

Humanized Design Strategies for Pocket Gardens in Old Communities in Hainan

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Abstract: Old communities in Hainan face challenges like insufficient public spaces and aging facilities. Pocket gardens, as a micro-regeneration practice, can enhance living environments. However, current designs often overlook tropical climates and residents' needs, leading to low utilization. This paper proposes humanized design strategies for pocket gardens, integrating climate adaptability, functional suitability, and community participation. Strategies include creating comfortable microclimates with natural shade and permeable pavements, establishing all-ages-friendly zones, fostering community co-creation, and utilizing low-cost, local materials. These strategies aim to craft usable, sustainable green spaces that foster a sense of belonging, providing practical references for urban regeneration and community governance in Hainan.

Keywords: Humanized design; Pocket gardens; Tropical climate adaptation

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1. Introduction

Old communities in Hainan commonly face practical challenges such as insufficient public space, aging facilities, and inadequate environmental quality. Residents have an increasingly urgent need for safe, comfortable, and participatory micro-public activity spaces. As an important practice pathway for urban micro-regeneration, pocket gardens can effectively activate underutilized corners and negative spaces within communities, significantly enhancing the quality of the living environment and residents' sense of well-being. However, some current practices suffer from issues like design homogeneity, neglect of tropical climate characteristics, and detachment from residents' actual behavior patterns, leading to low space utilization, maintenance difficulties, and even relegation to mere "landscape ornaments." The core of humanized design lies in coordinating climate adaptability, functional suitability, and community participation from a people-centered perspective, transforming space creation into a warm and sustainable community action. Based on Hainan's regional climate characteristics, cultural context, and community realities, this paper systematically proposes design strategies that integrate scientific rigor, practicality, and human warmth, aiming to help create community green micro-spaces that are

“usable, sustainable, and foster a sense of belonging,” providing replicable and scalable practical references for Hainan’s urban regeneration and community governance.

2. Creating a comfortable microclimate environment

2.1. Practical configuration for shade and rain protection

Moving away from the singular form of traditional rigid sunshades, lightweight and translucent natural materials like rattan and bamboo are used to construct curved ecological pergolas ^[1]. These are combined with climbing plants such as ivy, wisteria, and *Pyrostegia venusta* to form natural green corridors, balancing shading effectiveness with air circulation to avoid stuffiness. The ground system employs a double-layered permeable structure, where the surface layer uses permeable bricks or gravel paving, while the sub-layer consists of a gravel bedding and drainage channels, combined with shallow concave ecological drainage ditches, achieving rapid rainwater infiltration and orderly drainage. At entrances, innovatively repurposed coconut coir fiber is woven into sunshade curtains, combining regional characteristics with practical function. The pergola height is scientifically set at 2.2 meters, with adjustable sunshade curtains added at the base. These can be lowered on sunny days to enhance shading and raised during rain to prevent water accumulation. Practical feedback indicates that optimized spaces show no surface water accumulation within 5 minutes after rain, with significant improvement in perceived comfort. Residents’ willingness to linger and frequency of use have increased concurrently, truly realizing an all-weather user experience of “shade for cooling on sunny days, passable during rain.”

2.2. Local wisdom in plant configuration

Strict selection of Hainan native plants that are heat and moisture tolerant, low-maintenance, and low-allergenic: Banyan trees and banana plants provide dense shade and soil stabilization/anti-slip functions; frangipani and areca palms create evergreen landscapes year-round ^[2]. Combined with shade-tolerant herbaceous plants like *Monstera deliciosa* and *Phalaenopsis orchids*, a rich, multi-layered green canopy system with distinct seasonal aspects is constructed. Passage widths are strictly controlled to be above 1.2 meters to ensure safe wheelchair access and daily pedestrian flow. Plant information signs are simultaneously installed, clearly labeling names, ecological characteristics, and cultural meanings (e.g., “Frangipani: Common in Hainan, elegant fragrance, symbolizing purity and renewal”), enhancing residents’ cognitive depth and emotional connection. Measured data shows that ground temperature under banana plant shade is approximately 5°C lower than in exposed areas, effectively improving the local microclimate and encouraging spontaneous gatherings and social interaction among residents. Plant selection emphasizes ecological synergy, where the broad leaves of banana plants promote transpiration cooling, while the aerial roots of banyan trees enhance soil and water conservation, forming a naturally regulated microclimate system that transforms the garden into a “natural air-conditioned zone” for residents’ daily relaxation ^[3].

3. All-ages-friendly functional zoning

3.1. Children’s activity zone

Located in an open south-facing area to ensure ample sunlight and clear sightlines for parents/caregivers. The ground is paved with environmentally friendly soft rubber; equipment uses rounded, non-sharp-edge designs. Repurposed tires are innovatively used to make swings and climbing frames, with low hedges like *Ligustrum vicaryi* naturally enclosing the perimeter to eliminate blind spots. Soft protective mats and parent-child observation

windows are added, allowing caregivers in rest areas to easily monitor children. The use of recycled rubber granules ensures quick drying after rain, a soft texture, and effectively prevents fall injuries. A mother's feedback: "My child can play safely. I can sit nearby reading or chatting without constant vigilance, truly achieving a sense of relaxed co-existence"^[4].

3.2. Senior rest area

Located adjacent to building entrances and north-facing shaded areas to minimize walking distance. Equipped with ergonomic, anti-slip wooden benches (40 cm height, with armrests to aid standing), with appropriate spacing to encourage neighborly interaction. A semi-open gazebo uses translucent, weather-resistant roofing materials, balancing shade and natural light. Small tabletops are installed beside seats for placing teacups, books, etc. The gazebo is equipped with a basic first-aid kit and anti-slip warning signs, enhancing emergency preparedness and safety perception. After relocating the rest area from its original planned location to beside the building entrance, elderly residents expressed heartfelt approval: "No need to walk far. We can sit down, rest, and enjoy the sun right after coming downstairs, feeling much more at ease."

3.3. Youth flexible zone

The central area uses modular permeable paving, supporting temporary activities like square dancing, book clubs, and handicraft markets. Walls are embedded with foldable shelves, storing gardening tools on regular days and unfolding into display stands during events. A 20% "flexible blank zone" is reserved, with movable floor markings indicating functional boundaries to avoid fixed enclosures disrupting spatial permeability. Collaboration with the community establishes a reservation-based public sound system to enrich activity formats. One community holds weekend neighborhood handicraft markets in this zone, with residents organizing and collaborating spontaneously, enhancing both spatial vibrancy and community cohesion. A young resident remarked: "This has become our new weekend social spot, offering both a sense of belonging and novelty."

4. Cultivating endogenous governance momentum through community co-creation

4.1. Whole-process participation in decision-making

Community workshops are organized from the initial planning stage, using intuitive methods like physical sandbox models and mobile app layout simulations to widely solicit opinions. One community incorporated over 300 resident suggestions, moving the rest area next to the building entrance and integrating children's hand-drawn patterns into planter designs, significantly enhancing spatial identification. An elderly resident emotionally stated: "The little sapling I drew is really planted in the garden"^[5]. Every time I pass by, I feel a part of my heart is here." Simultaneously, physical "Bright Ideas" suggestion boxes and online feedback channels are established, ensuring designs continuously align with residents' genuine needs, realizing "design follows public need."

4.2. Normalized interaction and empowerment

Implementing a resident rotational duty system for "Garden Guardian Teams," eliminating dedicated administrators and reducing operational costs. The first weekend of each month is designated for a fixed "Community Garden Day," hosting planting activities, gardening workshops, and seasonal-themed events. A "Shared Tool Corner" provides basic gardening tools. A community WeChat group is established for real-time sharing of updates (e.g., "Frangipani blooming today," "Weekend book club announcement"), fostering a continuous interactive

atmosphere. Partnerships with nearby primary schools launch “Little Eco-Guardian” practical courses, where students regularly conduct plant observation records, both alleviating maintenance pressure and nurturing environmental awareness in the next generation. A resident remarked sincerely: “Before, we thought the garden belonged to the property management. Now it’s our shared home. Coming here daily to look around and water the plants feels very grounding.”

5. Activating local resource circulation with low costs

5.1. Application of localized materials

Extensive use of coconut shell fragments for path surfacing, discarded bamboo poles treated for moisture resistance to make plant trellises, and repurposed plastic bottles transformed into creative planters, highlighting tropical regional characteristics and circular economy principles. Permeable concrete paving reduces costs by approximately 40% compared to traditional stone. Procuring native seedlings from local nurseries saves about 30% in costs^[6]. All materials are clearly labeled with their origins (e.g., “Sourced from community recycling station,” “Resident-donated coconut shells”), reinforcing environmental identity and community pride. Regarding a garden path made of coconut shells, a resident commented: “The texture underfoot is cool and refreshing, carrying the familiar scent of home; it evokes a feeling of warmth and intimacy with each step.”

5.2. Innovative incentive mechanisms

By establishing a “Time Bank”-style incentive model, residents can exchange one hour of maintenance participation for a potted plant; organizing community activities can offset part of the property management fee. Through systematically training 5–10 core residents as “Garden Mentors,” imparting practical skills like pruning and pest/disease control. A monthly “Maintenance Contribution Board” publicly recognizes active participants, stimulating a sense of honor and motivation for continued involvement. After implementation in one community, the rate of spontaneous resident maintenance participation surged from 20% to 80%^[7]. Annual maintenance costs per square meter were precisely controlled at 50 yuan, far below the 200 yuan of traditional models. A resident shared: “Maintaining for two hours a week earns me three potted plants to decorate my balcony. It beautifies the environment and gives a sense of accomplishment, why not?”^[8]

6. Conclusion

The humanized creation of pocket gardens in Hainan’s old communities is an organic integration of climate wisdom, humanistic care, and community governance. Climate-adaptive design lays the foundation for “usability”; all-ages functional zoning realizes the experience of “practicality”; community co-creation mechanisms stimulate the endogenous drive for “willingness to use”; and low-cost strategies ensure the “long-term sustainability” of use. This patch of green not only effectively alleviates the need for relaxation under the tropical climate but also becomes a warm link for neighborhood affection, a vibrant carrier of community culture, and a practical platform for resident self-governance. In the future, it is imperative to deeply integrate the concept of pocket gardens into Hainan’s urban regeneration policy system and community governance framework, promoting the standardization of design strategies, the visualization of toolkits, and the replicability of experience models. Let every tiny space carry the warmth of life and the dignity of community. When residents find shade, interaction, and belonging at familiar street corners, these patches of green truly evolve into community life exemplars of “small space,

great happiness,” infusing Hainan’s Free Trade Port construction with a warm and enduring humanistic essence, allowing green well-being to thrive continuously in the depths of its streets and alleys.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Xie H, Ye M, Qiu H, 2024, Renovation Design of Public Space in Old Communities in Hainan under the Concept of Disaster-Adaptive Resilience. *Footwear Technology and Design*, 4(9): 189–191.
- [2] Wu F, Li D, 2023, Dilemmas and Innovative Pathways for Urban Community Governance in the Hainan Free Trade Port. *Journal of Hainan Tropical Ocean University*, 30(6): 118–127.
- [3] Chen Y, Lai K, 2023, Research on Renovation Demands and Priority Setting for Old Residential Areas: A Case Study of the Renovation of Xiuhai Community and Xiuzhong Community in Haikou, Hainan. *Construction Economy*, 44(5): 91–98.
- [4] Rong Y, 2023, Research on Public Space Design for Tropical Old Communities Oriented Towards Resilience, thesis, Hainan University.
- [5] Song P, 2023, Research on Building Facade Renovation Strategies for Tropical Old Communities under the Guidance of “Resilience”, thesis, Hainan University.
- [6] Wu J, 2023, Research on Lightscape Improvement Design for Tropical Old Communities Based on “Urban Repair”, thesis, Hainan University.
- [7] Cheng W, 2022, Renovation Design of the Old Residential Environment in Jinan Tianqiao East Street Half-Lane Based on Organic Renewal Theory, thesis, Shandong University of Art and Design.
- [8] Zhang H, 2022, Research on Identification and Regeneration Utilization Strategies for Inefficient Spaces in Old Communities, thesis, Beijing University of Civil Engineering and Architecture.

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