Research on the Site Selection of Recreation and Sports Industry Development Based on GIS Analysis--Henghe Town as an Example

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Abstract. In the context of population aging and "sub-health" phenomenon, people's demand for health and recreation, leisure and sports environment is getting stronger and stronger. This paper takes Henghe Town, Yangcheng County, Jincheng City, Shanxi Province, as an example, and uses RS and ArcGIS in geographic information technology to analyze the data elevation, slope and slope direction, to analyze the chart of Henghe Town's recreation and sports industry development environment, so as to carry out product planning and environmental site planning under the recreation and sports industry. The aim is to create a national brand of forest recreation and sports and to promote industrial linkage. And it provides reference and reference for other forest recreation and sports industry development based on GIS environment site selection.

1. Foreword
Recreation industry is mainly to develop resources to create a comprehensive service industry of tourism, leisure, convalescence, vacation, recreation, sports, health and pension for the purpose of repairing physical and mental health, adjusting body functions and delaying life aging [1]. The sports industry is an industry that provides various sports materials and services to the whole society, and it is also a collection of the same type of economic activities and the sum of similar economic sectors that provide sports products to the society [2].

GIS has powerful spatial data input, storage, management and analysis functions. With the support of GIS, the management and application of detailed ecological information data provided by remote sensing images can quickly and accurately perform quantitative analysis, simulation calculation and image display of regional ecological conditions, and the organic combination of the two provides a powerful support tool for regional ecological landscape technology research [3].

2. Overview of Henghe Town
Henghe Town is located in the southwest of Yangcheng County, Jincheng City, Shanxi Province, and is a "window" between Yangcheng County and Henan Province, which can effectively solve the high-capacity commuting, tourist vacation and other passenger transportation. In 2020, Henghe Town was formally established as a cycling town - "dynamic (riding habitat) town". The town is mainly to build "the most beautiful mountain cycling route in the north", "the most comprehensive mountain cycling town in the industry", "the first domestic full intelligent management cycling route", and to build a mountain cycling. The "dynamic (riding habitat) town" is featured.
2.1 Recreation industry

2.1.1. Policy Orientation. In recent years, national government agencies at all levels have issued a series of policies to promote the development of forest recreation, providing institutional protection for the steady promotion of sports recreation in Henghe Town.

2.1.2. Forest resources. There are 300,000 mu of forest land in the town, accounting for 90% of the total land area, with 236,000 mu of state-owned forest land and 64,000 mu of collective forest land. The forest coverage area of the town is about 80%. It is suitable for the development of forest recreation and tourism industry. (Figure 1)

2.1.3. Climate conditions. Henghe town is a continental warm temperate monsoon climate, high temperature and rain in summer, cold and dry in winter, four distinct seasons, rain and heat in the same season. Among the climate zones in the county, Henghe belongs to the mild and semi-humid climate zone in low and medium mountains, and the cool, warm and humid climate zone in high and medium mountains. (Figure 2)

As shown in the figure, the average summer temperature in Henghe Town is around 28°, and the climate is cool and humid, which shows that Henghe Town has the climatic conditions and potential to create a summer resort, and is suitable for the development of forest recreation industry. The average annual precipitation is about 700-740mm, and the frost-free period is about 170 days, which is the shortest in the county. It is suitable for the development of winter tourism.
2.1.4. Tourism resources. Henghe Town has unique tourism resources, with many famous mountains and scenic spots, as detailed in the following table.

Table 1 List of tourism resources in Henghe Town

| Main Category               | Subcategory                        | Basic Type                          | Resource Monomer                                                                 |
|-----------------------------|------------------------------------|-------------------------------------|----------------------------------------------------------------------------------|
| A Geomantic Landscape      | Integrated Nature Tourism Sites    | AAA Hill-Type Tourist Sites          | Yunmeng Mountain, Xicheng Mountain, Aobei Mountain, Xiaojian Mountain             |
|                            | AC Geomorphological                | ACE Peculiar and Hieroglyphic        | Shibaluoahen Peaks                                                               |
|                            | Process Traces                     | Rocks                               |                                                                                  |
|                            |                                    | ACM Dune Field                      |                                                                                  |
|                            |                                    | BAA Sightseeing and Recreational     |                                                                                  |
|                            |                                    | BCA Suspended Waterfall             |                                                                                  |
|                            |                                    | BDA Cold Spring                     |                                                                                  |
| B Waterscape               | BA River Segment                   |                                |                                                                                  |
|                            | BC Waterfall                       | Recreational River Segment          |                                                                                  |
|                            | BD Spring                          |                                      |                                                                                  |
| C Biological Landscape     | CD Wildlife Habitat                | CAC Alone Tree                      |                                                                                  |
|                            |                                    | BCA Suspended Waterfall             |                                                                                  |
|                            |                                    | BDA Cold Spring                     |                                                                                  |
|                            |                                    | CDB Terrestrial Animal Habitat      |                                                                                  |
| E Relic Landscape          | EA Prehistoric Human Activity Sites| EAA Human Activity Sites            |                                                                                  |
|                            |                                    |                                    |                                                                                  |
| F Building and Facilities  | FA Comprehensive Humanistic Tourist| FAA Teaching and Research Experimental Sites |                                                                                  |
|                            | FA Cultural Activity Sites         |                                      |                                                                                  |
|                            |                                    | FDA Traditional and Vernacular      |                                                                                  |
|                            |                                    | Architecture                        |                                                                                  |
|                            |                                    | FDD Homes of Famous People and      |                                                                                  |
|                            |                                    | Historical Monuments                |                                                                                  |
| G Tourist Goods            | GA Local Tourism Products          | GAA Cuisine Diet                     |                                                                                  |
|                            |                                    | GAD Chinese Herbs and Products      |                                                                                  |
| H Humanities Activities    | HC Folk Customs                    | HCF Temple Fairs and Folk Gatherings|                                                                                  |
|                            |                                    |                                      |                                                                                  |
| 7 Main Categories          | 13 Subcategories                   | 18 Basic Types                      | 36 Resource Monomers                                                            |
|                            |                                    | Quantity Statistics                 |                                                                                  |

As the table shows, Henghe Town is rich in natural tourism resources, human tourism resources and red culture tourism resources, and tourists can enjoy a variety of different types of natural and humanistic scenery here. Therefore, Henghe Town has the tourism industry to build tourism.

2.2. Sports industry

2.2.1. Policy Orientation. In recent years, the publication of important documents such as "Outline of the Construction of a Strong Sports Country", "Outline of the Health China 2030 Plan", "Outline of the 14th Five-Year Plan and 2035 Visionary Goals for National Economic and Social Development of the People's Republic of China" and other important documents have pointed out the direction for the transformation and development of China's sports industry in the future, and also given a new and greater historical mission to the sports industry [4]. In 2020, Henghe Town was officially established as a cycling town - "dynamic (cycling habitat) town".

2.2.2. Elevation analysis. The elevation analysis of Henghe Town was obtained from the analysis of Arctoolbox tool of GIS software. The topography of Henghe Town is mainly mountainous, with high and low perimeter. The topography is obviously undulating and the mountains are deep. The high point is Yunmeng Mountain in the southwest, with an elevation of 1951.4 meters, and the average
elevation of the town is about 1200-2000 meters.

Mountain outdoor sports refer to outdoor sports related to mountaineering in mountainous areas and hills below 3,500m above sea level. As shown in the figure 3: Based on the mountainous terrain, Henghe Town can develop sports industry and create mountain outdoor sports products such as mountain riding, jungle traversing, orienteering and mountaineering. We will build a "dynamic (riding) town" featuring mountain riding, and plan a mountain riding belt around Zhongtiao Mountain Forest Park, Yunmeng Mountain, Yacheng Mountain, Shengwangping, Xiaojian Mountain and other scenic areas.

![Figure 3 Elevation analysis](image1)

![Figure 4 Slope analysis](image2)

2.2.3. Slope analysis The slope analysis of Henghe Town is derived from the analysis of Arctoolbox tool of GIS software. As shown in the figure 4, the flat slopes of 0°-5° are mainly located in the central Henghe Town and the eastern areas of Pingshang and Hailongdong, which have gentle terrain and are suitable for building sports buildings such as Pingshang Gymnasium for indoor activities; the gentle slopes of 6°-15° are mainly located in the central Qianling area, the northern area of Qiantouzhuang and the eastern area of Hailongdong, which are suitable for building expansion bases for group expansion activities; the slopes of 15°-25° are suitable for jungle exploration and jungle camping, wilderness survival and other programs. The steep slopes of 25°-35° and the sharp slopes of 35°-45° are scattered in the Henghe Town area, which are suitable for creating a cycling belt.

2.2.4. Slope direction analysis and mountain shadow analysis. The slope direction analysis of Henghe Town is obtained by the Arctoolbox tool of GIS software. As shown in the figure, Henghe town has mountains such as Yunmeng Mountain, Yacheng Mountain, Aobei Mountain and Xiaojian Mountain, so Henghe town has windward slopes and sunny slopes, which have good light and airflow conditions and can meet the growth of plants and animals in the territory. It is also possible to use the light from the sunny slopes and shady slopes to meet the shade for outdoor expansion in summer and the light for outdoor activities in winter at the same time. The paragliding training base is planned on the windward slope of Yunmeng Mountain.
3. Coupled development mode of recreation industry and sports industry

Based on the location, traffic and resource conditions, analysis of the elevation and slope direction of Henghe town, consideration of the regional industrial development base and the degree of perfection of basic service facilities, combined with the layout of forest recreation industry development needs, planning Henghe recreation product system, including 6 recreation industry projects, 9 sports industry projects and 4 special projects, forming a project system with various types throughout the town, demonstrating and driving the town's industrial development.

The recreation industry chain mainly includes Madi Forest Recreation Station, Niu Xin Wen Forest Recreation Resort, Xin Cheng Mountain Forest Recreation Base, Forest Healing Center, Doujia Waterfront Forest Recreation Resort, etc.; the sports industry chain mainly includes Riding Sutra Town, Rock Climbing Base, Zhongtiao Mountain Forest Expansion Base, Gymnasium, etc.; and other tourism products combining with the local characteristics of Henghe Town: Paleolithic Culture Museum, Qianfeng Temple History and Culture Museum, Yinhe Culture Exhibition Center, etc. Secondly, the planned products will be connected through a cycling belt to create a national forest recreation and sports brand and promote industrial linkage. (Figure 7)
4. Conclusion
The coupling development of recreation industry and sports industry should be guided by government policies and clear industrial development planning; secondly, the cultural interpretation should be the connotation and build a market-driven mode; thirdly, the application of resources should be the key and build a creative design mode; fourthly, the synergistic development should be the guarantee and build a linkage sharing mode [5]. In this paper, taking Henghe Town in Yangcheng County, Jincheng City, Shanxi Province as an example, we use ArcGIS to conduct data elevation analysis, slope and slope direction analysis, and graphical analysis of forest resources, tourism resources and climate resources in Henghe Town to build it into a high-quality forest recreation and sports tourism resort with characteristics, large scale, obvious economic benefits and high tourist satisfaction. In this way, the trend of the times of coupling development of recreation industry and sports industry is highlighted to promote better development of recreation tourism industry. To achieve the purpose of creating a national forest recreation sports brand and promoting industrial linkage.

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References
[1] Ma Rongchao & Pan Xuefei, Research on the development strategy of forest sports and recreation in Sanming City--based on S W O T analysis. Journal of Wuyi College, 2020. 39(01): pp. 26-31 [In Chinese].
[2] Zhang Yixuan, Zhou Liqing, Xie Zhongjun, Guo Ajun. Exploration of forest recreation resource distribution in Jilin Province based on GIS spatial statistics[J]. Modern Horticulture,2021,44(11):149-152[In Chinese].
[3] Liu Quan. Research on forest park planning based on GIS spatial analysis[D]. Zhongnan University of Forestry Science and Technology, 2020[In Chinese].

[4] Chen Qiao, Research on the development of the integration of leisure sports and recreation industry in Sichuan Province. Contemporary Sports Science and Technology, 2017. 7(17): pp. 220-221[In Chinese].

[5] Research on the evaluation of sports tourism resource endowment and [1] development strategy in Shanxi Province based on RMP-SWOT model.2021.5[In Chinese].