multiple households in one house, idle houses, high construction costs, overburdened farmers, low design and construction levels, poor quality, inconsistent construction standards, lack of planning and supervision, and large gaps in farmers' current status, lack of management, illegal construction of houses.

[This page is deliberately left blank.]

Chapter 6: Management Strategy for Rural Housing Construction (RHC) in the Context of New Countryside Construction (NCC)

According to the deficiencies in the management of RHC in the previous chapter, this chapter discusses the strategies to make up for the deficiencies from the perspective of the RHC against the background of NCC, to fulfill the purpose of the study.

6.1 RHC environment

6.1.1 Natural environment

1. Climate. General Principles for the Design of Civil Buildings (China's Ministry of Housing and Urban-Rural Development, 2019) claimed that different zones of architectural climate have different requirements for RHC. In summer, rural housing should be protected from heat, shade, ventilation, and moisture, while in winter, it should be insulated, and protection against cold and freezing conditions. The choice of structural design, building materials and heating methods need to be considered. Rural housing in a region should adapt to the local architectural climate. The climatic conditions determine the culture and expression of buildings, and affect the architectural style of rural housing, which is a key factor in RHC.

2. Geography. The topography of China is high in the west and low in the east, and the terrain is so diverse that plateaus, mountains, hills, plains, and basins are all distributed in China. Geological conditions are different, and natural disasters such as earthquakes and debris flows occur from time to time. These have a great influence on the location of farmhouses, the choice of building materials, and structural design. From the perspective of safety, rural settlements should be reasonably distributed so as to avoid areas where natural disasters occur frequently.

6.1.2 Cultural environment

1. Population. Rural houses are built to meet the living needs of rural people, so population is one of the most important conditions for RHC. Suining Statistics Bureau (2019) said that the proportion of rural permanent population in Suining accounted for about 41%, 47% of the total population in Suining were migrant workers in other cities, and 12% went to Suining downtown

area as migrant workers. The population is not a single constant but contains multiple variables, including age, income, family size and composition, total population. These contents change over time, thereby increasing the complexity of the long-term development of RHC.

2. Culture. China is a country composed of 56 ethnic groups. In addition to the Han ethnic group, there are 55 ethnic minorities scattered all over the country. They have their own characteristics in clothing, food, housing, travel, customs, artistic style, and enjoyment. Different cultures penetrate the architectural style of local rural housing. Traditional rural housing in the form of village is a precious cultural heritage. In the unique climate, landform and other regional environments, different forms of architectural styles carry rich cultural connotations and unique values.

6.1.3 Macro environment

1. Policy. Policies related to RHC mainly include rural housing policies, homestead policies and land policies. The introduction of rural housing policies directly regulates and guides RHC in the long run. On the one hand, with the acceleration of the urbanization process, the government has taken various measures to increase investment in real estate development and affordable housing and strive to provide living conditions for rural migrants entering the cities and towns. On the other hand, the government has adopted measures such as homestead system reform, land circulation, and accessibility of building materials in countryside, and increased investment in rural planning and construction to promote residential construction in rural areas towards a better future.

2. Economy. The income of the Chinese people has been increasing since the reform and opening up. Nowadays, China's economic characteristics are at a new stage featuring promoting agriculture with the help of industry and developing rural areas with the help of city. This is very beneficial for accelerating construction of beautiful and new countryside (CBNC) in China. Suining Statistics Bureau (2017, 2018) argued that the per capita net income of farmers exceeded the growth rate of disposable income of urban residents. As farmers' incomes have increased year by year, their lives have been improved. After solving the problem of food and clothing, improving the living environment and improving the quality of living has become the main demand of many farmers.

3. Society. The quality of the Chinese people is constantly improving, but for the people in rural areas, their literacy is not high, so their innovation consciousness is weak, not able to keep up with the pace of technology advancement. The China Rural Statistical Yearbook (National

Statistical Bureau, 2017) stated that the education level of the rural labor force of Chinese rural households was mainly junior high school, and most migrant farmers could not receive technical training. Nearly 70% of the migrant workers were male and about 30% were female. In rural areas, the main population is the elderly and women and children who are unable to work.

4. Technology. Technology refers to technologies related to RHC. In recent years, China has made great efforts in promoting CBNC. RHC technology is also synchronized with technology used in urban housing construction. RHC technology is basically synchronized with technology used in civil buildings in terms of energy conservation, environmental protection, and earthquake resistance. Technology Promotion Catalog for Livable Housing in Village and Town (China's Ministry of Housing and Urban-Rural Development & China's Ministry of Science and Technology, 2010) is often used as a reference. Sichuan Province Rural Construction Management Measures (Sichuan Provincial People's Government, 2017) pointed out that the significance of the technical document is to guide the construction and manage housing construction in rural areas.

6.2 SWOT analysis of RHC

6.2.1 Strengths

1. The fast-growing construction industry. In recent years, the construction industry has developed rapidly. For rural areas, infrastructure construction is in the process of upgrading and transformation. Most of the infrastructure that has been built recently is able to meet local transportation and housing needs, and local governments use policies to highlight the importance of modern construction. China Information Technology Research Network (2017) and National Statistical Bureau (2018) promulgated that the output value of the construction industry was 21.3954 trillion yuan, a year-on-year increase of 10.5% in 2017. Nowadays, the construction industry is the pillar industry of national economy, making contributions to the construction of rural infrastructure. The key point for the NCC strategy is rural construction. A part of the construction companies and enterprises will move to rural market, intervening in the development and construction of rural houses to provide a new source for RHC, which is conducive to enhancing the level of RHC and improving the quality of life of farmers.

2. Sustained and healthy growth of China's economy needs coordinated development of multiple parties, and the development of other industries as a guarantee. While China's

economy is developing rapidly, all sectors of society have experienced unprecedented growth. These sectors influence each other, penetrate each other, and develop together, supporting the development of the entire national economy. The rural housing industry is centered on rural housing and covers a holistic system involving different industries and fields. Related industries include planning and design, building materials, building components, transportation, equipment rental, construction and installation, and post-housing services. These industries have grown accordingly due to the emerging of rural housing industry, forming a complete market system and scale effect, which not only promotes the rapid development of the rural economy, but also better serves RHC.

3. Rural infrastructure is still being improved. The report of the 18th National Congress of CPC (CPC Central Committee, 2012) indicated that China has expanded the scope of public finance to a large number of rural areas. The Report of the 19th National Congress of CPC (CPC Central Committee, 2017) required that investment by state-owned capital should continue to increase in rural areas. China's Ministry of Housing and Urban-Rural Development (2000) put forward a work goal that was to construct roads in rural areas so as to be better serve urbanization and continued to increase investment in rural roads. Rural areas will enjoy transportation accessibility supported by unimpeded roads in the future, which will greatly facilitate travel of farmers.

6.2.2 Weakness

1. The planning of RHC lags behind. At present, most of the rural areas in China lack scientific plans for town and village construction, and some rural construction plans are only the application and extension of urban community planning, which cannot adapt to the characteristics of rural resident settlement in NCC. According to the National Statistics Bulletin (National Statistical Bureau, 2018), there were 195,919 planned administrative villages in China by the end of 2017, accounting for only one-third of the total number of all administrative villages surveyed in this census. The lack of NCC planning has caused seriously unreasonable layout of houses in many villages.

2. Lack of construction technology and construction standards for rural housing. The current standards for RHC are the Planning Standards for Towns (GB50188-07) (China's Ministry of Housing and Urban-Rural Development, 2007), which is not sufficient for the economic and social needs CBNC. There is a lack of corresponding technical standards for the overall planning of CBNC, public facility construction, rural residential planning, residential

design, residential construction and acceptance, land supervision, residential energy conservation, comprehensive disaster prevention, environmental protection, pollutant disposal and discharge.

3. The technology for RHC needs to be innovated. In the past, the focus of China's housing development was on cities. RHC completely relied on traditional technologies and the limited skills possessed by farmers, resulting in the general backwardness of RHC. Most rural areas still inherit the tradition of self-service housing construction. New technologies, new products, and new processes suitable for RHC cannot be promoted and applied in a timely manner. Due to the lack of scientific design, lack of building materials and products, and backward construction techniques, RHC is plagued by poor quality, low level, and low-cost performance.

6.2.3 Opportunities

1. The Chinese government has issued many policies to strengthen agriculture and support the benefit of farmers. The Chinese government has promulgated many policies to support the construction of rural areas for 20 consecutive years, and many of these policies have also been issued in the form of National No.1 document, which shows that the country attaches paramount importance to rural work. The first is to find effective ways to continuously increase the income of farmers. The second is to improve the initiative of farmers to improve their cultural competence. The third is to continuously increase the welfare and treatment of farmers. policies in terms of rural revitalization and dilapidated house renovation are directly related to RHC. Through reform of taxation and royalties, the Chinese government has significantly improved the overall productivity of rural agriculture, continuously consolidated rural foundation, and gradually realizing the major goal of rural and agricultural modernization.

2. NCC goals. After 2005, China took rural modernization as a major historical task, and continued to develop production to improve the quality of life of residents in rural areas. Since then, there has been a wave of NCC in various regions. The construction of a new socialist countryside provides a valuable opportunity for China to build a beautiful new rural housing that inherits traditional housing culture and integrates modern housing technology.

3. Rural revitalization strategy. Regarding rural revitalization, China's State Council (2018) put forward that rural culture needs continuous development to take a brand-new look. No efforts should be spared to pool talents to support rural revitalization. The price of commercial housing should be limited, rural dilapidated houses should be renovated to ensure that farmers live in a safe, reliable, comfortable, and beautiful place with complete functions and supporting

facilities.

6.2.4 Challenges

1. New urbanization with farmers moving to cities. The total rural population and the total number of households are the basic factors that affect the demand for housing. They determine the lower limit of the stock and increment of rural housing. New urbanization continues to advance, and the rural population continues to migrate outward, causing uncertainty in RHC. Based on this situation, China has established a dual social system based on the household registration system, thereby restricting the situation of excessively free movement of personnel. The family contract responsibility system has been implemented since 1982, and some farmers have entered local township and village enterprises to make a living. Deng (1992) lifted policy restrictions on rural population mobility, and the scale of rural-urban migration increased since then. The flow of rural population is reflected in the urbanization rate. Ning (2018), director of the National Statistical Bureau, introduced that the total population of mainland China was 1,390.8 million at the end of 2017, and the urban permanent population was 81.347 million, an increase of 20.49 million from the end of the previous year.

2. Rural hollowing. The household registration system allows migrant workers to work in the city with rural household registration, but they still occupy land in rural area that are not used, affecting the scale of agriculture. The National Statistical Bureau (2018) publicized the total number of migrant workers in China, and the number of migrant workers in Suining increased by 0.9%. In today's society, the phenomenon of rural hollowing is very popular because a decreasing number of farmers still live in village.

3. The area of cultivated land in China is constantly decreasing. The Chinese government attaches great importance to this issue, and land reform is the key to sustainable development. Lu (2008), deputy minister of China's Ministry of Land and Resources, issued new regulations on rural reform measures, firmly keeping the bottom line of 27 billion hectares of cultivated land, strongly supporting rural development and CBNC in the context of NCC. The occupation of farmland and cultivated land in the name of construction should be given enough attention.

According to the internal and external environment analysis of RHC in the context of CBNC and NCC, the SWOT analysis is shown in Table 5.1. Opportunities should be seized, and advantages should be exploited to implement the SO strategy of resource integration, market expansion, living quality improvement, and promotion of rural development. The advantage of opportunities should be taken, and disadvantages should be avoided to implement

the WO strategy of increasing support, planning first, scientific construction, demonstration as the engine. Advantages should be given full play, and challenges need to be addressed to implement the ST strategy of leading the flow of population and narrow the gap between urban and rural areas. Disadvantages should be reduced, and challenges should be responded to adopt the WT strategy of gathering strength, farmers' participation, perfect facilities, beautiful new villages.

6.3 Management strategy of RHC in the context of NCC

6.3.1 RHC planning with high standard system

Scientific and reasonable village planning plays an important role in NCC. Building houses strictly in accordance with village planning can effectively avoid the phenomenon of scattered and disorderly construction of houses by farmers, reduce land waste, and facilitate the centralized deployment of infrastructure and public services.

At present, the vast majority of villages in Suining have not formulated village construction plans. RHC, the construction of public service facilities of village committees, and the construction of cultural courtyards basically follow "old rules" and subjective feelings, lacking general planning.

The rural construction plan should be prepared in accordance with the characteristics and requirements of each village and town, including land use, rural housing construction standards, infrastructure, environmental protection, and unified planning should be carried out, and publicity should be strengthened and implemented. Governments at all levels should work together with relevant departments such as construction, housing management, land, and other departments to make specific plans in accordance with the overall plan of each region and do a good job in the service and management of rural housing construction. Formulate clear house site approval measures and rural housing plan approval measures and implement the "site selection opinions" and "start-up permit" system for farmhouse construction and arrange village construction in a centralized manner to reduce the land area for farmhouses. Construction at all levels and related scientific research and design departments, and technical colleges and universities should do a good job in providing technical guidance and service to rural housing construction in areas such as planning and design, fixed line release, construction management, quality supervision, and completion acceptance.

RHC can be done in two steps. The first step is unified planning, so that every village has a

plan, and households in this village follow the plan. The second step is to achieve unified planning and construction. In this way, the housing construction plan can be implemented, to accomplish efficient and high-quality RHC.

6.3.2 Improving the standard of RHC

According to the promulgated Construction Law of the People's Republic of China (China People's Congress, 2019), Regulations on Planning and Construction Management of Villages and Market Towns (China's State Council, 1993), Regulations on Construction Project Quality Management (China's State Council, 2000), Regulations on Planning and Management of Villages and Towns in Sichuan Province (Sichuan Provincial People's Congress, 2004), Administrative Measures for Sichuan Rural Construction Craftsmen (Sichuan Provincial Department of Housing and Construction, 2017), Regulations on the Management of Rural Housing Construction in Sichuan Province (Sichuan Provincial People's Government, 2017) included the construction activities of low-rise housing built by farmers themselves into construction management, to provide guidance and mandatory provisions for RHC.

Establishing, updating, and improving the standard system of RHC is not only conducive to providing effective guarantees for the various elements and links of quality and safety of RHC, so that RHC is within the control of relevant norms and standards. Moreover, judging from the results of the survey, farmers in Suining agree and accept the state-mandated standards and requirements for quality and safety in building houses.

6.3.3 Establishing the supervision system of RHC

The construction administrative departments of governments at all levels should raise the importance of rural construction to the same level as that of urban construction, establish and improve a RHC supervision system, implement unified planning and management of counties, townships, and villages, strictly implement approval procedures, to ensure that RHC is carried out in an orderly manner from design, survey, construction, completion, and acceptance.

Standardizing current irregular activities in RHC and options of its building materials are particularly essential for process monitoring and completion acceptance of RHC. Because of the small scale and short period of RHC, it is not necessary to supervise the whole process of construction, but nonscheduled spot checks should be carried out.

For the completion and acceptance of RHC, some relevant contents of the Completion Acceptance Record Form for Housing Construction and Municipal Infrastructure Projects

(China's Ministry of Housing and Urban-Rural Development, 2000) can be used as a reference, and after a step-by-step improvement, it can be transited to institutionalization. The professional level of personnel supervising and managing construction engineering quality in various regions should expand their scope of work in construction acceptance.

In order to better implement the completion acceptance system in rural areas, there are following measures. First is to regularly train and educate construction engineering personnel in the field of quality supervision and management, so they are able to grasp relevant standards and technical knowledge. Second is to train the management personnel on engineering quality supervision and management, so that they know how to supervise and inspect RHC. After training, they obtain qualification in quality supervision of RHC, thus responsible for this work in the rural areas.

6.3.4 Strengthening financial support for RHC

RHC should prioritize self-financing of farmers, supplemented by relevant policy support, credit support, and social assistance, and raise funds through various channels and in various forms. Government should take the lead to continue to increase capital investment for rural construction, to solve the problem of shortage of funds in the process of RHC, and to relax credit requirement and intensify support for farmers.

First, preferential policies for differentiated credit. For farmers with better economic conditions, although they have a certain economic foundation, they still face the problem of insufficient funds when building housing. They generally borrow from relatives and friends, or loans from banks and rural credit cooperatives, but these credits institutions often worry about farmers' solvency, thereby conducting credit rationing, which will affect the progress and enthusiasm of farmers in building houses. The relevant government departments should improve policies to provide farmers with different incomes with corresponding levels of loan guarantees to reduce the heavy economic burden caused by RHC. This can not only meet the actual needs of farmers to build houses, but also mobilize farmers' enthusiasm for building and improving houses.

Second, cash assistance. For rural households with poor housing conditions, they often hope that the government issues funds directly in the form of housing subsidies. However, the distribution of funds should be strictly controlled in accordance with established procedures to prevent illegal activities to prevent from wrongdoing, so that the poor can truly obtain special funds. Taking such safeguards is easy to operate and effective, but it should be strictly

monitored, so it is necessary to establish a monitoring procedure.

Third is to develop financial market of rural housing. In order to effectively solve the phenomenon of farmers' shortage of funds in the process of RHC and heavy borrowing for RHC, it is urgent to establish and improve the rural financial system and propel consumer credit business in rural housing. Rural credit cooperatives should promptly introduce different types of consumer credit business types, establish a mechanism to guarantee rural credit and to expand the scope of effective collateral in rural areas, and encourage rural residents to enter urban areas to purchase commercial housing through homestead replacement and paid withdrawal. At the same time, a unified and standardized human resources market should be established to provide equal employment opportunities for urban and rural workers, which can better encourage and guide rural residents to do small business and increase their income in multiple ways to enhance their self-development ability.

6.4 Expansion of third-party professional institutions (ACM)

6.4.1 Pilots on RHC projects using ACM

ACM of government-invested projects refers to that government-invested projects entrust a correspondingly qualified engineering management company or other enterprise with corresponding engineering management capabilities to organize of the project on behalf of the investor or construction institute through prescribed procedures. The government selects a qualified project management company as the legal person during the project construction period who is fully responsible for the organization and management of the entire process of the project construction, which promotes the separation of the functions of "investment, construction, management, use" of government investment projects, and achieves the purpose of controlling investment, improving investment efficiency and management level through professional project management. .

As an internationally common management method, ACM of government-invested project adopts various methods such as tendering to select specialized companies to implement project construction, which can effectively control the costs of project investment, improve the quality of project construction, ensure the duration of project construction, improve the overall efficiency of government investment projects. ACM is applicable to the demolition and resettlement, land acquisition and resettlement, various types of relocation, and concentrated settlements in RHC projects in China.

In May 2019, Anju District of Suining was selected as a pilot for RHC in Sichuan Province. Suining should seize the opportunity brought by this pilot, based on comprehensive research and local reality, promote the concept of "co-creating" RHC which means that RHC fully respects the wishes of farmers, and under which decision-making, development, construction, management, and evaluation of results are all done in a joint manner, thus sharing achievements between the two parties. A multi-party co-management mechanism involving the government, village collectives, and villagers should be established. The design staff helps the farmers design, or the farmers choose the appropriate design scheme for their house, and the villagers are encouraged to participate in the whole process of RHC and its design.

Setting up demonstration sites for ACM of RHC in Anju District. The system of approval with plan and construction according to drawings, the rural construction model of integrated planning, design, construction and operation, and the non-profit ACM of RHC in pilot villages and towns should be promoted. On the basis of respecting farmers' housing needs and the actual construction of farmhouses, building a group of livable demonstrative farmhouses with modern functions, rural features, cost economy, structural safety, and green environmental protection to improve the living conditions and living environment of farmers, and enhance the rural style. Experience summarized from these demonstrative rural housing can serve as basis for further promotion.

6.4.2 Improving rural homestead management

Rural homesteads are the foundation for farmers to settle down. The government should improve the management of rural homesteads from various aspects. First, strictly control the new homesteads in rural areas. It is strictly forbidden to have multiple homes. The construction of new homes should be demolished. The farmers are strictly prohibited from using their contracted farmland as homesteads to build houses. Second, establish a paid exit mechanism for contracted land and homesteads, so that farmers who withdraw from rural collective membership and leave the countryside completely can obtain the realizable value of their rural property. In this way, capable farmers who are willing to be urbanized can take the lead in urbanization. Third, materialize the right to use homesteads owned by rural residents, allow villagers to perform substitution of their farmland in different places and the substitution between urban and rural areas, and encourage farmers to use the indicators of rural homesteads to purchase affordable housing and new community housing built by the government.

6.4.3 Improve rural infrastructure construction and environment

Rural infrastructure facilities and rural living environment are one of the most concerned issues of farmers, and important factors affecting farmers' living and quality of life. Construction of supporting facilities and centralized distribution of rural public infrastructure should be accelerated to achieve infrastructure sharing, meet the basic living needs of rural residents, improve the efficiency of infrastructure use, and enhance the appearance of villages and the living environment of farmers.

6.4.4 Design and general drawing set for rural housing

Promoting the investigation and design system for RHC and encouraging the use of general drawing set for housing construction. According to the actual situation in Suining, the construction administrative department of Suining should jointly design a set of general drawings or various types of houses, including foundation, main structure, wall masonry form, as assistance for farmers who need to build houses. Guidance articles such as construction-related magazines and books can be provided to rural residents through government service windows, bookstores, and other channels in a regular manner. The general drawing set designed by the government should provide rural housing design with low construction costs under the premise of ensuring quality, and the drawing set itself should be sold at a low price or directly distributed free of charge to farmers who need to build houses.

RHC within the scope of urban planning should use the general drawing set provided by the government construction planning or the design drawings issued by a qualified design unit. For the construction of remote rural housing, it is encouraged to use the general drawing set provided by the government's construction planning department that meet RHC standards. Rural residents can also entrust craftsman to design their houses to minimize the design of houses by farmers themselves. Farmers who choose to build houses according to use the general drawing set can be given an appropriate number of subsidies.

6.4.5 Solving the problem of "rural hollowing"

Abandoned land, pits, idle homesteads, idle housing, and more than one homestead in one household are all promising land backup resources. The "hollow village" renovation is the best way to alleviate the shortage of land use, improve land utilization and save resources. According to preliminary estimates, the rural settlements in Suining used more than 40,000 hectares of land. If all the land is renovated, at least 10,000 hectares of land can be freed up

(Suining Statistics Bureau, 2019). The following measures can be taken.

Firstly, actively guide and give full play to the main role of farmers. To govern "hollow villages", the benefits of farmers and voluntary participation of the masses are the key. Therefore, farmers should be given the major role at full play. It may be considered to issue demolition subsidies, introduce collective construction, fee reduction and other policies to reduce the pressure of farmers in demolition and increase their enthusiasm for the demolition of old houses and the construction of new ones.

Secondly, carry out the "hollow village" governance activities. All civil servants and employees of the district and county government should act as examples to take responsibility of demolishing illegal buildings, idle houses, over occupied homesteads and subcontracted contractual farmland in their villages, or turn them over to the authorities during weekends, which will be inspected and accepted by the township government where they are located. Those who fail to pass the inspection will be required to stop payment of salary or demolish within a time limit.

Thirdly, implement the classification in combination with the reality. According to the reasons for the formation of "hollow villages" and the current status of village appearances, it is appropriate to adapt to local conditions with tailed measures in each village. Combined with geographical location, economic conditions, NCC, cultural construction against the background of NCC, and small market town construction in rural areas, four modes of governance can be adopted: original site planning, overall relocation, filling empty houses, and small villages merged into large villages. On the basis of beneficiaries of the masses and voluntary participation of the masses, planning plans and implementation plans are formulated, and the plan will not be implemented and transformed if conditions are not ripe in a village. For villages suitable for original site planning, conditions for the use of homesteads and land occupation standards should be implemented strictly in the principle of reasonable arrangements and paid use. On the basis that each rural household has only one homestead, farmers need to be guided to use idle homesteads as much as possible. It is possible to repossess old homesteads to the collective in the form of rent and redistribute it to effectively control the villagers to abandon the old housing and construct new one. These repossessed homesteads can be allocated to users who urgently need to build new houses or use as farmland once again where chicken sheds and pig pens cab be placed, to achieve the purpose of land saving. For "hollow villages" with many idle land, idle homesteads, and idle spaces that cannot be re-planned, it is more appropriate to relocate the village as a whole. Villages with hidden dangers of natural disasters, no living conditions, too small scale, and inconvenient

transportation conditions should also be relocated as a whole.

For the house-building households that need to be relocated in the governance work, priority is given to arranging the house site and reducing all expenses. When reclaiming the land of the original settlement after the governance, the principle of "remediation of the land is mainly based on collectives, and those who develops benefits" is adhered to encourage the public to rectify and develop their homestead and contract planting. All the contract fees collected by the village collective are used for the remediation of other lands in the village and cannot be used for other purposes. For trees planted on the reclaimed land in the original settlement, there is no need to apply for a forest harvesting permit when logging, the forestry department does not charge any fees, and the trees are owned by the growers.

For villages that merge to form a central village, priority should be given to improving and perfecting infrastructure with awards as incentives and other measures. For the villages that vacated the land in time, subsidies for reclaiming should be provided to support the unified contracting or even distribution of land for reasonable use. Special rectification of illegal land occupation and house building should be carried out to correct the illegal occupation of homesteads. Special rectification activities for illegal housing construction in rural areas meet the need to maintain social equity. A small number of people can obtain a large benefit at a relatively low cost, while the legal construction of a house requires several times the effort. The illegal land use and illegal construction of a house satisfy the private desires of the minority, but damage legal rights and interests of the majority. Through the implementation of special rectification of illegal RHC, the legitimate rights and interests of people who respect the discipline and the law are guaranteed, those who use land and build houses illegally are punished and maintain a fair and equitable order in the land construction market and the society at large.

[This page is deliberately left blank.]

Chapter 7: Conclusions and Prospects

This study adopted rural housing construction (RHC) management in new countryside construction (NCC) as the main line, used RHC management principles in NCC, and summarized relevant factors that impose impact on the satisfaction of rural residents with RHC in NCC from the stakeholder relationship. The research subject is RHC management in Suining city, Sichuan province. The main research objective is to systematically study factors that impact the construction and management of rural housing in the new countryside, so as to provide reference for RHC management in NCC in local and other areas and for improving rural housing satisfaction.

7.1 Research process and major conclusions

7.1.1 Research process

By describing China's support for rural development and RHC in new villages in the past 40 years, this research is centered on three key aspects for RHC in NCC. The first is about the current confusion in the construction and management of new rural housing: are rural residents satisfied with the housing quality after years of efforts in NCC and rural housing improvement? After reviewing previous researches, this study theoretically analyzes the stakeholders in rural housing construction and identified the direct and indirect stakeholders. Second, this research sums up important factors that affect the satisfaction of rural residents with the housing quality. Third, the influence of these factors on RHC management is studied through investigation and empirical analysis on new rural houses in Suining city, Sichuan province. To this end, referring to previous research literature at home and abroad, the author selected rural housing characteristics, rural housing quality characteristics, rural housing finance, personal status, construction management and services as research variables to analyze the impact relationship of rural housing quality and satisfaction of rural residents. This study used questionnaire survey to collect data and conducted an expert review of the questionnaire. Then the author collected the samples reasonably and screened the sample data and collected 919 valid questionnaires for statistical analysis. The logistic model was used for regression analysis, followed by discussion on the analysis result.

7.1.2 Major conclusions

Through the analysis of the questionnaire data, the author found that in the research model, each time the variable characteristic is added, and the control variables are further adjusted, the significance of the housing characteristics and the housing quality characteristics is basically unchanged. Details have been listed in the discussion section in this thesis.

Firstly, there are direct and indirect stakeholders in RHC management. Factors influencing the satisfaction of the rural housing quality were summarized via analysis of the direct and indirect stakeholders in RHC. This research used the basic principles RHC in NCC to explain the stakeholders of RHC, identified direct and indirect stakeholders in the process of RHC and its management, and concluded that the impact of RHC and construction quality on satisfaction on rural resident, and built framework for factors having impacts on the satisfaction of rural housing.

Secondly, factors influencing the satisfaction with the rural housing quality are rural housing characteristics, housing quality characteristics, housing finance policies, personal characteristics of rural residents, and RHC management and services. Through the empirical analysis of the questionnaire of RHC in NCC in Suining, Sichuan Province, it is found that these five factors have a significant impact on the housing satisfaction of rural residents. Among them, twelve items exert a very significant impact on housing satisfaction, including the housing age, using time and housing cost, among others; ten items impact housing satisfaction significantly, including the nature of housing, housing structure, building methods, housing area and housing construction duration, to name a few. The assumptions and results of the empirical analysis are detailed in Model 5.

Thirdly, to improve the rural housing satisfaction based on the findings of this study, the author provided solutions to the problems of RHC and its management in NCC through SWOT analysis. Farmers are used to building their own houses, without specific design and planning or a systematic management. This research summarizes the relevant strategic suggestions for RHC and its management, proposes the implementation of ACM for RHC in NCC, enriches the research content of RHC management as project, and improves the management level of RHC projects, which provides a scientific management path for NCC and adds a new practical measure for rural sustainable development.

7.2 Innovation and limitations

7.2.1 Research innovation

(1) Theoretical innovation

This study uses the basic principles of RHC management in NCC, combines with national support policies for RHC in NCC, organically integrates the relevant theories of stakeholders to identify the direct and indirect stakeholders of RHC management. This is the expansion and deepening of the theory of RHC management, which enriches the theory of RHC management in NCC.

The basic principles of RHC management in NCC have always been copy from the general principles of urban housing construction management (Peng & Kuang, 2014; Qu, 2017; Hu, 2015). However, RHC has the inherent characteristics, especially the interests and stakes in building houses are not supported by systematic theories, thus failing to effectively guide farmers in the implementation of RHC in NCC. This research summarizes the direct and indirect stakeholders in the process of RHC based on previous literature, extracts 5 factors that exert impacts on the housing satisfaction of farmers, and empirical results show that housing characteristics, housing quality characteristics, housing finance, personal characteristics, building management and services have a very significant impact on the housing satisfaction of rural residents. To a certain extent, this research has made up for the shortcomings of the current theoretical research on RHC management, and thus expanded and deepened the RHC management theory in NCC.

(2) Innovation practice

This research focuses on the main line of RHC management in NCC, combines with relevant literature research and questionnaires, describes the characteristics of rural residents' satisfaction with RHC, and explores the impact of housing characteristics, housing quality, housing finance, and personal characteristics, building management and services, empirically tests the significance of impacts on rural residents' satisfaction with RHC. To a certain extent, this research reveals the method and strategic path of how factors of RCH in NCC have impacts on RHC management.

This research took the rural area of Suining, Sichuan Province as the research object, and conducted an empirical study on the impacts of RHC management on housing satisfaction. This study analyzed and discussed the relationship between the 5 factors on the satisfaction of the

quality of rural housing, found the problems in RHC management in NCC, and put forward suggestions for RHC management from a strategic perspective. It provides a new practical path for RHC and its management in NCC and enriches practical experience in rural sustainable development.

7.2.2 Research limitations

Although this study has some innovations in theory and practice, which can make a little contribution to the field of RHC management in NCC. However, everything is not perfect, and there are always flaws and deficiencies, not to mention that this research is limited to the ability and knowledge of the author, plus the objective constraints on resource, it is inevitable that limitations exist in this study.

(1) Micro individual

This study is mainly based on the analysis of RHC management in Suining, so the sample is from farmers in 5 districts and counties in Suining. There is no analysis and elaboration of the internal structure of the construction enterprises and management institutions engaged in RHC. It does not summarize the management system housing construction management departments in the government at all levels, nor does it describe the individual characteristics of construction craftsmen. In addition, RHC in the system management in China started late, and there are many relevant topics that need to be studied. Due to limited length of this thesis, these topics cannot be described comprehensively. Furthermore, some variables in the questionnaire need to be further improved. Choice was made subjectively in the questionnaire survey, which cannot avoid deviations and defects caused by random answers made by respondents, which may affect the results of the research.

(2) Macro policy

This study is limited to RHC management and failed to carry out a longitudinal study on how the policies, key resource elements, quality, investment, schedule, safety, information. formulated by the government affect housing satisfaction. How to accomplish rural development with a dual structure is a process of knowledge and experience accumulation. Rural development is indispensable to the support of government's macro-policy. This study does not systematically analyze policy interventions in RHC and lacks research on scientifically formulating rural housing policies in NCC for sustainable development.

7.3 Prospects for further research

Clearly recognizing the limitations of the research, the author thinks the follow-up research can proceed in the following directions.

7.3.1 Broadening geographical scope

Taking RHC management in NCC in the whole province or China as the research object can further improve the universality of the research results. The regional scope of Suining in Sichuan Province is limited. Whether the main conclusions obtained in this study are consistent with RHC management in NCC in the whole province and even the whole country needs further examination. In future research, the author will broaden the geographical scope of the research to study RHC management.

7.3.2 Expanding research perspective

(1) Integrating different analysis perspectives of rural construction management to build an analysis framework of RHC management

The framework of factors imposing impacts on the satisfaction of RHC management constructed in this thesis is based on the research results of RHC management principles, while engineering project management is not particularly used in RHC management. further research is still required to consider RHC project as a holistic scientific system. For example, safety management, contract management, the relationship between the quality, progress, and investment of RHC needs further explanation.

(2) Adopting the computer management system to construct the management model of RHC

The RHC strategy and stakeholders who control and control the planning of RHC management proposed in this study enjoys its rationality and feasibility, but the actual process is more complicated, and the workload is huge. Scientific management and related cybernetics can be borrowed, behavioral science and computer science act as the basis, and computer technology and information technology can be utilized to effectively establish and modify RHC management model, and finally conducting research through human-computer interaction functions. Using computer for system planning can effectively solve the common problems in the satisfaction model of RHC management in this study and provide managers with a more

scientific and correct information and data.

7.3.3 National policies

At this stage, the engineering projects used in RHC present a diversified status, including public-private partnership (PPP) model, build-operate-transfer (BOT) model, and transfer-operate-transfer (TOT) model. There is no policy support, and no attempt is made to solve outstanding financial problems in RHC in the context of CBNC through these models. The different project modes used in the RHC projects causes corresponding changes. For example, the rights and resource risks between managers and the government, between the government and farmers show a major difference in the PPP model and the BOT model. In addition, when RHC project uses different management models, the management strategy and the relationship between various stakeholders also change accordingly. This study provides a detailed explanation of RHC planning, law enforcement, but does not consider the impact of policy-related factors. The author hopes that the author can carry out more accurate analysis and research on specific project models.

Bibliography

Amerigo, M. & Aragones, J. I. (1997). A theoretical and methodological approach to the study of residential satisfaction. *Journal of Environmental Psychology*, 17(1), 47-57.

Ananth, P. (2017). Housing for poor and the impact of IAY in rural India: Present context. *International Journal of Humanities and Social Science Research*, 53(6), 264-279.

Bai, X. (2015). *Investigation and design research on the floor plan of the decentralized farmhouses in Yongchuan Chongqing*. Doctorial Thesis, Chongqing University. (in Chinese)

Bobkov, V. N., Dolgushkin, N. K., & Odintsova, E. V. (2021). Features of housing provision for rural and urban populations. *Herald of the Russian Academy of Sciences*. 91(4), 473-481.

Carson, J. A. & Mattingly, M. J. (2018). *Rural Housing Challenges Through the Lens of Two New England Communities*. Durham: Carsey School of Public Policy.

Chen, X. & Ma, J. (2016). Empirical research on stakeholder identification differences. *Business Economics Research*, 20, 111-114. (in Chinese)

Chen, Y. H. (2015). *Research on the improvement of owner satisfaction of BC supervision*. Doctorial Thesis, Shandong University. (in Chinese)

Chi, L. (2014). *Research on the practice of rebuilding farmhouses after the disaster and research on the optimization of atlas design*. Doctorial Thesis, Chongqing University. (in Chinese)

Chu, D. P. (2014). *China's urbanization development.* Doctorial Thesis, Zhejiang University. (in Chinese)

Cutter, S. (2013). Residential satisfaction and the suburban homeowner. *Urban Geography*, 3(4), 315-327.

Deng, T. J., He, Z. J., & Li, H. (2011). Satisfaction: The core concept of engineering construction project management. *Technological Progress and Countermeasures*, 13, 77-80. (in Chinese)

Deng, X. P. (1992). *Selected Works of Deng Xiaoping*. Beijing: People's Publishing House. (in Chinese)

Ding, G. X. (2019). On the risks and countermeasures of agent construction system of government investment projects. *Times Finance*, 33, 86-87. (in Chinese)

Dong, Y. M. (2016). Construction stakeholder governance. *Engineering Construction and Design*, 3, 152-154. (in Chinese)

Drucker, P. F. (1954). *The Practice of Management*. Buenos Aires: Editorial Sudamericana.

Forte, F. & Russo, Y. (2017, June 12-16). *Evaluation of user satisfaction in public residential housing: A case study in the outskirts of Naples, Italy* [Conference session]. IOP Conference Series: Materials Science and Engineering, Prague, Czech Republic.

Gan, X. L. (2014). *Research on decision model of sustainable construction scheme of infrastructure project based on stakeholder theory*. Doctorial Thesis, Chogqing University. (in Chinese)

Gao, S. P. (2019). Rural homestead system: From regulation, empowerment to revitalization. *Agricultural Economic Issues*, 1, 60-72. (in Chinese)

Gao, Y. C. (2014). Analysis and research on sampling survey of dangerous buildings in rural China. *Small Town Construction*, 4, 61-64. (in Chinese)

Haken, H. (1981). *Erfolgsgeheimnisse der Natur*. Shanghai: Shanghai Translation Publishing

House. (in Chinese)
Hao, G. Q. & Zhou, W. J. (2019). Research on the inheritance and innovation of rural traditional culture from the perspective of rural revitalization. *Journal of Guangxi Teachers College (Philosophy and Social Sciences Edition)*, 40(4), 78-84. (in Chinese)
He, X. H. & Hu, W. F. (2002). Introduce agent construction system and promote the innovation of engineering management system. *China Water Transport*, 5, 34. (in Chinese)
Hu, J. J. (2018a). Thoughts on the implementation of agent construction system for urban demolition and resettlement housing projects. *Theoretical Research on Urban Construction (Electronic Version)*, 27, 192. (in Chinese)
Hu, Y. M. (2015). Some thoughts on the management of farmhouse construction in beautiful and new village. *Sichuan Architecture*, 3, 288-290. (in Chinese)
Hu, Y. M. (2016). Probe into the planning and management of the construction of new village farmhouses. *Sichuan Architecture*, 36(3), 124-125. (in Chinese)
Hu, Y. M. (2017a). Research on the protection planning of ethnic villages. *Sichuan Architecture*, 37(2), 79-81. (in Chinese)
Hu, Y. M. (2017b). Viewing green poverty alleviation in Sichuan Tibetan areas from the practice of Li county. *Contemporary County Economy*, 10, 52-53. (in Chinese)
Hu, Y. M. (2018b). *Practices of Facilitating Development of Suili, A Minority Group Place*. Beijing: Kaiming Press. (in Chinese)
Hu, Y. M. (2020). Remember the original heart and help rural areas. *County Economy*, 4, 32-34. (in Chinese)
Huang, J. L. (2017). Guangxi launched a four-year action to improve housing quality satisfaction. *Guangxi Urban Construction*, 2, 3-5. (in Chinese)
Huang, Y. B. (2015). How to do a good job in surveying customer satisfaction of construction projects. *Construction Workers*, 36(1), 10-13. (in Chinese)
Jiang, P. (2016). *Analysis and measurement of factors affecting the complexity of large-scale engineering projects*. Doctorial Thesis, Harbin Institute of Technology. (in Chinese)
Jiang, Z. W. (2015). *Research on reconstruction and operation mechanism of expressway project management mode based on TCE and MDT*. Doctorial Thesis, Chongqing University. (in Chinese)
Jin, L. (2014). *Study on the climate adaptability of rural houses in Chaoshan area*. Doctorial Thesis, South China University of Technology. (in Chinese)
Kulshreshtha, Y., Mota, N., Jagadish, S. K., Bredenoord, J., Vardon, J. P., Loosdrecht., M.C.M., et al.(2020). The potential and current status of earthen material for low-cost housing in rural India. *Construction and Building Materials*, 247(Jun.30), 118615.1-118615.14
Li, D. X. (2017). Construction quality control analysis and evaluation method application research based on construction engineering. *Construction Engineering Technology and Design*, 8, 52-56. (in Chinese)
Li, Z. & Mao, H. Y. (2020). Discussion on residents' satisfaction with rural cultural construction in poverty-stricken areas and its promotion countermeasures: a survey based on Chongqing. *Journal of Chongqing Technology and Business University (Social Science Edition)*, 37(1), 87-98. (in Chinese)
Liaoning Lijie Consulting Co., Ltd. (2006). *ACM System, Management and Practice*. Beijing: Machinery Industry Press. (in Chinese)
Liu, C. (2019). Rural renovation of dangerous buildings and related policy analysis. *Sichuan Building Materials*, 45(11), 49-50. (in Chinese)
Liu, J. H. (2013). *Research on suitable construction strategy and design model of ecological farmhouse in Longdong area*. Doctorial Thesis, Xi'an University of Architecture and Technology University. (in Chinese)
Liu, J. J. (2018a). Discussion on the construction model of new farmhouse. *Housing Industry*, 4,

15-17. (in Chinese)
Liu, J. J. (2018b). Discussion on the development and construction model of rural house. *Housing Industry*, 8, 58-59. (in Chinese)
Liu, Y. W. (2012). Sewage treatment and urban environmental protection issues. *Theoretical Research on Urban Construction (Electronic Version)*, 36, 1-3. (in Chinese)
Liu, Z. L. (2016). *Research on modeling and optimization of complex R&D project process and organization*. Doctorial Thesis, Beijing Technology University. (in Chinese)
Lu, J. & Zou, X. J. (2018). Implementation, problems, and skills of rural questionnaire survey method: taking questionnaire survey of farmer's food safety consumption behavior in Jiangxi as an example. *Jiangxi Journal of Agricultural Sciences*, 30(9), 133-137. (in Chinese)
Luo, L. J. (2017). *Research on contract management and evaluation method of agricultural infrastructure investment under PPP mode*. Doctorial Thesis, Chinese Academy of Social Sciences. (in Chinese)
Luo, Z. D. (2018). Research on Chongqing farmers' housing quality evaluation based on analytic hierarchy process. *Western Leather*, 40(16), 102. (in Chinese)
Lv, P., Yu, M., & Yu, L. Y. (2020). On construction of new rural housing system suitable for rural revitalization strategy. *Issues in Agricultural Economy*, (01), 17-27 (in Chinese)
Lv, T. (2017). *Research on stakeholder's governance of ACM*. Doctorial Thesis, Dalian University of Technology. (in Chinese)
Mao, X. P., Lu, H. M., & Li, M. Q. (2012). Stakeholder research on sustainable construction of Chinese engineering projects. *Journal of Southeast University (Philosophy and Social Sciences Edition)*, 14(2), 46-50. (in Chinese)
Mitroff, I. (1983). *Stakeholders of the Organizational Mind: Toward a New View of Organizational Policy Making*. New York: Jossey-Bass.
Mo, Z. B. (2019). *A study on the difference of urban and rural residential land use power*. Doctorial Thesis, Zhejiang University. (in Chinese)
Ni, Y. (2016). *Research on design of ecological new farmhouse in hot summer and cold winter area*. Doctorial Thesis, Nanjing University of Technology. (in Chinese)
Nigati, N. (2015). *Study on the spatial layout of villages under the background of beautiful countryside*. Doctorial Thesis, Xinjiang University.
Niu, B. (2016). *Regional small town construction project group management*. Doctorial Thesis, Xi'an University of Architecture and Technology. (in Chinese)
Pan, Y. J., Zhang, Z. T., & Wang, Z. H. (2020). Research on the practice of rural construction planning permit system for rural residence: taking the rural area of Zhuhai as an example. *City Planning Review*, 46-51. (in Chinese)
Parmar, B., Freeman, R., Harrison, J., & Purnell, A. (2010). Stakeholder theory: The state of the art. *The Academy of Management Annals*, 3, 403-445.
Peng, D. Y. & Kuang, Y. F. (2014). Construction of people's livelihood and life satisfaction of migrant workers. *Journal of Xuzhou Institute of Technology (Social Science Edition)*, 1, 51-57. (in Chinese)
Peng, W. H. (2018). *Research on quality evaluation system of new rural housing construction process*. Doctorial Thesis, South China University of Technology. (in Chinese)
Preston, V. & Taylor, S. M. (1981). Personal construct theory and residential choice. *Annals of the Association of American Geographers*, 71(3), 437-451.
Project Management Institute. (2017). *A Guide to the Project Management Body of Knowledge*. Beijing: Electronic Industry Press. (in Chinese)
Qu, X. Z. (2017). *New model of rural house construction*. Doctorial Thesis, Tianjin University. (in Chinese)

Ren, G. Q. (2019). *Logic analysis of stakeholder behavior in construction of small public welfare water conservancy project*. Doctorial Thesis, Central China Normal University. (in Chinese)

Satsangi, M., Gallent, N., & Bevan, M. (2010). *The Rural Housing Question: Community and Planning in Britain's Countrysides*. Bristol: Policy Press.

Scott, M., Bullock, C., & Foley, K. (2013). Design matters: Understanding professional, community and consumer preferences for the design of rural housing in the Irish landscape. *The Town Planning Review*, 84(3), 337-370.

Shao, T. (2018). *Research on energy-saving optimization of rural residence in northeast severe cold area*. Doctorial Thesis, Harbin Institute of Technology. (in Chinese)

Shen, Q. (2019). The exploration process of the agent construction system of Chinese government investment projects and the difficulties of further development. *Housing and Real Estate*, 15, 1. (in Chinese)

Shi, L. & Liu, A. Q. (2015). Research on the problem of common agency under the tripartite construction model. *Journal of Engineering Management*, 2, 91-95. (in Chinese)

Song, Y. Q., Li, Y. L., Li, G. J., & Jia, C. L. (2014). Governance structure of complex product system projects: Based on the research of stakeholder theory. *Technology and Economy*, 33(6), 90-100. (in Chinese)

Sun, X. Y. (2017). *Research on architectural design and construction strategy of farmhouse in Handan Plain*. Doctorial Thesis, Hebei University of Engineering. (in Chinese)

Tan, Q. X. & Zhang, B. (2015). Analysis of rural residents' housing satisfaction and its influencing factors: Based on a survey of 1000 rural households in 5 provinces in China. *China Rural Economy*, 2, 52-65. (in Chinese)

Tao, L., Zou, M., & Wu, G. C. (2019). Shared ownership housing and residential satisfaction: An evaluation of shanghai model with consideration of housing price. *Price Theory and Practice*, 3, 51-54. (in Chinese)

Taylor, F. W. (1909). *The Principles of Scientific Management*. New York: Loki's Publishing.

Wang, C. Q. (2019). Research on the path of traditional culture promoting rural revitalization and development. *Rural Economy and Technology*, 30(8), 188-189. (in Chinese)

Wang, L. (2017). On construction engineering quality management and control. *Green and Environmentally Friendly Building Materials*, 10, 207. (in Chinese)

Wang, R. & Tan, R. (2020). Efficiency and distribution of rural construction land marketization in contemporary China. *China Economic Review*, 60. (in Chinese)

Wang, W. J. (2014a). Research on the control of the influencing factors of construction project construction quality and the evaluation of its quality management. *Operation Managers*, 31, 329-329. (in Chinese)

Wang, Y. Y. (2014b). *Research on brand governance based on stakeholders*. Doctorial Thesis, Shandong University. (in Chinese)

Wesonga, R., Kasedde, H., Kibwami N., & Manga, M. (2021). A comparative analysis of thermal performance, annual energy use, and life cycle costs of low-cost houses made with mud bricks and earthbag wall systems in Sub-Saharan Africa. *Energy and Built Environment*, (1), 56-61.

Wiegand, M., Koomen, E., & Pradhan, M. (2017). *The Impact of Road Development on Household Welfare in Rural Papua New Guinea*. New York: Social Science Electronic Publishing.

Wu, S. (2016). *Research on the influence of control and trust synergy on construction project management performance*. Doctorial Thesis, Tianjin University. (in Chinese)

Wu, Y. D. (2015). *Research on intelligent construction information model under the concept of intelligent construction*. Doctorial Thesis, Harbin Institute of Technology. (in Chinese)

Wu, Z. B. (2013). *Research on the supervision system of government investment agent*

construction projects. Doctorial Thesis, Beijing Jiaotong University. (in Chinese)
Xin, J. Y. (2017). *Research on villager participation in village planning*. Doctorial Thesis, Shanxi University. (in Chinese)
Xu, F. & Zhao, S. H. (2016). Research on quality risk evaluation and management of engineering construction projects. *Building Materials and Decoration*, 35, 190-191. (in Chinese)
Xue, W. R. (2015). *Research on project management for collaborative construction*. Doctorial Thesis, Harbin Institute of Technology. (in Chinese)
Xue, X. X. & Zhang, M. J. (2017). Sichuan: Preparing "good medicine" for regulating the management of rural housing construction. *Urban and Rural Construction*, 6, 69. (in Chinese)
Yang, Y. (2014). *Research on the management mechanism of collaborative innovation alliance for complex and major scientific and technological projects*. Doctorial Thesis, Beijing Institute of Technology. (in Chinese)
Yao, Y. & Guo, Z. D. (2014). A dynamic game study on the supervision of government investment agent construction projects. *Journal of Engineering Management*, 4, 52-56. (in Chinese)
Ye, P. D. & Dong, J. G. (2017). An empirical study on the influencing factors of rural residents' housing satisfaction: Based on a survey of 457 farmers in Shandong province. *Journal of Shandong University of Finance and Economics*, 29(6), 75-82. (in Chinese)
Yi, F. (2019). Analysis of the problems and countermeasures of China's agent construction system model. *Anhui Architecture*, 26(10), 231-232. (in Chinese)
Yi, X. (2010). German rural planning and its legal construction. *International Urban Planning*, 2, 11-16. (in Chinese)
You, X. S. (2017). *Multi-criteria group decision-making for public projects under public participation based on fuzzy preference relations*. Doctorial Thesis, Tianjin University. (in Chinese)
Yu, H. (2017). *Application of green technology in the construction of farmhouses*. Doctorial Thesis, Tianjin University. (in Chinese)
Yu, T. (2015). *Research on government investment efficiency: Based on the perspective of local government investment project management model*. Doctorial Thesis, Northeast University of Finance and Economics. (in Chinese)
Yuan, M. H. & Wu, Y. F. (2015). Construction and control of project objectives based on the perspective of stakeholders. *Urban Architecture*, 14, 175-176. (in Chinese)
Zhang, D., Wu, S. Y., & Wang, X. B. (2015). Research on project management optimization of transmission and transformation lines based on objective management method. *Operation Manager*, 29, 334. (in Chinese)
Zhang, H. & Yang, Y. C. (2015). An empirical study on the satisfaction of residents in affordable housing: Taking Yinchuan as an example. *Regional Research and Development*, 5, 82-85. (in Chinese)
Zhang, Q. Y. (2018). Thoughts on the reconstruction of new houses and old houses in rural areas. *China Construction*, 2, 93-95. (in Chinese)
Zhang, S. T. (2015a). Comparative analysis of construction project stakeholders and company stakeholders. *Construction Economy*, 8, 112-116. (in Chinese)
Zhang, S., Yang, Y. L., & Wang, J. X. (2018). Research on the management mode of agent construction system for relocation house project. *Live and Work*, 7, 175-178. (in Chinese)
Zhang, X. & Zhang, X. (2021). Comparison and sensitivity analysis of embodied carbon emissions and costs associated with rural house construction in China to identify sustainable structural forms. *Journal of Cleaner Production*, 293(8), 126-130. (in Chinese)
Zhang, X. C. (2015b). *Study on roof ventilation of farmhouses in Yongchuan area: Loft design*

based on thermal comfort of two-story residence. Doctorial Thesis, Chongqing University. (in Chinese)

Zhang, Z. H. (2017). *The conflict of design thinking in rural construction in contemporary China*. Doctorial Thesis, Nanjing Arts Institute. (in Chinese)

Zhao, X. Q., Du, J. J., Xue, F. Z., & An, H. L. (2019). Research on the present situation and satisfaction of rural resident housing in Jinzhong. *Shanxi Architecture*, 45(16), 189-191. (in Chinese)

Zhao, Z. W. (2019). Practical analysis of agent construction system of resettlement house project. *Sichuan Cement*, 9, 248. (in Chinese)

Zheng, Z. J. (2014). New rural folk culture innovation research. *Packaging World*, 1, 94-95. (in Chinese)

Zhou, L. & Song, H. X. (2019). Statistical analysis of library science research articles using questionnaire survey in recent years. *Library Forum*, 39(2), 18-24. (in Chinese)

Zhou, Y. & Luo, X. (2015). Under the new situation, the exploration of the development path of urban and rural integration in Pudong New Area. *Beijing Planning and Construction*, 5, 126-128. (in Chinese)

Zhou, Y. & Zhou, J. Y. (2015). The practice of rural planning in urban planning areas: Taking Luwan village planning in Nansha district of Guangzhou as an example. *Urban Planning*, 8, 93-101. (in Chinese)

Zhou, Y. (2016). *Research on the construction of rural planning system framework in Guangdong*. Doctorial Thesis, South China University of Technology. (in Chinese)

Zhu, J. Z. (2015). *Government investment project performance evaluation index system and decision analysis research*. Doctorial Thesis, Hehai University. (in Chinese)

Zuo, W. Q. (2015). *Research on problems and improvement countermeasures of rural housing construction management in Jiangxi province*. Doctorial Thesis, Nanchang University. (in Chinese)

Webliography

China Broadcasting Network. (2010, January 31). Sichuan Suining M5 Earthquake. Retrieved December 30, 2019, from https://china.huanqiu.com/article/9CaKrnJmXpG

Li, S. J. (2011, December 17). 2011 PMI Trend. Retrieved November 4, 2012, from http://guoqing.china.com.cn/2012-11/04/content_26996522.htm

Lu, X. S. (2008, June 5). Ministry of Land and Resources: Strictly Control Urban and Rural Construction Land and Adhere to the Red Line of 1.8 Billion Mu of Cultivated Land. Retrieved December 9, 2019, from http://www.china.com.cn/economic/txt/2009-06/23/content_17998214.htm

Ning, Z. (2018, January 21). Minister of Transportation: Accelerating the Four Transformations of Rural Roads. Retrieved December 9, 2019, from http://www.scio.gov.cn/xwfbh/xwbfbh/wqfbh/39595/39709/

Xi, J. P. (2015, October 21). Discussion on Urban-Rural Integration. Retrieved October 21, 2015, from http://theory.people.com.cn/n/2015/1021/c40531-27723378.html

Xi, J. P. (2017, June 24). A Summary of the Construction of Rural Spiritual Civilization. Retrieved June 24, 2017, from http://www.xinhuanet.com/2017-06/24/c_1121202789.htm

[This page is deliberately left blank.]

Other References

China Information Technology Research Network. (2017). *2017-2022 China Construction Industry Development Dynamic Analysis and Market Profit Forecast Report*. Beijing, China Information Technology Research Network.

China People's Congress. (2019). *Construction Law of the People's Republic of China*. Beijing, China People's Congress.

China's Administration of Quality Supervision & National Standards Council. (2015). *Guide to the Construction of Beautiful Villages (GB/T32000-2015)*. Beijing, Administration of Quality Supervision & National Standards Council.

China's Central Government. (2019). *Regulations on Construction Engineering Quality Management*. Beijing, China's Central Government.

China's Ministry of Construction. (1996). *Administrative Measures for the Qualification of Construction Workers in Villages and Towns*. Beijing, Ministry of Construction.

China's Ministry of Construction. (2004). *Several Opinions on Strengthening the Quality and Safety Management of Village and Town Construction Projects*. Beijing, Ministry of Construction.

China's Ministry of Finance. (2016). *Construction Cost Management Regulations for Infrastructure Construction Project*. Beijing, China's Ministry of Finance.

China's Ministry of Housing and Urban-Rural Development. (2000). *Completion Acceptance Record Form for Housing Construction and Municipal Infrastructure Projects*. Beijing, China's Ministry of Housing and Urban-Rural Development.

China's Ministry of Housing and Urban-Rural Development. (2007). *Planning Standards for Towns (GB50188-07)*. Beijing, China's Ministry of Housing and Urban-Rural Development.

China's Ministry of Housing and Urban-Rural Development & China's Ministry of Science and Technology. (2010). *Technology Promotion Catalog for Livable Housing in Village and Town*. Beijing, China's Ministry of Housing and Urban-Rural Development & China's Ministry of Science and Technology.

China's Ministry of Housing and Urban-Rural Development. (2019). *General Principles for the Design of Civil Buildings*. Beijing, China's Ministry of Housing and Urban-Rural Development.

China's State Council. (1993). *Regulations on Planning and Construction Management of Villages and Market Towns*. Beijing, China's State Council.

China's State Council. (2004). *Decision of the State Council on the Reform of the Investment System*. Beijing, China's State Council.

China's State Council. (2014). *Construction Engineering Safety Management Regulations*. Beijing, China's State Council.

China's State Council. (2005). *Several Opinions on Increasing Reform and Innovation and Accelerating the Construction of Agricultural Modernization*. Beijing, China's State Council.

China's State Council. (2018). *Action Plan for Tourism Infrastructure Renovation and Upgrade in Deeply Poor Areas in Three Regions and Three Prefectures.* Beijing, China's State Council.

China's State Council. (2019). *Construction Engineering Quality Management Regulations*. Beijing, China's State Council.

China's State Council. (2020). *Opinions on Key Tasks in the Field of Agriculture, Rural Areas and Farmers to Ensure a Comprehensive Well-Off*. Beijing, China's State Council.

China's State Council. (2000). *Regulations on Construction Project Quality Management*. Beijing, China's State Council.

CPC Central Committee. (2005). *Proposal of the Central Committee of the Communist Party of China on Formulating the Eleventh Five-Year Plan for National Economic and Social Development*. Beijing, CPC Central Committee.

CPC Central Committee. (2012). *The Report of the 18th National Congress of the Communist Party of China*. Beijing, CPC Central Committee.

CPC Central Committee. (2015). *Proposal of the CPC Central Committee on Formulating the Eleventh Five-Year Plan for National Economic and Social Development*. Beijing, CPC Central Committee.

CPC Central Committee. (2017). *The Report of the 19th National Congress of the Communist Party of China*. Beijing, CPC Central Committee.

CPC Central Committee & the State Council. (2006). *Several Opinions on Promoting the Construction of a New Socialist Countryside*. Beijing, CPC Central Committee & the State Council.

National People's Congress. (2004). *Administrative Licensing Law*. Beijing, National People's Congress.

National People's Congress. (2019). *Land Management Law*. Beijing, National People's Congress.

National People's Congress. (2019). *Construction Law of the People's Republic of China*. Beijing, National People's Congress.

National Research Consulting Group. (2019). *2019-2025 China Infrastructure Market Status Survey and Development Trend Forecast Report*. Beijing, National Research Consulting Group.

National Statistical Bureau. (2016). *China Statistical Yearbook*. Beijing, National Statistical Bureau.

National Statistical Bureau. (2017). *China Rural Statistical Yearbook*. Beijing, National Statistical Bureau.

National Statistical Bureau. (2018). *China Statistical Yearbook*. Beijing, National Statistical Bureau.

National Statistical Bureau. (2018). *National Statistics Bulletin*. Beijing, National Statistical Bureau.

Office of Rural Work Leading Group in CPC Central Committee. (2018). *Rural Revitalization Strategic Planning (2018-2022)*. Beijing, Office of Rural Work Leading Group in CPC Central Committee.

Sichuan Provincial People's Congress. (2004). *Regulations on Planning and Management of Villages and Towns in Sichuan Province*. Sichuan, Sichuan Provincial People's Congress.

Sichuan Provincial People's Government. (2014). *Urbanization Planning of Sichuan Province (2014-2020)*. Sichuan, Sichuan Provincial People's Government.

Sichuan Provincial People's Government. (2017). *Measures of Managing Rural Housing Construction in Sichuan Province*. Sichuan, Sichuan Provincial People's Government.

Sichuan Provincial People's Government. (2017). *Overall Plan for the Construction of a Happy and Beautiful New Village (2017-2020)*. Sichuan, Sichuan Provincial People's Government.

Sichuan Provincial People's Government. (2017). *Regulations on the Management of Rural Housing Construction in Sichuan Province*. Sichuan, Sichuan Provincial People's Government.

Sichuan Provincial People's Government. (2017). *Sichuan Province Rural Housing*

Construction Management Measures. Sichuan, Sichuan Provincial People's Government.
Suining People's Government. (2015). *Suining Happy and Beautiful New Village Planning*. Suining, Suining People's Government.
Suining People's Government. (2019). *Suining Municipal Government Communique*. Suining, Suining Municipal People's Government.
Suining Statistics Bureau. (2017). *Suining Statistical Yearbook*. Suining, Suining Statistics Bureau.
Suining Statistics Bureau. (2018). *Suining Statistical Yearbook*. Suining, Suining Statistics Bureau.
Suining Statistics Bureau. (2019). *Suining Statistical Yearbook*. Suining, Suining Statistics Bureau.

[This page is deliberately left blank.]

Annex A: Questionnaire on rural housing construction (RHC) Management

1. The purpose of this survey is to understand the current situation of RHC and to help decision-making and provide better RHC service for rural residents.

2. The objects of this investigation are residents of villages and towns.

3. Except those clearly marked items, the rest are single answer.

I. Basic information on households

1. your gender:

A. Male

B. Women

2. your age?

A. 20 to 30

B. 31 to 40

C. 41 to 50

D. Over 51

3. which type does your family belong to?

A. Poverty alleviation households

B. Non-poor

C. Civil servant at village government

D. Civil servant at township government

4. How many family members?

A. 1 person

B. 2 persons

C. 3 persons

D. 4 persons

E. 5 or more

5. your education?

A. Primary or below

B. Junior high school

C. Secondary/secondary/technical schools

D. Junior College

E. Bachelor degree or above

6. are your family members currently living together?

A. Young or middle-aged couple

B. Children + young or middle-aged couples

C. Three generations

D. Only the elderly

E. Others.

7. What is the annual total income of your family (in yuan):

A. Below 10,000

B. 10000~50000

C. 50000~100000

D. 100000~150000

E. 150000~200000

F. More than 200,000

8. How much is your family's income?

A. Agriculture

B. Working mainly

C. Mainly doing business

II. Basic Situation of Your Housing Construction

1. your current housing is:

A. Ordinary bungalows

B. Courtyard buildings

C. Unit buildings

D. Other

2. the nature of your home:

A. Poverty alleviation relocation

B. Disaster avoidance and ecological relocation

C. Renovation of Dangerous Old Houses

D. Self-built improvements

3. your current housing construction methods are:

A. Unified planning and construction

B. Unified planning and self-construction

C. Self-construction

4. your current housing homestead area (㎡)?

A. Below 50

B. 50~100

C. 100~200

D. 200~300

E. Above 300

5. the total floor area of your current home(㎡):

A. Below 50

B. 50~100

C. 100~200

D. 200~300

E. Above 300

6. Is your current housing granted a Certificate of Tile?

A. Yes

B. No

C. Yes, but not yet handled.

D. Other

7. there are several homesteads in your house

A. 1

B. 2 locations

C. 3 and above

8. how many years have your current housing been built?

A. Less than 1 year

B. 1~2 years

C. 3~4 years

D. 5~10 years

E. 10~20 years

F. Over 20 years

9. How long has your house been occupied 9. year?

A. Less than 1 month

B. 1~2 months

C. 3~5 months

D. 6~10 months

E. All year round

10. How long did it take for your house to start and finish?

A. Less than 2 months

B. 2 months ~ half a year

C. Half year ~1 year

D. 1 year ~2 years

E. 2 years or more

11. Your current housing construction cost is (to meet the basic occupancy criteria) (thousand yuan):

A. Less than 20

B. 30~50

C. 60~100

D. 110-150

E. 160~200

F. 210~300

G. 310~500

H. More than 510

12. Your current source of funding for housing construction (optional):

A. Own funds

B. Lending from relatives

C. Bank loans

D. Government subsidies

13. Have you applied to the Government for your current housing construction?

A. Yes

B. No

14. How did you handle the original homestead after you built your new house?

A. Reconstruction of housing

B. Reclamation

C. Idle

D. Other

15. Are you satisfied with the current housing:

A. Very satisfied

B. Basic satisfaction

C. Not satisfied

D. Not satisfied

16. Your dissatisfaction with existing housing is (optional):

A. Location

B. Room type

C. Area

D. Quality

E. Infrastructure

F. Design design

G. Environment

F. Other

17. What is the structure of your current home:

A. Wood structure

B. Adobe-brick structure

C. Brickwork structure

D. Brick-concrete structure

E. Reinforced concrete structure

F. Other

18. Is your house professionally designed?

A. Yes

B. No

19. Have you asked professionals to survey your current housing estate before it is built?

A. Yes

B. No

20. Has the construction process (survey, verification, acceptance) been regulated by government authorities?

A. Full supervision during construction.

B. Partial supervision.

C. No regulation

III. THE SAFETY OF HOUSE OF HOME FUNDS

1. the construction teams you currently employ for housing construction have construction qualifications?

A. Yes

B. No

2. your current housing construction with reference to the relevant construction standards?

A. Yes

B. No

3. you think construction drawings are important when building houses?

A. Important

B. Not important

4. whether the government monitors the quality of your current housing during construction

A. Yes

B. No

5. whether there have been any safety incidents during the construction of your current housing

A. Yes

B. No

6. is there a quality problem with your current housing?

A. Yes

B. No

If 7 is yes, what kind of problem (optional)?

A. Seepage, leakage

B. Wall cracking

C. Wall shedding

D. Foundation sinking

E. Beam, column bulge, warp

F. Unreasonable layout

G. Other

8. if there is a quality problem with housing, what will you do?

A. Ignore it

B. Find a repair team

C. Get professionals to repair

D. Simple repair

E. Other

9. what do you think is the most important factor affecting housing security (optional)?

A. Building materials

B. Housing structure

C. Foundation foundation

D. Construction quality

F. Feng Shui

G. Other

IV. Expectations of Farmers for Housing Construction Management

1. what kind of housing would you like to live in?

A. Ordinary bungalows

B. Courtyard buildings

C. Unit buildings

D. Other

2. the type of housing structure you expect is:

A. Wood structure

B. Abode-brick structures

C. Brickwork structure

D. Brick-concrete structure

E. Reinforced concrete structure

F. Other

3. the Government's support policy for housing construction you are looking forward to is:

A. Provision of surveying, housing design and other services

B. Provision of quality control services

C. Provision of low-interest loan services

D. Funding subsidy

E. Others

4. you think the ideal housing construction model is:

A. Unified planning and construction

B. Unified planning and self-construction

C. Self-construction

D. Purchase of commodity housing

E. Other

5. your greatest concern about housing construction is:

A. Building materials

B. Building structures

C. Housing type

D. Cost of construction

E. Housing quality

F. Others

6. if you build a house in the future, you will choose?

A. Contact the construction company to design and build

B. Design and find workers to build

C. I designed it and built it

D. Purchase of commercial housing

E. Other

7. Do you have any suggestions?

Note: Research Address:_____Village_____Township_____County