Urban Population Size in the Territorial Spatial Planning System: Enduring Challenges, New Frameworks, and Reconceptualization

WANG Xinzhe, XUE Haoying, LIU Zhenyu

Abstract: During the compilation of territorial spatial master plans, the projected population size in most cities remains inflated. The aggregate population size stated in municipal master plans often exceeds the population size set in provincial plans, producing a systematic upward distortion in the transmission of population indicators. At the same time, indicators such as per capita construction land cannot be matched with population figures and are therefore often regarded as nominal values. This paper argues that these phenomena arise from old modes of thinking within a new planning system: a biased understanding of the connotation of population size, which equates it with statistical population; an insufficient understanding of the systemic nature of territorial spatial planning, which leads to a simple emphasis on consistency across levels; and the limited adaptability of static planning to dynamic change, especially the neglect of dynamic flows. On this basis, the paper proposes that the setting of population size should adapt to the new system by distinguishing the policy meanings of population size at different planning levels, abandoning the pursuit of exact numerical correspondence, and optimizing human-land relations through refined management. These reflections are expected to provide references for improving the compilation of plans at different levels and of different types, refining the data logic of the one-map system, and enhancing the refined governance capacity of planning.

Keywords: population size; planning system; territorial spatial form and flow; policy choice

Research on population size is a fundamental task in spatial planning. Its accuracy directly affects the rational allocation of urban and rural spatial resources, infrastructure provision, and public service supply. In traditional urban planning, population analysis has mainly centered on population forecasting, usually including projections of total size, structure, and spatial distribution. In recent years, accelerated urbanization and intensified population mobility have increased the complexity of forecasting urban population size. At the same time, new technical methods such as big data have continued to improve population research in planning practice. On the one hand, the object of study has gradually expanded from registered population to permanent residents and then to actual service population. Planning scholars have recognized that the massive daily mobility of people in large cities has a structural impact on internal urban space, and have argued that studying the actual population of megacities from the perspective of daily mobility is highly significant for refined urban spatial management [1]. Since short-term resident populations are by no means isolated phenomena, spatial planning in megacities needs to shift its response from the conventional permanent-resident population toward actual service population [2]. By integrating conventional socioeconomic data with location-based big data, methods for estimating actual service population across the full population chain have also been developed [3]. On the other hand, population analysis has gradually moved from single-factor total-size prediction to integrated analysis of structure and spatial distribution. Systematic analysis of population structure is regarded as a prerequisite for genuinely people-oriented urban and rural planning [4], and population forecasting should shift from scale priority to structure priority [5]. As a basis for allocating spatial resources, the analysis of population distribution has also been strengthened and has gradually become an important research foundation for key spatial issues such as jobs-housing relations, central-place systems, and land-use layout [6-7].

Nevertheless, population analysis in planning and its practical results continue to face many criticisms. It is generally believed that the greatest problem in urban population forecasting in China is inaccuracy. Under the traditional logic of determining land by population and the model of controlling population by land, population-size forecasting has become a numerical game and has therefore damaged the image of planning as a scientific discipline [4,8]. Many studies have analyzed this disorder in population forecasting and attempted to propose solutions. Although they have gradually recognized that population forecasting in planning should move from pure technical prediction toward policy choice [9-10], the concrete solutions still concentrate mainly on technical improvement, such as subdividing population types, unifying statistical calibers, strengthening data collection, and enhancing trend analysis [5,8,10-11]. The connotation and function of population size in planning remain insufficiently discussed.

In territorial spatial planning, the issue of population size remains important. In addition to the above problems, the organizational features of territorial spatial master-plan compilation have brought new issues, including top-down transmission, bottom-up fallacy of composition, and the resulting loss of control over land indicators. These phenomena have not yet received sufficient attention in related studies [5,10]. Under the new planning system, how to express the policy nature of population size and embed it into the territorial spatial planning system, in addition to making forecasts more precise, has become an urgent issue.

1 The Fictionalization of Population Size: New Manifestations of an Old Problem

1.1 Inflated Planned Population Size

An exaggerated population size in planning is a long-standing problem. During the period of territorial spatial master-plan compilation, however, China had already entered an overall phase of negative population growth. Even so, the projected population size in most cities remained relatively high. In many regions where the population had declined markedly over the past decade, the planned population size still increased substantially compared with the current situation (Tab. 1). This has raised doubts among experts and the public, who view inflated planned population size as inconsistent with reality and attribute it to the persistence of old modes of thinking [10].

表1 部分七普人口下降城市的规划人口规模

Tab.1 Planned population sizes of selected cities with population decline in the seventh national census

城市	六普常住人口/万人	七普常住人口/万人	十年常住人口增量/万人	2035年规划人口规模/万人
丹东市	244	219	−25	259
通化市	232	181	−51	210
哈尔滨市	1064	1001	−63	1180
双鸭山市	146	121	−25	150
酒泉市	110	106	−4	110
陇南市	257	241	−16	255
荆门市	287	260	−27	300
随州市	216	205	−11	235
襄阳市	550	526	−24	560
衡阳市	715	665	−50	680
岳阳市	548	505	−43	512.5

资料来源：六普及七普常住人口分别来源于第六次全国人口普查及第七次全国人口普查，2035年规划人口规模来源于各地市的国土空间总体规划草案公示

Tab. 1 Planned population sizes of selected cities with population decline in the seventh national census.

1.2 Upward Distortion in the Transmission of Population Size

The simultaneous compilation of territorial spatial master plans at multiple levels makes accurate transmission possible. Yet the published provincial and municipal plans show that the sum of the population sizes in most municipal master plans exceeds the population size set in provincial plans. Although the population sizes in municipal and county master plans are numerically consistent, this is mostly the result of strict transmission control during approval. In mechanical terms of consistency, the transmission of population size is still fractured. Taking Jiangsu Province as an example, according to the publicized territorial spatial master plans of its prefecture-level cities, the aggregate planned permanent population of the municipal built-up areas reaches 100.90-103.60 million, exceeding the total population size in Jiangsu Province's territorial spatial plan by more than 10 million (Tab. 2). Such a fallacy of composition inevitably raises doubts about the scientific validity of planning. In subsequently released official plans, population size, though an important indicator, is often difficult to find. This can be understood as a change in regulatory method, but the perception of transmission distortion is also an important reason for this intentional avoidance.

表2　江苏省各市人口规模与省级规划人口规模的比较

Tab.2　Comparison of population sizes of cities in Jiangsu Province with provincially planned population sizes

城市名称	七普常住人口 / 万人	2035规划人口规模 / 万人	城市人口规模合计 / 万人	省级规划人口规模 / 万人
南京市	931.47	1300	10 090—10 360	9000
无锡市	746.21	900左右		
徐州市	908.38	980		
常州市	527.81	700		
苏州市	1274.83	1700—1800		
南通市	772.66	920—980		
连云港市	459.94	500		
淮安市	455.62	500		
盐城市	670.96	780		
扬州市	455.98	480—520		
镇江市	321.04	340—360		
泰州市	451.28	460—500		
宿迁市	498.62	530—540		

资料来源：七普数据来源于第七次全国人口普查，江苏省及各地市规划2035年人口来源于江苏省及各市国土空间总体规划公示稿

Tab. 2 Comparison between city-level population sizes in Jiangsu Province and the population size planned at the provincial level.

1.3 Nominal Per Capita Construction Land

In territorial spatial master plans, per capita construction land is another awkward indicator. Unlike in urban and rural master plans, territorial spatial plans contain both total construction-land size and population size, yet these values often cannot be matched with the per capita construction-land indicator in the indicator table. In one city's territorial spatial master plan, for example, the calculated value of per capita urban construction land based on current urban construction land and current permanent population is 149.6 m2 per person. The calculated value based on the target year is 143.8 m2 per person, while the target value set in the plan is 100 m2 per person (Tab. 3). The target value is therefore detached from the current and projected figures and appears nominal. This is not an isolated case. Some plans delete detailed appendices and calculation data in the official release in order to avoid public misunderstanding. Although such treatment may reduce misinterpretation, it also weakens the explanatory power of the indicator system and makes the public more inclined to regard per capita construction land as a symbolic target detached from real population size.

表3　某市国土空间总体规划中人均城镇建设用地指标的计算值及指标值比较

Tab.3　Comparison of calculated and target values of per capita urban construction land indicators in the territorial spatial master plan of a city

人均城镇建设用地指标项	根据相关数据计算的人均建设用地		指标表中的数值（m^2/人）
	计算方式	数值（m^2/人）	
基期年—全域	三调城镇图斑面积/七普城镇人口	124	124
目标年—全域	全域国土空间结构调整表城镇用地/城镇人口	134	120
基期年—中心城区	中心城区基期年城镇建设用地面积/七普中心城区人口	118	122
目标年—中心城区	中心城区目标年城镇建设用地面积/规划中心城区人口	153	118.5

资料来源：作者根据某市国土空间总体规划文本整理

注：《市级国土空间规划编制指南（试行）》中人均城镇建设用地面积的含义是“城市、建制镇范围内的建设用地面积与城镇常住人口规模的比值”。基期年常见计算方式是规划编制人员基于此含义选择的计算数值

Tab. 3 Comparison between calculated and target values of per capita urban construction land in the territorial spatial master plan of one city.

2 Causes of the Fictionalization of Population Size: Old Thinking Under a New System

The above phenomena cannot be explained only by local developmental impulse or inflated growth expectations. These problems have already been criticized in many studies, and the territorial spatial planning system has strengthened discipline and scientific argumentation. The persistence of population-size inflation under the new system indicates that the problem lies deeper in the understanding of the indicator itself, the planning system, and the relationship between static plans and dynamic population flows.

2.1 Biased Understanding of the Connotation of Population Size

2.1.1 Population size should not be equated with statistical population

Statistical population is undoubtedly an important basis for planning, but the population size used in planning should not be simply equated with a statistical population. It is related to future development expectations, construction needs, and public service provision, and is therefore a comprehensive and dynamic target. Common demographic concepts include registered population, permanent population, actual resident population, actual service population, and planned population size (Tab. 4). The connotations of these concepts differ in terms of statistical caliber, temporal-spatial boundary, institutional basis, and planning function.

概念	定义	统计口径
人口数	指一定时点、一定地区范围内有生命的个人总和	
户籍人口	指公民依照《中华人民共和国户口登记条例》,已在其经常居住地的公安户籍管理机关登记了常住户口,或者由于某种原因暂时没有登记户口的人（如刚出生的婴儿）	
常住人口	指实际经常居住在某地区半年以上的人口	包括三种类型的人口:一是居住在本乡镇街道且户口在本乡镇街道或户口待定的人。二是居住在本乡镇街道且离开户口登记地所在的乡镇街道半年以上的人。三是户口在本乡镇街道且外出不满半年或在境外工作学习的人
流动人口	指离开了户籍所在地在其他地方居住的人口	人户分离人口中扣除市辖区内人户分离的人口。其中,人户分离人口是指居住地与户口登记地所在的乡镇街道不一致且离开户口登记地半年及以上的人口,也就是常住人口中的第二种类型人口
城市实际服务管理人口	需要城市提供交通、市政、商业等城市基本服务以及行政管理的城市实有人口,除城市常住人口外,还包括出差、旅游、就医等短期停留人口	日均城市实际服务管理人口统计方式:利用位置大数据识别区域内某月的日均实有人口数量(根据设备用户数和设备覆盖率计实有人口,不含停留时间3 h以内的短时过境人口,建议参考常住人口统计调查时点,选取11月)[2]

Tab. 4 Common demographic concepts.

In the new round of territorial spatial planning, the widespread use of census data has changed the connotation of planned population size to some extent. Census data have official authority and comparability, and they respond to the requirements of the planning review system. Yet the direct use of census data can also lead to the misunderstanding that planned population size is equivalent to statistical population. For example, if county-level urban construction land from the third national land survey is divided by the permanent population from the seventh census, the national average per capita urban construction land reaches 136.7 m2 per person, and more than half of counties exceed 150 m2 per person. This seems to suggest a loss of control over construction land, but the result is also closely related to changes in population caliber. Treating the number mechanically as a planning indicator therefore risks misjudging the actual human-land relationship.

2.1.2 Population size is a guarantee of spatial rights and interests

The household registration system separates statistical population from actual population to a considerable extent. Public services and spatial rights are often anchored to registered population, whereas the actual use of urban space is increasingly shaped by permanent residents, commuters, short-term residents, and other mobile groups. In the past, the mechanism that linked construction-land expansion with the settlement of agricultural migrants often had a lag of five to eight years, or even longer. Repeated counting and relatively elastic population-size arrangements in earlier master plans therefore had a practical function: they protected the spatial rights and property interests of migrant populations and reserved development space for the future. From this perspective, population size is not merely a statistical result; it also carries the function of safeguarding spatial rights and coordinating resource allocation.

2.2 Insufficient Understanding of the Systemic Nature of Territorial Spatial Planning

2.2.1 Population size is not an exact calculation requiring consistency across all levels

Territorial spatial planning is a complex mega-system. Population size in provincial, municipal, county, township, and detailed plans is not a set of figures that can be linearly decomposed or mechanically summed. Similar problems also exist for economic and policy indicators, where bottom-level sums often exceed upper-level targets. The simultaneous compilation of plans at multiple levels makes cross-level checking possible, but it should not turn numerical balance into the primary criterion for judging scientific validity. Municipal master plans tend to give particular weight to population size because the indicator is closely linked to land allocation, public service supply, and approval control, whereas provincial plans are usually less focused on assigning exact city-by-city population figures. For example, Zhejiang Province's territorial spatial plan sets a permanent population of 78-79 million by 2035, considerably higher than the 64.57 million recorded in the seventh census, an increase of about 21%-22% [12]. This arrangement partly reflects the need to maintain consistency with the planning system and leave room for uncertainty. In one central province, the sum of planned population sizes in municipal plans exceeded the provincial figure by about 8%, and the final result was shaped by multiple rounds of negotiation and compromise among different levels.

2.2.2 Population size is a tool of policy guidance

Population size in planning is closely related to urban positioning, development image, resource allocation, and spatial politics. It is therefore not a neutral statistical figure, but an important instrument of policy guidance. Elasticity in population size helps balance different indicators under the control of per capita construction land. For instance, when the expansion of an urban development boundary is set at 30%, the planned population growth of the central urban area may also need to reach a similar level in order to maintain the internal consistency of the data system. At the same time, shrinking cities have become a common phenomenon. Studies show that, depending on the definition and measurement method, the proportion of shrinking cities in China may range from 25.6% to 73.9% [13]. For such cities, the planned population size cannot simply be defined as the terminal-year forecast. A more appropriate policy choice usually lies between the peak population in the planning period and the final forecast value. This makes the planned population size higher than the terminal forecast in many cases (Fig. 1).

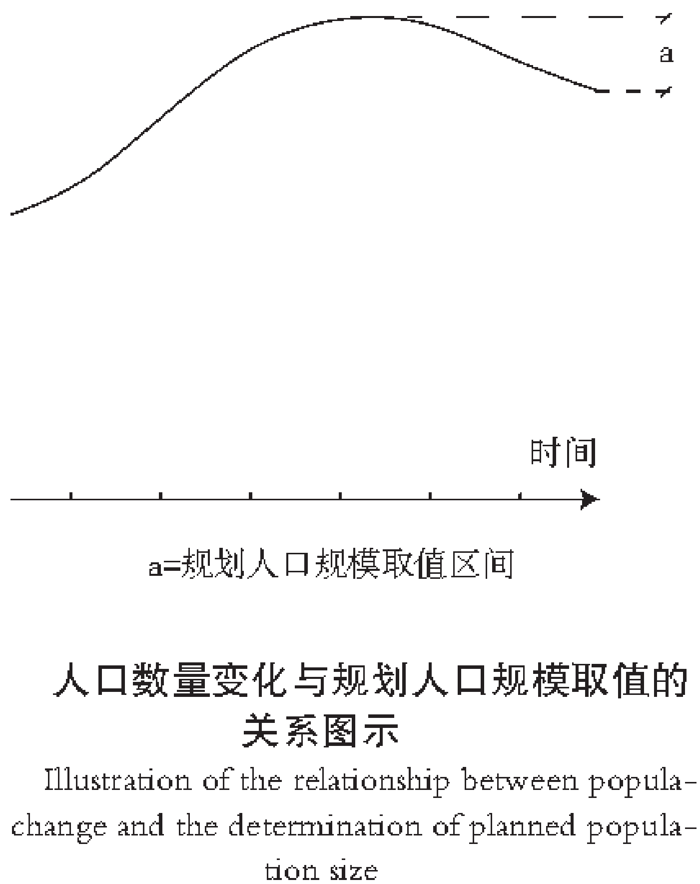

Fig. 1 Illustration of the relationship between population change and the determination of planned population size.

2.3 Insufficient Adaptability of Static Planning to Dynamic Change

2.3.1 Population size should not neglect dynamic flows

Information technologies have made population forecasting more precise, but most forecasts still describe a static state. Census data record the result of population flows at a given point in time, while the processes, rhythms, and demands generated by flows are often overlooked. In many regions, multi-place residence, seasonal production and living, cross-provincial commuting, temporary education and medical demand, tourism-related population peaks, and digital nomads are increasingly common [14]. These mobile populations have real demands for land, housing, infrastructure, and public services, yet institutional responses often lag behind the speed and intensity of population movement. If planning continues to rely mainly on static population size, it will be difficult to respond to the spatial requirements of mobile society.

2.3.2 Population forecasting should move beyond static thinking

The relationship between territorial spatial form and flow reveals the dynamic mechanism of spatial evolution. Traditional planning often treats form as a container and flow as a displacement within that container. Under conditions of intensified mobility, this static ontology needs to be revised. Population forecasting should incorporate dynamic flows and the changing intensity of spatial use. The resulting planned population size may differ from the static actual population, but it can more effectively reflect different types of population demand and support more reasonable resource allocation. The key is therefore to move from a single static number toward a policy indicator that connects population size, flow intensity, service demand, and spatial carrying capacity.

3 Optimizing the Setting of Population Size: Reconceptualization in a New Environment

3.1 Distinguishing the Policy Meanings of Population Size at Different Levels

The meaning of population size differs across planning levels and plan types (Tab. 5). Provincial plans focus more on optimizing the urban system, guiding the spatial distribution of population, and improving overall efficiency. Municipal and county master plans are more directly connected to concrete supply-demand relations, including urban development boundaries, construction-land scale, infrastructure capacity, and public service provision. Detailed planning within urban development boundaries pays more attention to activity population, age structure, education demand, and neighborhood-level service capacity. Special plans also use population indicators in different ways. For example, education facility planning is usually concerned with the actually resident school-age population, while power and transportation plans must consider peak population and temporal variation. Only by clarifying these differences can population size function as an effective policy indicator within the planning system.

人口规模	含义
国家级	代表资源总体承载量、消耗量、劳动力供给、消费需求等社会经济总量。结果更接近于统计的人口数量
省级	
市级	代表了资源承载容量以内的社会经济发展的预期值，住房、教育、医疗、道路、市政等设施的规划需求。由于人口规模与用地等多项指标相挂钩，政策属性较强，因此需要一定弹性冗余
县级	
乡镇级	
开发边界外详细规划（村庄规划）	在村庄内有耕地、宅基地等产权的村民及直系家属，通常为村庄户籍人口
开发边界内详细规划	在规划范围内可承载的居住、工作、休闲的人数

Tab. 5 Comparison of the meanings of population size in different types of plans at different levels.

3.2 Abandoning the Pursuit of Exact Correspondence

Population size is an expected indicator with uncertainty. Planning should therefore establish a scientific understanding of it from the perspective of the planning system. Zhang Hao and Sun Shiwen argue that consistency in planning systems is often accompanied by fractures, and that the pursuit of formal consistency cannot eliminate structural inconsistency [15]. In the territorial spatial planning system, consistency remains a basic principle, but it needs to be realized through indicator embedding, differentiated transmission, and precise implementation mechanisms [16]. Wang Xinzhe and colleagues further distinguish nominal scale from rated scale in master-plan compilation, emphasizing that population size should be understood as a planning target shaped by policy and capacity, not as a simple statistical result [17]. Among the territorial spatial master plans of 23 provincial capital cities, 14 use the concept of service population, with the service population accounting for an average of 23.9% of the population size (Tab. 6). This practice reflects a form of elasticity and also indicates that many cities have begun to resist exact one-to-one correspondence between statistical population and planning population size.

Tab.6 Descriptions of population size in the territorial spatial master plans of selected provincial capital cities

城市	表述
太原	到2035年，全市常住人口预计达到700万人
呼和浩特	到2035年，呼和浩特市常住人口预计达到410万人
沈阳	到2035年，市域常住人口严格控制在1200万人以内……以1500万人实际服务人口统筹全市基础设施和公共服务设施供给能力
长春	规划到2035年，市域常住人口规模预计为1050万人
哈尔滨	到2035年，市域常住人口规模格控制在1180万人以内，……市域按1500万人实际服务人口规模弹性配置相应设施，制定管理政策
南京	到2035年，全市常住人口严格控制在1300万人以内……以1300万人常住人口统筹建设用地需求，以1560万人实际服务人口统筹基础设施和公共服务设施供给能力
杭州	到2035年，常住人口严格控制在1500万人以内……实际服务管理人口2000万人
福州	到2035年，市域常住人口预计约1000万人
南昌	到2035年，预计全市常住人口约800万人（实际服务管理人口1000万人）
济南	到2035年，市域常住人口严格控制在1200万人以内
郑州	到2035年，常住人口严格控制在1750万人以内，新增人口严格控制在490万人以内……预留20%的服务人口弹性，统筹公共服务设施和基础设施配置
武汉	到2035年,全市常住人口严格控制在1630万人以内……考虑半年以下暂住人口、跨市域通勤人口、短期商务旅游人口等在内的城市实际管理服务需求，公共服务设施和基础设施配置在常住人口基础上,预留增加20%的弹性
长沙	到2035年，市域常住人口规模严格控制在1400万人以内……住房和养老、基础教育、基础医疗、基础体育等公共服务设施满足常住人口的需求；水、能源、安全、交通等基础设施按照超出常住人口20%进行配置，满足实际服务人口的需求
广州	2035年常住人口规模严格控制在2200万人以内……同时，考虑半年以下暂住人口、跨市域通勤人口、短期商务旅游人口等在内的城市实际管理服务需求，预计管理服务人口2500万—3000万人
南宁	到2035年，预计市域常住人口规模在1050万人以内
海口	到2035年，常住人口规模预计达到400万人……全市实际服务人口规模预计达到450万人
成都	到2035年，全市常住人口规模严格控制在2350万人以内……按照规划常住人口规模上浮20%配置基础设施和公共服务设施
贵阳	到2035年，全市常住人口预计在900万以内……按照规划人口上浮10%，配置重要公共服务设施及市政基础设施
昆明	到2035年，全市常住人口严格控制在1100万人以内……全市实际服务人口按照常住人口的1.1—1.2倍配置基础设施与公共服务设施
西安	到2035年，市域常住人口严格控制在1560万人以内……基础设施按照实际服务人口2000万人进行规划布局
兰州	规划到2035年，全市常住人口控制在650万人以内
西宁	到2035年，常住人口规模预计280万—300万人
银川	到2035年，预计全市常住人口为380万至400万人

资料来源：作者根据各市国土空间总体规划文本公开稿整理

Tab. 6 Descriptions of population size in the territorial spatial master plans of selected provincial capital cities.

3.3 Optimizing Human-Land Relations Through Refined Management

Planning studies space, but its ultimate object is people. A correct understanding of human-land relations is the foundation of territorial spatial planning practice [18]. Under low-speed urbanization, population decline, and more intensive land-use governance, the calculation of population size should not be understood as a blueprint-style expectation of future growth. It should become a means to identify different human-land relations precisely and adopt differentiated policy responses. In areas with population shrinkage, reducing construction land is often difficult, and construction land may even continue to expand, leading to a decoupling between population and land [19]. A moderate redundancy in per capita construction land may improve strategic resilience and risk-response capacity. However, the total population indicator alone provides limited support for people-oriented planning. Planning should pay closer attention to population structure and population profiles, including youth-friendly, child-friendly, and elderly-friendly cities, mobile populations, migratory communities, university towns, and boundary areas. Refined management should transform population size from an aggregate control number into a set of differentiated governance tools.

4 Conclusion: From Technical Indicator to Governance Tool

4.1 Population Size Has a Distinct Policy Attribute

Population-size forecasting in planning should emphasize policy choice more than technical prediction. Territorial spatial planning is a policy tool for coordinating development and protection [20]. Population size is therefore a policy-goal-oriented indicator set by government for resource allocation and spatial governance. It is more complex than a statistical population figure. In the territorial spatial planning system, planned population size can be understood as a comprehensive indicator determined through scientific forecasting and dynamic regulation, based on resource and environmental carrying capacity as well as the needs of development and protection during the planning period.

4.2 Dynamic Thinking Should Be Emphasized in Planning Population Size

Many controversies over inflated population size stem from a conceptual misunderstanding. Population size in planning is not a static statistical value, but a comprehensive target with carrying-capacity, service-capacity, and policy attributes. As mobility becomes a normal condition of urban and regional development, planning research should move from sectional analysis toward dynamic analysis. In the longer term, territorial spatial planning needs to develop real-time population perception, adaptive infrastructure supply, and a governance logic that shifts from providing supply according to scale toward providing services according to demand. A smart governance system oriented to mobile population and dynamic land use is therefore an important direction for planning improvement.

4.3 The Territorial Spatial Planning System Should Better Accommodate Inconsistency

Recent studies have increasingly emphasized the inevitability and governance significance of inconsistency in planning systems. The inconsistency and fracture identified by Zhang Hao and Sun Shiwen [15], the difficulties and optimization measures in spatial transmission discussed by Wang Xinzhe and colleagues [16], and the planning gap and planning paradox proposed by Gu Wei and colleagues [21] all show that territorial spatial planning cannot rely on mechanical numerical consistency alone. The transformation of population size from a technical indicator to a governance tool helps planning strategies remain flexible and effective under uncertainty. It can also support the optimization of plans at different levels and of different types, improve the data logic of the one-map system, enhance refined governance capacity, and allow the territorial spatial planning system to accommodate necessary and meaningful inconsistency.

References

[1] Wang De, Ren Xiyuan. Distribution and mobility composition of Shanghai's actual population from the perspective of daily mobility [J]. Urban Planning Forum, 2019(2): 36-43.
[2] Shi Cheng, Chen Chen, Niu Xinyi. Spatial planning responses of megacities oriented to actual service population: A case study of Hangzhou [J]. Urban Planning Forum, 2018(4): 41-48.
[3] Meng Hao, Mao Xiyan, Huang Xianjin, et al. Conceptual connotation and spatio-temporal characteristics of actual service population in large cities [J]. World Regional Studies, 2024, 33(10): 116-128.
[4] Shi Song. Paradigm transformation of urban population-size forecasting methods and Shanghai practice [J]. Planners, 2015, 31(10): 22-27.
[5] Chen Hongzheng, Wang Hongyang. Population forecasting in territorial spatial planning: An analysis based on historical materialism [J]. City Planning Review, 2025, 49(6): 54-66.
[6] Zhang Shangwu, Yan Longxu, Wang De, et al. Policy paths for optimizing the spatial structure of the Shanghai metropolitan area: An analytical method based on population distribution scenarios [J]. Urban Planning Forum, 2015(6): 12-19.
[7] Yan Longxu, Zhang Shangwu, Wang Ying, et al. Intelligent planning system and application for optimizing spatial layout [J]. City Planning Review, 2024, 48(10): 26-35.
[8] Wang Chaoshen, Zhang Pei. Issues and reflections on population forecasting in master plans of large and medium-sized cities: Evidence from 17 prefecture-level cities in Sichuan Province [J]. Modern Urban Research, 2017(8): 52-57.
[9] Wang De, Liu Zhenyu, Yu Xiaotian, et al. Strategic analysis of urban population size: A case study of the special population-size study for Wuhan [J]. Urban Planning Forum, 2017(5): 58-65.
[10] Wang Wei, Ouyang Peng, Jiang Yating, et al. Reflection and improvement of population-size forecasting in urban planning: A comparative analysis of seventh-census population and planned population in 38 key cities [J]. Urban Studies, 2024(4): 78-84.
[11] Niu Huien. Standardized research on population-size forecasting in urban planning: Reflections on compiling the Technical Specification for Urban Population Size Forecasting [J]. City Planning Review, 2007(4): 16-19.
[12] Department of Natural Resources of Zhejiang Province. Territorial Spatial Plan of Zhejiang Province (2021-2035) [EB/OL]. (2024-08-09) [2025-11-20]. https://zrzyt.zj.gov.cn/art/2024/8/9/art_1292468_59029235.html.
[13] Sang Chun, Pan Xin, Zhang Shangwu, et al. Review and research agenda of urban shrinkage in China from the perspective of spatial governance [J]. Urban Planning Forum, 2024(2): 58-63.
[14] Niu Xinyi, Yue Yufeng, Li Kaike. Intercity travel characteristics between central cities and surrounding cities in the Yangtze River Delta urban agglomeration [J]. Shanghai Urban Planning Review, 2020(4): 1-8.
[15] Zhang Hao, Sun Shiwen. Consistency and fracture in the planning system: A case study of central Shanghai [J]. Urban Planning Forum, 2022(2): 27-34.
[16] Wang Xinzhe, Yang Yuhan, Zong Li, et al. Spatial transmission from master planning to detailed planning in territorial space: Practical difficulties, basic logic, and optimization measures [J]. Urban Planning Forum, 2023(2): 96-102.
[17] Wang Xinzhe, Xue Haoying, Yao Kai. Key issues in compiling territorial spatial master plans: With a discussion on provincial territorial spatial planning [J]. Urban Planning Forum, 2022(3): 50-56.
[18] Liu Zhenyu, Chen Yongyu. Reflections on territorial spatial planning practice from the perspective of human-land relations [J]. Ideal Space, 2023(3): 12-16.

[19] Yi Xiaoxiang, Wang Shuyu, Zhang Haoping, et al. Challenges and solutions for urban construction land under population shrinkage: A case study of the three northeastern provinces of China [J]. Urban Planning Forum, 2023(6): 68-78.
[20] Zhang Shangwu. Technical system for compiling territorial spatial planning: Top-level architecture and key breakthroughs [J]. Urban Planning Forum, 2022(5): 45-50.
[21] Gu Wei, Wu Cifang, Xu Zhongguo, et al. Planning gap and planning paradox: A new perspective for understanding territorial spatial planning [J]. Journal of Natural Resources, 2024, 39(12): 2881-2896.

AI-assisted translation