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Project Construction in the Building of Rural Human Settlements in China

Yinxia Hou
Center of Social Engineering Research, School of Humanities and Social Science Harbin Institute of Technology, Harbin, Heilongjiang 150001, China

ABSTRACT

It is an important part for the building of a new countryside to improve the rural human settlements constantly and it has important meanings to promote the planning of city and village and build the harmonious society. As the important production base of farm products, northeast of China should strengthen the rural human settlements project construction. So the government planning of village space should be made，the rural housing construction of saving energy and protecting environment should be spread, the renewable energy should be developed and utilized actively and the rural living garbage should be disposed according to the principle of cycle economy. And the ecological civilization concept should be regarded as the standard to build the rural human settlements to promote the sustainable, coordinate and steady development of local rural economy.

Key words: Northeast of China; building of a new countryside; rural human settlements

INTRODUCTION

The Greek scholar C.A. Doxiadis proposed the word of human settlements in the book of "*Ekistics*：*an introduction to the science of human settlements*" in [1]. His "science of human settlements"，especially the thinking of studying human settlements systematically has a far-reaching impact in the world. Wu Liangyong, School of Architecture of Tsinghua University，constructed the scientific system of human settlements through using the western academic thinking for reference and considering the Chinese national conditions[2]. He made the definition as "human settlements，as the name suggests, is a place where human beings live life ，is the earth' surface space which is related to the survival activities of human beings closely，it is the base which human depends on in nature and the main places of utilizing nature and transforming nature of human "in his book "*Introduction to the Science of Human Settlements*". Thus, the relevant researches spread on different levels[3].

The necessity of strengthening rural human settlements project construction in the building of a new countryside

The report of the 17st Communist Party of China proposed the new requirements of constructing well-off society wholly. The most difficult and most arduous task lies in rural areas in the building of well-off society, because if there is no modernization of rural areas and comprehensive well-off, there can be no modernization of the country and comprehensive well-off society; and if the modernization of rural areas can not be promoted effectively and with the same pace，the entire national economic growth will be blocked. Therefore，the relations

between workers， peasants， city and village must be handled properly to accelerate modernization and the rural economic and social comprehensive progress must be promoted to building the harmonious society[4]. Only developing rural economy and building their homes to let farmers lead a comfortable life，the economic and social development result can be shared by all the people and the national economic development can continue. “Production development, well-off life, civilized local customs，clean village appearance and management democracy”，outline the beautiful blueprint of building a new countryside, which is the major historic task in the process of Chinese modernization，the specific measures to coordinate the urban and rural development，the major strategic initiatives of constructing well-off society wholly. In a sense, the construction of rural human settlements is the key link in the building of a new countryside. The reasons are:

First，the construction of rural human settlements aims at coordinating the urban and rural development，improving the rural residential environment and upgrading the living standards of farmers through the construction of rural infrastructure, housing and sanitation facilities and coordinating the production and living activities of rural residents so as to promote the agricultural economic development and farmers well-off life[5]. Second, it can make people live in the good environment, beautiful scene and harmony through the construction of rural human settlements. Marx once said，“the relationship between people and the natural world contains the relationship between people directly, and the relationship between human beings is the relationship between humans and nature directly.” So we can say the relationship between human and nature embodies the relationship between human beings. The improvement of the relationship between human and nature and the increase of people's own accomplishment will promote the harmony among people, thus promoting the civilized local customs greatly. Finally, the construction of rural human settlements can promote clean village appearance. Some of rural human settlements are not satisfactory for a long time[6]. The filthy，disorder and bad rural environment is due to the way of production and living of wasting resources polluting the environment. If the concept of ecological civilization is regarded as the standard in the construction of rural human settlements，the filthy，disorder and bad problems can be solved in the internal of production and living，the negative efficiency of pollution can be changed into the positive efficiency of resources and the pollution prevention and control can be put in the increase of agricultural efficiency and farmers’ incomes. And the environment and human settlements which have been destroyed will be improved evidently，the farmer can drink clean water, breathe clean air, eat safe food and village has clean appearance, attraction and reaches the perfect combination with surroundings[7].

The present situation of rural human settlements construction in northeast of China

Northeast of China, including Liaoning, Jilin andHeilongjiang provinces and three cities and a union in eastern Inner Mongolia Autonomous Region, is more than 1600 km long from north to south, more than 1400 km wide from east to west, the land area is 1,244,200 km2. It has a broad distribution of forest and meadow grassland, a broad area of permafrost and marshes. The soil fertility is good and the rural settlements are extensive. The area of arable land is 1.948 million hectares which is higher than the national average. So it is the important production base of agricultural products. In the northeast, the climate shows a long winter and a short summer；the winter is dry and cold；the summer has concentrated rainfall，long sunshine and it is warm

humid；the spring has strong winds and low precipitation, and the autumn has a sharp fall of temperature and more early frost by the humid temperate and sub-humid continental monsoon climate. According to the information of statistics, the existing population in the northeastern region is 108 million, the rural population is 48.244 million, accounting for 44.8 percent of the population of the region. With the economic development, the living standards of farmers are improved constantly. The net income per capita rose from 2198 yuan in 2000 to 3616 yuan in 2007 and increased 55 percent, which is higher than the national average of 11 percentage points ；Engel coefficient of rural residents dropped from 45.5 percent to 40 percent. Based on the unique geographical culture, the residential housing in northeast of China is the house with oblique roof，quadrangle or other style of courtyard. The residential area is small and it is mostly the single-layer structure with the insulation and heating equipment. In recent years, the rural residential area per capita is growing steadily, as shown in Table 1, the rural residential area per capita of Liaoning, Jilin and Heilongjiang provinces continues to be improved. The great achievements have been gotten in the construction of rural human

Table 1. The rural residential area per capita in the three provinces of northeast of China in 2004-2006

the rural residential area per capita（square meter）	**2004**	**2005**	**2006**
Liaoning Province	23.9	25.1	25.2
Jilin Province	19.8	20.1	20.7
Heilongjiang Province	20.4	20.4	20.9

settlements in northeast of china，but it is still in the development state of spontaneous and disordered，it exists the following problems：

1- The layout and construction are disordered

Benefiting from the strengthening farmer and favoring farmer policy of the Communist Party of China and government，many farmers have a steady growth in their income，and their common practices are building houses. However, many rural settlements do not have the detailed planning, make centralized building，or build along the road，all of these will cause the density of building is too large，the space is too small， the roads are blocked，the sewage are emitted randomly and the signs of having new village without new looks can be found everywhere. And some residents do not demolish the old house after building the new house and form the so-called “hollow village”.

2- The scientific content of residential construction is low

The rural houses of northeast of China are mainly the red–brick houses with 490 mm or 370 mm wall thickness and part immature soil building. And the coefficient of wall conducting heat is between 2.0 -1.4W/m2· K. For example，the rural brick and tile cottage area accounts for 49.2 percent in the rural housing area，reinforced concrete structure accounts for 2.5 percent，the brick and wood structure area accounts for 15.2 percent，and the area of brick and tile cottage and brick and wood structure area account for 50 percent respectively in the new

building area in Heilongjiang province in 2006. According to the survey of Wenhe Liu，only the utilization rate of solar energy is higher in the use of renewable energy source of biomass, solar, wind and heat pump of ground source in the village of northeast of China，it accounts for 46 percent，and the energy-saving measures which are adopted in the rural residential walls, roofs , windows, floors, account for 60 percent，30 percent，10 percent，2 percent respectively. The brick and tile building in which the thermal insulation energy-saving design are neglected exists the defects of small envelope structure and large energy consumption, resulting in the large fluctuations of indoor temperature, the morning temperature is generally low, below 10 ℃, and even some north corners of residential kitchen have frost as a result of twinkling high humidity and can't achieve energy-saving requirements. At the same time, the nitrogen and oxides affect the ecological environment directly which the building releases to the external environment for adding heat loss. Therefore, this high consumption, high emissions, low comfortable building needs transformation to the type of low consumption，low-emission, high comfort, high-tech content.

3-The infrastructure lagged behind and the environment is dirty and disordered

Many rural infrastructure construction lagged behind in northeast of China and there are difficult issues of walking，drinking water and communicating in the village. The water penetration rate is lower in some villages，there is no unified water supply and drainage systems ，the farmers get the water through drawing the underground water wells and the water treatment equipment is deficient. The majority of villages lack of necessary garbage collecting system and treatment measure，the mode of garbage cleaning，transporting and processing has not been formed yet. It is very slowly to promote clean energy and the number of biogas digesters and straw gasification station is small. It caused bad impacts on the human settlements for the indiscriminate discharge of life sewage and garbage and the mixed housing of human, livestock, poultry and nourished the emergence of disease and plague in rural areas. According to the typical survey report which was carried out by the Chinese villages and towns construction office of Ministry of Construction in 2005 to 105 rural works of 74 villages of 3 counties of 9 provinces，there was no centralized water supply in 41 percent villages，there was no drainage ditches and sewage treatment system in 96 percent villages，it was difficult to walk on rainy days in 40 percent villages，the pen of livestock was mixed with housing in 72 percent villages ，the traditional lavatory was used in most villages，the garbage was littered everywhere in 89 percent villages，there was no fire safety facilities in 95 percent villages.

The countermeasures of strengthening human settlements construction in the building of a new countryside in northeast of China

1- Paying attention to the renovation planning of village space

The minister of Ministry of Construction Wang Guangtao has pointed out that the natural ecological space must be protected strictly and the village layout should be determined in the next 10-20 years. Therefore, the relevant departments should be guided by the concept of ecological planning to make scientific and reasonable renovation planning and make the comprehensive arrangements to the housing， water supply , electricity supply, roads, afforestation, sanitation and production facilities according to the level of local economic development in the process of drawing up the rural renovation planning. The layout and

proportion configuration of various types of land use should be adjusted further to build a scientific and rational land-use structure. It is necessary to protect not only the interests of farmers but also the former home of the famous with cultural heritage and the historic building with value to embody the characteristics of the region. The popularity of tap water and drainage project construction should be strengthened, and the capital investment should be added to the agricultural water-saving irrigation, drinking water, rural roads, rural water and electricity and irrigation area transformation in the agricultural infrastructure planning[8].

2-Making experienments and spread the energy-saving and environment-protecting rural housing construction

The rural housing is the basic living and production sites and it is related to the farmer's health and quality of life directly. First, it should be in line with the standards of healthy housing which are recommended by the World Health Organization. Second, the advanced energy-saving technologies should be spread vigorously, the concept of ecological civilization should be regarded as the standard to the planning，design, construction, use, maintenance, removal of rural housing construction to minimize the building energy consumption and the energy-saving, land-saving, water-saving and wood-saving rural housing should be built. For example, the straw can be made into crop blocks through the new technology processing and regarded as the building wall to replace the traditional red brick. And its strength and indicators in some aspects have exceeded the red brick so it is used widely in the developed countries，Mongolia, and Hebei Province of China. Finally, the thermal resistance value of rural residential envelope structure should be increased, the economic, efficient and rich thermal insulation materials should be adopted to compose the composite wall and roof，thereby the quality of rural housing is enhanced and the living conditions of farmers are improved [9].

3- The renewable energy should be exploited vigorously

The Fourteenth Meeting of the Tenth National People's Congress Standing Committee adopted the “Renewable Energy Law of People's Republic of China ”on February 28, 2005 and it came into effect on January1,2006. The article II of this Act states the so-called renewable energy is wind, solar, hydropower, biomass, geothermal energy, ocean energy and other non-fossil energy，it can not only increase the rural energy supply substantially to solve the problem of energy scarcity fundamentally but also reduce the consumption of fossil fuels and the emission of reducing carbon dioxide, sulfur dioxide and other harmful gases through the development and use of renewable energy in rural areas. It can reduce environmental pollution to provide the basic guarantee for sustainable development through turning waste (straw, manure, garbage) to treasure (fuel, feed, fertilizer) and turning harm into treasure with technical means. And the above types of energy are abundant in the northeast of China so the potential of energy should be tapped further and the renewable energy should be made full use of. For example, the biomass refers to the energy which is transformed through using the plants of nature, manure, and urban and rural organic waste. It is the earliest, the largest, the most direct source of energy which is used by human and it stems from trees, crop straw, firewood, water plants, manure of livestock，processing residues of agro-forestry product and organic waste. It can be converted to high-grade energy, such as gas and liquid fuels，and it can replace much conventional energy so it is the fourth largest energy besides coal, oil and natural gas. As the high grade biomass, the biogas can not only solve the energy problem but also saving resources and protect environment. The raw materials of biogas are rich, such as rural crop straw, livestock manure, distiller’s grains

and the waste materials in the production process of biogas, such as biogas liquid and biogas residue, are also the excellent organic fertilizer. The application of cycle mode which regards the biogas as the key makes the picture of the stack of crop straw and animal manure in the past village change radically. In addition, the promotion of biogas can replace the original way of logging， so that the forests get protection and the rural ecological environment gets improvement. Thus, with the energetic development and use of renewable energy，the problem of rural energy scarcity can be solved effectively and the rural human settlements will be improved greatly.

4- The rural living garbage should be treated according to the principle of cycle economy

It is the foundation for garbage collection to carry out the scientific classification in the rural living garbage. If the garbage is filled or incinerated without classification，it is not only the huge waste of resources, but also the secondary pollution. The disposal way of living garbage is mainly incineration, filling and compost after classification at present. Because the levels of economic development, the way of production, living and residential environment in different regions are different, these three disposal ways are used at the same time generally. The disposal of rural living garbage in northeast of China started rather late and thecurrent sanitary standards and disposal ways are in accordance with the city. The Ministry of Construction in the general principles 1.6 of urban living garbage disposal and pollution control technology policy states that the garbage disposal technology and equipment of sanitary fill， incineration, compost and recycling have the appropriate conditions of application, one of them or the right mix can be chosen on the conditions of adhering to local conditions, technical feasibility, equipment reliability, appropriate scale, comprehensive management and use. Therefore, the choice of rural living garbage disposal technology should also be guided by this principle[10].

The organic garbage which will rot and deteriorate, such as residual refuse，leftovers，the skin of fruit and vegetable leaves, can be composted. It regards solar energy as its heat source and makes high temperature anaerobic digestion to the organic garbage, as a result, the garbage can be used as high-quality organic fertilizer after three months. The garbage which can be reused, such as plastics, rubber，metal scraps, may be sold to the recycling companies and the brickbats and stones may be used as the road filler to pave the way. And a certain amount of methane, carbon dioxide and small amounts of nitrogen, oxygen can be released in the process of natural fermentation and degradation through the sanitary fill of garbage and these gases can be collected for power generation, lighting and so on. The hazardous waste, such as batteries and residual pesticide bottles should be handled separately[11]. The power generation of incineration is also the garbage disposal technology which is widely used around the world. The garbage calorific value can meet the requirements of garbage incineration after the classification in Chinese village. So it is the key development direction of garbage disposal in the northeast of China. In short, the way of eco-composting, sanitary fill and power generation of incineration is different in different geographical environment，garbage composition and level of economic development，but the common ground is to follow the principle of recycling to protect the rural human settlements effectively[12].

CONCLUSION

As the important production base of farm products，northeast of China can promote the sustainable，coordinate and steady development of local rural economy through strengthening the rural human settlements project construction, paying attention to the government planning of village space， spreading the rural housing construction of saving energy and protecting environment, developing and utilizing the renewable energy actively，disposing the rural living garbage according to the principle of cycle economy and regarding the ecological civilization concept as the standard to build the rural human settlements.

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