



THE MACROSCOPIC MECHANISM FOR RURAL SAFE DRINKING WATER

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ABSTRACT

China has about 300 million unsafe drinking water in rural areas by the end of 2010. China as an example, this paper presents macroscopic mechanism system for rural safe drinking water. It consists of six subsystem such as the legal construction including water source protection, planning and construction and operation and management of drinking water projects; funds security including the central and local government financial investment, social donations, rural residents pay; preferential policies including taxation expenses preference, electrovalence preferential policies; social security including personnel policy, employee wages, social security and welfare; self-consciousness of rural residents including the water-cultural awareness on the core of drinking water security concept, demand expression, active participation of rural residents; societal forces including non-profit social organizations, experts and scholars, corporate organizations and individuals. The perfect rural safe drinking water mechanisms play a key important role in solving safe drinking water in rural areas.

Keywords: *Rural Drinking Water, Legal Construction, Funds Security, Preferential Policies, Social Security*

1. INTRODUCTION

Safe drinking water in rural areas has become highly concerned about the livelihood issues for various countries governments, particularly in developing countries. Rural safe drinking water has been listed as one of the United Nations Millennium Development Goals, and belongs to the contents of the seventh goal. The seventh goal of the Millennium Development Goals includes integrating the principles of sustainable development into country policies and programs and reversing loss of environmental resources, reducing by half the proportion of people without sustainable access to safe drinking water, achieving significant improvement in lives of at least 100 million slum dwellers by the end of 2020. It is important for solving safe drinking water in rural areas to improve people's livelihood, China is certainly no exception. China has about 300 million unsafe drinking water in rural areas by the end of 2010, rural safe drinking water is one of the major livelihood issues, there is no time to delay for solving safe drinking water. Rural safe drinking water is the prerequisite and basis for building a new socialist countryside, is the most basic means of subsistence for rural residents. During the 10th Five-Year Plan, the central government scheduled

11.7 billion yuan of special fund for treasury bond, there is 10.5 billion yuan of the local government and rural residents self-financing, which solved drinking water problems of the rural population of 67.22 million. During the 11th Five-Year Plan, national actual investment amounted to 105.3 billion yuan, including 59 billion yuan central fiscal allotment from 2006 to 2011, 43.9 billion yuan self-financing funding of local governments and residents, 2.4 billion yuan social financing, which solved 218 million rural population drinking water safety. During the 12th Five-Year Plan, the Chinese government will strive to solve the problems concerning drinking water safety for 298 million rural residents from 2011 to 2015, a total of 114,000 rural schools. It is estimated that rural drinking water safety projects total investment will reach more than 170 billion, government investment mainly. A large number of rural drinking water projects were built in the past 10 years, but the project quality and efficiency is not very good, which the government has attached high importance to.

At present, domestic and foreign scholars have researched on drinking water technology, management, water resource protection, and so on. For example, organochlorine pesticide residues in rural drinking water[1]; a potential alternative



source[2]; water quality assessment[3,4]; drinking water and health [5]. There are good rural drinking water safety in developed countries, but poor rural drinking water in developing countries and least developed countries. China as a developing country, rural safe drinking water situation is very serious. Because of the differences in urban and rural dualistic society in China, the central and local governments attach great importance to urban safe drinking water, regulations on urban water supply was legislated by the State Council of the People's Republic of China in 1994. But rural safe drinking water is not being taken seriously, there is the absence of laws and regulations and sound mechanism, there is a serious shortage of investment in government finances, rural safe drinking water mechanism is seriously lagging behind, which hinder the solution to safe drinking water in rural areas in some degree. In recent years, government investment have made great achievements in rural drinking water projects construction, but there is the serious phenomenon that the government attaches importance to rural drinking water projects construction and neglects of rural drinking water projects management[6-7].

Solving the problem of rural drinking water safety is building a large number of drinking water projects in China, the management level is relatively weak. Therefore, the study focuses mainly on the macroscopic mechanism for rural safe drinking water in order to improve rural safe drinking water system and enhance management level. Establishing management team that have strong professional ability, high quality and strong sense of responsibility, is key to safe drinking water in rural areas in China. The paper discusses the people's livelihood connotation, the macroscopic mechanism for rural safe drinking water and analyses the legal construction, funds security, preferential policies, social security, self-consciousness, societal forces.

2. SAFE DRINKING WATER FOR THE PEOPLE'S LIVELIHOOD BASIS

2.1 The fundamental connotation on the people's livelihood

The modern concept of people's livelihood includes the generalized and narrow people's livelihood. All things related to people's livelihood including directly related and indirectly related things, belong to the people's livelihood in the broad sense, which can be extended almost to the economic, social, political, cultural and other fields. There are the more classic interpretation of

livelihood issues for Sun Yat-sen who is the modern democratic revolution, the Chinese Nationalist Party founder, the Three People's Principles of the advocates. From the selected works of Sun Yat-sen published by the people's Publishing House in 1981, he pointed out that the people's livelihood was the people's life including social existence, national bread, masses life; people's livelihood is the center of politics, economy and various historical act; people's livelihood is motive power on all social activities. In the narrow sense, the people's livelihood from the social level is mainly focused on the basic survival and living conditions, the basic development opportunities, the basic development capacity and protection of the basic rights and interests. According to the Guangming Daily, there are the specific content of the three levels showing a progressive state from low to high for the people's livelihood, first, mainly involving in the bottom line of the people's basic livelihood state; second, mainly involving in the basic development opportunity and development ability for the masses of people; third, mainly involving in social welfare state above the line of people's basic living. Therefore, rural drinking water safety belongs to the range of people's livelihood issues and the basic problem of life state for rural residents. The connotation of people's livelihood varies with the times. Nowadays, it refers to the public's rights to live, to develop, and to entertain, which is reflected in their material life, political life, cultural life and social life[8]. Since 2000, the people's livelihood problems are entered gradually into the vision of scholars, after the 17th CPC National Congress, the Chinese government and the public attach increasingly importance to the people's livelihood issues. The improvement of people's livelihood should follow the principle of human-orientation and overall planning. Only when we call on the efforts of all concerned, including the government, social communities and individuals, which can solve the problems of people's livelihood.

2.2 Water for life, water for livelihoods

Before the birth of life, water exists in the world and raises life. Water is not only the basic conditions of the existence of life, but also the essential component of life structures. The human body consists of protein accounting for 17%, fat accounting for 14%, carbohydrates accounting for 1.5%, mineral substance accounting for 6%, water accounting for 61.5%. In other words, two-thirds of the body weight is water. The share of water in the human body is also different from different stages



of growth, for example, the fetal stage water accounting for 90%, the infant stage 80%, the juvenile stage 75%, the adult male stage 70%, older men stage 65%. The ancients said that water is the king of medicine. Modern medicine finds that 80% of diseases are related to water, such as cardiovascular disease, cancer, digestive diseases, blood diseases. It is thus clear that drinking water is closely related to human health.

According to Human Development Report 2006 (Beyond scarcity: Power, poverty and the global water crisis) released by the United Nations Development Programme (UNDP), access to clean water is not just a fundamental human right and an intrinsically important indicator for human progress. It also gives substance to other human rights and is a condition for attaining wider human development goals. "By means of water", says the Koran, "we give life to everything." That simple teaching captures a deeper wisdom. People need water as surely as they need oxygen: without it life could not exist. But water also gives life in a far broader sense. People need clean water and sanitation to sustain their health and maintain their dignity. But beyond the household water also sustains ecological systems and provides an input into the production systems that maintain livelihoods. Water gives life to everything, including human development and human freedom. Nowhere is this more apparent than in the area of water for life. Today, some 1.1 billion people in developing countries have inadequate access to water, and 2.6 billion lack basic sanitation. Meanwhile, slum dwellers and poor households in rural areas of the same countries have access to much less than the 20 litres of water a day per person required to meet the most basic human needs. Women and young girls carry a double burden of disadvantage, since they are the ones who sacrifice their time and their education to collect water. The idea of water as a human right reflects these underlying concerns. As the UN Secretary-General has put it, "Access to safe water is a fundamental human need and, therefore a basic human right." Ensuring that every person has access to at least 20 liters of clean water each day to meet basic needs is a minimum requirement for respecting the right to water—and a minimum target for governments. The new infrastructure broke the link between dirty water and infectious disease. By one estimate water purification explains almost half the mortality reduction in the United States in the first third of

the 20th century. In Great Britain the expansion of sanitation contributed to a 15-year increase in life expectancy in the four decades after 1880. Most of the 1.1 billion people categorized as lacking access to clean water use about 5 litres a day—one-tenth of the average daily amount used in rich countries to flush toilets. Dripping taps in rich countries lose more water than is available each day to more than 1 billion people lacking access to clean water. The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use.

3. THE MACROSCOPIC MECHANISM FOR RURAL SAFE DRINKING WATER

Drinking water safety has been classified as one of the UN Millennium Development Goals, which various countries governments attach great importance to, especially in developing countries and least developed countries. Therefore, drinking water safety is not only the economic issue, but also the social problem, and even become the political issue, China will also be no exception. From a macro point of view, solving safe drinking water in rural areas is the systems engineering, by no means the simple technical and economic issues. From improving people's livelihood and promoting social harmony and enhancing people's quality of life, the central and local governments design macroscopic mechanism for rural safe drinking water. In accordance with the principle of "government-led, social support, and the public participation", the macroscopic mechanism for rural safe drinking water is shown Figure 1 in China.

Figure 1 shows that the government, civil society and rural residents need the joint efforts and mutual cooperation and understand their respective responsibilities and obligations in order to solve the problem of safe drinking water in rural areas. According to the theory of public goods, rural safe drinking water has the limited exclusiveness and competitiveness, it belongs to the quasi-public goods. The legal construction for rural drinking water is legal basis for safe drinking water, financial investment and tax preference are the key to safe drinking water, technology development suitable for rural drinking water system is to protect, the extensive social support is social foundation, drinking water safety concept, initiative and enthusiasm of rural residents is the core.

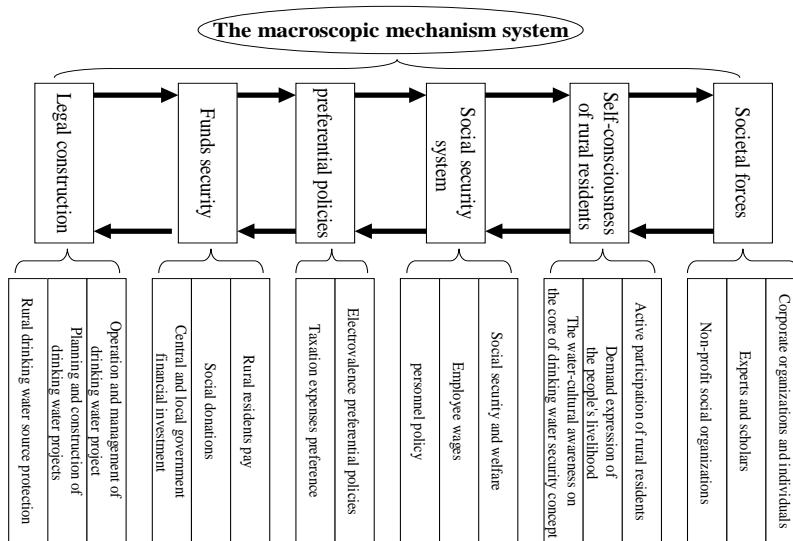


Figure 1: The Macroscopic Mechanism For Rural Safe Drinking Water In China

4. MACROSCPIC MECHANISM ANALYSIS OF RURAL DUINKING WATER

4.1 The Legal Construction For Rural Drinking Water

At present, the existing legal framework system in China, laws and regulations related to drinking water is shown Table 1[9]. Table 1 shows that law includes constitution of the People's Republic of China, environmental protection law of the People's Republic of China, water law of the People's Republic of China, law of the People's Republic of China on the prevention and control of water pollution, solid waste pollution prevention law of the People's Republic of China, the law of the People's Republic of China on water and soil conservation. Regulations includes implementation rules for law of the People's Republic of China on the prevention and control of water pollution, regulations on urban water supply of the People's Republic of China, management regulations on water permits and water resource fee levy. Local regulations includes regulations on protection of drinking water sources of Hangzhou, regulations on protection of drinking water sources of Shanghai, and so on.

Although China has formed a preliminary system of laws and regulations for drinking water, the problem is also very prominent. First, the existing laws and regulations are more dispersed,

the standards are not unified. For example, lack of the basic law on rural drinking water source protection, environmental protection law is not consistent with law on the prevention and control of water pollution. Environmental protection department delineates source water protection areas based on technical guideline for delineating source water protection areas of drinking water, water resources department delineates source water protection areas based on technical details for delineating source water protection areas of nationwide city drinking water. Law of prevention and control of environmental pollution by solid wastes provides water conservation from water environment pollution by solid wastes, law of water and soil conservation provides water conservation from ecological environment. Second, Legal articles related to drinking water, is applicable to urban drinking water, but basically is not suitable for rural drinking water. For example, regulations on urban water supply of the People's Republic of China is only suitable for urban drinking water. In the legislative process, it mainly focuses in urban drinking water and neglects of rural drinking water safety. Therefore, there is not the special law and regulations on rural safe drinking water, which is very detrimental to solve drinking water safety in rural areas. So it is very necessary to improve the legal construction on rural drinking water.

Table 1: Laws and regulations on drinking water in china

Category	Name of laws and regulations	Relevant article	Promulgation date	Effective date	Promulgation department
<i>Basic law</i>	Constitution of the People's Republic of China	Article 9,26	March 14,2004	March 14,2004	the National People's Congress
	Environmental Protection Law of the People's Republic of China	Article 17,19,20,23,31,32	December 26,1989	December 26,1989	Standing Committee of the National People's Congress
	Water Law of the People's Republic of China	Article 4,6,9,11,21,33,34,35,54	August 29,2002	October 1,2002	Standing Committee of the National People's Congress
<i>General law</i>	Law of the People's Republic of China on the Prevention and Control of Water Pollution	Article 3,4,7,10,24,29,30,31,32,33,34,35,36,37,38,39,47,48,49,50,56,57,58,59,60,61,62,63	February 28,2008	June 1,2008	Standing Committee of the National People's Congress
	Solid Waste Pollution Prevention Law of the People's Republic of China	Article 9,17,20,22,36,40,63	December 29,2004	April 1,2005	Standing Committee of the National People's Congress
	The Law of the People's Republic of China on Water and Soil Conservation	Article 8,16,31,33,36	December 25,2010	March 1,2011	Standing Committee of the National People's Congress
	Implementation Rules for Law of the People's Republic of China on the Prevention and Control of Water Pollution	Article 20,21,22,23,32,33,34,36,37	March 20,2000	March 20,2000	The State Council
<i>Administrative regulations</i>	Regulations on Urban Water Supply of the People's Republic of China	Article 9,10,11,12,13,14	July 19,1994	October 1,1994	The State Council
	Management Regulations on Water Permits and Water Resource Fee Levy	Article 5,7,9	January 1,2006	April 15,2006	The State Council
	Regulations on Protection of Drinking Water Sources Quality of Guangdong Province	Full text	March 29,2007	July 1,2007	Standing Committee of the Guangdong Provincial People's Congress
	Environmental Protection Regulations on Urban Drinking Water Source Protection Areas of Shanxi Province	Full text	March 28,2002	March 28,2002	Standing Committee of the Shanxi Provincial People's Congress
<i>Local regulations</i>	Regulations on Protection of Drinking Water Sources of Hefei	Full text	October 24,2003	October 24,2003	Standing Committee of the Hefei Municipal People's Congress
	Regulations on Protection of Drinking Water Sources of Shenzhen Special Economic Zone	Full text	October 17,2001	July 1,2002	Standing Committee of the Shenzhen Municipal People's Congress
	Regulations on Protection of Drinking Water Sources of Hangzhou	Full text	May 28,2004	August 1,2004	Standing Committee of the Hangzhou Municipal People's Congress
	Regulations on Protection of Drinking Water Sources of Shanghai	Full text	December 10,2009	March 1,2010	Standing Committee of the Shanghai Municipal People's Congress

There are mainly two ways for rural drinking water legislation, first, legislation on law on safe drinking water or regulations on safe drinking water including urban and rural residents; second, alone legislation on regulations on rural safe drinking water. The legislative content include the following seven chapters: drinking water source protection, rural water supply system planning and water resource development and utilization, investment and financing and construction,

operation management system and training, the early warning system, information opening and water pricing, supervision system. The legal construction for rural drinking water is divided into the national level including industry standards, the provincial level, the county level, there are legal rules on the clear and definite responsibility of governments at all levels, obligation of rural residents, the role of social groups. Law and regulations on rural drinking water should include

article that rural residents participate in rural drinking water system in the whole course, which give full play to the important role of rural residents to solve safe drinking water.

4.2 Funds Security For Rural Drinking Water

In a narrow sense, public goods are non-competitive and non-exclusive goods, while in a broad sense, public goods are non-competitive or non-exclusive goods including pure public goods, club goods and pool resources. The un-competitiveness of the right for rural drinking water and the un-exclusiveness of rural drinking water beneficial main body indicates the quasi-public goods character of rural drinking water. To provide public goods is government's duty to solve "market failure", but that is generally with "government failure", the critical problem is that government failure aggravates market failure. Recent researches on public goods in general have shifted to the issue of supply, governmental supply, private supply, joint supply, voluntary general supply and any combination of which are the basic supply modes. In China, there are a lot of urban public goods produced by private organizations while the rural public goods, presently, should be provided by the government. In summary, the supply of safe drinking water in rural areas rely mainly on the central and local governments, but the way of supplying should be reasonably choosed in accordance with the local situation. The central and local governments should mainly undertake the funding of safe drinking water in rural areas. Funds security for rural drinking water includes mainly central and local government financial investment, social donations, rural residents pay. Investment in rural drinking water projects in China from 2006 to 2010 is shown Figure 2.

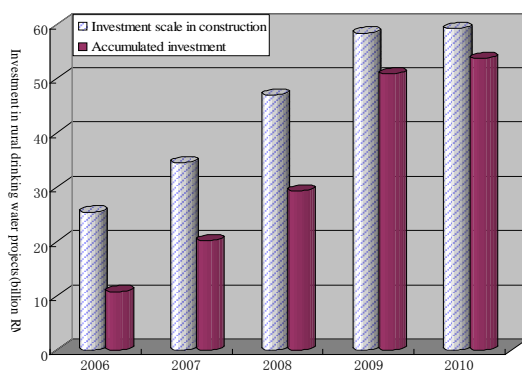


Figure 2: Investment In Rural Drinking Water Projects In China From 2006 To 2010

Figure 2 shows that the Chinese government is increasing the scale of investment in rural safe drinking water projects since the Eleventh Five-Year plan, which greatly improves the condition of rural drinking water and increases rate of water-served population reaching 54.7%. Since the beginning of 2008, the government subsidy standard for rural drinking water safety project is 503 yuan per person in Chongqing, in which the central subsidy 403 yuan, the municipal subsidy 100 yuan. The total investment in rural drinking water safety project funded by central budget in 2011 reached 1.9 billion RMB in the Guangxi Zhuang Autonomous Region, which plans to solve the unsafe drinking water for the population of 3.32 million, of which teachers and students for rural school five hundred thousand. Because of small-scale and less effective rural drinking water projects, it is difficult to absorb private capital to participate in drinking water projects construction and operation management, the Government's financial investment is the main source of funding for safe drinking water in rural areas. According to the decision on water conservancy reform and development released by the Central Committee of CPC and the State Council, the government raises funds through multiple channels, the average annual investment in water conservancy for the whole society in the next 10 years is two times in 2010, funds for farmland water conservancy construction is extracted from 10% of the land transfer proceeds. It is thus clear that the government investment in rural drinking water safety is seriously insufficient, the party and government should pay great attention to the problem of fund shortage. Through the financial mechanism, increasing investment in safe drinking water in rural areas and improving rural residents' livelihood is conducive to promoting the harmonious development of the whole society.

4.3 Preferential Policies For Rural Drinking Water

Preferential policies for rural drinking water includes mainly taxation expenses preference and electrovalence preferential policies.

Rural drinking water project in construction and operation period must pay some taxation expenses, for example, in construction period business tax, urban construction maintenance cost, additional education tax; in operation period business tax, value-added tax, urban construction maintenance cost, additional education tax, stamp duty etc. According to the investigate and survey data of

“the long-term mechanism of rural drinking water projects” research group coming from China’s Rural Drinking Water Safety Management Practices and Explore, percentage of taxation expenses to cost of rural drinking water is shown Figure 3 in some areas of China.

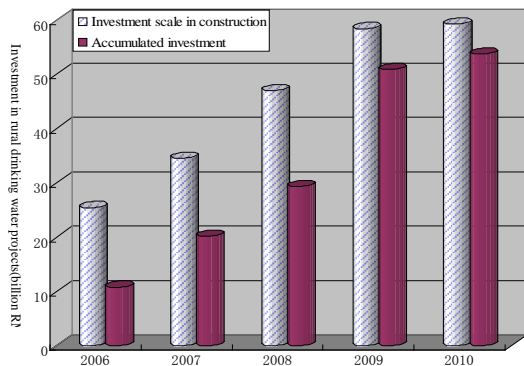


Figure 3: Percentage Of Taxation Expenses To Cost Of Rural Drinking Water In Some Areas Of China

Figure 3 shows that percentage of taxation expenses to construction cost in Heilongjiang is the highest reaching 2.89%, percentage of taxation expenses to operating cost in Zhejiang is the highest reaching 9.12%. Therefore, the central and local governments should attach great importance to the impact of taxation expenses on the cost of rural water supply. In accordance with preferential taxation expenses policy, taxation expenses is reduced and canceled with the purpose of reducing the cost of rural water supply.

The most important factor affecting rural water supply costs includes electric charge, amortized installation cost and staff wages. According to the investigate and survey data of “the long-term mechanism of rural drinking water projects” research group, electricity prices (kW.h) and water price (RMB/m³) is shown Figure 4 in some areas of China.

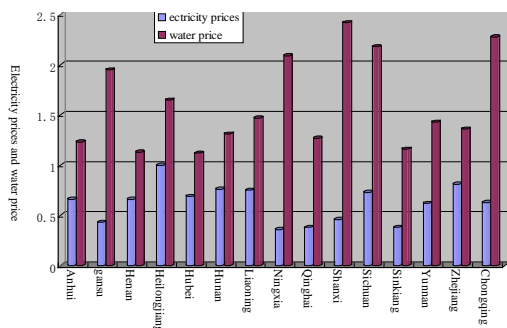


Figure 4: Electricity Prices And Water Price In Some Provinces Of China

Figure 4 shows that electricity prices in Heilongjiang is the highest, water price in Shanxi is the highest reaching 2.42 RMB/m³. According to electrovalence research and analysis of rural drinking water project in the 17 areas in China, the average price for rural drinking water project is 0.644 RMB/kWh, but the average price for urban residents livelihood 0.452 RMB/kWh, there are the average price for 15 areas higher than the local city residents living electricity price [10]. Therefore, it is very important to reduce electricity prices for rural drinking water.

4.4 Social Security For Rural Drinking Water

The state financial support has the remarkable effect on rural drinking water safety project construction, but the construction of rural drinking water management team is seriously lagging behind, which leading to a serious shortage of technical personnel to the disadvantage of rural safe drinking water. In recent years, with the increase in the number of rural drinking water projects, drinking water project management has become a key factor in restricting rural safe drinking water in China [11]. As drinking water is a quasi-public goods, urban drinking water system staffs have better welfare and social security, but there is no good in rural areas, it is very difficult to build the stable and high-quality management team of rural drinking water. Therefore, the human resources and social security departments should attach great importance to this situation, the government needs to give appropriate social security for rural drinking water staff, the funds from the central and local financial subsidies. Social security include endowment insurance, medical insurance, unemployment insurance, employment injury insurance, maternity insurance, housing provident fund, staff wages and holidays welfare.

4.5 Self-Consciousness Of Rural Residents For Rural Drinking Water

The self-consciousness of rural residents plays a key role in solving the problem of safe drinking water in rural areas, the more intense demand, the more effect [12]. The self-consciousness of rural residents is mainly reflected in the water-cultural awareness on the core of drinking water security concept, demand expression of the people’s livelihood and active participation of rural residents. The water-cultural education on drinking water security concept includes mainly water and life, healthy water, drinking water and health, science drinking water, water environment and health, water resources protection and



development, water and quality of life. Demand expression of the people's livelihood includes government departments, the People's Congress, the Political Consultative Committee, social organizations such as research institutions, the news media, and so on. Active participation of rural residents means full participation in rural drinking water system, including the preparatory stage, the construction phase, the operation and management phase.

4.6 Societal Forces For Rural Drinking Water

The major participants of safe drinking water in rural areas are government and rural residents in China, in which the government plays a leading role in rural safe drinking water. In the process of solving rural safe drinking water, societal forces have been in short supply. Societal forces to support rural safe drinking water includes the non-profit social organizations, enterprises, entrepreneurs, non-profit social activities such as vocal concert and social fundraising campaign, the lottery of safe drinking water in rural areas, research institutions such as experts and scholars, and so on. At the same time, the government through taxes policy encourages enterprises, entrepreneurs and inhabitant to make a contribution to rural safe drinking water.

5. CONCLUSION

China as an example, the paper researches on safe drinking water in rural areas, focusing on macroscopic mechanism system for rural safe drinking water. Safe drinking water is the most basic means of subsistence for rural residents, is directly related to social harmony and stability, is the basis of people's livelihood. Through the analysis of macroscopic mechanism system for rural safe drinking water, the conclusion is the following aspects. First, this paper elaborates the fundamental connotation on the people's livelihood, including in the broad sense and in the narrow sense. It is thus clear that drinking water is closely related to human health. Second, this paper presents the macroscopic mechanism system for rural safe drinking water, including the legal construction, funds security, preferential policies, social security system, self-consciousness of rural residents, societal forces. Third, this paper analyses detailedly the elements in the macroscopic mechanism system for rural safe drinking water. The central and local governments should play a leading role in the rural safe drinking water, rural residents need to participate actively in

entire drinking water system, as well as the active support of the broad societal forces.

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