

Building An Inclusive & Healthy Livable Environment for Chinese Communities Based on Grid Management

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Abstract

In order to improve the quality of the living environment, facilitate special groups such as the old and young, nursing women, the sick and disabled to fully participate in social life, reflect the humanistic care of spatial planning, and create a barrier free and environmentally friendly community environment. China has put forward a strategy of inclusive and healthy urban development based on grid management. Grid management is a phased achievement of social management innovation in contemporary China. The establishment and promotion of this model is a better choice to achieve the government's goals of strengthening social management capacity and improving public service capacity at the same time under the constraints of the existing system, such as the rapid development of urban scale, excessive population concentration and so on.

This paper introduces two cases of grid management. One is the case of Beijing, where urban service management is refined. This case adopts the methods of "ten thousand meter unit grid management method", "urban parts (furniture) management method", "1510 life service circle" and improving public service facilities, so as to achieve hierarchical, hierarchical and whole area management of the management space within the jurisdiction, benefit people's life and improve people's happiness. The other is the case of fine management of ecological environment in Tianjin. This case adopts the method of combining the grid hierarchical management and control system of natural resources and the grid fine pollution control management of "one map of environmental information" to fully cover the urban human settlement space from the macro scale to the micro scale. Strive to achieve no dead angle in the management of urban complex ecosystem.

The unique advantages of grid management lie in its precise positioning, clear space, resource integration, collaborative work, and strong adaptability and wide applicability. It is beneficial for city managers to make accurate decisions and specific emergency response measures under the very limited time constraints under the abnormal crisis situation.

Keywords

Community Grid Management, Ten thousand meter unit, Smart community, "One picture" of environmental information, The physical environment construction of community health and fine

Residents' health is not only affected by individual physiological characteristics and lifestyle, but also closely related to environmental factors, which is the result of multi-scale environmental factors. As the micro unit of an urban, community environment is an important place for people to live. Especially affected by ecological and environmental problems and public health emergencies, good community environmental governance can promote the improvement of public physical and mental health, and pay full attention to the needs of different groups for barrier free, convenient and healthy life.

In order to improve the quality of the living environment, facilitate special groups such as the old and young, nursing women, the sick and disabled to fully participate in social life, reflect the humanistic care of spatial planning, and create a barrier free and environmentally friendly community environment. China has put forward a strategy of inclusive and healthy urban development based on grid management.

1. Origin of grid management

1.1. Definition

Grid management is to divide administrative regions into unit grids according to certain standards, so that these grids become the basic units of the government in managing grass-roots society. By strengthening the inspection of the cell grid, actively finding problems and dealing with them in time, strengthening the government's management ability and improving work efficiency. It was initially applied to the urban management system.

From the technical level, it is to divide the governance space into several grid units, use modern information technology to establish a resource and information sharing platform. And achieve all-weather, real-time, dynamic and intelligent monitoring of people, things, incidents and situations in the grid.

From the perspective of government urban management, it is characterized by sinking administrative management resources as much as possible, mobilizing and integrating various forces to participate in grass-roots social management with specific grids as units. Its goal is to improve the responsiveness of the government to the growing needs of grassroots society for social public services, and to improve the public's participation in community management.

1.2. Challenges faced by traditional urban management mode

Since 1996, China's urbanization has entered a period of accelerated development, with the rapid expansion of urban scale and the increasing difficulty of urban management. The need to adopt advanced technology and new management methods to improve the city's management ability is prominent.

1.2.1 Urban management involves many departments, with large institutions, many management personnel and high operating costs

Urban management involves many departments, such as Garden Bureau, Urban Management Bureau, Market Supervision Bureau, Environmental Protection Bureau, Housing Management Bureau, Comprehensive Management Office, Health Bureau, Legal Affairs Office and so on. Personnel costs and urban management costs of multiple departments are very high.

1.2.2 Unreasonable division of management space and unclear management responsibilities

In the traditional urban management mode, each professional department assumes different management responsibilities in urban management, and manages the affairs within the responsibilities of the Department. In general, the mode of urban management is divided into districts, with 3-5 people in charge of several square kilometers. They conduct regular fixed-point patrols according to the specified time and route. They do not divide the specific patrol area into specific individuals, and their authority and responsibility are unclear.

1.2.3 The management object is not specific, the information lags behind, and the disposal is not timely

Urban components (furniture) involve a wide range of categories and quantities, and their special uses are not clear. For example, well covers, municipal roads and street lamps are not divided into such sub categories as Tap water well covers, power well covers and communication well covers. The management object is not clear, and the responsibility is often unclear when dealing with component problems, resulting in the problem being unsolved.

1.2.4 Unbalanced public service resources, incomplete service facilities, low accessibility and convenience

In the original convenience services of various communities, there are some shortcomings, such as incomplete content, unbalanced service resources, nonstandard management and inconsistent service standards.

In the face of the advent of the aging population, it is urgent to effectively solve the problem of inconvenient living for the elderly, especially how to provide life services for the disabled, empty nesters, orphans and widows. How to integrate elderly care services through community planning to provide basic environment and social facilities suitable for the elderly.

How to consider the use of the elderly in smart technology? How to build a smart elderly care community? How to provide accurate services for the elderly in community management? All these problems need to be solved by a new management mechanism.

1.3. Grid management emerge as the times require

In 2003, Dongcheng District of Beijing studied and innovated the urban management mode, and established the research group of "creating a new urban management mode relying on digital urban technology". In 2004, the research and practice took the lead in implementing urban management grid in China, mainly to implement municipal management responsibilities, divide public areas such as municipal roads into 1652 "ten thousand meter grids", and effectively maintain the safety of municipal facilities. It has attracted extensive attention from government departments and academia.

1.3.1 Social public service system

Since 2010, urban grid management has further developed in depth. The central government has begun to strengthen the supply of urban public services, sinking the focus of management and service to the grass-roots level. Urban grid management has extended from the narrow sense of municipal management to social governance and public services, and has become a normal mode of promoting good governance at the grass-roots level. To a certain extent, it has promoted the equalization of urban public services, the refinement of management and service. The mode effectively improve the government's public service capacity and to enhance the sense of access and happiness of urban residents.

1.3.2 Comprehensive social management

In November 2012, in order to improve the grass-roots public security prevention and control network and consolidate the foundation of social governance, China proposed innovative grid service management and comprehensively promoted the construction of three-level comprehensive governance centers at the county (urban, district), township (street) and village (community).

In November 2013, China officially put forward the grass-roots governance direction of "grid management and social service". All urban areas have carried out social governance grid work one after another, and the concept of grid has been expanded. For example, public security, civil affairs, health, environmental protection, human resources and social security, housing management, industry and commerce and other departments will share data, open up the "information channel" between departments, build an open comprehensive data service platform for urban management, and integrate more government departments for joint management.

With the continuous expansion of the urban population, fragmented management models, lagging institutional arrangements and other problems seriously restrict the effect of urban grid management. For this reason, the central government has strengthened the institutional construction of grassroots social governance innovation: in 2017, the central government issued the "urban and rural community grid service management norms", It clearly puts forward that grid service management should be incorporated into community service work, innovates the tools of urban management, and further promotes the development of cities from extensive to grid and refined.

1.3.3 Fine management of ecological environment

With the acceleration of urbanization, the situation of ecological environment destruction and pollution has become more and more serious, which has become a more prominent livelihood issue. Ecological civilization construction and environmental governance have become the key topics of the central government. In the field of ecological environment, the grid management mode has also been applied. For example, the grid supervision system has been implemented in key areas and communities, and the grid supervision of landscaping, air pollution, noise, dust, water, garbage disposal, etc. has been strengthened with the help of grid patrol, UAV, satellite remote sensing, high-definition video monitoring and other technical means. In 2018 and 2019, laws on ecological environment protection were promulgated to strengthen the application of urban grid management mode in its fields.

1.3.4 Contingency Management System

At the beginning of 2020, the raging COVID-19 epidemic gave birth to a new emergency management model characterized by "grid management". Diversified, refined and personalized emergency management services were provided in emergency situations to effectively improve the emergency response and disposal capacity of community grassroots units. The refined prevention and control of community grids has become an important "magic weapon" for Chinese cities to win the battle of epidemic prevention and control, it is an important guarantee to prevent the spread of the epidemic. Therefore, grid management has been extended to emergency public health events, mitigation and relief in the field of disaster prevention management.

2. Development of grid management - refinement of urban service management (case study: "ten thousand meter unit" in Dongcheng District, Beijing)

Dongcheng District is the jurisdiction of Beijing Municipality, the central urban area of Beijing and the core functional area of the capital. It is named after the east side of the central axis of Beijing. Dongcheng District adopts the methods of "ten thousand meter unit grid management method", "urban parts (furniture) management method", "1510 life service circle" and improving public service facilities, so as to achieve level, hierarchical and whole area management of the management space within the jurisdiction, benefit people's life and improve people's happiness.

The method effectively integrate resources of all parties on the basis of further clarifying management responsibilities and improving management efficiency, it realizes the transformation of urban management from extensive to accurate, and meets the living needs of vulnerable groups.

2.1. "Ten thousand meter cell grid management method"

With the help of the urban management information system, integrating information technology, geocoding technology and grid map technology, taking 10000 square meters as the basic unit and 100 meters * 100 meters as the minimum grid unit. The urban management area is divided into countless regional grids with clear boundaries and regions through 10000 meter unit grids. The 25.38 square kilometers of Dongcheng District are divided into 17 streets, 187 communities and 1593 grid units. 350 urban management supervisors will monitor the 10000 meter units under their charge at all times to provide all-round, full process and full coverage dynamic services for community residents. Its core objectives include: responsibility grid, platform informatization, management refinement and service humanization.

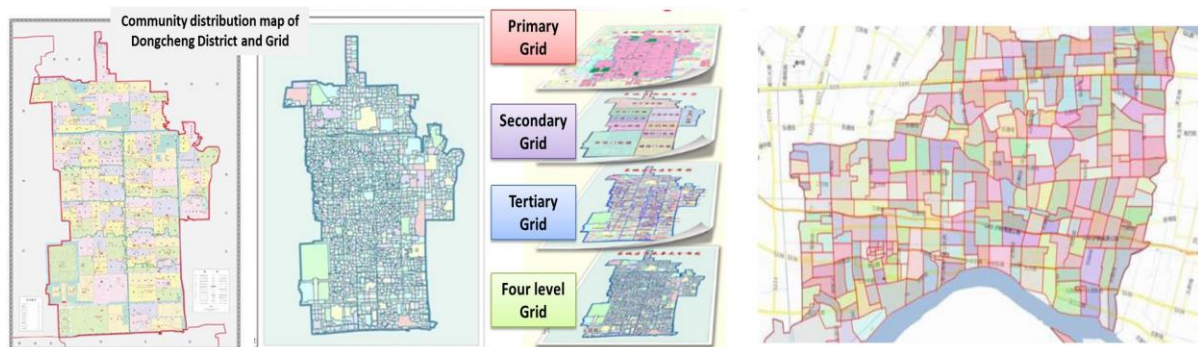


Figure 1. Schematic diagram of ten thousand meter unit grid. Source: DDU M & SC of Beijing Municipality.

2.2. "Urban parts (furniture) management law"

That is, the materialized urban management objects are managed as urban components, and the urban components are positioned on the ten thousand meter grid map according to geographical coordinates by using geocoding technology, and are classified and managed through the grid urban management information platform. We regard all public resources in the city, such as manhole covers, guardrails, billboards, etc., as public resources, which are called 'components' and classified.

2.3. "1510 Life service circle"

The "1510 life service circle" is the "quarter hour convenience life service circle" and the "last kilometer" of serving the masses. According to the planning, community residents can enjoy 10 basic life services within a 15 minute walk from their homes. There are 10 life service stations in the community, including fruit and vegetable stalls, non-staple food shops, car repair stalls, shoe repair stalls, cultural activity rooms, fitness parks, waste recycling stations, barbershops, health stations and Breakfast shops. By transforming "business into the community" into "business integration into the community", the goal is to meet the basic consumption and quality consumption of residents' daily life. A community business circle formed by the clustering of multiple business forms.

Commercial facilities are constantly upgraded. Up to now, 23 convenient commercial outlets have been built and upgraded in the whole district. 168 communities in the whole district have achieved full coverage of the "five types of business within 500 meters" community, and the eight basic convenient commercial service function communities have continued to maintain full coverage.

2.4 Improve the special facilities, and do a good job in the allocation of welfare facilities related to the elderly, disabled and children

2.4.1 Further rely on local resources to provide basic convenience services

According to the characteristics of the community where there are many elderly people and many people living alone, public service stations and commercial outlets are set up according to local conditions. After strict examination and approval, the types and scale of service merchants are scientifically determined, so as to ensure that basic community service items such as catering, hairdressing, medical care, health care and cultural entertainment are covered, and door-to-door services are provided for the elderly and disabled people with mobility difficulties.

2.4.2 It is planned to build a community 15 minute elderly care service circle to meet the needs of the elderly at home

The spatial configuration of medical and nursing service facilities will directly affect the accessibility and satisfaction of the elderly's living needs. More than 99% of the elderly in the community can reach at least one elderly care facility and community hospital within 15 minutes (within 1000m). With the continuous development of grass-roots grid, grid governance has been applied to the field of public health. At present, there are 8 community health service centers, 53 community health service stations and 238 family doctor teams in the jurisdiction, which are seamlessly connected to meet the basic medical service needs of the elderly, the weak, the sick, the disabled and the pregnant.

2.4.3 Integrate community resources and give play to the role of voluntary service

They integrated the volunteer service resources of four old communities, reorganized and established a number of volunteer teams, including "psychological counseling service team", "accompany the elderly chat service team", "legal consulting service team", "special hardship assistance service team", "elderly care service team", "community 119 emergency team" and "community 110 security patrol team", established and improved systems and mechanisms, standardized the management of volunteer teams. Strive to improve the effectiveness and level of voluntary service.

With the aggravation of China's aging population, the society's awareness of caring for the disabled is growing. The spatial planning integrates resources such as traditional Chinese medicine hospital,

rehabilitation medical center, elderly restaurant and day care center to provide "comprehensive medical" services for vulnerable groups in the community.

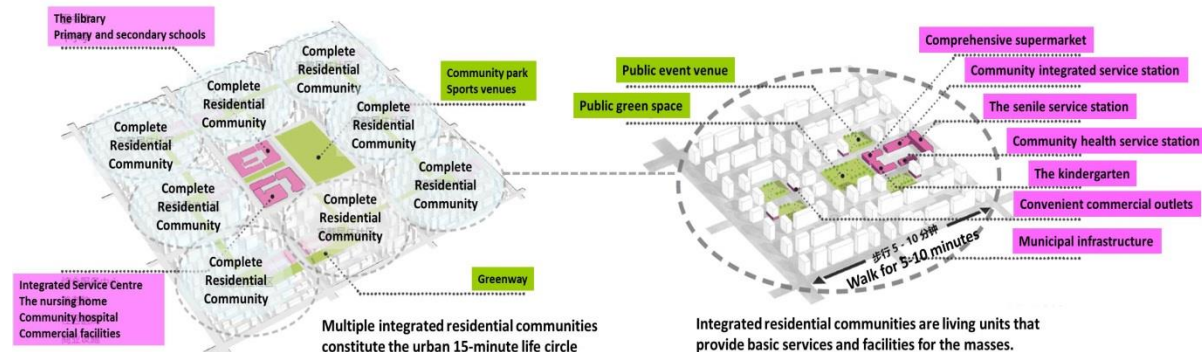


Figure 2. Schematic diagram of '15 Minute Life Circle'. Source: Construction Standards for Complete Residential Communities (Trial) issued by the Ministry of Housing and Urban-Rural Development of China.

3. Extended application of grid management -- fine management of ecological environment (case study: Tianjin urban environment grid)

City is a complex ecosystem. We should not only pay attention to the control of the overall urban ecological space, but also pay attention to the construction of the healthy physical environment of the micro community grid, so as to fundamentally improve the living ecological environment of residents.

3.1. Grid hierarchical management and control system of natural resources

The city has 281 environmental control units divided into three categories: priority protection, key control and general control.

The priority protection units refer to the areas mainly focusing on ecological environment protection, with a total of 108, covering an area of 2607 square kilometers, accounting for 21.9% of the land area. It mainly includes the ecological protection red line, the first-class control area of the green ecological barrier between the two cities, as well as the nature reserves, wetland parks, important wetlands and other protected lands and ecological lands at all levels.

The key control units refer to the key control areas involving water, atmosphere, soil, natural resources and other resources and environmental elements, with a total of 165 areas and an area of 5381 square kilometers, accounting for 45.1% of the land area. It mainly includes the central urban area, urban development zones, industrial parks at or above the municipal level and other areas with high development intensity, high pollution emission intensity and relatively concentrated environmental problems.

The general control unit refers to other areas except the priority protection unit and the key control unit, with a total of 8, covering an area of 3929 square kilometers, accounting for 33.0% of the land area.

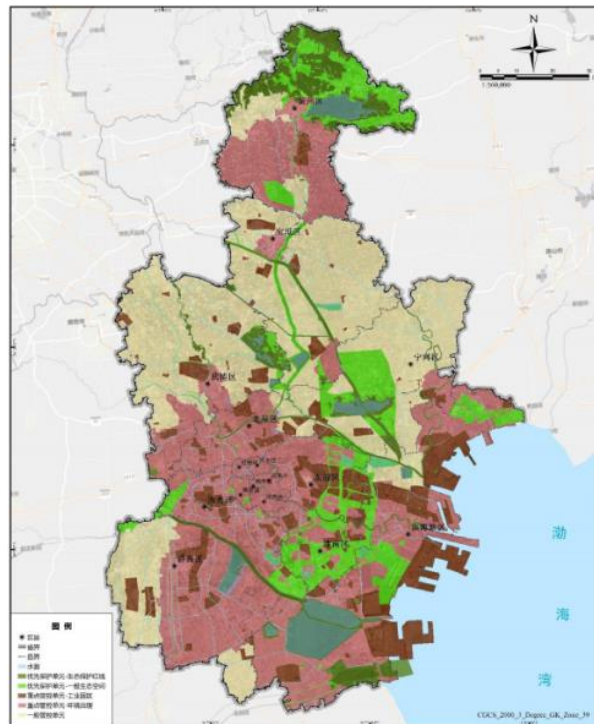


Figure 4. Distribution map of environmental control units in Tianjin. Source: Tianjin Bureau of Ecology and Environment.

3.2. "One picture" of environmental information gridding and fine "pollution control"

All districts and counties in Tianjin have basically formed a grid management system of "one map - grid division map, one network - grid management network, and one set of standards - work standard process" for environmental information. Tianjin takes districts and counties, streets, townships, and communities (villages) as the units. Sixteen districts and counties in the city have designated 33 first-class grids, 200 second-class grids, 2041 third-class grids, and 5718 fourth level grids, ranging from districts and counties to communities, so as to achieve full coverage.

3.2.1 To build a grid environment supervision system

In 2012, Tianjin Environmental Protection Department was the first to build a grid environmental supervision system in China. It adopted a combination of ten thousand meter unit grid management method, environmental management components and event management method. Based on digital geographic information, combined with mobile positioning system and digital communication technology, it provided a four in one urban digital management platform of sound, image, graphics and text for urban managers. It realizes the functions of inspection, alarm, emergency handling, command and dispatching, supervision and law enforcement for urban environmental components. The system includes the environmental grid management data center, the environmental grid supervision GIS platform, the network mobile app platform, the network case management platform, the network comprehensive management system, and the network evaluation management system. Grid data includes pollution sources, environmental quality, source related units, hazardous wastes, ecological protection,

environmental emergency, total emission reduction and other information data, which will be analyzed and reported in time. Form the "one map" of the city's environmental management information.

3.2.2 To start grid management of air pollution prevention and control

On this basis, in 2014, the grid management of air pollution prevention and control in Tianjin was officially launched. Through fine pollution control, we will strive to achieve no dead angle in air pollution prevention and control. Community grid members need to patrol the community under their jurisdiction. Once they find any behavior that damages the ecological environment, they will take photos with their mobile phones and report to the district command platform at the first time through the "Urban Management Communication" mobile terminal. Grid inspectors should report the problems found to the management platform every day. The management platform uniformly dispatched and centralized handled the problems according to their categories.

All kinds of pollution behaviors, ranging from the burning of garbage in communities to the illegal discharge of pollutants by enterprises, will be discovered and treated in time through grid management. After the implementation of pollution prevention and control grid in Tianjin, the 2014 environmental status bulletin showed that the annual PM_{2.5} decreased by 13.5%.



Figure 5. Intelligent environmental monitoring platform. Source: EGOVA

4. The opposite conclusion

Grid management is a phased achievement of social management innovation in contemporary China. The establishment and promotion of this model is a better choice to achieve the government's goals of strengthening social management capacity and improving public service capacity at the same time under the constraints of the existing system, such as the rapid development of urban scale, excessive population concentration and so on.

The social service of grid management follows the planning guidance of "people-oriented". As the name implies, it advocates that people should be the starting point and the center to optimize the configuration of public service facilities. By analyzing the interaction between residents' daily activities and public service facilities in the living space through grid dynamic supervision, the dynamic relationship among regional spatial resource allocation, facility supply and residents' demand can be optimized. The essence of its planning is to achieve the balanced allocation of population and resources within a certain

circle. From the perspective of residents' behavior demand, it uses the concept of life circle to form a "push" for the supply of resources and facilities, so as to achieve a "bottom-up" spatial order in planning. So that urban development gradually shifts from macro narration on a large scale to spatial adjustment on a small scale, gets rid of the planning concept of treating residents as homogeneous service objects, and pays attention to understanding the diversified needs of different types of groups.

Community Grid Division is the combination of refined management of social services and smart communities. As the basic unit of digital city construction, smart community provides safe, comfortable and convenient smart life scenes for community residents. Stay indoors to meet the barrier free needs of life in time.

To sum up, the unique advantages of grid management lie in its precise positioning, clear space, resource integration, collaborative work, and strong adaptability and wide applicability. In the future, relying on smart city technology, we can dynamically pay close attention to the demands of multiple subjects, and give play to the forces of the government, society and citizens to participate in the inclusive and healthy fine governance of the human settlements environment. Based on the current frequency of global climate change and emergency public health events, grid emergency management organically integrates emergency management functions into the field of normal social governance, realizes the sinking of urban daily management and emergency management functions, meets the physical and mental needs of residents in the "last kilometer" of life, and implements dynamic and all-round grass-roots emergency management for each grid, To realize the implementation of grass-roots emergency management responsibilities, information sharing and rapid response. It is beneficial for city managers to make accurate decisions and specific emergency response measures under the rather limited time constraints under the abnormal crisis situation, where all kinds of sudden adverse situations, serious threats, uncertainties and unpredictability are highly concentrated.

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