

# Application of Environmental Psychology in the Design of Intelligent Agricultural Garden

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In order to improve the design quality of intelligent agricultural park and meet the needs of tourists, the concept of environmental psychology is applied to the design of sightseeing park. Combined with the basic concept of environmental psychology, this paper analyzes the relationship between environmental psychology and the design of smart agricultural park, so as to determine the behavior needs of the audience. On this basis, the construction type of the garden sightseeing park is determined, and the appropriate construction site is selected according to its construction orientation. Combined with wireless sensor technology, multiple sensors are deployed to design the spatial layout of the smart agricultural park from two aspects of spatial zoning and sightseeing routes, and natural resources, human resources and park facilities are included in the design. Finally, the design results of the smart agricultural park are obtained. The concept of environmental psychology is applied to the practical design of intelligent agricultural park. Through the comparison, it is found that the application of environmental psychology can better meet the viewing needs of tourists, and the comprehensive score is also improved.

**Keywords:** environmental psychology, smart agriculture, agricultural garden, sightseeing Park

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## INTRODUCTION

Wisdom agriculture is the wisdom economy in agriculture, or the specific performance of wisdom economy form in agriculture. Smart agriculture is an important part of the smart economy; for developing countries, smart agriculture is the main part of the smart economy, and is the main way for developing countries to eliminate poverty, realize the advantage of late development, catch up in economic development and realize the catch-up strategy. The Internet of things technology is applied to traditional agriculture, and sensors and software are used to control agricultural production through mobile platform or computer platform, which makes traditional agriculture more "intelligent". In addition to accurate perception, control and

decision-making management, in a broad sense, smart agriculture also includes agricultural e-commerce, food traceability and anti-counterfeiting, agricultural leisure tourism, agricultural information services, etc. Due to the concept of smart agriculture, the smart agricultural garden sightseeing park is derived. The sightseeing park is an entertainment environment with sightseeing as the main project and agricultural production environment as the main place. Tourists can enjoy the crops and natural scenery, and also harvest happiness through practice and experience<sup>1</sup>. Agricultural sightseeing parks are characterized by superior location, powerful production function, beautiful landscape and remarkable comprehensive benefits. At present, almost every large and medium-sized

city is surrounded by a large number of agricultural parks of various types. However, the operation of most of the agricultural sightseeing parks is not optimistic. One of the most important reasons is that many parks have problems in the early stage of project approval and planning, and in the later stage of operation and management. These problems gradually appear in the future construction and operation and management process, and eventually lead to the failure of development projects. Therefore, the theory of environmental psychology is applied to the design of intelligent agricultural garden. Environmental psychology is a field of applied social psychology which studies the relationship between environment and people's psychology and behavior. From the perspective of psychology, it analyzes the interaction and influence between human experience, activities and their social environment, especially the physical environment, and reveals various environmental conditions. Human psychology is the foundation and bridge of the relationship between human and environment. Agricultural landscape sightseeing garden is a subject that studies how to use natural and social factors reasonably to create a beautiful and ecologically balanced human living environment. The agricultural garden and sightseeing garden is to serve people. Therefore, the primary problem in the design of agricultural landscape sightseeing park is to solve the relationship between human and environment, and create a safe, comfortable, pleasant and aesthetic environment from two aspects of human physiology and psychology. If we don't understand the psychological and behavioral characteristics and laws of people in different environments, we can't scientifically and artistically grasp the relationship between various elements in landscape design, and we can't create a space environment that meets people's needs<sup>2</sup>. This paper applies the theory of environmental psychology to the design work, and considers the research problems from the psychological characteristics of people, so as to have a deeper understanding of the relationship between people and the environment and the modern garden

space design.

## DESIGN METHOD OF INTELLIGENT AGRICULTURAL GARDEN SIGHTSEEING PARK

The design of smart Agricultural Garden Tourism Park refers to the planning of coordinating the functional structure, overall layout and business strategy of the project on the basis of certain investigation and research, according to the characteristics, planning basis and social development trend of smart Agricultural Garden Tourism Park, combined with the uniqueness of the park. When planning the park, we should consider the feasibility of the project and the economic, social and environmental benefits, so as to maintain the sustainable development of the park. Therefore, a forward-looking and feasible planning is a necessary condition for the sustainable development of tourism agriculture. The ultimate goal of the design of smart agricultural garden sightseeing park is to improve the comprehensive benefits of the park, put forward the characteristics and diversity of the park, and promote the transformation from traditional agriculture to smart agriculture.

The design of the system mainly follows the following three principles

(1) The idea is to establish a reasonable mathematical model of the temperature field after analyzing the physical model of the greenhouse, sample the temperature value of the corresponding points in the greenhouse, and calculate the expression of the temperature field in the greenhouse by using a feasible and accurate calculation method, so as to obtain the distribution of the temperature in the greenhouse. This requires the design of temperature field modeling method and calculation method;

(2) According to the principle of stability, the greenhouse is a relatively closed environment, and it is also a man-made environment suitable for the growth of plants. The hardware equipment will be affected by environmental factors such as light and moisture. It is necessary to ensure the anti-interference and durability of the hardware

system. The system needs to use the wireless sensor network, and the network is always unobstructed in order to finally collect the ring collected by the sensor. The stability of hardware system and wireless network is the premise of good operation of the system, which puts forward requirements for hardware design and network design;

(3) Cost performance plateau, the construction of agricultural greenhouses are large-scale, the system needs to be used on a large scale, the layout of wireless sensor nodes is also a large number, so the cost is also one of the problems that need to be considered. The investment of the system is lower than the income it brings is the guarantee of the system feasibility. It needs to ensure that the system can complete the function well and reduce the cost as much as possible. In order to reduce the cost, it has higher cost performance, which requires the selection of components.

Therefore, the layout of wireless sensor is the focus of the whole system. There are 660 wireless sensor nodes in the system, which are distributed in the corresponding positions in the greenhouse according to a certain layout scheme. Each node contains a temperature sensor, and six nodes contain humidity, light intensity and carbon dioxide concentration sensors. These six wireless sensor nodes are arranged in the corresponding positions according to the requirements. The wireless sensor node is responsible for collecting the environmental parameter data in the greenhouse and transmitting the data to the data acquisition unit in the corresponding area

(1) Precision agriculture system monitoring. Using wireless sensor technology to collect environmental information of crop growth, such as soil temperature and humidity, soil pH value, CO<sub>2</sub> concentration and light intensity, can provide accurate information for people to monitor the agricultural environment, and help to find more effective methods to improve crop yield.

(2) Intelligent irrigation system monitoring. Intelligent irrigation system monitoring mainly uses intelligent control technology and Internet of

things communication technology to collect information such as soil temperature and humidity, water quantity in root area of soil, air temperature and humidity, wind speed and lighting time. According to the information, reasonable equipment operation control and pump station operation are designed to regulate irrigation water consumption and time, which saves water resources.

(3) Agricultural new energy project monitoring. The photovoltaic power generation system of agricultural intelligent equipment can use optical sensor to measure solar energy intensity, and use other energy to generate complementary power through information analysis. Wireless sensor technology can also be applied to agricultural biogas engineering. In biogas engineering, temperature sensor, pH value monitoring sensor, redox potential monitoring sensor and flow sensor are used for remote monitoring, control and diagnosis of biogas engineering, which can better monitor equipment, reduce safety hazards in biogas engineering management, and play an important role in improving the quality of biogas production<sup>2</sup>.

(4) Agricultural UAV plant protection. In the agricultural environment monitoring system, the UAV GPS navigation is used to analyze the environmental information, collect the geographical location of sensor nodes, optimize the route, and obtain the information of sensor nodes through the shortest path, so as to reduce the energy consumption. The plant protection UAV can also be equipped with imaging transmission equipment to collect the diseases and insect pests, seedling and soil moisture of crops in the field in real time through remote sensing, image processing and other technologies, accurately analyze the diseases and insect pests and growth of crops in the farmland, and implement precision pesticide and chemical fertilizer spraying, so as to reduce the agricultural cost to the greatest extent.

(5) Animal husbandry monitoring. Wireless sensor network technology is also well applied in aquaculture intelligent monitoring system, which can obtain real-time and effective farm

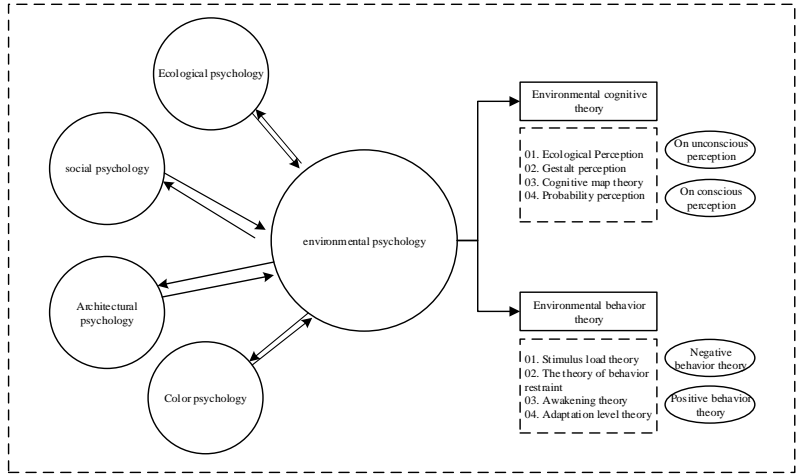
environmental information. It can also use WSN technology or radio frequency identification to monitor livestock in the farm, realize real-time monitoring of livestock, realize centralized data management and alarm and other functions.

Analyzing the Influence of Environmental

Psychology on the Intelligent Agricultural Garden

Combined with the definition of environmental psychology, the corresponding theoretical system can be obtained, as shown in Figure 1.

Figure 1.  
Frame diagram of theoretical system of environmental psychology



The core of environmental psychology is to study the interaction between environment and human psychology from the objective aspect (environment) and subjective aspect (Human Psychology). From the origin and development of the theory in the last century to now, the research content of environmental psychology has been continuously enriched and added, mainly including the following two dimensions: action and reaction. The former "environment" includes three levels: the specific reality of malignant environment, the environment in which human beings live and work, and the environment under interaction. The first is the research on the physical and psychological effects of crowding, noise and air pollution; the second is the research on the impact of environmental factors in architecture, landscape and urban planning on people's work and quality of life; the third is the research on the interaction between environment and people's behavior, involving environmental pressure, stress response, environmental load, etc. It is the influence of the objective environment on the subject person, and the latter is the influence of the subject person's behavior on the objective

environment<sup>3</sup>. In the process of interaction between human and environment, on the one hand, human can change the environment; on the other hand, human behavior and experience are also changed by the environment. In the study of human's reaction on the environment, it mainly contains the dual connotation of ecological environmental protection and social development. Firstly, it involves the environmental behavior and the impact of human behavior on the surrounding environment and ecosystem in the research of environmental protection psychology; secondly, it is the research of environmental psychology and the sustainable development of nature and society.

In the study of environmental psychological relationship, people in the subjective aspect not only have unconscious perception and conscious perception, but also have the corresponding environmental behavior caused by thinking after perception. "Environmental perception" only stays in the visual and psychological level, while "environmental behavior" is promoted to the level of human behavior experience. A lot of information in the environment can cause people

to react to the environment. Human reactions are divided into physiological reactions, behavioral reactions and emotional reactions. According to the reaction results after experience, it can be divided into negative behavior theory and positive behavior theory. Among them, stimulation load theory and behavior constraint theory belong to negative behavior theory; arousal theory and adaptation level theory belong to positive behavior theory<sup>[4]</sup>. Based on the above theory, we can get the influence of environmental psychology on the design of agricultural landscape sightseeing park, which mainly reflects the layout, color, pavement and other aspects. Under the guidance of environmental psychology, it is necessary to clarify the relationship between environmental psychology and agricultural landscape color. Through the excavation of the space carrier of the color of agricultural garden and the psychological and behavioral needs of urban people, it is found that the relationship between environmental psychology and the color of agricultural garden and sightseeing garden can be summarized into five levels, including the overall tone of beauty and sightseeing garden color, the spatial experience of perceptibility and sightseeing garden color, and the spatial relationship between identifiability and sightseeing garden color. Inter positioning, identifiability and the field identification of the color of agricultural landscape sightseeing garden, imageability and the spiritual attribution of the color of agricultural landscape sightseeing garden<sup>5</sup>. On the basis of meeting the basic needs, the colors of agricultural garden and sightseeing garden should meet the regional culture and the sense of belonging of the community, so that the city has a unique image. This kind of imaginability has the generation process and characteristics from bottom to top. It is not a form label imposed on the park by an individual, but a city symbol color recognized by the local people growing up from the matrix of the regional color of the park. If these colors are properly applied to the outer space of the park, they can well symbolize the unique spiritual temperament of the park and convey the inner culture of the

park. In addition, the texture, configuration and boundary of the pavement in the sightseeing park will have different psychological effects.

### Analysis of the Psychological and Behavioral Needs of the Audience

According to the basic theory of environmental psychology, this paper aims to understand the behavior and psychological law of people in the environment of the sightseeing park, explore the rationality and scientificity of the space design of the sightseeing park, and fundamentally embody the guiding ideology of "people-oriented" design. Combined with the theory of environmental psychology, determine the psychological and behavioral needs of the audience<sup>6</sup>. Sense of security is the most basic physiological needs of human beings, and the primary consideration of urban people in the process of activities is security. Based on this premise, we can improve the utilization rate of space, and further increase people's desire for possession and control of the space. In the sightseeing park, there are five factors that directly or indirectly affect people's physiological needs: shape, volume, light, material and color. For example, the design of white zebra crossing and brick red blind road in urban street landscape can meet the physiological needs of people in pursuit of stability and safety in color and texture. After meeting the basic security needs, the demand of the crowd rises to the satisfaction of visual comfort. From the two aspects of people's visual viewing habits and psychological feelings aroused by color, color can make people have two different visual feelings: positive and negative. In addition to the color collocation of the object itself, color collocation also includes the collocation of color and background environment<sup>7</sup>. The significance of domain theory to environmental landscape design is to help establish a design that can reduce conflicts, enhance control, and improve the sense of order and security. The ultimate goal of landscape color is to meet the needs of environmental cognition and identification in the field of space in environmental psychology. In addition to the

individual needs of physiology, psychology and behavior, their needs for the sightseeing park are also reflected in the collective needs for the environment, that is, to meet the expectation, desire and identity of community belonging and regional culture. On the one hand, the color of the sightseeing park shows the historical development of the city, on the other hand, it also shows the local cultural image and implication<sup>8</sup>. The spiritual pursuit of meeting the sense of place belonging is mainly reflected in three aspects, namely, the color of geographical culture, the

color of historical context and the color of sightseeing park. The color of sightseeing park is an expression of city memory and city spirit.

Determine the Type of Smart Agricultural Garden Sightseeing Park

The basic types of smart agricultural garden include production type, leisure type, science and technology type and ornamental type. The characteristics of different types of sightseeing garden are shown in Table 1.

Table 1.  
Types of smart agricultural garden

Type and name of Sightseeing Park	Explain	Function
Production oriented Sightseeing Park	Taking advantage of suburban resources, taking the market as the guide, agricultural production as the support, large-scale production as the purpose and sightseeing as the supplement	Show the production of agricultural products and handicrafts with local characteristics and their processing and manufacturing process, and even part of the labor process, so that tourists can personally participate in and experience
Leisure tourism park	We should make use of the natural ecological and environmental resources in the suburbs, combine the production of agriculture, forestry, fishery and animal husbandry, rural culture and rural life	For people to relax, rest and entertainment, participate in farming, experience farm life
Science and technology tourism park	Through the corresponding production process and management control technology, we can cultivate agricultural products with high scientific and technological content, and use high and new technology to carry out different forms of finishing and deep processing of agricultural products	Agricultural technology development and demonstration promotion, experience the contribution of science and technology to agricultural development
Sightseeing Park	With beautiful agriculture, forestry, fishery and animal husbandry landscape, distinctive humanistic ecological landscape and simple folk customs	Constitute a strong characteristic, beautiful landscape tourism leisure agricultural tourism base

Site Selection of Smart Agricultural Garden Sightseeing Park

The basic requirements for the site selection of smart agricultural garden sightseeing park include: conforming to the nature and scale determined in the land planning, regional planning, urban green space system planning and modern agricultural planning, selecting suburban areas with convenient transportation and smooth flow of people and logistics, and making the park close to the main roads in the suburb as far as possible, It is beneficial to the transportation of agricultural products; it is suitable for the construction and agricultural production of the scenic agricultural

park in the flat land where the terrain changes little<sup>9</sup>. If the park has to be built in a place with complex terrain, it should be transformed according to local conditions, which is conducive to enriching the landscape planning requirements of the park; it can choose the area around the scenic area with good natural scenery and rich vegetation, and it can also be transformed on the basis of farms, woodlands or nurseries; it should select the park site according to the economic and technological level of the region, and plan the corresponding park, Different level conditions lead to different types of parks, and land should be planned to reserve suitable development

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 reserve <sup>10</sup>. The development mode of agricultural conditions is shown in Table 2.  
 sightseeing park under various geographical

Table 2.  
 Development mode of Agricultural Sightseeing Park

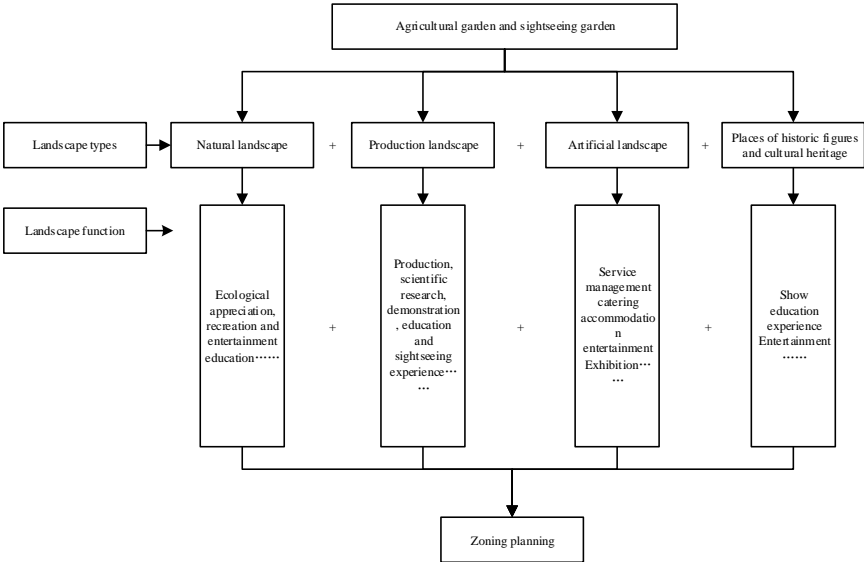
Geographical conditions	Main types of development	Development content	Development projects
Flat terrain, high level of agricultural development	Production oriented Sightseeing Park	Agricultural Comprehensive Park, fruit and vegetable, flower production base, horticultural field, etc	Vegetable production and processing, fruit production and processing, flower production and processing, agricultural characteristic products production and processing
There are many changes in land type, undulating mountains and beautiful natural landscape	Leisure tourism park	Rural sightseeing, agricultural park, etc	Rare animals and plants viewing, human landscape package viewing forest, rare aquatic products viewing Museum, fabricated technology viewing, etc
There are lakes, water bodies, forests and other natural resources, with distinctive rural characteristics	Science and technology tourism park	Leisure fishing ranch, agricultural amusement park, rural life experience Park, etc	Fishing, hunting, rural folk customs et al
High level of agricultural development, good infrastructure	Sightseeing Park	High efficiency agricultural park, agricultural science and technology sightseeing park, etc	High tech agricultural production and processing, modern agricultural production exhibition, etc

### Spatial Layout of Smart Agricultural Garden and Sightseeing Garden

The planning of the spatial layout of the smart agricultural garden sightseeing park is divided into spatial zoning, sightseeing route planning and other parts <sup>11</sup>. The zoning planning of eco agricultural sightseeing park should be based on

the full analysis of the current situation, the integration and utilization of all kinds of resources in the site, the reasonable development of landscape functions of all kinds of resources, and meeting the needs of production and sightseeing, as shown in Figure 2.

Figure 2.  
 Landscape types and functions of Agricultural Sightseeing Park



As can be seen from Figure 2, each type of landscape has a variety of landscape functions, and there is a certain intersection between them.

The same landscape type will produce different activity types, while the same activity type will contain different landscape types <sup>12</sup>. There is no

fixed and unified classification mode for the division of eco agricultural sightseeing park. Different parks have different division types due to different development orientation and resource types. However, in terms of its essence, the division of eco agricultural sightseeing park follows the characteristics of sightseeing agriculture, and there are four main types, including landscape appreciation, production demonstration, leisure and entertainment, and service management. Each type contains more sub categories.

Tour route refers to a route with certain geographical space, following certain principles, specially designed for tourists' sightseeing activities, and reasonably running through a number of tourist attractions with road system<sup>13</sup>. It is an important link to connect tourists and tourism objects, tourist source and destination. According to the psychological experience of tourists travelling in motor vehicles and walking, it is better for the park's landmarks to appear thousands of meters away from it. Every 300m to 500m, there should be a large morphological rhythm change to form a gradual rhythm. Within 500m from the sightseeing park is the most critical and delicate part of the journey before entering the park. You can use the mutational aesthetic composition rule to leave a deep and yearning impression on visitors. The internal garden road is the skeleton and vein of the park, the link between various scenic spots, and also an important factor in the formation of scenic spots in the park<sup>14</sup>. The characteristic of the cold area eco-tourism agricultural garden road is that the shape, color and texture of the route should be coordinated and integrated with the surrounding countryside and natural landscape. In addition, the planning of tour route intersection is an important part of garden road construction. From the comparison between the planned garden road system and the natural garden road system, the natural garden road system is mainly composed of three forks, while in the planned garden road system, there are more Shi'an intersections. However, in order to strengthen the tourism, there should be less crossroads and more three

forks. When roads intersect, in addition to the mountainous Zhipo terrain, the normal intersection mode is generally used as far as possible<sup>15</sup>. If the angle of oblique intersection is acute, the angle shall not be less than 60° as far as possible to facilitate vehicle turning.

### Design of Elements of Sightseeing Park

The landscape composition of sightseeing agricultural park can be divided into natural resource landscape, human resource landscape, agricultural resource landscape and facility landscape. Natural resources, such as topography, mountain forests and water bodies; human resources, such as local culture and folk houses; agricultural resources, such as rice, wheat, fruit forests, vegetable fields, agricultural technology and agricultural activities; park facilities, including production facilities and tourist service facilities, production facilities, such as irrigation canals, reservoirs, horse drinking pools, wells, agricultural science and technology facilities; tourist service facilities, such as Road signs, benches, retaining walls, hand basins, roads, squares, entrance gates, landscape architecture, flower racks, etc.

### Landscape design of natural resources

The low-lying area with rich vegetation is designed as a Wetland Wild natural habitat to show visitors the community evolution of natural organisms and the interdependent survival relationship between various organisms in the ecosystem. The steep terrain is treated as a platform landscape, which becomes the background landscape of the park. At the same time, it gives visitors a kind of psychological safety hint, so that when visitors visit the park, they will take the platform background as the reference point of their position and will not lose their way<sup>16</sup>. In order to add vitality and tension to the landscape of the whole park, it is necessary to shape the varied terrain artificially, such as creating waves, pyramids or ups and downs. For the flat terrain area, the use of crops, fruit forest, vegetable land, vegetation and other elements to divide the space, create a different size, flexible

space for visitors to play and rest. The rich original natural vegetation in the park, such as mixed forest, mixed forest, shrubs and weeds, will be displayed to visitors, so that visitors can experience the wild and disordered nature, and let them completely release their nature and all kinds of pressure in the park. You can also design the destroyed mountain forests, such as burned, felled forests or dead ancient trees, into a desolate landscape, which can shock the hearts of tourists, make them feel the harm caused by human beings to nature, and play an educational role in protecting the natural landscape<sup>17</sup>. The main forms of waterscape in agricultural sightseeing park are streams and ponds. Stream water is mainly used for leisure and sightseeing. It is a dynamic waterscape. Because it winds through the park in a natural curve, some stones are randomly placed and wild flowers and plants are planted in the water landscape design to create a kind of Huaxi landscape with strong local implication.

### **Landscape design of human resources**

As the tourism theme of the park, agricultural resource landscape is the most important characteristic landscape element different from other parks. The life of the development of sightseeing agricultural park lies in its characteristics. The more characteristic the agricultural landscape is, the stronger its attraction and development potential will be. Therefore, the landscape treatment of sightseeing agricultural park should be different from ordinary orchards, farmland, fish ponds, pastures and other landscapes as far as possible<sup>18</sup>. The landscape of sightseeing agricultural park will deviate from the theme of the park if it leaves agriculture or takes agriculture as the ornament of the scenic spot and carries out the construction of cultural facilities, so the focus of the park landscape treatment is to make the agricultural landscape more ornamental and artistic, with its own unique charm.

### **Landscape design of park facilities**

Scenic forest is a kind of forest landscape with aesthetic appreciation as its main function. The

planning of scenic forest should focus on ornamental trees. Try to make the forest neat, beautiful, and colorful, which can arouse people's interest in sightseeing. But also through the development of artificial art, people are willing to form a recreational space environment<sup>19</sup>. The plants are scattered and combined to form a green sea scene with excellent ornamental effect. Due to the different functions of each division, tree species with various colors, seasonal changes and rich levels are usually arranged according to the theme and cultural atmosphere of each park, forming a natural effect of different height and orderly front and back, integrating with the surrounding natural landscape, so as to improve the winter depressed landscape of ecological light agriculture park in cold region. Outdoor plants should fully cooperate with landscape architecture, such as porch and roof. The natural curve line is suitable for the linear landscape such as the outer contour of the scenic spot space, roads, farmland, water shoreline, etc., which is integrated with the rich natural elements such as terrain transformation, plant landscape skyline, etc., to show the unique charm of nature.

According to the idea of landscape planning and design, starting from the use function of the garden, according to the topography, landform, functional area and the distribution of scenic spots of the ecological garden, and combined with the needs of garden management activities, comprehensive consideration, unified planning. The layout of the garden road will not affect the operating environment of the agricultural ecosystem in the garden, nor the harmony and beauty of the scenic spots in the garden<sup>20,21</sup>. The garden road layout mainly adopts the natural garden layout, which makes the landscape in the ecological garden beautify the nature but not solemn, and highlights the characteristics of the combination of agriculture and nature in the ecological garden.

In addition, the lighting equipment in the sightseeing park is mainly divided into functional lighting and landscape lighting. The first level lighting refers to the lamps set to meet the most basic lighting needs of tourists, including the

street lamps on the garden road and the high pole lamps in the main square and under forest space; the second level lighting refers to the lamps set to make the park landscape have a good landscape effect at night, including embedded wall lamps, low wall lamps Column lamp, buried lamp, underwater floodlight, green floodlight and so on, in order to solve the problem of insufficient lighting in the park at night.

## APPLICATION CASE ANALYSIS

In order to test the application effect of environmental psychology in the design of intelligent agricultural landscape sightseeing park, a certain intelligent agricultural landscape sightseeing park is selected as the research sample for analysis, and the evaluation results of Zhihui agricultural landscape sightseeing park before and after the application of environmental psychology are compared from two aspects of landscape evaluation and tourist satisfaction.

The most basic data communication experiment is carried out. By adjusting and setting the communication distance, obstacles and other factors that affect the communication quality, the final result is that the distance interval is within 42 meters, so that it can maintain good penetration, and the communication is always stable, and its speed can be maintained at 100 Kbps. Therefore, considering the physical model size of the greenhouse and the communication quality of cc1101, the crop growing area in the greenhouse is evenly divided into three areas of the same volume, namely area 1, area 2 and area 3. Several wireless sensor nodes are reasonably arranged in each area, and a data acquisition unit (cluster head node) is set at the top of the greenhouse directly above the center of the area, It is responsible for collecting the data collected by all wireless sensor nodes in the area to ensure that the distance between each wireless sensor node and the data acquisition unit is less than 42 meters. In the wireless sensor network of each area, the network topology of star structure is adopted, that is, the wireless sensor nodes do not communicate with each other, and each wireless sensor node can only communicate with the data

acquisition unit Data transmission. Because the location of the data acquisition unit is not easy to replace the battery, and the amount of data received each time is large, resulting in high power consumption, the wired power supply mode is adopted. Considering that the wired communication is easier to realize and relatively more stable, a RS485 bus is designed between the control unit (base station) and the data acquisition unit, and the three data acquisition units are connected hand in hand through RS485 communication The control unit is the main device, and the data acquisition unit is the slave device, which is connected to RS485 bus.

## Sample Survey of Smart Agricultural Garden Sightseeing Park

The intelligent agricultural garden Sightseeing Park 21 km away from the urban area is selected as the research sample. The terrain in the park is low mountains and hills, high in North and South and low in the middle. The climate is temperate continental monsoon climate with local microclimate. The total area is about 3.3 million square meters. The construction area of the first phase core area is 330000 square meters, and the construction area of the second phase demonstration area is 650000 square meters. The current situation mainly for agricultural land, including a large area of economic crops and cultivation of northern medicinal crops. Under the guidance of the strategy of ecological development and tourism development, we should strengthen the protection of tourism resources represented by the ecological agricultural sightseeing park, vigorously develop the ecological tourism, carry out the cultural theme activities of ecological tourism, and meticulously create the characteristic landscape of the ecological agricultural sightseeing park, so as to integrate the landscape of the scenic spot with the river, water and forest in the natural environment, so that the whole park has man-made in nature and man-made in sight Nature is not only derived from nature, but also higher than nature. It is gradually built into a distinctive ecological sightseeing agricultural park

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with strong ecological flavor, high scientific and technological content, good cultural connotation and full of vitality. The overall structure of the

selected research samples at this stage is shown in Figure 3.

Figure 3.

Study on the overall structure of agricultural landscape sightseeing park

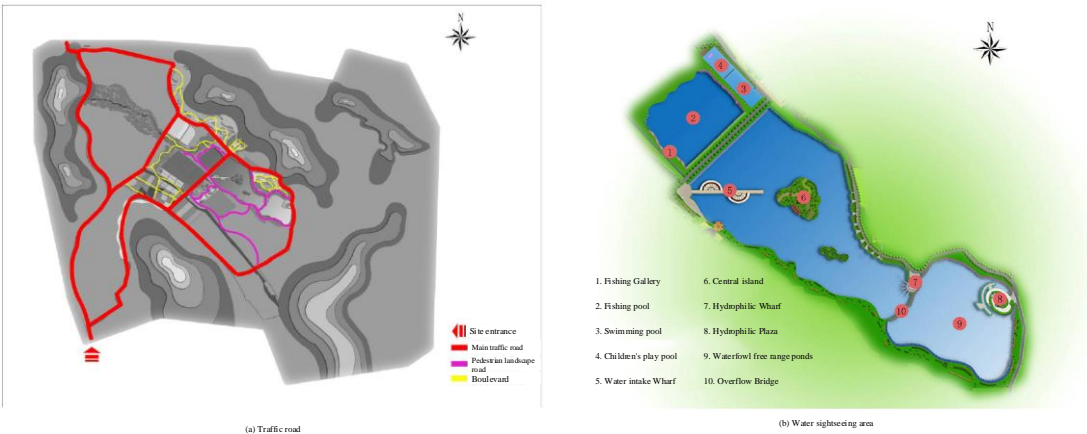


Sample Design Results of Smart Agricultural Landscape Garden

On the basis of the current sightseeing garden, combined with the concept of environmental psychology, the agricultural garden sightseeing garden is designed, and the final design results are obtained. The design results of roads and water sightseeing areas in the sample park are shown in Figure 4.

Figure 4.

Schematic diagram of design results of intelligent agricultural garden



Selection of Evaluation Methods

Through consulting a large number of literatures about agricultural sightseeing park and rural landscape evaluation, and conducting field investigation of Agricultural Sightseeing Park, we

can understand the current situation of agricultural sightseeing park. On this basis, the evaluation index system of agricultural sightseeing park is preliminarily established, as shown in Table 3.

Table 3.

Evaluation index system of Agricultural Sightseeing Park

Criterion layer	Sub criteria layer	Index layer
Rural landscape resources	Natural landscape	Beauty ,vernacular ,richness, cleanliness, ecology
	Agricultural landscape	Ornamental , efficient, holistic, natural
	Artificial landscape	Functionality, coordination , rationality
	Places of historic figures and cultural heritage	Characteristics, cultural attraction, artistic value, participation
Social effects	Production status	Seasonality, popularity, park benefits
	Location	Location, accessibility

According to the evaluation indexes in Table 3, the quantitative scoring results are as follows:

$$A = \sum_{i=1}^n s_i \times w_i \quad (1)$$

In the formula: A is the comprehensive score of landscape quality,  $s_i$  is the fuzzy score of an evaluation factor,  $w_i$  is the weight value of an evaluation factor, n is the number of evaluation factors, the weight value and average value of each evaluation factor are brought into the above mathematical model, and the final weighted comprehensive evaluation value is obtained. The evaluation is generally five levels: Grade I is very good, 100-90 points, Grade II is good 90-80, grade III is general 80-60, grade IV is poor 60-40, grade V is very poor below 40.In addition to the quantitative scoring results, tourists' satisfaction with the park reflects the important factors of the

quality of the park. After visiting the park, tourists score the park's satisfaction, which is divided into four levels: very satisfied, satisfied, general and dissatisfied. Statistics of passenger flow in a day, and calculate the percentage of tourists corresponding to different satisfaction levels.

Application Effect Analysis

The application effect of environmental psychology in the design of intelligent agricultural garden and sightseeing garden is obtained from two aspects of quantitative score and tourist satisfaction, as shown in Table 4.

Table 4.

Statistical tables of Applied Effects

Functional zoning	Intelligent agricultural garden without applying environmental psychology					Application of environmental psychology in intelligent agricultural garden				
	Comprehensive score/point	Number of tourists expressing "very satisfied"/person	Number of "satisfied" tourists / person	Average number of tourists / person	Number of "dissatisfied" tourists / person	Comprehensive score/point	Number of tourists expressing "very satisfied"/point	Number of "satisfied" tourists / person	Average number of tourists / person	Number of "dissatisfied" tourists / person
Reception service area	84	29124	2352	2588	461	93	30256	3607	574	88
Places for sightseeing	87	29413	2031	2939	142	97	31625	2250	558	92
Leisure Area	89	29323	2574	2473	155	96	33204	1240	65	16
Agricultural products	82	29156	2285	2524	560	94	31256	2902	267	100

The daily passenger flow of the park on the test day is 34525, so it can be seen from table 4 that the average comprehensive score of the intelligent agricultural garden before and after the application of environmental psychology is 85.4 and 95.6 respectively. After the application of environmental psychology, the very satisfaction of tourists in the park has increased by 7.1%, and the dissatisfaction of tourists has decreased by 0.58%.

## CONCLUSION

The design of modern intelligent agricultural garden and sightseeing park should actively explore the application of environmental psychology in the design of sightseeing area, so as to design a safe, practical and pleasant sightseeing environment that takes public and private into consideration, so as to meet the various needs of users and truly embody the humanistic design concept.

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