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National Fitness Evaluation of Urban Parks in the National Ecological Garden City: A Case Study in Baoji, China

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Abstract: Urban parks are important places for residents to engage in physical activity (PA). Properly designed fitness facilities play a positive role in the PA level of park users. We conducted a quantitative evaluation of urban park systems based on the revised Chinese version of ParkScore (RCPS) from the perspective of national fitness. Baoji, one of the first National Ecological Garden Cities (NEGCs), was selected as a case study. We analyzed 19 parks and found that comprehensive parks and sports parks obtained high evaluation scores. The area of fitness facilities in Baoji urban parks was low, with an average of 1.85 hm^2 per park. Professional sports venues and multifunctional sports venues each accounted for about one-third and children's activity venues for about a quarter. There were many national fitness stations, but they covered a small area. Only 16% of parks had fitness trails, which was the least represented type of fitness facility. About 40% of the parks had children's activity venues, with a 1:2 ratio of PA venue to amusement area. The area of free open venues accounted for only 0.1% of the total area of the parks. The number of parks *per capita* was about 52% of the overall NEGCs, accessibility of 500 m was 34%, and of 1000 m was about 54%. Overall, we found that the supply of Baoji urban parks was insufficient. These results directly reflect differences among fitness facilities in urban parks and can help form a quantitative basis for the optimization of urban park systems and advance the national fitness plan and promote public health.

Keywords: urban park; National Ecological Garden City; fitness facility; quantitative study; national fitness

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1. Introduction

Physical inactivity increases the risk of adverse health outcomes such as obesity and chronic disease, both with high medical costs [1,2]. In China, existing scientific evidence showed that physical inactivity contributed between 12% and 19% to the risks associated with the major non-communicable chronic diseases such as hypertension and diabetes [3]. It was estimated that by 2050, more than 9% of the gross national production (GNP) would be used to prevent and control chronic diseases caused by lack of physical activity (PA) [4]. Although the health benefits of increased PA have been well documented [5,6], 31% of the global population over the age of 15 is physically inactive [7]. Results of survey research have indicated that enabling a wider population to achieve prescribed levels of PA, and enjoy its benefits, remains a significant challenge to public health [8,9]. Thus, governments have constructed PA infrastructure for broad public use. Considerable attention has been given to the impact of public infrastructure on the daily PA of urban residents [10,11].

Among all environments where PA infrastructure is made available, urban parks have become the preferred place for people [4,12]. Relevant built environment characteristics of parks can significantly impact PA levels and behaviors of residents [13,14]. Studies have shown that different park spaces such as playgrounds, open fields, or sports venues were associated with PA levels across all age groups [15–17]. A study in China showed that paths in parks were most significantly related to PA, especially for seniors [18]. The installation of fitness stations and trails had attracted more residents to visit parks and engage in PA [19,20]. Park size and accessibility were also frequently reported factors impacting PA levels in related studies [1,14,21].

In response to physical inactivity and improving health levels, national fitness has become a national strategy in China, advocating that all people should participate in moderate-to-vigorous physical activity (MVPA) for three times per week, no less than 30 min each time. At the end of 2021, there were 3.971 million sports venues in China, and the *per capita* area was 2.41 m^2 [22]. In its latest National Fitness Plan (2021–2025), Chinese authorities have proposed to promote PA and improve public health through the construction of new and expanded sports parks and adding leisure and fitness facilities in urban parks [23]. However, there are many questions to be answered, the first and most important of which is how the number and size of existing fitness facilities in urban parks meets the PA needs of residents. Answering this will provide a reference for the construction or expansion of urban parks and their fitness facilities.

The quantitative evaluation of fitness facilities in urban park systems is an effective means to address these questions. International research projects on the quantitative evaluation of open spaces have been conducted earlier, and the applied evaluation systems include the Recreation Facility Evaluation Tool (RFET) [24], the Green Flag Award scheme of the United Kingdom [25], the Environmental Assessment of Public Recreation Spaces Tool (EAPRS) [26], and others for a wide range of urban open spaces, e.g., parks, playgrounds, stadiums, etc. There are also specific assessment systems for PA spaces, such as the Physical Activity Resource Assessment (PARA) [27] and the Bedimo-Rung Assessment Tools (BRAT) [28]. Trust for Public Land's ParkScore is the most comprehensive rating system for measuring the quality of park systems across the 100 most populated cities in the United States [29]. The ParkScore index, including 14 measures across five categories, i.e., acreage, investment, amenities, access, and equity, has been used for urban park development by many cities and agencies, e.g., the city of Albuquerque, NM and the U.S. Department of Housing and Urban Development [30]. The index can also be used to examine the relationship between urban park quality and public health [31]. However, few studies were conducted on the quantitative evaluation of fitness facilities in urban parks, especially in China. In China, a park is defined as a green space open to the public, with recreation as its main function, relatively good facilities, and with ecological and beautification functions [32]. This suggests that the dual functions of parks are recreation and ornamentation, yet insufficient attention has been paid to their fitness function. This has led to the fact that many existing studies on park evaluation focus on the park ecological quality [33] and plant diversity [34], and few have established a park scoring system from the perspective of national fitness.

The National Ecological Garden City (NEGC) is currently the highest honorary title for evaluating the construction of urban ecological environments in China. The focus of this program is not only to improve urban ecological functions but also on the level of services provided to urban dwellers [35]. The results of NEGC construction should be able to play a demonstration role across China. The NEGC evaluation has been carried out every year since 2006, and 19 cities across the country have been awarded the title. An NEGC generally includes a relatively well-established urban parks system with both natural and social attributes [35]. The parks in an NEGC should not only provide a full range of ecological services, but also meet the diverse needs of residents, provide efficient and convenient venue facilities for their PA, and play an important role in building a high-quality public service system for national fitness.

Baoji, one of the first NEGCs in China and the only NEGC in Shaanxi Province, was selected to serve as a case study. Our study aims to establish an urban park scoring system from the perspective of national fitness by generating a PA demand-oriented ranking of Baoji's urban parks. Field studies combined with remote sensing were used to identify and analyze the park system and fitness facilities indicators that can promote national fitness. These findings will help to form a scientific basis for optimizing and improving the fitness facilities of park systems and broaden data support for the improvement of a national plan to promote fitness and health among Chinese citizens.

2. Materials and Methods

2.1. Study Area

The built-up area of Baoji in Shaanxi, China was selected as the study area, and the boundary was delineated based on Global Artificial Impervious Area (GAIA) data from Tsinghua University, including Weibin, Jintai, and Chencang Districts, with a total area of approximately 240.2 km^2. The 19 selected urban parks were free and open to the public and were not closed for maintenance during field investigations in 2020 (Figure 1). With a total area of 641 hm^2, the parks covered about 2.7% of the study area. More than half of the park area and more than one-third of parks themselves were adjacent to rivers, mountains, or plateaus in Baoji. However, according to the Statistical Yearbook of Urban Construction 2020 [36], there were 28 urban parks within the built-up area of Baoji, with an area of 920 hm^2. To ensure data uniformity and comparability, the official statistical yearbook data were used for the comparative study of Baoji and other representative urban park systems at home and abroad.

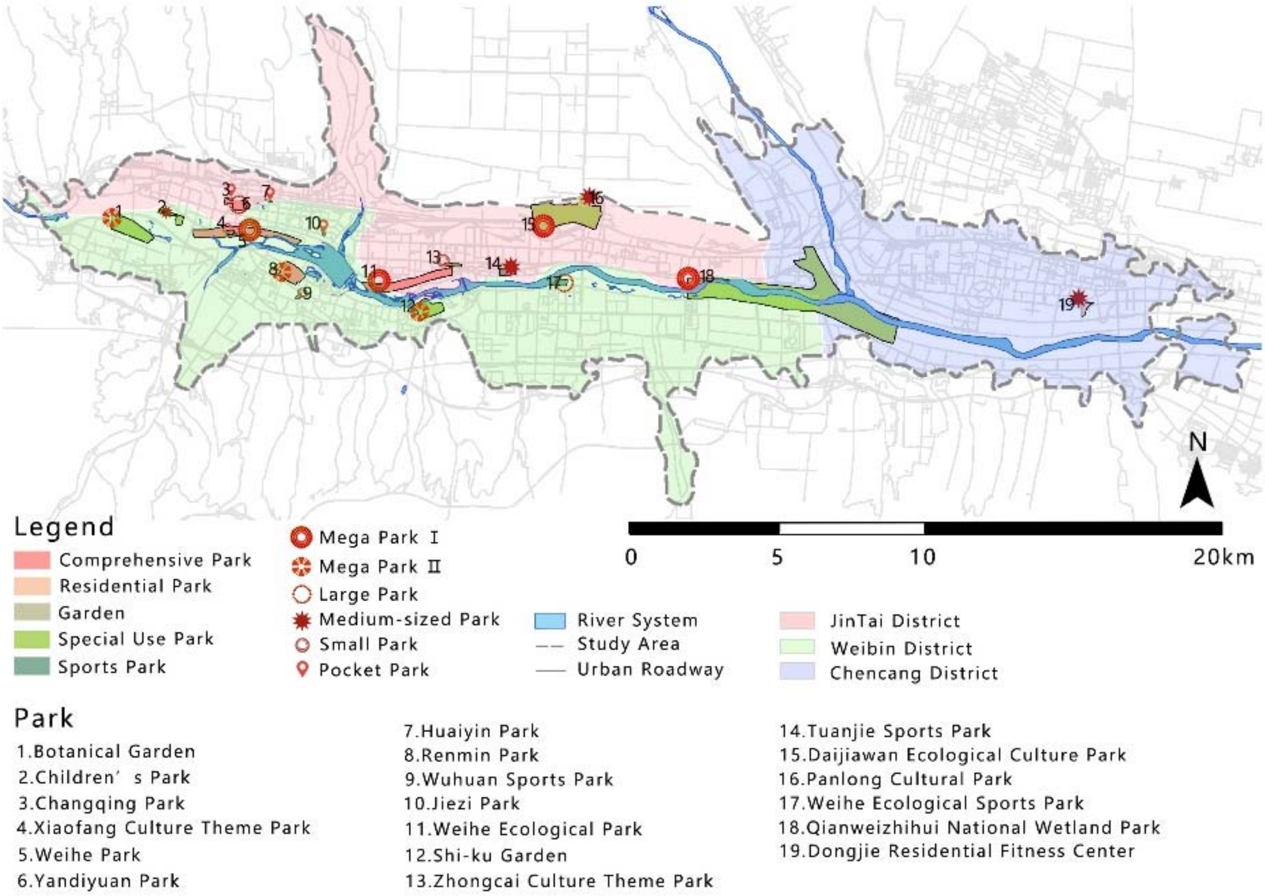

Figure 1. The location of urban parks in the study area.

2.2. Urban Park Scoring System

The urban park scoring system, a revised Chinese version of ParkScore (RCPS), was modified from ParkScore, USA. Compared to the original ParkScore, which includes five primary indicators, the RCPS used the three primary indicators (i.e., park size, fitness facilities, and accessibility) and eight corresponding secondary indicators to quantitatively evaluate the parks. The primary indicator of park size included two secondary indicators: the total park area and the proportion of park accessible area (i.e., the ratio of the accessible area of the park to the total park area). The primary indicator of fitness facilities included four secondary indicators: professional sports venue area, multifunctional sports venue area, national fitness station ("facilities occupying small areas in communities, villages, parks, green areas, etc., consisting of a collection of outdoor fitness equipment, which are economical, practical and can be used free of charge" [37]) area, and the proportion of children's activity venue area (i.e., the ratio of the children's activity venue area to the total park area). The accessibility indicator included two secondary indicators: population at the 500 m service level and population at the 1000 m service level.

All indicators in the scoring system were given equal weight [29]. In principle, indicator data were sorted and divided into 10 parts in numerical order, and then assigned 10 to 100 points as appropriate. In practice, to avoid distortion of scoring caused by large variation in the raw data, the data between minimum and the median were assigned scores from 10 to 50, and the data between the median and maximum were from 60 to 100. An example of the scoring process was shown in Figure 2. Data exceeding twice the median were directly rated as the maximum score 100.

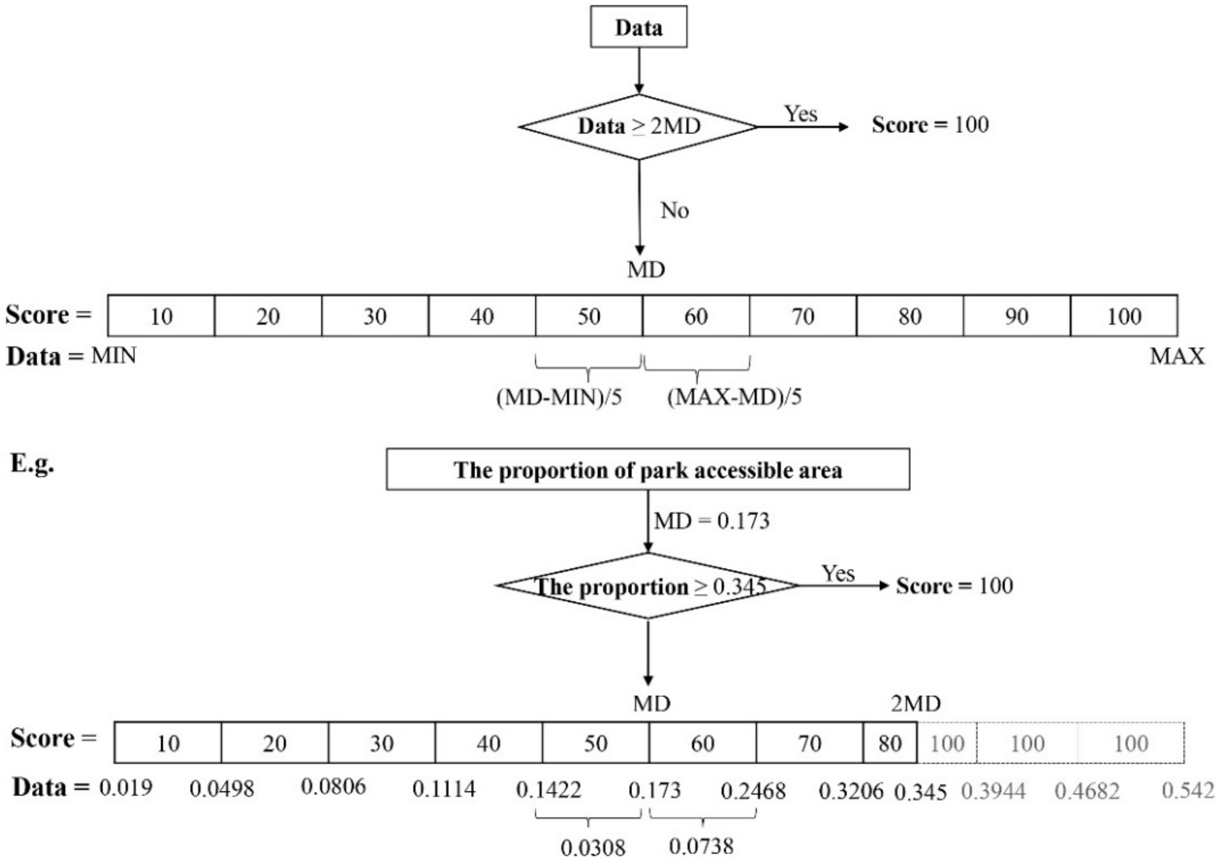

Figure 2. An example of the scoring process based on the proportion of park accessible area.

2.3. Data Collection and Processing

2.3.1. Urban Park System Characteristics

Park type, size, location, and construction year were used to describe urban park characteristics. Relevant data were obtained through the Baoji's Urban Master Plan (2008–2020) [38], Google satellite images, and official urban park statistics. According to the China's Urban Green Space Classification Standard (CJJT 85-2017) [39], urban parks were grouped into four types: comprehensive, residential, garden, and special use (sports parks were a sub-type under special use parks). We classified urban parks into five sizes: pocket (2 hm^2 and below), small (2–5 hm^2), medium (5–10 hm^2), large (10–20 hm^2), mega park II (20–50 hm^2), and mega park I (>50 hm^2) parks. These classes were based on the Design Code of Public Parks (GB 51192-2016) [32].

2.3.2. Park Accessibility

A buffer zone method was used to quantify the accessibility of urban parks. Two levels of buffer zones were established with a radius of 500 and 1000 m from the boundary of each park [40]. The 500 and 1000 m buffers are shown in Figure 3. The ratios of corresponding area and population within the buffer zones were used to measure park accessibility. The buffer zones were generated using ArcMap software, and population data were obtained from the Sixth China's Population Census in 2010 (http://www.stats.gov.cn, accessed on 20 November 2021).

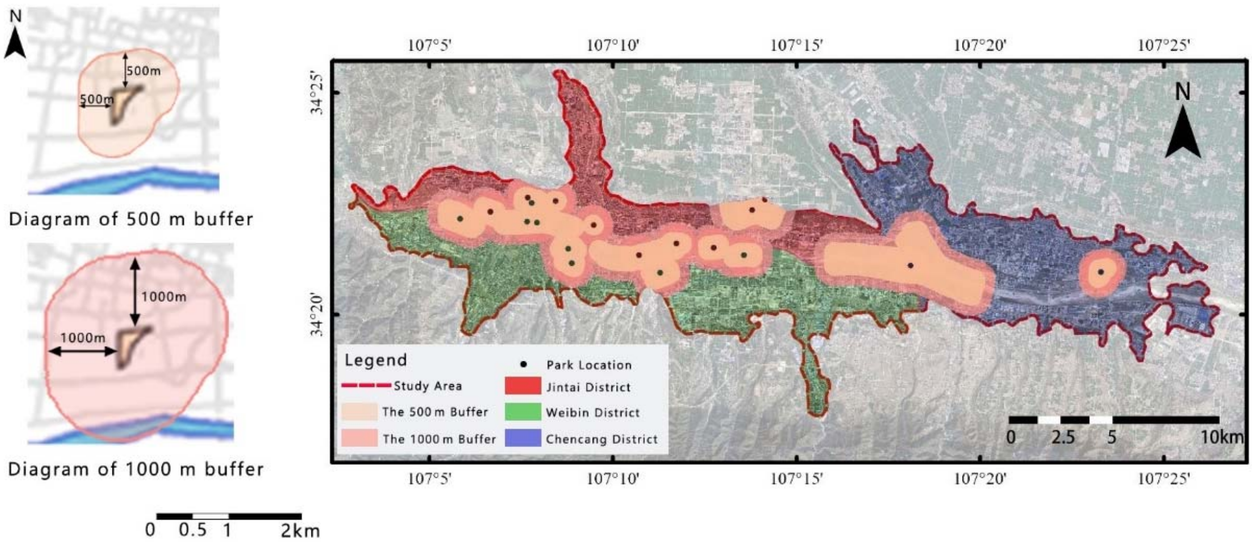

Figure 3. Park accessibility at 500 and 1000 m in the study area.

2.3.3. Park-Based Fitness Facilities

The park area, the number and area of various PA venues, and the number and area of children's activity venues were selected as the indicators of park fitness facilities. Fitness facility data from the 19 urban parks were recorded using the combination of field measurements using hand-held differential GPS (UniStrong A5, Beijing, China) devices and remote measurements using Google satellite images.

2.3.4. Representative Urban Park System Characteristics at Home and Abroad

Representative urban parks system characteristics at home and abroad largely included the number and area of urban parks, and the number and area of parks *per capita*. Data from urban parks in domestic provinces and municipalities came from the Statistical Yearbook of Urban Construction 2020 [36], data from urban parks in the United States was derived from the City Park Facts 2020 [41] and the Minneapolis Park and Recreation Board (https://www.minneapolisparks.org/, accessed on 20 November 2021), and data from urban parks in Tsukuba, Japan was obtained from the official government website of Tsukuba City (https://www.city.tsukuba.lg.jp/shisei/joho/toukei/1002336.html, accessed on 20 November 2021).

3. Results

3.1. Characteristics of the Urban Park System in Baoji

Urban park characteristics are given in Table 1. Special use parks were the most common and had the largest area, accounting for more than half of the parks. More than one-third of special use parks were sports parks. Residential parks were the least common, accounting for only 5.3%, and gardens covered the least area, accounting for 0.2% of total urban park area. Park type differed by construction era. The period 1978–2000 was dominated by the construction of comprehensive parks, accounting for about two-thirds of the total number of parks in this period. Ecological and cultural parks began to appear after

2000, accounting for about one-third of the total number of parks during this era. Since 2012, the construction of sports parks has been vigorously promoted, and many existing parks have been refurbished and expanded to meet PA needs. While the number of parks of different size was relatively balanced, there was still a large disparity in area. The total area of mega parks I was the largest, accounting for 70% of the total, while the total area of pocket parks was the smallest, accounting for only 0.2%.

Table 1. Characteristics of the urban park system in Baoji.

Classification	Index			
Park Type	Number	Percent	Area (hm^2)	Percent
Comprehensive Park	4	21.1	182.7	28.5
Residential Park	1	5.3	5.4	0.8
Garden	3	15.8	1.0	0.2
Special Use Park	11	57.9	452.1	70.5
(Sports Park)	3	15.8	26.2	4.1
Park Size	Number	Percent	Area (hm^2)	Percent
Mega Park I	4	21.1	459.5	71.7
Mega Park II	3	15.8	109.2	17.0
Large Park	2	10.5	29.7	4.6
Medium-sized Park	4	21.1	32.6	5.1
Small Park	3	15.8	9.1	1.4
Pocket Park	3	15.8	1.0	0.2
Park Construction Stage	Number		Area (hm^2)	
1978–2000	3		95.8	
2001–2011	9		385.4	
2012–2022	7		159.9	

3.2. Park Accessibility

Using ArcMap software to determine park accessibility (Figure 3), the 500 and 1000 m buffer zones covered 53.11 and 95.71 km^2, respectively, accounting for 22.11% and 39.84% of the study area. The population within the 500 m buffer was 298,100 persons and 478,100 persons in the 1000 m buffer, accounting for 33.65% and 53.98% of the population living in the study area, respectively. The Weibin District had the highest accessibility, with two-level buffers accounting for 9.29% and 15.98% of the total study area, and 22.11% and 32.01% of the total population. Chencang District had the lowest park accessibility, with two-level buffers accounting for only 5.03% and 9.05% of the total study area, and 1.85% and 3.89% of the total population.

3.3. Park-Based Fitness Facilities

Among the various types of fitness facilities, national fitness stations were the most common, accounting for about 60% of the total, but were smallest in area, with an average of 24 stations per park and an average area of 0.03 hm^2 (Table 2). The number and area of professional sports venues and multifunctional sports venues were relatively balanced, with about seven venues per park and an average area of 0.6 hm^2. Fitness trails were the least common, present in only 3 out of the 19 parks.

The average number of professional sports venues in comprehensive parks was slightly higher than that in sports parks, but their average area in comprehensive parks was only half of that in sports parks. The average number and area of multifunctional sports venues were greatest in comprehensive parks; national fitness stations were mainly located in sports parks.

The average number and area of professional sports venues in mega park I types were the greatest and approximately 3× that of the overall mean among all parks. Multifunctional sports venues also had the largest average area in mega parks I; about twice the mean, but the average number was highest in mega parks II. National fitness stations were principally constructed in small parks.

Table 2. Park-based fitness facilities in Baoji.

		Professional Sports Venue	Multifunctional Sports Venue	National Fitness Station	Fitness Trail	Children's PA Venue	Amusement Area
Park Type	Comprehensive Park	17.8/0.94	14.8/1.83	37.0/0.02	1/2300	2.3/0.73	1.3/1.58
	Residential Park	1.0/0.02	3.0/0.12	13.0/0.01	—	—	—
	Garden	—	1.3/0.06	—	—	—	—
	Special Use Park	6.3/0.74	7.3/0.50	27.0/0.05	2/4800	0.8/0.03	0.3/0.02
	(Sports Park)	13.3/1.79	2.0/0.31	66.7/0.15	2/4800	2.0/0.06	—
Park Size	Mega Park I	20.5/1.42	10.3/1.64	31.3/0.02		1.3/0.69	0.5/1.47
	Mega Park II	4.7/0.22	11.7/0.55	12.7/0.06	1/2300	1.0/0.01	1.0/0.15
	Large Park	12.0/1.03	8.5/0.92	24.5/0.02	1/2800	1.0/0.04	0.5/0.04
	Medium-sized Park	4.0/0.08	11.3/0.64	27.0/0.10	1/2000	2.0/0.08	0.5/0.03
	Small Park	2.0/0.10	1.3/0.09	46.0/0.02		—	—
	Pocket Park	—	1.3/0.01	—		—	—
Park Construction Stage	1978–2000	5.3/0.23	12.7/0.60	24/0.01	1/2800	1.3/0.05	1.3/0.18
	2001–2011	9.1/0.59	9.7/0.92	16.3/0.01	1/2300	1.0/0.34	0.4/0.67
	2012–2022	6.1/0.85	3/0.39	34.1/0.06	1/2000	0.7/0.02	—
Total number/Total area		141.0/11.88	146.0/12.86	458.0/0.58	3/9100	18.0/3.30	8.0/6.55
Overall Mean		7.4/0.63	7.7/0.68	24.1/0.03	—	0.9/0.17	0.4/0.34

Note: The data before and after "/" of professional sports venue, multifunctional sports venue, national fitness station, children's PA venue, and amusement area are average number and average area (hm^2), respectively. The data before and after "/" of fitness trail are total number and total length (m).

The total area of children's activity venues was about 10 hm^2, accounting for 3% of the park area with children's activity venues. Children's activity venues can be subdivided into children's PA venues and amusement areas. There were 18 children's PA venues and 8 amusement areas. Fees were charged for access to all amusement areas and only nine children's PA venues were free of charge, with an area of about 0.38 hm^2 and less than 0.1% of the park area. The average number and area of children's PA venues were largest in comprehensive parks, followed by sports parks. All amusement areas were built in comprehensive and special use parks. There were no children's activity venues in residential parks or gardens. Children's PA venues were most common in medium-sized parks, while the number and area of amusement areas were highest in mega parks II and mega parks I, respectively. Children's activity venues were not found in small and pocket parks.

3.4. Comparison of Urban Park Systems between Baoji and Other Cities

According to the aforementioned Statistical Yearbook of Urban Construction 2020, Baoji, the only NEGC in Shaanxi province, had 28 urban parks totaling 920 hm^2, with 10 m^2 park area *per capita* and about 0.3 parks per 10,000 residents. These values were higher than the average for Xi'an and Shaanxi Province (Figure 4). Among 19 NEGCs (i.e., Xuzhou, Suzhou, Kunshan, Shouguang, Zhuhai, Nanning, Hangzhou, Xuchang, Changshu, Zhangjiagang, Nanjing, Taicang, Nantong, Suqian, Zhuji, Xiamen, Dongying, Zhengzhou, and Baoji), Baoji ranked 12th in terms of park area *per capita* and parks per 10,000 residents, both of which were smaller than the overall mean.

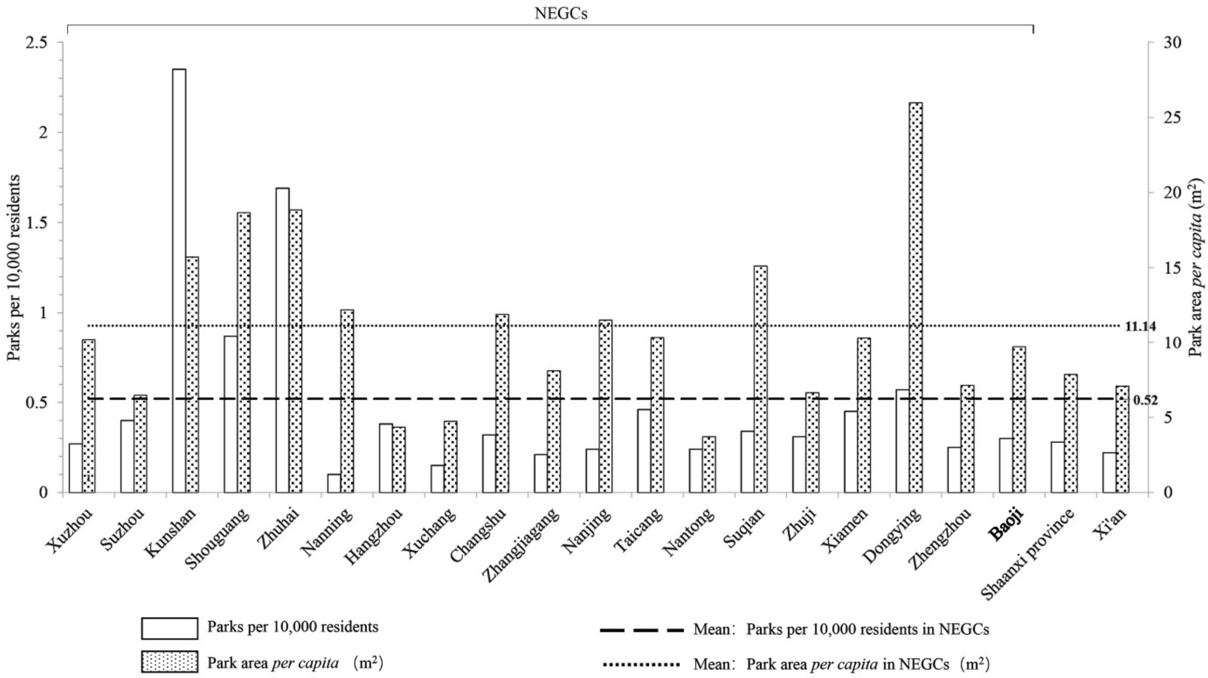

Figure 4. Comparison of urban park systems between Baoji and other NEGCs.

By comparison, by the end of 2020, there were 8.29 parks per 10,000 residents in Tsukuba, Japan, with about 8.04 m^2 park area *per capita* (Figure 5). The top 100 cities in the United States by population size had 3.77 parks per 10,000 residents, and the park area *per capita* was about 130.17 m^2. Minneapolis, which ranked first in the 2020 ParkScore rating results, had 4.29 parks per 10,000 residents and 48.42 m^2 park area *per capita*. Oklahoma, which ranked last, has 2.8 parks per 10,000 residents and 111.91 m^2 park area *per capita*. Except that the park area *per capita* in Tsukuba, Japan was slightly lower, the other data were greatly higher than that in Baoji.

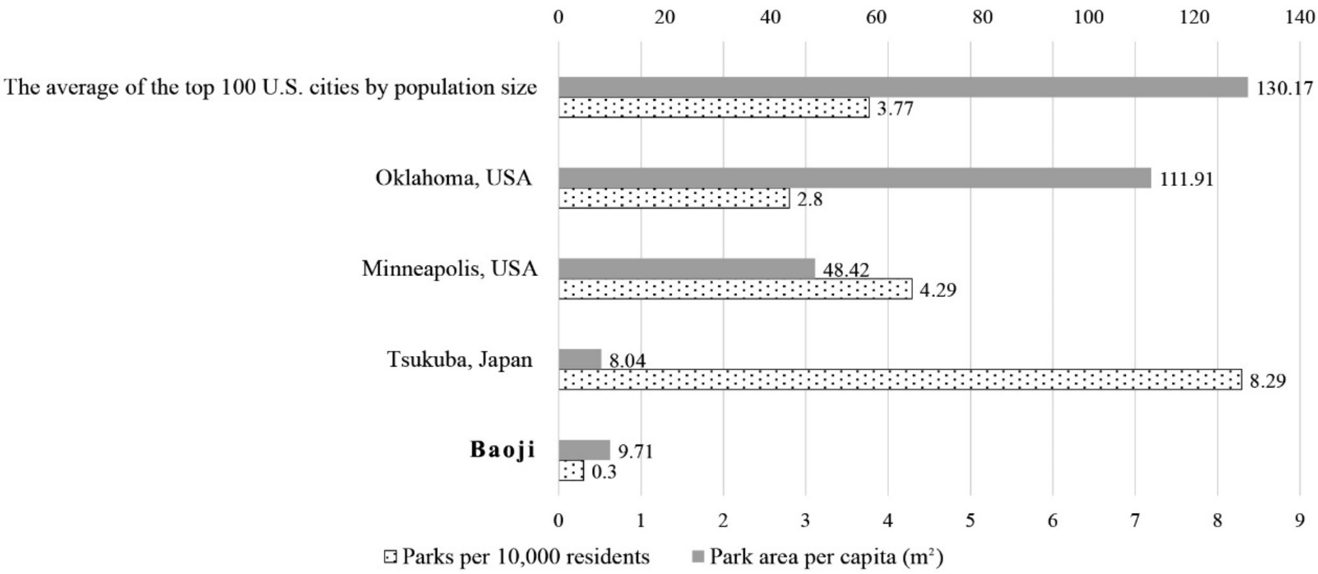

Figure 5. Comparison of urban park systems between Baoji and foreign cities.

3.5. Baoji Urban Park Ranking from the Perspective of National Fitness

Baoji urban park scores and ranking were correlated with park type and the administrative district in which the parks were located (Table 3). Parks in Weibin and Jintai Districts scored higher in all aspects, while parks in Chencang District scored lower. With respect to park type, parks that scored higher than average were comprehensive or sports parks. Comprehensive parks obtained higher scores in all indicators. Sports parks had higher scores for facilities, but lower scores in area and accessibility, resulting in a relatively low ranking. The parks with below-average scores were residential parks, gardens, and other special use parks, with 70% of them scoring below average in accessibility.

Table 3. Baoji urban park scores and ranking.

Rank	Park Name	Administrative District	Area Score	Accessibility Score	Facilities Score	Total
1	Weihe Park	Weibin District	80	100	100	93.3
2	Weihe Ecological Park	Jintai District	80	100	70	83.3
3	Renmin Park	Weibin District	80	100	57.5	79.2
4	Yandiyuan Park	Weibin District	60	80	72.5	70.8
5	Tuanjie Sports Park	Jintai District	80	35	75	63.3
6	Wuhuan Sports Park	Weibin District	50	80	55	61.7
7	Weihe Ecological Sports Park	Weibin District	80	10	90	60.0
8	Shi-ku Garden	Weibin District	70	60	22.5	50.8
9	Botanical Garden	Weibin District	80	15	52.5	49.2
10	Qianweizhihui National Wetland Park	Chencang District	60	55	32.5	49.2
11	Xiaofang Culture Theme Park	Weibin District	20	80	32.5	44.2
12	Zhongcai Culture Theme Park	Jintai District	30	35	67.5	44.2
13	Children's Park	Jintai District	50	15	57.5	40.8
14	Dongjie Residential Fitness Center	Chencang District	40	25	57.5	40.8
15	Panlong Cultural Park	Jintai District	75	10	32.5	39.2
16	Jiezi Park	Jintai District	20	60	32.5	37.5
17	Daijiawan Ecological Culture Park	Jintai District	55	45	10	36.7
18	Changqing Park	Jintai District	15	55	20	30.0
19	Huaiyin Park	Jintai District	10	60	15	28.3
	Mean		54.5	53.7	50.1	52.8

Note: Comprehensive parks include 1 to 4. Special use parks include 5 to 13, 15, and 17 (sports parks refer to 5–7). Park 14 is residential, and gardens include parks 16, 18, and 19.

4. Discussion

We conducted a quantitative evaluation of the Baoji urban park system using RCPS from a national fitness perspective. Three results directly reflected differences among parks through the combined scores of the three primary indicators: park size, accessibility, and fitness facilities. First, park type had a significant impact on differences in evaluation scores. Comprehensive and sports parks occupied the top seven of the overall score, with an average of 81.7 and 61.7, respectively. Second, we found no correlation between evaluation scores and park size, nor between evaluation scores and construction stage. Finally, fitness facilities area in Baoji urban parks was comparatively low and there were large differences among types of fitness facilities.

4.1. Quantitative Evaluation Can Provide a Basis for the Optimization of Urban Park Systems

Comprehensive parks generally had high scores among the three primary indicators. Only Renmin Park scored relatively low in fitness facilities due to the high proportion of scenic hills, water features, and commercial buildings (Ice and Snow World, Haunted House, etc.) in the park, which covered approximately 60% of the park area. Weihe Park (comprehensive) ranked highest in the urban park scoring system, with large park size, good accessibility, and well-established fitness facilities. With a total area of 61 hm^2, the park had various types of fitness facilities covering more than 95% of the actual accessible park area, and many residential and commercial areas were within the 500 m service radius. Newly built sports parks, mostly located in remote suburban regions, were likely to obtain lower scores in accessibility but have higher scores for size and fitness facilities, such as Weihe Ecological Sports Park which was renovated in 2014. Wuhuan Sports Park, which ranked sixth overall and second among sports parks, had good accessibility but its small size (2.25 hm^2) somewhat limited the supply of fitness facilities. The solution to its small size was to construct national fitness stations along the park pathways. Other types, including special use parks (other than sports parks), residential parks, and gardens, had total scores below the overall mean of 52.8. For example, Huaiyin Park (garden), which covered an area of 0.3 hm^2 with good accessibility, had only one multifunctional sports venue and placed at the bottom of ranking. Qianweizhihui National Wetland Park, a special use park, with the second largest park area (127 hm^2) and built to preserve wetlands and maintain an ecological environment, was deficient in fitness facilities and thus had a low fitness facilities score.

Baoji had an average of about 1.85 hm^2 of fitness facilities per park. Professional sports venues and multifunctional sports venues had the largest area among fitness facilities in each park, each accounting for about one-third of the total. National fitness stations were numerous but covered a small area, present in only 16% of parks, making them the least common type of fitness facility. Children's activity venues accounted for about one-quarter of all fitness facilities, with an average of 0.17 and 0.34 hm^2 per park for children's PA venues and amusement areas. The U.S. City Park Facts 2020 data [41] reported that Minneapolis had an average of about 10.43 hm^2 of fitness facilities per park, 4.7× greater than the Baoji urban parks, of which professional sports venues accounted for about 90%. The U.S. urban park classification system recommends areas and lengths for park equipment sites (analogous to the national fitness stations in China) and fitness trails at 0.7 hm^2 and 1.6 km, respectively. Fitness facilities are widely available in various types of urban parks in the U.S., and their allocation is positively correlated with park size and service level [42]. NEGC Baoji is still well behind in comparison.

In China, the Design Code of Public Parks [32] and the Urban Green Space Classification Standard [39], which serve as a normative guide for urban park planning and design, required the installation of fitness facilities in comprehensive and sports parks to meet users' park-based PA. These requirements partially ensure the supply of fitness facilities in these parks. However, this standard did not cover all park types, nor did it specify the quantitative indicators for the supply of fitness facilities. The American urban park classification system takes park size as the main classification standard for calculating requirements and defines the corresponding service radius and quantitative indicators of site and facility allocation [42]. Japan also takes park size as a basis for quantitative allocation and stipulates the service radius and allocation mode of various types of parks through the Urban Park Law. The Urban Park Law also stipulates the corresponding technical standards such as site facilities and building density for various park types [43,44].

4.2. Increase the Supply of Children's Activity Venues in Urban Parks to Meet the Needs of Children's Out-of-School PA

Entry to all amusement areas had a price and only nine children's PA venues were free of charge—less than 0.1% of the park area. In comparison, the ratio of free children's activity venues in Japan is about 13% and in Sweden about 7.2% [45]. In addition to the area of the venues, whether the children's activity venues were available nearby was also an important factor influencing children's participation in PA [46–48]. There are no clear service level standards for children's activity venues in China. The U.S. authority requires all urban park types to be equipped with children's activity venues to meet the children's PA needs within a 400–800 m buffer of parks. In Japan, children's activity venues are provided through the construction of children's parks, which were generally located within a 2–3 min walk of residential areas or schools, with a service area of 250 m [45,49]. In contrast, none of the residential parks and gardens in Baoji had been built with children's activity venues, nor were children's parks or children's activity venues provided in populated areas to effectively meet the children's needs for proximity to use.

The experience of Western developed countries and Japan was to pay attention to the children's PA needs and to make quantitative provisions for the number, area, and service level of children's activity venues in their park classification standards or design codes [42,43,46]. In China, less attention is paid to children's activity venues in parks. The current park design codes only require the supply of children's activity venues in comprehensive parks, without giving quantitative indicators about their number, area, and service level standards [32]. To standardize the planning and design of children's activity venues, the Chinese Society of Landscape Architecture released the Guidelines for the Design of Children's Outdoor Recreation Venues (Draft for Public Comments) (hereinafter referred to as the Guidelines) in 2020 [50]. Although the Guidelines do not give quantitative indicators for children's activity venues, they specified the area of various types of children's activity venues. The Guidelines recommend that children's activity venues should be located in places with convenient pedestrian access or adjacent to educational resources, somewhat ensuring the accessibility of children's activity venues. Nevertheless, there is a lack of quantitative regulations on the service level of children's activity venues. This lack of children's activity venues will have a negative impact on children's PA levels and potentially result in serious health problems for children [51–53]. Increasing the supply of children's activity venues in parks and improving the accessibility of children's activity venues could be an effective way to improve the deteriorating trend of children's health [54,55]. From the perspective of national fitness, urban park planners and designers should pay attention to the construction of children's activity venues to ensure the venues' area and service level.

4.3. Ensure the Supply of Urban Parks and Improve Park Accessibility

Urban park systems can meet the growing demand for national fitness with appropriate optimization and improvement. This study provides two alternatives for the optimization and improvement of the Baoji's urban park system. One is through the construction of an urban park scoring system from the perspective of national fitness (as above), and the other is through a horizontal comparison of Baoji with other NEGCs in China and foreign urban park systems. The comparative results show that the number of parks *per capita* in Baoji is significantly less than the overall mean of NEGCs; only 58% of the overall mean. The park area *per capita* is essentially the same as the overall mean (about 87%). Influenced by the number and area of parks *per capita*, accessibility was also an important dimension of the urban park system. In general, a positive correlation can be found between the *per capita* park number and accessibility. For example, the *per capita* park number in Nanning (0.10 parks per 10,000 people) was lowest among NEGCs, with only 15.13% of the area of its central city within a 1200 m service radius of urban parks [56].

We found a large gap between NEGCs and selected foreign urban park systems. The number of parks *per capita* in Minneapolis, USA was eight times and area more than four times those of the NEGC mean, and the 800 m service radius of its urban parks covers 98% of the urban population [41]. In addition, it is noteworthy that Oklahoma had more than twice the park area *per capita* than Minneapolis, but the park number *per capita* in Oklahoma was only 60% of that in Minneapolis. The accessibility of the 800 m service radius of Oklahoma urban parks is only 38%. The ratio of the number and area of parks *per capita* in Baoji was analogous to that of Oklahoma, i.e., a high *per capita* area but a low *per capita* number, with the accessibility of its park system at 500 and 1000 m being about 34% and 54%, respectively.

To our knowledge, our study was the first quantitative evaluation of urban parks from the perspective of national fitness in mainland China. However, two limitations should be noted. First, the urban park scoring system used in this study weighed evenly the three primary indicators and eight corresponding secondary indicators so that the relative importance of various indicators was not reflected. Second, the perception and preference of park users for built environment also play important roles in park-based PA. For example, the self-reported assessment of park users can be obtained with a questionnaire that can be combined with objective built environment evaluation. Despite these limitations, our study adds to the limited literature on the park-based PA in mainland China and provides a basis for continued investigations into the integration of subjective and objective evaluation.

5. Conclusions

This study completed a quantitative evaluation of urban parks in the NEGC of Baoji based on the RCPS from the perspective of national fitness. The findings are relevant to urban park planners and designers, as well as policymakers concerning optimizing and improving Baoji's urban park system. The key finding is to increase the number of parks, especially the number of parks near residential areas, schools, and other population centers. Building urban parks in newly urbanized areas or peripheral suburbs is also a viable way to increase the number of parks, but as they are located far away from the population center, they will have a limited impact on the overall accessibility of urban parks. Assuming no change in urban park construction investment, priority should be given to ensuring the number of urban parks and avoiding the construction of oversized urban parks. In addition, the optimization and improvement of Baoji's urban park system should also be coordinated with population distribution, land use, and other planning to match the city's sustainable development goals. The attention and investment in park-based PA will eventually provide a return in public health improvement and lower medical expenditure.

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