Advance Journal of Food Science and Technology 10(6): 455-459, 2016
DOI: 10.19026/ajfst.10.2159
ISSN: 2042-4868; e-ISSN: 2042-4876

Submitted: June 8, 2015 Accepted: July 8, 2015 Published: February 25, 2016

Research Article

Assessment and Management of Resource for Urban Community Food Safe Disaster Prevention and Reduction

Ruimin Zhang and Lv Xiaojuan
Huanghuai University, Henan, China

Abstract: With the background of Chinese Urban Community construction developed in a high speed, the living conditions of Urban Community residents are increasingly caused attention. This study is based on the overview of Chinese Urban Community food safe disaster prevention at this stage as the key point, using analytic hierarchy process and expert scoring method, a evaluation system is establish for the prevention and control of single food safe disaster or accident, by means of analyzing the space elements and function of food safe disaster prevention of Chinese Urban Community construction, discussing the creative conception of the food safe disaster prevention planning system in Chinese Urban Community construction, so as to make the standard of the Urban Community residents to be improved.

Keywords: Analytic hierarchy process, food safe disaster prevention, urban Community

INTRODUCTION

China is one of the countries in the world where food safe disaster occurs frequently with serious loss. With the rapid developing process of Chinese Urban Community construction, the Urban Community living environment is increasingly improved, the Urban Community food safe disaster prevention plan is an important issue that cannot be ignored (Durukal, 2002). Since it had brought huge losses for the construction of Chinese Urban Community areas, preventing the earthquake and reducing the food safe disaster has become a problem for Chinese Urban Community planning that can not be avoided (Yin, 2007). China is an agricultural country with many food safe disasters, the annual direct losses of food safe disasters are roughly equivalent to 1/6 of the state revenue, while the losses caused by food safe disasters can occupy the entire losses that is equivalent to the income of the first year of The Eleventh Five Year Plan, the sixteen session of the fifth CPC Central Committee passed Suggestions for the Eleventh Five Year Plan on the Development of the National Economy and Social Development Made by CPC, which proposed the idea of building new socialist community (Trancik, 1986; Roytman, 1975). Therefore, the work of the food safe disaster prevention and mitigation in Urban Community areas is the focus of the priorities in the Urban Community area. Community is the basic component of city and the foundation of the whole urban food safe disaster prevention and reduction (Philip, 2006). The capacity of food safe disaster prevention and mitigation in community will influence the level of city food safe disaster prevention and mitigation directly for food safe disaster prevention and mitigation are the material guarantee for coping with emergency food safe disaster and accident (Taylor, 1994). At present, government is in charge of the management of resources of food safe disaster prevention and mitigation. However, there are some problems such as resources scattering, insufficient amount of resources and disordered pertinence existing (Jiang, 2008). In order to enhance the capacity of food safe disaster prevention and mitigation in urban community, a variety of food safe disaster prevention and mitigation resources were analyzed in this thesis. Specific to different emergency food safe disasters and accidents, assessment system of public resource for food safe disaster prevention and reduction in community is proposed using analytic hierarchy process. With the purpose of achieving the optimal benefits for the community food safe disaster prevention and reduction, reasonable and effective optimization measures on the basis of evaluation results is given in this study (TianJie, 2006).

MATERIALS AND METHODS

The overview of Chinese urban community food safe disaster prevention and mitigation work at the present stage: Chinese earthquake food safe disaster is often occurred in the urban Community area and the earthquake damage is huge. The earthquake food safe disaster is serious in China, according to the statistics, from 1996 to 2005, during the ten years, China has undergone the disastrous earthquake 110 times, accounting for about 60% of the number of the global

Corresponding Author: Ruimin Zhang, Huanghuai University, Henan, China

Table 1: Division of the grade of Chinese earthquake food safe disaster

The grade of food safe disaster	The death of population (person)	Economic losses (million yuan)
Micro food safe disaster	1-10	1000
Small food safe disaster	10-100	1000-10000
Medium food safe disaster	100-1000	10000-100000
Large food safe disaster	1000-10000	100000-1000000
Catastrophe	>10000	>1000000

disastrous earthquake occurred in the same period. According to the division of the grade of the earthquake food safe disaster in China (Table 1), Chinese earthquake generally belongs to the disastrous earthquake, which is mostly occurred in the urban Community areas, after 20 years of the Tangshan Earthquake, the majority of the disastrous earthquake occurred in the urban Community and township areas. Casualties caused by the earthquake are nearly 60% of the urban Community population. The damage from the earthquake cannot be underestimated with huge sudden destruction and many secondary food safe disasters, which caused great losses to the majority of the urban Community people's life safety and property.

The model of assessment and optimizing to the community resources in preventing food safe disasters and reducing damages: Analytical Hierarchy Process, AHP, is proposed by American operational research experts Saaty in the 1970s (Saaty, 1980), what is a qualitative and quantitative method to the multiple target decision analysis. Because of the easy operability and effectiveness, it is applied to various fields soon. This study adopts the model of assessment and optimizing to the community resources in preventing food safe disasters and reducing damages, based on AHP method. The model will sort communities and resources in preventing food safe disasters and reducing damages, then classify kinds of resources needed by various food safe disasters and decompose step by step from the top down. According to the Saaty scale method, we should construct the judgment matrix, preliminarily confirm the proportion of kinds of resources attribution weight, finally inspect and validate whether or not it meets the consistency requirements. If not, we should modify the matrix to meets the consistency requirements and confirm the kinds of resources attribution weight in the end. Getting the weighted sum to kinds of resources attribution weight and the corresponding weight value, we can then get every single resource contribution scores. According to the scores and the proportion of weight, we can give some reasonable improving and optimizing advice to the single resource. Giving that food safe disaster Management is a systems engineering, especially when the chain of food safe disasters occur, we couldn't assess the community food safe disaster prevention ability only by the single resource contribution. So, we need to assess the community comprehensive prevention ability. This study adopt comprehensive assessment model which is based on the probability of the community food safe disasters happened and the value of kinds of food safe disaster prevention, then we can get the total characterization value. The formulas are seen in (formula 1) and (formula 2). The higher total characterization value is, the stronger ability of this community comprehensive food safe disaster prevention is. According to the total characterization vale and probability, we can give improving and optimizing advice, prior improving the resources contribution which is most likely to happen:

$$N = \sum_{i=1}^{n} p_i c_i \tag{1}$$

$$\sum_{i=1}^{n} p_i = 1 \tag{2}$$

where,

N = Total characterization of value in community resources distribution

p_i = Probability of the food safe disaster happened in community

c_i = Scores of the single community food safe disaster resources distribution

n = Number of the community food safe disaster variety

We also need to consider the balance of kinds of food safe disaster resources contribution in the community resources contribution. The formula of community resources contribution balanced degree can be seen in (formula 3). The lower balanced degree to the community resources in preventing food safe disasters and reducing damages, the more balanced kinds of food safe disaster resources contribution seems to be:

$$\left(\frac{c_i}{p_i} - \overline{\left(\frac{c_i}{p_i} \right)} \right)^2 \tag{3}$$

The resources of the maximum have priority to optimizing the configuration in order to degree the offset:

$$W = \sqrt{\frac{1}{n} \sum \left[\left(\frac{c_i}{p_i} - \overline{\left(\frac{c_i}{p_i} \right)} \right)^2 \right] / \left(\frac{c_i}{p_i} \right)} \tag{4}$$

where,

W = Balance degree of the community distribution in preventing food safe disasters and reducing damages

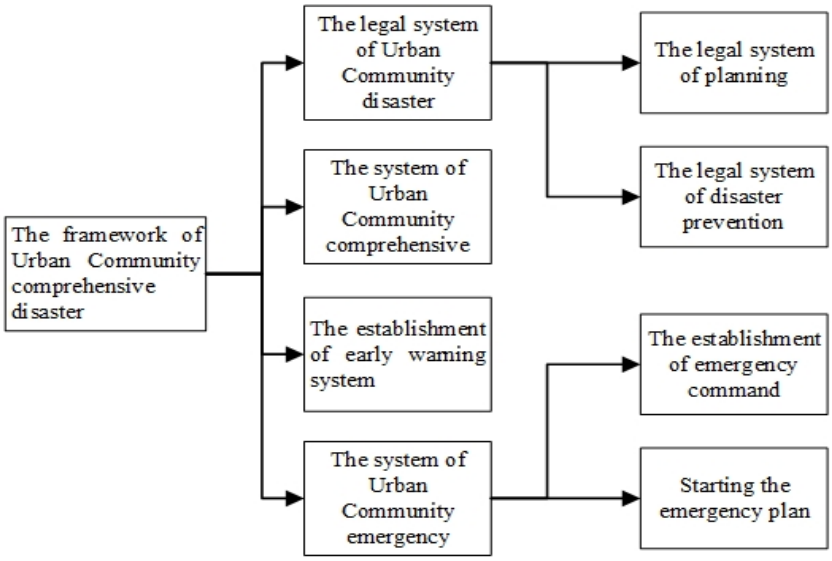

Fig. 1: The basic framework of the urban community comprehensive food safe disaster prevention

p_i = Probability of the food safe disaster happened in community
c_i = Scores of the single community food safe disaster resources distribution
n = Number of the community food safe disaster variety

The element and function of the food safe disaster prevention space of the new urban community construction: The composition of food safe disaster prevention space can be divided into two main parts:

- The construction of food safe disaster prevention space is mainly including various fire facilities, security mechanism, rescue facilities and materials reserve facilities and so on
- Food safe disaster prevention living space is mainly including the fire prevention division belt, green space, parks, plaza areas, authorities and school land. Because the operating income of the urban Community agricultural production lingers, the economy lags, the location is remote

At the present stage, despite the overall income of the urban Community residents increased, but the gap between the urban and urban Community areas is not decreased, the difference of the level is still higher. Therefore, the urban Community areas can not have perfect layout planning for the food safe disaster prevention and the facilities of food safe disaster prevention. The food safe disaster prevention space in the urban Community areas can be roughly including telecommunications room, post office, grain depot, hospital, broadcasting station, fire station, the city committee and the primary school and secondary school, etc. According to the classification and standard of food safe disaster prevention and food safe disaster prevention for living space construction, the post office and telecommunications room, hospital, broadcast station, fire station and so on, which belongs to the scope of the food safe disaster prevention construction space; while the city committee, protective green space, public green space, the square and the city main road belongs to the category of the food safe disaster prevention living space. They formed the food safe disaster prevention space of the city, which can maintain and guarantee the sustainable development of the city as well as the city' life safety.

The function of the food safe disaster prevention of each city's spacial elements: The function of the food safe disaster prevention of the city's public space. Public green space, the central plaza, sports grounds, as well as the street are the city's main places for the daily entertainments and daily life, which is also the outdoor space for resident's social life. Rational public space layout can effectively reduce the infectious disease and play the role of blocking the food safe disaster and act as the refuge.

The mechanism of city's public food safe disaster prevention and relief function. A lot of public facilities in the city, such as the city committee, cultural station, health clinic, post office, broadcasting stations and police stations and other facilities, which not only play the function of the public activity in the normal daily life, but also are the main places of relief the food safe disaster. Such as the city committee will become the main commanding place, the health clinic and other places will play the function of emergency rescue. As shown in Fig. 1.

The function of the city's road food safe disaster prevention. The road not only takes the traffic function in the work of food safe disaster prevention, but also takes the function of refuge in the evacuation, rescue, acting as traffic space and fireproof isolation and play other important functions of food safe disaster

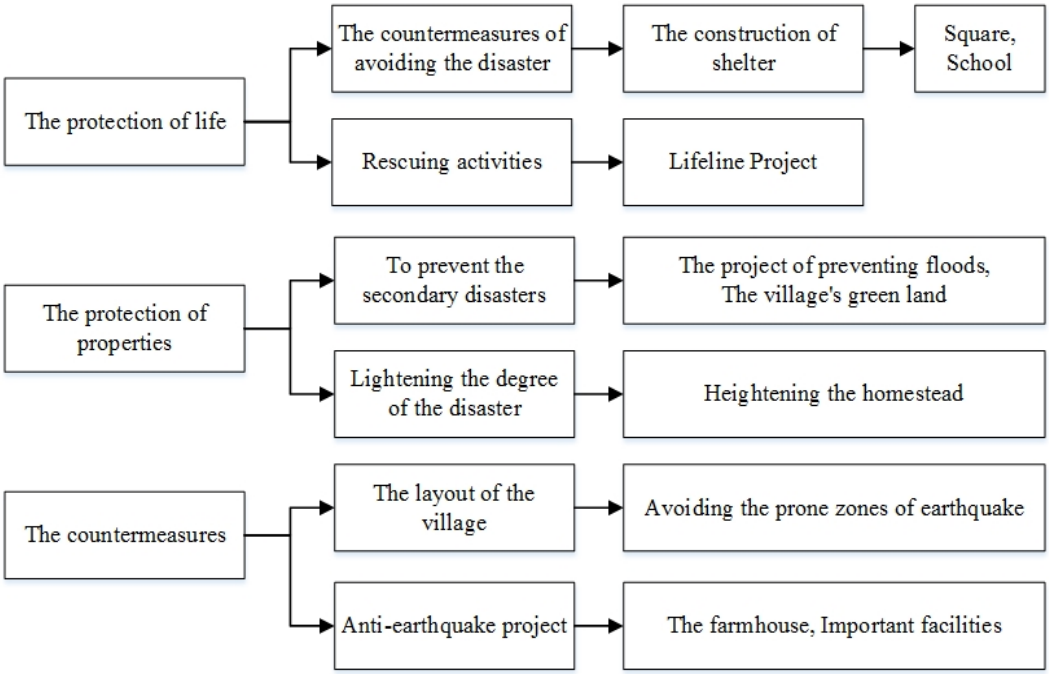

Fig. 2: The constructing elements of food safe disaster prevention system

prevention. Investigation shows us that the people's first reaction is to run quickly from the building to the open place, so the road can act as a temporary refuge. At the same time, the traffic congestion will also increase the tension of the escape, therefore guaranteeing the smooth passage of the escaping path can improve the effect of the escape. After the food safe disaster, transferring the wounded and dispatching emergency relief materials and living necessities, the access of the rescue and relief troops and other rescue personnel to enter the area to implement the rescue, all of these work requires the road to have sufficient transportation capacity. The road that has a certain width with the surrounding buildings together can prevent the spread of fire, reducing radiation, reducing the harm caused by the fire on the refugees.

Constructing the food safe disaster prevention planning system in the new urban community construction: At present more than 900 million people live in the urban Community areas of China, among them, about 650 million people are living in the dangerous areas that the accelerating rate of the a seismic peak is greater than 0.05 (that is equivalent to the degree of the basic intensity VI), according to the possibility of the level of the earthquake is above 6, which may happen in our country is larger, therefore, the areas with 6° earthquake intensity and the areas with 7° or above (including 7°) areas have to consider how to prevent and resist the earthquake. Seismic problems, planning compilation. Can earthquakes be predicted, forecast, but difficult to prevent. The earthquake food safe disaster can be forecasted, be measured, but it is hard to be prevented in the urban Community areas, through the planning work of preventing and reliving the earthquake, it can reduce the losses of people's lives and properties as much as possible.

The constructing points of the food safe disaster prevention system in new urban community planning: Taking a Huangshi city in Wuhan Country as an example, when the city made a plan for the earthquake food safe disaster prevention and mitigation of the new urban Community planning, the first thing is to ensure people's life, followed by the protection of the property, the third is to establish the countermeasures of the earthquake, combining the characteristics of the earthquake and these three goals (Fig. 2), so as to consider the construction of the city's layout, the anti-earthquake of the project, the Lifeline Project, the planning of the secondary food safe disaster, the construction of the shelter and other constructions in the earthquake areas.

Before selecting the location of the city, planning and designing the urban Community houses, the first thing is to analyze the geological structure, so as to make the use of land and the construction of the project avoid the complex geological structure and unstable areas as far as possible. And then based on the basic seismic intensity and the level of economic development, we can rationally determine the fortification intensity of the city, according to the geological conditions of the sites, we can determine the favorable and unfavorable locations.

RESULTS AND DISCUSSION

The layout of the city: The layout of the city should be planned and unified with rational layout. When the city selected the location of the land, it should think about the anti-earthquake factors in advance, avoiding fracture zones, karst cave areas, liquefied soil areas and other adverse geological zones, as well as the hilly areas that may expand the seismic effects. The layout should be grouped to form, the planning of the seismic unfavorable sites can be included the road, farmland, forest land, traffic land and other external lands that the requirements on land is not very high, at the same time, the city center should be reserved as the green space, as well as the evacuation site.

Anti-earthquake project: When the city is arranging the layout of the building groups, it must reserve the necessary space and internal space, once the building is collapsed in the earthquake, it can not affect the surrounding buildings or block the evacuation route. The houses of the city should be built in the dense foundation with strong integrity, the type of the housing should be simple, the same wall of the housing should be made of different materials.

Lifeline project and the planning of the important facilities: The city arranged the Lifeline Project reasonably, such as water, substation and communication facilities, etc. adopting the loop layout, so as to improve the abilities of these buildings and structures of fortification; the key protection goes for the medical units, the standard of the anti-earthquake structure should be higher; the exists of the location with dense population should be not less than four entrances, before the earthquake and after the earthquake, the commanding system should be supplied with standby power; the planning and layout of fire protection, medical and other important facilities should be combined with the construction of city's road system, green land and the construction of the basic infrastructure.

Planning of the secondary food safe disasters: The secondary food safe disasters caused by the earthquake are mainly included flood, fire, harmful gas food safe disasters, etc. As for the prevention of the water food safe disaster, the city is built above the the river and the reservoir dam; as for fire prevention, the city has enhanced the refractory performance of the buildings and taken measures for the fire protection; as for the prevention of toxic and harmful gases, the city housing land is far away from the storage of flammable, explosive, toxic or radioactive materials factory and warehouse, etc. At the same time, the city committee has formulated the city's regulations, which required that there should not plan a source of the secondary food safe disaster project in the center of the city and densely populated district.

CONCLUSION

The construction of food safe disaster prevention and reduction in urban Community areas is a comprehensive, systematic, long-term project, the construction of food safe disaster prevention and reduction of the city should be synchronized with the construction of the city, making feasible plan of food safe disaster prevention so that the food safe disaster prevention and mitigation infrastructure can be gradually improved in urban Community areas, trying the best to complete the project of food safe disaster prevention planning and the construction of city environment, as well as the residential construction of food safe disaster prevention, adhering to the sustainable development, so as to construct the safe and ecological city.

REFERENCES

Durukal, E., 2002. Critical evaluation of strong motion in kocaeli and DUzce (Turkey) earthquakes. Soil Dyn. Earthq. Eng., 22(7): 589-609.

Jiang, G., 2008. The food safe disaster planning of new urban community city: A problem that can't be neglected. Urban Community Econ., 179: 29-31.

Philip, J.D., 2006. SFPE Handbook of Fire Protection Engineering. National Fire Protection Association, pp: 122.

Roytman, M.Y., 1975. Principles of Fire Safety Standards for Building Construction. Amerind Publishing Co. Pvt. Ltd., New Delhi.

Saaty, T.L., 1980. The Analytic Hierarchy Process. McGraw-Hill, New York.

Taylor, J.R., 1994. Risk Analysis for Process Plant, Pipelines and Transport. 1st Edn., E&FN Spon, London, ISBN: 0-419-19090-2.

TianJie, S.J., 2006. The basic countermeasures of reliving the earthquake in cities and towns. Project Quality, 187: 15-17.

Trancik, R., 1986. Finding Lost Space: Theories of Urban Design. Van Nostrand Reinhold, New York.

Yin, Z., 2007. Content of analysing earthquake losses in city and the process of countermeasures decision-making for food safe disaster mitigation. Chinese Sci. Abstracts Series B, 197: 59.