# Chapter 2
# The Spatial Pattern of Selecting and Developing China's Urban Agglomerations


Urban agglomerations in China are not only clusters of economically connected and integrated cities, but also strategic locations that will carry the national or regional missions for global integration and competition. Although technically, any groups of closely integrated cities (both geographically and economically) can have the potential of growing into a fully developed urban agglomeration, based on China's current *National Development Priority Zone Planning*, the national "One-Belt, Seven-Axes, and Multiple-Channels" urban system planning strategies, the Chinese Academy of Sciences proposed "15 + 8" spatial pattern, and other urban agglomeration related plans, our study attempts to develop potential locations in the prioritized and key development zones identified in the Priority Development Zone Planning, but avoid development in the restricted and prohibited development zones. Specifically, from the perspective of promoting China's New Urbanization strategy, we propose to build 5 national-level urban agglomerations, 9 regional-level urban agglomerations, and 6 local-level urban agglomerations (the China's "5 + 9 + 6" urban agglomeration spatial pattern). The spatial pattern follows an "axes connect agglomerations while agglomerations support axes" strategic pattern that is the essence of China's New Urbanization strategy.

## 2.1 The Fundamental Principles and Basis for Urban Agglomerations Selection and Development

### *2.1.1 Selection and Development Based on the Priority Development Zone Planning*

Based on the Priority Development Zone Planning, China's Priority Development Zones include prioritized development zones, key development zones, restricted development zones and prohibited development zones. The national-level priority development zones are the vital support for the national "two horizontal and three



C. Fang and D. Yu, *China's Urban Agglomerations*, Springer Geography,
https://doi.org/10.1007/978-981-15-1551-4_2

vertical axes" urbanization strategic pattern, "seven zones and twenty-three belts" agricultural strategic pattern and "two screens and three bands of ecological security" strategic pattern. The Priority Development Zone Planning proposed to build 3 prioritized urbanization regions and 18 key urbanization regions to form a "3 + 18" national urbanization strategic pattern.

1. **The three prioritized urbanization regions are located within national prioritized development zones**

The three national-level prioritized development zones include the Bohai Rim Region (Beijing-Tianjin-Hebei, Central and Southern Liaoning and Shandong Peninsula), the Yangtze River Delta Region and the Pearl River Delta Region. These regions have comprehensive developmental strength, which represent the comprehensive competitiveness of the China. Their economies are more developed and can support and drive the national economic development. Their urban systems are relatively sound. They meet the fundamental requirements to form mega urban agglomerations that can effectively participate in global integration and competition. These regions generally have highly integrated economic relationship, strong scientific and technological innovation capability. Hence they can lead the national self-innovation and industrial structure upgrading. These are the regions that will be prioritized for industrialization and urbanization development.

2. **The eighteen key urbanization regions are all in key priority development zone**

The national-level key urbanization areas include the Central and Southern Hebei, the Middle Reaches of the Yangtze River, the Chengdu-Chongqing Area, Jianghuai Region, the Western Coast of the Taiwan Strait Economic Zone, the Central Plains Economic Zone, Central Shaanxi-Tianshui Area, Harbin-Changchun Area, the Northern Slope of the Tianshan Mountains Area, Guangxi Beibu Gulf Area, Lanzhou-Xining Area, Central Shanxi Urban Agglomeration, Central Yunnan Area, Central Guizhou Area, Hohhot-Baotou-Ordos-Yulin Area, Ningxia Yellow River Area, Eastern Longhai Area, and Central and Southern Xizang. These urbanization areas generally have relatively stronger economic foundations, as well as good scientific and technological innovation potential. Within there areas, there are relatively developed urban systems, and their economies are also integrated. The central cities in these areas have the potential to grow into true radiating centers and drive the areas to grow into new national-level urban agglomerations or at least regional-level urban agglomerations. Development of these areas could significantly promote the national regional coordinated development. These are the regions that will be the key areas for industrialization and urbanization.

3. **Urban agglomeration development and growth actively avoid the twenty-five key ecological protection priority zones and 1443 development prohibited zones**

The national key ecological development zones are the areas that restrict the development of high intensity industrialization and urbanization and assume the main

functions of safeguarding the national ecological security. These areas include areas that provide water conservation, soil and water conservation, windproof sand-fixing and biodiversity protection functions. There are 25 such key ecological functional areas. The selection and layout of urban agglomerations must avoid these areas.

The Prohibited Development Zones are regions banning the development of high intensity industrialization and urbanization, including 1443 prohibited development zones. Specifically, there are 319 national nature reserves, 40 world cultural natural heritages, 208 national scenic spots, 738 national forest parks and 138 national geoparks, the choice and layout of urban agglomeration must avoid these areas.

### *2.1.2 The National Urban System Plan's "One Belt, Seven Axes, and Multiple Channels" Spatial Structure Is the Foundation of the Spatial Pattern of China's Urban Agglomerations*

According to the *National Urban System Plan*, the spatial organization of the future Chinese urban agglomerations will be centered on a group of closely integrated cities, connect through the primary transportation channels and various central cities, to form a "diversified, multipolar, and networked" urban spatial pattern. "Diversified" refers to regions with different resource conditions, different development stages, different development mechanisms and different types shall have their own most suitable but different development modes and spatial organizations. "Multipolar" refers to that we need to rely on different types, different levels of urban agglomerations and central cities to develop different regions and implement the national coordinated regional development strategy. "Networked" refers to a networked spatial pattern that relies on the transportation channels to encourage close integration, supplementation, and free movement of production factors among different central cities, townships and villages. The key is to promote the "One Belt, Seven Axes, and Multiple-Channels" networked urban development system. The various national transportation channels (including highway, railway, waterway, and seaway), central cities and other cities will be the primary elements of the network to form a closely integrated, rationally distributed, coordinated, and networked urban system [1].

1. **Open the "one belt", connect the "seven axes" and form the "multiple channels"**

The "One Belt" refers to the coastal town development belt along the Bohai Sea, the East China Sea, the Yellow Sea and the South China Sea. Along this Belt, the focus of urban agglomeration development will be on the development of the Beijing-Tianjin-Hebei, Yangtze River Delta, the Pearl River Delta key urban agglomerations. Furthermore, development on this Belt will also promote the development of the Central and Southern Liaoning, Shandong Peninsula, the Western Coast of the Taiwan

Strait, and the Beibu Gulf Urban Agglomerations. We should strengthen the construction of the coastal corridor, take advantage of both the domestic and foreign markets, participate in economic globalization competition and guide the country to achieve all-round development.

"The Seven Axes" refer to the seven urban contact channels that are formed through the main national transportation axes. Specifically, they are the Shanghai-Nanjing-Hefei-Wuhan-Chongqing-Chengdu (including Yangtze River) axis; the Beijing-Shijiazhuang-Zhengzhou-Wuhan-Changsha-Guangzhou (including Beijing-Guangdong, Beijing-Kowloon Railway); Lianyungang-Xuzhou-Zhengzhou-Xi'an-Lanzhou-Ürümqi (Longhai Lanzhou-Xinjiang Railway, to the land border crossings), Harbin (linking the land border crossings)-Changchun-Shenyang-Dalian; Beijing-Zhangjiakou-Datong-Hohhot-Baotou-Yinchuan-Lanzhou (including Xining); Lanzhou-Chengdu (Chongqing)-Kunming-Nanning-Haikou; and Shanghai-Nanchang-Changsha-Guiyang-Kunming. These development along the seven axes will strengthen the links among the central cities, enable the rational organization of population and industry accumulation and diffusion, promote regional coordinated development, strengthen the national strategic traffic corridor construction along the border areas, and strengthen the link between the border city and the central city.

"Multiple Channels" refer to the various transportation channels that connect China with the surrounding countries over the sea and the land. They have strong impetus into the Belt and Road Initiative.

2. **Construct the three metropolises, and eight key town agglomerations**

According to the *National Urban System Planning*, the focus of China's urbanization in the future will be on the three metropolis, namely, the Yangtze River Delta Metropolis, the Pearl River Delta Metropolis and the Beijing-Tianjin-Hebei Metropolis, and eight urban agglomerations, namely, the Chengdu and Chongqing Urban Agglomeration, Central and Southern Liaoning Urban Agglomeration, Western Coast of Taiwan Strait Urban Agglomeration, Shandong Peninsula Urban Agglomeration, Changsha-Zhuzhou-Xiangtan Urban Agglomeration, Wuhan Plain Urban Agglomeration, Zhengzhou (Central Plains) Urban Agglomeration, and Xi'an (Central Shaanxi) Urban Agglomeration. The basic characteristics and future development of these urban agglomerations are show in Table 2.1.

### *2.1.3 The "15 + 8" Spatial Pattern Proposed by the Chinese Academy of Sciences Is Foundation for Constructing China's Urban Agglomerations*

The research team led by Fang Chuanglin of the Chinese Academy of Sciences published the first *China's Urban Agglomeration Development Report* in 2010. In the Report, the team evaluated 23 city clusters in China based on 7 quantitative criteria

**Table 2.1** The 11 key urban agglomerations identified in the *National Urban System Planning* [1]

| | Key urban agglomerations | Characteristics and spatial expansion | Future development direction |
|---|---|---|---|
| 1 | Yangtze River Delta Urban Agglomeration | The development of urban space in the Yangtze River Delta is divided into two regions: the north wing (Southern Jiangsu and the banks of the Yangtze River) and the south wing (the coastal area of Hangzhou Bay and Eastern Zhejiang). The north wing area of the Yangtze River Delta has formed the spatial pattern of continuous development from Shanghai to Nanjing, and the intensive development of Nanjing to Hefei and Tongling area. The southern wing area of Yangtze River Delta mainly forms the continuous development from areas surrounding Hangzhou Bay and Wentai, and the spatial pattern of dense development along the inland area of Zhejiang-Jiangxi area | With the completion of several traffic passages spanning the Yangtze River and Qiantang Estuary (Hangzhou Bay), the network development trend in the Yangtze River Delta area is more obvious. The future of Shanghai, Hangzhou, Nanjing, Ningbo, Suzhou, Wuxi, Wenzhou, Hefei, Nantong and other cities supplemented by the integrated transport hub status will be more prominent. In the future, the regions of central Jiangsu, Zhejiang and Jiangxi, Central and Southern Anhui area will gradually integrate into the Yangtze River Delta Metropolis |
| 2 | Pearl River Delta Urban Agglomeration | The Pearl River Delta has formed a "Three large and three small areas" metropolitan development pattern. The three large areas include Guangzhou, Shenzhen, Hong Kong, and the three small areas include Foshan, Dongguan, Zhuhai. The metropolis has highly integrated urban and rural development. The town density of this area is quite high, close to 100 per 10,000 $km^2$, and the average travelling distance among cities is less than 10 km | The future development will focus on the Eastern and Western from the Bay surrounding areas to form a Pearl River Bay Metropolis. Guangzhou-Hong Kong-Shenzhen will be the center, and Zhuhai and Macau will support a networked transportation hub system. Areas in the two wings of Pearl River estuary, and Zhaoqing, Huizhou and other areas will gradually integrate into the Pearl River Delta Metropolis |
| 3 | Beijing-Tianjin-Hebei Urban Agglomeration | There are Beijing and Tianjin metropolitan areas. The areas from Beijing to Tianjin to the Binhai New District has a prominent continuous development trend. Most of the cities and towns are densely distributed along the Beijing-Guangzhou, Beijing-Shenyang and Beijing-Kowloon and other traffic lines. The average distance among cities is 40 km. Urban development within the Metropolis has obvious regional difference. Beijing and Tianjin are the two absolute cores, neighboring cities within the metropolis are lagging behind | In the future, this metropolis will strengthen its coastal oriented development. Many of the coastal cities will gradually grow to be central cities. A comprehensive transportation hub centered on Beijing and Tianjin, and supported by Tangshan, Shijiazhuang will be more prominent in future development. The central and northern parts of Hebei Province will gradually integrate into the Metropolis |

(continued)

**Table 2.1** (continued)

| | Key urban agglomerations | Characteristics and spatial expansion | Future development direction |
|---|---|---|---|
| 4 | Chengdu-Chongqing Urban Agglomeration | Chengdu-Chongqing area has China's highest population density and also high density of cities. There are Chengdu and Chongqing metropolitan areas. The cities are densely distributed along Baoji-Chengdu, Chengdu-Kunming, and Chengdu-Chongqing railways. Most of them are located in the Chengdu Plain area. Other than the two megacities, Chengdu and Chongqing, the majority of other cities are small cities and townships. The metropolis has high pressure from inland flooding | Chengdu-Chongqing area is the experimental area for China's national coordinated urban and rural comprehensive reform. In the future, all the cities around the transportation lines (including land and waterways) will develop rather fast extending from the Chengdu-Nanchong-Chongqing area. The integration of Chengdu and Chongqing will also speed up. Centered on Chengdu and Chongqing, other secondary transportation hub cities, such as Zigong, Nanchong and Mianyang will also become more prominent. The internal travel time will be reduced to 2 h within the urban agglomeration |
| 5 | Central and Southern Liaoning Urban Agglomeration | This urban agglomeration has two connected dense city clusters. One is centered with Shenyang in the north and the other is centered with Dalian in the south. Cities around the Shenyang-Dalian and Beijing-Harbin railways are very densely distributed. The average distances among cities are 40–50 km | In the future, the connection between the north and south city clusters will be strengthened. Shenyang, Dalian, Yingkou and Jinzhou will serve as important regional transportation hubs. Cities in the coastal Liaoning area will develop fast and gradually integrate with Dalian, Yingkou and Jinzhou |
| 6 | Western Coast of the Taiwan Strait Urban Agglomeration | There are currently three centers in this urban agglomeration, namely, Fuzhou, Xiamen and Quanzhou. Cities are densely distributed within the urban agglomeration, especially in the Xiamen-Zhangzhou-Quanzhou area. As more transportation lines become available, cities within this urban agglomeration will become more integrated. Currently, the most active development regions concentrate in Xiamen Bay, Quanzhou Bay, Meizhou Bay, and Sanduao surrounding areas | In the future, the coastal cities will gradually integrate into a coastal metropolis on the Western Coast of the Taiwan Strait. Integration among urban and rural areas will be strengthened. Transportation hubs such as Fuzhou, Xiamen, and Quanzhou will take the roles of central cities. Commute time among cities within the urban agglomeration will be reduced to 1–1.5 h. In the meantime, the inland cities in the vicinity will also gradually integrate to the expanding agglomeration |

(continued)

**Table 2.1** (continued)

| | Key urban agglomerations | Characteristics and spatial expansion | Future development direction |
|---|---|---|---|
| 7 | Shandong Peninsula Urban Agglomeration | This urban agglomeration is one of the most active, densely populated provincial level urban agglomeration with densely distributed cities. Urban system within this urban agglomeration is relatively developed, with two major centers: Jinan and Qingdao. Most cities are densely distributed along the Jinan-Qingdao transportation line. Along the coastal areas, there are also some very active developing areas around central cities such as Qingdao, Rizhao, Yantai and Dongying. This urban agglomeration's development, however, is severely constrained by available water resources | In the future, the areas along the Jinan-Qingdao transportation line will be the primary location for the integration of cities within this urban agglomeration. Central cities like Jinan, Qingdao, Zibo, Yantai, and Rizhao, will develop to be comprehensive transportation hubs. Commute time between Jinan and Qingdao will be reduced to 1.5 h. In addition, the north and south cities of Shandong province will gradually integrate into this urban agglomeration as well |
| 8 | Changsha-Zhuzhou-Xiangtan Urban Agglomeration | Cities within this urban agglomeration are densely distributed along the Beijing-Guangzhou transportation line, the National 320 Highway, and Xiangjiang River. Changsha, Zhuzhou and Xiangtan are highly integrated due to their relative short distance. Small cities and townships within this urban agglomeration develop rapidly, though large cities remain relatively under-developed. The most active developing areas are still following the main transportation lines | This urban agglomeration is also a national experimental area for the resource-conserving, environmentally friendly society. We expect the area will receive strong concentration in population and industries. In the future, centered on Changsha, Xiangtan and neighboring cities will grow to be comprehensive transportation hubs. In the meantime, cities in Northern, Central and Western Hunan will also gradually integrate to this urban agglomeration |

(continued)

**Table 2.1** (continued)

| | Key urban agglomerations | Characteristics and spatial expansion | Future development direction |
|---|---|---|---|
| 9 | Wuhan Plain Urban Agglomeration | Cities in this urban agglomeration are densely distributed along the Yangtze River (middle reaches) and the Beijing-Guangzhou transportation line. With 1/3 of Hubei's land area, this urban agglomeration concentrates 1/2 of Hubei's population. Wuhan has recently emerged as a significant central China metropolitan. Medium-sized and small cites are developing fast with a large number of townships. On the other hand, large cities within this urban agglomeration are lacking. Within this urban agglomeration, there are multiple waterbodies (lakes, rivers and regional creeks), yet their areas are decreasing, which threatens the overall eco-environmental quality. The most developed areas are concentrated around Wuhan city and areas along the Yangtze River | This urban agglomeration is another national experimental region for the resource-conserving and environmentally friendly society" reform. Its leading role in urbanization of central China will be strengthened and grow to be the center of population and industrial concentration. Wuhan will grow to be a national-level comprehensive transportation hub. In the future, integration among various cities within this urban agglomeration will be strengthened through networked development. Commute time among central cities will be reduced to within 1 h. In the meantime, cities east of Wuhan will also gradually integrate into this urban agglomeration |
| 10 | Zhengzhou (Central Plains) Urban Agglomeration | This urban agglomeration has China's highest amount of total population and most densely distributed cities. Most cities are concentrated along the Beijing-Guangzhou transportation line and the Yellow River banks for a typical cross shape. In addition, on the Southern slope of Taihang Mountains, and the flood plain of the Yellow River, there also concentrate many resource-oriented cities | The central location of Zhengzhou in China will be strengthened with more concentrated population and industries. Zhengzhou and Luoyang will develop to be the primary comprehensive transportation hubs. Commute time among central cities will be reduced to 1–1.5 h. In addition, cities in the Eastern, Central and Southern Henan will also gradually integrate to this urban agglomeration |
| 11 | Xi'an (Central Shaanxi) Urban Agglomeration | Cities in this urban agglomeration are mainly concentrated on Longhai Railway and Wei River banks. Urban system has typical primate city characteristics in which the primate city (Xi'an) is highly developed with relatively under developed medium-sized and small cities. Currently, Xi'an and Xianyang are highly integrated. Development of the urban agglomeration is severely restricted by available water resources | Xi'an and Baoji in this urban agglomeration will grow to be the most important comprehensive transportation hubs. Commute time among major central cities will be reduced to within 1 h |

*Source National Urban System Plan (2006–2020)*, Commercial Press, 2010

and 9 specific indicators (number of cities, number of cities with more than 1 million population, population size, urbanization level, GDP per capita, economic density, economic extroversion, non-agricultural industry output ratio, and core city's GDP centralization degree). Based on their evaluation, they suggest that 15 of the 23 city clusters have met the standard of being urban agglomeration, and 8 have not yet met the standards [2–5].

1. **The fifteen urban agglomerations that have met the standards**

A city cluster is said to meet the standard of being an urban agglomeration if it meets 2/3 of the standard values of the 9 indicators. They are: ① Yangtze River Delta Urban Agglomeration; ② Pearl River Delta Urban Agglomeration; ③ Beijing-Tianjin-Hebei Urban Agglomeration; ④ Shandong Peninsula Urban Agglomeration; ⑤ Central and Southern Liaoning Urban Agglomeration; ⑥ The Western Coast of Taiwan Strait Urban Agglomeration; ⑦ Changsha-Zhuzhou-Xiangtan Urban Agglomeration; ⑧ Wuhan Urban Agglomeration; ⑨ Chengdu-Chongqing Urban Agglomeration; ⑩ Poyang Lake Rim City Urban Agglomeration; ⑪ Central Plains Urban Agglomeration; ⑫ Harbin-Dalian-Changchun Urban Agglomeration; ⑬ Jianghuai Urban Agglomeration; ⑭ Central Shaanxi Urban Agglomeration; ⑮ The Northern Slope of the Tianshan Mountains Urban Agglomeration.

2. **The eight city clusters that have yet to meet the standards**

Following the above judging standards, 8 city clusters fail to meet 2/3 of the standards of being an urban agglomeration. These are: ① The Northern and Southern Qinzhou-Fangchenggang (of Guangxi) city clusters; ② the Central Shanxi city clusters; ③ the Yinchuan Plain city clusters; ④ Hohhot-Baotou-Ordos city clusters; ⑤ Jiuquan-Jiayuguan-Yumen (of Gansu) city clusters; ⑥ Lanzhou-Baiyin-Xining city clusters; ⑦ the Central Guizhou city clusters; ⑧ the Central Yunnan city clusters.

The above city clusters, which are currently less developed, cannot be properly called an urban agglomeration. Considering that the construction of China's urban agglomerations has clear government dominance, when developing their own respective economic growth poles, each province often consciously designates an area with a number of well-connected cities together as an urban agglomeration to drive regional economic development. For this reason, we also call these city clusters "urban agglomerations" (though under developed) for the purpose of coordinating and balancing regional development. In the long run, these city clusters will be purposefully strengthened and further developed to take the roles of local/regional urban agglomerations. For instance, the Northern and Southern Qinzhou-Fangchenggang (of Guangxi), Yinchuan Plain and Lanzhou-Baiyin-Xining city clusters are all located in ethnic minority autonomous regions; Jiuquan-Jiayuguan-Yumen (of Gansu) is located in China's Space Base. These city clusters not only shoulder urban and economic development missions, but also serve as regional development driving center that will bring the relatively under developed or relatively remote regions to rapid development. For these considerations, these city clusters are also designated urban agglomerations. After this designation, the "15 + 8" urban agglomerations proposal

form the basis for the new "5 + 9 + 6" urban agglomeration new pattern that we intend to propose here.

### *2.1.4 Other Urban Agglomeration Proposals*

Other than the above discussed plans for China's urban agglomerations, there are also other often cited studies on China's urban agglomerations. These include Yao Shimou's "6 + 7" proposal, Gu Chaolin's "3 + 3 + 7 + 17" proposal, Xiao Jincheng's "10 + 6" proposal, Ning Yuemin's "10 + 3" proposal, Li Xun's "4 + 6" proposal, Ni Pengfei's "33 + *X*" proposal, and McKinsey's "7 + 10 + 5" proposal. All these proposals have their own significant contribution for understanding and designating the future urban agglomeration spatial patterns in China. Brief introductions follow.

1. **The "6 + 7" proposal**

Professor Yao Shimou, from Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, proposed the "6 + 7" proposal in his 1992 book *China's Urban Agglomerations* [6]:

The six super urban agglomerations are: Shanghai-Nanjing-Hangzhou Urban Agglomeration, Beijing-Tianjin-Tangshan Urban Agglomeration, Pearl River Delta Urban Agglomeration, Shandong Peninsula Urban Agglomeration, Central and Southern Liaoning Urban Agglomeration, and Sichuan Basin Urban Agglomeration.

The seven areas with dense city concentration are: The Central Shaanxi, Central Hunan, Central Plains, Fuzhou-Xiamen, Harbin-Dalian-Qiqihar, Wuhan, and Western Coast of the Taiwan Strait.

2. **The "3 + 3 + 7 + 17" proposal**

Professor Gu Chaolin of Tsinghua University's School of Architecture proposed 3 metropolises, 3 large dense city areas, 7 urban agglomerations, and 17 urban development areas in his research *Spatial Pattern of China's Urban Systems* [7].

The 3 metropolises include the Yangtze River Delta Metropolitan Area, the Pearl River Delta Metropolitan Area and the Beijing-Tianjin Metropolitan Area. The 3 large dense city areas include the densely populated areas of the Central and Southern Liaoning, the densely populated urban areas along the Jinan-Qingdao railway and the densely populated urban areas along Southeastern Fujian. The 7 urban agglomerations include Jianghan Plain Urban Agglomeration, Central Plains Urban Agglomeration, Songnen Plain Urban Agglomeration, Central Hunan Urban Agglomeration, Sichuan Basin Urban Agglomeration, Three Gorges Urban Agglomeration, and Central Shaanxi Urban Agglomeration. The 17 urban development areas include Southern and Central Hebei province, Jiangsu-Shandong-Anhui Junction Area, Southern Guangdong, Guangxi Beibu Gulf, Eastern Hainan, Northeastern Heilongjiang, Central Jilin, Central Shanxi, Central Anhui, Northern Jiangxi, Central Inner Mongolia, upper reaches of the Yellow River in Ningxia and Inner Mongolia, Qinghai and

Gansu urban development area, the Northern Slope of the Tianshan Mountains, Central Guizhou, Eastern Yunnan and Xizang.

3. **The "10 + 6" proposal**

Professor Xiao Jincheng of the National Development and Reform Commission's Institute of Land and Regional Economics Research proposed a 10 developed urban agglomeration and 6 newly developing urban agglomeration spatial pattern in China [8].

The 10 developed urban agglomerations include areas in the Yangtze River Delta, the Pearl River Delta, the Beijing-Tianjin-Hebei region, the Central and Southern Liaoning, the Shandong Peninsula, the middle reaches of the Yangtze River, the Sichuan-Chongqing, the Western Coast of the Taiwan Strait, the Central Plains, and the Central Shaanxi.

The 6 developing urban agglomerations include areas in the Beibu Gulf, Jianghuai, Eastern Hunan, Central Jilin, Harbin-Dalian-Qiqihar, and the Northern Slope of the Tianshan Mountains.

4. **The "10 + 3" proposal**

Professor Ning Yuemin of the East China Normal University proposed the "10 + 3" urban agglomeration spatial pattern in China based on the study of spatial distribution of metropolitan areas in China. In this proposal, the 10 areas that can be designated as urban agglomerations include areas in the Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Tangshan, Shandong Peninsula, Central Liaoning Peninsula, Harbin-Qiqihar, Changchun-Jilin, Central Plains, South Fujian, and Chengdu-Chongqing. Of these 10 areas, there are at least one central city with a population of more than 2 million and quite a few cities with a population of 500,000 to 1 million. More importantly, cities in these areas are often located along national transportation lines that facilitate their internal socioeconomic integration. In addition, in Wuhan area, Changsha-Zhuzhou-Xiangtan area, and Central Shaanxi area, though no cities have population over 2 million (as when the study was conducted in 2000), population in the core metropolitan areas is over 2 million, while in 2000, China's overall urbanization level was still relatively low. Sizes of urban agglomerations were correspondingly smaller than today. Many of the large urban agglomerations were defined as the urban belt formed along the railway lines with two metropolitan districts as endpoints. For instance, the Central and Southern Liaoning Urban Agglomeration is composed of cities mainly along the Shenyang-Dalian Railway. Shandong Peninsula Urban Agglomeration is mainly composed of cities along the railway linking Jinan, Qingdao and Yantai. Chengdu-Chongqing Urban Agglomeration contains cities mainly along the Chengdu-Chongqing railway. The Central Plains Urban Agglomeration is composed of cities mainly in the Longhai Railway from Kaifeng to Luoyang, and so on. Based on this study, there are 13 large urban agglomerations in China then [9].

5. **The "4 + 6" proposal**

Professor Li Xun of China's Urban Planning and Design Research Institute in 2000 proposed that China's urban development then had 4 urban agglomerations (Central and Southern Liaoning, Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta), and 6 densely urbanized areas (Songnen Plains, Central Plains, Jianghan Plains, Central Hunan, Sichuan Basin and Central Shaanxi).

6. **The "33 + *X*" proposal**

Dr. Ni Pengfei of Chinese Academy of Social Sciences in the *China's Urban Competitiveness Report* (2008) proposed that there will be 33 large urban agglomerations and many (X) smaller urban agglomerations. The 33 large urban agglomerations are located in Yangtze River Delta, Pearl River Delta, Beijing-Tianjin-Tangshan, Eastern Taiwan Strait, Shandong Peninsula, Central and Southern Liaoning, Western Taiwan Strait, Central Plains, Wuhan region, Chengdu-Chongqing, Central Shaanxi, Harbin region, Changchun region, Jianghuai region, Xuzhou region, Eastern Zhejiang, Shantou region, Qionghai region, Shijiazhuang region, Central Shanxi, Poyang Lake region, Hohhot-Baotou-Ordos region, Lhasa region, Yinchuan region, Lanzhou region, Wuchang region, Nanjing region, Central Guizhou, Central Yunnan, Henan-Anhui region, Hebei-Shandong-Henan region, and Hubei-Henan region [10].

7. **The "7 + 10 + 5" proposal**

McKinsey's City Cluster (Cluster Map) method divides Chinese cities into 22 urban agglomerations. Each urban agglomeration centers on 1–2 central cities. With this method, all the satellite (peripheral) cities are less than 300 km away from one of the central cities. For any urban agglomeration, its GDP shall be over 1% of China's total GDP. Among the 22 urban agglomerations, there are 7 "super" urban agglomerations, which are located in Beijing-Tianjin-Hebei, Shanghai, Shandong Peninsula, Hangzhou, Guangzhou, Nanjing and Shenzhen. In 2008, their populations are from 19 to 55 million. Each city's GDP is about 5–12% of the total GDP of Chinese cities. There are 10 "large" urban agglomerations. They are located in Central and Southern Liaoning, Xiamen-Fuzhou, Lower Reaches of the Yangtze River, Central Plains, Changchun-Harbin, Chengdu, Hefei, Changsha-Zhuzhou-Xiangtan, Central Shaanxi, and Chongqing. Their population ranges from 13 to 39 million. The other 5 "small" urban agglomerations are located in Nanning, Nanchang, Taiyuan, Hohhot and Kunming. McKinsey's Cluster Map covers 606 cities of all 815 cities in China. The population of these cities accounts for 82% of total urban population in China, and their GDP will be likely to reach 92% of Chinese cities' total.

## 2.2 Construction of the New "5 + 9 + 6" Spatial Pattern of China's Urban Agglomerations

Based on our above analyses of urban agglomeration development and how it shall be coordinated with *National Development Priority Zone Planning* and *National Urban System Planning*, we proposed a new urban agglomeration system that contained 5 national-level urban agglomerations, 9 regional-level urban agglomerations and 6 local-level urban agglomerations (the "5 + 9 + 6" pattern, see Table 2.2).

### *2.2.1 The Basic Framework of China's "5 + 9 + 6" Urban Agglomeration Spatial Pattern*

After analyzing and comparing a variety of different proposals of China's urban agglomerations and collecting opinions and suggestions from scholars and government officials, our proposed urban agglomeration spatial pattern focus on selecting and developing 20 urban agglomerations of three different levels. The first is at the national level. There are five urban agglomerations that will be of top construction priority. The second level is regional urban agglomerations that require stable investment and support. There are 9 such urban agglomerations. The third level is local urban agglomerations that require significant guidance and future support. Most of them have not fully met all the requirements of becoming full-fledged urban agglomerations. There are 6 such urban agglomerations (Figs. 2.1 and 2.2 and Table 2.3).

1. **The hierarchical composition of the "5 + 9 + 6" spatial organization of China's urban agglomerations**

Table 2.3 suggests that there are 434 cities of different sizes in all of China's urban agglomerations, which accounted for 66.05% of all the cities in China. Among them, all the provincial-level municipalities are included. In addition, these urban agglomerations included 194 (67.31%) prefecture-level cities, and 240 county-level cities (65.04%), and 11787 small cities and towns (60.73%).

In 2014, all the urban agglomerations in China accounted for 28.17% of its land area; 68.7% of its urban construction land area. Population in urban agglomerations accounted for 68.90% of China's total, and 73.13% of China's urban population. Their total economic outputs accounted for 82.45% of China's total. Among them, the added value of the primary industry accounted for 59.54%, of the secondary industry accounted for 93.51%, and of the tertiary industry accounted for 77.07% of China's total. The total social consumer goods retail in urban agglomerations accounted for 81.59% of the national total; and 75.14% of national fixed asset investment happened in urban agglomerations. 90.53% of the actual foreign investment utilized, 90.3% of total import and export, 83.39% of local fiscal income, 84.4% of total savings in various financial institutions, 75.19% of fixed line telephone users, 83.73%

**Table 2.2** Comparison between different urban agglomeration programs

| Chinese Academy of Sciences' Program | Development Priority Zone of the National Development and Reform Commission | Ministry of Housing and Urban-Rural Development and National Urban System Planning | National Development and Reform Commission | Integrated program | Integrated program grading | Number and names of prefecture-level cities included |
|---|---|---|---|---|---|---|
| Yangtze River Delta Urban Agglomeration | Yangtze River Delta Region | Key urban agglomeration in Yangtze River Delta | Yangtze River Delta Urban Agglomeration | Yangtze River Delta Urban Agglomeration | National level (world class) | Shanghai, Suzhou, Wuxi, Changzhou, Nanjing, Zhenjiang, Yangzhou, Taizhou, Nantong, Hangzhou, Jiaxing, Huzhou, Ningbo, Shaoxing, Zhoushan, Taizhou |
| Pearl River Delta Urban Agglomeration | Pearl River Delta Region | Key Urban Agglomeration in the Pearl River Delta | Pearl River Delta Urban Agglomeration | Pearl River Delta Urban Agglomeration | National level (world class) | Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Zhaoqing, Jiangmen, Dongguan, Zhongshan, Hong Kong, Macau |
| Beijing-Tianjin-Hebei Urban Agglomeration | Central and South Hebei Region | Beijing-Tianjin-Hebei Key Urban Agglomeration | Beijing-Tianjin-Hebei Urban Agglomeration | Beijing-Tianjin-Hebei Urban Agglomeration | National level (world class) | Beijing, Tianjin, Tangshan, Langfang, Baoding, Qinhuangdao, Shijiazhuang, Zhangjiakou, Chengde, Cangzhou |
| East Liaoning Peninsula Urban Agglomeration | Bohai Rim Region | Central and Southern Liaoning Urban Agglomeration | Central and Southern Liaoning Urban Agglomeration | East Liaoning Peninsula Urban Agglomeration | Regional level | Shenyang, Anshan, Fushun, Benxi, Fuxin, Panjin, Dandong, Liaoyang, Tieling, Huludao, Dalian, Yingkou, Jinzhou |

(continued)

**Table 2.2** (continued)

| Chinese Academy of Sciences' Program | Development Priority Zone of the National Development and Reform Commission | Ministry of Housing and Urban-Rural Development and National Urban System Planning | National Development and Reform Commission | Integrated program | Integrated program grading | Number and names of prefecture-level cities included |
|---|---|---|---|---|---|---|
| Shandong Peninsula Urban Agglomeration | Bohai Rim Region | Shandong Peninsula Urban Agglomeration | Shandong Peninsula Urban Agglomeration | Shandong Peninsula Urban Agglomeration | Regional level | Jinan, Qingdao, Yantai, Weihai, Rizhao, Dongying, Weifang, Zibo |
| Wuhan Urban Agglomeration | Middle Reaches of the Yangtze River | Wuhan Urban Agglomeration | Urban Agglomeration in the Middle Reaches of the Yangtze River | Central Triangle (Middle Reaches of the Yangtze River) Urban Agglomeration | National level | Wuhan, Huangshi, Ezhou, Xiaogan, Huanggang, Xianning, Xiantao, Qianjiang, Tianmen |
| Changsha-Zhuzhou-Xiangtan Urban Agglomeration | | East Hunan Urban Agglomeration | | | | Changsha, Zhuzhou, Xiangtan, Yueyang, Changde, Yiyang, Loudi, Hengyang |
| Poyang Lake Urban Agglomeration | | Nanchang-Jiujiang Urban Agglomeration | | | | Nanchang, Jiujiang, Jingdezhen, Yingtan, Shangrao |
| Chengdu-Chongqing Urban Agglomeration | Chengdu-Chongqing Area | Chengdu-Chongqing Urban Group | Sichuan-Chongqing Urban Agglomeration | Chengdu-Chongqing Urban Agglomeration | National level | Chongqing, Chengdu, Deyang, Mianyang, Guangyuan, Yibin, Leshan, Luzhou, Nanchong, Zigong, Dazhou, Meishan, Neijiang, Suining, Guangan, Yaan, Ziyang, Bazhong |

(continued)

**Table 2.2** (continued)

| Chinese Academy of Sciences' Program | Development Priority Zone of the National Development and Reform Commission | Ministry of Housing and Urban-Rural Development and National Urban System Planning | National Development and Reform Commission | Integrated program | Integrated program grading | Number and names of prefecture-level cities included |
|---|---|---|---|---|---|---|
| Jianghuai Urban Agglomeration | Jianghuai Area | | Jianghuai Urban Agglomeration | Jianghuai Urban Agglomeration | Regional level | Hefei, Wuhu, Tongling, Maanshan, Chuzhou, Chizhou, Anqing, Xuancheng |
| The Western Coast of the Taiwan Strait Urban Agglomeration | Western Coast Economic Zone | Urban groups on the Western Coast of the Taiwan Strait | The Western Coast of the Taiwan Strait Urban Agglomeration | The Western Coast of the Taiwan Strait Urban Agglomeration | Regional level | Fuzhou, Xiamen, Zhangzhou, Quanzhou, Putian, Ningde |
| Central Plains Urban Agglomeration | Central Plains Economic Zone | Central Plains Urban Group | Central Plains Urban Agglomeration | Central Plains Urban Agglomeration | Regional level | Zhengzhou, Luoyang, Kaifeng, Xinxiang, Jiaozuo, Xuchang, Jiyuan, Pingdingshan, Luohe |
| Central Shaanxi Urban Agglomeration | Central Shaanxi -Tianshui Area | Central Shaanxi Town Group | Central Shaanxi Urban Agglomeration | Central Shaanxi Urban Agglomeration | Regional level | Xi'an, Xianyang, Tongchuan, Baoji, Weinan, Hancheng, Huayin, Xingping |
| Harbin-Dalian-Changchun Urban Agglomeration | Harbin-Changchun Area | Harbin Town Group | Central Jilin Urban Agglomeration, the Southwest Heilongjiang Urban Agglomeration | Harbin-Dalian-Changchun Urban Agglomeration | Regional level | Harbin, Daqing, Qiqihar, Changchun, Jilin, Songyuan |

(continued)

**Table 2.2** (continued)

| Chinese Academy of Sciences' Program | Development Priority Zone of the National Development and Reform Commission | Ministry of Housing and Urban-Rural Development and National Urban System Planning | National Development and Reform Commission | Integrated program | Integrated program grading | Number and names of prefecture-level cities included |
|---|---|---|---|---|---|---|
| The Northern Slope of the Tianshan Mountains Urban Agglomeration | Areas on the Northern Slope of the Tianshan Mountains | Ürümqi Town Group | The Northern Slope of the Tianshan Mountains Urban Agglomeration | The Northern Slope of the Tianshan Mountains Urban Agglomeration | Regional level | Ürümqi, Changji, Fukang, Shihezi, Wujiaqu, Karamay, Usu, Kuitun |
| The North-South Qinzhou-Fangchenggang Urban Group | Beibu Gulf Region | Beibu Gulf Town Group | Beibu Gulf Urban Agglomeration | The North-South Qinzhou-Fangchenggang Group | Regional level | Nanning, Beihai, Fangchenggang, Qinzhou |
| Lanzhou-Baiyin-Xining Urban Agglomeration | Lanzhou-Xining area | | | Lanzhou-Xining Urban Agglomeration | Regional level | Lanzhou, Baiyin, Xining, Dingxi, Linxia |
| Central Shanxi Urban Agglomeration | Taiyuan Urban Agglomeration | Central Shanxi Town Group | | Central Shanxi Urban Agglomeration | Regional level | Taiyuan, Jinzhong, Yangquan |
| Central Yunnan Urban Agglomeration | Central Yunnan Region | Urban Group of Central Yunnan | | Central Yunnan Urban Agglomeration | Regional level | Kunming, Qujing, Yuxi, Chuxiong |
| Central Guizhou Urban Agglomeration | Central Guizhou Region | | | Central Guizhou Urban Agglomeration | Regional level | Guiyang, Zunyi, Anshun, Duyun, Kaili |

(continued)

**Table 2.2** (continued)

| Chinese Academy of Sciences' Program | Development Priority Zone of the National Development and Reform Commission | Ministry of Housing and Urban-Rural Development and National Urban System Planning | National Development and Reform Commission | Integrated program | Integrated program grading | Number and names of prefecture-level cities included |
|---|---|---|---|---|---|---|
| Hohhot-Baotou-Ordos Urban Agglomeration | Hohhot-Baotou-Ordos-Yulin Area | | | Hohhot-Baotou-Ordos-Yulin Urban Agglomeration | Regional level | Hohhot, Baotou, Ordos |
| Yinchuan Plain Urban Agglomeration | Ningxia along the Yellow River Economic Zone | | | Areas in Ningxia along the Yellow River Urban Agglomeration | Regional level | Yinchuan, Wuzhong, Shizuishan, Zhongwei |
| Jiuquan-Yumen-Jiayuguan Urban Agglomeration | | | | | | Jiuquan, Jiayuguan, Yumen |
| | East Longhai Area | | | | | |
| | Central and South Tibet | | | | | |
| 15+8 | 3+18 | 17 | 10+6 | 5+9+6 | 3 | 174 |

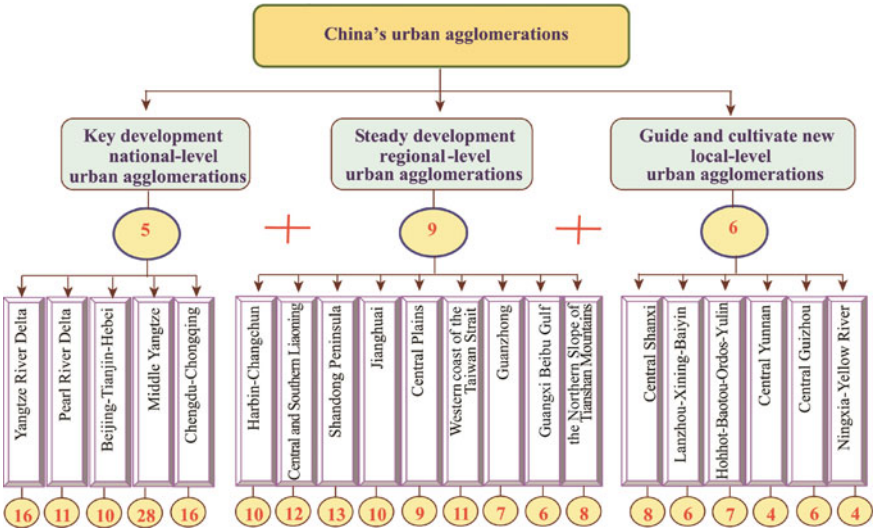


**Fig. 2.1** Policy classification and guidance of China's urban agglomerations


**Fig. 2.2** New spatial pattern of "5 + 9 + 6" in the future construction of China's urban agglomerations

**Table 2.3** The basic framework of China's urban agglomerations and their levels (2015)

| Number | Levels | Urban agglomeration | Included areas | Prefecture-level cities | Number of cities | Number of towns |
|---|---|---|---|---|---|---|
| 1 | **National Level Key Urban Agglomerations (5)** | Yangtze River Delta | Shanghai, Nanjing, Wuxi, Changzhou, Suzhou, Nantong, Yangzhou, Zhenjiang, Taizhou, Hangzhou, Ningbo, Jiaxing, Huzhou, Shaoxing, Zhoushan, Taizhou | 16 | 51 | 1027 |
| 2 | | Pearl River Delta | Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Zhaoqing, Huizhou, Dongguan, Zhongshan, Hong Kong, Macau | 11 | 17 | 335 |
| 3 | | Beijing-Tianjin-Hebei | Beijing, Tianjin, Tangshan, Langfang, Baoding, Qinhuangdao, Shijiazhuang, Cangzhou, Chengde, Zhangjiakou | 10 | 27 | 1009 |
| 4 | | The Middle Reaches of the Yangtze River | Wuhan, Huangshi, Ezhou, Xiaogan, Huanggang, Xianning, Xiantao, Qianjiang, Tianmen, Xiangyang, Yichang, Jingzhou, Jingmen, Changsha, Zhuzhou, Xiangtan, Hengyang, Yueyang, Yiyang, Changde, Loudi, Nanchang, Jiujiang, Jingdezhen, Yingtan, Xinyu, Fuzhou, Yichun, Pingxiang, Shangrao, Ji'an | 31 | 63 | 1586 |

(continued)

**Table 2.3** (continued)

| Number | Levels | Urban agglomeration | Included areas | Prefecture-level cities | Number of cities | Number of towns |
|---|---|---|---|---|---|---|
| 5 | **National Level Key Urban Agglomerations (5)** | Chengdu-Chongqing | Chongqing (including Wanxian, Fuling, Yuzhong, Dadukou, Jiangbei, Shapingba, Jiulongpo, Nan'an, Beibei, Wansheng, Yubei, Banan, Changshou, Jiangjin, Hechuan, Yongchuan, Nanchuan, Shuangqiao, Qijiang, Tongnan, Tongliang, Dazu, Rongchang, Bishan, Liangping, Fengdu, Dianjiang, Zhongxian, Kaixian, Yunyang, Shizhu), Chengdu, Deyang, Mianyang, Meishan, Ziyang, Suining, Leshan, Yaan, Zigong, Luzhou, Neijiang, Nanchong, Yibin, Dazhou, Guang'an | 16 | 33 | 2108 |
| 6 | **Regional level steadily constructed urban agglomerations (9)** | Central and Southern Liaoning | Shenyang, Dalian, Dandong, Jinzhou, Yingkou, Panjin, Huludao, Anshan, Fushun, Benxi, Liaoyang, Tieling | 12 | 27 | 489 |
| 7 | | Shandong Peninsula | Jinan, Qingdao, Yantai, Weihai, Rizhao, Dongying, Weifang, Zibo, Taian, Laiwu, Binzhou, Dezhou, Liaocheng | 13 | 46 | 740 |
| 8 | | The Western Coast of the Taiwan Strait | Fuzhou, Xiamen, Quanzhou, Wenzhou, Shantou, Zhangzhou, Putian, Ningde, Chaozhou, Jieyang, Shanwei | 11 | 23 | 931 |
| 9 | | Harbin-Changchun | Harbin, Daqing, Qiqihar, Suihua, Mudanjiang, Changchun, Jilin, Songyuan, Siping, Liaoyuan, Yanji | 11 | 34 | 547 |

(continued)

**Table 2.3** (continued)

| Number | Levels | Urban agglomeration | Included areas | Prefecture-level cities | Number of cities | Number of towns |
|---|---|---|---|---|---|---|
| 10 | **Regional level steadily constructed urban agglomerations (9)** | Central Plains | Zhengzhou, Luoyang, Kaifeng, Xinxiang, Jiaozuo, Xuchang, Jiyuan, Pingdingshan, Luohe | 9 | 23 | 413 |
| 11 | | Jianghuai | Hefei, Wuhu, Bengbu, Huainan, Anqing, Chizhou, Tongling, Ma'anshan, Chuzhou, Xuancheng | 10 | 14 | 413 |
| 12 | | Central Shaanxi | Xi'an, Xianyang, Baoji, Tongchuan, Weinan, Shangluo, Tianshui, Yan'an, Qingyang, Pingliang | 10 | 10 | 518 |
| 13 | | Guangxi Beibu Gulf | Nanning, Beihai, Fangchenggang, Qinzhou, Yulin, Chongzuo | 6 | 9 | 308 |
| 14 | | The Northern Slope of the Tianshan Mountains | Ürümqi, Shihezi, Changji, Fukang, Kuitun, Wusu, Wujiaqu, Karamay | 2 | 8 | 19 |
| 15 | **Local level urban agglomerations that require further guidance and support (6)** | Central Shanxi | Taiyuan, Jinzhong, Yangquan, Xinzhou, Linfen, Changzhi, Fenyang, Xiaoyi | 6 | 14 | 267 |
| 16 | | Hohhot-Baotou-Ordos-Yulin | Hohhot, Baotou, Ordos, Ulanqab, Bayannur, Wuhai, Yulin | 7 | 8 | 312 |
| 17 | | Central Yunnan | Kunming, Qujing, Yuxi, Chuxiong | 4 | 6 | 218 |

(continued)

**Table 2.3** (continued)

| Number | Levels | Urban agglomeration | Included areas | Prefecture-level cities | Number of cities | Number of towns |
|---|---|---|---|---|---|---|
| 18 | **Local level urban agglomerations that require further guidance and support (6)** | Central Guizhou | Guiyang, Zunyi, Anshun, Bijie, Kaili (Qiandongnan county-level city), Duyun (Qiannan county-level city) | 4 | 9 | 284 |
| 19 | | Lanzhou-Xining | Lanzhou, Baiyin, Xining, Haidong, Dingxi, Linxia (county-level city) | 5 | 6 | 182 |
| 20 | | Ningxia along the Yellow River | Yinchuan, Wuzhong, Shizuishan, Zhongwei | 4 | 6 | 81 |
| Total | 3 | 20 | 198 | 198 | 434 | 11787 |
| | 3 | 20 | 198 | 288 | 657 | 19410 |

of mobile phone users, 95.89% of Internet users, 93.79% of college students and 83.57% of all patent authorization are in these urban agglomerations. These figures suggest that urban agglomerations are the most concentrated areas of China's various socioeconomic activities.

2. **The "5 + 9 + 6" spatial pattern of China's urban agglomerations**

(1) National level urban agglomerations. The national-level urban agglomerations include the Beijing-Tianjin-Hebei Urban Agglomeration, the Yangtze River Delta Urban Agglomeration, the Pearl River Delta Urban Agglomeration, the Middle Reaches of the Yangtze River Urban Agglomeration and the Chengdu-Chongqing Urban Agglomeration. By 2014, these urban agglomerations occupied 630.2 thousand km$^2$, accounting for 9.78% of the national total. There were 486 million people (35.54%), and 297 million urban residents (39.64%) in these urban agglomerations. Their GDP (current price) was 326.3 trillion RMB Yuan (47.67%). The added-value of the primary industry was 17.8 trillion RMB Yuan (28.36%); of the secondary industry was 151.3 trillion RMB Yuan (51.85%), and of the tertiary industry was 157.2 trillion RMB Yuan (47.68%). The total fixed asset investment in these national-level urban agglomerations was 191.5 trillion RMB Yuan (37.33%); actual utilization of foreign investment was 165.292 billion US dollars (58.29%); total food production was 164 million tons (27.03%); total social consumer retail was 214.1 trillion RMB Yuan (46.73%); total financial income was 38.9 trillion RMB Yuan (51.23%); total savings at all financial institutions at the end of the year was 626.3 trillion RMB Yuan (55.01%); and the total residents' savings were 233.6 trillion RMB Yuan (46.1%) (Fig. 2.3 and Tables 2.4, 2.5 and 2.6). These figures suggest that

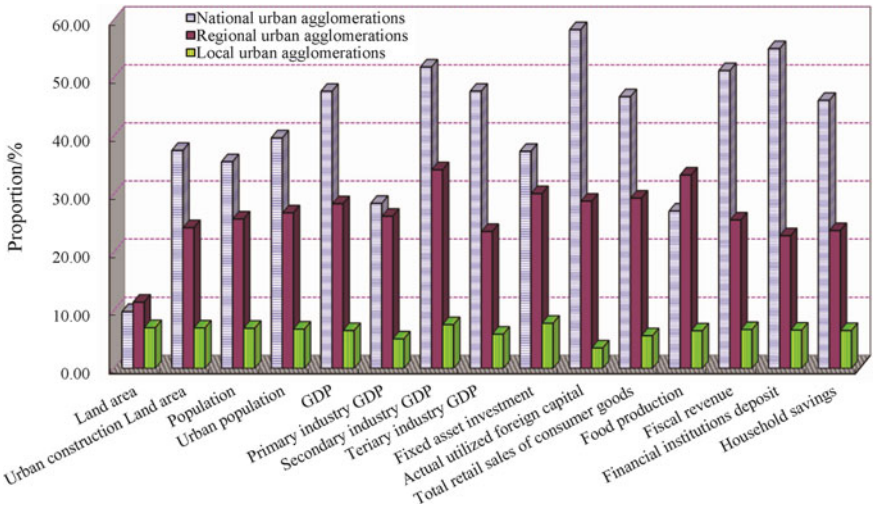


**Fig. 2.3** National strategic position of Chinese urban agglomerations

**Table 2.4** Changes of some main economic indicators of China's agglomerations between 1980 and 2014

| Urban agglo-mera-tions | Year | Total area /km$^2$ | Total population /thousand people | Urban population /thousand people | GDP / (current price, 100 million RMB Yuan) | Added value of the primary industry /100 million RMB Yuan | Added value of the secondary industry /100 million RMB Yuan | Added value of the tertiary industry /100 million RMB Yuan | Total fixed asset investment /100 million RMB Yuan | Actual utilized foreign investment /100 million US dollars | Food produc-tion/ton | Financial Income /100 million RMB Yuan | Total Savings at all financial institutions /100 million RMB Yuan | Residents' savings /100 million RMB Yuan |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National level | 1980 | 630,248.8 | 25,260.74 | 5,679.39 | 1,850.1 | 433.32 | 1,015.85 | 517.55 | 284.68 | 2.98 | 9,719.73 | 525.11 | 859.25 | 208.96 |
| | 2014 | 938,691 | 48,609.63 | 29,694.63 | 326,276.1 | 17,776.63 | 151,263.7 | 157,227.3 | 191,454.5 | 1,652.92 | 16,407.44 | 38,861.94 | 626,318.6 | 233,631.6 |
| Regional level | 1980 | 424,211 | 18,918.11 | 2,871.64 | 1,180.15 | 329.02 | 614.91 | 235.58 | 207.01 | 2.81 | 7,175.11 | 145.19 | 309.59 | 118.39 |
| | 2014 | 1,093,025 | 35,075.6 | 20,029.58 | 193,447.2 | 16,389.7 | 99,602.82 | 77,510.73 | 154,054.5 | 815.1 | 20,178.27 | 19,330.79 | 259,493.9 | 119,923.8 |
| Local level | 1980 | 244,722 | 5,789.43 | 1,034.91 | 188.7 | 45.87 | 103.75 | 44.86 | 38.06 | 0.14 | 1,060.28 | 35.43 | 157.83 | 27.81 |
| | 2014 | 672,443.7 | 9,450.34 | 5,055.94 | 44,548.07 | 3,173.53 | 21,962.94 | 19,411.81 | 39,774.1 | 99.48 | 3,918.12 | 5,068.68 | 75,147.92 | 33,066.53 |
| Total | 1980 | 1,299,182 | 49,968.28 | 9,585.94 | 3,218.95 | 808.21 | 1,734.51 | 797.99 | 529.75 | 5.93 | 17,955.12 | 705.73 | 1,326.67 | 355.16 |
| | 2014 | 2,704,160 | 93,135.57 | 54,780.15 | 564,271.4 | 37,339.86 | 272,829.4 | 254,149.8 | 385,283 | 2,567.5 | 40,503.83 | 63,261.41 | 960,960.5 | 386,621.9 |

**Table 2.5** The proportion of main economic indicators of urban agglomerations at different levels to national urban agglomeration total between 1980 and 2014 (%)

| Urban agglomerations | Year | Total area | Urban construction land use | Population | Urban population | GDP | Added value of the primary industry | Added value of the secondary industry | Added value of the tertiary industry | Total Fixed Asset Investment | Actual utilization of foreign investment | Total social consumer retail | Food production | All financial institutions' savings at the end of the year | Residents' savings at the end of the year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National level | 1980 | 48.51 | 43.70 | 50.55 | 59.25 | 57.48 | 28.67 | 53.61 | 58.57 | 64.86 | 53.74 | 50.25 | 55.94 | 64.77 | 58.84 |
| | 2014 | 34.71 | 54.67 | 52.19 | 54.21 | 57.82 | 24.38 | 47.61 | 55.44 | 61.86 | 49.69 | 64.38 | 57.27 | 65.18 | 60.43 |
| Regional level | 1980 | 32.65 | 38.59 | 37.86 | 29.96 | 36.66 | 47.34 | 40.71 | 35.45 | 29.52 | 39.08 | 47.39 | 36.81 | 23.34 | 33.33 |
| | 2014 | 40.42 | 35.22 | 37.66 | 36.56 | 34.28 | 44.82 | 43.89 | 36.51 | 30.50 | 39.98 | 31.75 | 35.85 | 27.00 | 31.02 |
| Local level | 1980 | 18.84 | 17.71 | 11.59 | 10.80 | 5.86 | 23.99 | 5.68 | 5.98 | 5.62 | 7.18 | 2.36 | 7.25 | 11.90 | 7.83 |
| | 2014 | 24.87 | 10.12 | 10.15 | 9.23 | 7.89 | 30.80 | 8.50 | 8.05 | 7.64 | 10.32 | 3.87 | 6.88 | 7.82 | 8.55 |
| Total | 1980 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | 2014 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

**Table 2.6** The proportion of main economic indicators of urban agglomerations at different levels to national total between 1984 and 2014(%)

| Urban agglomerations | Year | Total area | Urban construction land use | Population | Urban population | GDP | Added value of the primary industry | Added value of the secondary industry | Added value of the tertiary industry | Total fixed asset investment | Actual utilized foreign investment | Total social Consumer retail | Food production | Financial income | All financial institutions' savings at the end of the year | Residents' savings at the end of the year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| National level | 1980 | 6.56 | 39.93 | 25.58 | 34.74 | 40.71 | 31.59 | 46.34 | 52.71 | 31.25 | 39.55 | 34.35 | 30.31 | 60.01 | 49.44 | 52.3 |
| | 2014 | 9.78 | 37.49 | 35.54 | 39.64 | 47.67 | 28.36 | 51.85 | 47.68 | 37.33 | 58.29 | 46.73 | 27.03 | 51.23 | 55.01 | 46.1 |
| Regional level | 1980 | 4.42 | 35.25 | 19.17 | 17.57 | 25.95 | 24 | 28.04 | 24.01 | 22.73 | 37.29 | 22.62 | 22.37 | 16.59 | 17.83 | 29.64 |
| | 2014 | 11.39 | 24.16 | 25.66 | 26.72 | 28.29 | 26.13 | 34.14 | 23.52 | 30.04 | 28.74 | 29.25 | 33.24 | 25.49 | 22.78 | 23.67 |
| Local level | 1980 | 2.55 | 16.19 | 5.88 | 6.33 | 4.15 | 3.34 | 4.74 | 4.57 | 4.18 | 1.86 | 4.45 | 3.3 | 4.05 | 9.34 | 6.96 |
| | 2014 | 7 | 6.95 | 6.9 | 6.75 | 6.51 | 5.06 | 7.52 | 5.88 | 7.76 | 3.51 | 5.62 | 6.46 | 6.67 | 6.58 | 6.51 |
| Total | 1980 | 13.53 | 91.37 | 50.63 | 58.64 | 70.81 | 58.93 | 79.12 | 81.29 | 58.16 | 78.7 | 61.42 | 55.98 | 80.65 | 76.61 | 88.9 |
| | 2014 | 28.17 | 68.6 | 68.1 | 73.11 | 82.47 | 59.55 | 93.51 | 77.08 | 75.13 | 90.54 | 81.6 | 66.73 | 83.39 | 84.37 | 76.28 |

these five national-level urban agglomerations accounted almost half of entire China's total socioeconomic activities. They contributed the greatest to China's socioeconomic development and dominate the lifeblood of China's economic development [11].

(2) Regional level urban agglomerations. The regional-level urban agglomerations include the Central and Southern Liaoning Urban Agglomeration, Shandong Peninsula Urban Agglomeration, The Western Coast of the Taiwan Strait Urban Agglomeration, Harbin-Changchun Urban Agglomeration, Central Plains Urban Agglomeration, Jianghuai Urban agglomeration, Central Shaanxi Urban Agglomeration, Guangxi Beibu Gulf Urban Agglomeration, and The Northern Slope of the Tianshan Mountains Urban Agglomeration. By 2014, these 9 urban agglomerations occupied 1.093 million $km^2$ (11.39%) with 351 million people (25.66%), and 200 million urban population (26.72%). These 9 urban agglomerations' GDP was 193.4 trillion RMB Yuan (current price) in 2014 (28.29%). Among them, the added value of the primary industry was 16.4 trillion RMB Yuan (26.13%); of the secondary industry was 99.6 trillion RMB Yuan (34.14%); of the tertiary industry was 77.5 trillion RMB Yuan (23.52%). The total fixed asset investment in these 9 urban agglomerations was 154.1 trillion RMB Yuan (30.04%); actual utilization of foreign investment was 81.51 billion US dollar (28.74%); total food production was 202 million tons (33.24%); total financial income was 19.3 trillion RMB Yuan (25.49%), total savings at all financial institutions at the end of the year was 259.4 trillion RMB Yuan (22.78%); and the total residents' savings were 111.9 trillion RMB Yuan (23.67%). These figures suggest that the 9 regional-level urban agglomerations accounted for approximately one third of China's socioeconomic activities [12].

(3) Local level urban agglomerations. The local-level urban agglomerations include 6 urban agglomerations, namely, Central Shanxi Urban Agglomeration, Hohhot-Baotou-Ordos-Yulin Urban Agglomeration, Central Yunnan Urban Agglomeration, Central Guizhou Urban Agglomeration, Lanzhou-Xining Urban Agglomeration, and Ningxia along the Yellow River Urban Agglomeration. By the end of 2014, these 6 urban agglomerations occupied 0.6724 million $km^2$ (7%) with 95 million people (6.9%), and 51 million urban population (6.75%). These 6 urban agglomerations' GDP was 44.5 trillion RMB Yuan (current price) in 2014 (6.51%). Among them, the added value of the primary industry was 5.2 trillion RMB Yuan (5.06%); of the secondary industry was 22 trillion RMB Yuan (7.52%); of the tertiary industry was 19.4 trillion RMB Yuan (5.88%). The total fixed asset investment in these 6 urban agglomerations was 39.8 trillion RMB Yuan (7.76%); actual utilization of foreign investment was 9.948 billion US dollars (3.51%); total food production was 39 million tons (6.46%); total financial income was 5.1 trillion RMB Yuan (6.67%), total savings at all financial institutions at the end of the year was 75.1 trillion RMB Yuan (6.58%); and the total residents' savings were 33.1 trillion RMB Yuan (6.51%). The local urban agglomerations accounted for approximately 6–7% of China's total socioeconomic activities.

### 3. The relationship between the "5 + 9 + 6" urban agglomerations classification and spatial pattern and relevant national plans

Relationships between the "5 + 9 + 6" urban agglomeration classification and spatial pattern and the 21 key urbanization areas identified in the *National Development Priority Zone Planing* [13]. The 21 key urbanization areas identified in the *National Development Priority Zone Planing* and the "5 + 9 + 6" urban agglomerations spatial pattern are highly overlapping except for the Eastern Area of the Longhai Railway, and Central and Southern Xizang. The reasons follow. For the Eastern Area of the Longhai Railway, there are two major cities, namely, Lianyungang and Rizhao. These two cities, though serve as the bridgeheads of the second Eurasian Land Bridge (the Longhai Railway), are not immediately supported by enough density of other cities. The entire area lacks the required amount and integration of cities. They are not included in any of the urban agglomerations.

For the Central and Southern Xizang, this area has only two relatively large cities, namely, Lhasa and Xigazê. Still, even for these two cities, not only are their urbanization levels low, they are also separated quite afar. There are not enough smaller sized cities that are located in between these two cities, and transportation conditions between these two cities develop far behind any other urban agglomeration areas. In the foreseeable future, cities in this area will remain relatively underdeveloped. Because of both the urban development status and natural conditions and eco-environment carrying capacity, concentrated and highly integrated urban agglomeration in this area might not form any time soon. Specifically, for urbanization development planning in Xizang, we need to understand the five characteristics, namely, its relatively harsh natural conditions (high-elevation plateau), relatively lagging development status, relatively under-developed stage, unique development mechanisms (government driving) and sparse development patterns. Based on these five characteristics, we propose the development path for Xizang's urbanization in the future shall be based on China's national requirements, considering closely the local relatively fragile eco-environment conditions of Xizang, fully supporting areas and cities that can be developed fast, but also focusing on balancing development and protection. The goals for Xizang's urbanization are set to be about 30% in 2020, and 35% in 2030. The most important consideration for Xizang's urbanization is to respect local culture and natural conditions. It is imperative to avoid one-size-fit-all type of urbanization. Integration and concentrated development must be within local carrying capacity instead of seeking "the closer the better" type of concentration. Based on the current socioeconomic and urbanization status of Xizang, we propose to urbanize the residents gradually without encroaching both their traditional customs and life styles by building small townships around grazing grounds to facilitate their husbandry needs, but also provide stable residence. Urbanization in Xizang needs to be connected and integrated with local cultures, traditions, and customs. The goal for Xizang's urbanization is to reach the middle stages of urbanization and keep in this stage for a very long time. Instead of encouraging the development of large population concentration centers, it is necessary to encourage the development of small cities and townships that can gradually gather local farmers and herdsmen and

transform them to township denizens. A possible strategy would be to standardize the village community construction to promote self-guided and gradual urbanization, or to attempt shareholding strategies to convert local farmers and herdsmen to township shareholders. The spatial pattern of Xizang's New Urbanization will follow a typical inverted "T" model with "one agglomeration, three axes, and multiple nodes." Specifically, the "one agglomeration" refers to Xizang Zedang specialized urban agglomeration that will be the focus of Xizang's urban agglomeration construction; the three axes refer to the urban agglomeration developing axis in the Middle and Lower Reaches of Niyang River in the east, the urban agglomeration developing axis in the Upper and Middle Reaches of the Yarlung Zangbo River in the west, and the urban agglomeration developing axis along the Qinghai-Xizang railroad in the north. These urban agglomeration axes require significant support and guidance; the multiple nodes refer to the relatively developed townships in Eastern, Northern, Western Xizang and along the border lines [14].

The coordinated relationships between the "5 + 9 + 6" urban agglomeration spatial pattern and the national new urbanization planning. China's national new urbanization planning proposes China's future urbanization macro pattern will be based on the "two horizontal and three vertical" primary transportation corridors. The 5 national-level, 9 regional-level and 6 local-level urban agglomerations are all distributed along the five primary New Urbanization axes, namely, the Coastal Urbanization Primary Axis, the Yangtze River Urbanization Primary Axis, the Eurasian Land Bridge Urbanization Primary Axis, the Harbin-Beijing-Guangzhou Railway Urbanization Primary Axis, and Baotou-Kunming Railway Urbanization Primary Axis. These twenty various levels of urban agglomerations and the five Urbanization Primary Axes form a distinctive urban agglomeration spatial pattern in which "the axes connect the urban agglomerations, and the urban agglomerations support the axes."

The interlaced relationship between the "5 + 9 + 6" urban agglomeration spatial pattern and the 25 national key eco-functional areas. The twenty selected urban agglomerations are all outside the 25 national key eco-functional areas to avoid encroachment of urban development to the eco-functional areas.

The corresponding relationship between the "5 + 9 + 6" urban agglomeration spatial pattern and the 11 key urban agglomerations proposed in the *National Urban System Planning*. The proposed "5 + 9 + 6" urban agglomerations agree well with the 11 key urban agglomerations proposed in the *National Urban System Planning*. All these twenty urban agglomerations are located on the "one belt, seven axes, and multiple channels" structure proposed in the national urban system.

### 2.2.2 *Basic Thoughts of the Layered Construction of the "5 + 9 + 6" Spatial Pattern of China's Urban Agglomerations*

1. **Focused construction: the 5 large national-level urban agglomerations**

The national-level urban agglomerations are the most developed, and most integrated urban agglomerations in China. The construction of these urban agglomerations takes first priority and will be the foci of China's urban agglomeration construction for the foreseeable future. Construction for these national-level urban agglomerations shall follow the thoughts of developing internationally influential and competitive growth poles based on national central cities, promoting these core cities' international service and innovation capability, enhancing their domestic and international radiating/penetrating capability, strengthening cooperation and division of labor among these cities, optimizing their industrial structure and regional development structure, strengthening regional eco-environment protection, strictly controlling developing intensity and density, strengthening urban network construction and infrastructure development, and innovating urban agglomeration management mechanism. Currently, the national-level urban agglomerations occupied about 9.78% of China's land area; about 35.54% of China's population, about 35.15% built-up areas, about 39.64% of China's urban population, 47.67% of China's GDP, about 37.33% of total fixed asset investment, about 58.29% actual utilization of foreign investment, about 46.73% total retail sales of consumer goods, about 51.23% of total revenue, about 55.02% of year-end financial institution deposit balance, and about 46.1% of annual balance of urban and rural residents' savings [15].

(1) Yangtze River Delta Urban Agglomeration: Building a world-class urban agglomeration with the strongest national comprehensive competitiveness

The Yangtze River Delta Urban Agglomeration includes Shanghai, Nanjing, Wuxi, Changzhou, Suzhou, Nantong, Yangzhou, Zhenjiang, Taizhou of Jiangsu Province, Hangzhou, Ningbo, Jiaxing, Huzhou, Shaoxing, Zhoushan, and Taizhou of Zhejiang Province (15 prefecture level cities). In 2014, there were 29 county-level cities, 45 cities of other types, and 892 established townships under the jurisdiction of the urban agglomeration, accounting for 6.93% of China's cities, and 4.37% of China's established townships. The land area is about 110.8 thousand $km^2$ (about 1.15% of the national total). Total population is about 106,691.7 thousand (about 7.80% of the national total). GDP is about 10575.051 billion RMB Yuan (about 15.45% of the national total). The Yangtze River Delta Urban Agglomeration is the most economically development, most urbanized and most competitive urban agglomeration in China. It is also one of the globally recognized six world-class urban agglomerations.

The construction goal of the Yangtze River Delta Urban Agglomeration is to build an important international gateway for China to the Asia-Pacific region, an important modern service industry and advanced manufacturing base, and a world-class urban agglomeration in China. The development of this urban agglomeration will be centered on building Shanghai to be an international economic, financial, trade and

shipping center, promoting and developing globally influential international financial services system, international business service system, and international logistics network system. In so doing, we aim to promote the opening level of Yangtze River Delta Urban Agglomeration so that it can play a central role in China's participation in global cooperation and foreign exchange.

To achieve these goals, it is imperative to fully develop the integrated service function of the Yangtze River Delta Urban Agglomeration, accelerate the development of financial, logistics, information, research and development-oriented modern service industry, strive to form a modern service industry-oriented industrial system, construct a number of leading, radiating modern service industries and industry agglomerations so that it will play an even more important role in the global service system. In addition, we should speed up the construction of regional innovation system, enhance the capability of independent innovation, develop recycle economy, promote industrial upgrading, upgrade the level of manufacturing industry, build up a number of advanced manufacturing industrial clusters with international leading level, and become an important and advanced manufacturing base in the world. It is also important to unleash the leading role of Shanghai, strive to enhance globalization level of Nanjing, Suzhou, Wuxi, Hangzhou, Ningbo and other regional central cities, pursue the Belt and Road Initiative and the Yangtze River Economic Belt and other national strategic construction projects. The goal is to build a networked urban system centered on super and megacities with coordinated development among different levels of cities so that it will be China's most active and globally competitive world-class urban agglomeration. By 2020, we envision that Yangtze River Delta Urban Agglomeration will form a service-oriented modern industrial system, take the lead in realizing modernization; reach or even exceed advanced global development level in important fields of scientific and technological innovation, significantly strengthen the leading and supporting role for economic development, create more coordinated, more reasonable division of labor and highly specialized spatial pattern within the urban agglomeration, significantly improve the ecological and environmental conditions. By that time, it is expected that in the Yangtze River Delta Urban Agglomeration, the per unit GDP energy consumption is close to or reaches the world advanced level; human and the nature co-exist harmoniously; social security level enhances further with the realization of basic public service equalization; citizens are more affluent, and the quality of life is greatly improved. By 2030, the globally oriented high-end services industries will be the economic pillars of this urban agglomeration, and it will grow to be a world class urban agglomeration with sustainable growing potential, complete industrial system and reasonable spatial layout. The urban agglomeration's industrial structure and regional division of labor will be more reasonable. Its basic services will be available to all its citizens. Its infrastructure conditions and public service capacity will reach that of the developed countries and regions. Its economic growth and ecological environment will gradually integrate into a virtuous cycle. In summary, this urban agglomeration will become an exemplar world class urban agglomeration that is based on China's domestic markets and resources, but also radiate to the entire world with harmonious human and natural development and relationship.

The spatial structure of the Yangtze River Delta Urban Agglomeration will include the One Core (Shanghai), Two Centers (Nanjing and Hangzhou), One Belt (the Beijing-Shanghai-Hangzhou industrial development and dense belt of cities and towns along the Nanjing-Shanghai-Hangzhou-Ningbo-Zhoushan transportation corridor), Three Axes (Nantong-Shanghai-Ningbo Coastal Development Axis, Yangzhou-Taizhou-Nantong Development Axis, and Nanjing-Huzhou-Hangzhou Development Axis). The "One Core" refers to Shanghai as the core of development and the center of the urban agglomeration. Shanghai will focus on optimizing the core function of the city's development, aiming to be one of the global centers of international economy, finance, trade, and shipping; vigorously develop modern service industries and advanced manufacturing industries; continue to enhance economic extroversion; further enhance Shanghai's innovation ability; and promote its domestic and international competitiveness. The "Two Centers" refer to the two major regional central cities, namely, Nanjing and Hangzhou. The two central cities should take advantages of existing resources and industrial foundation to develop the service industries such as tourism, leisure, exhibition, research and development and special ecological agriculture. The goal for the two central cities is to become important domestic and international tourism centers, regional exhibition centers and domestic research and development bases. At the same time, we should fully unleash the regional central cities' transportation, information, finance, and trade functions. Nanjing will serve as the center and radiate to the development of Wanjiang urban belt to build up an important gateway through which the Yangtze River Delta can radiate to drive the development of the central and western regions. Hangzhou will serve as the center of Hangzhou metropolis, and promote urban development in Huzhou and surrounding cities. The "One Belt" refers to the Beijing-Shanghai-Hangzhou industrial development and dense city belt along the Nanjing-Shanghai-Hangzhou-Ningbo-Zhoushan transportation corridor. The Beijing-Shanghai-Hangzhou development belt is a "Z"-shaped structure that links the core (Shanghai) and the two central cities, including Shanghai-Nanjing and Shanghai-Hangzhou-Ningbo transportation corridors that connect cities along the river, coastal, and the bay areas. Specifically, the Nanjing-Shanghai section links Zhenjiang, Changzhou, Wuxi, Suzhou; the Shanghai-Hangzhou section connects Jiaxing, Hangzhou to Shaoxing, Ningbo, and Zhoushan, along the Hangzhou bay area. As the main development region, the Beijing-Shanghai-Hangzhou belt need to focus on optimizing the cities' functions, enhancing their innovation ability, strictly controlling potential environmental pollution, and building high-tech industries belt and modern service industries, so that it will have profound impact on and also fully serve the development in Yangtze River Delta Urban Agglomeration and even the entire nation.

The "Three Axes" includes the coastal development axis from Nantong-Shanghai-Ningbo, the Yangtze River development axis from Yangzhou-Taizhou-Nantong, and the railway development axis from Nanjing-Huzhou-Hangzhou. The coastal development axis shall rely on Nantong Port, Shanghai Port, Ningbo Port and other port groups to accelerate the development of economic extroversion, improve the port logistics base, guide moderate growth of energy and chemical industries, rationally develop and utilize marine resources, and steadily promote the development of port

industries. The Yangtze River development axis should take full advantage of the Golden Waterway (the Yangtze River), actively promote the development and the construction of river banks and ports, and guide appropriate concentration of equipment, logistics, chemical and other industries. Development in this axis also needs to pay extra attention to regional environmental management. The railway development axis from Huzhou-Hangzhou shall take full advantage of the high-speed rail to strengthen the connections among the cities in urban transportation, information, industry and other aspects of the relationship, focus on the development of high-tech, textile appliances, tourism and leisure, modern logistics, ecological agriculture and other industries, and actively cultivate clustered urban areas so that it will facilitate the expansion of the Yangtze River Delta's influence on Central and Western China. In the future, we propose to integrate the Yangtze River Delta and Jianghuai Urban Agglomerations into the Lower Reaches of the Yangtze River Urban Agglomeration and develop it to be the most competitive world-class urban agglomeration.

(2) The Pearl River Delta Urban Agglomeration: The most competitive urban agglomeration in the Asia-Pacific region

The Pearl River Delta Urban Agglomeration includes 9 prefecture-level cities, namely, Guangzhou, Shenzhen, Zhuhai, Foshan, Jiangmen, Zhaoqing, Huizhou, Dongguan, and Zhongshan of Guangdong Province and Hong Kong, Macau. In 2014, there were also 5 county-level cities, 14 small cities of other types, and 335 established townships, accounting for 2.16% of China's cities and 1.64% of all the established townships in China. The total land area was about 54.9 thousand $km^2$, accounting for 0.57% of the total national land area. Permanent residents were about 57.6338 million, accounting for 4.21% of the national total. Its GDP was 5,780.197 billion RMB Yuan, accounting for 10.24% of the national GDP. The Pearl River Delta Urban Agglomeration is the most economically dynamic and most urbanized urban agglomerations of the three large urban agglomerations in China.

We proposed to build the Pearl River Delta Urban Agglomeration into the world's advanced manufacturing and modern services base, the strategic hub of China's "21st Century Meritime Silk Road", the International Exchange Center for the "South-South" cooperation, an important national economic center and a pioneer area for innovative deep reform and social governance, and a globally competitive, people-oriented, and sustainable world-class urban agglomeration with Hong Kong and Macau. It is important for the development of this urban agglomeration to adhere to the strategic orientation of high-end development, build new horizon of independent innovation, create a number of world-level advanced manufacturing industry bases, cultivate a group of world-class enterprises and brands with international competitiveness, develop a complete modern service system to facilitate the development of Hong Kong's International Financial Center, and construct a series of international shipping, logistics, trade, exhibition, tourism and innovation centers that supplement the development of Hong Kong and Macau. It is of critical importance for the development of this urban agglomeration to stick to the "one country, two systems" policy, promote close cooperation, integration and development with Hong Kong

and Macau, and jointly build the Asia-Pacific region's most dynamic and internationally competitive urban agglomeration. It is necessary to innovate the international regional cooperation mechanism, upgrade the level of economic internationalization comprehensively, and improve the open economic system with enhanced internal and external linkage, mutual benefit, and security and efficiency. This urban agglomeration will continue to undertake the historical mission of being China's "experimental plots" of national reform, boldly explore, and experiment different pathways. It is imperative to comprehensively promote the reforms in economic system, political system, cultural system and social system, take the lead in breaking through in important fields and key links, provide a powerful impetus for the realization of scientific development, and create new experiences for the development of socialism with Chinese characteristics. To achieve these goals, it is necessary to grant the Pearl River Delta Urban Agglomeration greater autonomy, support its initial exploration of the transformation of economic development modes, coordinate development of urban and rural areas, new ways and new measures to construct a harmonious society, so that it will create a development pathway with efficient production and development, affluent living, and sustainable ecological environment to provide a demonstration for the national scientific development.

Specifically, the Pearl River Delta Urban Agglomeration will have an overall spatial pattern composed of "Two Cores" (Guangzhou, Shenzhen), "Three Circles" (Guangzhou-Foshan-Zhaoqing economic circle, Shenzhen-Dongguan-Huizhou economic circle, and Zhuhai-Zhongshan-Jiangmen economic circle), "Three Main Axes" (Guangzhou-Dongguan-Shenzhen-Hong Kong development axis, Guangzhou-Zhongshan-Zhuhai-Macau development axis, and Shenzhen-Zhuhai coastal development axis), and "One Secondary Axis" (Zhaoqing-Foshan-Guangzhou-Huizhou axis).

The "Two Cores" refer to two core cities, Guangzhou and Shenzhen. On one hand, their development will focus on promoting professional innovation capability supporting producer service industries, accelerating the development of modern logistics, finance, commerce, cultural creativity, headquarters economy and other high-end services, improving investment in research and development, and reaching new horizon of regional innovation. On the other hand, taking advantage of the construction of the 21st Century Maritime Silk Road, it is necessary for these two core cities to continue to play the central roles in the development of entire Pearl River Delta Urban Agglomeration, to deepen cooperation with Hong Kong and Macau, and to create a dual-core linkage development pattern. In particular, Shenzhen should strengthen its cooperation with Hong Kong so that these two cities will have much stronger westwards radiating capability to further expand the opening-up channel.

The "Three Circles" refer to the Guangzhou-Foshan-Zhaoqing economic circle, Shenzhen-Dongguan-Huizhou economic circle, and Zhuhai-Zhongshan-Jiangmen economic circle. For the Guangzhou-Foshan-Zhaoqing economic circle, Guangzhou is the center, covering Foshan and Zhaoqing. This economic circle will focus on accelerating the promotion of industrial optimization, increasing investment in science and technology, promoting high-tech industry development, emphasizing the development of automotive, shipbuilding, machinery manufacturing and other advanced

manufacturing, striving to build world-class modern service industries, and establishing a pilot zone for the integrated development of the Pearl River Delta region, an experimental zone for deep national reform and scientific development, a comprehensive portal zone for China, an advanced manufacturing base for the international modern service center, and a demonstration zone for Guangdong's livable urban and rural construction. The Shenzhen-Dongguan-Huizhou economic circle centers on Shenzhen and covers Dongguan and Huizhou. The development strategy for this economic circle is to strengthen the construction of airport agglomeration within the area, deepen the opening to the outside world, and establish an open and market-oriented regional innovation system with the enterprise as the primary players, actively integrating research and production, build a national demonstration area for independent innovation, and build the Pearl River Delta National Greater Science Center. The Zhuhai-Zhongshan-Jiangmen economic circle is centered on Zhuhai, covering Zhongshan and Jiangmen. The development strategy of this economic circle shall be centered on the construction of the Hengqin free-trade experiment zone, so as to strengthen the inter-connection among local cities to facilitate further opening-up.

The "Three Main and One Secondary Axes" refer to Guangzhou-Dongguan-Shenzhen (Hong Kong) development axis, Guangzhou-Zhongshan-Zhuhai (Macau) development axis, Shenzhen-Zhuhai Coastal development axis, as well as Zhaoqing-Foshan-Guangzhou-Huizhou secondary development axis. The development strategies for the four axes depend on the development of the Jiangmen high-tech zone, Zhaoqing high-tech zone and Jiangmen Daguang Bay economic zone. To take advantage of existing manufacturing bases, these four axes shall focus on the development of Foshan Intelligent Equipment and Automotive Manufacturing, Zhuhai Communication, marine engineering and general aviation equipment manufacturing, Zhongshan port side engineering equipment and installation, wind power equipment industry, satellite equipment industry, Jiangmen rail transportation equipment manufacturing industry, and Zhaoqing automobile parts manufacturing. In addition, for a better connectivity among cities within the region and better opening up, construction of the Xintai high-speed rail extension line, Huizhou-Macau expressway, Hongwan to Gaolan Port expressway, and the ring express way between Nanping (Shenzhen) and Daya Bay must have high priority. In the future, this urban agglomeration will gradually merge with the Western Coast of the Taiwan Strait Urban Agglomeration to form a gigantic Pearl and Minjiang River Urban Agglomeration and become the most competitive and dynamic world-class urban agglomeration in the Asia-Pacific region.

(3) Beijing-Tianjin-Hebei Urban Agglomeration: a world-class urban agglomeration with the strongest national innovation ability

The Beijing-Tianjin-Hebei Urban Agglomeration includes the two provincial level municipalities, Beijing, Tianjin, and 8 prefecture-level cities of Hebei Province, including Shijiazhuang, Tangshan, Qinhuangdao, Baoding, Zhangjiakou, Chengde, Cangzhou, and Langfang. This urban agglomeration has China's most vibrant economy, the highest degree of openness, the most innovative capacity, and the most attractive region to migrants. In 2014, there were 17 county-level cities, 27 cities

of other types, and 1067 established townships, accounting for 4.16% of China's cities, and 5.23% of China's established towns. Its land area was 183.4 thousand $km^2$ (1.91%). It had a population of 88.8711 million (6.5%). The GDP in 2014 was 6022.724 billion RMB Yuan (8.80%).

According to the *Beijing-Tianjin-Hebei Cooperative Development Plan*, this urban agglomeration will develop into a world-class urban agglomeration centered on China's capital city, Beijing. It will become the pioneer region for regional overall coordinated development reform, a new engine for national innovation-driven economic growth, and a demonstration area for eco-remediation and environment improvement.

The core and main goal for the future development of the Beijing-Tianjin-Hebei Urban Agglomeration is to achieve joint development, which can be divided into three stages in the near, medium and long terms. The near stage runs from 2014 to 2017, in which Beijing's non-capital functions will be gradually and orderly transferred to other parts within the urban agglomeration. The urban agglomeration will gradually achieve goals of integrated transportation, eco-environmental protection, and industrial upgrading. The medium-term stage runs from 2017 to 2020, in which the urban agglomeration's population size will be controlled within 23 million people; Beijing's "Big City Disease" will be under control; an integrated regional transportation network comes into being; the eco-environment quality improves substantially; and its coordinated industrial development achieves significant progress. In addition, during this stage, the urban agglomeration's public service facilities will cover the entire population; its coordinated development mechanism matures; the regional development gap tends to shrink; and the urban agglomeration achieves a highly balanced, coordinated, and mutually beneficial development. From 2020 to 2030, Beijing's capital functions will be further optimized. Development among Beijing-Tianjin-Hebei is highly integrated with more rational regional economic structure, better eco-environmental quality, and more balanced public services. This urban agglomeration will become the leader of China's national economic and social development with strong international competitiveness and influence.

The spatial pattern of the Beijing-Tianjin-Hebei Urban Agglomeration will be composed of "One Core (Beijing), Two Cities (Beijing and Tianjin), three axes (Beijing-Tianjin main axis, Qinhuangdao-Beijing-Baoding-Shijiazhuang secondary axis, and Qinhuangdao-Tangshan-Tianjin-Cangzhou secondary axis), four zones (central core function zone, east coastal development zone, south functional development zone and the northwest ecological conservation zone), and multiple-nodes".

For the "One Core, Two Cities", the future will focus on the development of high-end service industries, advanced manufacturing industries, strong science and technological research and development, healthy financial operations, close transportation connection to facilitate interconnection and coordinated development among the two cities and strengthen the region's openness. The ultimate goal is to build Beijing and Tianjin into the most innovative, highly open, and globally competitive dual-core global metropolis. For the "three axes," the main axis (Beijing-Tianjin) connects Beijing, Langfang, Tianjin, and radiates to Zhangjiakou and Chengde. Development for

this axis can take advantage of the strong creativity and research capability in Beijing and Tianjin to promote the concentration of modern service industries and high-end manufacturing industries. On the other hand, this axis can also attempt to develop new, sustainable urbanization and industrialization strategies that can take advantage of the ecological and environment resources in Zhangjiakou and Chengde. Development of the Qinhuangdao-Beijing-Baoding-Shijiazhuang secondary axis shall be centered on Beijing and promote its close connection with the two regional central cities, Baoding and Shijiazhuang, to develop modern logistic industries, modern electronics and information industries, and mechanic manufacturing industries. The goal is to enable efficient southwards transportation and diffusion of production factors from Beijing and Tianjin. Towards the north, the axis also connects Beijing to Tangshan and Qinhuangdao, which provides important seaports for Beijing. Development of the Qinhuangdao-Tangshan-Tianjin-Cangzhou secondary axis shall be centered on Tianjin and extended to the three coastal cities of Tangshan, Qinhuangdao and Cangzhou. This secondary axis is an important integrated part of this urban agglomeration's "sea economy," which shoulders the integration of inland and coastal economic activities.

For the four zones, the central functional zone (Beijing, Tianjin, Langfang) is the primary economic core. The east coastal development zone (Tianjin, Tangshan, Qinhuangdao, Cangzhou) is the primary location for the development of "sea economy." The south functional extension zone (Shijiazhuang, Baoding) will be the secondary core within this urban agglomeration. The northwest ecological conservation zone (Zhangjiakou, Chengde) is the experimental zone for new and sustainable urbanization and industrialization. The "multiple nodes" include regional central cities such as Shijiazhuang, Baoding, Tangshan, and nodal cities such as Zhangjiakou, Chengde, Qinhuangdao and Cangzhou, and their tasks are to enhance their comprehensive carrying capacity and service capability, promote concentration of industries and population. In the long run, this urban agglomeration will gradually merge the Central and Southern Liaoning Urban Agglomeration and Shandong Peninsula Urban Agglomerations to create the Greater Bohai Rim Urban Agglomeration, one of the world-class urban agglomerations in China that will actively support national economic development and globalization.

(4) The Middle Reaches of Yangtze River Urban Agglomeration: the national urban agglomeration that will drive the development of central China

The Middle Reaches of Yangtze River Urban Agglomeration includes the three capital cities of Hubei, Hunan, and Jiangxi provinces, namely, Wuhan, Changsha, and Nanchang, as well as 31 prefecture-level cities, namely, Huangshi, Jingmen, Jingzhou, Ezhou, Xiaogan, Huanggang, Xianning, Yichang, Xiantao, Qianjiang, Tianmen, Xiangyang, Zhuzhou, Xiangtan, Hengyang, Yueyang, Yiyang, Changde, Loudi, Jiujiang, Jingdezhen, Yingtan, Xinyu, Fuzhou, Yichun, Pingxiang, Shangrao, and Ji'an. In 2014, there were also 30 county-level cities in the jurisdiction of this urban agglomeration. There were in total 61 cities of various sizes, and 1586 established townships, accounting for 9.40 and 7.77% of the national total. This urban agglomeration covered 350 thousand $km^2$ (3.65%), with 131.1656 million people

(9.59%). Its GDP in 2014 was 6181.571 billion RMB Yuan (9.03). This is the key region of Central China's development, and also the one urban agglomeration that covers the largest land territory and includes the largest number of cities.

Based on the State Council approved document (April, 2015), *the Development Plan for the Middle Reaches of Yangtze River Urban Agglomeration*, the plan aims to build this urban agglomeration into one of the new growth poles of China's economic development, a pilot region for the implementation of New Urbanization in Central and Western China, a demonstration zone for inland opening and cooperation, and a leading zone for building the "resource-saving and environment-friendly" (also known as the "two-oriented") society. Through speeding up the transformation of economic development mode, implementing innovation-driven development strategy, developing advanced manufacturing industry, upgrading the development level of modern service industry, actively cultivating strategic emerging industries, vigorously developing modern agriculture, the goal is to construct the Middle Reaches of Yangtze River Urban Agglomeration to be a modern industrial base with global influence and an important national innovation base. In addition, through enhancing the comprehensive strength and competitiveness of this urban agglomeration, we aim to build an important support for the Yangtze River Economic Belt, to drive the accelerated development in Central and Western China and build a new economic growth pole. Furthermore, through continuous improvement of the institutional mechanism for urban agglomeration integration and development, we should promote the intensive concentrated development of urban agglomeration, adjust the setting of city establishment, optimize the spatial form and layout of cities, improve the comprehensive carrying capacity of towns, promote the unification of urban development and industry support, integrate employment transfer and population concentration, and construct livable and workable cities which are integrated with the local natural conditions (mountain and water systems). In addition, we should build an urbanization model focusing on local urbanization that can maximize the absorption of agricultural transfer population, promote the integration of urban and rural areas and facilitate the integrated development of urban agglomeration. With the Yangtze River Golden Waterway and other important traffic channels within the urban agglomeration as the primary links, relying on the central cities and industrial bases, smoothing internal and external relations, strengthening cooperation and interaction with the Yangtze River Delta, Pearl River Delta, and Chengdu-Chongqing Urban Agglomerations, we will be able to establish a unified and open market system and a high-level open platform, deepen global cooperation and international exchanges, and create a pioneering demonstration area of multi-level open cooperation. By speeding up the construction of resource-saving and environment-friendly society, we intend to promote a green low-carbon production life style and urban construction management model in the Middle Reaches of Yangtze River Urban Agglomeration, build a linkage mechanism of trans-regional ecological construction and environmental protection, expand green ecological space, and create an ecological urban agglomeration with important influence, so that it can provide a typical demonstration of the "two-oriented" society building for national urban agglomeration development.

The general spatial pattern of the Middle Reaches of Yangtze River Urban Agglomeration is centered on Wuhan, Changsha and Nanchang (the three capital cities of the three provinces in this urban agglomeration). There will be "three centers", "three axes (Wuhan-Changsha axis, Wuhan-Nanchang axis, and Changsha-Nanchang secondary axis)", and "three sub-urban agglomerations (Wuhan sub-urban agglomeration, Changsha-Zhuzhou-Xiangtan sub-urban agglomeration, and Poyang Lake sub-urban agglomeration)". For the "three centers", the primary tasks are to further develop modern service industries, enhance the ability of scientific and technological innovation, upgrade the level of modernization and internationalization of the cities, improve the mechanism and system of cooperative development, and establish close connections among industry, transportation, information and other aspects of the economic activities, so that their development will promote the rapid development of Wuhan sub-urban agglomeration, Changsha-Zhuzhou-Xiangtan sub-urban agglomeration and the Poyang Lake sub-urban agglomeration. The "three axes" will serve as primary connection channels that integrate the three centers and their peripheral cities together. For the "three circles" (or three sub-urban agglomerations), the Wuhan sub-urban agglomeration shall rely fully on Wuhan's science and education advantages and industrial advantages, strengthen the leading role of Wuhan's radiation, carry out the national innovative city pilot experiment, upgrade the level of internationalization, and become an important integrated transport hub, advanced manufacturing and high-tech industrial base, and the modern service center of Central China. The Changsha-Zhuzhou-Xiangtan sub-urban agglomeration should rely on the existing national-level development zones and industrial bases, promote science and technology education, cultural creativity, business logistics and other functions, to build an important advanced manufacturing base, integrated transport hub and modern service center in Central China. The Poyang Lake sub-urban agglomeration should strengthen the construction of the central city Nanchang, promote the construction of ecological economic zone of Poyang Lake, build demonstration area of ecological human settlement environment of the Great Lakes Basin and model zone of low-carbon economic innovation development.

During the construction of the Middle Reaches of the Yangtze River Urban Agglomeration, there are a few major issues that require special attention:

(1) The Middle Reaches of the Yangtze River Urban Agglomeration should include only three provinces and 31 cities. The Jianghuai Urban Agglomeration to the east should not be included in this urban agglomeration. This is because when we are considering the factors such as geographical proximity, functional complementarity, cultural identity, contact tightness and common interest, common policy guidance and common development potential, according to the development standard of urban agglomeration, judging from the result of a fracture point model and gravity model, we can conclude that the rational geographic coverage of the Middle-Reach of the Yangtze River Urban Agglomeration should only include the areas in the middle reaches of the Yangtze River from Yichang of Hubei Province to Hukou of Jiangxi Province. Again, based on the models' results, we suggest this urban agglomeration including Wuhan, Huangshi,

Ezhou, Huanggang, Xiaogan, Xianning, Xiantao, Tianmen, Qianjiang, Yichang, Jingzhou, Jingmen of Hubei Province; Changsha, Zhuzhou, Xiangtan, Yueyang, Yiyang, Changde, Loudi and Hengyang of Hunan Province; and Nanchang, Jiujiang, Jingdezhen, Yingtan, Xinyu, Fuzhou, Yichun, Pingxiang of Jiangxi Province. From the standpoint of historical origin, economic connection, traffic accessibility and openness, the middle reaches of the Yangtze River has formed the early stage of a "Middle Triangle" urban agglomeration that is composed of the Wuhan sub-urban agglomeration, the Changsha-Zhuzhou-Xiangtan sub-urban agglomeration and the central Poyang Lake sub-urban agglomeration. On the other hand, Jianghuai urban agglomeration is relatively far away from the middle reaches of the Yangtze River; has rather weak economic and technical links with the middle reaches of the Yangtze River comparing to its close relationship with the Yangtze River Delta region. Even considering from the perspective of self-development, Jianghuai Urban Agglomeration should not move westwards to be integrated with the Middle Reach of the Yangtze River Urban Agglomeration. Instead, it will be far more likely and beneficial for Jianghuai Urban Agglomeration to strengthen its close connection eastwards with the Yangtze River Delta Urban Agglomeration and eventually merge into it to build a world-class super urban agglomeration.

(2) It is important to scientifically compile the Master Plan for the Middle Reach of the Yangtze River Urban Agglomeration based on the reasonable geographic coverage. It is important to make sure that the defined geographic coverage of the urban agglomeration will not change as administrative personnel changes. Once the geographical coverage of the urban agglomeration is determined, it will then be necessary (and possible) to create a unified master plan for the urban agglomeration. The goal is centered on the 10 "synchronization", namely, synchronization of plan compilation, industrial chains, urban and rural planning, transportation network, information sharing, financial systems within the same city, market integration, development of science and technology, environmental protection and ecological construction, so that the urban agglomeration will have integrated regional industrial development distribution, integrated infrastructure construction, integrated regional market construction, integrated urban and rural development and planning, integrated environmental protection and ecological construction, and integrated social development and social security system construction. Via allowing the market mechanism to play the dominant role in the formation and development of the urban agglomeration, along with the prioritized infrastructure construction, we can then build an all-around, holistic greater transportation network within the urban agglomeration.

(3) The coordinated promotion working mechanism for constructing the Middle Reaches of the Yangtze River Urban Agglomeration needs to be initiated at the national level. Since the proposed urban agglomeration includes 28 prefecture level cities and three provincial capital cities, any one of the provinces or cities can hardly shoulder the responsibility or have the administrative authority to lead the construction of the Middle Reaches of the Yangtze River Urban Agglomeration. We propose to integrate the advantageous resources of the three

provinces, and establish a national-level leading organization of urban agglomeration construction in the middle reaches of the Yangtze River. The organization's primary task is to coordinate and arrange consultations on some major issues during the construction of the urban agglomeration, create a virtuous coordination and innovative working mechanism, mobilize the enthusiasm of all the three provinces, and avoid the potential problems of internal competition instead of cooperation. Within each province, there can be a provincial level branch organization that will assist the national-level organization's daily activities.

(4) It is critical to attach great importance to the construction of the Middle Reaches of the Yangtze River Urban Agglomeration to become the national-level urban agglomeration that drives the rise of the central region. The Middle Reaches of the Yangtze River Urban Agglomeration, as China's national key development region to accelerate industrialization and urbanization, has very important and far-reaching strategic significance for the healthy development of urbanization in the middle reaches of the Yangtze River and the way to explore the healthy urbanization with Chinese characteristics. Future key construction projects will focus on the construction of the Wu(han)-Chang(sha), Wu(han)-Nan(chang) primary axes and the Chang(sha)-Nan(chang) secondary axis. The goal is to build an important integrated transportation hub, scientific and technological innovation base, and advanced manufacturing and modern service base; build a national resource-saving and environment-friendly ecological urban agglomeration and establish it as the core growth zone leading the rise of the central region. In the meantime, within this urban agglomeration we will also strive to construct the water ecological security zone in the middle and lower reaches of the Yangtze River to provide a model for the comprehensive renovation of the Great Lakes and Rivers and the "two-oriented" (resource-saving and environmental-friendly) society and also to provide strategic support for national food and ecological security.

(5) It is also critical to fully understand the long-term and difficult nature of the construction of this urban agglomeration so that we will not rush the process and be impatient. From analyzing the periodic rules of the development of urban agglomeration, the Middle Reaches of the Yangtze River Urban Agglomeration is still at its early stage of relatively low development level. We must realize that it needs a very long term of exploration and fusion process to realize the high level of urbanization and integration. In addition, we need to realize that the construction of the urban agglomerations in the middle reaches of the Yangtze River is not dependent on the any subjective "plans" but relies on the market mechanism to "develop", and also relies on the actual "actions" of cooperation among different cities. Therefore, we should fully understand the long-term and difficulty nature of the construction of the Middle Reaches of the Yangtze River Urban Agglomeration, follow the periodic rules of urban agglomeration development, and gradually cultivate and build the urban agglomeration continuously.

(5) The Chengdu-Chongqing Urban Agglomeration: a national urban agglomeration that drives the development of western regions

The Chengdu-Chongqing Urban Agglomeration is composed of the provincial level municipality of Chongqing and prefecture-level cities in Sichuan Province, namely, Deyang, Mianyang, Meishan, Ziyang, Leshan, Zigong, Luzhou, Neijiang, Yibin, Suining, Yaan, Nanchong, Dazhou, and Guang'an. In 2014, there were 13 county-level cities in this urban agglomeration, 29 cities of other types and 1569 established townships, accounting for 4.47% of all the cities in China and 7.69% of all the established townships. The land area is approximately 239.5 thousand $km^2$ (2.5%). It had approximately 110.1929 million people (8.06%). Its GDP was 4068.07 billion RMB Yuan (5.94%). The Chengdu-Chongqing Urban Agglomeration is the locomotive driving the economic development of Western China and one of the important engines of China's economic development.

Based on the State Council Executive Meeting approved *Chengdu-Chongqing Urban Agglomeration Development Plan* in March 2016, the Chengdu-Chongqing Urban Agglomeration will be constructed as a national-level urban agglomeration leading to the opening and development of Western China, a leading platform for opening-up in the Yangtze River economic belt, a strategic fulcrum of urban and rural development demonstration and an important national ecological civilization and ecological security construction area. It is important for the Chengdu-Chongqing Urban Agglomeration's development to adhere to the new urbanization and new industrialization development strategy, promote the function and internationalization of Chongqing and Chengdu's central city functions, exert these "two engines" driving and supporting functions in the urban agglomeration, promote the integration of resources, optimize the opening environment, improve the opening-up level, build an open inland platform, smooth the eastward, the southward and the northwestward channels of opening up, to build the urban agglomeration to be the national-level urban agglomeration that leads the opening-up and development of Western China. We propose the Chengdu-Chongqing Urban Agglomeration to seize the strategic development opportunities in the Yangtze River Economic Belt, deepen communication and cooperation with the Middle Reaches of the Yangtze River Urban Agglomeration, Yangtze River Delta Urban Agglomeration, accelerate the transfer of industries from the east, accelerate the development of advanced manufacturing and services, build the country's important modern agricultural base, advanced manufacturing base and high-tech industrial clusters, and build the Chengdu-Chongqing Urban Agglomeration to be an important engine of economic growth in the west and the upper reaches of the Yangtze River Economic Belt. We will vigorously promote the construction of integrated urban and rural comprehensive reforms in Chongqing and Chengdu, coordinate urban and rural industrial development, urban and rural infrastructure construction, and the development of urban and rural social development, promote equalization of basic public services, allow industries to promote agriculture and allow urban area to elevate rural area to form a new pattern of integration and development and become the demonstration model of the national coordinated urban and rural development. In addition, we will also strive to coordinate the construction

of ecological environment and economic and social development, to develop green economy and recycle economy, to promote the joint treatment of ecological environment of Chengdu-Chongqing Urban Agglomeration, to strengthen environmental remediation in key watersheds and key areas, to open and preserve ecological corridor and to construct ecological security barrier in the upper reaches of the Yangtze River.

The overall spatial pattern of the Chengdu-Chongqing Urban Agglomeration follows a mode of "two cores, two circles, three axes, and multiple nodes", which relies on the developed road network and the dense distribution of towns. The "two cores, two circles" refer to the core cities of Chongqing, Chengdu, and the two metropolis circles centered on these two cities. The Chongqing metropolitan area includes Yuzhong, Dadukou, Jiangbei, Shapingba, Jiulongpo, Nan'an, Beibei, Yubei, and Ba'nan. For this metropolitan circle, we should take full advantage the Chongqing's provincial municipality's system advantages and its radiation agglomeration role to strengthen traffic, finance, commerce, logistics and other essential comprehensive urban services, focus on the development of high-tech industries and modern services, and create economically prosperous, socially harmonious, and environmentally beautiful international metropolis. In the meantime, with Chongqing as the center, we propose the metropolitan area to cover Hechuan, Jiangjin, Yongchuan. By strengthening Jiangjin, Hechuan, Yongchuan, Nanchuan, Shuangqiao's infrastructure construction and industrial connection with Chongqing, we will eventually create a complementary, coordinated interaction pattern in this metropolitan area. On the other hand, Chengdu should focus on the development of modern service industries, high-tech industries, advanced manufacturing and special agriculture. On the one hand, it is imperative to strengthen Chengdu's interaction with Chongqing, speed up the traffic construction and research and development cooperation between Chengdu and Chongqing. On the other hand, it is important for Chengdu to take advantage of its capital city's advantages, to promote the development of the metropolitan area centered on Deyang, Mianyang, Meishan, and Leshan. We should actively build up the industrial upstream and downstream relationship and form a situation where resources complement each other, and industry develops together. The "three axes" refer to the Chengdu-Chongqing primary development axis, the Chengdu-Mianyang-Leshan secondary development axis, and the Chongqing-Wanzhou-Yibin secondary development axis. The "multiple nodes" refer to the numerous nodal cities with different sizes and functions. Among them, the Chengdu-Chongqing primary development axis connects the two core cities, connects Ziyang, Neijiang, Yongchuan, and radiates to Suining and Zigong. The development of the Chengdu-Chongqing primary development axis should rely on the Chengdu-Chongqing, Lanzhou-Chongqing and Chongqing-Suining railways, and Chengdu-Chongqing, Chengdu-Nanchong, Chongqing-Suining, and Southern Chongqing expressways as the link, focus on the development of equipment manufacturing, electronic devices and information industries, business logistics and other pillar industries, strive to enhance the financial, cultural, trade, tourism and other new industries, actively guide the industry and population agglomeration, and build an important economic belt connecting the two cores. The Chengdu-Mianyang-Leshan secondary development axis shall be centered on

Chengdu, connect to Mianyang and Deyang to the northeast, Meishan and Leshan to the south, radiate Ya'an, rely on Chengdu-Mianyang-Leshan intercity passenger line, Baoji-Chengdu and Chengdu-Kunming railways and Chengdu-Mianyang, Chengdu-Leshan expressways as the primary connecting channels, optimize the cities' functions, guide the differential urban development, build equipment manufacturing, electronic information, biomedicine, and specialized agriculture industrial clusters, improve the environmental quality, and build an internationally competitive belt of industries and cities. For the Chongqing-Wanzhou-Yibin secondary development axis, it is centered on Chongqing, connecting to Wanzhou to the northeast, and Jiangjin, Luzhou, Yibin to the southwest. Relying on the Yangtze River Golden Waterway and the expressways along the river, this axis will focus on the development of new material, the clean energy, textile and food industries, and trade logistics. In the meantime, it is important for this development axis to strengthen its environmental protection and ecology construction and build the upper reaches of the Yangtze River belt of industries and cities.

In the long run, the Chengdu-Chongqing Urban Agglomeration will be constructed as an experimental area for national integrated urban and rural comprehensive reform. More importantly, it will be developed to be the largest dual-core urban agglomeration in Western China, forming the largest strategic support point and the primary strategic growth pole of developing the western region, the development center of the upper reaches of the Yangtze River and the fifth national-level urban agglomeration.

2. **Steadily construct nine large regional-level urban agglomerations**

The regional-level urban agglomerations are the key urban areas which drive the regional economic development. This group of urban agglomerations are the secondary level urban agglomerations (compared to the national-level urban agglomerations, which are the primary level urban agglomerations). These urban agglomerations generally have at least one national central city or regional central city as their core cities. To actively cultivate these types of urban agglomerations, we need to focus on improving the infrastructure, enhancing the function of the central city and promoting the division of labor in areas with strong carrying capacity of resources and environment, comparatively sound urban system and a regional central city that has strong radiation-driven function. Based on our comprehensive empirical and fieldwork experiences, we propose to steadily construct 9 large regional urban agglomerations in the immediate future. Specifically, these 9 large regional urban agglomerations include 3 each in the Eastern, Central and Western China, which will serve as important development engines for regional economic development in the three regions. These 9 large regional urban agglomerations are the Central and Southern Liaoning Urban Agglomeration, Shandong Peninsula Urban Agglomeration, the Western Coast of the Taiwan Strait Urban Agglomeration, Harbin-Changchun Urban Agglomeration, Central Plains Urban Agglomeration, Jianghuai Urban Agglomeration, Central Shaanxi Urban Agglomeration, Guangxi Beibu Bay Urban Agglomeration, and the Northern Slope of the Tianshan Mountains Urban Agglomeration. In 2016, Land areas of these 9 regional urban agglomerations account for 11.39%

of the national total; their total population accounts for 25.66%; among them, their urban population accounts for 26.72%. Their current price GDP accounts for 28.29% of the national total; their social fixed assets investment accounts for 30.04% of the national total; their actual use of foreign capital accounts for 28.74% of the national total; their total food production accounts for 33.24% of the national total; their fiscal revenue accounts for 25.49% of the national total; their year-end deposit in various financial institutions accounts for 22.78% of the national total. In addition, their comprehensive urban and rural resident savings at the end of the year also account for 23.67% of the national total. These regional urban agglomerations contribute to approximately 30% of the national total [16].

(1) The Central and Southern Liaoning Urban Agglomeration

The Central and Southern Liaoning Urban Agglomeration includes 12 prefecture level cities, namely, Shenyang, Dalian, Dandong, Jinzhou, Yingkou, Panjin, Huludao, Anshan, Fushun, Benxi, Liaoyang and Tieling, 15 county-level cities, and 506 established townships, which accounts for 4.16% of all the cities, and 2.48% of all the established townships in China. This urban agglomeration's land area is 117.3 thousand $km^2$, covering 1.22% of the national territory. It is the core area of economic development in Liaoning Province and the "dragon's head" of economic development in Northeastern China. It also serves as the core city of the old industrial base of Northeast China and the important pilot area of revitalizing the old industrial base, as well as the primary region for the Northeastern to join the process of globalization.

The Central and Southern Liaoning Urban Agglomeration will be built into a pilot region for revitalizing old industrial bases in Northeastern China, an important international hub for connecting and opening up to the Northeastern Asia, and a pilot region for socioeconomic development and industrial structure optimization. It is very important for the development of this urban agglomeration to continue to make significant progress in the new round of comprehensive revitalization of the old industrial base, strive to build into a pilot area for key breakthrough in the institutional mechanism, optimization of economic structure, innovation and entrepreneurship and overall progress of the people's livelihood. The future development of the urban agglomeration will focus on further improving the levels of opening-up, building a new pattern of overall opening-up along the coast and inland areas, actively participating in the international industrial division of labor and regional cooperation in Northeastern Asia, enhancing the quality of foreign investment and foreign trade, and promoting overseas investments and scientific and technological cooperation, economic and technological cooperation. The goal is to build this urban agglomeration into an important international hub that connects China and the Northeastern Asia. Through promoting the development and construction of the coastal economic zone in Liaoning, and integrating various port resources, we aim to build the Dalian Northeastern Asia International Shipping Center, International Logistics Center and Regional Financial Center, with Jinzhou as the regional center of the Western Liaoning. The development shall adhere to the principle of coordinating land and sea development, facing and connecting to "Russian-Outer Mongolian-European", actively

participating in the construction of China-R.O. Korea free trade area. The key development priorities for this urban agglomeration is to optimize the industrial structure, speed up the upgrading of traditional industries, build an internationally competitive equipment manufacturing base, a national new raw material and energy security base, a national important commodity grain and agricultural production base, and the national important technology research and innovation base. The space pattern of this urban agglomeration is composed of the "dual-cores (Shenyang and Dalian)", "one-axis (Shenyang-Dalian development axis)", and "one belt (Liaoning Southern Coastal Economic Belt)". This urban agglomeration will drive the development of Eastern Liaoning Peninsula.

(2) Shandong Peninsula Urban Agglomeration

The Shandong Peninsula Urban Agglomeration includes 13 prefecture-level cities, namely, Jinan, Qingdao, Yantai, Weihai, Rizhao, Dongying, Weifang, Zibo, Taian, Laiwu, Binzhou, Dezhou, Liaocheng, 25 county-level cities and 719 established townships, which accounts for 5.86% and 3.52% of the national total, respectively. The land area of the urban agglomeration is 113.1 thousand $km^2$, covering 1.18% of the national territory. The construction of Shandong Peninsula Urban Agglomeration is strategically important to promote regional cooperation in the Bohai Sea, lead the accelerated development in the lower reaches of the Yellow River, and also connect to the Beijing-Tianjin-Hebei Urban Agglomeration, Yangtze River Delta Urban Agglomeration, eventually promote the optimization of spatial layout of the eastern coastal areas.

The Shandong Peninsula Urban Agglomeration will be built to be the leading area for national innovation and transition development, a demonstration area of the four synchronous modernization development, the strategic location of deep cooperation between China, Japan and R.O. Korea, an internationally famous tourist destination and an important growth pole in the eastern coastal areas. The development of this urban agglomeration will follow in-depth implementation of innovation-driven strategy, and continuously improve the ability of independent innovation. In addition, the development here will actively transform from the high-consuming, low-efficient model to a green, low-carbon development model and corresponding spatial configuration. It is important to coordinate among population transfer, town layout, industrial development and resource and environmental carrying capacity, and strive to build a nationally important advanced high-tech industrial base, leading the national innovation-driving and transformation development. Moreover, for the Shandong Peninsula Urban Agglomeration, it is also important to explore and perfect the coordinated development mechanism of urban agglomeration from the aspects of management mode, factor flow, facility construction, service sharing, ecological protection and risk control, promote the development of new urbanization, industrialization, informatization and agricultural modernization, effectively reduce the gap between urban and rural areas and enable urban and rural residents to share the achievements. In so doing, the development model of this urban agglomeration will provide examples for the four national modernization construction. In

participating in international cooperation, the Shandong Peninsula Urban Agglomeration will actively pursue the Belt and Road Initiative, speed up the construction of China-Japan-R.O. Korea free trade association (FTA) and Western Economic Cooperation Demonstration Zone, consolidate the advantages of traditional cooperation with Japan and R.O. Korea, expand new areas of cooperation, timely establish the regional economic cooperation demonstration zone among Japan, R.O. Korea and the experimental area of Chinese (Shandong) free trade, and strive to open up a new situation to build an important platform for open cooperation in Northeastern Asia and the Pacific Rim, and to build an important open gateway in Northern China. The development of this urban agglomeration will fully explore the traditional cultural beauty and natural landscape, rationally develop and utilize coastal resources, speed up the construction of coastal charm leisure belt, enhance the capacity of tourism, and coordinate to build internationally renowned high-quality tourism destinations. Relying on coastal port resources and the modern transportation network, this urban agglomeration will strengthen its connection with the Beijing-Tianjin-Hebei Urban Agglomeration and the Yangtze River Delta Urban Agglomeration, promote cooperation in the Greater Bohai Rim region, accelerate the development of the middle and lower reaches of the Yellow River, and also initiate positive interactions with the Central, Western, and Northeastern China. The ultimate goal is to build the Shandong Peninsula urban agglomeration to be an important growth pole of eastern coastal China. The spatial pattern will be characterized as "two cores" (Jinan and Qingdao) led, axis and belts expanded (the Jinan-Qingdao-Liaocheng development belt, the coastal urban development belt, and the Beijing-Shanghai, Binzhou-Linyi, Yantai-Qingdao, Dezhou-Dongying, and Qingdao-Taian urban development axes), and seven districts supported (Jinan, Qingdao, Yantai-Weihai, Dongying-Binzhou, Weifang, Liaocheng, and Dezhou metropolises) network development.

(3) The Western Coast of the Taiwan Strait Urban Agglomeration

The Western Coast of the Taiwan Strait Urban Agglomeration includes 6 cities in Fujian Province (Fuzhou, Xiamen, Zhangzhou, Quanzhou, Putian, and Ningde), 4 cities in Guangdong Province (Chaozhou, Jieyang, Shantou, Shanwei), and Wenzhou in Zhejiang Province. There are also 12 county-level cities and 654 established townships, which account for 3.54% and 3.21% of the national total, respectively. Its land area is about 83.2 thousand $km^2$, or about 0.86% of the national total. This urban agglomeration is an important frontier platform and link that will strengthen the cross-Taiwan-Strait exchanges and cooperation, and promote the peaceful development of Mainland-Taiwan relations. It is also the central part of the Western Coast of the Taiwan Strait Economic Zone, and an important urban agglomeration that will serve the function of reunification of Mainland and Taiwan.

The Western Coast of the Taiwan Strait Urban Agglomeration will be built into a pilot area for people's exchanges and cooperation between Mainland and Taiwan, an important window for international cooperation, an important natural and cultural tourism area in China, an important base for advanced manufacturing in the eastern coastal areas, and a coastal growth pole that can radiate to central and Western China.

This urban agglomeration will form a spatial pattern with clear division of labor, rational layout, functional complementarity, differential development. Specifically, it will be a networked spatial configuration with "one belt (coastal development belt), four axes (Fuzhou-Ningde-Wenzhou development axis, Xiamen-Zhangzhou development axis, Quanzhou-Putian Development axis and Shantou-Chaozhou-Jieyang development axis), and six districts (Wenzhou Coastal Development Zone, Fujian Jiangkou Development Zone, Meizhouwan Development Zone, Quanzhou Bay Development Zone, Xiamen Bay Development Zone, and Eastern Guangdong Coastal Development Zone)". Relying on the high degree of marketability and developed private economy, this urban agglomeration shall actively promote the development of the coastline along the Western Coast of the Taiwan Strait, and form the bridgehead connecting to the Yangtze River Delta and the Pearl River Delta. According to the requirements of the development priority zone planning, we must vigorously develop the advanced manufacturing industries and modern services, optimize the function of cities, promote the integration and development of cities, and build a distinctive and competitive urban agglomeration on the Western Coast of the Taiwan Strait.

(4) The Central Plains Urban Agglomeration

The Central Plains Urban Agglomeration includes 9 prefecture-level cities, namely, Zhengzhou, Luoyang, Kaifeng, Xinxiang, Jiaozuo, Xuchang, Jiyuan, Pingdingshan, Luohe, 14 county-level cities (totaling 23 cities), and 464 established townships, accounting for 3.54% and 2.27% of the national total, respectively. The urban agglomeration's land area is 59.2 thousand $km^2$, covering 0.62% the national territory. In the future, the Central Plains Urban Agglomeration will be built to an important growth pole that supports the national economic growth, the country's important modern integrated transportation hub and logistics center, an innovation zone for China's historical civilization heritage, an important national high-tech industrial, advanced manufacturing and modern service base. Its development will strictly adhere to the core-driven, axes and belts promoting, node upgrading, and neighbor connecting principles. With Zhengzhou as the core city, Luoyang as the deputy central city, this urban agglomeration's development will focus on promoting the integration of inter-city transport, industry links, service sharing, ecological construction to enhance the overall strength and comprehensive competitiveness. By accelerating development of the Central Plains Urban Agglomeration, we aim to make it an important growth pole to promote the balanced territory development and lead the regional economic development. By strengthening Zhengzhou's transportation hub function, accelerating the construction of railway transportation hub and airport, constructing modern comprehensive transportation system within the urban agglomeration, and speeding up the development of modern logistics industry, the goal is to create this urban agglomeration to be an important modern integrated transportation hub and logistics center. Through exploring the historical and cultural resources of the Central Plains Urban Agglomeration, strengthening the cultural heritage protection and inheritance, enhancing global Chinese cultural influence, we aim to cultivating cultural brands that have unique characteristics that carry the marks of the Central Plains and China, but also is contemporary and globally influential,

so as to enhance the cohesion of China. The spatial pattern of this urban agglomeration will including "a pole (Zhengzhou), two axes (along the Longhai Railway development axis and along the Beijing-Guangdong development axis), and multi-centers (Luoyang as the deputy Center City, develop Kaifeng, Pingdingshan, Xinxiang, Jiaozuo, Xuchang into central cities with at least one million residents, Luohe and Jiyuan will be developed into central cities with over 500,000 residents [10]."

(5) The Harbin-Changchun Urban Agglomeration

The Harbin-Changchun Urban Agglomeration includes 10 prefecture-level cities, namely Harbin, Daqing, Qiqihar, Suihua, Mudanjiang of Heilongjiang Province, and Changchun, Jilin, Songyuan, Siping, Liaoyuan of Jilin Province, and 20 county-level cities and 580 established townships, which account for 4.62% and 2.84% of the national total. Its land area is about 280.6 thousand $km^2$, accounting for 2.92% of the national total. It is an important old industrial base and the largest commodity grain base, also an important part of the Northeast Urban Agglomeration and an important portal for China to open to the Northeast Asia.

In the future, the Harbin-Changchun Urban Agglomeration will be built as an important growth pole for the revitalization and development of the old industrial base in Northeastern China, an important gateway for Northern China, a pilot area for system innovation and green ecology. The key for this urban agglomeration's development will focus on structural reform, accelerating the transformation of development models, upgrading traditional industries, building a green safety demonstration zone for national new equipment manufacturing base, food production base, and food and medicine industry, accelerating the formation of an innovation-driven economic system and development model, and promoting economic transformation and development in Northeastern China. It is also important for this urban agglomeration to strengthen the construction of "China-Mongolia-Russia Economic Corridor", accelerate the development of the Changchun-Jilin-Tumenjiang pilot open zone, vigorously implement the "collaborating out" strategy, build an export-oriented modern industrial system, promote international production capacity and equipment manufacturing cooperation, and actively participate in the international division of labor, and create an important portal for the Belt and Road inclusive cooperation in Northern China. We should focus on reform and innovation, crack down the obstacles of institutional mechanism which restrict socioeconomic development, create the policy environment and system environment which can promote the comprehensive implementation of innovation-driven strategy and "popular entrepreneurship and innovation", form the institutional framework for promoting innovation, and provide examples for stimulating regional cooperative development. Moreover, during the development of this urban agglomeration, it is imperative to respect the natural pattern, rationally plan various urban spaces, protect the natural landscape, carefully inherit the historical culture, maintain the local special style, promote the coordinated development of the small and medium-sized cities and towns, build the internationally renowned tourism

destinations of ecology and ice and snow culture, and promote the new pattern of harmonious development of human and nature. The spatial pattern of this urban agglomeration is composed of "dual cores (Harbin and Changchun), one axis (Harbin-Changchun development axis), and two belts (Harbin-Dalian-Qiqihar-Mudanjiang development belt and Changchun-Jilin-Tumenjiang development belt)".

(6) Jianghuai Urban Agglomeration

The Jianghuai Urban Agglomeration includes 10 prefecture level cities, namely, Hefei, Wuhu, Bengbu, Huainan, Anqing, Chizhou, Tongling, Ma'anshan, Chuzhou, and Xuancheng. This urban agglomeration corresponds to one of the primary urbanization areas, the Jianghuai Area, as defined in the National Priority Development Zone. This is a portal urban agglomeration that shoulders the responsibility of receiving the transferring industries from the eastern and distributing them to central China. It is also often regarded as the "hinterland urban agglomeration" of the Yangtze River Delta Urban Agglomeration. The future development goal of Jianghuai Urban Agglomeration is to carry out the plans outlined in the *Planning for Industrial Transfer Model Zone in the Wanjiang City Belt* (National Letter 2010, number 5) approved by the State Council. It is imperative to adhere to the general principles of market-oriented, government-led, division and cooperation, and differential development for the development of the Jianghuai Urban Agglomeration. The spatial orientation of the development will be based in Anhui, relying on Wanjiang, merging into the Yangtze River Delta, connecting to the Central and Western China, and constantly exploring new ways of scientific development. In addition, with Hefei and Wuhu as the cores, focusing on the construction of Wanjiang development axis, promoting Hefei-Huainan integration, Wuhu-Ma'anshan integration, and Tonglin-Chizhou integration, encouraging the development of the cities on both sides of the Yangtze River, deepening the integration and interaction with the Yangtze River Delta, strengthening the contact with the surrounding cities, this urban agglomeration will eventually be built into an important growth pole that supports the development of Central China, and as a demonstration zone for industrial transfer. The ultimate goal is to build Jianghuai Urban Agglomeration into a priority zone that receives the transfer of industries and expansions from the Yangtze River Delta Urban Agglomeration, a strategic pivot for coordinated development in the Yangtze River Economic Belt, an important growth pole that leads the rise of Central China, and a national important advanced manufacturing base and modern services base.

(7) The Central Shaanxi Urban Agglomeration

The Central Shaanxi Urban Agglomeration includes 10 prefecture-level cities, namely, Xi'an, Xianyang, Baoji, Tongchuan, Weinan, Shangluo, Yan'an in Shaanxi Province, and Tianshui, Qingyang, Pingliang in Gansu Province. There are also 786 established townships, accounting for 1.54 and 3.85% of the national total. This urban agglomeration's land area is 164.4 thousand $km^2$, accounting for 1.71% of the national total. It is the most energetic and potential economic zone in the upper reaches of the Yellow River. In the future, this urban agglomeration will be built as the strategic support point of the Silk Road Economic Belt, the demonstration area

for Chinese civilization heritage, the leading area for central and Western China's industrial development, the demonstration area for the revolutionary bases, and the demonstration area to promote the new urbanization and the civil-military industrial integration and upgrading. This urban agglomeration will also serve as the economic center for China's inland development and opening-up, the transportation center for the Silk Road Economic Belt, and core region for cultural, science and technology exchanges. It is important to take full advantage of the integrated modern and ancient (Han and Tang dynasties) civilizations, especially in Xi'an, to build the Central Shaanxi Urban Agglomeration into a cultural center that reflects the blending of the ancient Chinese civilization and modern cultures. This urban agglomeration will serve as the engine to lead the industrial development in Central and Western China through growing to be a demonstration area for inheriting the industrial transfer from the east and an agglomeration area for high-end production factors, as well as focusing on developing labor-intensive industries and promoting the upgrading of modern service industries. It is imperative to adhere to the principles of people-oriented development, promote healthy urban development, build a demonstration area centered on coordinated urban and rural development in Yan'an, and promote urban-rural integration of the old revolutionary areas in the Shaanxi, Gansu, and Ningxia regions. We should also promote system and mechanism innovation for civil-military integration, enhance the independent innovation ability of the civil-military enterprises, guide the ownership enterprises to effectively participate in the construction of defense technology industry, develop the integrated military-civil industries, realize the effective integration and benign interaction between military and civilian economies to make sure that both economies are complementing each other and they can develop together. The spatial pattern of this urban agglomeration will be composed of "one main core (Xi'an and Xianyang core area), two secondary cores (Yan'an and Baoji), and two belts (Silk Road Economic Belt Shaanxi Section urban development primary belt and the revolutionary bases-the Chinese ancient capital urban development belt), and multi-centers [11]."

(8) Guangxi Beibu Gulf Urban Agglomeration

Guangxi Beibu Gulf Urban Agglomeration include 6 prefecture level cities in Guangxi, namely, Nanning, Beihai, Qinzhou, Fangchenggang, Yulin, and Chongzuo and 3 county-level cities, namely, Dongxiang, Pingxiang, and Beiliu. It also has 315 established townships, accounting for 0.92% and 1.54% of the national total, respectively. This urban agglomeration has a land area of 72.8 thousand $km^2$, covering 0.76% of the national total. This urban agglomeration has about 1600 $km^2$ of coastline on the top of the Beibu Gulf. It is the only economic area in China that has both the land border and sea channel with the Association of Southeast Asian Nations (ASEAN), a core urban agglomeration and Bay area urban agglomeration of the China-ASEAN Free Trade Area, and the only coastal region of China's western region. In the future, this urban agglomeration will be built into an important international regional economic cooperation region that is based on the Beibu Gulf, serving the "three South" (Southwestern, Southern and Central and Southern China), connecting Eastern, Central and Western China, and the Southeastern

Asia. This urban agglomeration will play a significant role to connect many regions and serve as a cooperation platform, to promote development with open-up strategies and cooperation, to establish as China-ASEAN's open and cooperative logistics base, business base, processing and manufacturing base and information exchange center, and to become the strategic highland to support the Greater Western development, a new strategic fulcrum to support development in the Southwestern and Central and Southern China, and an important platform to connect the 21st Century Maritime Silk Road and the Silk Road Economic Belt. The spatial pattern of this urban agglomeration contains "one core (Nanning development core), one axis (Nanning-Binhai development axis), and one corridor (Yuchong Development Corridor)."

(9) The Northern Slope of the Tianshan Mountains Urban Agglomeration

The Northern Slope of the Tianshan Mountains Urban Agglomeration includes 9 cities (at both prefecture and county levels) in Xinjiang, namely, Ürümqi, Changji, Miquan, Fukang, Shihezi, Usu, Kuitun, Karamay and Wujiaqu, and 49 established townships, accounting for 1.4 and 0.24% of the national total. This urban agglomeration has a land area of 121.8 thousand $km^2$, covering 1.26% of the national total. The Northern Slope of the Tianshan Mountains Urban Agglomeration is the most developed core region of modern industry, agriculture, traffic information, education and science and technology in Xinjiang. It has the best foundations for urban area, transportation and energy development, which plays a leading role in the whole Xinjiang economy. It is the land bridge portal urban agglomeration for the cooperation with Central Asia. In the future, the Northern Slope of the Tianshan Mountains Urban Agglomeration will be built as a land transportation hub and an important gateway for China to open up to the Central Asia and West Asia regions, an important energy base in China, a strategic passageway of international channel of importing resources, an important international business center, logistics center and foreign cooperative processing base, an important base for national oil, gas and chemical industries, coal electricity, coal chemical industries, mechanical and electrical industries and textile industries. The spatial pattern of this urban agglomeration will be composed of "One core (Ürümqi core), two axes (Ürümqi-Changji-Shihezi-Kuitun-Usu Town primary development axis and Ürümqi-Fukang-Wujiaqu secondary development axis), multi-center".

3. **Gradually guide and develop six local-level urban agglomerations**

The six new local urban agglomerations that will be gradually developed under strict guidance are all located in the central and western regions. These urbanized areas are basically the major urban areas identified in China's Development Priority Zones. They are also the key development areas in central and western regions. They typically play significant roles in their home provinces' economic development. Yet they also typically are in the early stages of urban agglomeration development. These areas are possible to become local-level urban agglomerations with careful policy guidance and development, and will become local examples for integrated economic development, urban and rural integration, locally urbanizing population and industrial development zones.

At present, there are six such local-level urban agglomerations including Central Shanxi Urban Agglomeration, Central Yunnan Urban Agglomeration, Central Guizhou Urban Agglomeration, Lanzhou-Xining Urban Agglomeration, Hohhot-Baotou-Ordos-Yulin Urban Agglomeration, and Areas in Ningxia along the Yellow River Urban Agglomeration. In 2014, the total area of these local-level urban agglomerations accounted for 7% of the national total; the total population accounted for 6.9% of the national total; the urban population accounted for 6.75%; their current price GDP accounted for 6.51%; their primary, secondary and tertiary industries' values added accounted for 5.06, 7.52, and 5.88% of the national total; their total investment in fixed assets accounted for 7.76%; their actual use of foreign capital accounted for 3.51%; their total grain production accounted for 6.46%; their fiscal revenue accounted for 6.67%; their year-end all financial institution deposits accounted for 6.58%; their year-end balance of rural and urban residents' savings accounted for 6.51%. These numbers suggest that the local-level urban agglomerations accounted for approximately 6–7% of the national economy. We will discuss these 6 local-level urban agglomerations in detail below.

(1) The Central Shanxi Urban Agglomeration

The Central Shanxi Urban Agglomeration includes 6 prefecture-level cities, namely, Taiyuan, Jinzhong, Yangquan, Xinzhou, Changzhi, Linfen and 2 county-level cities but under direct control of Shanxi's provincial government, namely, Xiaoyi, Fenyang (of the administrative jurisdiction of Luliang). There are also 6 county-level cities, and 302 established townships, accounting for 2.15 and 1.48% of the national total in 2014. The land area is 89.4 thousand $km^2$, 0.93% of the national total. The total resident population is 209.532 million (1.53% of national total). Its GDP in 2014 was 791.659 billion, accounting for 1.16% of the national GDP. This area is the most concentrated area of Shanxi's towns and industries, and also the most economically active area in Shanxi Province. In the future, the Central Shanxi Urban Agglomeration will be established as an important energy base and advanced manufacturing base, the core demonstration area for the comprehensive reform of resource-oriented economies in Shanxi Province, and an important growth pole for linking China's inland and Bohai Sea development. The spatial pattern of this urban agglomeration will follow a "one circle (Taiyuan-Jinzhong Metropolitan Circle), two cores (Taiyuan and Jinzhong main cores and Jiexiu, Xiaoyi and Fenyang secondary core), two axes (the primary axis connecting Xinzhou, the two cores, and Linfen, as well as the secondary axis connecting the two cores and Changzhi), and quadrupole (Xinzhou, Linfen, Changzhi, Yangquan)."

(2) Hohhot-Baotou-Ordos-Yulin Urban Agglomeration

The Hohhot-Baotou-Ordos-Yulin Urban Agglomeration includes 7 prefecture-level cities, namely Hohhot, Baotou, Ordos, Ulan Qab, Bayannur, Wuhai of the Inner Mongolia Autonomous Region and Yulin of Shaanxi Province, and also one county-level city. There are also 328 established townships, accounting for 1.23 and 1.61% of the national total. Its land area is 296.5 thousand $km^2$, accounting for 3.09% of the national total. Its resident total population was 15.5918 million, accounting for

1.14% of the national total. Its GDP was 1603.811 billion, accounting for 2.34% of the national GDP. This urban agglomeration is a nodal location with the most growth potential in the Yellow River Watershed. In the future, this urban agglomeration will be established as an important energy and coal chemical base, an industrial base for rare-earth materials and a processing base for agricultural and animal products, a strategic platform and economic growth pole for the opening-up to the north, and an important metallurgical and equipment manufacturing base in Northern China. The spatial pattern of this urban agglomeration is composed of "one core (Hohhot), two axes (the primary axis of areas along the Yellow River and the secondary axis of areas along the Baotou-Xi'an Railway), two circles (the Hohhot-Baotou-Ordos Triangle, and the triangle of the other prefecture-level cities)". It is important to strengthen the functions of Hohhot as an international exchange center in China, strengthen its political, economic, cultural, science and education functions so that it will play a role in driving the development of the entire urban agglomeration.

(3) The Central Guizhou Urban Agglomeration

The Central Guizhou Urban Agglomeration includes Guizhou Province's Guiyang, Zunyi, Anshun, Bijie (prefecture-level cities), as well as Duyun of the Southern Guizhou Bouyei and Miao Autonomous Prefecture and Kaili of the Southeast Guizhou Miao and Dong Autonomous Prefecture (both are county-level cities but also capitals of the two autonomous prefectures), and 4 other county-level cities. There are also 392 established townships in 2014, accounting for 1.54%, 1.92% of the national total. Its land area is 55.1 thousand $km^2$, accounting for 0.57% of the national total. Its permanent population was 20.5197 million, accounting for 1.50% of the national total. Its GDP was 648.146 billion, accounting for 0.95% of the national GDP. The Central Guizhou Urban Agglomeration is one of the most important urban agglomerations in Western China and the core of economic and social development in Guizhou Province. In the future, the Central Guizhou Urban Agglomeration will be established as an important national energy resources deep processing, special light industrial base, the equipment manufacturing base in the western, the national cultural tourism development and innovation zone, a national pilot zone for new urbanization in the mountainous region, a demonstration area for Eastern-Western interactive area and the southwest commerce and logistics center. Its spatial pattern is composed of "one core (Guiyang), two axes (the main axis connecting Zunyi, Guiyang, Anshun and the secondary axis connecting Bijie, Guiyang, Duyun, Kaili), five poles (Zunyi, Anshun, Bijie, Duyun and Kaili)". The future development will strengthen the radiation-driven role of the core city, Guiyang, build Guiyang into a national eco-civilized city, an important base of high-tech industry in the western region, and a regional trade and logistics exhibition center.

(4) The Central Yunnan Urban Agglomerations

The Central Yunnan Urban Agglomeration includes 4 prefecture-level cities in Yunnan province, namely, Kunming, Qujing, Yuxi, Chuxiong and two county-level cities. There are also 176 established townships, accounting for 0.92%, 0.86% of the national total. Its land area is 96.0 thousand $km^2$, accounting for 3.55% of the

national total. The total population here was 17.7130 million in 2014, accounting for 1.90% of China's population. Its GDP was 724.887 billion RMB Yuan, accounting for 1.28% of the national GDP. The Central Yunnan Urban Agglomeration is an important location for China to open-up and cooperate with the Southeast Asia. It is also the core of Yunnan province's economic and social development. In the future, this urban agglomeration will be built as a gateway urban agglomeration with distinctive features and strong competitiveness, a core area of China's bridgehead for opening-up to Southwest Asia, and the strategic core area of Yunnan Province's all-round development. The spatial pattern of this urban agglomeration will be composed of "one core (Kunming), two axes (the primary development axis connecting Kunming, Yuxi, Qujing and the primary development axis connecting Kunming and Chuxiong), three poles (Qujing, Yuxi and Chuxiong)". The focus of this urban agglomeration's development will be to improve the radiation-driven role of Kunming in this urban agglomeration, build national and regional airports, railways, highway transportation hubs, and agglomerate regional high-end functions. Kunming will serve as a regional international city for the Southeast Asia, South Asia, China's important tourist city, and one of the important central cities in Western China.

(5) Lanzhou-Xining Urban Agglomeration

The Lanzhou-Xining Urban Agglomeration includes five prefecture and county-level cities, namely, Lanzhou, Baiyin, Xining, Dingxi, Linxia, and Haidong. There were 224 established townships in 2014 as well, accounting for 0.77% and 1.1% of the national total. Its land area was 83.4 thousand $km^2$, accounting for 0.87% of the national land area. Its permanent population was 14.2556 million, accounting for 1.04% of the national total. Its GDP was 431.991 billion RMB Yuan, accounting for 0.63% of the national GDP. This urban agglomeration is the core urban agglomeration in the upper reaches of the Yellow River and the core of economic and social development in Gansu and Qinghai provinces. In the future, it will be built as a strategic node with international competitiveness in the Silk Road Economic Belt, China's important modern manufacturing base and demonstration zone for recycling economy, a comprehensive transportation hub in the northwest, a commerce and trade logistics center, an important scientific research and innovation base, a strategic fulcrum of the northwest inland development and opening-up. This urban agglomeration will serve as a gateway location facing the Central Asia, Western Asia and European countries, through innovating the institutional mechanism of international cooperation, this urban agglomeration will strengthen international cooperation in manufacturing, energy saving and environmental protection industries, and improve its economic extroversion. This urban agglomeration will also actively carry out industrial transformation and upgrading based on its relatively established industrial foundation. With good locational conditions, existing transportation infrastructure, relatively established commerce and trade logistics foundation and scientific research innovation ability, this urban agglomeration shall vigorously develop commerce and trade logistics and information service industry, radiate the vast northwest, continue to consolidate it as a comprehensive transportation hub, trade and logistics center and scientific research innovation base. It is imperative for this urban agglomeration to

seize the strategic opportunity of China's opening up and developing the Northwest inland areas, rely on its relatively established industry foundation and service ability, take the preferential national policies of project inclination and capital investment, build it as the development core and strategic supporting area for the development of Northwest inland area, and lead the development of the whole Northwestern China. The spatial pattern of this urban agglomeration is composed of "two cores (Lanzhou and Xining), two axes (the primary development axis of areas along the Lanzhou-Xinjiang Railway and the secondary development axis of areas along the Ningxia-Lanzhou section of the Beijing-Xizang Expressway and Lanzhou-Haikou Expressway), and many points".

(6) Areas in Ningxia along the Yellow River Urban Agglomeration

Areas in Ningxia along the Yellow River Urban Agglomeration include 4 prefecture-level cities in Ningxia Hui Autonomous Region, namely, Yinchuan, Shizuishan, Wuzhong, and Zhongwei, and two county-level cities. There are also 328 established townships in 2014, accounting for 0.92%, 1.61% of the national total. Its land area is 52.2 thousand $km^2$, accounting for 0.54% of the national total. Its resident population was 5.4701 million, accounting for 0.40% of the national total. Its GDP was 254.313 billion RMB Yuan, accounting for 0.37% of the national total. Areas in Ningxia along the Yellow River Urban Agglomeration is the core region of the economic and social development in Ningxia Autonomous Region. In the future, Areas in Ningxia along the Yellow River Urban Agglomeration will serve as a major national energy and chemical industry and new material base, an economic and cultural exchange center for China to open up to the Muslim countries and regions, the national Halal food and Muslim supplies processing and distribution base, an international core open area for China to open up to the Arab countries and the Muslim world, a demonstration area for harmonious human-nature development in the northwest region, and the radiation source of Ningxia economic and social development. Its spatial pattern is composed of "one core (Yinchuan), three points (Shizuishan, Wuzhong, Zhongwei City), and one belt (areas along the Yellow River belt)". It is critical to allow Yinchuan to serve to its full potential as the core city of this urban agglomeration, strengthen its modern service function for the energy "Golden Triangle", strengthen the economic and trade cooperation between Yinchuan and the Muslim world, promote the exchange of culture and tourism, and improve the opening level of this urban agglomeration.

### *2.2.3 The "5 + 9 + 6" Space Organization Pattern of China's Urban Agglomerations Will Eventually Develop to an "Axis and Agglomeration" Pattern*

Based on the "two horizontals and three verticals" macro-pattern as outlined in the *National Development Priority Zoning*, the spatial pattern of China's 20 urbanization agglomerations will be organized along the five main axes urbanization areas, namely

the coastal urbanization area, urbanization area along the Yangtze River, urbanization area along the Eurasian Land Bridge, urbanization area along the Harbin-Beijing-Guangzhou railway and urbanization areas along the Baotou-Kunming railway, to form a new urbanization macro pattern of "axes connect agglomerations and agglomerations support axes". Among them, the Beijing-Tianjin-Hebei Urban Agglomeration is the intersection of the main axes of the coastal urbanization area and the urbanization area along the Harbin-Beijing-Guangzhou railway. The Yangtze River Delta Urban Agglomeration is the intersection of the main axes of the coastal urbanization area and urbanization area along the Yangtze River. The Pearl River Urbanization Agglomeration is the intersection of the main axes of the coastal urbanization area and urbanization area along the Harbin-Beijing-Guangzhou railway. The Middle Reaches of the Yangtze River Urban Agglomeration is the intersection of the main axes of the urbanization area along the Yangtze River and urbanization area along the Harbin-Beijing-Guangzhou railway. The Chengdu-Chongqing Urban Agglomeration is the intersection of the main axes of the urbanization area along the Yangtze River and the Baotou-Kunming railway (Figs. 2.4 and 2.5). Apparently, all five national-level urban agglomerations are the primary intersections of the "two horizontals and three verticals" national urbanization development main axes.

1. **The urbanization area along the 21st Century Maritime Silk Road and the coastal area urbanization main axis connects 7 urban agglomerations**

The main axis of the coastal urbanization area is part of the laid-down "T" structure of the national main economic development axes (the vertical part, the horizontal part is the urbanization area along the Yangtze River). It has the country's strongest economic strength and highest degree of openness, and also a new urbanization main axis that connects the 21st Century Maritime Silk Road. This axis runs from north to south, connecting 7 urban agglomerations, namely, the Central and Southern Liaoning, Beijing-Tianjin-Hebei, Shandong Peninsula, Yangtze River Delta, the Western Coast of the Taiwan Strait, Pearl River Delta, and Guangxi Beibu Gulf. There are three national-level and four regional-level urban agglomerations. This main axis has the highest development of urban agglomerations. As the 7 urban agglomerations continue to develop, it is possible that these urban agglomerations will eventually merge into a gigantic greater coastal urban metropolitan area.

2. **The urbanization area along the Yangtze River Economic Belt connects six urban agglomerations**

The main axis of urbanization area along the Yangtze River Economic Belt is another part (the horizontal part) of the national laid-down "T" structure economic development axes. It is also one of the country's most economically developed main axes, and also the main axis for new urbanization. This axis runs from east to west, connecting six urban agglomerations including Yangtze River Delta, Jianghuai, the Middle Reaches of the Yangtze River, and Chengdu-Chongqing, of which three are national-level, one regional-level, and two local-level urban agglomerations. The is one of the most developed main axes of the urban agglomeration. In the future, as the three national-level and one regional-level urban agglomeration further strengthen

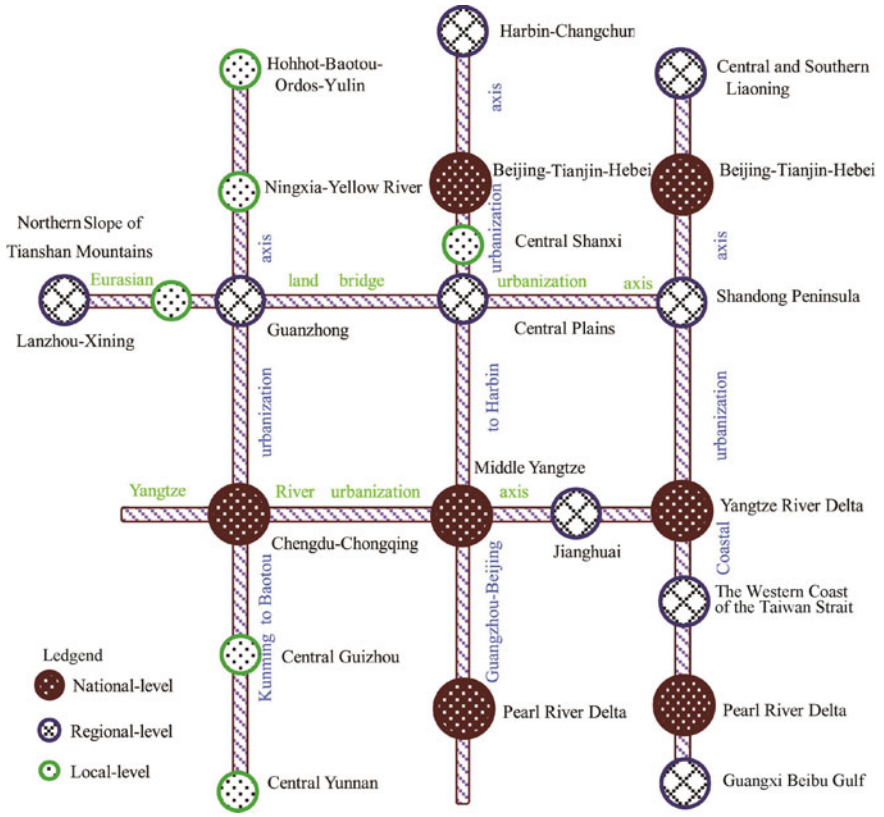


**Fig. 2.4** Framework of the spatial pattern of new-type urbanization development based on "clusters along the axes"

their development, the Yangtze River Delta, Jianghuai and the Middle Reaches of the Yangtze River urban agglomerations will enter the advanced stage of development, and eventually form the metropolitan area along the Yangtze River [17, 18].

3. **The urbanization area along the Harbin-Beijing-Guangzhou main axis connects six urban agglomerations**

The main axis of Harbin-Beijing-Guangzhou railway is one of the national "开" structure economic development pattern, and also one of the most developed national economic main axes. It is also a new urbanization main axis. This axis runs from the north to the south, connecting the Harbin-Changchun, the Beijing-Tianjin-Hebei, the Central Shanxi, the Central Plains and the Middle Reaches of the Yangtze River Urban Agglomerations. There are three national-level, two regional-level and one local-level urban agglomerations. This main axis is also one of the most urbanized axes. As the development degrees of the six urban agglomeration strengthen, the Beijing-Tianjin-Hebei Urban Agglomeration, the Central Shanxi Urban Agglomeration and

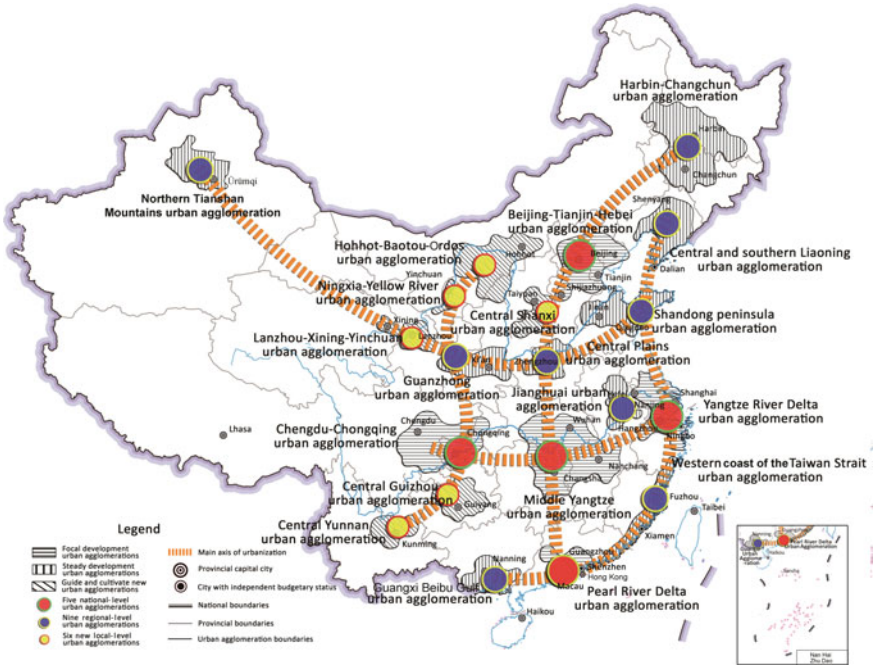


**Fig. 2.5** The new spatial pattern of China's urbanization based on "clusters along the axes"

Central Plains Urban Agglomeration will merge into a metropolitan area along the Beijing-Guangzhou railway.

4. **The urbanization area along the Eurasian land bridge main axis connects five urban agglomerations**

The urbanization area along the Eurasian land bridge main axis is another main axis of China's national "开" structure economic development pattern. It is also one of China's most developed main axis and the main axis of the new urbanization. This axis runs from east to west, connecting the Shandong Peninsula, the Central Plains, the Central Shaanxi, the Northern Slope of the Tianshan Mountains Urban Agglomerations. There are four regional-level and one local-level urban agglomerations. This is one of the main axes with weaker urban agglomeration development. In the future, along with the construction of the Silk Road Economic Belt and the further strengthening of the development degree of the urban agglomerations, this axis will become the strategic main axis to drive the development of new urbanization in Western China.

5. **The urbanization area along the Baotou-Chengdu-Chongqing-Kunming railway main axis connects six urban agglomerations**

As a new main axis of the national economic development pattern, the urbanization area along the Baotou-Chengdu-Chongqing-Kunming railway main axis is also one of the major axes of the new urbanization, which runs from north to south, connects the Hohhot-Baotou-Ordos-Yulin, Areas in Ningxia along the Yellow River, the Central Shaanxi, Chengdu-Chongqing, the Central Guizhou, and the Central Yunnan Urban Agglomerations. There are one national-level, one regional-level and four local-level urban agglomerations. This is also one of the main axes with relatively weaker urban agglomeration development level. In the future, along with the construction of the Silk Road Economic Belt and further strengthening of the development degree of the urban agglomerations, this axis will become the strategic main axis of the new urbanization development in the southwest regions of China.

## References

1. Housing and Urban and rural Ministry of Urban and Rural Planning Department, China Urban Planning and Design Institute Series (2010) National town system planning (2006–2020). Commercial Press, Beijing, pp 26–33
2. Fang CL, Yao SM, Liu SH et al (2011) China's urban agglomeration development report. Science Press, Beijing, pp 25–33
3. Fang CL (2014) Progress and the future direction of research into urban agglomeration in China. Acta Geogr Sin 69(8):1130–1144
4. Fang CL, Song JT, Zhang Q et al (2005) The formation, development and spatial heterogeneity patterns for the structures system of urban agglomerations in China. Acta Geogr Sin 60(5):827–840
5. Fang CL (2011) New structure and new trend of formation and development of urban agglomerations in China. Sci Geogr Sin 31(9):1025–1035
6. Yao SM, Chen ZG, Zhu YM et al (1992) China's urban agglomeration. University of Science and Technology of China Press, Hefei, pp 16–19
7. Gu CL, Yu TF, Li WM (2008) The pattern, process and mechanism of urbanization in China. Science Press, Beijing, pp 708–711
8. Xiao JC (2009) China's top ten urban agglomerations. Economic Science Press, Beijing, pp 35–46
9. Ning YM (2015) Some problems in the study of Chinese urban agglomeration, a new exploration of the selection and cultivation of Chinese urban agglomerations. Science Press, Beijing, pp 66–72
10. Ni PF (2008) Report of Chinese cities' competitiveness. Social Science Literature Press, Beijing, pp 35–47
11. Fang CL (2015) Scientific selection and grading cultivation of China's urban agglomeration adaptive to new normal in China. Bull Chin Acad Sci 30(2):127–136
12. Fang CL, Mao QZ (2015) The new exploration of China's urban agglomeration selection and cultivation. Science Press, Beijing, pp 98–122
13. Fang CL, Mao QZ, Ni PF (2015) Discussion on the scientific selection and development of China's urban agglomerations. Acta Geogr Sin 70(4):515–527
14. Fang CL, Li GD (2015) The particularity and gradual model of the new urbanization in Tibet and the countermeasures suggestions. Bull Chin Acad Sci 3:294–305

15. Fang CL (2014) China's new urbanization development report. Science Press, Beijing, pp 15–39
16. Fang CL, Mao HY, Ye DN (2016) China urban development spatial pattern optimization theory and method. Science Press, Beijing, pp 374–396
17. Fang CL, Wang ZB (2015) The strategic thinking and method of new urbanization of the Changjiang Economic belt-cluster town system construction concept, people's forum. Acad Front 9(next):35–45
18. Fang CL, Zhou CH, Gu CL (2016) Theoretical analysis of interactive coupled effects between urbanization and eco-environment in mega-urban agglomerations. Acta Geogr Sin 71(4):531–550