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# Optimal Design of Earth Landscape Colors Based on Beautiful Countryside

Wei HUANG<sup>1</sup>, Hui LIN<sup>2\*</sup>

1. College of Fine Arts, Jiangxi Normal University, Nanchang 330022, China; 2. College of City Construction, Jiangxi Normal University, Nanchang 330032, China

**Abstract** Through the analysis on the earth landscape colors in the beautiful countryside, this paper stated that the color is the most sensitive element when people touch the countryside. The quality of landscape color directly influences the people's mood when appreciating the beautiful countryside. Taking respecting natural environment, extending the historical context, and conforming to aesthetic taste as the precondition, this paper made optimal design of earth landscape colors in beautiful countryside using the hue unifying method, color contrast method, and color rhyme balancing method.

**Key words** Beautiful countryside, Earth landscape, Color optimization

## 1 Introduction

The significance of color to people's life is self-evident. Especially in the transition period from new rural areas to beautiful countryside, people are eager to improve living standards and the village appearance, and lots of old villages need transformation, and new villages are to be built. The earth landscape color, as the most characteristic element in the construction of beautiful countryside, belongs to the scope of study in the process of planning and design of countryside landscape. Countryside color, as an essential part of the environmental quality of rural residents, accumulates the countryside history and is closely connected with the geographical environment and traditional ethnic customs<sup>[1]</sup>.

## 2 Current situations of landscape color of beautiful countryside

**2.1 Countryside landscape color lacking individuality** In the planning and construction of beautiful countryside, some villages blindly imitate styles and colors of developed cities of China or other countries. They take for granted that as long as things are urban, they are beautiful, excellent, and advanced, while countryside things are bad, backward and rustic, so they monotonously apply unified design mode or learn or copy the so-called recognized beautiful landscape, but they lose their own beauty. As a result, many villages have the appearance similar to each other.

**2.2 Unclear regional characteristic of landscape color** The division of landscape color in different functional areas of the countryside is not clear. It lacks the analysis of the relationship between landscape color and the landscape of countryside space. Color changes are simple in commercial districts (small shops, for instance), service areas (such as small medical clinics, schools,

post offices, *etc.*), living areas (such as farmhouses, warehouse, livestock sheds, *etc.*), and recreational areas (grain sunning ground, green space beside houses, and central square, *etc.*). The regional function identification degree is ambiguous, far from expected effect of countryside landscape color, making the earth countryside landscape seem mediocre.

**2.3 Serious visual pollution of color** In the countryside landscape, the main color pollution is "dirty", "chaos", and "bright color". If staying in uncoordinated color environment for a long time, it is easy to generate anxiety, fatigue, and inattention, or even trigger mental illness. Thus, color pollution will affect people's physiological and psychological health.

**2.4 Aesthetic awareness of villagers for countryside landscape color to be improved** Villagers' color aesthetic awareness is weak. They just pile up colors with bright elements or high saturation elements, which seriously damage natural color charm of original countryside landscape, lead to many areas of countryside not matching with environment, and consequently generate color pollutant.

## 3 Concept of earth landscape color

**3.1 Connotation of earth landscape color** Perceived by the vision, color is attached to the concrete entity, but also depends on the abstract light and the existence of the entity. Color is the non-materialization and marginalization of space, and the most changeable dimension of visual representation<sup>[2]</sup>. In the earth, all color elements or combination can be reflected in the human eyes form the comprehensive landscape. From the macroscopic perspective, the earth landscape involves humanities, geography, climate, towns, and villages; from the microscopic perspective, earth landscape can be divided into different landscape color types.

**3.2 Composition of earth landscape color** (i) Natural colors. The colors of things in nature are called natural colors, such as the color of the sky, the color of the water, the color of the plant, the color of the mountain, *etc.* Natural colors change with time, season, and various climatic conditions. (ii) Semi-natural

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\* Corresponding author. E-mail: cxg2006090268@126.com

colors. Semi-natural colors are colors artificially processed without changing the color property of materials, usually manifested as variety of stone, timber and metal colors. Semi-natural colors add artificial elements on the basis of harmony of natural colors, enrich original elements, and enhance sense of hierarchy. (iii) Artificial colors. Artificial colors usually refer to the external colors artificially created. Artificial colors mainly consist of colors of buildings and their structures, colors of road pavement, colors of landscape pieces, colors of bridges, and colors of outdoor sign boards, *etc.* Artificial landscape colors are essential elements of the colors of countryside earth landscape. Using materials, construction skills, and construction forms unique to countryside, it is able to create marks unique to the countryside.

**3.3 Functions of colors in earth landscape** (i) Sense of beauty of colors. As visual language, colors have the primary function of displaying sense of beauty in the earth landscape. Harmonious colors will bring feeling of excitement and enjoyment. (ii) Identification function of colors. How to improve the identification and memory of countryside is an important goal of sustainable development of the countryside. Taking countryside landscape of Wuyuan in Jiangxi Province as an example, yellow of rape flowers, red of maple leaves, and black and white of villages are identified through their own colors, which enhances the identifiability of countryside landscape. (iii) Psychological and physiological functions of colors. Different colors bring people different feelings. Thus, using different color combinations and creating different color space, people may get different psychological perceptions. (iv) Therapeutic function of colors. The presentation of earth landscape is connected with the light and energy. Different colors have different frequencies, generate different perception energy, thus influencing people's physical and mental health<sup>[3]</sup>.

## 4 Principles and methods for optimization of landscape colors

### 4.1 Principles for optimization of earth landscape colors

**4.1.1 Seeking change and unification.** "Change and unification" is the basic principle for the harmony of the earth landscape colors. In rhythm of landscape colors, there should be rhythm changes, and unification in these changes. It is recommended to grasp the color relationship of countryside landscape at both macroscopic and microscopic levels, and avoid isolated or abrupt landscape colors in the overall effect.

**4.1.2 Extending the historical context.** In the historical development process of any village, there will be accumulation of certain colors or color system. It can be said that color of countryside is as long as history of countryside, some is natural environment, and some is customs and culture. Due to these elements, countryside earth landscape colors are different and fully reflect local historical context. Before determining characteristic colors of a region, in-depth survey of local colors is considerably important<sup>[4]</sup>.

**4.1.3 Respecting the natural environment.** From the human perspective, the natural color is most likely to be accepted. The blue

of sky, green of mountain, lush of trees, rich colors of flowers are essential elements of countryside natural landscape colors and also basic elements of countryside colors.

**4.1.4 Conforming to the aesthetic taste.** There is no beauty or ugliness in color itself. The key lies in how to match colors. Different color combination gives us different visual feelings, and harmonious color combination offers us comfortable visual enjoyment and clear impression, so as to raise the level of recognition of countryside. Color and color combination should conform to the principle of color combination, such as unification, balance, and contrast of hue, brightness, and purity; matching of color with environment should respect colors of natural landscape and existing colors of countryside environment. Only following these principles, may the color combination realize harmony and unification between human and countryside.

### 4.2 Methods for optimization of earth landscape colors

**4.2.1 Hue unification method.** (i) Dominant huge unification method. Environmental landscape color is mainly manifested as natural environment in original geographical and climatic condition. In the planning of earth landscape colors, it is required to stress the design principle of "the overall greater than the local". Under certain circumstances, the function of countryside landscape space determines the selection and combination of earth landscape colors. Therefore the dominant hue unification method can make the countryside earth landscape have the continuous, complete, and unified impression. (ii) Assistant color and embellishment color unification method. The countryside earth landscape consists of variety of colors. The function of countryside earth landscape color is varied with countryside landscape functions. Therefore, the design of the earth landscape color should meet requirements of countryside landscape functions. It is recommended to analyze colors of specific scenery of countryside earth landscape and summarize choice of assistant colors and embellishment colors using the color matching method.

**4.2.2 Color contrast method.** (i) Brightness contrast. It is recommended to design the countryside earth landscape colors according to changes in color brightness. In visual range, the brightness that has the largest contrast effect is black and white, and there are various gray colors between black and white. The color difference of brightness is represented in the form of arrangement of brightness axis, to visually understand the combination relationship between brightness of colors. However, such big color gradation is not proper in the design of countryside landscape, it is likely to make countryside earth landscape seem chaotic and unsystematic. The colors with small color gradation make people feel peaceful and coordinated relationship. The contrast is not strong, but there is still significant difference. (ii) Hue contrast. The hue contrast in the countryside earth landscape is one of the most direct ways of changing the color and countryside landscape. In the color combination, the most difficult is hue contrast and harmony. To make the hue contrast more visual, hue rings are used to explain the contrast relationship between hues. It is recommended to

take a color as basic color and define colors with different degrees of color distance, namely, similar color, contrast color, and complementary color, *etc.* Colors with hue ring difference greater than 15 degrees belong to huge difficult to distinguish and such color relationship is likely to generate harmonious effect and make people feel simple and harmonious. However, too similar and coordinated colors bring people with unclear feeling. (ii) Chroma contrast. It is recommended to plan and design countryside earth landscape according to difference in saturation of colors. Changes in chroma are visual effect generated from contrast of two colors with different level of saturation. For example, combination of blue with high saturation and gray blue with low saturation will make people feel active and bright, and it is easy to become the center of vision. The colors with medium chroma give people dignified and pretty visual enjoyment. Colors with low purity seem pure and warm.

**4.2.3 Color rhyme balancing method.** (i) Chroma balance. Chroma balance refers to the coordination between high chroma colors and low chroma colors. In visual perception, chroma balance brings more harmonious visual effect. It is required to pay attention to the chroma relationship. When the proportion of high chroma is too high, it is likely to lead to unclear relationship between primary and secondary colors, and large area of high chroma colors will make the overall effect seem bright and complex. By contrast, when the proportion of high chroma is low, the primary colors may be not prominent, the color structure will be unclear, and it will fail to reach the effect of adding the finishing touch. (ii) Bright balance. It refers to the proportion of depth of overall color brightness of the countryside landscape, so as to reach the coordination of the overall effect. The balance of brightness mainly plays the role of rhyming and precipitation in the design of countryside earth landscape. Rich color changes in countryside earth landscape are mainly manifested in natural colors. When there are many colors with low depth and high purity in the environment, the overall environment remains bright but floating state, it is required to properly increase the color depth and increase colors with low purity, and stabilize the color environment. (iii) Hue balance. It refers to the proportion of colors used in the countryside earth landscape. Countryside always offers people unsophisticated, fresh, simple and elegant visual enjoyment, thus selection of colors for countryside earth landscape should match the environment and style. When too many types of colors are used, the overall environment and style of countryside will change. Riot of colors easily makes the visual effect become complex and gaudy; if too few types of colors are used, the level of hierarchy of countryside earth landscape will become weak, and characteristics of earth landscape become single and mediocre. In sum, it is recommended to make reasonable selection of color types, moderate control of color ratio, and restore countryside natural landscape as far as possible.

## 5 Measures for optimization of earth landscape colors

### 5.1 Keeping natural characteristics and extending historical

**context** As the first impression of beautiful countryside environment, the earth landscape visually reflects levels of countryside landscape. It is recommended to design the earth landscape colors combining environmental characteristics of countryside, attach great importance to extension of traditional history and regional characteristic of colors, and manifest styles and historical atmosphere unique to countryside. Considering local overall environment, combined with local climate, terrain, and landform design, it is recommended to take full advantage of local materials and plants, and protect regional and harmonious environment characteristics and biodiversity.

### 5.2 Building color framework and improving color system

The famous French color scientist Jean Philippe Lenclos stated that different regions have formed unique color system due to geographical environment, climate conditions and cultural human landscape<sup>[5]</sup>. It is recommended to build color framework to control large environment color of earth landscape, make earth landscape colors of beautiful countryside more harmonious, mainly express the conception and idea of earth landscape, and do not directly express individual colors. Beautiful countryside earth landscape colors should reach unified and coordinated countryside landscape environment through reasonable color planning. Through systematically controlling the color coordination of the overall environment and local color embellishment, it is expected to rich and varied beautiful countryside earth landscape colors.

### 5.3 Formulating color rhythm and enriching landscape levels

Through in-depth survey and study, it is recommended to accurately extract colors for historical context of countryside, and formulate unified subject hue. Besides, it is recommended to make proper positioning of various colors, integrate the earth landscape colors into overall functional zone of beautiful countryside. At the same time, it is recommended to verify and complete main hue and form unique countryside landscape colors. Scientific construction of the earth landscape colors can easily grasp the overall color environment of countryside and local color characteristics, and form diversified and coordinated landscape colors, making countryside colors more coordinated. The construction of countryside earth landscape colors satisfies expectation of people for countryside environment on the basis of natural ecology. It is recommended to explain feelings of people using the relationship between man and nature, and make the relationship between new and old earth landscape coordinated and bring into play the coordination function, to reach the optimal effect of satisfying social demands and pleasing, which is an essential part of the quality of living environment of rural residents.

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economy. In the 1990s, under the rapid development of active urbanization, Lanzhou attracted a large number of inflow populations that migrant workers as main parts from surrounding areas. According to the fifth and sixth national population census, the inflow population of the four main districts (Chengguan, Qilihe, Xigu and Anning) of Lanzhou city were 404500 in 2000, and it reached 977000 in 2010, nearly 2.42 times of that in 2000. However, due to a series of institution barriers based on the domiciliary control system, the migrant workers could not obtain various policy houses provided by government, and had to solve their living problem through rescuing in work sheds, buying commercial houses, and renting houses. Due to limitation in technology level and genetic relationship, these migrant workers also had to engage in traditional catering, transportation, construction and other industries, and their income was low and not stable. In addition to failure to obtain housing accumulation funds and its low-interest loan, it is difficult for them to buy commercial houses, and they had to live in urban villages with less rent.

**4.5 Derivation of lagged economic development and unique regional culture** The changes of state-oriented industrial development policy and welfare housing supply system in the transition period were main motives for generation of urban poor people and their settlements. However, different from the eastern cities with developed economy, the derivation of lagged economic development and unique regional culture are also essential factors for the formation of urban poor settlements in Lanzhou. In the economic development, state-owned and collective enterprises have taken up the dominant position of Lanzhou City for a long time, while the private economy has lagged far behind, and so the vitality and adaptability of economic development are weak. Its economy is difficult to adapt to changes in domestic and foreign market in a short period, and also difficult to provide sufficient jobs for numerous laid-off employees and migrant workers, and thus could not bring huge amount of financial revenue and urban construction investment to renovate the declined settlements and urban villages. From the perspective of regional culture, on the one hand, being located in hinterland, Lanzhou has formed relatively closed and conserva-

tive regional culture, which not only restricts urban residents, especially restricts the unemployed groups, who get born here, so would rather grow here and live here, to have their own business and go out for gold rush, but also makes migrant workers have to live together to better adapt to urban life depended on geographical relation, and choose the living model of "you live here, I live here, and he or she lives here". On the other hand, Islamic culture takes up an essential position in multi-ethnic culture of Lanzhou. The Muslim people who believe in Islam have the living tradition of "greatly scattered but little concentrated" and "living around the mosques". Many Muslim people coming from surrounding areas of Lanzhou choose to live together, especially people from the Linxia Hui Autonomous Prefecture. As a result, many multi-ethnic type poor settlements appeared around the mosques, such as Wuxingping, Luotuoxiang, and Yanjiaping in Qilihe District, Shangxujiawan, Fulongping, and Nanzhuanwayao in Chengguan District.

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